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MIXED WASTE LANDFILL ANNUAL LONG-TERM MONITORING & MAINTENANCE REPORT APRIL 2017 – MARCH 2018

SANDIA NATIONAL LABORATORIES, NEW MEXICO LONG-TERM STEWARDSHIP

JUNE 2018





United States Department of Energy Sandia Field Office

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MIXED WASTE LANDFILL ANNUAL LONG-TERM MONITORING & MAINTENANCE REPORT APRIL 2017 – MARCH 2018

- 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 Sandia Field Office Technical Contact: Mr. David Rast, General Engineer U.S. Department of Energy, Sandia Field Office P.O. Box 5400/MS 0184 Albuquerque, NM 87185-5400 (505) 845-5349 David.Rast@nnsa.doe.gov
- Operator: National Technology & Engineering Solutions of Sandia, LLC Technical Contact: Ms. Pamela Puissant, Manager Analytical Services Sandia National Laboratories P.O. Box 5800/MS 1103 Albuquerque, NM 87185-5800 (505) 844-3185 pmpuiss@sandia.gov

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 Title 40, Code of Federal Regulations 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 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 (LTMMP) (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 fifth MWL Annual Long-Term Monitoring & Maintenance Report documents monitoring, inspection, maintenance, and repair activities conducted at the MWL during the April 1, 2017 through March 31, 2018 reporting period.

Sampling activities for this reporting period included two semiannual monitoring events each for groundwater and soil-vapor, and four quarterly monitoring events for radon. Annual soil-moisture monitoring was conducted in April 2017, and annual tritium surface soil sampling and annual biota sampling (metals and radionuclides) were conducted in August 2017. All monitoring activities were conducted in accordance with LTMMP requirements and no monitoring results exceeded LTMMP trigger levels. All monitoring results were consistent with historical MWL monitoring data.

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

The Evapotranspirative (ET) Cover continues to meet successful revegetation criteria and is in excellent condition with even coverage of mature, native perennial grasses. Minor maintenance was performed during the reporting period as a best practice for ET Cover vegetation. 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.

Regulatory activities during the reporting period included submittal of the Mixed Waste Landfill Annual Long-Term Monitoring & Maintenance Report, April 2016-March 2017 (SNL/NM June 2017a) 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 2017 through March 2018 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
CAC	Corrective Action Complete
CY	Calendar Year
DI	deionized water
DOE	U.S. Department of Energy
DOO	data quality objective
FPA	U.S. Environmental Protection Agency
ERFO	Environmental Resources Field Office
FT	
۲ ۵\/	electron volts
	Election volts Elevible Liner Underground Technology Ltd $^{\text{TM}}$
FLUTE	Field Operating Precedure
FUF ft bac	feet below ground surface
GEL	GEL Laboratories LLC
gpm	galions per minute
HVVB	Hazardous Waste Bureau
KAFB	Kirtland Air Force Base
LIMM	Long-Term Monitoring & Maintenance
LIMMP	Long-Term Monitoring and Maintenance Plan
MDA	minimum detectable activity
MDL	method detection limit
mg/L	milligrams per liter
MWL	Mixed Waste Landfill
NMED	New Mexico Environment Department
PCE	tetrachloroethene
pCi/L	picocuries per liter
Permit	RCRA Facility Operating Permit for Sandia National Laboratories,
	EPA ID No. NM5890110518
PID	photoionization detector
PPE	personal protective equipment
ppmv	parts per million by volume
PQL	practical quantitation limit
QC	quality control
RCRA	Resource Conservation and Recovery Act
RL	reporting limit
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SME	subject matter expert
SNL	Sandia National Laboratories
SNI /NM	Sandia National Laboratories, New Mexico
TA	Technical Area
TCF	trichloroethene
VOC	volatile organic compound
v U U	volatile organic compound

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1.0 INTRODUCTION

Sandia National Laboratories, New Mexico (SNL/NM) is a multimission laboratory owned by the U.S. Department of Energy (DOE)/National Nuclear Security Administration. SNL/NM is managed and operated by National Technology and Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International, Inc. 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. From March 1959 to December 1988, the MWL accepted low-level radioactive waste, hazardous waste, and mixed waste from SNL/NM research facilities and off-site DOE and U.S. Department of Defense generators. More specific information regarding the MWL inventory and past disposal practices is presented in the MWL Phase 2 Resource Conservation and Recovery Act (RCRA) Facility Investigation Report (Peace et al. September 2002) and the extensive MWL Administrative Record.

All monitoring, inspection, and maintenance/repair requirements are defined in the MWL Long-Term Monitoring and Maintenance Plan (LTMMP) (SNL/NM March 2012) and have been met for the April 1, 2017 through March 31, 2018 reporting period. This fifth MWL Annual Long-Term Monitoring & Maintenance (LTMM) Report documents all activities and results as required by Section 4.8.1 of the LTMMP. 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 LTMMP 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)
- SNL/NM RCRA Permit
 - Module IV of RCRA Permit No. NM5890110518 (EPA August 1993)
 - Facility Operating Permit EPA ID Number NM5890110518 (NMED January 2015)
- New Mexico Administrative Code (NMAC), Title 20, Chapter 4, Part 1, Section 600 (20.4.1.600 NMAC) incorporating Title 40 of the Code of Federal Regulations (CFR), Part 264.101 (40 CFR 264.101)



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



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

On February 12, 2016, the New Mexico Environment Department (NMED) issued the Final Order *In the Matter of Proposed Permit Modification for Sandia National Laboratories EPA ID No. NM5890110518 to Determine Corrective Action Complete with Controls at the Mixed Waste Landfill,* No. HWB 15-18 (P) (Flynn February 2016). As of March 13, 2016, the February 2016 Final Order became effective, granting the Class 3 Permit Modification to reflect that the MWL is Corrective Action Complete (CAC) with Controls. All controls required for the MWL are defined in the MWL LTMMP 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 (Permit) (Kieling February 2016). Long-term monitoring and maintenance is conducted in accordance with the Permit (NMED January 2015, with all approved modifications).

1.1 Purpose and Scope

The purpose and scope of this Annual LTMM Report is to document monitoring, inspection, maintenance, and repair activities conducted during the April 1, 2017 through March 31, 2018 annual reporting period as required by Section 4.8.1 of the LTMMP.

1.2 Report Organization

This report is organized as follows:

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

Annexes to this report provide supporting information as follows:

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

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2.0 MONITORING AND INSPECTION REQUIREMENTS

Monitoring, inspection, maintenance, and repair requirements are defined in Chapters 3 and 4 of the MWL LTMMP 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 and site conditions.

2.1 Monitoring Requirements

The primary objective of MWL monitoring activities is to ensure that the ET Cover and site conditions are protective of human health and the environment. Monitoring activities include sampling and analysis of air, surface soil, vadose zone, groundwater, and biota. The multimedia 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 LTMMP, 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 MWL inspection, maintenance, and repair activities is to ensure that the ET Cover, other physical controls at the site (e.g., surface-water diversion features and perimeter security fence), and the monitoring systems (groundwater and vadose zone networks) perform as designed.

Inspection parameters, specifications, frequency, and repair requirements are detailed in Chapter 4 of the MWL LTMMP and summarized in Table 2-2. Repair work is initiated, as needed, based upon the results of the inspections and tracked to completion on the respective inspection forms. Long-term monitoring inspection checklists/forms are contained in the MWL LTMMP, 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 the MWL ET Cover, inspections and associated maintenance/repairs.

	Monitoring		Number			
	Parameters ^a /		of		.	
Sampling	Constituents	Monitoring Frequency	Samples	Menitoring Leastions	Monitoring	Commonto
Air	Of Concern	Voor 1 Ouerterly	Per Event	Monitoring Locations	Trock atch datactors	Comments
All	Rauun-222	Year 2 – Quarterly	17	corners and midpoints of	(at breathing zone	weighted average and will
		Year 3 – Semiannual		perimeter fence	height): sampling	be collected over a
		Year 4 – Semiannual		5 detectors placed on	and analysis per	3-month period.
		Year 5 and subsequent years –		completed cover	LTMMP Appendix C	The first quarterly
		Annual		2 detectors at		monitoring period begins
				background locations		in January of each year.
Surface Soil	Tritium	Annual	4	One sample collected	Grab samples of soil	Samples collected from
				from each corner of the	collected; moisture	the MWL ground surface
				MWL ET Cover	extracted and	at the four corners of the
					analyzed for tritium	ET Cover.
					scintillation per	
					I TMMP Appendix G	
Vadose	VOCs in soil	Year 1 – Semiannual	17	Samples collected from 2	Sampling and	MWL-SV01 and MWL-
Zone	vapor	Year 2 – Semiannual		single-port soil-vapor	analysis of soil	SV02 have a sampling
		Year 3 – Semiannual		monitoring points	vapor per LTMMP	port approximately 35 ft
		Year 4 and subsequent years –		installed through the ET	Appendix D	below the original ground
		Annual		Cover (MWL-SV01 and		surface. MWL-SV03,
				MWL-SV02) and 3		MVVL-SV04, and MVVL-
						SV05 have sampling ports
				SV03 MW/L-SV04 and		50 100 200 300 and
				MWI -SV05)		400 ft bas
Vadose	Moisture	Year 1 – Semiannual	171	3 soil-moisture monitoring	Soil-moisture	Moisture content in
Zone	content	Year 2 – Semiannual		access tubes	monitoring per	vadose zone beneath the
	beneath the ET	Year 3 and subsequent years -		Measurements obtained	LTMMP Appendix E	cover is measured using a
	Cover	Annual		at 1-ft increments from		neutron probe to evaluate
				4 ft to 25 ft bgs, then 5-ft		moisture infiltration
				increments to total depth		through the ET Cover.
				of the access tube		
				(200 linear ft)		

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

Refer to footnotes at end of table.

			0	, , ,		
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 LTMMP 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 LTMMP 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 LTMMP Appendix G	If no potentially deep- rooted plants are present, no samples will be collected.

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

Notes:

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

^bSampling and Analysis Plans and sampling requirements are provided in appendices of the MWL LTMMP (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.

FLUTe[™] = Flexible Liner Underground Technologies, Ltd.[™]

- ft = Foot (feet).
- LTMMP = Long-Term Monitoring and Maintenance Plan.
- MWL = Mixed Waste Landfill.

RCRA = Resource Conservation and Recovery Act.

VOC = Volatile organic compound.

MWL System to be Inspected	Inspection Frequency/ Performed by	Inspection Parameters	Maintenance Implementation	Maintenance/ Repair Frequency ^a	
ET Cover Surface	Quarterly until vegetation is established, annually	Vegetation Inventory	Soil augmentations and/or reseeding	Within 60 days of discovery of needed repairs. Reseeding repairs may be delayed to await the appropriate growing season.	
Biology Inspection	thereafter by a staff biologist ^b	Contiguous areas of no vegetation >200 ft ²	Revegetate barren areas that exceed prescribed limits		
(Cover vegetation and signs of animal activity)		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	
		Erosion of cover soil in excess of 6 inches deep		repairs. Reseeding repairs may be delayed to await the appropriate	
		Ponding of water on the ET Cover surface in excess of 100 ft ²			
		Animal intrusion burrows in excess of 4 inches in diameter		growing season.	
		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	
		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	repairs.	
Soil-Vapor Monitoring Wells, Soil- Moisture Monitoring Access	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.	
Tubes, and Groundwater		Well cover caps and Swagelok [®]			
		Monitoring wells and soil-vapor			
		sampling port labels			
		LOCKS Sampling pumps and tubing	4		
		Neutron probe and cable system			

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

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 Condition of fence wires, posts, gates, gate locks, warning signs, and survey monuments in the local area	Remove wind-blown plants and debris Repair broken wire sections and posts, repair/oil gates, clean/replace locks, repair/replace warning signs, clear dirt/debris from monuments	Within 60 days of discovery of needed repairs.

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).

^oBarren 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.

 ft^2 = Square feet.

MWL = Mixed Waste Landfill.

2.2.1 ET Cover

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 the ET Cover to the west (Figure 2-3). As documented in the June 2017 MWL Annual LTMM Report, from November 2016 through February 2017 the site access and perimeter road was improved. The surface of the road was raised, road ditches were installed on each side, and culverts were installed (SNL/NM June 2017a, Figure 9-1). These improvements provide additional site drainage control, intercepting surface water and channeling it away from the ET Cover area.

2.2.2 ET Cover Biology Inspection

Cover vegetation monitoring was accomplished in two phases. The first phase of quarterly inspections by the staff biologist focused on establishing native vegetation on the ET Cover such that successful revegetation criteria were met as defined in Section 4.1 of the MWL LTMMP. 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 documents the flora coverage and signs of animal and insect activity during these annual inspections.

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

At the end of each reporting year, the staff biologist summarizes the results of the annual inspection, presents local climate trends, and makes recommendations in a summary Biology Report included in the Annual LTMM Report (Annex G). The annual *Biology Inspection Checklist/Form* is also included in the Annual LTMM Report (Annex F).



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

2.2.3 ET Cover Surface and Physical Controls Inspection

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

2.2.4 Monitoring Networks and Sampling Equipment

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

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

3.0 RADON MONITORING RESULTS

This chapter presents radon monitoring activities (i.e., sampling and analysis), analytical results, and data evaluation in accordance with 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 of radon-222) to the atmosphere at the MWL. This monitoring provides an early warning detection system for changing conditions so that timely action can be taken, if necessary. The trigger level defined in LTMMP Section 5.2.1 applies 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 MWL radon monitoring activities conducted in conformance with LTMMP Appendix C, which describes the procedures, methods, and analytical protocols for deploying, collecting, and analyzing radon monitoring samples. Monitoring was conducted during four quarterly periods in calendar year (CY) 2017, fulfilling the LTMMP minimum requirement of semiannual monitoring. Radon monitoring presented for this April 1, 2017 through March 31, 2018 reporting period covers the CY 2017 period January 1, 2017 through December 31, 2017 due to the time required for laboratory analysis and data review after collection of the October through December 2017 detectors in early January 2018. The switch back to quarterly monitoring was made to evaluate the newer radon detectors (Radtrak2[®]) that were used for the first time for the July through December 2016 semiannual monitoring period.

The radon air measurements were obtained using alpha-track radon gas detectors manufactured by radonova (formerly Landauer[®] Nordic). Radtrak2[®] detectors were used for each quarterly monitoring event during CY 2017. Other detectors types, including modified Radtrak2[®] and Rapidos[®] detectors, were also used and deployed with the Radtrak2[®] detectors to allow comparison of results. 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 detector type, dates of deployment and collection, location number, average radon air concentrations in picocuries per liter (pCi/L) for each three-month period, and the CY 2017 range of radon air concentrations for each detector type.

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Figure 3-1 Mixed Waste Landfill Radon Detector Locations

Table 3-1 Summary of Radon Results Mixed Waste Landfill Air Monitoring Calendar Year 2017

r													
Deployment Period	1 ^{s⊤} Quarter	2 ^r Qua	rd		3 rd Quarter			4 th Quarter					
Detector Deployment Date	4-Jan-17	3-Apr-17		5-Jul-17		2-Oct-17		Range of Results Calendar Year 2017					
Detector Collection Date	3-Apr-17	5-Ju	I-17	17 2-Oct-17 2-Jan-18					Trigger Level				
	Detector Type										(pCi/L)		
Sample Location ^a	Radtrak2 [®]	Radtrak2 [®]	Rapidos®	Radtrak2 [®]	Rapidos®	Modified Radtrak2 [®]	Radtrak2 [®]	Rapidos®	Modified Radtrak2 [®]	Radtrak2 [®] Range	Modified Radtrak2 [®] Range	Rapidos [®] Range	
	Time-Weighted Average Radon Air Concentration (pCi/L)												
RN1	< 0.4	< 0.4	0.14	< 0.4	0.19	< 0.5	< 0.4	0.46	0.5	< 0.4	< 0.5 - 0.5	0.14 - 0.46	4
RN2	< 0.4	< 0.4	0.11	< 0.4	0.16	< 0.5	< 0.4	0.27	0.6	< 0.4	< 0.5 - 0.6	0.11 - 0.27	4
RN3	< 0.4	< 0.4	0.14	0.6	0.22	< 0.5	0.5	0.43	0.9	<0.4 - 0.6	< 0.5 - 0.9	0.14 - 0.43	4
RN4	< 0.4	< 0.4	< 0.08	< 0.4	0.24	< 0.5	0.4	0.38	< 0.8	< 0.4 - 0.4	< 0.5 - < 0.8	< 0.08 - 0.38	4
RN5	< 0.4	< 0.4	0.16	< 0.4	NR⁵	0.9	< 0.4	0.27	< 0.8	< 0.4	< 0.8 - 0.9	0.16 - 0.27	4
RN6	< 0.4	< 0.4	0.11	< 0.4	0.24	< 0.8	0.5	0.32	< 0.8	< 0.4 - 0.5	< 0.8	0.11 - 0.32	4
RN7	< 0.4	< 0.4	0.14	< 0.4	0.38	< 0.5	< 0.4	0.35	1.3	< 0.4	< 0.5 - 1.3	0.14 - 0.38	4
RN8	< 0.4	< 0.4	0.08	< 0.4	< 0.16	0.7	< 0.4	0.32	0.9	< 0.4	0.7 - 0.9	0.08 - 0.32	4
RN9	< 0.4	< 0.4	0.14	< 0.4	0.24	< 0.5	0.4	0.27	< 0.8	< 0.4 - 0.4	< 0.5 - < 0.8	0.14 - 0.27	4
RN10	< 0.4	< 0.4	< 0.08	< 0.4	< 0.16	0.6	0.5	0.24	0.8	< 0.4 - 0.5	0.6 - 0.8	< 0.08 - 0.24	4
RN11	< 0.4	< 0.4	< 0.08	< 0.4	0.19	0.6	0.4	0.30	< 0.5	< 0.4 - 0.4	< 0.5 - 0.6	< 0.08 - 0.30	NA
RN12	< 0.4	< 0.4	0.11	< 0.4	0.16	0.6	< 0.4	0.43	< 0.8	< 0.4	0.6 - < 0.8	0.11 - 0.43	NA
RN13	< 0.4	< 0.4	0.11	< 0.4	< 0.16	< 0.5	< 0.4	0.38	0.7	< 0.4	< 0.5 - 0.7	0.11 - 0.38	NA
RN14	< 0.4	< 0.4	0.11	< 0.4	< 0.16	< 0.5	0.5	0.30	0.6	< 0.4 - 0.5	< 0.5 - 0.6	0.11 - 0.30	NA
RN15	< 0.4	< 0.4	0.14	< 0.4	0.14	0.6	< 0.4	0.30	< 0.8	< 0.4	0.6 - < 0.8	0.14 - 0.30	NA
RN16	< 0.4	< 0.4	0.11	< 0.4	0.19	< 0.5	< 0.4	0.41	< 0.8	< 0.4	< 0.5 - < 0.8	0.11 - 0.41	NA
RN17	< 0.4	< 0.4	0.11	< 0.4	0.19	1.0	< 0.4	0.27	0.9	< 0.4	0.9 - 1.0	0.11 - 0.27	NA
RNTB	< 0.4	< 0.4	< 0.08	< 0.4	0.16	< 0.5	< 0.4	1.3	< 0.8	< 0.4	< 0.5 - < 0.8	< 0.08 - 1.3	NA

Notes:

^aBolded sample locations are the compliance locations where the trigger level of 4 pCi/L applies. ^bNo result (NR) due to a defect in the detector plastic.

NA = Not applicable.

pCi/L = Picocuries per liter. RNTB = Trip blank.

Radon monitoring results are reviewed and evaluated by an SNL/NM radiological subject matter expert (SME) and documented in a data evaluation memorandum. These reports are provided in Annex A and include the corresponding laboratory data sheets, Analysis Request/Chain-of-Custody forms (AR/COCs), and a map showing all monitoring locations.

As discussed in the June 2017 MWL Annual LTMM Report, Landauer[®] Nordic phased out the older Radtrak[®] detectors that had been deployed from January 2014 through June 2016. The new Radtrak2[®] detectors were deployed for the first time for the July through December 2016 semiannual monitoring period. The Radtrak2[®] results (time-weighted average radon air concentration in pCi/L) for the July through December 2016 monitoring event were lower at all monitoring locations (RN1 through RN17) when compared to the values obtained during the January through June 2016 monitoring event using the Radtrak[®] detectors. In 2017, an investigation was initiated to determine why the new Radtrak2[®] detector results were consistently lower, and the monitoring frequency was changed back to quarterly to allow for more data to be collected and the evaluation of different detectors. This investigation is briefly summarized below.

After receipt of the July through December 2016 Radtrak2[®] results in early 2017, discussions with the detector manufacturer were initiated to determine why Radtrak2[®] results were consistently lower than the previous Radtrak[®] results. Landauer[®] Nordic first suggested using the more sensitive Rapidos[®] detectors, considering the generally low (i.e., equivalent to background) concentrations measured at the site during previous quarterly and semiannual monitoring events. Rapidos[®] detectors were not initially selected for monitoring because they can only be deployed for three months, and radon monitoring had already transitioned to semiannual (i.e., six-month) duration.

Monitoring was transitioned back to quarterly monitoring with collection of the Radtrak2[®] detectors and deployment of a Radtrak2[®] and Rapidos[®] pair at all locations on April 3, 2017. After this dual deployment of the Radtrak2[®] and Rapidos[®] detectors, Landauer[®] Nordic followed up with correspondence on April 10, 2017 clarifying the new Radtrak2[®] detectors are designed to have a longer diffusion time than the older Radtrak[®] detectors, preventing thoron (a decay product of thorium with a half-life of just 56 seconds) from entering the detector and being measured. Measurement of thoron is not part of the monitoring objective. Based on the additional information, the investigation concluded with three sets of detectors deployed for the last two quarters of CY 2017 at all locations. For the July through September and October through December 2017 monitoring periods, the following three detectors were deployed at each location.

- <u>Radtrak2[®] detectors modified with holes and paper filters</u> to emulate original Radtrak® detectors that measure both radon and thoron
- Radtrak2[®] detectors (unmodified) that measure only radon
- <u>Rapidos[®] detectors</u> that measure only radon but have the lowest detection limit for a three-month monitoring period

The results of CY 2017 radon monitoring and the conclusions of the investigation of various radon detectors are summarized in Section 3.2.1.

3.1.1 Radon Monitoring Detector Deployment and Collection

The radon detectors were deployed and collected on a quarterly schedule in CY 2017 at the 17 sampling locations as shown in Table 3-1 and Figure 3-1. The following detectors were deployed for each quarter:

- January-March 2017: Radtrak2[®]
- April-June 2017: Radtrak2[®] and Rapidos[®]
- July-September 2017: Radtrak2[®], Rapidos[®], and modified Radtrak2[®]
- October-December 2017: Radtrak2[®], Rapidos[®], and modified Radtrak2[®]

During the months 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 and at the times of collection. Minor maintenance to remove spider webs and maintain the protective housing at each monitoring location was performed at the time of the inspections. Deployment/collection and monthly inspection forms are included in Annex A.

3.1.2 Field Quality Control

Field quality control (QC) measures associated with each monitoring period include two types of samples, one field control sample (trip blank) and two field background samples for each detector type deployed per monitoring period. The trip blank sample is used to confirm detectors were not contaminated during storage and shipment to the analytical laboratory. Two field background samples (RN16 and RN17) are collected 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 from 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 2017. The detectors were submitted to radonova (formerly 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 quarterly monitoring results are presented in Table 3-1. The CY 2017 range of results for all detectors was <0.08 to 1.3 pCi/L. The range for all background location results
was 0.11 to 1.0 pCi/L. No sample locations exceeded the trigger level of 4 pCi/L and all results confirm low levels of radon consistent with natural background levels and historical results.

As summarized in Section 3.1 and Table 3-1, various detectors were deployed at each monitoring location during the CY 2017 monitoring quarters to investigate the lower values measured by the Radtrak2[®] detectors during the July through December 2016 monitoring period. As anticipated, the results for the modified Radtrak2[®] detectors, which measure both radon and thoron, showed a slightly higher range (<0.5 to 1.3 pCi/L) relative to the Rapidos[®] (<0.08 to 0.46 pCi/L) and Radtrak2[®] (<0.4 to 0.6 pCi/L) detectors that measure only radon (combined range = <0.08 to 0.6). These slightly higher results are consistent with results from January 2014 through June 2016 obtained using the original Radtrak[®] detectors (<0.3 to 1.4 pCi/L), which also measure radon and thoron. These data sets confirm that the slightly higher historical results are due to the measurement of both radon and thoron, and the cause of the lower results using the newer Radtrak2[®] detectors is due to the fact that they measure only radon. All radon monitoring results for the MWL indicate very low radon activity consistent with background levels.

Based on the evaluation of MWL radon monitoring results (January 2014 through December 2017), monitoring will proceed in CY 2018 using the Radtrak2[®] detectors at a semiannual frequency. Based on the CY 2017 detector investigation, the Radtrak2[®] detectors will accurately measure radon activity over a six-month period and identify any changes in radon activity. Using an alpha-track detector that measures only radon-222 is an improvement that is consistent with the MWL radon monitoring DQOs and monitoring objective (SNL/NM March 2012). The Radtrak2[®] detector sensitivity will also increase with a longer monitoring period of six months (semiannual duration) versus three months (quarterly duration), providing a lower detection limit.

3.2.2 Field Quality Control Sample Results

Trip blanks for each detector type (designated as RNTB in Table 3-1) were submitted with the detectors collected at the end of each quarterly sampling period. The trip blank results confirmed there was no contamination during storage and shipment of detectors RN1 through RN17. However, the Rapidos[®] trip blank detector result for the October through December 2017 monitoring period, although a low value (1.3 pCi/L), was unusually high for a TB detector. Past trip blank results have been consistently very low detections or non-detects. Upon further investigation, the Rapidos[®] detector used for RNTB was a detector that was received from the laboratory in March 2017 and stored in a sealed plastic bag at the Environmental Resources Field Office (ERFO). If the RNTB result is recalculated for the longer exposure period (i.e., 9-month period from March 2017 through December 2017, assuming the plastic bag was not sealed properly) it would be approximately 0.14 pCi/L, which is consistent with past RNTB results. Another explanation could be the detector supplied by the laboratory was exposed prior to receipt at SNL/NM. Regardless, there was no adverse impact as the other two trip blank detectors provided representative results and all results from the 17 monitoring locations are consistent with historical results.

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

3.2.3 Data Quality

There was one data quality issue associated with the July through September monitoring period. No radon result was reported for location RN5 for the Rapidos[®] detector due to a manufacturer defect in the plastic of the detector, which was identified at the laboratory after the detector was returned for analysis. The defect did not adversely affect data quality because two other detectors were deployed at this location and provided valid results. All other data were acceptable and met the DQOs. The contract verification reviews for each monitoring period is included in Annex A.

3.2.4 Variances

There were no variances from the LTMMP radon monitoring requirements.

3.3 Data Evaluation and Monitoring Trigger Level

The trigger level for radon in air is 4 pCi/L (time-weighted average), which applies to detectors RN1 through RN10 located on the perimeter fence. The trigger level of 4 pCi/L is the same as the 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 2017.

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

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

4.1 Tritium Surface Soil Sampling Field Activities

This section describes activities conducted in conformance with LTMMP Appendix G, which describes the procedures, methods, and analytical protocols for collecting and analyzing tritium surface soil samples. The August 2017 results are presented in the following sections.

Surface soil samples were collected at the four ET Cover corner monitoring locations on August 30, 2017 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 data evaluation memorandum prepared by the radiological SME, data validation contract verification reviews, and AR/COC forms.

4.1.1 Field Quality Control

A field QC sample (duplicate soil sample) was collected as part of the August 30, 2017 tritium sampling event in accordance with the Tritium and Biota SAP (Appendix G, Table G-4.2-1 of the LTMMP), which requires that one duplicate sample pair be collected for every twenty environmental samples. The environmental-duplicate sample pair for the August 2017 sampling event was collected at the southwest corner of the ET Cover, tritium monitoring location MWL TS-2SW (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. Analytical results that are below the minimum detectable activity (MDA) are qualified with a "U" and are designated as below the detection level. Analytical laboratory reports, including certificates of analyses, analytical methods, sample results, dates of analyses, results of QC analyses, and data validation reports are filed in the SNL/NM Record Center.

4.2.1 Environmental Sample Results

Table 4-1 summarizes the tritium surface soil results for the August 2017 sampling event. Reported tritium activities for all samples were very low, below the MDA. All samples had good soil moisture content, ranging from 6 to 9 percent by mass, and the MDA ranged from 183 pCi/L (northwest ET Cover corner location, MWL TS-2NW) to 228 pCi/L (northeast ET Cover corner location, MWL TS-2NE). The results are consistent with the August 2016 results and 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.

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

Table 4-1 Summary of Tritium Results (EPA Method 906.0^a) Mixed Waste Landfill Surface Soil Monitoring August 2017

Sample	Result (pCi/L)	Percent Soil Moisture	MDA (pCi/L)	Laboratory Qualifier ^b	Validation Qualifier ^b	Trigger Level
Location		(pCi/L)				
MWL TS-2NW	6.07 ± 105	6.96	183	U	BD	
MWL TS-2SW	51.8 ± 133	8.61	227	U	BD	
MWL TS-2SW (Duplicate)	195 ± 141	9.28	228	U	BD	20,000
MWL TS-2SE	201 ± 140	8.83	227	U	BD	
MWL TS-2NE	191 ± 141	6.88	228	U	BD	

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

Laboratory Qualifier

U = Analyte activity is below the detection limit.

Validation Qualifier

BD = Result that is not statistically different from zero.

EPA = U.S. Environmental Protection Agency. MDA = Minimum detectable activity.

MWL = Mixed Waste Landfill.

pCi/L = Picocuries per liter.

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 2017b).

Based upon data validation and review criteria, all tritium results were determined acceptable and met the DQOs. Reported QC sample results comply with analytical method and laboratory procedure requirements. Data validation and contract verification reviews are provided in Annex B.

4.2.4 Variances

There were no variances from the LTMMP 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 August 2017 sample results exceeded the trigger level.

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. Historical 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 2017 are consistent with historical data and reflect tritium activity at very low levels that are close to or below the laboratory MDA. Given the mobility of tritium, the results indicate 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 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 of 42.5 and 41.5 feet below ground surface (ft bgs), respectively. MWL-SV03, MWL-SV04, and MWL-SV05 are Flexible Liner Underground Technology, Ltd.[™] (FLUTe[™]) multi-sampling-port wells. Each has 5 sampling ports at depths of approximately 50, 100, 200, 300, 400 ft bgs. These FLUTe[™] multi-sampling port wells are installed around the ET Cover perimeter as shown in Figure 5-1.

Two soil-vapor monitoring events were conducted during the April 1, 2017 through March 31, 2018 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 May 30, 2017. Soil-vapor samples were collected from all monitoring well sampling ports. Duplicate samples were collected from two MWL-SV03 sampling ports (200 and 400 ft bgs ports).
- The second sampling event was conducted on October 26, 2017. Soil-vapor samples were collected from all monitoring wells and duplicate samples were collected from the single sampling ports at MWL-SV01 (42.5 ft bgs) and MWL-SV02 sampling port (41.5 ft bgs).



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

5.1.1 Well Purging

Purging removes stagnant air from each sampling port and associated sample tubing, and draws representative soil vapor from the soil/sediment pore space surrounding the sampling port in the subsurface. All wells were purged to remove a minimum of three tubing volumes of air, and until VOC levels stabilized (i.e., 3 photoionization detector [PID] measurements after purging 3 tubing volumes within plus or minus 10 percent), in accordance with procedures described in field operating procedure FOP 08-22, "Soil-Vapor Sampling" (SNL/NM October 2016) and LTMMP 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 ultrapure grade nitrogen gas sample at each monitoring well. Results were used to assess whether contamination of the samples may have resulted from ambient field conditions and/or during shipment and analysis at the laboratory.

The field QC sampling protocol for the May and October 2017 sampling events included the collection of an environmental-duplicate sample pair from the sampling ports located at 200 ft bgs and 400 ft bgs at monitoring well MWL-SV03 in May, and the sampling ports located at 42.5 ft bgs and 41.5 ft bgs at monitoring wells MWL-SV01 and MWL-SV02, respectively, 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.

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

All VOC concentrations for the three deepest sampling ports are well below the trigger levels. The PCE maximum concentration was 0.390 ppmv from the May MWL-SV03-400 environmental sample. The TCE maximum concentration was 0.250 ppmv from the May MWL-SV03-400 duplicate sample. The maximum Total VOCs concentration was 0.69654 ppmv from the May MWL-SV03-400 environmental sample.

5.2.1 Environmental Sample Results

This section summarizes soil-vapor monitoring results for the April 1, 2017 through March 31, 2018 reporting period. A summary of compounds detected in each semiannual event is provided below, and a summary of historical data (i.e., soil-vapor results collected since implementation of the LTMMP in January 2014) is presented in Section 5.3.

First Sampling Event – May 30, 2017

A total of 27 compounds were detected above laboratory MDLs in May 2017 samples. All of these VOCs were also detected in the October samples except benzene, bromodichloromethane, bromoform, 2-hexanone, 1,1,2-trichloroethane, and vinyl acetate.

- Acetone Benzene Bromodichloromethane Bromoform 2-Butanone Carbon Disulfide Carbon Tetrachloride Chloroform Chloromethane Dichlorodifluoromethane 1,1-Dichloroethane 1,1-Dichloroethene cis-1,2-Dichloroethene Ethyl benzene
- 2-Hexanone Methylene Chloride Tetrachloroethene Toluene 1,1,2-Trichloro-1,2,2-trifluoroethane 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichlorofluoromethane 1,2,4-Trimethylbenzene Vinyl acetate m, p-Xylene o-Xylene

PCE and TCE are the primary VOCs of concern, exhibit the highest concentrations, and were reported at low concentrations in all environmental samples from all sampling ports. PCE was detected at concentrations ranging from 0.044 ppmv (MWL-SV05-50) to 0.390 ppmv (MWL-SV03-400). TCE concentrations ranged from 0.049 (MWL-SV05-50) to 0.250 ppmv (MWL-SV03-200 and MWL-SV03-400, duplicate sample). Total VOCs concentrations ranged from 0.232861 ppmv (MWL-SV04-50) to 0.78555 ppmv (MWL-SV03-200, duplicate sample). Other VOCs detected in all monitoring well sampling ports, generally at lower concentrations, include chloroform; dichlorodifluoromethane; 1,1-dichloroethane; 1,1-dichloroethane; and trichlorofluoromethane. The two highest sample port VOC concentrations were both PCE results: 0.390 ppmv (MWL-SV03-400) and 0.300 ppmv (MWL-SV01-42.5).

For the May 2017 results from the three deepest sampling ports of MWL-SV03, MWL-SV04, and MWL-SV05, PCE concentrations ranged from 0.100 ppmv (MWL-SV04-400 and MWL-SV05-400) to 0.390 ppmv (MWL-SV03-400). TCE concentrations ranged from 0.085 ppmv (MWL-SV04-400) to 0.250 ppmv (MWL-SV03-400, duplicate sample). Total VOCs concentrations ranged from 0.29962 ppmv (MWL-SV05-400) to 0.69654 ppmv (MWL-SV03-400).

Second Sampling Event - October 26, 2017

A total of 22 compounds were detected above laboratory MDLs in October 2017 samples. All of these VOCs were also detected in the May samples except 1,3,5-trimethylbenzene.

Acetone	Methylene Chloride
2-Butanone	Tetrachloroethene
Carbon Disulfide	Toluene
Carbon Tetrachloride	1,1,2-Trichloro-1,2,2-trifluoroethane
Chloroform	1,1,1-Trichloroethane
Chloromethane	Trichloroethene
Dichlorodifluoromethane	Trichlorofluoromethane
1,1-Dichloroethane	1,2,4-Trimethylbenzene
1,1-Dichloroethene	1,3,5-Trimethylbenzene
cis-1,2-Dichloroethene	m, p-Xylene
Ethyl benzene	o-Xylene

PCE and TCE exhibited the highest concentrations, and were reported in all environmental samples from all sampling ports. PCE was detected at concentrations ranging from 0.021 ppmv (MWL-SV05-50) to 0.420 ppmv (MWL-SV01-42.5, duplicate sample). TCE concentrations ranged from 0.042 ppmv (MWL-SV05-50) to 0.230 ppmv (MWL-SV03-200 and MWL-SV03-400). Total VOCs concentrations ranged from 0.25573 ppmv (MWL-SV04-50) to 0.89810 ppmv (MWL-SV01-42.5, duplicate sample). Other VOCs detected in all monitoring wells, generally at lower concentrations include chloroform, dichlorodifluoromethane; 1,1-dichloroethane; 1,1,2-trichloro-1,2,2-trifluoroethane; 1,1,1-trichloroethane; and trichlorofluoromethane. The two highest sample port VOC concentrations were both PCE results: 0.420 and 0.340 ppmv (MWL-SV01-42.5, duplicate sample and environmental sample, respectively) and 0.310 ppmv (MWL-SV03-400).

For the October 2017 results from the three deepest sampling ports of MWL-SV03, MWL-SV04, and MWL-SV05, PCE concentrations ranged from 0.092 ppmv (MWL-SV05-400) to 0.310 ppmv (MWL-SV03-400). TCE concentrations ranged from 0.081 ppmv (MWL-SV04-400) to 0.230 ppmv (MWL-SV03-400). Total VOCs concentrations ranged from 0.29543 ppmv (MWL-SV05-400) to 0.62930 ppmv (MWL-SV03-400).

Tables 5-1 and 5-2 (provided at the end of this chapter) summarize detected VOCs results for the May 2017 and October 2017 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 May and October 2017 sampling events included the collection and analysis of environmental-duplicate sample pairs and field blank samples. Field QC sample results met the sampling DQOs and validated the field sampling procedures and protocol. The analytical results for each field QC sample type are presented in this section.

Table 5-3 summarizes results of environmental-duplicate sample pair analyses and the calculated RPD values for the May and October 2017 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 – May 30, 2017

The two environmental-duplicate sample pairs collected during the May sampling event were analyzed for all analytical parameters. The calculated RPDs show good agreement for the May environmental-duplicate sample pairs, ranging from less than 1 to 14. 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 field blank samples were submitted for analysis with the May 2017 environmental samples. VOCs detected in field blank samples included acetone (3 samples), benzene (1 sample), carbon disulfide (1 sample), dichlorodifluoromethane (1 sample), methylene chloride (1 sample), toluene (2 samples), and trichlorofluoromethane (1 sample). No corrective action was required for dichlorodifluoromethane or trichlorofluoromethane since these compounds were detected in associated environmental samples at concentrations greater than five times the field blank concentration. Acetone, benzene, carbon disulfide, methylene chloride, and toluene were qualified as not detected during data validation for environmental samples from MWL-SV01, MWL-SV02, MWL-SV03, and MWL-SV05 since these compounds were reported at concentrations less than the laboratory practical quantitation limit (PQL).

Table 5-3 Summary of Duplicate Samples Mixed Waste Landfill Soil-Vapor Monitoring May and October 2017

	Environmental Sample (B ₁)	Duplicate Sample							
Well ID/Parameter	(pr	. RPD" (%)							
May 2017 Environmental-Duplicate Sample Pair Results									
MWL-SV03-200									
Dichlorodifluoromethane	51	55	8						
1,1-Dichloroethane	7.9	7.9	< 1						
1,1-Dichloroethene	33	33	< 1						
Tetrachloroethene	210	210	< 1						
1,1,2-Trichloro-1,2,2-trifluoroethane	170	170	< 1						
Trichloroethene	240	250	4						
Trichlorofluoromethane	38	38	< 1						
MWL-SV03-400									
1,1-Dichloroethene	21	22	5						
Tetrachloroethene	390	340	14						
1,1,2-Trichloro-1,2,2-trifluoroethane	28	29	4						
Trichloroethene	230	250	8						
October 2017 Environmental-Duplicate S	ample Pair Results								
MWL-SV01-42.5									
Chloroform	14	14	< 1						
Dichlorodifluoromethane	84	84	< 1						
Tetrachloroethene	340	420	21						
1,1,2-Trichloro-1,2,2-trifluoroethane	67	72	7						
1,1,1-Trichloroethane	34	37	8						
Trichloroethene	74	86	15						
Trichlorofluoromethane	160	170	6						
MWL-SV02-41.5									
Dichlorodifluoromethane	80	78	3						
Tetrachloroethene	69	72	4						
1,1,2-Trichloro-1,2,2-trifluoroethane	49	50	2						
1,1,1-Trichloroethane	72	74	3						
Trichloroethene	65	67	3						
Trichlorofluoromethane	300	310	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

R₁ = Analysis result. R₂ = Duplicate analysis result.

ppbv = Parts per billion by volume basis.

Second Sampling Event - October 26, 2017

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 less than 1 to 21.

A total of five field blank samples were submitted for analysis with the October 2017 samples. VOCs detected in the field blank samples included acetone (3 samples), benzene (5 samples) chloromethane (1 sample), methylene chloride (2 samples), PCE (3 samples), toluene (2 samples), and TCE (2 samples). No corrective action was required for PCE or TCE since these compounds were detected in associated environmental samples at concentrations greater than five times the field blank concentration. Acetone, benzene, chloromethane, methylene chloride, and toluene were qualified as not detected during data validation for various environmental samples from all monitoring wells since these compounds were reported at concentrations less than the PQL.

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. There were no issues associated with laboratory QC samples for the May and October sampling events. All laboratory control sample results for both sampling events met the accuracy (i.e., % recovery) requirement of 50 to 130% for detected compounds (Section 2.2 of LTMMP Appendix D).

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 2014; SNL/NM June 2017b). Based upon the data validation and review criteria, all May and October analytical data were determined acceptable and met the DQOs. Reported QC sample results comply with analytical method and laboratory procedure requirements. Data validation reviews, contract verification reviews, and certificates of analysis are provided in Annex C.

5.2.4 Variances

One variance from requirements in the LTMMP was identified for the May and October 2017 soil-vapor monitoring activities. This variance is considered minor because it has no adverse impact on data quality. During the purging process, a PID with an 11.7 electron volts (eV) lamp was used instead of an 11.8 eV lamp as specified in Section 3.3 in Appendix D of the LTMMP. 11.8 eV lamps are not currently available from the manufacturer or the distributors. A permit modification request is being prepared to address this minor variance.

5.3 Historical Data Evaluation

Tables 5-4, 5-5, and 5-6 provide results for PCE, TCE, and Total VOCs, respectively. Each table presents results for the eight semiannual monitoring events conducted since implementation of the LTMMP in 2014. Key points from the evaluation of the 2014 through 2017 soil-vapor monitoring results are summarized below.

- All individual VOC results for all monitoring well sampling ports are low concentrations, less than 0.600 ppmv.
- Concentrations throughout the 500-foot thick vadose zone are relatively consistent; shallow results do not vary considerably from deeper results.
- The soil-vapor monitoring results are consistent with an old source that has slowly dissipated throughout the vadose zone through diffusion.
- The distribution of concentrations in the vadose zone indicates the VOC soil-vapor plume is stable, with no evidence of new releases from the disposal area in the shallower sampling port results.
- 2014 through 2017 results for the shallow sampling ports closer to the disposal areas (i.e., sampling port depths ranging from 41.5 to 100 ft bgs at all five monitoring wells) reflect lower concentrations than were measured during the Phase 2 RCRA Facility Investigation in 1994 (Peace et al. September 2002) and 2008 VOC Soil-Vapor Investigation (SNL/NM August 2008), further supporting the absence of new releases from the disposal area.
- Results for the three deepest sampling ports of MWL-SV03 through MWL-SV05 (400 ft 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 eight sampling events conducted from 2014 to 2017 is less than 0.100 ppmv for all sampling ports except MWL-SV01-42.5 (the maximum PCE variation was 0.260 ppmv between the September 2014 and May 2017 results). The PCE concentrations at the MWL-SV03 400 ft bgs sampling port showed slight increases from September 2014 through October 2016. However, the 2017 results are the lowest concentrations measured over the four-year monitoring period indicating stable conditions with small fluctuations over the four-year period. 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 0.300 to 0.560 ppmv) and Total VOCs concentrations (ranging from 0.62930 to 1.14010 ppmv). The 2014 through 2017 data sets are very similar indicating stable VOC concentrations throughout the 500-foot thick vadose zone. The variability shown in the data is expected given the vadose zone geology, which is laterally and vertically discontinuous, and comprised of interfingering, unconsolidated, alluvial-fan deposits ranging in grain size from clay to poorly sorted coarse gravels.

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

Well ID & Sample	September 2014 ^b	October 2014 ^b	April 2015⁵	October 2015 ^b	April 2016 ^b	October 2016 ^b	May 2017⁵	October 2017 ^b
Port Depth ^a	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)
MWL-SV01-42.5	0.560	0.400	0.460	0.470	0.410	0.450	0.300	0.420
MWL-SV02-41.5	0.086	0.067	0.075	0.068	0.068	0.070	0.071	0.072
MWL-SV03-50	0.140	0.120	0.150	0.110	0.170	0.140	0.100	0.140
MWL-SV03-100	0.210	0.230	0.240	0.220	0.240	0.240	0.160	0.220
MWL-SV03-200	0.300	0.320	0.310	0.290	0.270	0.270	0.210	0.260
MWL-SV03-300	0.290	0.320	0.290	0.370	0.310	0.300	0.220	0.280
MWL-SV03-400	0.390	0.400	0.420	0.450	0.430	0.440	0.390	0.310
MWL-SV04-50	0.072	0.076	0.076	0.074	0.078	0.077	0.052	0.063
MWL-SV04-100	0.130	0.120	0.120	0.120	0.130	0.130	0.089	0.110
MWL-SV04-200	0.180	0.180	0.170	0.150	0.180	0.150	0.110	0.130
MWL-SV04-300	0.110	0.130	0.110	0.120	0.130	0.130	0.095	0.120
MWL-SV04-400	0.110	0.140	0.120	0.140	0.150	0.130	0.100	0.110
MWL-SV05-50	0.052	0.048	0.055	0.040	0.060	0.045	0.044	0.021
MWL-SV05-100	0.092	0.096	0.100	0.077	0.099	0.095	0.089	0.070
MWL-SV05-200	0.140	0.170	0.150	0.120	0.170	0.140	0.140	0.100
MWL-SV05-300	0.090	0.120	0.097	0.110	0.100	0.110	0.110	0.091
MWL-SV05-400	0.100	0.110	0.080	0.120	0.110	0.110	0.100	0.092
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 Historical TCE Concentrations
Mixed Waste Landfill Soil-Vapor Monitoring

Well ID & Sample	September 2014 ^b	October 2014 ^b	April 2015⁵	October 2015 ^b	April 2016 ^b	October 2016 ^b	Мау 2017 ^ь	October 2017 ^b
Port Depth ^a	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)
MWL-SV01-42.5	0.110	0.090	0.099	0.110	0.091	0.100	0.071	0.086
MWL-SV02-41.5	0.075	0.058	0.067	0.065	0.063	0.065	0.070	0.067
MWL-SV03-50	0.100	0.082	0.097	0.080	0.140	0.110	0.098	0.120
MWL-SV03-100	0.190	0.190	0.200	0.200	0.210	0.210	0.130	0.180
MWL-SV03-200	0.300	0.300	0.290	0.310	0.250	0.270	0.250	0.230
MWL-SV03-300	0.190	0.210	0.170	0.260	0.200	0.220	0.200	0.210
MWL-SV03-400	0.290	0.280	0.260	0.350	0.300	0.320	0.250	0.230
MWL-SV04-50	0.061	0.059	0.060	0.066	0.070	0.067	0.054	0.058
MWL-SV04-100	0.130	0.120	0.120	0.130	0.140	0.150	0.120	0.120
MWL-SV04-200	0.210	0.210	0.190	0.200	0.220	0.200	0.180	0.170
MWL-SV04-300	0.076	0.091	0.064	0.093	0.081	0.097	0.087	0.094
MWL-SV04-400	0.075	0.096	0.060	0.097	0.070	0.091	0.085	0.081
MWL-SV05-50	0.067	0.061	0.064	0.052	0.074	0.058	0.049	0.042
MWL-SV05-100	0.140	0.130	0.130	0.120	0.130	0.130	0.110	0.100
MWL-SV05-200	0.200	0.240	0.210	0.200	0.210	0.200	0.190	0.150
MWL-SV05-300	0.100	0.130	0.082	0.120	0.096	0.120	0.120	0.120
MWL-SV05-400	0.094	0.100	0.066	0.120	0.089	0.100	0.087	0.097

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.

Well ID &	September	October	April	October	April	October	May	October
Sample	2014 ^b	2014 ^b	2015 ^b	2015 ^b	2016 ^b	2016 ^b	2017 ^b	2017 ^b
Port Depth ^a	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)
MWL-SV01-42.5	1.14010	1.00870	1.11670	1.03620	0.93510	0.97570	0.740723	0.89810
MWL-SV02-41.5	0.71822	0.67880	0.76470	0.69150	0.71030	0.70780	0.62944	0.67594
MWL-SV03-50	0.36957	0.31750	0.37076	0.30743	0.48016	0.42248	0.34860	0.42918
MWL-SV03-100	0.61151	0.63820	0.69490	0.74420	0.73270	0.73682	0.53366	0.62881
MWL-SV03-200	0.91906	0.94754	0.99016	0.93230	0.84151	0.87920	0.78555	0.78590
MWL-SV03-300	0.64917	0.67835	0.59506	0.83120	0.68678	0.74430	0.61278	0.71640
MWL-SV03-400	0.87270	0.81410	0.85950	0.95920	0.8798	0.89730	0.69654	0.62930
MWL-SV04-50	0.25949	0.26359	0.28424	0.28232	0.30064	0.29728	0.232861	0.25573
MWL-SV04-100	0.45631	0.42879	0.44346	0.46616	0.50930	0.53785	0.40932	0.43340
MWL-SV04-200	0.68361	0.66935	0.64340	0.63160	0.72689	0.66068	0.56579	0.56287
MWL-SV04-300	0.26624	0.32355	0.27345	0.34519	0.32831	0.37126	0.32319	0.35562
MWL-SV04-400	0.25031	0.3246	0.26702	0.35374	0.35148	0.38251	0.31282	0.32932
MWL-SV05-50	0.36547	0.31833	0.33990	0.30406	0.37770	0.35609	0.29951	0.26189
MWL-SV05-100	0.56578	0.54556	0.57169	0.53248	0.59430	0.61891	0.54760	0.51172
MWL-SV05-200	0.70237	0.82115	0.73680	0.65830	0.80567	0.73190	0.69410	0.57349
MWL-SV05-300	0.35628	0.42371	0.33576	0.44336	0.36421	0.46092	0.47695	0.44050
MWL-SV05-400	0.54096	0.39521	0.25075	0.45245	0.30765	0.40839	0.29962	0.29543

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

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 5-1Summary of Detected VOCs – May 2017

Table 5-2Summary of Detected VOCs – October 2017

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Table 5-1 Summary of Detected VOCs (EPA Method TO-15^a) Mixed Waste Landfill Soil-Vapor Monitoring May 2017

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^ь (ppbv)	RL ^ь (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV01-42.5	Acetone	0.0086	0.18	5.0		J+
30-May-17	Benzene	0.00015	0.079	0.40	J	
-	Bromodichloromethane	0.00064	0.066	0.30		
	Bromoform	0.0001	0.070	0.40	J	
	2-Butanone	0.0031	0.20	0.80		
	Carbon tetrachloride	0.00039	0.064	0.80	J	
	Chloroform	0.017	0.095	0.30		
	Dichlorodifluoromethane	0.078	2.0	5.4		
	1,1-Dichloroethane	0.0029	0.072	0.30		
	1,1-Dichloroethene	0.0076	0.13	0.80		
	cis-1,2-Dichloroethene	0.0014	0.089	0.40		
	Ethylbenzene	0.000085	0.063	0.40	J	
	2-Hexanone	0.00033	0.087	0.40	J	
	Methylene chloride	0.00053	0.072	0.40		
	Tetrachloroethene	0.300	0.69	5.4		
	Toluene	0.00023	0.051	0.40	J	0.4U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.064	2.2	5.4		
	1,1,1-Trichloroethane	0.044	0.065	0.30		
	1,1,2-Trichloroethane	0.00019	0.067	0.40	J	
	1,2,4-Trimethylbenzene	0.00039	0.16	0.80	J	
	Trichloroethene	0.071	1.4	5.4		
	Trichlorofluoromethane	0.140	2.6	5.4		
	m,p-Xylene	0.00022	0.10	0.80	J	
	o-Xylene	0.000098	0.054	0.40	J	
	Total Organics ^d	0.740723	NA	NA	NA	NA

Refer to footnotes at end of table.
Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL [♭] (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV02-41.5	Acetone	0.013	0.95	27	J	27U
30-May-17	2-Butanone	0.0074	1.1	4.3		
-	Chloroform	0.0031	0.51	1.6		
	Dichlorodifluoromethane	0.100	0.77	2.1		
	1,1-Dichloroethane	0.0026	0.38	1.6		
	1,1-Dichloroethene	0.012	0.69	4.3		
	cis-1,2-Dichloroethene	0.00084	0.47	2.1	J	
	2-Hexanone	0.0005	0.46	2.1	J	
	Tetrachloroethene	0.071	0.27	2.1		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.052	0.87	2.1		
	1,1,1-Trichloroethane	0.080	0.35	1.6		
	Trichloroethene	0.070	0.56	2.1		
	Trichlorofluoromethane	0.230	2.1	4.3		
	Total Organics ^d	0.62944	NA	NA	NA	NA
MWL-SV03-50	Acetone	0.0085	0.33	9.3	J	
30-May-17	Benzene	0.00044	0.15	0.74	J	0.74U
	2-Butanone	0.00063	0.37	1.5	J	
	Carbon tetrachloride	0.00026	0.12	1.5	J	
	Chloroform	0.0016	0.18	0.56		
	Dichlorodifluoromethane	0.019	0.27	0.74		
	1,1-Dichloroethane	0.0031	0.13	0.56		
	1,1-Dichloroethene	0.012	0.24	1.5		
	cis-1,2-Dichloroethene	0.0018	0.16	0.74		
	Methylene chloride	0.00081	0.13	0.74		
	Tetrachloroethene	0.100	0.094	0.74		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.072	0.30	0.74		
	1,1,1-Trichloroethane	0.0039	0.12	0.56		
	Trichloroethene	0.098	0.19	0.74		
	Trichlorofluoromethane	0.027	0.36	0.74		
	Total Organics ^d	0.34860	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^b (ppmy)	MDL ^b (ppby)	RL ^b (ppby)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV03-100	Acetone	0.0047	0.49	14	J	
30-May-17	Benzene	0.00022	0.22	1.1	J	1.1U
	2-Butanone	0.00066	0.55	2.2	J	
	Carbon tetrachloride	0.0004	0.18	2.2	J	
	Chloroform	0.0023	0.26	0.82		
	Dichlorodifluoromethane	0.039	0.40	1.1		
	1,1-Dichloroethane	0.0057	0.20	0.82		
	1,1-Dichloroethene	0.023	0.35	2.2		
	cis-1,2-Dichloroethene	0.0034	0.24	1.1		
	Methylene chloride	0.0017	0.20	1.1		
	Tetrachloroethene	0.160	0.14	1.1		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.120	0.45	1.1		
	1,1,1-Trichloroethane	0.0048	0.18	0.82		
	Trichloroethene	0.130	0.35	1.3		
	Trichlorofluoromethane	0.038	0.54	1.1		
	Total Organics ^d	0.53366	NA	NA	NA	NA
MWL-SV03-200	Acetone	0.0054	0.66	19	J	
30-May-17	Benzene	0.00029	0.29	1.5	J	1.5U
-	Carbon tetrachloride	0.00053	0.24	3.0	J	
	Chloroform	0.0025	0.35	1.1		
	Dichlorodifluoromethane	0.051	0.54	1.5		
	1,1-Dichloroethane	0.0079	0.27	1.1		
	1,1-Dichloroethene	0.033	0.48	3.0		
	cis-1,2-Dichloroethene	0.005	0.33	1.5		
	Methylene chloride	0.0034	0.27	1.5		
	Tetrachloroethene	0.210	0.19	1.5		
	Toluene	0.00062	0.19	1.5	J	
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.170	0.60	1.5		
	1,1,1-Trichloroethane	0.0032	0.24	1.1		
	Trichloroethene	0.240	0.66	2.5		
	Trichlorofluoromethane	0.038	0.73	1.5		
	Total Organics ^d	0.77055	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL⁵ (ydqq)	RL⁵ (ppby)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV03-200 (Duplicate)	Acetone	0.0065	0.64	18	J	
30-May-17	Benzene	0.00029	0.29	1.4	J	1.4U
,	Carbon tetrachloride	0.00051	0.23	2.9	J	
	Chloroform	0.0025	0.34	1.1		
	Dichlorodifluoromethane	0.055	0.52	1.4		
	1,1-Dichloroethane	0.0079	0.26	1.1		
	1,1-Dichloroethene	0.033	0.47	2.9		
	cis-1,2-Dichloroethene	0.0052	0.32	1.4		
	Methylene chloride	0.0034	0.26	1.4		
	Tetrachloroethene	0.210	0.18	1.4		
	Toluene	0.00044	0.18	1.4	J	
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.170	0.59	1.4		
	1,1,1-Trichloroethane	0.0031	0.24	1.1		
	Trichloroethene	0.250	0.64	2.4		
	Trichlorofluoromethane	0.038	0.71	1.4		
	Total Organics ^d	0.78555	NA	NA	NA	NA
MWL-SV03-300	Acetone	0.0069	0.69	19	J	
30-May-17	Benzene	0.0004	0.31	1.6	J	1.6U
	Carbon tetrachloride	0.0004	0.25	3.1	J	
	Chloroform	0.0015	0.37	1.2		
	Dichlorodifluoromethane	0.027	0.56	1.6		
	1,1-Dichloroethane	0.0037	0.28	1.2		
	1,1-Dichloroethene	0.021	0.50	3.1		
	cis-1,2-Dichloroethene	0.0028	0.35	1.6		
	Methylene chloride	0.0017	0.28	1.6		
	Tetrachloroethene	0.220	0.20	1.6		
	Toluene	0.00038	0.20	1.6	J	
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.110	0.63	1.6		
	1,1,1-Trichloroethane	0.0014	0.25	1.2		
	Trichloroethene	0.200	0.41	1.6		
	Trichlorofluoromethane	0.016	0.76	1.6		
	Total Organics ^d	0.61278	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^ь (ppmv)	MDL⁵ (ppbv)	RL [♭] (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV03-400	Acetone	0.0029	0.81	23	J	
30-May-17	Benzene	0.00042	0.36	1.8	J	1.8U
	Chloroform	0.0012	0.43	1.4	J	
Trigger Levels	Dichlorodifluoromethane	0.0046	0.66	1.8		
Tetrachloroethene = 20 ppmv	1,1-Dichloroethane	0.0046	0.33	1.4		
Trichlolorethene = 20 ppmv	1,1-Dichloroethene	0.021	0.59	3.6		
Total Organics = 25 ppmv	cis-1,2-Dichloroethene	0.0023	0.40	1.8		
	Methylene chloride	0.0015	0.33	1.8	J	
	Tetrachloroethene	0.390	0.40	3.1		
	Toluene	0.00084	0.23	1.8	J	
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.028	0.74	1.8		
	1,1,1-Trichloroethane	0.0018	0.30	1.4		
	Trichloroethene	0.230	0.48	1.8		
	Trichlorofluoromethane	0.0078	0.89	1.8		
	Total Organics ^d	0.69654	NA	NA	NA	NA
MWL-SV03-400 (Duplicate)	Acetone	0.0029	1.1	30	J	
30-May-17	Carbon tetrachloride	0.00043	0.38	4.7	J	
	Chloroform	0.0014	0.56	1.8	J	
Trigger Levels	Dichlorodifluoromethane	0.0054	0.86	2.4		
Tetrachloroethene = 20 ppmv	1,1-Dichloroethane	0.0048	0.43	1.8		
Trichlolorethene = 20 ppmv	1,1-Dichloroethene	0.022	0.76	4.7		
Total Organics = 25 ppmv	cis-1,2-Dichloroethene	0.0024	0.53	2.4		
	Methylene chloride	0.0017	0.43	2.4	J	
	Tetrachloroethene	0.340	0.30	2.4		
	Toluene	0.0011	0.30	2.4	J	
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.029	0.97	2.4		
	1,1,1-Trichloroethane	0.002	0.39	1.8		
	Trichloroethene	0.250	0.62	2.4		
	Total Organics ^d	0.66313	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^b (ppmv)	JDM (vdqq)	RL⁵ (ppby)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV04-50	Acetone	0.0038	0.18	5.0	J	
30-May-17	Benzene	0.00039	0.079	0.40	J	
	2-Butanone	0.00059	0.20	0.80	J	
	Carbon disulfide	0.0001	0.078	0.80	J	
	Carbon tetrachloride	0.00023	0.064	0.80	J	
	Chloroform	0.0019	0.095	0.30		
	Dichlorodifluoromethane	0.013	0.15	0.40		
	1,1-Dichloroethane	0.0014	0.072	0.30		
	1,1-Dichloroethene	0.0068	0.13	0.80		
	cis-1,2-Dichloroethene	0.00056	0.089	0.40		
	Methylene chloride	0.00014	0.072	0.40	J	
	Tetrachloroethene	0.052	0.051	0.40		
	Toluene	0.000051	0.051	0.40	J	
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.061	0.25	0.62		
	1,1,1-Trichloroethane	0.0079	0.065	0.30		
	Trichloroethene	0.054	0.11	0.40		
	Trichlorofluoromethane	0.029	0.20	0.40		
	Total Organics ^d	0.232861	NA	NA	NA	NA
MWL-SV04-100	Acetone	0.0032	0.27	7.7	J	
30-May-17	Benzene	0.00028	0.12	0.62	J	
	2-Butanone	0.00045	0.31	1.2	J	
	Carbon disulfide	0.0022	0.12	1.2		
	Carbon tetrachloride	0.0004	0.099	1.2	J	
	Chloroform	0.002	0.15	0.46		
	Dichlorodifluoromethane	0.024	0.22	0.62		
	1,1-Dichloroethane	0.0031	0.11	0.46		
	1,1-Dichloroethene	0.016	0.20	1.2		
	cis-1,2-Dichloroethene	0.0018	0.14	0.62		
	Methylene chloride	0.00049	0.11	0.62	J	
	Tetrachloroethene	0.089	0.079	0.62		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.100	0.46	1.1		
	1,1,1-Trichloroethane	0.0064	0.10	0.46		
	Trichloroethene	0.120	0.30	1.1		
	Trichlorofluoromethane	0.040	0.30	0.62		
	Total Organics ^d	0.40932	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV04-200	Carbon tetrachloride	0.00059	0.30	3.8	J	
30-May-17	Chloroform	0.0016	0.45	1.4		
	Dichlorodifluoromethane	0.042	0.68	1.9		
	1,1-Dichloroethane	0.0052	0.34	1.4		
	1,1-Dichloroethene	0.031	0.61	3.8		
	cis-1,2-Dichloroethene	0.003	0.42	1.9		
	Methylene chloride	0.0017	0.34	1.9	J	
	Tetrachloroethene	0.110	0.24	1.9		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.150	0.76	1.9		
	1,1,1-Trichloroethane	0.0027	0.30	1.4		
	Trichloroethene	0.180	0.49	1.9		
	Trichlorofluoromethane	0.038	0.92	1.9		
	Total Organics ^d	0.56579	NA	NA	NA	NA
MWL-SV04-300	Acetone	0.005	0.48	14	J	
30-May-17	Benzene	0.0003	0.21	1.1	J	
	Carbon tetrachloride	0.00036	0.17	2.2	J	
	Chloroform	0.00066	0.26	0.82	J	
	Dichlorodifluoromethane	0.024	0.39	1.1		
	1,1-Dichloroethane	0.0013	0.20	0.82		
	1,1-Dichloroethene	0.015	0.35	2.2		
	cis-1,2-Dichloroethene	0.00088	0.24	1.1	J	
	Methylene chloride	0.00039	0.20	1.1	J	
	Tetrachloroethene	0.095	0.14	1.1		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.076	0.44	1.1		
	1,1,1-Trichloroethane	0.0013	0.18	0.82		
	Trichloroethene	0.087	0.29	1.1		
	Trichlorofluoromethane	0.016	0.53	1.1		
	Total Organics ^d	0.32319	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL⁵ (ydqq)	RL⁵ (ppby)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV04-400	Acetone	0.011	0.49	14	J	
30-May-17	Benzene	0.0005	0.22	1.1	J	
	2-Butanone	0.0014	0.55	2.2	J	
Trigger Levels	Carbon disulfide	0.002	0.22	2.2	J	
Tetrachloroethene = 20 ppmv	Carbon tetrachloride	0.00023	0.18	2.2	J	
Trichlolorethene = 20 ppmv	Chloroform	0.00067	0.26	0.83	J	
Total Organics = 25 ppmv	Dichlorodifluoromethane	0.017	0.40	1.1		
	1,1-Dichloroethane	0.0013	0.20	0.83		
	1,1-Dichloroethene	0.011	0.36	2.2		
	cis-1,2-Dichloroethene	0.00081	0.25	1.1	J	
	Methylene chloride	0.00044	0.20	1.1	J	
	Tetrachloroethene	0.100	0.14	1.1		
	Toluene	0.00017	0.14	1.1	J	
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.066	0.45	1.1		
	1,1,1-Trichloroethane	0.0013	0.18	0.83		
	Trichloroethene	0.085	0.29	1.1		
	Trichlorofluoromethane	0.014	0.54	1.1		
	Total Organics ^d	0.31282	NA	NA	NA	NA
MWL-SV05-50	Acetone	0.0028	0.18	5.0	J	5.0U
30-May-17	Benzene	0.00018	0.079	0.40	J	
	2-Butanone	0.00048	0.20	0.80	J	
	Carbon disulfide	0.00088	0.078	0.80		
	Carbon tetrachloride	0.00033	0.064	0.80	J	
	Chloroform	0.0013	0.095	0.30		
	Dichlorodifluoromethane	0.023	0.15	0.40		
	1,1-Dichloroethane	0.0017	0.072	0.30		
	1,1-Dichloroethene	0.010	0.13	0.80		
	cis-1,2-Dichloroethene	0.00064	0.089	0.40		
	Methylene chloride	0.00025	0.072	0.40	J	0.4U
	Tetrachloroethene	0.044	0.051	0.40		
	Toluene	0.000085	0.051	0.40	J	0.4U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.044	0.16	0.40		
	1,1,1-Trichloroethane	0.014	0.065	0.30		
	Trichloroethene	0.049	0.11	0.40		
	Trichlorofluoromethane	0.110	0.70	1.4		
	Total Organics ^d	0.29951	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL⁵ (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV05-100	Acetone	0.0027	0.42	12	J	12U
30-May-17	Benzene	0.00022	0.18	0.94	J	
-	Carbon tetrachloride	0.00058	0.15	1.9	J	
	Chloroform	0.0021	0.22	0.70		
	Dichlorodifluoromethane	0.057	0.34	0.94		
	1,1-Dichloroethane	0.0036	0.17	0.70		
	1,1-Dichloroethene	0.023	0.30	1.9		
	cis-1,2-Dichloroethene	0.0016	0.21	0.94		
	Tetrachloroethene	0.089	0.12	0.94		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.091	0.38	0.94		
	1,1,1-Trichloroethane	0.014	0.15	0.70		
	Trichloroethene	0.110	0.25	0.94		
	Trichlorofluoromethane	0.150	0.96	2.0		
	Vinyl acetate	0.0055	0.34	1.9		J
	Total Organics ^d	0.54760	NA	NA	NA	NA
MWL-SV05-200	Acetone	0.0033	0.88	25	J	25U
30-May-17	Carbon disulfide	0.001	0.38	3.9	J	3.9U
	Carbon tetrachloride	0.0011	0.31	3.9	J	
	Chloroform	0.0022	0.47	1.5		
	Chloromethane	0.0012	0.97	3.9	J	
	Dichlorodifluoromethane	0.066	0.71	2.0		
	1,1-Dichloroethane	0.0055	0.35	1.5		
	1,1-Dichloroethene	0.042	0.63	3.9		
	cis-1,2-Dichloroethene	0.0028	0.44	2.0		
	Methylene chloride	0.0029	0.35	2.0		
	Tetrachloroethene	0.140	0.25	2.0		
	Toluene	0.00028	0.25	2.0	J	2.0U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.150	0.80	2.0		
	1,1,1-Trichloroethane	0.004	0.32	1.5		
	Trichloroethene	0.190	0.52	2.0		
	Trichlorofluoromethane	0.085	0.96	2.0		
	Vinyl acetate	0.0014	0.71	3.9	J	
	Total Organics ^d	0.69410	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^ь (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV05-300	Acetone	0.0055	0.54	15	J	15U
30-May-17	Benzene	0.00025	0.24	1.2	J	
	Carbon tetrachloride	0.001	0.19	2.4	J	
	Chloroform	0.001	0.29	0.91		
	Dichlorodifluoromethane	0.040	0.44	1.2		
	1,1-Dichloroethane	0.0025	0.22	0.91		
	1,1-Dichloroethene	0.031	0.39	2.4		
	cis-1,2-Dichloroethene	0.0012	0.27	1.2		
	Methylene chloride	0.0012	0.22	1.2		
	Tetrachloroethene	0.110	0.15	1.2		
	Toluene	0.00019	0.15	1.2	J	1.2U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.130	0.49	1.2		
	1,1,1-Trichloroethane	0.0018	0.20	0.91		
	Trichloroethene	0.120	0.32	1.2		
	Trichlorofluoromethane	0.037	0.59	1.2		
	Total Organics ^d	0.47695	NA	NA	NA	NA
MWL-SV05-400	Acetone	0.0064	0.41	12	J	12U
30-May-17	Benzene	0.00034	0.18	0.93	J	
	2-Butanone	0.00074	0.46	1.9	J	
Trigger Levels	Carbon disulfide	0.014	0.18	1.9		
Tetrachloroethene = 20 ppmv	Carbon tetrachloride	0.00061	0.15	1.9	J	
Trichlolorethene = 20 ppmv	Chloroform	0.00075	0.22	0.70		
Total Organics = 25 ppmv	Dichlorodifluoromethane	0.0094	0.34	0.93		
	1,1-Dichloroethane	0.0018	0.17	0.70		
	1,1-Dichloroethene	0.022	0.30	1.9		
	cis-1,2-Dichloroethene	0.00078	0.21	0.93	J	
	Methylene chloride	0.00085	0.17	0.93	J	0.93U
	Tetrachloroethene	0.100	0.12	0.93		
	Toluene	0.0016	0.12	0.93		J+
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.036	0.38	0.93		
	1,1,1-Trichloroethane	0.0016	0.15	0.70		
	Trichloroethene	0.087	0.24	0.93		
	Trichlorofluoromethane	0.023	0.45	0.93		
	Total Organics ^d	0.29962	NA	NA	NA	NA

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Table 5-1 (Concluded) Summary of Detected VOCs (EPA Method TO-15^a) Mixed Waste Landfill Soil-Vapor Monitoring May 2017

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.

Laboratory Qualifier

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

Validation Qualifier

- J = The associated value is an estimated quantity.
- J+ = The associated value is an estimated quantity with a suspected positive bias.
- 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 qualified during data validation as not detected not included).

- 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.
- VOC = Volatile organic compound.

Well ID/Sample Port	Analyte	Result⁵ (ppmv)	MDL ^b (ppbv)	RL⁵ (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV01-42.5	Acetone	0.0047	1.8	51	J	
26-Oct-17	Chloroform	0.014	0.97	3.1		
	Dichlorodifluoromethane	0.084	1.5	4.1		
	1,1-Dichloroethane	0.0024	0.73	3.1	J	
	1,1-Dichloroethene	0.0065	1.3	8.2	J	
	cis-1,2-Dichloroethene	0.0012	0.91	4.1	J	
	Methylene chloride	0.00081	0.73	4.1	J	4.1U
	Tetrachloroethene	0.340	0.52	4.1		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.067	1.7	4.1		
	1,1,1-Trichloroethane	0.034	0.66	3.1		
	Trichloroethene	0.074	1.1	4.1		
	Trichlorofluoromethane	0.160	2.0	4.1		
	Total Organics ^d	0.78780	NA	NA	NA	NA
MWL-SV01-42.5 (Duplicate)	Acetone	0.0051	1.8	51	J	
26-Oct-17	Chloroform	0.014	0.97	3.1		
	Dichlorodifluoromethane	0.084	1.5	4.1		
	1,1-Dichloroethane	0.0023	0.73	3.1	J	
	1,1-Dichloroethene	0.0066	1.3	8.2	J	
	cis-1,2-Dichloroethene	0.0011	0.91	4.1	J	
	Tetrachloroethene	0.420	0.52	4.1		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.072	1.7	4.1		
	1,1,1-Trichloroethane	0.037	0.66	3.1		
	Trichloroethene	0.086	1.1	4.1		
	Trichlorofluoromethane	0.170	2.0	4.1		
	Total Organics ^d	0.89810	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^ь (ppmv)	MDL ^b (ppbv)	RL⁵ (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV02-41.5	Acetone	0.0073	1.4	38	J	38U
26-Oct-17	2-Butanone	0.0035	1.5	6.1	J	
	Chloroform	0.0028	0.73	2.3		
	Dichlorodifluoromethane	0.080	1.1	3.1		
	1,1-Dichloroethane	0.0023	0.55	2.3		
	1,1-Dichloroethene	0.011	0.99	6.1		
	Tetrachloroethene	0.069	0.39	3.1		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.049	1.2	3.1		
	1,1,1-Trichloroethane	0.072	0.50	2.3		
	Trichloroethene	0.065	0.80	3.1		
	Trichlorofluoromethane	0.300	1.5	3.1		
	Total Organics ^d	0.65460	NA	NA	NA	NA
MWL-SV02-41.5 (Duplicate)	Acetone	0.0059	1.3	37	J	37U
26-Oct-17	Chloroform	0.0029	0.70	2.2		
	Dichlorodifluoromethane	0.078	1.1	2.9		
	1,1-Dichloroethane	0.0024	0.53	2.2		
	1,1-Dichloroethene	0.011	0.95	5.9		
	Ethylbenzene	0.00054	0.46	2.9	J	
	Tetrachloroethene	0.072	0.37	2.9		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.050	1.2	2.9		
	1,1,1-Trichloroethane	0.074	0.48	2.2		
	Trichloroethene	0.067	0.77	2.9		
	Trichlorofluoromethane	0.310	1.4	2.9		
	1,2,4-Trimethylbenzene	0.0031	1.2	5.9	J	
	1,3,5-Trimethylbenzene	0.0014	0.92	2.9	J	
	m,p-Xylene	0.0025	0.73	5.9	J	
	o-Xylene	0.0011	0.40	2.9	J	
	Total Organics ^d	0.67594	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL [♭] (ppbv)	RL⁵ (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV03-50	Acetone	0.0012	0.72	20	J	20U
26-Oct-17	Benzene	0.00056	0.32	1.6	J	1.6U
	Chloroform	0.0018	0.38	1.2		
	Dichlorodifluoromethane	0.024	0.59	1.6		
	1,1-Dichloroethane	0.0037	0.29	1.2		
	1,1-Dichloroethene	0.014	0.52	3.2		
	cis-1,2-Dichloroethene	0.0018	0.36	1.6		
	Methylene chloride	0.0011	0.29	1.6	J	
	Tetrachloroethene	0.140	0.21	1.6		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.086	0.66	1.6		
	1,1,1-Trichloroethane	0.0041	0.26	1.2		
	Trichloroethene	0.120	0.43	1.6		
	Trichlorofluoromethane	0.032	0.79	1.6		
	m,p-Xylene	0.00068	0.41	3.2	J	
	Total Organics ^d	0.42918	NA	NA	NA	NA
MWL-SV03-100	Acetone	0.0033	0.72	20	J	20U
26-Oct-17	Carbon tetrachloride	0.00031	0.26	3.3	J	
	Chloroform	0.0023	0.39	1.2		
	Chloromethane	0.00083	0.80	3.3	J	3.3U
	Dichlorodifluoromethane	0.031	0.59	1.6		
	1,1-Dichloroethane	0.0057	0.29	1.2		
	1,1-Dichloroethene	0.022	0.53	3.3		
	cis-1,2-Dichloroethene	0.0033	0.36	1.6		
	Methylene chloride	0.0018	0.29	1.6		
	Tetrachloroethene	0.220	0.21	1.6		
	Toluene	0.00037	0.21	1.6	J	1.6U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.120	0.66	1.6		
	1,1,1-Trichloroethane	0.0044	0.26	1.2		
	Trichloroethene	0.180	0.43	1.6		
	Trichlorofluoromethane	0.038	0.80	1.6		
	Total Organics ^d	0.62881	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^ь (ppmv)	MDL [♭] (ppbv)	RL [⊾] (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV03-200	Acetone	0.0022	1.4	38	J	38U
26-Oct-17	Chloroform	0.0023	0.72	2.3		
	Dichlorodifluoromethane	0.050	1.1	3.0		
	1,1-Dichloroethane	0.0074	0.55	2.3		
	1,1-Dichloroethene	0.030	0.98	6.1		
	cis-1,2-Dichloroethene	0.0041	0.68	3.0		
	Methylene chloride	0.0034	0.55	3.0		
	Tetrachloroethene	0.260	0.39	3.0		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.160	1.2	3.0		
	1,1,1-Trichloroethane	0.0027	0.49	2.3		
	Trichloroethene	0.230	0.80	3.0		
	Trichlorofluoromethane	0.036	1.5	3.0		
	Total Organics ^d	0.78590	NA	NA	NA	NA
MWL-SV03-300	Acetone	0.0052	1.3	37	J	37U
26-Oct-17	Chloroform	0.0014	0.70	2.2	J	
	Chloromethane	0.0015	1.4	5.9	J	5.9U
	Dichlorodifluoromethane	0.039	1.1	2.9		
	1,1-Dichloroethane	0.0034	0.53	2.2		
	1,1-Dichloroethene	0.022	0.94	5.9		
	Methylene chloride	0.0015	0.53	2.9	J	
	Tetrachloroethene	0.280	0.37	2.9		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.140	1.2	2.9		
	1,1,1-Trichloroethane	0.0011	0.48	2.2	J	
	Trichloroethene	0.210	0.77	2.9		
	Trichlorofluoromethane	0.018	1.4	2.9		
	Total Organics ^d	0.71640	NA	NA	NA	NA

Well ID/Sample Port Analyte		Result ^b (ppmy)	MDL ^b (ppby)	RL ^b (ppby)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV03-400	Acetone	0.012	1.9	55	J	55U
26-Oct-17	Chloroform	0.0015	1.0	3.3	J	
	Dichlorodifluoromethane	0.013	1.6	4.4		
Trigger Levels	1,1-Dichloroethane	0.0035	0.79	3.3		
Tetrachloroethene = 20 ppmv	1,1-Dichloroethene	0.015	1.4	8.8		
Trichlolorethene = 20 ppmv	cis-1,2-Dichloroethene	0.0031	0.97	4.4	J	
Total Organics = 25 ppmv	Methylene chloride	0.0022	0.79	4.4	J	
	Tetrachloroethene	0.310	0.56	4.4		
	Toluene	0.0039	0.56	4.4	J	4.4U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.042	1.8	4.4		
	1,1,1-Trichloroethane	0.0013	0.71	3.3	J	
	Trichloroethene	0.230	1.1	4.4		
	Trichlorofluoromethane	0.0077	2.1	4.4		
	Total Organics ^d	0.62930	NA	NA	NA	NA
MWL-SV04-50	Acetone	0.0024	0.36	10	J	
26-Oct-17	Benzene	0.00049	0.16	0.80	J	0.80U
	Carbon tetrachloride	0.00021	0.13	1.6	J	
	Chloroform	0.0019	0.19	0.60		
	Dichlorodifluoromethane	0.017	0.29	0.80		
	1,1-Dichloroethane	0.0016	0.14	0.60		
	1,1-Dichloroethene	0.0078	0.26	1.6		
	cis-1,2-Dichloroethene	0.00072	0.18	0.80	J	
	Methylene chloride	0.00022	0.14	0.80	J	0.80U
	Tetrachloroethene	0.063	0.10	0.80		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.067	0.33	0.80		
	1,1,1-Trichloroethane	0.0071	0.13	0.60		
	Trichloroethene	0.058	0.21	0.80		
	Trichlorofluoromethane	0.029	0.39	0.80		
	Total Organics ^d	0.25573	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL [♭] (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV04-100	Acetone	0.0038	0.80	22	J	
26-Oct-17	Benzene	0.00044	0.35	1.8	J	1.8U
	Carbon disulfide	0.0012	0.35	3.6	J	
	Chloroform	0.0019	0.43	1.3		
	Dichlorodifluoromethane	0.032	0.65	1.8		
	1,1-Dichloroethane	0.0033	0.32	1.3		
	1,1-Dichloroethene	0.017	0.58	3.6		
	cis-1,2-Dichloroethene	0.002	0.40	1.8		
	Methylene chloride	0.00076	0.32	1.8	J	1.8U
	Tetrachloroethene	0.110	0.23	1.8		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.100	0.73	1.8		
	1,1,1-Trichloroethane	0.0052	0.29	1.3		
	Trichloroethene	0.120	0.47	1.8		
	Trichlorofluoromethane	0.037	0.88	1.8		
	Total Organics ^d	0.43340	NA	NA	NA	NA
MWL-SV04-200	Acetone	0.0052	0.98	28	J	
26-Oct-17	Carbon tetrachloride	0.00047	0.35	4.4	J	
	Chloroform	0.0015	0.52	1.7	J	
	Dichlorodifluoromethane	0.041	0.80	2.2		
	1,1-Dichloroethane	0.0052	0.40	1.7		
	1,1-Dichloroethene	0.030	0.71	4.4		
	cis-1,2-Dichloroethene	0.0031	0.49	2.2		
	Methylene chloride	0.0016	0.40	2.2	J	2.2U
	Tetrachloroethene	0.130	0.28	2.2		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.140	0.90	2.2		
	1,1,1-Trichloroethane	0.0024	0.36	1.7		
	Trichloroethene	0.170	0.58	2.2		
	Trichlorofluoromethane	0.034	1.1	2.2		
	Total Organics ^d	0.56287	NA	NA	NA	NA

Well ID/Sample Port		Analyte	Result ^b	MDL ^b (nnby)	RL⁵ (nnbv)	Laboratory	Validation
MWI -SV04-300		Acetone	0.0042	0.53	15	dualifier	
26-Oct-17		Benzene	0.00037	0.24	1.2	J	1.2U
		Carbon disulfide	0.00051	0.23	2.4	J	
		Carbon tetrachloride	0.00029	0.19	2.4	J	
		Chloroform	0.00064	0.29	0.90	J	
		Dichlorodifluoromethane	0.018	0.44	1.2		
		1,1-Dichloroethane	0.0016	0.22	0.90		
		1,1-Dichloroethene	0.016	0.39	2.4		
		cis-1,2-Dichloroethene	0.00088	0.27	1.2	J	
		Methylene chloride	0.00045	0.22	1.2	J	1.2U
		Tetrachloroethene	0.120	0.15	1.2		
		Toluene	0.0002	0.15	1.2	J	
		1,1,2-Trichloro-1,2,2-trifluoroethane	0.082	0.49	1.2		
		1,1,1-Trichloroethane	0.0013	0.20	0.90		
		Trichloroethene	0.094	0.32	1.2		
		Trichlorofluoromethane	0.016	0.59	1.2		
		Total Organics ^d	0.35562	NA	NA	NA	NA
MWL-SV04-400		Acetone	0.0059	0.53	15	J	
26-Oct-17		Benzene	0.00067	0.24	1.2	J	1.2U
		2-Butanone	0.00085	0.60	2.4	J	
Trigger Levels		Carbon disulfide	0.0042	0.23	2.4		
Tetrachloroethene	= 20 ppmv	Carbon tetrachloride	0.0002	0.19	2.4	J	
Trichlolorethene	= 20 ppmv	Chloroform	0.00062	0.29	0.90	J	
Total Organics	= 25 ppmv	Dichlorodifluoromethane	0.019	0.44	1.2		
		1,1-Dichloroethane	0.0013	0.22	0.90		
		1,1-Dichloroethene	0.012	0.39	2.4		
		cis-1,2-Dichloroethene	0.00083	0.27	1.2	J	
		Methylene chloride	0.00041	0.22	1.2	J	1.2U
		Tetrachloroethene	0.110	0.15	1.2		
		Toluene	0.00022	0.15	1.2	J	
		1,1,2-Trichloro-1,2,2-trifluoroethane	0.076	0.49	1.2		
		1,1,1-Trichloroethane	0.0012	0.20	0.90		
		Trichloroethene	0.081	0.32	1.2		
		Trichlorofluoromethane	0.016	0.59	1.2		
		Total Organics ^d	0.32932	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^ь (ppmv)	MDL ^ь (ppbv)	RL ^ь (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV05-50	Acetone	0.0026	0.62	18	J	18U
26-Oct-17	Carbon disulfide	0.0011	0.27	2.8	J	
	Carbon tetrachloride	0.00026	0.22	2.8	J	
	Chloroform	0.0011	0.33	1.1		
	Dichlorodifluoromethane	0.036	0.51	1.4		
	1,1-Dichloroethane	0.0016	0.25	1.1		
	1,1-Dichloroethene	0.0097	0.45	2.8		
	cis-1,2-Dichloroethene	0.00066	0.31	1.4	J	
	Methylene chloride	0.00047	0.25	1.4	J	
	Tetrachloroethene	0.021	0.18	1.4		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.040	0.57	1.4		
	1,1,1-Trichloroethane	0.012	0.23	1.1		
	Trichloroethene	0.042	0.37	1.4		
	Trichlorofluoromethane	0.096	0.69	1.4		
	Total Organics ^d	0.26189	NA	NA	NA	NA
MWL-SV05-100	Acetone	0.0029	0.80	23	J	23U
26-Oct-17	Carbon tetrachloride	0.00052	0.29	3.6	J	
	Chloroform	0.0021	0.43	1.4		
	Dichlorodifluoromethane	0.067	0.66	1.8		
	1,1-Dichloroethane	0.0034	0.33	1.4		
	1,1-Dichloroethene	0.023	0.58	3.6		
	cis-1,2-Dichloroethene	0.0016	0.40	1.8	J	
	Methylene chloride	0.0011	0.33	1.8	J	
	Tetrachloroethene	0.070	0.23	1.8		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.090	0.74	1.8		
	1,1,1-Trichloroethane	0.013	0.29	1.4		
	Trichloroethene	0.100	0.47	1.8		
	Trichlorofluoromethane	0.140	0.89	1.8		
	Total Organics ^d	0.51172	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL⁵ (ppbv)	RL⁵ (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV05-200	Acetone	0.0051	0.81	23	J	23U
26-Oct-17	Carbon disulfide	0.00062	0.35	3.6	J	
	Carbon tetrachloride	0.00087	0.29	3.6	J	
	Chloroform	0.0019	0.43	1.4		
	Dichlorodifluoromethane	0.051	0.66	1.8		
	1,1-Dichloroethane	0.0048	0.33	1.4		
	1,1-Dichloroethene	0.037	0.59	3.6		
	cis-1,2-Dichloroethene	0.0022	0.40	1.8		
	Methylene chloride	0.0025	0.33	1.8		
	Tetrachloroethene	0.100	0.23	1.8		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.140	0.74	1.8		
	1,1,1-Trichloroethane	0.0036	0.30	1.4		
	Trichloroethene	0.150	0.48	1.8		
	Trichlorofluoromethane	0.079	0.89	1.8		
	Total Organics ^d	0.57349	NA	NA	NA	NA
MWL-SV05-300	Acetone	0.014	0.71	20	J	20U
26-Oct-17	Benzene	0.00038	0.32	1.6	J	1.6U
	2-Butanone	0.0012	0.80	3.2	J	
	Carbon disulfide	0.0018	0.31	3.2	J	
	Chloroform	0.0014	0.38	1.2		
	Chloromethane	0.0011	0.79	3.2	J	
	Dichlorodifluoromethane	0.032	0.58	1.6		
	1,1-Dichloroethane	0.0024	0.29	1.2		
	1,1-Dichloroethene	0.028	0.52	3.2		
	cis-1,2-Dichloroethene	0.0012	0.36	1.6	J	
	Methylene chloride	0.0014	0.29	1.6	J	
	Tetrachloroethene	0.091	0.20	1.6		
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.120	0.65	1.6		
	1,1,1-Trichloroethane	0.002	0.26	1.2		
	Trichloroethene	0.120	0.42	1.6		
	Trichlorofluoromethane	0.037	0.79	1.6		
	Total Organics ^d	0.44050	NA	NA	NA	NA

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^ь (ppbv)	RL⁵ (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV05-400	Acetone	0.0069	0.63	18	J	18U
26-Oct-17	Benzene	0.00033	0.28	1.4	J	1.4U
	Carbon tetrachloride	0.00061	0.23	2.8	J	
Trigger Levels	Chloroform	0.00092	0.33	1.1	J	
Tetrachloroethene = 20 ppmv	Dichlorodifluoromethane	0.015	0.51	1.4		
Trichlolorethene = 20 ppmv	1,1-Dichloroethane	0.0024	0.25	1.1		
Total Organics = 25 ppmv	1,1-Dichloroethene	0.018	0.45	2.8		
	cis-1,2-Dichloroethene	0.00097	0.31	1.4	J	
	Methylene chloride	0.0012	0.25	1.4	J	
	Tetrachloroethene	0.092	0.18	1.4		
	Toluene	0.00063	0.18	1.4	J	
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.038	0.57	1.4		
	1,1,1-Trichloroethane	0.0027	0.23	1.1		
	Trichloroethene	0.097	0.37	1.4		
	Trichlorofluoromethane	0.026	0.69	1.4		
	Total Organics ^d	0.29543	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.

Laboratory Qualifier

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

Validation Qualifier

U = The analyte was reported as a detection by the laboratory but was qualified during data validation as not detected. The associated numerical value is the revised sample quantitation limit 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.
- VOC = Volatile organic compound.

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6.0 SOIL-MOISTURE MONITORING RESULTS

This chapter presents soil-moisture monitoring activities (i.e., data collection and evaluation) in accordance with LTMMP 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 and disposal area so that timely action can be taken, if necessary. Results for the depth range of 8.7 to 86.6 ft bgs for each soil-moisture access tube are compared to the trigger level defined in LTMMP 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, 2017 through March 31, 2018 reporting period fulfilling the LTMMP annual monitoring requirement. The monitoring event was conducted on April 17, 2017. 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 LTMMP Section 3.4.2 and Appendix E (SNL/NM March 2012). Baseline for soil-moisture content was determined for each access tube prior to the ET Cover subgrade work in September 2006 by averaging data collected during ten monitoring events 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 MW-VZ-1, MWLVZ-2, and MWL-VZ-3, respectively. The results for the April 17, 2017 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 ft 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 LTMMP 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 ft bgs for each monitoring location as specified in LTMMP 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 5.2 percent, compared to 1.7 to 5.6 percent baseline. At MWL-VZ-2 the soil-moisture content ranged from 2.0 to 4.6 percent, compared to 2.1 to 5.5 percent baseline. At MWL-VZ-3 the soil-moisture content ranged from 1.3 to 4.1 percent, compared to 1.8 to 4.5 percent baseline.

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



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



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



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

7.0 GROUNDWATER MONITORING RESULTS

This chapter presents groundwater monitoring activities (i.e., sampling and analysis), analytical results, and data evaluation in accordance with LTMMP Sections 3.5 and Appendix F (SNL/NM March 2012). The monitoring objective is to 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 groundwater monitoring events were conducted during the April 1, 2017 through March 31, 2018 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 May 2 and 8, 2017. An environmentalduplicate sample pair was collected from MWL-MW9.

The second sampling event was conducted between October 17 and 24, 2017. An environmental-duplicate sample pair was collected from MWL-MW8.

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 YSI[™] Model EXO1 Water Quality Meter and a HACH[™] Model 2100Q portable turbidity meter. Additional water quality measurements included oxidation-reduction potential and dissolved oxygen.



Figure 7-1 Mixed Waste Landfill Groundwater Monitoring Well Locations

A portable Bennett[™] groundwater sampling system was used to collect environmental samples from all wells. Purge requirements were satisfied at all monitoring wells. In accordance with LTMMP 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 0.12 gallons per minute (gpm) at MWL-MW9 to 0.32 gpm at MWL-BW2 for the May 2017 sampling event. The average flow rates ranged from 0.09 gpm at MWL-MW9 to 0.28 gpm at MWL-BW2 for the October 2017 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 May and October sampling events is provided below. Analytical results are presented in Section 7.2.

First Sampling Event – May 2-8, 2017

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

Second Sampling Event – October 17-24, 2017

One duplicate sample was collected at MWL-MW8. One equipment blank sample was collected prior to sampling MWL-MW8. Five field blank samples were collected; one at ERFO and four at the site (one at each monitoring well). Five trip blank samples were also submitted 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 231 gallons of wastewater were generated during the May 2017 groundwater sampling event and approximately 226 gallons were generated during the October 2017 sampling event.

PPE and other solid waste generated during May and October 2017 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 historical 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, 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

LTMMP trigger levels. All results were below applicable LTMMP trigger levels defined in Section 5.2.4 of the LTMMP (SNL/NM March 2012) and were comparable to historical MWL groundwater monitoring results.

Table 7-1 summarizes detected VOCs for the May and October sampling events. The MDLs for all VOCs are presented in Table 7-2. The 2017 results for cadmium, chromium, nickel, and uranium are provided in Table 7-3, and the radionuclide, gross alpha, gross beta, tritium, and radon results are provided in Table 7-4. Table 7-5 summarizes field water quality measurements taken prior to environmental groundwater sample collection for both 2017 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 40 CFR 141. Uranium is measured independently in groundwater samples, 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. In other words, the gross beta activity is compared to natural background beta activity. If there are indications of radiological anomalies, additional analysis may be required to identify the specific radionuclide that is causing the anomalous beta activity. Once the specific radionuclide is identified, the corresponding dose to a human receptor can be calculated and compared to the trigger of 4 millirem per year. Additional analysis based on elevated gross alpha or gross beta screening results would only be required if the results are not explained by the other radionuclide-specific results. In summary, the screening and evaluation process ensures that if radiological contamination is present, it will be detected, evaluated, and appropriate follow-up actions will be taken.

Table 7-1 Summary of Detected VOCs (EPA Method 8260B^a) Mixed Waste Landfill Groundwater Monitoring May and October 2017

Well ID	Analyte	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	Trigger Levels (µg/L)	Laboratory Qualifier ^b	Validation Qualifier ^b
October 2017 Sampling Event							
MWL-MW8 24-Oct-2017 (duplicate)	Acetone	1.70	1.5	10.0	3000	J	10U

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.

Laboratory Qualifier

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

Validation Qualifier

U = The analyte was reported as a detection by the laboratory but was qualified during data validation as not detected. The associated numerical value is the revised sample quantitation limit in units of $\mu g/L$, in accordance with the data validation process.

EPA = U.S. Environmental Protection Agency.

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

 μ g/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 May and October 2017

	MDL
Analyte	(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.

 μ g/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 May and October 2017

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	Trigger Level (mg/L)	Laboratory Qualifier ^b	Validation Qualifier ^b
May 2017 Sampling Event							•
MWL-BW2	Cadmium	ND	0.0003	0.001	0.0025	U	
02-May-17	Chromium	ND	0.003	0.010	0.043	U	
-	Nickel	ND	0.0006	0.002	0.050	U	
	Uranium	0.00675	0.000067	0.0002	0.015		
MWL-MW7	Cadmium	ND	0.0003	0.001	0.0025	U	
04-May-17	Chromium	ND	0.003	0.010	0.043	U	
-	Nickel	ND	0.0006	0.002	0.050	U	
	Uranium	0.00759	0.000067	0.0002	0.015		
MWL-MW8	Cadmium	ND	0.0003	0.001	0.0025	U	
08-May-17	Chromium	ND	0.003	0.010	0.043	U	
-	Nickel	ND	0.0006	0.002	0.050	U	
	Uranium	0.0071	0.000067	0.0002	0.015		
MWL-MW9	Cadmium	ND	0.0003	0.001	0.0025	U	
03-May-17	Chromium	ND	0.003	0.010	0.043	U	
-	Nickel	ND	0.0006	0.002	0.050	U	
	Uranium	0.00932	0.000067	0.0002	0.015		
MWL-MW9 (Duplicate)	Cadmium	ND	0.0003	0.001	0.0025	U	
03-May-17	Chromium	ND	0.003	0.010	0.043	U	
	Nickel	ND	0.0006	0.002	0.050	U	
	Uranium	0.00902	0.000067	0.0002	0.015		

Table 7-3 (Concluded) Summary of Cadmium, Chromium, Nickel, and Uranium Results (EPA Method 6020^a) Mixed Waste Landfill Groundwater Monitoring May and October 2017

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	Trigger Level (mg/L)	Laboratory Qualifier ^b	Validation Qualifier ^b	
October 2017 Sampling Event								
MWL-BW2	Cadmium	ND	0.0003	0.001	0.0025	U		
17-Oct-17	Chromium	ND	0.003	0.010	0.043	U		
	Nickel	0.00157	0.0006	0.002	0.050	J		
	Uranium	0.00697	0.000067	0.0002	0.015			
MWL-MW7	Cadmium	ND	0.0003	0.001	0.0025	U		
23-Oct-17	Chromium	ND	0.003	0.010	0.043	U		
	Nickel	ND	0.0006	0.002	0.050	U		
	Uranium	0.00745	0.000067	0.0002	0.015			
MWL-MW8	Cadmium	ND	0.0003	0.001	0.0025	U		
24-Oct-17	Chromium	ND	0.003	0.010	0.043	U		
	Nickel	ND	0.0006	0.002	0.050	U		
	Uranium	0.00733	0.000067	0.0002	0.015			
MWL-MW8 (Duplicate)	Cadmium	ND	0.0003	0.001	0.0025	U		
24-Oct-17	Chromium	ND	0.003	0.010	0.043	U		
	Nickel	ND	0.0006	0.002	0.050	U		
	Uranium	0.00776	0.000067	0.0002	0.015			
MWL-MW9	Cadmium	ND	0.0003	0.001	0.0025	U		
18-Oct-17	Chromium	ND	0.003	0.010	0.043	U		
	Nickel	0.00143	0.0006	0.002	0.050	J		
	Uranium	0.00925	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.

Laboratory Qualifier

- 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 7-4Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Tritium, and Radon ResultsMixed Waste Landfill Groundwater MonitoringMay and October 2017

Well ID	Analyte	Result ^a (pCi/L)	MDA ^ь (pCi/L)	Trigger Level	Laboratory Qualifier ^c	Validation Qualifier ^c	Analytical Method ^d
May 2017 Sampling Event	1					1	
MWL-BW2	Americium-241	-5.44 ± 16.4	19.0	NE	U	BD	EPA 901.1
02-May-17	Cesium-137	-1.2 ± 3.30	3.74	NE	U	BD	EPA 901.1
	Cobalt-60	0.609 ± 3.02	3.94	NE	U	BD	EPA 901.1
	Gross Alpha	6.38	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^e	5.54 ± 1.26	1.17	4 mrem/yr			EPA 900.0
	Tritium ^f	$\textbf{7.93} \pm \textbf{82.4}$	147	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	412 ± 105	59.0	1000 pCi/L			SM7500 RnB
MWL-MW7	Americium-241	0.0778 ± 7.43	12.9	NE	U	BD	EPA 901.1
04-May-17	Cesium-137	0.487 ± 1.55	2.79	NE	U	BD	EPA 901.1
	Cobalt-60	2.09 ± 1.83	3.07	NE	U	BD	EPA 901.1
	Gross Alpha	8.01	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^e	5.93 ± 1.58	1.37	4 mrem/yr			EPA 900.0
	Tritium ^f	-5.79 ± 82.6	150	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	205 ± 58.9	47.7	1000 pCi/L			SM7500 RnB
MWL-MW8	Americium-241	0.579 ± 15.4	23.8	NE	U	BD	EPA 901.1
08-May-17	Cesium-137	1.08 ± 1.87	3.26	NE	U	BD	EPA 901.1
	Cobalt-60	0.338 ± 1.77	3.10	NE	U	BD	EPA 901.1
	Gross Alpha	4.36	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^e	5.04 ± 1.32	1.36	4 mrem/yr			EPA 900.0
	Tritium ^f	24.2 ± 83.5	147	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	120 ± 60.6	84.5	1000 pCi/L		J	SM7500 RnB
MWL-MW9	Americium-241	4.10 ± 10.0	16.8	NE	U	BD	EPA 901.1
03-May-17	Cesium-137	-1.3 ± 1.86	2.93	NE	U	BD	EPA 901.1
	Cobalt-60	1.21 ± 2.06	3.85	NE	U	BD	EPA 901.1
	Gross Alpha	4.06	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^e	6.62 ± 1.39	1.10	4 mrem/yr			EPA 900.0
	Tritium ^f	-1.18 ± 79.8	144	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	509 ± 125	56.8	1000 pCi/L			SM7500 RnB

Table 7-4 (Continued) Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Tritium, and Radon Results Mixed Waste Landfill Groundwater Monitoring May and October 2017

Well ID	Analyte	Resultª (pCi/L)	MDA ^ь (pCi/L)	Trigger Level	Laboratory Qualifier ^c	Validation Qualifier ^c	Analytical Method ^d
May 2017 Sampling Event (Co	ntinued)						
MWL-MW9 (Duplicate)	Americium-241	-0.414 ± 6.48	11.2	NE	U	BD	EPA 901.1
03-May-17	Cesium-137	-0.365 ± 1.77	3.00	NE	U	BD	EPA 901.1
	Cobalt-60	-0.181 ± 1.68	3.02	NE	U	BD	EPA 901.1
	Gross Alpha	6.46	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^e	$\textbf{6.59} \pm \textbf{1.39}$	1.14	4 mrem/yr			EPA 900.0
	Tritium ^f	30.2 ± 81.6	142	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	450 ± 112	56.9	1000 pCi/L			SM7500 RnB

Table 7-4 (Continued) Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Tritium, and Radon Results Mixed Waste Landfill Groundwater Monitoring May and October 2017

Well ID	Analyte	Resultª (pCi/L)	MDA ^ь (pCi/L)	Trigger Level	Laboratory Qualifier ^c	Validation Qualifier ^c	Analytical Method ^d
October 2017 Sampling Even	nt						
MWL-BW2	Americium-241	-5.66 ± 15.9	25.7	NE	U	BD	EPA 901.1
17-Oct-17	Cesium-137	-1.29 ± 2.23	3.63	NE	U	BD	EPA 901.1
	Cobalt-60	-1.08 ± 3.71	4.06	NE	U	BD	EPA 901.1
	Gross Alpha	4.57	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^e	4.13 ± 0.959	0.794	4 mrem/yr		J	EPA 900.0
	Tritium ^f	$\textbf{-80.3} \pm \textbf{98.3}$	175	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	379 ± 92.7	47.2	1000 pCi/L			SM7500 Rn B
MWL-MW7	Americium-241	-7.34 ± 15.6	23.4	NE	U	BD	EPA 901.1
23-Oct-17	Cesium-137	0.250 ± 1.95	3.38	NE	U	BD	EPA 901.1
	Cobalt-60	0.0962 ± 1.93	3.53	NE	U	BD	EPA 901.1
	Gross Alpha	3.39	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^e	5.66 ± 1.18	0.781	4 mrem/yr		J	EPA 900.0
	Tritium ^f	-89.1 ± 104	185	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	174 ± 62.5	69.2	1000 pCi/L		J	SM7500 Rn B
MWL-MW8	Americium-241	0.311 ± 14.7	23.9	NE	U	BD	EPA 901.1
24-Oct-17	Cesium-137	-0.0501 ± 2.05	3.51	NE	U	BD	EPA 901.1
	Cobalt-60	0.261 ± 1.83	3.43	NE	U	BD	EPA 901.1
	Gross Alpha	10.99	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^e	4.71 ± 1.02	0.767	4 mrem/yr		J	EPA 900.0
	Tritium ^f	61.4 ± 106	179	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	145 ± 52.3	58.0	1000 pCi/L		J	SM7500 Rn B
MWL-MW8 (Duplicate)	Americium-241	1.06 ± 8.95	14.7	NE	U	BD	EPA 901.1
24-Oct-17	Cesium-137	1.39 ± 1.76	3.04	NE	U	BD	EPA 901.1
	Cobalt-60	0.895 ± 1.92	3.55	NE	U	BD	EPA 901.1
	Gross Alpha	6.40	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^e	5.06 ± 1.09	0.760	4 mrem/yr		J	EPA 900.0
	Tritium ^f	12.3 ± 104	180	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	201 ± 62.6	58.1	1000 pCi/L			SM7500 Rn B

Table 7-4 (Concluded) Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Tritium, and Radon Results Mixed Waste Landfill Groundwater Monitoring May and October 2017

Well ID	Analyte	Result ^a (pCi/L)	MDA ^ь (pCi/L)	Trigger Level	Laboratory Qualifier ^c	Validation Qualifier ^c	Analytical Method ^ª
October 2017 Sampling Event	(Continued)						
MWL-MW9	Americium-241	$\textbf{-9.68} \pm \textbf{16.6}$	24.5	NE	U	BD	EPA 901.1
18-Oct-17	Cesium-137	0.856 ± 2.32	4.05	NE	U	BD	EPA 901.1
	Cobalt-60	-0.898 ± 2.61	4.10	NE	U	BD	EPA 901.1
	Gross Alpha	0.54	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^e	5.54 ± 1.19	0.895	4 mrem/yr		J	EPA 900.0
	Tritium ^f	-47.7 ± 104	182	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	$\textbf{356} \pm \textbf{85.7}$	39.5	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.

^bMDA is the minimal detectable activity or minimum measured activity in a sample required to ensure 95% probability that the measured activity is accurately quantified above the critical level.

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

Laboratory Qualifier

NA = Not applicable.

U = Analyte was below detection limit.

Validation Qualifier

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

J = Estimated value.

None = No data validation for corrected gross alpha activity.

^dAnalytical 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.

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

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

EPA = U.S. Environmental Protection Agency.

mrem/yr = Millirem per year.

NA = Not applicable.

- NE = Not established.
- pCi/L = Picocuries per liter.

Table 7-5 Summary of Field Water Quality Measurements^a Mixed Waste Landfill Groundwater Monitoring May and October 2017

Well ID/	Temperature	SC	ORP		Turbidity	DO	DO
Sample Date	(°C)	(µmhos/cm)	(mV)	рН	(NTU)	(% Sat)	(mg/L)
May 2017 Sampling Ev	ent						
MWL-BW2	21.35	705.9	132.9	7.42	3.62	39.9	3.52
MWL-MW7	21.22	592.3	187.1	7.64	1.22	71.6	6.35
MWL-MW8	22.19	629.3	148.5	7.56	1.63	22.6	2.00
MWL-MW9	21.36	598.4	132.1	7.55	0.49	13.7	1.20
October 2017 Sampling	g Event						
MWL-BW2	20.85	675.0	140.2	7.29	3.72	38.0	3.39
MWL-MW7	20.91	561.4	107.7	7.48	1.18	73.6	6.54
MWL-MW8	19.20	550.0	175.1	7.42	0.91	23.1	2.15
MWL-MW9	22.91	599.1	253.9	7.28	0.46	15.9	1.34

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 - May 2-8, 2017

VOCs were not detected in the environmental samples above MDLs. To evaluate previous sporadic, low-concentration detections of PCE in MWL-MW8 groundwater samples, two additional groundwater samples were collected from this well during the purging process. The sample collected after the removal of approximately five gallons had a detection of PCE at 0.370 micrograms per liter. This result is consistent with the hypothesis of PCE soil-gas entering the monitoring well through the unsaturated screen interval (over 20 feet of well screen present above the groundwater elevation in MWL-MW8) and diffusing directly into the groundwater, causing sporadic low-concentration PCE detections. To further test this hypothesis and evaluate conditions in the MWL-MW8 well screen and casing, passive VOC soil-gas samplers will be deployed in MWL-MW8 in 2018. Although there are other possible explanations, this hypothesis is the most likely based on extensive characterization work performed at the nearby Chemical Waste Landfill.

Cadmium, chromium, and nickel were not detected above the associated MDL. Uranium was detected above the associated MDLs and below LTMMP trigger levels in all groundwater samples. Uranium concentrations ranged from 0.00675 milligrams per liter (mg/L) at MWL-BW2 to 0.00932 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). Gross alpha activity was detected in all samples ranging from 4.06 pCi/L (MWL-MW9) to 8.01 pCi/L (MWL-MW7). Gross beta activity was detected in all samples ranging from 5.04 pCi/L (MWL-MW8) to 6.62 pCi/L (MWL-MW9). Radon-222 was detected in all samples, with activities ranging from 120 pCi/L at MWL-MW8 to 509 pCi/L at MWL-MW9. All radiological results were reviewed by an SNL/NM radiological SME to screen for potential indications of radiological contamination; there were no indications of radiological anomalies in the groundwater sample results. Results are consistent with historical results and below LTMMP trigger levels.

Second Sampling Event - October 17-24, 2017

VOCs were not detected in the environmental samples above MDLs, except for acetone in the duplicate sample from monitoring well MWL-MW8. Acetone was qualified as not detected during data validation, as it was also detected in the associated equipment blank sample. Acetone was not detected in the MWL-MW8 environmental sample and is a common laboratory contaminant.

Cadmium and chromium were not detected above the associated MDLs. Nickel was detected in MWL-BW2 and MWL-MW9 samples at concentrations of 0.00157 mg/L and 0.00143 mg/L, respectively. Uranium was detected in all groundwater samples with concentrations ranging from 0.00697 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). Gross alpha activity was detected in all samples ranging from 0.54 pCi/L (MWL-MW9) to 10.99 pCi/L (MWL-MW8). Gross beta activity was detected in all samples ranging from 4.13 pCi/L (MWL-BW2) to 5.66 pCi/L (MWL-MW7). Radon-222 was detected in all samples, with activities ranging from 145 pCi/L at MWL-MW8 to 379 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. Variation shown in these plots reflects natural background variation in the concentration of these constituents within the Regional Aquifer.



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

0.012

0.010

Uranium Concentration (mg/L) 900'0 900'0 900'0

0.002

0.000



October 2016 May 2017

October 2017

April 2017 – March 2018

MWL-MW8



Time (month/year)

April 2014 October 2014 April 2015 October 2015 April 2016



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

7.2.2 Field Quality Control Sample Results

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

Table 7-6 summarizes results of environmental-duplicate sample pair results and the calculated RPD values for the May and October 2017 data sets. RPDs were calculated for constituents that exceeded the MDL in the sample pairs. Only the metal uranium was detected above the associated MDLs in the two sample pairs. Calculated RPDs for uranium show good agreement (i.e., RPD values less than or equal to 35 for metals) for both sampling events, ranging from 3 to 6.

Table 7-6 Summary of Duplicate Sample Results Mixed Waste Landfill Groundwater Monitoring May and October 2017

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R ₂)	RPD ^a
May Sampling Event			
MWL-MW9			
Uranium (mg/L)	0.00932	0.00902	3
October Sampling Event			
MWL-MW8			
Uranium (mg/L)	0.00733	0.00776	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: R_1 = Environmental sample result.

R₂ = Duplicate sample result.

mg/L = Milligram(s) per liter.

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

First Sampling Event – May 2-8, 2017

The equipment blank sample for the May sampling event was analyzed for all constituents. No constituents were detected above the MDLs in the equipment blank sample.

VOCs were not detected in the five field blank samples associated with the May sampling event.

VOCs were not detected in the six trip blank samples associated with the May sampling event.

Second Sampling Event – October 17-24, 2017

The equipment blank sample for the October sampling event was analyzed for all constituents. Acetone and toluene were detected. Acetone in the MWL-MW8 duplicate sample result was qualified as not detected during data validation since the reported acetone concentration was less than ten times the equipment blank concentration. No corrective action was necessary for toluene since this compound was not detected in associated environmental samples. Both of these compounds are common laboratory contaminants.

Of the five field blank samples collected in October, the field blank sample associated with well MWL-MW7 had an acetone detection. No corrective action was necessary since acetone was not detected in the associated environmental sample.

VOCs were not detected in the six 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 comply with analytical method and laboratory procedure requirements. Laboratory QC sample results that effected environmental sample results are discussed below.

First Sampling Event – May 2-8, 2017

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 133% in the laboratory batch associated with the May equipment blank, MWL-BW2, MWL-MW7, and MWL-MW9 samples. No corrective action was required since acetone was not detected in any of the associated environmental samples.

Second Sampling Event – October 17-24, 2017

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 several VOCs. The matrix spike and matrix spike duplicate recoveries for various compounds were greater than acceptance criteria. No corrective action was necessary, since all laboratory internal standards met QC criteria and analytical method requirements.

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 2014; SNL/NM

June 2017b). Based upon the data validation and review criteria, all analytical data were determined acceptable and met the DQOs. Data validation and contract verification reviews are provided in Annex E.

7.2.4 Variances and Non-Conformances

Variances and non-conformances are defined in the LTMMP Appendix F, Section 6 for groundwater monitoring. There were no variances or non-conformances from LTMMP requirements for groundwater monitoring during the May and October 2017 sampling events.

7.3 Hydrogeologic Assessment

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

The upper surface of the Regional Aquifer at the MWL is contained within the interfingering, unconsolidated, fine-grained alluvial-fan deposits of the Santa Fe Group. The more transmissive, coarser-grained Ancestral Rio Grande sediments underlie the fine-grained alluvial deposits beneath the MWL. The depth to water is approximately 500 ft bgs and groundwater flows generally westward, away from the Manzanita Mountains and towards the Rio Grande. Several 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 2017. 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 2017 all wells except MWL-BW2 and MWL-MW4 showed an increase ranging from 0.11 to 0.53 feet. From October 2015 to October 2017, the groundwater elevation declined in well MWL-BW2 only 0.52 feet, and the groundwater elevation decline in well MWL-MW4 was 1.60 feet. The subtle water table rebound measured in the monitoring wells on the west side of the MWL has been observed in wells located farther north on KAFB and is most likely related to a relaxation 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 Aguifer 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 2017 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 slug testing of the four compliance monitoring wells, and an effective porosity of 25 percent. The calculated 2017 groundwater velocity ranges from 0.02 to 0.06 feet per day; the average is 0.04 feet per day. These very low values and the general position of the groundwater elevation contours have not changed over the past four 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 2017

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 LTMMP 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, and potentially deep-rooted vegetation, is performed if these features are identified during the annual ET Cover Biology Inspection. Biota monitoring functions as an early warning detection system for biotic mobilization of contaminants to the surface so that timely action can be taken, if necessary. Results are compared to trigger levels and background levels defined in LTMMP 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, 2017 through March 31, 2018 reporting period fulfilling the LTMMP annual monitoring requirement. The biota sampling locations were identified during the annual ET Cover Biology Inspection performed on August 21, 2017. The sampling locations are shown in Figure 8-1 and consist of two ant hills (MWL AHSS-01-2017 and MWL AHSS-02-2017) and two animal burrows (ABSS-01-2017 and ABSS-02-2017). There were no potentially deep-rooted plants identified on the ET Cover during the Biology Inspection. The two ant hill locations selected for surface soil sampling were the largest and most active of the ant hills on the ET Cover, and they provide good spatial coverage. Only four very small (less than 1-inch), inactive, shallow (less than 1.5-inches deep) animal burrows were identified on the south end of the ET Cover during the annual inspection. Two of these locations were selected for sampling as a best practice. Surface soil samples were collected at these locations on August 28, 2017 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 LTMMP Appendix G, Table G-4.2-1), one field QC sample (duplicate sample) was collected at MWL ABSS-01-2017.

8.1.2 Waste Management

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



Figure 8-1 Mixed Waste Landfill Biota Sampling Locations

8.2 Laboratory Results

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

8.2.1 Environmental Sample Results

Table 8-1 summarizes metals results and Table 8-2 summarizes gamma spectroscopy results for the two ant hill and two animal burrow 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 gamma spectroscopy radionuclide activities were low, below the respective NMED-approved background activities. Thirteen of the 30 results were non-detects. Two of the uranium-238 results were qualified during data validation as estimated values because the result is less than or equal to 3 times the MDA. The gamma spectroscopy results were reviewed by an SNL/NM radiological SME to screen for potential indications of radiological contamination; there were no indications of radiological anomalies in the biota soil sample results.

8.2.2 Field Quality Control Sample Results

Table 8-3 summarizes results of environmental-duplicate sample pairs and the RPD values calculated for the August 2017 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 4 to 23, except for mercury with an RPD of 60. As defined in Section 2.3, Appendix G of the LTMMP, an RPD of less than or equal to 35 is considered acceptable for metals results. The greater RPD value for mercury is likely related to natural variability in the soil matrix, and not indicative of an issue with data precision. This situation is relatively common for low concentrations of naturally occurring metals. Both mercury results are below the NMED-approved background concentration and below the trigger level. Based on the agreement of the other RPD values, additional corrective actions are not required.

Table 8-1 Summary of Metals Results (EPA Method 6020/7470^a) Mixed Waste Landfill Biota Monitoring August 2017

Sample Location	Parameter	Result (mg/kg)	MDL (mg/kg)	Reporting Limit (mg/kg)	NMED Background ^ь (mg/kg)	Trigger Level (mg/kg)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL ABSS-01-2017	Arsenic	2.92	0.324	0.960	5.6	17.7		
28-Aug-17	Barium	91.8	0.096	0.384	130	100,000		J
	Beryllium	0.448	0.0192	0.096	0.65	2,260		
	Cadmium	0.0766	0.0192	0.192	<1	897	J	0.19U
	Chromium	8.86	0.192	0.576	17.3	63.1	N	J
	Cobalt	3.39	0.0576	0.192	5.2	20,500		
	Copper	5.83	0.0633	0.192	15.4	45,400		
	Lead	6.61	0.096	0.384	21.4	800	N	J
	Mercury	0.041	0.00393	0.0117	<0.25	73.6		
	Nickel	7.11	0.096	0.384	11.5	22,500		
	Selenium	0.885	0.345	0.960	<1	5,680	J	
	Silver	ND	0.0949	0.474	<1	5,680	U	
	Vanadium	17.8	0.288	0.960	20.4	5,680	N	J
	Zinc	23.5	0.768	1.92	62	100,000		J
MWL ABSS-01-2017	Arsenic	3.09	0.334	0.988	5.6	17.7		
28-Aug-17	Barium	116	0.0988	0.395	130	100,000		J
(Duplicate)	Beryllium	0.502	0.0198	0.0988	0.65	2,260		
	Cadmium	0.0759	0.0198	0.198	<1	897	J	0.20U
	Chromium	10.1	0.198	0.593	17.3	63.1	N	J
	Cobalt	3.63	0.0593	0.198	5.2	20,500		
	Copper	6.50	0.0652	0.198	15.4	45,400		
	Lead	7.21	0.0988	0.395	21.4	800	N	J
	Mercury	0.0221	0.00393	0.0117	<0.25	73.6		
	Nickel	7.87	0.0988	0.395	11.5	22,500		
	Selenium	0.950	0.356	0.988	<1	5,680	J	
	Silver	ND	0.0958	0.479	<1	5,680	U	
	Vanadium	19.5	0.296	0.988	20.4	5,680	N	J
	Zinc	24.9	0.791	1.98	62	100,000		J
MWL ABSS-02-2017	Arsenic	2.57	0.336	0.994	5.6	17.7		
28-Aug-17	Barium	89.7	0.0994	0.398	130	100,000		J
	Beryllium	0.414	0.0199	0.0994	0.65	2,260		
	Cadmium	0.106	0.0199	0.199	<1	897	J	0.20U
	Chromium	8.48	0.199	0.596	17.3	63.1	N	J
	Cobalt	3.52	0.0596	0.199	5.2	20,500		
	Copper	5.93	0.0656	0.199	15.4	45,400		
	Lead	7.76	0.0994	0.398	21.4	800	N	J
	Mercury	0.0176	0.0036	0.0108	<0.25	73.6		
	Nickel	6.62	0.0994	0.398	11.5	22,500		
	Selenium	0.926	0.358	0.994	<1	5,680	J	
	Silver	ND	0.099	0.495	<1	5,680	U	
	Vanadium	15.1	0.298	0.994	20.4	5,680	N	J
	Zinc	23.3	0.795	1.99	62	100,000		J

Table 8-1 (Concluded) Summary of Metals Results (EPA Method 6020/7470^a) Mixed Waste Landfill Biota Monitoring August 2017

Sample Location	Parameter	Result (mg/kg)	MDL (mg/kg)	Reporting Limit (mg/kg)	NMED Background ^ь (mg/kg)	Trigger Level (mg/kg)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL AHSS-01-2017	Arsenic	2.66	0.328	0.971	5.6	17.7		
28-Aug-17	Barium	89.5	0.0971	0.388	130	100,000		J
	Beryllium	0.399	0.0194	0.0971	0.65	2,260		
	Cadmium	0.092	0.0194	0.194	<1	897	J	0.19U
	Chromium	8.58	0.194	0.583	17.3	63.1	N	J
	Cobalt	2.97	0.0583	0.194	5.2	20,500		
	Copper	6.36	0.0641	0.194	15.4	45,400		
	Lead	6.56	0.0971	0.388	21.4	800	N	J
	Mercury	0.016	0.00393	0.0117	<0.25	73.6		
	Nickel	6.45	0.0971	0.388	11.5	22,500		
	Selenium	0.896	0.350	0.971	<1	5,680	J	
	Silver	ND	0.0971	0.485	<1	5,680	U	
	Vanadium	16.3	0.291	0.971	20.4	5,680	N	J
	Zinc	23.5	0.777	1.94	62	100,000		J
MWL AHSS-02-2017	Arsenic	2.89	0.324	0.958	5.6	17.7		
28-Aug-17	Barium	99.6	0.0958	0.383	130	100,000		J
	Beryllium	0.438	0.0192	0.0958	0.65	2,260		
	Cadmium	0.0854	0.0192	0.192	<1	897	J	0.19U
	Chromium	9.62	0.192	0.575	17.3	63.1	N	J
	Cobalt	3.34	0.0575	0.192	5.2	20,500		
	Copper	6.41	0.0632	0.192	15.4	45,400		
	Lead	7.24	0.0958	0.383	21.4	800	N	J
	Mercury	0.0135	0.00383	0.0114	<0.25	73.6		
	Nickel	7.12	0.0958	0.383	11.5	22,500		
	Selenium	0.905	0.345	0.958	<1	5,680	J	
	Silver	ND	0.0969	0.484	<1	5,680	U	
	Vanadium	18.3	0.287	0.958	20.4	5,680	N	J
	Zinc	24.5	0.766	1.92	62	100,000		J

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

Laboratory Qualifier

- = Estimated value, the analyte concentration is greater than the MDL but less than the Reporting Limit. .1
- Ν = Result for the associated matrix spike had high recovery.
- U = Analyte was not detected.
- Validation Qualifier
- = Estimated value. J
- 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.
- MDL = Method detection limit.

- 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 August 2017

Sample Location	Parameter	NMED Background ^ь (pCi/g)	Result (nCi/a)	MDA (pCi/g)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWI_ABSS-01-2017	Cesium-137	1.5	0.0761 ± 0.0311	0.0248		
28-Aug-2017	Cobalt-60	NA	0.000766 ± 0.0149	0.0275	U	BD
	Radium-226	27	0.594 ± 0.0913	0.0469		
	Thorium-232d	15	0.939 ± 0.0969	0.0364		
	Uranium-235	0.18	0.000 ± 0.0000	0.0004	11	BD
	Uranium-238	2.3	0.069 + 1.24	1 13	Ŭ	BD
MWL ABSS-01-2017	Cesium-137	1.5	0.0662 + 0.0241	0.0178		
28-Aug-2017	Cobalt-60	NA	0.000638 ± 0.0105	0.0174	U	BD
(Duplicate)	Radium-226	2.7	0.629 ± 0.0748	0.0312		
,	Thorium-232 ^d	1.5	0.899 ± 0.0929	0.0256		
	Uranium-235	0.18	-0.00092 ± 0.0561	0.091	U	BD
	Uranium-238	2.3	0.382 ± 0.997	0.541	U	BD
MWL ABSS-02-2017	Cesium-137	1.5	0.138 ± 0.0304	0.0222		
28-Aug-2017	Cobalt-60	NA	0.00337 ± 0.0149	0.0277	U	BD
-	Radium-226	2.7	0.629 ± 0.101	0.0453		
	Thorium-232 ^d	1.5	0.940 ± 0.0975	0.0381		
	Uranium-235	0.18	0.0467 ± 0.0833	0.146	U	BD
	Uranium-238	2.3	0.436 ± 1.11	1.12	U	BD
MWL AHSS-01-2017	Cesium-137	1.5	0.0613 ± 0.0171	0.0157		
28-Aug-2017	Cobalt-60	NA	-0.00465 ± 0.0104	0.0172	U	BD
	Radium-226	2.7	0.614 ± 0.069	0.0265		
	Thorium-232 ^d	1.5	0.877 ± 0.0808	0.0217		
	Uranium-235	0.18	0.0178 ± 0.0809	0.0724	U	BD
	Uranium-238	2.3	1.06 ± 0.835	0.534		J
MWL AHSS-02-2017	Cesium-137	1.5	0.0918 ± 0.0204	0.0165		
28-Aug-2017	Cobalt-60	NA	0.00803 ± 0.0115	0.0207	U	BD
	Radium-226	2.7	0.604 ± 0.0705	0.0333		
	Thorium-232d	1.5	0.866 ± 0.0857	0.0275		
	Uranium-235	0.18	-0.0322 ± 0.0629	0.0981	U	BD
	Uranium-238	2.3	1.20 ± 0.603	0.427		J

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

= Analyte is below detection limit.

Validation Qualifier

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

= Estimated value, result was less than the MDA but less than three times the MDA. J

^dThorium-232 activity is quantified and reported using the daughter isotope Lead-212 results.

DOE = U.S. Department of Energy.

= U.S. Environmental Protection Agency. EPA

MDA = Minimum detectable activity.

= Not applicable. NA

NMED = New Mexico Environment Department.

= Picocuries per gram. pCi/g

Table 8-3 Summary of Duplicate Sample Results Mixed Waste Landfill Biota Monitoring August 2017

Sample Location	Environmental Sample (R1)	Duplicate Sample (R ₂)	RPD ^a
MWL ABSS-01-2017 - Metals (n	ng/kg)		
Arsenic	2.92	3.09	6
Barium	91.8	116	23
Beryllium	0.448	0.502	11
Chromium	8.86	10.1	13
Cobalt	3.39	3.63	7
Copper	5.83	6.50	11
Lead	6.61	7.21	9
Mercury	0.041	0.0221	60
Nickel	7.11	7.87	10
Vanadium	17.8	19.5	9
Zinc	23.5	24.9	6
MWL ABSS-01-2017 – Radionu	clides (pCi/g)		
Cesium-137	0.0761	0.0662	14
Radium-226	0.594	0.629	6
Thorium-232	0.939	0.899	4

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: R_1 = Environmental sample result. R_2 = 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 AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data" (SNL/NM June 2017b). Data validation and contract verification reviews are provided in Annex B.

Minor issues with various metals results were identified during data validation and are summarized below. All cadmium results reported by the laboratory were estimated concentrations above the MDL but below the RL; however, were qualified during data validation as non-detects due to calibration blank contamination. All barium and zinc results were qualified

during data validation as estimated values due to lack of matrix spike information. All chromium, lead, and vanadium results were above the RL; however, were qualified during data validation as estimate values due to high matrix spike recoveries.

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

8.2.4 Variances

There were no variances from the LTMMP biota monitoring requirements.

8.3 Data Evaluation and Monitoring Trigger Level

Trigger levels for metals in surface soil samples collected at ant hills and animal burrows are specified in the MWL LTMMP, 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 LTMMP 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 and animal burrows were below the NMED-approved background activity levels. No deeprooted vegetation was identified for sampling.

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

9.0 INSPECTION, MAINTENANCE, AND REPAIR RESULTS

This chapter presents a summary of inspection, maintenance, and repair activities conducted in accordance with requirements in MWL LTMMP 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, 2017 through March 31, 2018 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, which are summarized in Sections 9.2 and 9.6.

9.1.1 Biology Inspection

One ET Cover Biology Inspection was performed by the staff biologist on August 21, 2017 fulfilling the requirement for an annual Biology Inspection during the reporting period growing season (Table 9-1). The ET Cover vegetation continues to meet all LTMMP criteria for successful revegetation. The approximate foliar coverage on the ET Cover was 51 percent, with 99 percent of this coverage composed of native vegetation. The foliar coverage is dominated by native grasses, with Galleta grass (native grass species) comprising approximately 40 percent of the total foliar coverage. There were no contiguous areas without vegetation exceeding 200 square feet in size and no plants capable of developing deep root systems were identified. Sixteen ant hills were observed evenly distributed on the side slopes and cover surface. Four very shallow (less than 1.5-inches deep), small-diameter (less than 1-inch) animal burrow entrance diggings were noted on the ET Cover. No action or repairs were required based on the Biology Inspection. Overall, the ET Cover vegetation and surface is in excellent condition. Additional information is provided on the August 21, 2017 Biology Inspection Form/Checklist (Annex F) and in the Biology Report (Annex G). The Biology Report summarizes ET Cover background information, local climate trends, maintenance performed to support the vegetation, and recommendations for the ET Cover based on inspections performed during the reporting period. Although only the annual Biology Inspection is required, the staff biologist performs verification inspections to support the quarterly ET Cover surface inspections performed by a field technician (Section 9.1.2).

Table 9-1 Inspection Frequency and Dates Performed Mixed Waste Landfill April 2017 – March 2018 Reporting Period

Inspection Type	Frequency	Form/Checklist ^a	Date Performed
ET Cover Biology Inspection	Annual ^b	Biology Inspection Checklist/Form	August 21, 2017
			June 14, 2017
ET Cover Surface	Quarterly	Cover Inspection	September 13, 2017
Inspection	Quarterry	Checklist/Form	December 1, 2017
			March 9, 2018
			June 14, 2017
Storm-Water Diversion	Quarterly	Cover Inspection	September 13, 2017
Structure Inspection ^c		Checklist/Form	December 1, 2017
			March 9, 2018
Soil-Vapor Monitoring	Somiannuallyd	Soil-Vapor Monitoring	May 30, 2017
Network Inspection	Semiannually	Network Checklist/Form	October 26, 2017
Soil-Moisture Monitoring Network Inspection	Annually ^d	Soil-Moisture Monitoring Network Checklist/Form	April 17, 2017
Groundwater Monitoring	Somionnuollud	Groundwater Monitoring	May 2, 2017
Network Inspection	Semiannually	Network Checklist/Form	October 17, 2017
			June 14, 2017
Security Fence	Quartarhy	Cover Inspection	September 13, 2017
Inspection ^c	Quarterry	Checklist/Form	December 1, 2017
			March 9, 2018

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.

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 LTMMP quarterly inspection requirement (Table 9-1). The quarterly inspections were supported by the staff biologist. There were no inspection items that required maintenance or repairs, although some minor best practice maintenance was performed as discussed in Section 9.7.

9.2 Storm-Water Diversion Structure Inspection

Storm-water diversion structure inspections were combined with the quarterly ET Cover System/Surface Inspections during the reporting period, fulfilling the 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, Figure 2-3), 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 14, 2017 Inspection

No inspection items required maintenance or repairs.

September 13, 2017 Inspection

No inspection items required maintenance or repairs.

December 1, 2017 Inspection

No inspection items required maintenance or repairs.

March 9, 2018 Inspection

Accumulation of dead, dry wind-blown tumbleweeds were identified along the perimeter fence. The plant debris was removed by the cover system landscaping/maintenance contractor as of April 27, 2018, within 60 days of the inspection.

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 practice to support the establishment and long-term health of the native grasses.

Three routine weed control events were conducted during 2017 as a best practice, from May 8 - 22, July 13 - 17, and September 18 - 21. The May event addressed clearing the perimeter fence of windblown tumbleweeds (requirement) and the removal of an invasive shrub from the western perimeter (best practice), both identified during the March 22, 2017 inspection (last inspection of the previous reporting period). The three events included removal of approximately 36 cubic yards of dead, windblown tumbleweeds from the ET Cover surface, perimeter fence, and drainage swale. A pre-/post-emergent herbicide was applied to North and South Staging Areas during the May and July events, and to the 3-foot area outside the perimeter fence line during the September event. The September event also included the removal of live weeds from the ET Cover, the 3-foot area outside the fence, and a 10-foot area around the monitoring well erosion control features on the western perimeter. These weed control activities help the desired native grasses by reducing the availability of weed seeds and competition from the future growth of invasive plants.

10.0 REGULATORY ACTIVITIES

On January 8, 2014, the NMED approved the MWL LTMMP (Blaine January 2014). All MWL regulatory submittals since approval and full implementation of the LTMMP are summarized in Section 10.1, along with submittals that occurred during this April 1, 2017 through March 31, 2018 reporting period.

Post-LTMMP implementation submittals, including submittals associated with the April 2017 through March 2018 reporting period, are summarized in this Section. There were no LTMMP modification requests, although preparation of an LTMMP permit modification request was initiated during the reporting period.

10.1 MWL Regulatory Submittals

Regulatory submittals during this reporting period include the fourth MWL Annual LTMM Report, April 2016 – March 2017 (SNL/NM June 2017a), approved by NMED in April 2018 (Kieling April 2018). There were also two submittals of updated procedures cited in the LTMMP Sampling and Analysis Plans. These updates keep the procedures current to reflect ongoing modifications and improvements in industry practices. In July 2017, the data validation procedure was submitted, and in February 2018, four groundwater monitoring procedures were submitted to the NMED. Both submittals were within 30 days of the effective date for the updated procedures.

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	LTMMP 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
September, 2014	Section 3.4.1	Installation Report for Three Soil-Vapor Monitoring Wells at the Mixed Waste Landfill • Approved in September 2014
March 6, 2014	Appendices C through G	Procedures, plans, and documents cited in the LTMMP 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. • 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. • Approved in October 2015
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. • 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.
April 2017 through March 2018 Reporting Period Submittals		
June 6, 2017	Section 4.8.1	MWL Annual LTMM Report, April 2016 – March 2017. • Approved in April 2018
July 6, 2017	Appendices C, D, E, F, and G	Updates to one document used by SNL/NM personnel to validate analytical data from contract laboratories.
February 8, 2018	Appendix F	Updates to reference documents used by SNL/NM personnel to conduct groundwater 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. LTMMP = 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, 2017 through March 31, 2018 reporting period were completed in accordance with LTMMP requirements. The results for each monitoring activity are summarized as follows.

Radon Monitoring

The radon air monitoring minimum frequency is semiannual, but quarterly monitoring was performed to allow for deployment and testing of multiple detectors. The range of radon activity for all monitoring locations was <0.08 to 1.3 pCi/L, and the range for all background location results was 0.11 to 1.0 pCi/L. No sample locations exceeded the trigger level of 4 pCi/L and all results confirm low levels of radon consistent with natural background levels and historical results. Radon monitoring will return to a semiannual frequency using the newer Radtrak2[®] detectors for the next reporting period.

Tritium Surface Soil Monitoring

The tritium surface soil monitoring frequency is annual. Soil samples were collected on August 30, 2017. 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 27 VOCs were detected during the May 2017 sampling event and a total of 22 VOCs were detected during the October 2017 sampling event. Results for PCE, TCE, and Total VOCs from the deepest sampling port of wells MWL-SV03, MWL-SV04, and MWL-SV05 (400 ft bgs) were below the 20 ppmv trigger level for PCE and TCE, and the 25 ppmv trigger level for Total VOCs. The maximum concentrations detected for PCE and TCE at the 400 ft bgs sampling ports were 0.390 ppmv and 0.250 ppmv, respectively. The maximum concentration for Total VOCs at the 400 ft bgs sampling ports was 0.69654 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 ft bgs at the three monitoring locations. The soil-moisture content by volume for this depth interval ranged from 1.8 to 5.2 percent, below the 23 percent soil-moisture content by volume trigger level. Soil moisture monitoring results are consistent with baseline results established prior to ET Cover construction and indicate the ET Cover is performing as designed.

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 metals and radionuclide results were below respective NMED-approved background levels and trigger levels.

11.2 Inspections/Maintenance/Repairs Activities

The annual ET Cover Biology Inspection was performed on August 21, 2017 during the reporting period growing season. The ET Cover continues to meet LTMMP successful revegetation criteria. Efforts completed since ET Cover construction in 2009 to establish self-sustaining, native grasses on the ET Cover have been successful. As a result, minimal maintenance was required during this reporting period, and no supplemental watering was needed. The ET Cover vegetation is in excellent 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. Inspections of the engineered storm-water drainage swale, perimeter security fence and access controls (i.e., gates, locks, signs), and survey monuments were performed at the same time and frequency. No issues were identified requiring maintenance or repairs beyond that performed during the inspections, except for clearing the perimeter fence of windblown tumbleweeds after the March 9, 2018 final inspection. The fence was cleared by the ET Cover maintenance contractor as of April 27, 2018, within 60 days of the inspection.

Inspections of the soil-vapor monitoring network, soil-moisture monitoring network, groundwater monitoring network, and associated sampling equipment were performed at required frequencies and no issues requiring repairs or maintenance were identified.

Three routine weed control events were conducted as a best practice during the 2017 growing season. These events included removal of dead, windblown tumbleweeds from the ET Cover surface, perimeter fence, and drainage swale as well as the application of herbicides to North

and South Staging Areas and a 3-foot area outside the perimeter 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.

11.3 Regulatory Activities

Regulatory activities during the April 2017 – March 2018 reporting period included submittal of the fourth MWL Annual LTMM Report, April 2016 – March 2017, in June 2017. NMED approved the report in April 2018 (Kieling April 2018).

Updates to documents used by SNL/NM personnel to perform monitoring activities at the MWL were submitted to NMED in July 2017 and February 2018.

11.4 Conclusions

All required MWL LTMMP monitoring, inspection, and maintenance/repair activities for the April 1, 2017 through March 31, 2018 reporting period were performed and documented in this fifth Annual LTMM Report, which meets the requirements of the MWL LTMMP, 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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12.0 REFERENCES

American Public Health Association American Water Works Association, and Water Environment Federation, 1988. "Standard Methods for the Examination of Water and Wastewater," 7500-Rn B Method, 20th Edition, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C., 1998.

Blaine, T. (New Mexico Environment Department), January 2014. Letter to G.L. Beausoleil (U.S. Department of Energy NNSA/Sandia Site Office) and S. Andrew Orrell (Sandia National Laboratories/New Mexico), "Approval, Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan, March 2012, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-12-007," January 8, 2014.

Curry, R. (New Mexico Environment Department), May 2005. "Final Order, State of New Mexico Before the Secretary of the Environment in the Matter of Request for a Class 3 Permit Modification for Corrective Measures for the Mixed Waste Landfill, Sandia National Laboratories, Bernalillo County, New Mexico," EPA ID# 5890110518." May 26, 2005.

Dinwiddie, R.S. (New Mexico Environment Department), September 1997. Letter to M.J. Zamorski (U.S. Department of Energy), "Request for Supplemental Information: Background Concentrations Report, SNL/KAFB," September 24, 1997.

EPA, see U.S. Environmental Protection Agency.

Flynn, R. (New Mexico Environment Department), February 2016. Final Order No. HWB 15-18 (P), State of New Mexico Before the Secretary of the Environment in the Matter of Proposed Permit Modification for Sandia National Laboratories, EPA ID #5890110518, To Determine Corrective Action Complete with Controls at the Mixed Waste Landfill, New Mexico Environment Department, Santa Fe, New Mexico, February 12, 2016.

Goering, T.J., G.M. Haggerty, D. Van Hart, and J.L. Peace, December 2002. "Mixed Waste Landfill Groundwater Report, 1990 through 2001, Sandia National Laboratories, Albuquerque, New Mexico," SAND2002-4098, Sandia National Laboratories, Albuquerque, New Mexico.

Kieling, J.E. (New Mexico Environment Department), February 2016. Letter to J.P. Harrell (U.S. Department of Energy NNSA/Sandia Field Office) and P.B. Davies (Sandia National Laboratories, New Mexico), "Approval, Final Decision on Proposal to Grant Corrective Action Complete with Controls Status for Mixed Waste Landfill, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-14-014," February 18, 2016.

Kieling, J.E. (New Mexico Environment Department), April 2018. Letter to J.P. Harrell (U.S. Department of Energy NNSA/Sandia Field Office) and J. Huff (Sandia National Laboratories, New Mexico), "Approval, Mixed Waste Landfill Annual Long-Term Monitoring & Maintenance Report, April 2016 – March 2017, June 2017, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-17-009," April 6, 2018.

New Mexico Environment Department (NMED), April 2004. "Compliance Order on Consent Pursuant to the New Mexico Hazardous Waste Act § 74-4-10," prepared by the New Mexico Environment Department in the matter of Respondents U.S. Department of Energy and Sandia Corporation, Sandia National Laboratories, Bernalillo County, New Mexico, April 29, 2004.

New Mexico Environment Department (NMED), October 2009 and subsequent revisions. "Resource Conservation and Recovery Act, Post-Closure Care Permit, EPA ID No. NM5890110518, to the U.S. Department of Energy/Sandia Corporation, for the Sandia National Laboratories Chemical Waste Landfill," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, October 15, 2009. Revised November 7, 2013.

New Mexico Environment Department (NMED), January 2015, and subsequent revisions. "Resource Conservation and Recovery Act Facility Operating Permit EPA ID Number NM5890110518 Issued to the U.S. Department of Energy/Sandia Corporation for the Sandia National Laboratories Hazardous and Mixed Waste Treatment and Storage Units and Post-Closure Care of the Corrective Action Management Unit," January 27, 2015.

NMED, see New Mexico Environment Department.

Peace, J.L., T.J. Goering, M.D. McVey, September 2002. "Report of the Mixed Waste Landfill Phase 2 RCRA Facility Investigation, Sandia National Laboratories, Albuquerque, New Mexico," SAND2002-2997, Sandia National Laboratories, Albuquerque, New Mexico.

Peace, J.L., P.J. Knight, T.S. Ashton, and T.J. Goering, November 2004. "Vegetation Study in Support of the Design and Optimization of Vegetative Soil Covers, Sandia National Laboratories, Albuquerque, New Mexico," SAND2004-6144, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), August 2008. "Investigation Report on the Soil-Vapor Volatile Organic Compounds, Tritium, and Radon Sampling at the Mixed Waste Landfill," Environmental Restoration Operations, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), June 2010. "Mixed Waste Landfill Groundwater Monitoring Report, Calendar Year 2009," Sandia National Laboratories, Albuquerque, New Mexico, June 7, 2010.

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 2014. "Data Validation Procedure for Chemical and Radiochemical Data," AOP 00-03, Revision 4, Sample Management Office, 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, April 2014 – March 2015," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), October 2016. "Field Operating Procedure, Soil Vapor Monitoring, Revision 04," SNL/NM FOP 08-22, Long-Term Stewardship Department, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), June 2017a. "Mixed Waste Landfill Annual Long-Term Monitoring and Maintenance Report, April 2016 – March 2017," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), June 2017b. "Data Validation Procedure for Chemical and Radiochemical Data," AOP 00-03, Revision 5, Sample Management Office, Sandia National Laboratories, Albuquerque, New Mexico.

SNL/NM, see Sandia National Laboratories, New Mexico.

Sullivan, R.M., and P.J. Knight, 1992. "Biological Assessment for the Sandia National Laboratories Coyote Canyon Test Complex, Kirtland Air Force Base, Albuquerque, New Mexico," Special Technical Report 1 (Contract AB4892), Physical Sciences Laboratory, Las Cruces, New Mexico.

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

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

U.S. Environmental Protection Agency (EPA), August 1993. "Module IV. Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA for Sandia National Laboratories/New Mexico, EPA I.D. Number NM 5890880518," U.S. Environmental Protection Agency, Region VI, Dallas, Texas. August 26, 1993.

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

Mixed Waste Landfill Radon Monitoring

January-December 2017

Data Evaluation Memos

Field Forms

Inspection Forms

Contract Verification Reviews

MIXED WASTE LANDFILL

RADON MONITORING

January-March 2017 Monitoring Period



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

Albuquerque, New Mexico 87185-0651

date: June 5, 2017

to: Mike Mitchell (8854), Robert Ziock (641), Bonnie Little (631), and Annemarie Rader (641)

from: Kelly Green (628-1) kagreen@sandia.gov Kelly Luen

subject: Review of MWL Radon Air Data – January through March 2017 Quarterly Monitoring Period

The purpose of this memo is to document my review of the radon air monitoring results for the January through March 2017 quarterly monitoring event. My review includes evaluation of the results and supporting documentation relative to the data quality objective (DQO) and monitoring objectives specified in the Mixed Waste Landfill (MWL) Long-Term Monitoring and Maintenance Plan (Appendix 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. Although radon monitoring at the MWL transitioned from a quarterly to semiannual frequency in calendar year (CY) 2016, we decided to return to quarterly monitoring for CY 2017 after review of the July through December 2016 results. Details regarding this decision and the ongoing radon detector investigation are provided in this memo after my evaluation of the January through March 2017 quarterly results.

The radon air monitoring measurements were obtained using Radtrak2[®] radon detectors that were submitted to Landauer[®] Nordic Laboratory for analysis on Analysis Request/Chain of Custody (AR/COC) #617811. On January 4, 2017, 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 LTMMP. The detectors remained in the field for approximately 3 months and were collected on April 3, 2017. The protective casing and mounting hardware were inspected during the collection effort and repairs were made if needed. The location of the detectors is shown in Figure 1.

The results for this monitoring period along with supporting field documentation meet the LTMMP DQO and monitoring objectives. The radon results were consistent with the July through December 2016 results. All results were non-detects with a detection limit of 0.4 pCi/L due to the three-month deployment period. 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 quarterly monitoring event will be presented in the next MWL Annual LTMM Report

Review of MWL Radon-in-Air Data 1st Quarter CY 2017 (Jan - March 2017) June 5, 2017

that will be submitted to NMED in June 2018 (reporting period is April 1, 2017 through March 31, 2018).

Radon Detector Investigation

The July-December 2016 semiannual monitoring event was the first time Radtrak2[®] detectors were used for radon monitoring at the MWL. As documented in my data evaluation memo dated April 12, 2017, the Radtrak[®] detector was phased out by Landauer[®] and replaced with the new Radtrak2[®] detector. The Radtrak2[®] detector was selected because it was the direct replacement for the original Radtrak[®] detector and could be used for a 6-month deployment period. The more sensitive Rapidos[®] detector was not selected because it has a maximum deployment period of 3 months, and the transition had already been made to semiannual monitoring (i.e., 6-month).

The results for the July through December 2016 monitoring period (obtained from Radtrak2[®] detectors) were lower than previous results measured using the original Radtrak[®] detectors. After receiving the data report for the July through December 2016 monitoring period in February 2017, we initiated our investigation to further evaluate the newer Radtrak2[®] detectors, including the testing of other detector types. As part of this investigation, the decision was made to move back to quarterly monitoring to allow for the collection of more data to support the investigation. The Radtrak2[®] detectors deployed on January 4, 2017 were collected on April 3, 2017 (January through March 2017 quarterly monitoring period). A side-by-side deployment of Radtrak2[®] and Rapidos[®] detectors, at every monitoring location, is currently in process for the April through June 2017 quarterly monitoring period, as recommended by the Landauer[®] Nordic Laboratory Manager.

The Landauer[®] Nordic Laboratory Manager followed up with correspondence on April 10, 2017 (after the deployment on April 3) that provided a more likely explanation for the lower values measured by the new Radtrak2[®] detectors. He clarified that the new 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. In other words, the newer Radtrak2[®] detectors should measure lower activities because they do not measure thoron. Based upon this information, a triple deployment of detectors is now scheduled for the July through September 2017 quarterly monitoring period. This deployment will include 1) Radtrak2[®] detectors that only measure radon, and 3) Rapidos[®] detectors that also only measure radon with a lower detection limit. The results from the triple deployment period will help determine the impact thoron may have had on the higher radon values measured in monitoring events conducted through June 2016, using the older Radtrak[®] detectors. A decision regarding which radon monitoring detectors will be used in the future and the corresponding period of deployment will be made based upon evaluation of CY2017 quarterly monitoring data sets.

Attachments:

Analysis Request/Chain of Custody #617811 Landauer Radon Monitoring Report (analytical laboratory results) Figure 1. Location of the Alpha Track Detectors at the MWL Review of MWL Radon-in-Air Data 1st Quarter CY 2017 (Jan - March 2017) June 5, 2017

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY AOP 95-16

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° 102235	001	RN-3 Radt	trak 625656-4		NA	4/3/17	10:31	AF	N	0 NA	NONE	Collection	Sample		RADON	
• 102236	001	RN-4 Radt	trak 703671-8		NA	4/3/17	11:08	AF	N	0 NA	NONE	Collection	Sample		RADON	
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€ 102238	001	RN-6 Radt	trak 131171-1		NA	4/3/17	12:10	AF	N	ONA	NONE	Collection	Sample		RADON	
* 102239	001	RN-7 Radt	trak 612987-8		NA	4/3/17	12:03	AF	N	ONA	NONE	Collection	Sample		RADON	
e 102240	001	RN-8 Radt	trak 996619-3		NA	4/3/17	11:40	AF	N	ONA	NONE	Collection	Sample		RADON	
€ 102241	001	RN-9 Radt	trak 380112-7		NA	4/3/17	11:32	AF	N	0 NA	NONE	Collection	Sample		RADON	
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- 3 -

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

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Review of MWL Radon-in-Air Data 1st Ouarter CY 2017 (Jan - March 2017) June 5, 2017

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87185 US



Robert Ziock MWL Radon Monitoring P.O. Box 5800 MS-1103 Albuquerque NM 87185 United States

RADON MONITORING REPORT

Issued by an Accredited Laboratory

Building Id: 6



107831-AL, 107830-RT REPORT NUMBER 4699831:1 REPORT DATE 04/17/2017

PRINT DATE 04/17/2017

REPORT PAGE 1(6)

MEASUREMENT PERFORMED FOR Robert Ziock MWL Radon Monitoring P.O. Box 5800 Albuquerque NM 87185

REPORT RECEIVER(S) Robert Ziock

Type of building:

Foundation type:

Purpose of test:

Building year: HVAC:

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 04/06/2017. They were measured 04/12/2017 .

Property data and address

MWL Radon Monitoring P.O. Box 5800 Albuquerque NM 87185

MS-1103

Test data have been given by Annemarie Rader

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/I 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.

/).0/LB

-VI 20 / 2016-04-21

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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RADON MONITORING REPORT

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REPORT NUMBER	REPORT PAGE 2()	
4699831:1		
REPORT DATE	PRINT DATE	
04/17/2017	04/17/2017	

Test results

	Detector	Start date	Stop date	Location	Detector comment	Floor level	Avg Radon Conc. pCi/l	Total Radon Exp pCi-days/l
	627057-3	01/04/2017	04/03/2017	RN1	102233-001		< 0.4	< 35
	402562-3	01/04/2017	04/03/2017	RN2	102234-001		< 0.4	< 35
	625656-4	01/04/2017	04/03/2017	RN3	102235-001		< 0.4	< 35
	703671-8	01/04/2017	04/03/2017	RN4	102236-001		< 0.4	< 35
	507308-5	01/04/2017	04/03/2017	RN5	102237-001		< 0.4	< 35
	131171-1	01/04/2017	04/03/2017	RN6	102238-001		< 0.4	< 35
	612987-8	01/04/2017	04/03/2017	RN7	102239-001		< 0.4	< 35
9	996619-3	01/04/2017	04/03/2017	RNS	102240-001		< 0.4	< 35
di mananana								

Comment to the results

Detector 380112-7 listed on COC, not received.

Detector 380112-7, RN9, was received by the laboratory, analyzed, and the result (<0.4 pCi/L) provided to SNL on May 11, 2017.

Tryggve Rönnqvist (Electronically signed)

Signature Landauer Nordic Laboratory Measurement Specialist

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Review of MWL Radon-in-Air Data 1st Ouarter CY 2017 (Jan - March 2017) June 5, 2017

Sida 3

87185 US



Robert Ziock MWL Radon Monitoring P.O. Box 5800 MS-1103 Albuquerque NM 87185 United States

RADON MONITORING REPORT

Issued by an Accredited Laboratory

Building Id: 6



REPORT NUMBER 4699831:1 REPORT DATE 04/17/2017

107831-AL, 107830-RT

PRINT DATE 04/17/2017

REPORT PAGE 3(6)

MEASUREMENT PERFORMED FOR Robert Ziock MWL Radon Monitoring P.O. Box 5800 Albuquerque NM 87185

REPORT RECEIVER(S) Robert Ziock

Type of building:

Foundation type:

Purpose of test:

Building year: HVAC:

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 04/06/2017. They were measured 04/12/2017 .

Property data and address

MWL Radon Monitoring P.O. Box 5800 Albuquerque NM 87185

MS-1103

Test data have been given by Annemarie Rader

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/I 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.

/J.O/LB

VI 207 2016-04-21

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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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REPORT NUMBER 4699831:1	REPORT PAGE 4()
REPORT DATE 04/17/2017	PRINT DATE 04/17/2017

Test results

Detector	Start date	Stop date	Location	Detector comment	Floor level	Avg Radon Conc. pCi/l	Total Radon Exp pCi-days/I
658720-8	01/04/2017	04/03/2017	RN10	102242-001		< 0.4	< 35
975536-4	01/04/2017	04/03/2017	RN11	102243-001		< 0.4	< 35
130986-3	01/04/2017	04/03/2017	RN12	102244-001		< 0.4	< 35
248716-3	01/04/2017	04/03/2017	RN13	102245-001		< 0.4	< 35
987902-4	01/04/2017	04/03/2017	RN14	102246-001		< 0.4	< 35
606910-8	01/04/2017	04/03/2017	RN15	102247-001		< 0.4	< 35
265664-3	01/04/2017	04/03/2017	RN16	102248-001		< 0.4	< 35
771008-0	01/04/2017	04/03/2017	RN17	102249-001		< 0.4	< 35

RT002LN -VI 20 / 2016-04-21 /J.O / LB

Comment to the results

Detector 380112-7 listed on COC. not received.

Detector 380112-7, RN9, was received by the laboratory, analyzed, and the result (<0.4 pCi/L) provided to SNL on May 11, 2017.

Tryggve Rönnqvist (Electronically signed)

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Review of MWL Radon-in-Air Data 1st Ouarter CY 2017 (Jan - March 2017) June 5, 2017

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87185 US



Robert Ziock MWL Radon Monitoring P.O. Box 5800 MS-1103 Albuquerque NM 87185 United States

RADON MONITORING REPORT

Issued by an Accredited Laboratory

Building Id: 6



107831-AL, 107830-RT REPORT NUMBER 4699831:1 REPORT DATE 04/17/2017

PRINT DATE 04/17/2017

REPORT PAGE 5(6)

MEASUREMENT PERFORMED FOR Robert Ziock MWL Radon Monitoring P.O. Box 5800 Albuquerque NM 87185

REPORT RECEIVER(S) Robert Ziock

Type of building: Building year:

Foundation type:

Purpose of test:

HVAC:

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 04/06/2017. They were measured 04/12/2017 .

Property data and address

MWL Radon Monitoring P.O. Box 5800 Albuquerque NM 87185

MS-1103

Test data have been given by Annemarie Rader

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/I 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

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/).o.(/

-VI 20 / 2016-04-21

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- · ANSI/AARST Radon Mitigation Standards for Schools and Large Buildings.
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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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REPORT NUMBER 4699831:1	REPORT PAGE 6()					
REPORT DATE 04/17/2017	PRINT DATE 04/17/2017					

Test results

1	Detector	Start date	Stop date	Location	Detector comment	Floor level	Avg Radon Conc. pCi/l	Total Radon Exp pCi-days/I
	715804-1	01/04/2017	04/03/2017	RNTB	102250-001		Conc. pCi/l < 0.4	Exp pCi-days/l < 36
02LN -VI 207 2016-04-21 /J.O./ LB								

Comment to the results

Detector 380112-7 listed on COC, not received.

Detector 380112-7, RN9, was received by the laboratory, analyzed, and the result (<0.4 pCi/L) provided to SNL on May 11, 2017.

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

FOP 14-03

Mixed Waste Landfill Radon Detector Deployment / Collection Form

Name: Annemane Rader Signature: Annemane Activity (check all that apply):							
Name:		Signatu	ire:			Deployme	nt 🗆 Collection
ARCOC #:	617811	De	tector Type:	Radtrac	k		
Detector Serial Number	Sample Number	Sampling Location	Deployment Date	Deployment Time	Collection Date	Collection Time	Comments
627657-3	102233-001	RN1	1-4-17	1530	4-3-17	1117	
402562-3	10223041-00)	RN2		1515		1023	
625656-4	10223 5-001	RN3		1510		1031	
703671-8	1022316-001	RN4		1607		108	
507308-5	1022:37-001	RN5		1645		1215	
131171-1	102238-001	RN6		1640		1210	
61.2987-8	102239-001	RN7		1636		103	
996619-3	102240-00l	RN8		1620		1140	
380112-7	102241-60	RN9		1616	r	1137	
658720-8	102242-001	RN10		1610		1126	
975536-4	102243-001	RN11		1540		1041	
130986-3	102244-0d	RN12		1545		1050	
248716-3	102245-001	RN13		1550		1056	
9879024	102246-001	RN14		1555		1103	
606910-8	102247-001	RN15		600		1046	
265664-3	10224B-001	RN16		1525		1220	
77/008-0	102249-001	RN17		1630		115/	
715804-1	102250-001	RNTB	V	ever	Ń	1225	

Additional Comments: ____

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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. 617811	Analytical Lab LAND	SDG No. 4699831-1

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

2.0 Analytical Laboratory Report

Line	ltom	Comp	olete?	If no evolein
No.	Item	Yes	No	li no, explain
2.1	Data reviewed, signature	Х		
2.2	Method reference number(s) complete and correct	Х		
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	Х		
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	Х		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	Х		
2.10	Narrative provided	N/A		
2.11	TAT met	Х		
2.12	Holding times met	Х		
2.13	Contractual qualifiers provided	N/A		
2.14	All requested result and TIC (if requested) data provided	Х		

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	Х		
3.2	Quantitation limit met for all samples	Х		
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	Х		

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) lon 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	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	lf 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? O Yes o No		
Based on the review, this data package is complete	. © Yes © No	
Reviewed by: Wendy Palencia Date: 05-11-2017 11	:03:00	
Closed by: Wendy Palencia Date: 05-11-2017 11:03	3:00	

Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection Form

Annemarie Rader Name Date of Inspection 2 - 9 - 201

Signature

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). Rapidos[®] 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

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Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection Form

Annemarie Roder Name

Signature

Date of Inspection 03-02-17

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).

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	Remared spectre and web- Rarolind 3-2-17
RN11	X lone
RN12	Klone
RN13	None
RN14	None
RN15	None
RN16	None
RN17	Removed speden and web, Revolud 3-2-17

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MIXED WASTE LANDFILL

RADON MONITORING

April-June 2017 Monitoring Period



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

Albuquerque, New Mexico 87185-0651

date: September 15, 2017

to: Mike Mitchell (8854), Robert Ziock (641), and Bonnie Little (631)

Kelly Treen Kelly Green (6283) kagreen@sandia.gov from:

subject: Review of MWL Radon Air Data – April through June 2017 Quarterly Monitoring Period

The purpose of this memo is to document my review of the radon air monitoring results for the April through June 2017 quarterly monitoring event. My review includes evaluation of the results and supporting documentation relative to the data quality objective (DQO) and monitoring objectives specified in the Mixed Waste Landfill (MWL) Long-Term Monitoring and Maintenance Plan (Appendix 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. Although radon monitoring at the MWL transitioned from a quarterly to semiannual frequency in calendar year (CY) 2016, a decision was made to return to quarterly monitoring for CY 2017 after review of the July through December 2016 results. Details regarding this decision and the ongoing radon detector investigation are provided in this memo after the evaluation of April through June 2017 results.

Radon air monitoring measurements during the April through June 2017 quarter were obtained using Radtrak2[®] radon detectors and Rapidos[®] detectors that were deployed side by side at each of the monitoring locations (locations are shown in Figure 1). The detectors were deployed on April 3, 2017 and were collected on July 5, 2017 in accordance with the requirements of Section 3.2.1 of the LTMMP. The protective casing and mounting hardware were inspected during the collection effort and repairs were made if needed. The detectors remained in the field for approximately 3 months and were submitted to the analytical laboratory for analysis on Analysis Request/Chain of Custody (AR/COC) #617812 and AR/COC #617990, respectively. A trip blank detector (RNTB) was submitted with both sets of detectors.

The results for this monitoring period and associated field documentation meet the LTMMP DQO and monitoring objectives. The radon results were consistent with the January through March 2017 results. All results for the Radtrak2[®] detectors were non-detects with a detection limit of 0.4 pCi/L. The results for the Rapidos[®] detectors, which have a lower detection limit, ranged from non-detects

(< 0.08 pCi/L) at locations RN4, RN10, and RN11 to 0.16 pCi/L at RN5. The Rapido[®] results include detections at 14 of the 17 field locations, with a range of 0.08 pCi/L to 0.16 pCi/L. The trigger level of 4 pCi/L 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). Both sets of results are consistent and indicate very low activities of radon in the air at the MWL, consistent with background radon activity. The results from this quarterly monitoring event will be presented in the next MWL Annual LTMM Report that will be submitted to NMED in June 2018 (reporting period is April 1, 2017 through March 31, 2018).

Radon Detector Investigation Background Information

The July through December 2016 semiannual monitoring event was the first time Radtrak2[®] detectors were used for radon monitoring at the MWL. As documented in my data evaluation memo dated April 12, 2017, the Radtrak[®] detector was phased out by the manufacturer and replaced with the new Radtrak2[®] detector. The Radtrak2[®] detector was selected because it was the direct replacement for the original Radtrak[®] detector and could be used for a 6-month deployment period. The Rapidos[®] detector has a lower radon detection limit but was not selected because it has a maximum deployment period of 3 months.

The Radtrak2[®] detector results for the July through December 2016 monitoring period were lower than previous results measured using the original Radtrak[®] detectors. After receiving the data report for the July through December 2016 monitoring period in February 2017, we initiated our investigation to further evaluate the newer Radtrak2[®] detectors, including the testing of other detector types. The decision was made to move back to quarterly monitoring to allow for the collection of more data in a shorter period of time to support the investigation.

Based on correspondence with the analytical laboratory manager during April 2017, the most likely explanation for the lower values measured by the new Radtrak2[®] detectors is that they are designed to have a longer diffusion time than the original Radtrak[®] detectors. Because of this design change, thoron (Radon-220 with a half-life of just 56 seconds) is not measured by the Radtrak2[®] detector, but is measured by the original Radtrak[®] detector. In other words, when deployed under the same conditions, the newer Radtrak2[®] detectors should measure lower activities than the Radtrak[®] detectors because they do not measure only radon, not radon and thoron. This information was received after the deployment of detectors for the April through June 2017 monitoring period, so only Rapidos[®] and Radtrak2[®] detectors were deployed at each location.

To test this hypothesis, three sets of detectors were deployed on July 5th for the July through September 2017 quarterly monitoring period. The deployment included placement of three detectors at each monitoring location: 1) thoron detectors (i.e., Radtrak2[®] detectors modified with holes and paper filters so they measure both thoron and radon similar to the original Radtrak[®] detectors), 2) Radtrak2[®] detectors that only measure radon, and 3) Rapidos[®] detectors that also only measure radon but with a lower detection limit than the Radtrak2[®] detectors. The results from this triple deployment (detectors to be collected in early October 2017) will help determine the impact thoron may have had on the higher radon values measured in monitoring events conducted through June 2016, using original Radtrak[®] detectors. A decision regarding the selection of a detector for future monitoring events will be made based upon evaluation of CY2017 quarterly monitoring data sets.

Attachments:

Analysis Request/Chain of Custody #617812 Landauer Radon Monitoring Report (analytical laboratory results for Radtrak2[®] detectors) Analysis Request/Chain of Custody #617990 Landauer Radon Monitoring Report (analytical laboratory results for Rapidos[®] detectors) Figure 1. Location of the Alpha Track Detectors at the MWL

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Internal Lab															Page 1 of 2	
Batch No.					SMO Use									ARICOC	647040	
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Service Order	Number:	195122.10.11.08 CE379.17	Lab Contact:	100	Amy Krusz	ynskl	40.000		Wendy P	alencia/505	5-844-3132		Released	by COC No.		
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Building:		Room:	Operationa	al Site:									P.O. Box 5800, M	IS-0154		
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102254	001	RN4/ Radtrak2 324264-	1	N/A	7/5/17	0917	AF	N	0 NA	NONE	C	SA	RADON			
102255	001	RN5/ Radtrak2 317285-	5	N/A	7/5/17	0928	AF	N	0 NA	NONE	С	SA	RADON	1.1.1		
102256	001	RN6/ Radtrak2 324550-3	3	N/A	7/5/17	0936	AF	N	0 NA	NONE	с	SA	RADON		0.55	
102257	001	RN7/ Radtrak2 325635-	1	N/A	7/5/17	0945	AF	N	0 NA	NONE	С	SA	RADON		1000	
102258	001	RN8/ Radtrak2 324779-4	В	N/A	7/5/17	17 1012 AF N ONA NONE C SA RADON			and the							
102259	001	RN9/ Radtrak2 325782-	1	N/A	7/5/17	AF N ONA NONE C SA RADON				1000						
102260	001	RN10/ Radtrak2 317845	-6	N/A	7/5/17	1025	AF	N	0 NA	NONE	С	SA	RADON		The second	
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*Prior confirmation with SMO required for 7 and 15 day TAT

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation) AOP 95-16

617812 19519 Page 2 of 2 AR/COC 617989 MWL RADON MONITORIN Project/Task Manager: Project Name: Robert Zlock Project/Task No.: 195122.10.11.08 Tech Area: Building: Room: Lab use Date/Time Depth Sample Container Preserv- Collection Sample Parameter & Method Lab Sample No. Sample Location Detail Fraction (ft) Collected Matrix Type Volume ative Method Туре Requested Sample ID 7/5/17 1100 102261 001 RN11/ Radtrak2 324569-3 N/A RADON AF Ν 0 NA NONE С SA 001 RN12/ Radtrak2 324452-2 RADON 102262 N/A 1106 AF N 0 NA NONE C SA 102263 001 RN13/ Radtrak2 312506-9 N/A 1109 RADON AF Ν 0 NA NONE C SA 102264 001 RN14/ Radtrak2 325535-3 N/A 1113 AF Ν 0 NA NONE С SA RADON 102265 001 RN15/ Radtrak2 316582-6 RADON N/A 1117 AF Ν 0 NA NONE С SA 102266 001 RN16/ Radtrak2 317047-9 N/A RADON 0250 AF Ν 0 NA NONE С SA 102267 001 RN17/ Radtrak2 311958-3 N/A RADON Ν 1000 AF 0 NA NONE С SA RNTB/ Radtrak2 320103-5 45/2 V 1125 102268 001 N/A AF Ν 0 NA NONE С RADON SA \$11628-2 Recipient Initials

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The globalleader in radon measuremen

Robert Ziock

United States

RADON MONITORING REPORT

Issued by an Accredited Laboratory



REPORT NUMBER 4725979:2

REPORT DATE

10/31/2017 MEASUR DMDNT PERFORMED FOR Robert Ziock

PRINT DATE 10/31/2017

REPORT PAGE 1(6)

REPORT RECEIVER(S) Robert Ziock

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 Radonova Laboratories AB 07/07/2017. They were measured 07/12/2017 . Property data and address **Building Id:**

ARCOC# 617812

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. Radonova Laboratories 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 Radonova Laboratories AB. Detector deployment is not performed by Radonova Laboratories AB. Measurement information such as monitoring period (dates) and placement location is provided to Radonova Laboratories AB by the end user.

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.

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- More information about radon measurements and mitigation can be found in the AARST and EPA publications:
- · ANSI/AARST Protocol for Conducting Measurements of Radon and Radon-Decay Products in Schools and Large Buildings · ANSI/AARST Protocol for Conducting Radon and Radon Decay Product Measurements in Multifamily Buildings.
- · ANSI/AARST Radon Mitigation Standards for Schools and Large Buildings.
- ANSI/AARST Radon Mitigation Standards for Multifamily Buildings.
- EPA Radon Measurements in Schools, EPA 402-R-92-014, July 1993.

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

Signature on the report

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

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REPORT NUMBER 4725979:2	REPORT PAGE 2(6)		
REPORT DATE	PRINT DATE		
10/31/2017	10/31/2017		

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1489 ISO/EC 17625

Test results

	Detector	Start	Stop	Location	Detector comment	Floor level	Avg Radon Conc. pCi/l	Total Radon Exp pCi-days/I
	312202-5	04/03/2017	07/05/2017	RNI			< 0.4	< 37
	312705-7	04/03/2017	07/05/2017	R1N2			< 0.4	< 37
	311765-2	04/03/2017	07/05/2017	RN3			< 0.4	< 37
	324264-1	04/03/2017	07/05/2017	R.N4			< 0.4	< 37
	317285-5	04/03/2017	07/05/2017	R.N5			< 0.4	< 37
	324550-3	04/03/2017	07/05/2017	RN6			< 0.4	< 37
	325635-1	04/03/2017	07/05/2017	RN7			< 0.4	< 37
0/LB	324779-8	04/03/2017	07/05/2017	RN8			< 0.4	< 37
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005LN - VL40 /								
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Comment to the results

> This report replaces 4725979:1. Reason: detector RN9 has been added to this commission and location codes have been updated for all detectors.

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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RADON MONITORING REPORT

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Robert Ziock United States REPORT NUMBER 4725979:2

REPORT DATE 10/31/2017

PRINT DATE

REPORT PAGE 3(6)

MEASUR DADAT PERFORMED FOR Robert Ziock

10/31/2017

REPORT RECEIVER(S) Robert Ziock

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 Radonova Laboratories AB 07/07/2017. They were measured 07/12/2017 . Property data and address **Building Id:**

ARCOC# 617812

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

Measurement method: closed alpha-track detector

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Radon measurements in Multifamily Buildings, Schools and Large Buildings

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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.
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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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REPORT NUMBER REPORT PAGE 4(6) 4725979:2 REPORT DATE 10/31/2017

PRINT DATE 10/31/2017

Test results

	Detector	Start	Stop	Location	Detector comment	Floor level	Avg Radon Conc. pCi/l	Total Radon Exp pCi-days/I
	317845-6	04/03/2017	07/05/2017	RN10			< 0.4	< 37
	324569-3	04/03/2017	07/05/2017	RN11			< 0.4	< 37
	324452-2	04/03/2017	07/05/2017	RN12			< 0.4	< 37
	312506-9	04/03/2017	07/05/2017	RN13			< 0.4	< 37
	325535-3	04/03/2017	07/05/2017	RN14			< 0.4	< 37
	316582-6	04/03/2017	07/05/2017	RN15			< 0.4	< 37
	317047-9	04/03/2017	07/05/2017	RN16			< 0.4	< 37
002LN-VL40/2017-06-22 /JO/LB	311958-3	04/03/2017	07/05/2017	RN17			< 0.4	< 37
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Comment to the results

This report replaces 4725979:1. Reason: detector RN9 has been added to this commission and location codes have been updated for all detectors.

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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Robert Ziock

United States

RADON MONITORING REPORT

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REPORT NUMBER

4725979:2

REPORT PAGE 5(6)

REPORT DATE 10/31/2017 PRINT DATE 10/31/2017

MEASUREMENT PERFORMED FOR Robert Ziock

REPORT RECEIVER(S) Robert Ziock

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- · ANSI/AARST Protocol for Conducting Radon and Radon Decay Product Measurements in Multifamily Buildings.
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WED40 1489 150/EC 17629

REPORT PAGE 6(6) REPORT NUMBER 4725979:2 REPORT DATE PRINT DATE 10/31/2017

10/31/2017

Test results

	Detector	Start	Stop	Location	Detector comment	Floor level	Avg Radon Conc. pCi/l	Total Radon Exp pCi-days/l
	311628-2	04/03/2017	07/05/2017	RNTB			< 0.4	< 37
	325782-1	04/03/2017	07/05/2017	RN9			< 0.4	< 37
E C								
7-06-22 / 10								
N-VL40/201								
RTOOL								

Comment to the results

This report replaces 4725979:1. Reason: detector RN9 has been added to this commission and location codes have been updated for all detectors.

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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SMC	2012-AR	COC (4-2012)	AN	ALY	SIS RE	ONTRA	CT LA	BOR D CH	ATORY AIN O	F CUS	TODY					AOP 95-	16
Internal Lab	NA														ŕ	Page 1 of	12
Project Name	1. 101	MWL RADON MONITORIN	Date Semples	Shinned	SMOUS	1-1-1		CHAO A	utheringties	7-			1	AR/0	COC	617	/990
Project/Task I	Manager:	Robert Ziock	Carrier/Waybill	No.	267	729		SMO C	ontact Phone	10	-	5		e Characteri	zation		
Project/Task I	Number:	195122.10.11.08	Lab Contact:		Amy Krusa	rynski/	1. A. 1.		Wendy P	alencia/50	5-844-3132		Relea	sed by COC	No.		
Service Order		CF378-17	Lab Destination	NC .	LAND	175 (AS30		Send R	eport to SMC	D:						☑ 4	° Celsiu
Tech Area:			Contract No.:		1490047		1000		Stephanie	Montaño/5	05.284.255	3	Bill to: Sand	a National L	aboratorie	as (Accourt	nts Payabl
Building:		Room:	Operational	Site:									Albuquerque	NM 87185	0154		
Sample No.	Fraction	Sample Location I	Detail	Depth (ft)	Date	Time	Sample Matrix	Туре	Volume	Preserv-	Collection Method	Sample Type	Par	ameter & Request	Method		Lab
102997	001	RN1/ Rapidos 752802-9		N/A	7/5/17	1035	AF	N	0 NA	NONE	с	SA	RADON				5
102998	001	RN2/ Rapidos 410589-6	1	N/A	7/5/17	1040	AF	N	0 NA	NONE	С	SA	RADON				1 19 19
102999	001	RN3/ Rapidos 409238-3	3	N/A	7/5/17	0962	AF	N	0 NA	NONE	С	SA	RADON				and the second
103000	001	RN4/ Rapidos 410999-7		N/A	7/5/17	FIPO	AF	N	0 NA	NONE	с	SA	RADON				5122
103001	001	RN5/ Rapidos 764163-2	2	N/A	7/5/17	0928	AF	N	0 NA	NONE	с	SA	RADON				4.3
103002	001	RN6/ Rapidos 410870-0		N/A	7/5/17	0936	AF	N	0 NA	NONE	с	SA	RADON				
103003	001	RN7/ Rapidos 410065-7		N/A	7/5/17	0945	AF	N	0 NA	NONE	с	SA	RADON				1
103004	001	RN8/ Rapidos 409428-0	1	N/A	7/5/17	1012	AF	N	0 NA	NONE	с	SA	RADON				PAR SA
103005	001	RN9/ Rapidos 410504-5		N/A	7/5/17	1020	AF	N	0 NA	NONE	с	SA	RADON				(shall
103006	001	RN10/ Rapidos 976967-	0	N/A	7/5/17	1025	AF	N	ONA	NONE	С	SA	RADON				20145
Last Chain:	a mide	Yes	5	ample	Tracking		SMO	Use	Special Ins	structions	QC Requir	ements:				Condit	ions on
Background	eq a:	Yes Ves		ate Ent	ered:		A set fine		EDD		⊻ Yes					Rec	pelpt
Confirmator	v:	Yes		C inite				-	Negotiated	d Time	17-Day	·	15-Day*	<u>∠</u> 30-	Day		1. State
Sample	N	ame / Signat	ure	Init.	Compa	ny/Organizat	ion/Phone	e/Cell	Sample Dis	sposal	Return	to Client		Disposal h	v Lab		22624
Team	Robert Z	ock The Uno	pine .	22	8NL/00641	/505-845-04	85/505-23	38-3668	Return Sar	nples By:				Disposal o	7 200		
Members	Danielle I	Michel Daly	eler o		SNL/00641 SNL/00641	/505-844-26 /505-845-77	40/505-38 06/505-21	19-7143	Comments:								
Relinquished t	y The	his there	Brg. 641	Date	7/5/	2 Time /	7/4	Relinqui	shed by		2	- 00		Date 7	17/12	Lab	Use
Received by	Top	-	Org0631	Date	71511	Time	314	Receive	dby	The	3	Org.	1	Date 7	4/17	Time	0 PM
Relinquished b	TO	50	Org. 0621	Date	7/6/1	Time O	900	Relinqui	shed by	10		Org.		Date	" /17	Time	IC IN
Received by	-		Org.	Date	Th	Antime	2 :00	Receive	d by			Org.		Date		Time	

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation) AOP 95-16

												AR/COC	Page 2 of 1 617990
Project Name:		MWL RADON MONITORIN Project/Ta	ask Manag	ger:	Robert Zio	ck		Project/Ta	sk No.:	195122	2.10.11.08		
Tech Area:									1				
Building:		Room:	Denth	Date	Time	Sample	Co	ntainar	-	Collection	Cample	Decemptor P Mothod	Lab use
Sample No.	Fraction	Sample Location Detail	(ft)	Col	lected	Matrix	Туре	Volume	Preserv- ative	Method	Type	Requested	Sample II
103007	001	RN11/ Rapidos 409724-2	N/A	7/5/17	1100	AF	N	0 NA	NONE	С	SA	RADON	
103008	001	RN12/ Rapidos 410313-1	N/A	7/5/17	1106	AF	N	0 NA	NONE	С	SA	RADON	
103009	001	RN13/ Rapidos 411020-0	N/A	7/5/17	1109	AF	N	0 NA	NONE	С	SA	RADON	
103010	001	RN14/ Rapidos 409243-3	N/A	7/5/17	1113	AF	N	0 NA	NONE	С	SA	RADON	
103011	001	RN15/ Rapidos 158164-4	N/A	7/5/17	1117	AF	N	0 NA	NONE	С	SA	RADON	
103012	001	RN16/ Rapidos 220527-6	N/A	7/5/17	0850	AF	N	0 NA	NONE	С	SA	RADON	
103013	001	RN17/ Rapidos 410868-4	N/A	7/5/17	0001	AF	N	0 NA	NONE	С	SA	RADON	
103014	001	RNTB/ Rapidos 409465-5	N/A	7/5/17	1125	AF	N	0 NA	NONE	С	SA	RADON	
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RAD	ON	MONITORING REPORT	
Issued	by an	Accredited Laboratory	

PRINT DATE

07/26/2017



REPORT NUMBER REPORT PAGE 1(4)

NTESS, LLC Wendy Palencia Mailstop 1103 PO Box 5800 1515 Eubank SE Albuquerque NM 87185 United States

REPORT RECEIVER(S)

4725980:2

REPORT DATE

07/26/2017

MEASUREMENT PERFORMED FOR

NTESS, LLC

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

Description of the measurement

The measurement was performed with a closed high-sensitivity alpha-track detector. The detector(s) arrived to Radonova Laboratories AB 07/07/2017. They were measured 07/12/2017.

Property data and address

ARCOC# 617990

Transit Detector 1: Transit Detector 2: Transit Detector 3:

Test data have been given by Robert Ziock

Measurement method: closed alpha-track high sensitivity 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. Transit detectors are used for the return delivery of the high-sensitivity detectors in order to make a more accurate background subtraction.

Radonova Laboratories AB 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 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 pCi²days/l will be reported.

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

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

Signature on the report

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

US_RT_H6_001 - VI.10 / 2017-05-04-/ JO / L8

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RADON MONITORING REPORT

Issued by an Accredited Laboratory



REPORT NUMBER 4725980:2 REPORT DATE 07/26/2017

PRINT DATE 07/26/2017

REPORT PAGE 2(4)

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Test results

	Detector	Start date	Stop date	Location		Detector comment	Location type	Avg Radon Conc. pCi/l	Total Radon Exp pCi-days/I
	752802-9	04/03/2017	07/05/2017	102997	RN1			0.14 +/- 0.09	14 +/- 9
	410589-6	04/03/2017	07/05/2017	102998	RN2			0.11 +/- 0.06	11 +/- 7
	409238-3	04/03/2017	07/05/2017	102999	RN3			0.14 +/- 0.09	14 +/- 9
	410999-7	04/03/2017	07/05/2017	103000	RN4			< 0.08	< 7
	764163-2	04/03/2017	07/05/2017	103001	RN5			0.16 +/- 0.09	15 +/- 9
	410870-0	04/03/2017	07/05/2017	103002	RN6			0.11 +/- 0.06	10 +/- 7
	410065-7	04/03/2017	07/05/2017	103003	RN7			0.14 +/- 0.09	12 +/- 9
0-1]0/LB	409428-0	04/03/2017	07/05/2017	103004	RN8			0.08 +/- 0.09	7 +/- 9
VI. 10 / 2017-05	410504-5	04/03/2017	07/05/2017	103005	RN9			0.14 +/- 0.09	12 +/- 9
US_RT_HS_001-A	976967-0	04/03/2017	07/05/2017	103006	RN10			< 0.08	< 7

Comment to the results

This report replaces 4725980:1. Reason: new or corrected measurement information has been received.

Tryggve Rönnqvist (Electronically signed)

prior written approval.

Signature Radonova Laboratories AB Laboratory Measurement Specialist This report may only be reproduced in full, unless the issuing laboratory has given Radonova Inc. 900 Oakmont Lane Suite 207, Westmont IL 60559 Telephone: 331,814.2200 E-mail: help@radonova.com

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PRINT DATE

07/26/2017



REPORT PAGE 3(4)

NTESS, LLC Wendy Palencia Mailstop 1103 PO Box 5800 1515 Eubank SE Albuquerque NM 87185 United States

MEASUREMENT PERFORMED FOR

REPORT NUMBER

4725980:2

07/26/2017

REPORT DATE

REPORT RECEIVER(S) NTESS, LLC

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RADON MONITORING REPORT

Issued by an Accredited Laboratory



REPORT NUMBER 4725980:2 REPORT DATE 07/26/2017

PRINT DATE 07/26/2017

REPORT PAGE 4(4)

Test results

	Detector	Start date	Stop date	Location		Detector comment	Location type	Avg Radon Conc. pCi/l	Total Radon Exp pCi-days/I
	409724-2	04/03/2017	07/05/2017	103007	RN11			< 0.08	<7
	410313-1	04/03/2017	07/05/2017	103008	RN12			0.11 +/- 0.09	11 +/- 9
	411020-1	04/03/2017	07/05/2017	103009	RN13			0.11 +/- 0.05	10 +/- 9
	409243-3	04/03/2017	07/05/2017	103010	RN14			0.11 +/- 0.05	9+/-9
	158164-4	04/03/2017	07/05/2017	103011	RN15			0.14 +/- 0.09	14 +/- 9
	220527-6	04/03/2017	07/05/2017	103012	RN16			0.11 +/- 0.09	11 +/- 9
	409765-5	04/03/2017	07/05/2017	103014	RNTB			< 0.08	<7
04-1JO/LB	410868-4	04/03/2017	07/05/2017	103013	RN17			0.11 +/- 0.05	11 +/- 9
1.10/2017-05									
RT_HS_001-V									

Comment to the results

This report replaces 4725980:1. Reason: new or corrected measurement information has been received.

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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Figure 1. Location of Radon Detectors at the MWL

Mixed Waste Landfill Radon Detector Deployment / Collection Form

	Name: Annem	harre Rudir	Signatu	ure:	h		Activity (Deployme	check all that apply): ent Collection
	Name: Rob	ert too	K Signatu	ire: <u>My</u>	in the	in	Deployme	ent D Collection
	ARCOC #: (e17812	liel De	Dertor Type:	Rad trac	K7		No lection
							•	
	Number	Sample Number	Sampling Location	Deployment Date	Deployment Time	Collection Date	Collection Time	Comments
ø	312202-5	102251-001	RN1	4-3-17	1117	7/5/12	1035	ene
÷	312705-7	102252-	RN2		1023	1	1040	MME
۰.	311765-2	102253	RN3		1031,		0908	WORE
e	324264-1	102254	RN4		1108		0917	NONE
•	317285-5	102255	RN5		1215		0928	noné
•	324550-3	102256	RN6		RÍD		6936	None
9	325635-1	102257	RN7		1203		0945	More
- 1	324779-8	102258	RN8		1140		1012	hone
•	325782-1	102259	RN9		1132		1020	NOUE
•	317845-6	102260	RN10		1126		1025	noué
·	324569-3	102261	RN11		1041		100	NONE
,	324452-2	102262	RN12		1050		1106	NONE
·	312506-9	102263	RN13		1056		1109	hone
•	325535-3	102264	RN14		1103		1113	MORE
	316582-6	102265	RN15		1046		1117	Wisne
1	317047-9	02266	RN16	-	1220		6850	WONE
۰L	311958-3	102267	RN17		1151		6001	NOME
L	320103-5	102208	RNTB		0350	V	1125	heme

Additional Comments:

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

FOP 14-03

Mixed Waste Landfill Radon Detector Deployment / Collection Form

	Name: <u>Anu</u>	emarie Pox	Signat	ure:	m	, E	Activity Deploym	(check all that apply): ent
	Name: Rok	bert tib	K Signat	ure: Ma	Inthe	Tay	Denlovm	ent Callestin
] OCU ARCOC #:	p17790	diel) De	Sull. stector Type:	hapidos	i,		Collection
	Detector Serial Number	Sample Number	Sampling Location	Deployment Date	Deployment Time	Collection	Collection	Comments
•	752802-9	100997	RN1	4-3-17	1117	7/5/17	1835	
۷	410589-6	102998	RN2		1023		1033	none
4	409238-3	102999	RN3		1031		1010	none
:	410999-62	103000	RN4		1108		2912	None
•	764163-2	103001	RN5		rus I		1972	None
٩	410870-0	103002	RN6		1210		N931	NONE
,	410065-7	103003	RN7		1703		1915	NONE.
•	409428-0	103004	RN8		140		UITS	None
	410504-5	03005	RN9		1137		1012	ILONÉ
. [976967-0	03006	RN10		1126		1020	none
,[409724-2	103007	RN11		11241		1025	NISHE
	410313-1	103008	RN12		1010		1100	World
	411020-1	122029	RN13		1090		1106	Noné
T	409243-3	D 3MAD	RN14		11/12		11057	NORE
1	58164-4	13011	RN15		10/		1113	None
Ľ	220527-6	03011	RN16		145 220			NORE
F	4/0868-4	12012	RN17		W JI		DESO 1	NONE
4	97/	02012	RNTP	P/ =	1151,7		000	USNE
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Additional Comments: _

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

Contract Verification Form (CVR)

Project Leader Ziock	Project Name MWL Radon Monitoring	Project/Task No. 195122_10.11.08
ARCOC No. 617812	Analytical Lab Radonova	SDG No. 4725979-1

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

2.0 Analytical Laboratory Report

Line	ltom	Complete?		If no evolein
No.	item	Yes	No	ii no, explain
2.1	Data reviewed, signature	Х		
2.2	Method reference number(s) complete and correct	Х		
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	Х		
2.6	QC batch numbers provided	Х		
2.7	Dilution factors provided and all dilution levels reported	N/A		
2.8	Data reported in appropriate units and using correct significant figures	Х		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	Х		
2.10	Narrative provided	Х		
2.11	TAT met	Х		
2.12	Holding times met	Х		
2.13	Contractual qualifiers provided	N/A		
2.14	All requested result and TIC (if requested) data provided	Х		

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	Х		
3.2	Quantitation limit met for all samples	N/A		
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	Х		

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	Х		
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) lon 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	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	lf 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? C Yes C No					
Based on the review, this data package is complete. 💿 Yes 🔿 No					
Reviewed by: Wendy Palencia Date: 10-23-2017 11:03:00					
Closed by: Wendy Palencia Date: 10-23-2017 11:03:00					

Contract Verification Form (CVR)

Project Leader Ziock	Project Name MWL Radon Monitoring	Project/Task No. 195122_10.11.08
ARCOC No. 617990	Analytical Lab Radonova	SDG No. 4725980-1

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

2.0 Analytical Laboratory Report

Line	ltom	Comp	olete?	If no evoluin
No.	item	Yes	No	ii no, explain
2.1	Data reviewed, signature	Х		
2.2	Method reference number(s) complete and correct	Х		
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	Х		
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	Х		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	Х		
2.10	Narrative provided	Х		
2.11	TAT met	Х		
2.12	Holding times met	Х		
2.13	Contractual qualifiers provided	N/A		
2.14	All requested result and TIC (if requested) data provided		Х	Results for sample 103013-001 not reported

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	Х		
3.2	Quantitation limit met for all samples	N/A		
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	Х		

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	Х		
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) lon 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	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	lf 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						
103013-001	Radon	Results not reported						
Were deficiencies	unresolved? © Yes O No							
Based on the revie	ew, this data package is complete. O Yes O No							
If no, provide nonc	conformance report or correction request number 19418	and date correction request was submitted: 07-18-2017						
Reviewed by: Wendy Palencia Date: 07-26-2017 08:52:00								
Were resolutions adequate and data package complete?								
Closed by: Wendy Palencia Date: 07-26-2017 15:33:00								

Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection Form

meinane Radoi-Name:

Signature:

Date of Inspection: <u>S-10-17</u>

Inspection parameters: Identification labeling; mounting bracket and stainless steel clamp and post; radon detector; radon detector enclosure and internal attachment components.

Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	None
RN3	None
RN4	Neme
RN5	None
RN6	None
RN7	None
RN8	None
RN9	None
RN10	None
RN11	Unit number was fading. Touched up paint on #5-0-12
RN12	None
RN13	. None
RN14	Unit # fading, touched up paint on #. 5-10-17
RN15	None
RN16	Non-e
RN17	None

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

make

Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection Form

Name: Robert Ziock

Signature: Tolut

Date of Inspection: June 21, 2017

Inspection parameters: Identification labeling; mounting bracket and stainless steel clamp and post; radon detector; radon detector enclosure and internal attachment components.

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
RN 11	None
RN12	None
RN13	None
RN14	None
R N15	None
RN16	None
RN17	None

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

Mixed Waste Landfill Radon Detector Collection Inspection Form

Signature

Collection Date: 7/5/2017

Detector Type: Rapidos & Radtrak2

Radon Monitoring Frequency: 🔽 Quarterly

Semiannually Annually

Ra	don Monitoring Location Inspection Parameters	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Action Required at Location Numbers
А.	Monitoring location identification labeling.	yes	No	
B.	Radon detector condition.	yes	No	
C.	Radon detector enclosure securely fastened (mounting bracket and stainless steel clamp) to post (fence or free standing).	yes	No	
D.	Radon detector enclosure and internal attachment components.	yes	No	
E.	Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	yes	No	
Ra	don Monitoring Detectors Inspection Parameters			
F.	Condition of radon detector at time of collection.	yes	No	

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	Nonce
RN13	None
RN14	None
RN15	None
RN16	None
RN17	None

Mixed Waste Landfill Radon Detector Collection Inspection Form

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

MIXED WASTE LANDFILL

RADON MONITORING

July-September 2017 Monitoring Period



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

Albuquerque, New Mexico 87185-0651

- date: November 10, 2017
- to: Mike Mitchell (8854), Robert Ziock (641), and Bonnie Little (631)
- from: Kelly Green (6283) kagreen@sandia.gov Kelly Juen

subject: Review of MWL Radon Air Data – July through September 2017 Quarterly Monitoring Period

The purpose of this memo is to document my review of the radon air monitoring results for the July through September 2017 quarterly monitoring event. My review includes evaluation of the results and supporting documentation relative to the data quality objective (DQO) and monitoring objectives specified in the Mixed Waste Landfill (MWL) Long-Term Monitoring and Maintenance Plan (Appendix 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. Although radon monitoring at the MWL transitioned from a quarterly to semiannual frequency in calendar year (CY) 2016, a decision was made to return to quarterly monitoring for CY 2017 after review of the July through December 2016 results. Details regarding this decision and the ongoing radon detector investigation are provided in this memorandum after the evaluation of July through September 2017 results.

Radon air monitoring measurements during the July through September 2017 quarter were obtained using three different detectors: Radtrak2[®] detectors (measure radon only), Rapidos[®] detectors (measure radon only with a lower detection limit), and Modified Radtrak2[®] detectors (measure radon and thoron). The three detectors were deployed at each monitoring location (Figure 1) on July 5, 2017 and were collected on October 2, 2017. The protective casing and mounting hardware were inspected during the collection effort and repairs were made if needed. The detectors remained in the field for approximately three months and were submitted to the analytical laboratory for analysis on Analysis Request/Chain of Custody (AR/COC) #617986 (Radtrak2[®]), AR/COC #617987 (Rapidos[®]), and AR/COC #617988 (Modified Radtrak2[®]). A trip blank detector (RNTB) was submitted with each set of detectors (total of 3 trip blanks). In the attached data reports from the analytical laboratory, the Radtrak2[®] and Modified Radtrack2[®] results (AR/COCs #617986 and #617988) are combined in one report (total of 2 data reports).

The results for this quarterly monitoring period and associated field documentation meet the LTMMP DQO and monitoring objectives. The radon results from the Radtrak2[®] and Rapidos[®] detectors were consistent with the July through December 2016 (6-month monitoring period) and April through June

2017 (3-month monitoring period) results. The radon plus thoron results from the Modified Radtrak2[®] detectors were slightly higher, and consistent with historic data from the original Radtrak[®] detectors (January 2014 through June 2016, 8 quarterly and 1 semiannual monitoring events) that also measured radon and thoron. The results from the three detector sets are briefly summarized below.

- All results for the Radtrak2[®] detectors (radon only) were non-detects with a detection limit of 0.4 pCi/L, with the exception of location RN3 (detection of 0.6 pCi/L).
- Results for the Rapidos[®] detectors (radon only with lower detection limit) ranged from nondetects (< 0.16 pCi/L) at locations RN8, RN10, RN13 and RN14 to 0.38 pCi/L at RN7. There was one location (RN5) that had no result for the quarter due to a plastic quality problem in the detector's alpha-track film. The 12 Rapidos[®] detections ranged from 0.16 to 0.38 pCi/L.
- Results for the Modified Radtrak2[®] detectors (radon plus thoron) ranged from non-detects (<0.5 or <0.8 pCi/L) at locations RN1, RN2, RN3, RN4, RN6, RN7, RN9, RN13, RN14, and RN16 to 1.0 pCi/L at RN17. The Modified Radtrak2[®] results included detections at 7 of the 17 locations, with a range of 0.6 to 1.0 pCi/L.

The trigger level of 4 pCi/L 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). All results indicate very low activities of radon in the air at the MWL, consistent with background radon activity. When thoron was measured along with radon (Modified Radtrak2[®] detector), the results were slightly higher and consistent with historic data (January 2014 through June 2016), which also measured radon and thoron (data from original Radtrak[®] detectors). The results from this quarterly monitoring event will be presented in the next MWL Annual LTMM Report that will be submitted to NMED in June 2018 (reporting period is April 1, 2017 through March 31, 2018).

Radon Detector Investigation Background Information

As previously reported, the July through December 2016 semiannual monitoring event was the first time Radtrak2[®] detectors were used for radon monitoring at the MWL and results were lower than previous results (January 2014 through June 2016, 8 quarterly and 1 semiannual monitoring events) measured using the original Radtrak[®] detectors. As documented in my data evaluation memorandum dated April 12, 2017, the Radtrak[®] detector was phased out by the manufacturer and replaced with the new Radtrak2[®] detector. The Radtrak2[®] detector was selected because it was the direct replacement for the original Radtrak[®] detector and could be used for a 6-month deployment period. The Rapidos[®] detector has a lower radon detection limit but was not selected because it has a maximum deployment period of 3 months.

After receiving the data report for the July through December 2016 monitoring period in February 2017, we initiated our investigation to evaluate the newer Radtrak2[®] detectors to determine why the results were lower. This investigation included the testing of other detector types (i.e., Rapidos[®] and Modified Radtrak2[®] detectors) at a quarterly frequency to allow for the collection and comparison of more data in a shorter period of time. Based on correspondence with the analytical laboratory manager during April 2017, the most likely explanation for the lower values measured by the new Radtrak2[®] detectors is that

they are designed to have a longer diffusion time than the original Radtrak[®] detectors. Because of this design change, thoron (Radon-220 with a half-life of just 56 seconds) is not measured by the Radtrak2[®] or Rapidos[®] detector, but is measured by the original Radtrak[®] detector. In other words, when deployed under the same conditions, the newer Radtrak2[®] detectors should measure lower activities than the older Radtrak[®] detectors because they measure only radon, not radon and thoron. This information was received after the deployment of detectors for the April through June 2017 monitoring period, so the deployment of Modified Radtrak2[®] detectors to confirm this hypothesis did not occur until the July through September quarterly monitoring period described in this memorandum.

As summarized earlier, three sets of detectors were deployed at each monitoring location for the July through September 2017 quarterly monitoring period. The results from this triple deployment have confirmed the impact of thoron on the MWL radon monitoring effort. Results for the Modified Radtrak2[®] detectors show a slightly higher range (<0.5 to 1.0 pCi/L), which is consistent with results from January 2014 through June 2016 using the original Radtrak[®] detectors (<0.3 to 1.4 pCi/L). The range for all "radon only" results using Rapidos[®] and Radtrak2[®] detectors (July 2016 through September 2017) is slightly lower (<0.08 to 0.6 pCi/L). As determined by comparing the Rapidos[®] and Modified Radtrak2[®] results for the four locations where a detection was reported for both detectors, the estimated thoron range is 0.41 to 0.81 pCi/L. All of this information is consistent with the explanation that historic results and recent results from detectors that measure both radon and thoron are slightly higher then results from detectors that measure only radon. All radon monitoring results for the MWL indicate very low radon activity consistent with background conditions.

Based on the evaluation of all MWL radon monitoring results, I recommend using the Radtrak2[®] detector for semiannual monitoring for CY 2018 and beyond. These detectors will accurately measure radon activity in air over a 6-month period and identify any changes in radon activity if they occur. With completion of the detector investigation, focusing on one detector that measures only radon is an improvement that is consistent with the MWL radon monitoring DQO and monitoring objectives. In addition, the Radtrak2[®] detection limit will decrease with a monitoring period of 6-months (semiannual frequency) versus 3-months (quarterly frequency).

An additional quarter of monitoring with the three different detectors is ongoing for the October through December 2017 monitoring period, and will provide one more data set to evaluate and confirm the impact of thoron on MWL radon monitoring results. When these detectors are collected in January 2018, only the Radtrak2[®] detectors should be deployed, marking the change back to semiannual monitoring with only one set of detectors that measure only radon.

Attachments: Analysis Request/Chain of Custody #617986 Analysis Request/Chain of Custody #617988 radonova Radon Monitoring Report (analytical laboratory results for Radtrak2[®] detectors Modified Radtrak2[®] detectors) Analysis Request/Chain of Custody #617987 radonova Radon Monitoring Report (analytical laboratory results for Rapidos[®] detectors) Figure 1. Location of the Alpha Track Detectors at the MWL

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

July-Sept. 2012

AOP 95-16

Internal Lab Page 1 of 2 Batch No. SMO Use AR/COC 617986 MWL RADON MONITORIN Date Samples Shipped: Project Name 10/3/17 SMO Authorization: Waste Characterization Project/Task Manager: Robert Ziock Carrier/Waybill No. 723 SMO Contact Phone: SMO _ RMA Project/Task Number: 195122.10.11.08 Lab Contact: Amy Kruszynski/ Wendy Palencia/505-844-3132 Released by COC No. CF378-18 Service Order: Lab Destination: M LAND Radonova Send Report to SMO: 4º Celsius 1495047 Contract No .: Stephanie Montaño/505.284.2553 Bill to: Sandia National Laboratories (Accounts Payable), Tech Area: P.O. Box 5800, MS-0154 Building: Room: Albuquerque, NM 87185-0154 **Operational Site:** Depth Date/Time Sample Container Preserv- Collection Sample Lab Parameter & Method Sample No. Sample Location Detail Fraction (ft) Collected Matrix Type Volume ative Method Type Requested Sample ID 102907 001 RN1/ Radtrak2 200144-4 RADON N/A 10/2/17 09:55 AF N 0 NA NONE С SA RN2/ Radtrak2 202032-0 102908 001 N/A 10/2/17 10:00 AF Ν С RADON SA 0 NA NONE RADON 102909 001 RN3/ Radtrak2 159248-4 N/A 10/2/17 08:43 AF N 0 NA NONE С SA RADON 102910 001 RN4/ Radtrak2 612821-9 N/A 10/2/17 08:50 AF Ν NONE С SA 0 NA 102911 001 RN5/ Radtrak2 111649-0 N/A 10/2/17 RADON 08:57 AF N 0 NA NONE С SA RADON 102912 001 RN6/ Radtrak2 138218-3 N/A 10/2/17 09:03 AF Ν 0 NA NONE С SA RADON 102913 001 RN7/ Radtrak2 206677-7 N/A 10/2/17 09:08 AF Ν 0 NA NONE С SA RADON 102914 001 RN8/ Radtrak2 609073-2 N/A 10/2/17 09:13 AF N SA 0 NA NONE С RADON 102915 001 RN9/ Radtrak2 126183-3 N/A 10/2/17 09:26 AF N 0 NA NONE С SA RADON 102916 001 RN10/ Radtrak2 189047-4 N/A 10/2/17 09:30 AF 0 NA NONE С SA N Last Chain: Yes SMO Use Special Instructions/QC Requirements: Sample Tracking Conditions on V Yes ✓ Yes Validation Reg'd: Date Entered: EDD Receipt Background: Yes Entered by: **Turnaround Time** 7-Day _____ 15-Day* 2 30-Day Confirmatory Yes QC inits .: Negotiated TAT Name Sample / Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Robert Ziock 12 SNL/00641/505-845-0485/505-238-3668 Return Samples By: Team Danielle Michel NR SNL/00641/505-845-7706/505-219-7143 Comments: Members Lab Use Relinquished by Org. 0641 Date 0/2/17 Time 14-05 Relinquished by 20 111011 Org. Reilann Date 10/09 Time N Received by Th Time 1425 Received by Org. 0631 Date 012117 Org. Date Time and Org.00631Date 0/3/17Time Relinguished by 1100 Relinquished by Org. Date Time Received by Org. Date (0/4//17 Time Received by Org. Date Son Time *Prior confirmation with SMO required for 7 and 15 day TAT

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- 4 -

> July-Sept. 2014 AOP 95-16

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

													AR/COC	617986
Project Name	:	MWL RADON MON		oject/Task Manag	ger:	Robert Zio	ck		Project/Ta	sk No.:	195122	2.10.11.08		
ech Area:									Roopen S.	in front by				
Building:		Room:			1. 1. 1. 1. 1.	-	1000	1000	200 4 0		1986.00	1400		Lab use
Sample No.	Fraction	Sample Lo	cation Det	ail (ft)	Date	Time	Sample Matrix	Cor	Volume	Preserv- ative	Collection	Sample Type	Parameter & Method Requested RADON	Lab Sample ID
102917	001	RN11/ Radtrak2	202876-9	N/A	10/2/17	10:06	AF	N	0 NA	NONE	c	SA		
102918	001	RN12/ Radtrak2	425700-2	N/A	10/2/17	10:05	AF	N	0 NA	NONE	С	SA	RADON	
102919	001	RN13/ Radtrak2	160180-6	N/A	10/2/17	10:12	AF	N	0 NA	NONE	С	SA	RADON	_
102920	001	RN14/ Radtrak2	985810-1	N/A	10/2/17	10:20	AF	N	0 NA	NONE	С	SA	RADON	1
102921	001	RN15/ Radtrak2	208677-	5 N/A	10/2/17	10:15	AF	N	0 NA	NONE	с	SA	RADON	
102922	001	RN16/ Radtrak2	559713-	3 N/A	10/2/17	08:30	AF	N	0 NA	NONE	С	SA	RADON	
102923	001	RN17/ Radtrak2	992164-4	N/A	10/2/17	09:17	AF	N	0 NA	NONE	С	SA	RADON	
102924	001	RNTB/ Radtrak2	231289-0) N/A	10/2/17	10:25	AF	N	0 NA	NONE	C	SA	RADON	1.
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July- Sept. 2017 AOP 95-16

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab	1												Р	age 1 of 2
Batch No.	VA			SMO Us	e						>		AR/COC	617988
Project Name	. 104	MWL RADON MONITORIN	Date Samples Shippe	d: (0)	3/17		SMO A	uthorization:	130		-	Wast	te Characterization	
Project/Task I	Manager:	Robert Ziock	Carrier/Waybill No.	-17	7930	-1	SMO C	ontact Phon	e:		340			
Project/Task I	Number:	195122.10.11.08	Lab Contact:	Amy Krus	zynski/	-		Wendy P	alencia/50	5-844-3132		Rele	ased by COC No.	
Service Order	r:	CF378-18	Lab Destination:	LAND	Radono	va	Send F	Report to SMO	D:					4º Celsius
			Contract No.:	1495047		14.10		Stephanie	Montaño/5	05.284.255	3	Bill to: Sand	dia National Laboratorie	s (Accounts Payable
Tech Area:												P.O. Box 58	00, MS-0154	
Building:		Room:	Operational Site:									Albuquerque	e, NM 87185-0154	
Sample No.	Fraction	Sample Location D	Depth letail (ft)	Dat Co	e/Time llected	Sample Matrix	C Type	ontainer Volume	Preserv- ative	Collection	Sample Type	Pa	rameter & Method Requested	Lab Sample II
102943	001	RN1/ Thoron 660360-9	N/A	10/2/17	09:55	AF	N	0 NA	NONE	С	SA	RADON		
102944	001	RN2/ Thoron 466380-3	N/A	10/2/17	10:00	AF	N	0 NA	NONE	С	SA	RADON		
102945	001	RN3/ Thoron 660 58-3	N/A	10/2/17	08:43	AF	N	0 NA	NONE	С	SA	RADON		
102946	001	RN4/ Thoron 466333-2	N/A	10/2/17	08:50	AF	N	0 NA	NONE	с	SA	RADON		
102947	001	RN5/ Thoron 466345-6	N/A	10/2/17	08:57	AF	N	0 NA	NONE	С	SA	RADON		
102948	001	RN6/ Thoron 660544-8	N/A	10/2/17	09:03	AF	N	0 NA	NONE	С	SA	RADON		
102949	001	RN7/ Thoron 466383-7	N/A	10/2/17	09:08	AF	N	0 NA	NONE	С	SA	RADON		-
102950	001	RN8/ Thoron 660445-8	N/A	10/2/17	09:13	AF	N	0 NA	NONE	с	SA	RADON		
102951	001	RN9/ Thoron 466417-3	N/A	10/2/17	09:26	AF	N	0 NA	NONE	с	SA	RADON		
102952	001	RN10/ Thoron 466346-4	N/A	10/2/17	09:30	AF	N	0 NA	NONE	С	SA	RADON		
Last Chain:		Yes	Sampl	e Tracking		SMC	Use	Special In:	structions	QC Requir	rements:			Conditions on
Validation F	Req'd:	✓ Yes	Date E	ntered:		State 2		EDD		✓ Yes				Receipt
Background	d:	Ves Ves	Entere	d by:			Ser in	Turnaroun	d Time	7-Day	· []	15-Day*	✓ 30-Day	
Confirmato	ry:	L Yes	QC init	s.:	A CARLENSE	Sat Pals		Negotiated	TAT	<u> </u>				
Sample	N	ame Signat	Init.	Comp	any/Organiza	tion/Phon	e/Cell	Sample Di	sposal	Return	n to Client	· 1	Disposal by Lab	
Team	Robert Z	iock how	year K	5TSNL/0064	1/505-845-0	485/505-2	38-3668	Return Sa	mples By:					
Members	Danielle	Michel haut	the of	- SNL/0064	1/505-845-7	706/505-2	19-7143	Comments						
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		1. 14 · · ·						-						LabUse
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SMO 2012-ARCOC (4-2012)

July-Scot. 2017 AOP 95-16

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

roject Name: ech Area:													AR/COC	617988
ech Area:		MWL RADON MOI	TOR N Project	Task Mana	ger:	Robert Zio	ck	12012	Project/Ta	sk No.:	195123	2 10 11 08		
				111243	10.000				Records of					
uilding:		Room:				12.0	100 m							Lab use
Sample No. Fra	action	Sample Lo	cation Detail	Depth (ft)	Date. Colle	Date/Time Collected		Со Туре	volume	Preserv-	Collection	Sample Type	Parameter & Method Requested	Lab Sample I
102953 00	01	RN11/ Thoron 6	60467-2	N/A	10/2/17	10:06	AF	N	0 NA	NONE	С	SA	RADON	
102954 00	01	RN12/ Thoron 4	66335-7	N/A	10/2/17	10:05	AF	N	0 NA	NONE	С	SA	RADON	
102955 00	01	RN13/ Thoron 6	86996-0	N/A	10/2/17	10:12	AF	N	0 NA	NONE	C	SA	RADON	
102956 00	01	RN14/ Thoron 4	66390-2	N/A	10/2/17	10:20	AF	N	0 NA	NONE	c	SA	RADON	
102957 00)1	RN15/ Thoron 4	66411-6	N/A	10/2/17	10:15	AF	N	0 NA	NONE	C	SA	RADON	
102958 00	01	RN16/ Thoron 4	66384-5	N/A	10/2/17	08:30	AF	N	0 NA	NONE	C	SA	RADON	19.5
102959 00)1	RN17/ Thoron 4	66371-2	N/A	10/2/17	09:17	AF	N	0 NA	NONE	C	SA	RADON	1
102960 00	01	RNTB/ Thoron 4	66341-5	N/A	10/2/17	10:25	AF	N	0 NA	NONE	С	SA	RADON	-
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Mailstop 1103

PO Box 5800 1515 Eubank SE Albuquerque NM 87185

United States

Wendy Palencia

RADON/THORON MONITORING REPORT
Issued by an Accredited Laboratory



REPORT NUMBER

4742341:1 REPORT DATE 10/17/2017

PRINT DATE 10/19/2017

REPORT PAGE 1(4)

MEASUREMENT PERFORMED FOR

REPORT RECEIVER(S)

NTESS, LLC

The analysis results are located on page 2 of this document. **Description of the measurement** The measurement was performed with closed radon/thoron alpha-track detectors.

Property address

Measurement method: closed alpha-track detector

The radon measurement was performed with a closed alpha-track detector following the quality guidance given in EPA 402-R-95-012. The detector container is manufactured from electrically conducting plastic. Through a small slit (filter) in the radon detector, radon gas enters the detector but the diffusion time is long enough to prevent thoron gas from entering. Through holes covered by paper filters in the thoron detector, both thoron and radon gas enter the detector. The thoron concentration is calculated by subtracting the radon contribution in the thoron detector as measured with the radon detector. The track-detecting material (film) inside the detectors are hit by alpha particles generated by radon and thoron entering the detectors and the decay products formed from them. On the film, alpha particles make small tracks which are enlarged through chemical etching and later analyzed via our proprietary Track-Etch methodology to determine the radon and thoron exposures. Radonova Laboratories AB (FC). Box 6522, SE-751-28 Uppsala, Sweden) is accredited (no. 1489) by SWEDAC to conduct radon-gas measurements using closed alpha-track detector method. The thoron measurement is not part of the accredited measurement methods. The analysis equipment is checked daily and the detectors are calibrated at regular intervals.

Measured radon and thoron concentrations

For each detector, the measured value of the radon and thoron concentration is given. The radon detector is marked with (R) after the detector number in the result table and the thoron detector with (T). For each value an uncertainty associated with the measurement to a 95% confidence level also given. For example a measurement result of 4.0 \pm 0.5 pCi/l means that the radon and thoron 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 and thoron concentration cannot be calculated. In such cases, the total exposure in pCi⁺days! will be reported.

Signature on the report

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

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Test results

RADON/THORON MONITORING REPORT									
Issued by an Accredited	Laborato	ry							
REPORT NUMBER	REPORT PAGE	2(4)							



REPORT PAGE 2(4) 4742341:1 REPORT DATE 10/17/2017

PRINT DATE 10/19/2017

	Detector	Start date	Stop date	Location	Detector comment	Avg Radon/Thoron Conc. pCi/I	Total Radon/Thoror Exp pCi-days/I
	200144-4 (R)	07/05/2017	10/02/2017	RNI		< 0.4	< 36
	660360-9 (T)	07/05/2017	10/02/2017	RNI		< 0.5	< 47
	292032-0 (R)	07/05/2017	10/02/2017	RN2		< 0.4	< 36
	466380-3 (T)	07/05/2017	10/02/2017	RN2		< 0.5	< 47
	159248-4 (R)	07/05/2017	10/02/2017	RN3		0.6 +/- 0.2	53 +/- 16
	660358-3 (T)	07/05/2017	10/02/2017	RN3		< 0.5	<47
	612821-9 (R)	07/05/2017	10/02/2017	RN4		< 0.4	< 36
	466333-2 (T)	07/05/2017	10/02/2017	RN4		< 0.5	< 47
	111649-0 (R)	07/05/2017	10/02/2017	RN5		< 0.4	< 36
	466345-6 (T)	07/05/2017	10/02/2017	RN5		0.9 +/- 0.4	81 +/- 38
	138218-3 (R)	07/05/2017	10/02/2017	RN6		< 0.4	< 36
	660544-8 (T)	07/05/2017	10/02/2017	RN6		< 0.8	< 72
	206677-7 (R)	07/05/2017	10/02/2017	RN7		< 0.4	< 36
	466383-7 (T)	07/05/2017	10/02/2017	RN7		< 0.5	< 47
0/LB	609073-2 (R)	07/05/2017	10/02/2017	RN8		< 0.4	< 36
6-04/	660445-8 (T)	07/05/2017	10/02/2017	RN8		0.7 +/- 0.4	62 +/- 34
/ 2017-0	126183-3 (R)	07/05/2017	10/02/2017	RN9		< 0.4	< 36
-VI.10	466417-3 (T)	07/05/2017	10/02/2017	RN9		< 0.5	< 47
10 HL	189047-4 (R)	07/05/2017	10/02/2017	RN10		< 0.4	< 36
S RT	466346-4 (T)	07/05/2017	10/02/2017	RN10		0.6 +/- 0.5	51 +/- 45

Comment to the results

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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Radonova Inc. 900 Oakmont Lane Suite 207, Westmont IL 60559 Telephone: 331.814.2200 E-mail: help@radonova.com

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Review of MWL Radon-in-Air Data 3rd Quarter CY 2017 (July - September 2017) November 10, 2017

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United States

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RADON/THORON MONITORING	REPORT
Issued by an Accredited Laboratory	,



4742341:1 10/17/2017 MEASUREMENT PERFORMED FOR

PRINT DATE 10/19/2017

REPORT PAGE 3(4)

REPORT RECEIVER(S)

NTESS, LLC

REPORT NUMBER

REPORT DATE

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

The measurement was performed with closed radon/thoron alpha-track detectors.

Property address

Measurement method: closed alpha-track detector

The radon measurement was performed with a closed alpha-track detector following the quality guidance given in EPA 402-R-95-012. The detector container is manufactured from electrically conducting plastic. Through a small slit (filter) in the radon detector, radon gas enters the detector but the diffusion time is long enough to prevent thoron gas from entering. Through holes covered by paper filters in the thoron detector, both thoron and radon gas enter the detector. The thoron concentration is calculated by subtracting the radon contribution in the thoron detector as measured with the radon detector. The track-detecting material (film) inside the detectors are hit by alpha particles generated by radon and thoron entering the detectors and the decay products formed from then On the film, alpha particles make small tracks which are enlarged through chemical etching and later analyzed via our proprietary Track-Etch methodology to determine the radon and thoron exposures. Radonova Laboratories AB (PO. Box 6522, SE-751 28 Uppsala, Sweden) is accredited (no. 1489) by SWEDAC to conduct radon-gas measurements using closed alpha-track detector method. The thoron measurement is not part of the accredited measurement methods. The analysis equipment is checked daily and the detectors are calibrated at regular intervals.

Measured radon and thoron concentrations

For each detector, the measured value of the radon and thoron concentration is given. The radon detector is marked with (R) after the detector number in the result table and the thoron detector with (T). For each value an uncertainty associated with the measurement to a 95% confidence level also given. For example a measurement result of 4.0 ± 0.5 pCi/I means that the radon and thoron concentration is most likely contained in the range 3.5-4.5 pCi/I . If the start or end date of the measurement has not been provided, the radon and thoron concentration cannot be calculated. In such cases, the total exposure in pCi*days/I will be reported.

Signature on the report

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

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Test results

RADON/THORON Issued by an Accred	ν ^{46D4} Ο Γ Γ	
REPORT NUMBER 4742341:1	REPORT PAGE 4(4)	1000 100100 17925
REPORT DATE	PRINT DATE	

10/17/2017

PRINT DATE 10/19/2017

	Detector	Start date	Stop date	Location	Detector comment	Avg Radon/Thoron Conc. pCi/l	Total Radon/Thoron Exp pCi-days/I
	202876-9 (R)	07/05/2017	10/02/2017	RN11		< 0.4	< 36
	660467-2 (T)	07/05/2017	10/02/2017	RN11		0.6 +/- 0.4	51 +/- 38
	425700-2 (R)	07/05/2017	10/02/2017	RN12		< 0.4	< 36
	466335-7 (T)	07/05/2017	10/02/2017	RN12		0.6 +/- 0.5	55 +/- 41
	160180-6 (R)	07/05/2017	10/02/2017	RN13		< 0.4	< 36
	686996-0 (T)	07/05/2017	10/02/2017	RN13		< 0.5	< 47
	985810-1 (R)	07/05/2017	10/02/2017	RN14		< 0.4	< 36
	466390-2 (T)	07/05/2017	10/02/2017	RN14		< 0.5	< 47
	208677-5 (R)	07/05/2017	10/02/2017	RN15		< 0.4	< 36
	466411-6 (T)	07/05/2017	10/02/2017	RN15		0.6 +/- 0.4	57 +/- 38
	559713-3 (R)	07/05/2017	10/02/2017	RN16		< 0.4	< 36
	466384-5 (T)	07/05/2017	10/02/2017	RN16		< 0.5	< 47
	992164-4 (R)	07/05/2017	10/02/2017	RN17		< 0.4	< 36
	466371-2 (T)	07/05/2017	10/02/2017	RN17		1.0 +/- 0.5	90 +/- 41
81/0(231289-0 (R)	07/05/2017	10/02/2017	RNTB		< 0.4	< 36
140-50	466341-5 (T)	07/05/2017	10/02/2017	RNTB		< 0.5	< 47
/ 2017-0							
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Comment to the results

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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Review of MWL Radon-in-Air Data 3rd Quarter CY 2017 (July - September 2017) November 10, 2017

SMO 2012-ARCOC (4-2012)

July- Sept 2017 AOP 95-16 CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY Internal Lab Page 1 of 2 N Batch No. SMO Use AR/COC 617987 Project Name: MWL RADON MONITORIN Date Samples Shipped: 10 3 SMO Authorizatio Waste Characterization Project/Task Manager: Robert Ziock 27 35 Carrier/Waybill No. SMO Contact Pho RMA Released by COC No. SMO Project/Task Number: 195122.10.11.08 Lab Contact: Amy Kruszynski/ Wendy Palencia/505-844-3132 Service Order: CF378-18 LAND Radenova Lab Destination: Send Report to SMO: ✓ 4° Celsius Contract No. 1495047 Stephanie Montaño/505.284.2553 Bill to: Sandia National Laboratories (Accounts Payable), Tech Area: P.O. Box 5800, MS-0154 Building: Room: **Operational Site:** Albuquerque, NM 87185-0154 Depth Date/Time Sample Container Preserv- Collection Sample Parameter & Method Lab Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume ative Method Type Requested Sample ID 102925 001 RN1/ Rapidos 206899-7 RADON N/A 10/2/17 09:55 AF N 0 NA NONE С SA 102926 001 RN2/ Rapidos 693556-3 N/A 10/2/17 10:00 AF RADON Ν 0 NA NONE С SA 102927 001 RN3/ Rapidos 130016-9 N/A 10/2/17 08:43 RADON AF N 0 NA NONE С SA 102928 001 RN4/ Rapidos 623600-4 RADON N/A 10/2/17 08:50 AF N 0 NA NONE C SA 102929 001 RN5/ Rapidos 745915-9 RADON N/A 10/2/17 08:57 AF N 0 NA NONE С SA 102930 001 RN6/ Rapidos 219977-6 RADON N/A 10/2/17 09:03 AF Ν NONE С 0 NA SA 102931 001 RN7/ Rapidos 402294-3 RADON N/A 10/2/17 09:08 AF N 0 NA NONE С SA RN8/ Rapidos 467745-6 499459-6 102932 001 RADON N/A 10/2/17 09:13 AF N 0 NA NONE С SA 102933 001 RN9/ Rapidos 768115-8 RADON N/A 10/2/17 09:26 AF N 0 NA NONE С SA 102934 001 RN10/ Rapidos 204812-2 10/2/17 RADON N/A 09:30 AF N 0 NA NONE C SA Last Chain: Yes Sample Tracking **SMO Use** Special Instructions/QC Requirements: Conditions on Validation Reg'd: ✓ Yes Date Entered: EDD V Yes Receipt Background: 7-Day* ___ Yes Entered by: 15-Day* 2 30-Day **Turnaround Time** Confirmatory: Yes QC inits. Negotiated TAT Sample Name Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Robert Ziock Team SNL/00641/505-845-0485/505-238-3668 Return Samples By: Danielle Michel 1101 K SNL/00641/505-845-7706/505-219-7143 Comments Members Lab Use Relinquished by Org-641 Date 10/2/17 Time 1423 Relinquished by Date 10/09/12Time li Am Tacha Org. Radia Received by Org6631 Date/0/2/17 Time | 42 Received by Org. Date Time Relinguished by Org. 0023/ Date 10/3 /17 Time Relinquished by Org Date SUR Time Received by Date W/4/7 Time Org. 32 Received by Org. Date Time

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

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Review of MWL Radon-in-Air Data 3rd Quarter CY 2017 (July - September 2017) November 10, 2017

SMO 2012-ARCOC (4-2012)

July-Sept. 2017 AOP 95-16

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

													AR/COC	61/98/
roject Name	:	MWL RADON MO	NITORIN Project/	Task Manag	ger:	Robert Zio	ck		Project/Ta	sk No.:	195122	2.10.11.08		
ech Area:		-												
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Sample No.	Fraction	Sample Lo	ocation Detail	(ft)	Colle	ected	Matrix	Туре	Volume	Preserv- ative	Method	Type	Parameter & Method Requested	Sample I
102935	001	RN11/ Rapidos	573636-8	N/A	10/2/17	10:06	AF	N	0 NA	NONE	С	SA	RADON	
102936	001	RN12/ Rapidos	209479-5	N/A	10/2/17	10:05	AF	N	0 NA	NONE	С	SA	RADON	
102937	001	RN13/ Rapidos	560189-3	N/A	10/2/17	10:12	AF	N	0 NA	NONE	С	SA	RADON	
102938	001	RN14/ Rapidos	662712-9	N/A	10/2/17	10:20	AF	N	0 NA	NONE	С	SA	RADON	
102939	001	RN15/ Rapidos	151098-1	N/A	10/2/17	10:15	AF	N	0 NA	NONE	С	SA	RADON	
102940	001	RN16/ Rapidos	411414-6	N/A	10/2/17	08:30	AF	N	0 NA	NONE	с	SA	RADON	1.1
102941	001	RN17/ Rapidos	207338-5	N/A	10/2/17	09:17	AF	N	0 NA	NONE	С	SA	RADON	
102942	001	RNTB/ Rapidos	562557-9	N/A	10/2/17	10:25	AF	N	0 NA	NONE	С	SA	RADON	
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Review of MWL Radon-in-Air Data 3rd Ouarter CY 2017 (July - September 2017) November 10, 2017

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NTESS, LLC

Wendy Palencia

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PO Box 5800 1515 Eubank SE Albuquerque NM 87185

United States

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REPORT NUMBER

4742342:2 REPORT DATE 10/25/2017 MEASUREMENT PERSONNED BOR

PRINT DATE 10/25/2017

NEPORT PAGE 1(4)

REPORT RECEIVER(S) NTESS, LLC

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

18445

Description of the measurement The measurement was performed with a closed high-sensitivity alpha-track detector. The detector(s) arrived to Radonova Laboratories AB 10/04/2017. They were measured 10/10/2017 .

Property data and address

Transit Detector 1: Transit Detector 2: Transit Detector 3:

Measurement method: closed alpha-track high sensitivity 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. Transit detectors are used for the return delivery of the high-sensitivity detectors in order to make a more accurate background subtraction.

Radonova Laboratories AB 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 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 pCP/days1 will be reported.

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.
- A Cittzen's Guide to Radon
- Home Buyer's and Seller's Gudie to Radon
- Consumer's Gudie to Radon Reduction

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

Signature on the report

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

0/01/ V1.10 / 2017-05-04-8 Ŷ UK RT

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Test results

RADON MONIT Issued by an Accredited			
AEPORT NUMBER. 4742342:2	NEPORT PAGE	2(4)	1994 December (1985
10/25/2017	10/25/2017	,	

	Detector	Start date	Stop date	Location	Detector comment	Location type	Avg Radon Conc. pCi/l	Total Radon Exp pCI-days/l
	206899-7	07/05/2017	10/02/2017	RNI			0.19 +/- 0.06	17 +/- 7
	693556-3	07/05/2017	10/02/2017	R042			0.16 +/- 0.06	15+/-7
	130016-9	07/05/2017	10/02/2017	EN3			0.22 +/- 0.11	19 +/- 9
	623600-4	07/05/2017	10/02/2017	R044			0.24 +/- 0.09	21 +/- 9
	219977-6	07/05/2017	10/02/2017	R246			0.24 +/- 0.11	23 +/- 9
	402294-3	07/05/2017	10/02/2017	7428			0.38 +/- 0.11	33 +/- 9
	477457-6	07/05/2017	10/02/2017	RINE			< 0.16	< 15
04-1).O.LB	768115-8	07/05/2017	10/02/2017	R249			0.24 +/- 0.11	23 +/- 9
1. 10 / 2012/02-1	204812-2	07/05/2017	10/02/2017	RN10			< 0.16	< 15
V-100_3H_10_3U	573636-8	07/05/2017	10/02/2017	RN11			0.19 +/- 0.06	18 +/- 7

Comment to the results

This report replaces 4742342:1. Reason: information added that due to found plastic quality problems in the alpha-track film for detector 745915-9 (RN5), the results for that detector could not be reported.

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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Review of MWL Radon-in-Air Data 3rd Ouarter CY 2017 (July - September 2017) November 10, 2017

87185 US

NTESS, LLC

Wendy Palencia

Mailstop 1103

PO Box 5800 1515 Eubank SE Albuquerque NM 87185

United States



Issued by an Accredited Laboratory

4104 WW PDITE

NEFORT NUMBER 4742342:2 REPORT PAGE 3(4)

REPORT DATE 10/25/2017 MEASUREMENT PERFORMED FOR PRINT DATE 10/25/2017

NERONT NECEVER NTESS, LLC

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

18445

Description of the measurement The measurement was performed with a closed high-sensitivity alpha-track detector. The detector(s) arrived to Radonova Laboratories AB 10/04/2017. They were measured 10/10/2017.

Property data and address

Transit Detector 1: Transit Detector 2: Transit Detector 3:

Measurement method: closed alpha-track high sensitivity 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. Transit detectors are used for the return delivery of the high-sensitivity detectors in order to make a more accurate background subtraction.

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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 also given. For example a measurement result of 4.0 ± 0.5 pC/I means that the radon concentration is most likely contained in the range 3.5-4.5 pC/I . If the start or end date of the measurement has not been provided, the radion concentration cannot be calculated. In such cases, the total exposure in pCr*days1 will be reported.

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

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

Signature on the report

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

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Test results

RADON MONITORING REPORT



Issued by an Accredited Laboratory REPORT NUMBER. NEPORT PAGE 4(4) 4742342-2 NEPORT DATE 10/25/2017

FAINT DATE	
10/25/2017	

	Detector	Start date	Stop date	Location	Detector comment	Location type	Avg Radon Conc. pCi/l	Total Radon Exp pCI-days/
	209479-5	07/05/2017	10/02/2017	RN12			0.16 +/- 0.06	15+/-7
	560189-3	07/05/2017	10/02/2017	RN13			< 0.16	< 15
	662712-9	07/05/2017	10/02/2017	RN14			< 0.16	< 15
	151098-1	07/05/2017	10/02/2017	RN15			0.14 +/- 0.06	12+/-7
	411414-6	07/05/2017	10/02/2017	RN16			0.19 +/- 0.11	17 +/- 9
	207338-5	07/05/2017	10/02/2017	RN17			0.19 +/- 0.11	16 +/- 9
	562557-9	07/05/2017	10/02/2017	RNTB			0.16 +/- 0.11	15+/-9
4-1JO/LB								
0/201202/0								
45_001-V1.0								
5.00								

Comment to the results

This report replaces 4742342:1. Reason: information added that due to found plastic quality problems in the alpha-track film for detector 745915-9 (RN5), the results for that detector could not be reported ...

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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Figure 1. Location of Radon Detectors at the MWL

Mixed Waste Landfill Radon Detector Deployment / Collection Form

Activity (check all that apply): Deployment Name: Robert Ziock Signature: Deployment ElleMichel Deployment Collection Name: Signature:

ARCOC #: 617986

Detector Type: Radtrack2

Detector Serial Number	Sample Number	Sampling Location	Deployment Date	Deployment Time	Collection Date	Collection Time	Comments
200144-4	102907	RN1	7/5/17	1036	10/2/17	0955	NDNF
292032-0	102908	RN2		1043		1000	Nerve
159248-4	102909	RN3		0911		0843	NONES
612821-9	102910	RN4		0921		1223U	Noré
111649-0	102911	RN5		6929		0e57	11 one
138218-3	102912	RN6		094D		6903	NAVE
206677.7	102913	RN7		0947		6908	MONE
609073-2	102914	RN8		1013		0913	NONÉ
26/83-3	102915	RN9		080		0926	UNE
189047-4	102916	RN10		1027		0930	WONE
202876-9	102917	RN11		1101		1006	Noné
425700-2	102918	RN12		1106		1005	NONE
160120-6	102919	RN 13		10		1012	HINE
985810-1	102920	RN 14		1114		1020	NOVE
208677-5	102921	RN15		1119		1015	NISTÉ
559713-3	102922	RN16		0855		0830	IVONE
992164-4	102923	RN17		1005		5917	NUSHÊ
231289-0	102924	RNTB	\vee	NA	Ý	1025	WARE

Additional Comments:

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

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Mixed Waste Landfill Radon Detector Deployment / Collection Form

	Aluta in	Activity (check al	l that-apply):
Name: Robert Ziock	Signature:	Deployment	Collection
Name: Darielle Michael	Signature: Da UMACUL	Deployment	
ARCOC #: 617988	Detector Type: Thorop		

Detector Type: Thoron

	Detector Serial Number	Sample Number	Sampling Location	Deployment Date	Deployment Time	Collection Date	Collection Time	Comments
	660360-9	102943	RN1	FISF	1036	10/2/17	ษรรี	MICHÉ
	466380-3	102944	RN2		1045		1000	HIME
a	660352-3	102945	RN3		0911		0243	MAND
	466333-2	102946	RN4		0921		0850	MONE
	466345.6	102947	RN5		0929		0857	Line
	660544-8	102948	RN6		0940		6903	NIME
	466383-7	102949	RN7		6947		0908	NONE
ortelin	466371-2	102950	RN8		1013		6913	NME
	466417-3	102951	RN9		10 0D		0926	NOME
	466346-4	102952	RN10		1027		0930	NONE
	660467-2	102953	RN11		101		1006	MORE
	466335-7	102954	RN12		1106		1005	Norre
	6869960	102955	RN13		1116		1012	More
	466390-Z	102956	RN14		1114		000	Norte
	466411-6	102957	RN15		1119		1015	ILONE
	4663845	102958	RN16		0855		5230	Nonê
	466371-2	102959	RN17		1665		0917	WSNÊ
	466341-5	102960	RNTB	V	NA	Y	1025	Noné

Additional Comments:

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

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Mixed Waste Landfill Radon Detector Deployment / Collection Form

	Allat them	Activity (check a	ll that apply):
Name: Robert Ziock	Signature: / www. Juna	Deployment	Collection
Name: Dori Elk Michal	Signature: Da 1 MM.o. W	Deployment	
ARCOC #: <u>617987</u>	Detector Type: Rapidos		

Detector Type: Rapidos

Detector Serial Number	Sample Number	Sampling Location	Deployment Date	Deployment Time	Collection Date	Collection Time	Comments
206899-7	102925	RN1	7/5/7	1036	10/2/17	0955	MARME
693556-3	102926	RN2		1043)	1000	lime
130016-9	102927	RN3		6911		0843	NONÉ
623600-4	102928	RN4		6921		0230	Noné
715915-9	102929	RN5		6927		fzeu	NONE
219977-6	102930	RN6		0940		0903	MIME
402294-3	102931	RN7		0947		6908	NORE
4677456	102932	RN8		1013		0913	NDAE
768115-8	102933	RN9		020		0926	NOME
204812-2	102934	RN10		1027		0930	IUME
5773636-8	102935	RN11		1101		1006	MONE
209479-5	102936	RN12		106		1005	NOVE
5-931022	102937	RN13		111		1012	hove
662712-9	102938	RN14		1114		000	Noné
151098-1	102939	RN15		1119		1015	NONE
411414-6	102940	RN 16		0355		0530	NONE
207338-5	102941	RN17		1005		6917	NONE
409765-2	102942	RNTB	\Diamond	MA	V	1025	MARE

Additional Comments:

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, 4100 Controlled Documents home page.

Contract Verification Form (CVR)

Project Leader Ziock	Project Name MWL Radon Monitoring	Project/Task No. 195122_10.11.08
ARCOC No. 617986 & 617988	Analytical Lab Radonova	SDG No. 4742341-1

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

2.0 Analytical Laboratory Report

Line	e ltom		olete?	If no evolein
No.	Item	Yes	No	ii no, explain
2.1	Data reviewed, signature	Х		
2.2	Method reference number(s) complete and correct	Х		
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	N/A		
2.6	QC batch numbers provided	Х		
2.7	Dilution factors provided and all dilution levels reported	N/A		
2.8	Data reported in appropriate units and using correct significant figures	Х		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	Х		
2.10	Narrative provided	Х		
2.11	TAT met	Х		
2.12	Holding times met	Х		
2.13	Contractual qualifiers provided	N/A		
2.14	All requested result and TIC (if requested) data provided	Х		

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	Х		
3.2	Quantitation limit met for all samples	Х		
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	Х		

. . . .

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	Х		
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) lon 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	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	lf 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? O Yes O No						
Based on the review, this data package is complete. 💿 Yes 🔿 No						
Reviewed by: Wendy Palencia Date: 10-25-2017 09:14:00						
Closed by: Wendy Palencia Date: 10-25-2017 09:14	:00					

Contract Verification Form (CVR)

Project Leader Ziock	Project Name MWL Radon Monitoring	Project/Task No. 195122_10.11.08
ARCOC No. 617987	Analytical Lab Radonova	SDG No. 4742342-1

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

2.0 Analytical Laboratory Report

SMO-05-03

Line	ltom	Complete?		If no evoluin
No.	item	Yes	No	ii no, explain
2.1	Data reviewed, signature	Х		
2.2	Method reference number(s) complete and correct	Х		
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	N/A		
2.6	QC batch numbers provided	Х		
2.7	Dilution factors provided and all dilution levels reported	N/A		
2.8	Data reported in appropriate units and using correct significant figures	Х		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	Х		
2.10	Narrative provided	Х		
2.11	TAT met	Х		
2.12	Holding times met	Х		
2.13	Contractual qualifiers provided	N/A		
2.14	All requested result and TIC (if requested) data provided		Х	No results were reported for detector RN5 (745915-9) due to plastic quality problems in the alpha-track film.

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	Х		
3.2	Quantitation limit met for all samples	N/A		
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		

3.9

herbicides 8151.

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	Х		
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	Х		

4.0 Calibration and Validation Documentation

Second column confirmation data provided for methods 8330

(high explosives), pesticides/PCBs 8081 and 8082 and

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		

N/A

Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	N/A		
	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) lon abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		

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

Line	ltere	Vee	Na	lf ne evolein
No.	nem	res	OVI	n no, explain

6.0 Problem Resolution

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

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions		
Were deficiencies unresolved? O Yes o No				
Based on the review, this data package is complete. 💿 Yes 🔿 No				
Reviewed by: Wendy Palencia Date: 10-25-2017 07:50:00				
Closed by: Wendy Palencia Date: 10-25-2017 07:50:00				

Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection Form

Annemarie Rador Name: 8-

Signature:

Date of Inspection:

Inspection parameters: Identification labeling; mounting bracket and stainless steel clamp and post; radon detector; radon detector enclosure and internal attachment components.

Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	Nore
RN3	None
RN4	Nore
RN5	None
RN6	None
RN7	Nore ful Added clamp to housing 8-10-12
RN8	Added clamp to new housing 8-10-17
RN9	None
RN10	None
RN11	Nere
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 Monitoring Location Supplemental Inspection Form

Annemaric Rader Name: Date of Inspection: 9/8/2017

Signature:

Inspection parameters: Identification labeling; mounting bracket and stainless steel clamp and post; radon detector; radon detector enclosure and internal attachment components.

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	NOME		
RN15	NonE		
RN16	NonE		
RN17	NAVE		

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Name: Robert Ziock

FOP 14-03

Mixed Waste Landfill Radon Detector Collection Inspection Form

1 Am
Alter Jane la
Signature:

Collection Date: 10/2/17

Detector Type: Rapidos

Radon Monitoring Frequency: 🔽 Quarterly

Semiannually Annually

Ra	don Monitoring Location Inspection Parameters	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Action Required at Location Numbers
А.	Monitoring location identification labeling.	yes	No	
В.	Radon detector condition.	yes	No	
C.	Radon detector enclosure securely fastened (mounting bracket and stainless steel clamp) to post (fence or free standing).	yes	No	
D.	Radon detector enclosure and internal attachment components.	yes	No	
E.	Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	yes	No	
Ra	don Monitoring Detectors Inspection Parameters			
F.	Condition of radon detector at time of collection.	Goal	No	

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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	Nore
RN11	None
RN12	Nore
RN13	None
RN14	None
RN15	None
RN16	None

Mixed Waste Landfill Radon Detector Collection Inspection Form

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

RN17

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None

Name: Robert Ziock

Radon Detector Collection Inspection Form

	att 1
Signature:	Hater Juns
_	

Collection Date: 10/2/17

Detector Type: Radtrak2

Radon Monitoring Frequency: 🗹 Quarterly

Semiannually Annually

Radon Monitoring Location Inspe	ection Parameters	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Action Required at Location Numbers
A. Monitoring location identifica	tion labeling.	yes	No	
B. Radon detector condition.		yes	No	
C. Radon detector enclosure secu stainless steel clamp) to post (rely fastened (mounting bracket and fence or free standing).	yes	No	
D. Radon detector enclosure and	internal attachment components.	yes	No	
E. Radon detector enclosure inter spider webs, etc.).	ior clean of debris (dirt, insects,	yes	Yes	RN15
Radon Monitoring Detectors Inspection Parameters				
F. Condition of radon detector at	time of collection.	bood	No	

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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	Spider web & nest removed from endosure
RN16	None
RN17	None

Mixed Waste Landfill Radon Detector Collection Inspection Form

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	Robert	Ziock	
INAMIC.	1.000015		

Collection Date: 10/2/17

Signature:

lie

Radon Monitoring Frequency: 🔽 Quarterly

Detector Type: Thoron

Semiannually Annually

Ra	don Monitoring Location Inspection Parameters	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Action Required at Location Numbers
А.	Monitoring location identification labeling.	yes	No	
В.	Radon detector condition.	yes	No	
C.	Radon detector enclosure securely fastened (mounting bracket and stainless steel clamp) to post (fence or free standing).	yes	No	
D.	Radon detector enclosure and internal attachment components.	yes	No	
E.	Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	yes	yes	RN15
Radon Monitoring Detectors Inspection Parameters				
F.	Condition of radon detector at time of collection.	600d	No	

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

Mixed Waste Landfill Radon Detector Collection Inspection Form

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

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MIXED WASTE LANDFILL

RADON MONITORING

October-December 2017 Monitoring Period


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

Albuquerque, New Mexico 87185-0651

- date: February 14, 2018
- to: Mike Mitchell (8854), Robert Ziock (641), and Bonnie Little (631)
- from: Kelly Green (6281) kagreen@sandia.gov Kelly Juan
- *subject:* Review of MWL Radon Air Data October through December 2017 Quarterly Monitoring Period

The purpose of this memo is to document my review of the radon air monitoring results for the October through December 2017 quarterly monitoring event. My review includes evaluation of the results and supporting documentation relative to the data quality objective (DQO) and monitoring objectives specified in the Mixed Waste Landfill (MWL) Long-Term Monitoring and Maintenance Plan (Appendix 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. Although radon monitoring at the MWL transitioned from a quarterly to semiannual frequency in calendar year (CY) 2016, a decision was made to return to quarterly monitoring for CY 2017 after review of the July through December 2016 results. Details regarding this decision and the ongoing radon detector investigation are provided in this memorandum after the evaluation of October through December 2017 results.

Radon air monitoring measurements during the October through December 2017 quarter were obtained using three different detectors: Radtrak2[®] detectors (measure radon only), Rapidos[®] detectors (measure radon only with a lower detection limit), and Modified Radtrak2[®] detectors (measure radon and thoron). The three detectors were deployed at each monitoring location (Figure 1) on October 2, 2017 and were collected on January 2, 2018. The protective casing and mounting hardware were inspected during the collection effort and repairs were made if needed. The detectors remained in the field for approximately three months and were submitted to the analytical laboratory for analysis on Analysis Request/Chain of Custody (AR/COC) #618180 (Radtrak2[®]), AR/COC #618227 (Rapidos[®]), and AR/COC #618001 (Modified Radtrak2[®]). A trip blank detector (RNTB) was submitted with each set of detectors (total of 3 trip blanks). In the attached data reports from the analytical laboratory, the Radtrak2[®] and Modified Radtrack2[®] results (AR/COCs #618180 and #618001) are combined in one report (total of 2 data reports).

The results for this quarterly monitoring period and associated field documentation meet the LTMMP DQO and monitoring objectives. The radon results from the Radtrak2[®] and Rapidos[®] detectors were

consistent with the July through December 2016 (6-month monitoring period), the April through June 2017, and the July through October 2017 (3-month monitoring period) results. The radon plus thoron results from the Modified Radtrak2[®] detectors were slightly higher, and consistent with historical data from the original Radtrak[®] detectors (January 2014 through June 2016, 8 quarterly and 1 semiannual monitoring events) that also measured radon and thoron. The results from the three detector sets are briefly summarized below.

- Results for the Radtrak2[®] detectors (radon only) ranged from non-detects (<0.4 pCi/L) at locations RN1, RN2, RN5, RN7, RN8, RN12, RN13, RN15, RN16, and RN17 to 0.5 pCi/L at locations RN3, RN6, RN10, and RN14. The Radtrak2[®] results included detections at 7 of the 17 locations, with a range of 0.4 to 0.5 pCi/L.
- Results for the Rapidos[®] detectors (radon only with lower detection limit) ranged from 0.24 pCi/L at RN10 to 0.46 pCi/L at RN1. The background locations RN16 and R17 results were 0.41 and 0.27 pCi/L respectively, which are very low and consistent with previous results. The Rapidos[®] trip blank detector (RNTB) result was unusually high at 1.3 pCi/L, but still a very low value. Past trip blank results have been consistently very low or non-detects. Upon further investigation, the Rapidos[®] detector used for RNTB is a detector that was received from the laboratory in March 2017. It is possible the detector was exposed to background levels of radon since March 2017. If the RNTB result is recalculated for the longer exposure period (i.e., 9-month period from March 2017 through December 2017) it would be approximately 0.14 pCi/L, which is more in line with past RNTB results. Based on the two other trip blank results and previous results, the Rapidos[®] RNTB result is not valid. There is no adverse impact as the other two trip blank detectors provided representative results and all results from the 17 monitoring locations are consistent with historical results.
- Results for the Modified Radtrak2[®] detectors (radon plus thoron) ranged from non-detects (<0.5 or <0.8 pCi/L) at locations RN4, RN5, RN6, RN9, RN11, RN12, RN15, and RN16 to 1.3 pCi/L at RN7. The Modified Radtrak2[®] results included detections at 9 of the 17 locations, with a range of 0.5 to 1.3 pCi/L.

The trigger level of 4 pCi/L 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). All results indicate very low activities of radon in the air at the MWL, consistent with historical results and background radon activity. When thoron was measured along with radon (Modified Radtrak2[®] detector), the results were slightly higher and consistent with historical data (January 2014 through June 2016), which also measured radon and thoron (data from original Radtrak[®] detectors). The results from this quarterly monitoring event will be presented in the next MWL Annual LTMM Report that will be submitted to NMED in June 2018 (reporting period is April 1, 2017 through March 31, 2018).

Radon Detector Investigation Background Information

As previously reported, the July through December 2016 semiannual monitoring event was the first time Radtrak^{2®} detectors were used for radon monitoring at the MWL and results were lower than previous results (January 2014 through June 2016, 8 quarterly and 1 semiannual monitoring events) measured using the original Radtrak[®] detectors. As documented in my data evaluation memorandum dated April 12, 2017, the Radtrak[®] detector was phased out by the manufacturer and replaced with the new

Radtrak2[®] detector. The Radtrak2[®] detector was selected because it was the direct replacement for the original Radtrak[®] detector and could be used for a 6-month deployment period. The Rapidos[®] detector has a lower radon detection limit but was not selected because it has a maximum deployment period of 3 months.

After receiving the data report for the July through December 2016 monitoring period in February 2017, we initiated our investigation to evaluate the newer Radtrak2[®] detectors to determine why the results were lower. This investigation included the testing of other detector types (i.e., Rapidos[®] and Modified Radtrak2[®] detectors) at a quarterly frequency to allow for the collection and comparison of more data in a shorter period of time. Based on correspondence with the analytical laboratory manager during April 2017, the most likely explanation for the lower values measured by the new Radtrak2[®] detectors is that they are designed to have a longer diffusion time than the original Radtrak[®] detectors. Because of this design change, thoron (Radon-220 with a half-life of just 56 seconds) is not measured by the Radtrak2[®] or Rapidos[®] detector, but is measured by the original Radtrak[®] detector. In other words, when deployed under the same conditions, the newer Radtrak2[®] detectors should measure lower activities than the older Radtrak[®] detectors because they measure only radon, not radon and thoron. This information was received after the deployment of detectors to confirm this hypothesis did not begin until the July through September 2017 monitoring period, and now concludes with the October through December 2017 quarterly monitoring period described in this memorandum.

As summarized earlier, three sets of detectors were deployed at each monitoring location for the October through December 2017 quarterly monitoring period. The results from this triple deployment have confirmed the impact of thoron on the MWL radon monitoring effort consistent with the July through October 2017 triple deployment results. Results for the Modified Radtrak2[®] detectors show a slightly higher range (<0.5 to 1.3 pCi/L) consistent with the July through September 2017 results (<0.5 to 1.0 pCi/L), and the results from January 2014 through June 2016 using the original Radtrak[®] detectors (<0.3 to 1.4 pCi/L). The range for all "radon only" results using Rapidos[®] and Radtrak2[®] detectors (July 2016 through December 2017) is slightly lower (<0.08 to 0.6 pCi/L). As determined by comparing the Rapidos[®] and Modified Radtrak2[®] results for the nine locations where a detection was reported for both detectors, the estimated thoron range is 0.30 to 0.95 pCi/L with the exception one location with an estimated value of 0.04 pCi/L. In June through September 2017, the estimated thoron range was 0.41 to 0.81 pCi/L. This information is consistent with the explanation that historical results and recent results from detectors that measure both radon and thoron are slightly higher then results from detectors that measure both radon and thoron are slightly higher then results from detectors that measure only radon. All radon monitoring results for the MWL indicate very low radon activity consistent with background conditions and well below the trigger level of 4 pCi/L.

As stated in my data evaluation memorandum dated November 10, 2017, based on the evaluation of all MWL radon monitoring results, I recommend using the Radtrak2[®] detector for semiannual monitoring for CY 2018 and beyond. These detectors will accurately measure radon activity in air over a 6-month period and identify any changes in radon activity if they occur. With completion of the detector investigation, focusing on one detector that measures only radon is an improvement that is consistent with the MWL radon monitoring DQO and monitoring objectives. In addition, the Radtrak2[®] detection limit will decrease with a monitoring period of 6-months (semiannual frequency) versus 3-months (quarterly frequency).

Attachments: Analysis Request/Chain of Custody #618180 Analysis Request/Chain of Custody #618001 radonova Radon Monitoring Report (analytical laboratory results for Radtrak2[®] detectors Modified Radtrak2[®] detectors) Analysis Request/Chain of Custody #618227 radonova Radon Monitoring Report (analytical laboratory results for Rapidos[®] detectors) Figure 1. Location of the Alpha Track Detectors at the MWL

SMO	2012-AR	COC (4-2012)	ANALY	CON SIS REQI	JEST AN	ABOR	ATORY IAIN O	F CUS	TODY		9 1	AOP 95-16
Internal Lab									,	1	ł	Page 1 of 2
Batch No.	MI	+		SMO Use				2	IP,I	/	AR/COC	618180
Project/Task I Project/Task I Project/Task I	: Manager: Number:	MWL RADON MONITORIN Robert Zlock 195122.10.11.08	Date Samples Shipped Carrier/Waybill No. Lab Contact:	Amy Kruszynsk	350	SMO A	ontact Phone Wendy P	e: CAA	5-844-3132	mo	Waste Characterization RMA Released by COC No.	
Service Order	r:	CF378-18	Lab Destination:	LAND		Send F	teport to SM	D:				✓ 4º Celsius
Tech Area:			Contract No.:	1495047	un o sue le sue		Stephanie	Montaño/5	05.284.255	3	Bill to: Sandia National Laboratori	es (Accounts Payable)
Building:	1. S.	Room:	Operational Site:								Albuquerque NM 87185-0154	
Sample No.	Fraction	Sample Location D	Depth etail (ft)	Date/Tim Collected	e Sample d Matrix	e C Type	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample II
103638	001	RN1/ Radtrak2 651919-	3 N/A	1/2/18 0	9:56 AF	N	0 NA	NONE	с	SA	RADON	The second
103639	001	RN2/ Radtrak2 496020-	9 N/A	1/2/18 1	0:00 AF	N	0 NA	NONE	С	SA	RADON	1000
103640	001	RN3/ Radtrak2 188184-	6 N/A	1/2/18 0	9-08 AF	N	0 NA	NONE	C	SA	RADON	
103641	001	RN4/ Radtrak2 203160-	7 N/A	1/2/18 0	0.14 AE	N	0.144	NONE	0	en.	RADON	
102642	001	PNE/ Padtrak2 179747	2 N/A	4/2/10 0	0.10	N	0 144	NONE	0	OA OA	RADON	The second
103042	001	RNS/ Raduak2 178747-		1/2/10 0	9.19 AF	IN	UNA	NONE	0	SA	RADON	
103643	001	RN6/ Radtrak2 202807-	4 N/A	1/2/18 0	9:23 AF	N	0 NA	NONE	C	SA	RADON	
103644	001	RN7/ Radtrak2 758051-	7 N/A	1/2/18 0	9:27 AF	N	0 NA	NONE	C	SA	RADON	1.1.1.1.1.1
103645	001	RN8/ Radtrak2 987084-	1 N/A	1/2/18 0	9:40 AF	N	0 NA	NONE	С	SA	RADON	14 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
103646	001	RN9/ Radtrak2 203338-	9 N/A	1/2/18 0	9:46 AF	N	0 NA	NONE	С	SA	RADON	Mar Start
103647	001	RN10/ Radtrak2 524243	3-3 N/A	1/2/18 0	9:51 AF	N	0 NA	NONE	С	SA	RADON	
Last Chain:		Yes	Sample	Tracking	SMO	O Use	Special Ins	structions/	QC Requir	ements:		Conditions on
Validation F	Req'd:	V Yes	Date En	tered:		17-39-ME-	EDD		✓ Yes			Receipt
Confirmator	nv:		CC inite	by:			Negotisted	d Time	17-Day		15-Day" 🗹 30-Day	
Sample Team	Danielle	ame Signat, Michel	re Init.	Company/Or SNL/00641/505	ganization/Phor 845-7706/505-2	ne/Cell 219-7143	Sample Di Return Sar	sposal nples By:	Return	to Client	Disposal by Lab	
Members	Mark Lyc	on Merly	a int	SNL/00631/505-	284-3982		Comments	loyed	10/	2/1-	7.	Labiliza
Relinquished I	by mg	elllust .	Orgivi,41 Date	13/18 1	ime 0340	Relingu	ished by 1)EFE	~	Org.	Date / / C//X	Time Kor
Received by	an	6 8 Pin one	Org.0063/ Date	1/3/18 1	ime 0740	Receive	ed by	land	NOO	Org.	. Date 1 / 9 / 18	Time
Relinquished I	by Ch	4 4 fin ano	Org. 006 7/Date	1/3/18 1	ime 0931	Relinqu	ished by	ð		Org.	. Date	Time
Received by	12	T	Org. Date	1/4/18 1	ime (?m	Receive	ed by			Org.	Date	Time

> SMO 2012-ARCOC (4-2012) CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

Page 2 of 2 AR/COC 618180 **Project Name:** MWL RADON MONITORIN Project/Task Manager: Robert Zlock Project/Task No.: 195122.10.11.08 Tech Area: Building: Room: Lab use Depth Date/Time Container Preserv. Collection Sample Sample Parameter & Method Lab Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume ative Method Туре Requested Sample ID RADON 103648 001 RN11/ Radtrak2 981385-8 N/A 1/2/18 AF N С SA 10:11 0 NA NONE 103649 001 RN12/ Radtrak2 202728-2 N/A RADON 1/2/18 С 10:15 AF Ν 0 NA NONE SA RADON 103650 001 RN13/ Radtrak2 607884-4 N/A 1/2/18 10:24 AF Ν 0 NA NONE С SA RADON 103651 001 RN14/ Radtrak2 701773-4 N/A 1/2/18 AF N С SA 10:28 0 NA NONE RADON 103652 001 RN15/ Radtrak2 668252-0 N/A 1/2/18 10:20 AF N 0 NA NONE С SA RADON 103653 001 RN16/ Radtrak2 726753-7 N/A 1/2/18 С 09:00 AF N 0 NA NONE SA 103654 001 RN17/ Radtrak2 760827-6 RADON N/A 1/2/18 09:32 AF Ν 0 NA NONE С SA 001 RNTB/ Radtrak2 401376-9 RADON 103655 N/A 1/2/18 09:00 AF N 0 NA NONE C SA 12 1 1.1.1 1.1 **Recipient Initials**

Internal Lab	11														Page 1 of 2
Batch No. /	101		In a number of the	SN	NO Use	1.20				A	10	1	100	AR/COC	618001
Project/Task I	Manager.	Robert Zlock	Carrier/Waybill No.	pec	136	11-35	0	SMO A	ontact Phone	-y/Y	60	GAND	Waste	Characterization	
Project/Task I	Number:	195122.10.11.08	Leb Contect	Am	y Kruszy	mskil	10000		Wendy P	alencia/50	5-844-3132	104	Releas	sed by COC No.	
Service Order	c.	CF378-18	Lab Destination:	LAN	ND		- Section of	Send R	leport to SMK	Dr.					4º Celsi
			Contract No.:	149	5047	United and			Stephanie	Montaño/5	05.284.255	3	Bill to: Sandi	a National Laboratorie	es (Accounts Payal
Tech Area:	1	-	-										P.O. Box 580	0, MS-0154	
Building:	1	Room:	Operational Site	i:	Date	Time	Remole	0	antalaur	In	Calleation	Panala	Albuquerque.	NM 87185-0154	Inc. Inc.
Sample No.	Fraction	Sample Location D	Detail (f)	Colle	cted	Matrix	Туре	Volume	ative	Method	Type	Par	Requested	Sample
103050	001	RN1/ Thoron 660573-7	N	A 1/	/2/18	09:56	AF	N	0 NA	NONE	C	SA	RADON		ALC: NO
103051	001	RN2/ Thoron 660181-9	N	A 1/	/2/18	10:00	AF	N	0 NA	NONE	С	SA	RADON		1
103052	001	RN3/ Thoron 660541-4	N	A 1/	/2/18	09:08	AF	N	0 NA	NONE	C	SA	RADON		0.22
103053	001	RN4/ Thoron 466415-7	N	A 1/	/2/18	09:14	AF	N	0 NA	NONE	С	SA	RADON		3128
103054	001	RN5/ Thoron 466395-1	N	A 1/	/2/18	09:19	AF	N	0 NA	NONE	с	SA	RADON		15-17
103055	001	RN6/ Thoron 660432-6	N	A 1/	/2/18	09:23	AF	N	0 NA	NONE	с	SA	RADON		1000
103056	001	RN7/ Thoron 660509-1	N	A 1/	/2/18	09:27	AF	N	0 NA	NONE	с	SA	RADON		10.21
103057	001	RN8/ Thoron 687144-6	N	A 1/	/2/18	09:40	AF	N	0 NA	NONE	с	SA	RADON		1
103058	001	RN9/ Thoron 466397-7	N	A 1/	/2/18	09:46	AF	N	0 NA	NONE	с	SA	RADON		
103059	001	RN10/ Thoron 686936-6	6 N/	A 1/	/2/18	09:51	AF	N	0 NA	NONE	с	SA	RADON		10.20
Last Chain:		Yes	Sam	ple Trac	cking		SMO	Use	Special Ins	structions	QC Requir	ements:	-		Conditions on
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SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation) AOP 95-16

Page 2 of 2 618001 AR/COC Project Name: MWL RADON MONITORIN Project/Task Manager: Robert Ziock Project/Task No.: 195122.10.11.08 Tech Area: Building: Room: Lab use Depth Date/Time Sample Container Preserv. Collection Sample Parameter & Method Lab Sample No. Fraction Sample Location Detail (ft) Collected Matrix Volume ative Method Requested Sample ID Туре Type RADON 103060 001 RN11/ Thoron 660225-4 N/A 1/2/18 10:11 AF N 0 NA NONE C SA RADON 103061 001 RN12/ Thoron 466355-5 N/A 1/2/18 AF Ν C 10:15 0 NA NONE SA RADON 103062 001 RN13/ Thoron 660542-2 N/A С 1/2/18 10:24 AF Ν 0 NA NONE SA RN14/ Thoron 660127-2 N/A RADON 103063 001 1/2/18 AF N 0 NA NONE C SA 10:28 RADON 103064 001 RN15/ Thoron 466382-9 N/A 1/2/18 AF 0 NA С 10:20 N NONE SA RN16/ Thoron 466387-8 N/A С SA RADON 103065 001 1/2/18 09:00 AF Ν 0 NA NONE RADON RN17/ Thoron 466408-2 103066 001 N/A 1/2/18 09:32 AF Ν 0 NA NONE С SA RNTB/ Thoron (20238-7 RADON 103067 001 N/A 1/2/18 AF N 0 NA NONE С SA 09:00 Same -**Recipient Initials**

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US

NTESS, LLC Wendy Palencia Mailstop 1103 PO Box 5800 1515 Eubank SE Albuquerque NM 87185 United States

RADON/THORON MONITORING REPORT
Issued by an Accredited Laboratory



107831-AL, 107830-RT REPORT NUMBER 4813903:1 REPORT DATE 01/11/2018

MEASUREMENT PERFORMED FOR

ROBERT ZIOCK

REPORT PAGE 1(4) PRINT DATE 01/11/2018

REPORT RECEIVER(S)

NTESS, LLC

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

The measurement was performed with closed radon/thoron alpha-track detectors.

Property address AR/COC 618180 & 618001

Measurement method: closed alpha-track detector

The radon measurement was performed with a closed alpha-track detector following the quality guidance given in EPA 402-R-95-012. The detector container is manufactured from electrically conducting plastic. Through a small slit (filter) in the radon detector, radon gas enters the detector but the diffusion time is long enough to prevent thoron gas from entering. Through holes covered by paper filters in the thoron detector, both thoron and radon gas enter the detector. The thoron concentration is calculated by subtracting the radon contribution in the thoron detector as measured with the radon detector. The track-detecting material (film) inside the detectors are hit by alpha particles generated by radon and thoron entering the detectors and the decay products formed from them. On the film, alpha particles make small tracks which are enlarged through chemical etching and later analyzed via our proprietary Track-Etch methodology to determine the radon and thoron exposures. Radonova Laboratories AB (P.O. Box 6522, SE-751 28 Uppsala, Sweden) is accredited (no. 1489) by SWEDAC to conduct radon-gas measurements using closed alpha-track detector method. The thoron measurement is not part of the accredited measurement methods. The analysis equipment is checked daily and the detectors are calibrated at regular intervals.

Measured radon and thoron concentrations

For each detector, the measured value of the radon and thoron concentration is given. The radon detector is marked with (R) after the detector number in the result table and the thoron detector with (T). For each value an uncertainty associated with the measurement to a 95% confidence level also given. For example a measurement result of 4.0 ± 0.5 pCi/l means that the radon and thoron 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 and thoron concentration cannot be calculated. In such cases, the total exposure in pCi*days/I will be reported.

Signature on the report

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

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Test results

RADON/THORON MONITORING REPORT Issued by an Accredited Laboratory

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REPORT NUMBER 4813903:1	REPORT PAGE	2(4)
REPORT DATE 01/11/2018	PRINT DATE 01/11/201	8

Detector	Start date	Stop date	Location	Detector comment	Avg Radon/Thoron Conc. pCi/l	Total Radon/Thoron Exp pCi-days/I
651919-3 (R)	10/02/2017	01/02/2018	RNI		< 0.4	< 37
660573-7 (T)	10/02/2017	01/02/2018	RNI		0.5 +/- 0.5	51 +/- 41
496020-9 (R)	10/02/2017	01/02/2018	RN2		< 0.4	< 37
660181-9 (T)	10/02/2017	01/02/2018	RN2		0.6 +/- 0.5	57 +/- 43
188184-6 (R)	10/02/2017	01/02/2018	RN3		0.5 +/- 0.2	44 +/- 16
660541-4 (T)	10/02/2017	01/02/2018	RN3		0.9 +/- 0.5	81 +/- 47
203160-7 (R)	10/02/2017	01/02/2018	RN4		0.4 +/- 0.3	38 +/- 20
466415-7 (T)	10/02/2017	01/02/2018	RN4		< 0.8	< 74
178747-2 (R)	10/02/2017	01/02/2018	RN5		< 0.4	< 37
466395-1 (T)	10/02/2017	01/02/2018	RN5		< 0.8	< 74
202807-4 (R)	10/02/2017	01/02/2018	RN6		0.5 +/- 0.3	48 +/- 20
660432-6 (T)	10/02/2017	01/02/2018	RN6		< 0.8	< 74
758051-7 (R)	10/02/2017	01/02/2018	RN7		< 0.4	< 37
660509-1 (T)	10/02/2017	01/02/2018	RN7		1.3 +/- 0.5	120 +/- 45
987084-1 (R)	10/02/2017	01/02/2018	RN8		< 0.4	< 37
687144-6 (T)	10/02/2017	01/02/2018	RN8		0.9 +/- 0.5	83 +/- 41
203338-9 (R)	10/02/2017	01/02/2018	RN9		0.4 +/- 0.3	37 +/- 20
466397-7 (T)	10/02/2017	01/02/2018	RN9		< 0.8	< 74
524243-3 (R)	10/02/2017	01/02/2018	RN10		0.5 +/- 0.2	46 +/- 16
686936-6 (T)	10/02/2017	01/02/2018	RN10		0.8 +/- 0.5	72 +/- 47

Comment to the results

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist This report may only be reproduced in full, unless the issuing laboratory has given prior written approval.

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RADON/THORON MONITORING REPORT
Issued by an Accredited Laboratory



107831-AL, 107830-RT Report Number 4813903:1 Report date

REPORT PAGE 3(4) PRINT DATE 01/11/2018

MEASUREMENT PERFORMED FOR ROBERT ZIOCK

REPORT RECEIVER(S)

NTESS, LLC

01/11/2018

The analysis results are located on page 2 of this document. **Description of the measurement** The measurement was performed with closed radon/thoron alpha-track detectors.

Property address AR/COC 618180 & 618001

Measurement method: closed alpha-track detector

The radon measurement was performed with a closed alpha-track detector following the quality guidance given in EPA 402-R-95-012. The detector container is manufactured from electrically conducting plastic. Through a small slit (filter) in the radon detector, radon gas enters the detector but the diffusion time is long enough to prevent thoron gas from entering. Through holes covered by paper filters in the thoron detector, both thoron and radon gas enter the detector. The thoron concentration is calculated by subtracting the radon contribution in the thoron detector as measured with the radon detector. The track-detecting material (film) inside the detectors are hit by alpha particles generated by radon and thoron entering the detectors and the decay products formed from them. On the film, alpha particles make small tracks which are enlarged through chemical etching and later analyzed via our proprietary Track-Etch methodology to determine the radon and thoron exposures. Radonova Laboratories AB (PC) Box 6522, SE-751-28 Uppsala, Sweden) is accredited (no. 1489) by SWEDAC to conduct radon-gas measurements using closed alpha-track detector method. The thoron measurement is not part of the accredited measurement methods. The analysis equipment is checked daily and the detectors are calibrated at regular intervals.

Measured radon and thoron concentrations

For each detector, the measured value of the radon and thoron concentration is given. The radon detector is marked with (R) after the detector number in the result table and the thoron detector with (T). For each value an uncertainty associated with the measurement to a 95% confidence level also given. For example a measurement result of 4.0 ± 0.5 pCi/l means that the radon and thoron concentration is most likely contained in the range $3.5 \cdot 4.5$ pCi/l. If the start or end date of the measurement has not been provided, the radon and thoron concentration cannot be calculated. In such cases, the total exposure in pCi⁺days/l will be reported.

Signature on the report

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

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Test results

RADON/THORON MONITORING REPORT Issued by an Accredited Laboratory



REPORT NUMBER REPORT PAGE 4(4) 4813903:1 REPORT DATE 01/11/2018 PRINT DATE 01/11/2018

Detector	Start date	Stop date	Location	Detector comment	Avg Radon/Thoron Conc. pCi/l	Total Radon/Thoror Exp pCi-days/I
981385-8 (R)	10/02/2017	01/02/2018	RN11		0.4 +/- 0.2	39 +/- 16
660225-4 (T)	10/02/2017	01/02/2018	RN11		< 0.5	< 50
202728-2 (R)	10/02/2017	01/02/2018	RN12		< 0.4	< 37
466355-5 (T)	10/02/2017	01/02/2018	RN12		< 0.8	< 74
607884-4 (R)	10/02/2017	01/02/2018	RN13		< 0.4	< 37
660542-2 (T)	10/02/2017	01/02/2018	RN13		0.7 +/- 0.5	68 +/- 41
701773-4 (R)	10/02/2017	01/02/2018	RN14		0.5 +/- 0.2	42 +/- 16
660127-2 (T)	10/02/2017	01/02/2018	RN14		0.6 +/- 0.5	55 +/- 43
668252-0 (R)	10/02/2017	01/02/2018	RN15		< 0.4	< 37
466382-9 (T)	10/02/2017	01/02/2018	RN15		< 0.8	< 74
726753-7 (R)	10/02/2017	01/02/2018	RN16		< 0.4	< 37
466387-8 (T)	10/02/2017	01/02/2018	RN16		< 0.8	< 74
760827-6 (R)	10/02/2017	01/02/2018	RN17		< 0.4	< 37
466408-2 (T)	10/02/2017	01/02/2018	RN17		0.9 +/- 0.6	83 +/- 56
401376-9 (R)	10/02/2017	01/02/2018	RNTB		< 0.4	< 37
660238-7 (T)	10/02/2017	01/02/2018	RNTB		< 0.8	< 74
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Comment to the results

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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Internal Lab														Page 1 of 2
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103773	001	RN1/ Rapidos 968916-7	7 N/	A	1/2/18	09:56	AF	N	0 NA	NONE	с	SA	RADON	100
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103775	001	RN3/ Rapidos 308633-7	7 N/	A	1/2/18	00-08	AF	N	D NA	NONE	c	SA	RADON	1000
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103777	001	RN5/ Rapidos 3/31/2-6	5 N/	A	1/2/18	09:19	AF	N	0 NA	NONE	C	SA	04000	100.00
103778	001	RN6/ Rapidos 693878-1	1 N/	A	1/2/18	09:23	AF	N	0 NA	NONE	C	SA	RADON	(5. m)
103779	001	RN7/ Rapidos 778752-6	5 N/	A	1/2/18	09:27	AF	N	0 NA	NONE	C	SA	RADON	100
103780	001	RN8/ Rapidos 132850-9	9 N/	A	1/2/18	09:40	AF	N	0 NA	NONE	С	SA	RADON	1014
103781	001	RN9/ Rapidos 231209-8	B N/	A	1/2/18	09:46	AF	N	0 NA	NONE	C	SA	RADON	
103782	001	RN10/ Rapidos 767139	-9 N/	A	1/2/18	09:51	AF	N	0 NA	NONE	С	SA	RADON	10.00
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CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

Page 2 of 2

AR/COC 618227 Project Name: MWL RADON MONITORIN Project/Task Manager: Robert Ziock Project/Task No.: 195122.10.11.08 Tech Area: Building: Room: Lab use Preserv- Collection Sample Depth Date/Time Sample Container Parameter & Method Lab Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume ative Method Type Requested Sample ID 103783 001 RADON RN11/ Rapidos 1293201-8 N/A 1/2/18 10:11 AF Ν 0 NA NONE С SA 103784 001 RADON RN12/ Rapidos 234218-6 С N/A 1/2/18 10:15 AF N 0 NA NONE SA RADON 103785 001 RN13/ Rapidos 673879-3 1/2/18 С N/A 10:24 AF Ν 0 NA NONE SA 103786 001 RN14/ Rapidos 772317-4 RADON N/A 1/2/18 10:28 AF N 0 NA NONE С SA 103787 001 RN15/ Rapidos 109531-4 N/A 1/2/18 AF С RADON Ν 0 NA SA 10:20 NONE RADON 103788 001 RN16/ Rapidos 163067-2 1/2/18 AF С N/A Ν 0 NA SA 09:00 NONE RADON 103789 001 RN17/ Rapidos 251872-8 N/A 1/2/18 09:32 AF N 0 NA NONE С SA RNTB/ Rapidos 207881-4 RADON 103790 001 N/A 1/2/18 09:00 AF Ν 0 NA NONE С SA **Recipient Initials**

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NTESS, LLC

Wendy Palencia

Mailstop 1103

PO Box 5800



107831-AL, 107830-RT

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REPORT NUMBER REPORT PAGE 1(4) 4813904:3 REPORT DATE PRINT DATE 01/22/2018 01/22/2018

MEASUREMENT PERFORMED FOR

1515 Eubank SE Albuquerque NM 87185 United States

REPORT RECEIVER(S)

NTESS, LLC

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

Description of the measurement

The measurement was performed with a closed high-sensitivity alpha-track detector.

The detector(s) arrived to Radonova Laboratories AB 01/04/2018. They were measured 01/10/2018 .

Property data and address

AR/COC 618227

Transit Detector 1: Transit Detector 2: Transit Detector 3:

Measurement method: closed alpha-track high sensitivity 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. Transit detectors are used for the return delivery of the high-sensitivity detectors in order to make a more accurate background subtraction.

Radonova Laboratories AB 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 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.

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

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

Signature on the report

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

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RADON MONITORING REPORT

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1409 ISO/EC17925

Issued by an Accredited Laboratory REPORT PAGE 2(4) REPORT NUMBER 4813904:3 REPORT DATE PRINT DATE 01/22/2018 01/22/2018

Test results

	Detector	Start date	Stop date	Location	Detector comment	Location type	Avg Radon Conc. pCi/l	Total Radon Exp pCi-days/l
	968916-7	10/02/2017	01/02/2018	RNI			0.46 ±0.1	42 ± 11
	234134-5	10/02/2017	01/02/2018	RIN2			0.27 ± 0.0	Q 24 ± 9
	308633-7	10/02/2017	01/02/2018	RIN3			0.43 ± 0.1	39 ± 11
	196111-9	10/02/2017	01/02/2018	R2N4			0.38 ±0.1	35 ± 11
	373172-6	10/02/2017	01/02/2018	R2N5			0.27 ± 0.0	Q 24 ± 9
	693878-1	10/02/2017	01/02/2018	R2N6			0.32 ± 0.1	29 ± 11
	778752-6	10/02/2017	01/02/2018	R2N7			0.35 ±0.1	32 ± 11
EU/01/-M-	132850-9	10/02/2017	01/02/2018	R248			0.32 ±0.1	30 ± 11
VI.10 / 2017-05	231209-8	10/02/2017	01/02/2018	RN9			0.27 ± 0.0	Q 24 ± 9
US_RT_HS_001 -	767139-9	10/02/2017	01/02/2018	RN10			0.24 ± 0.0	23 ± 9

Comment to the results

> Detector 207881-4 (RNTB) was delivered in March 2017 compared to the other detectors which were delivered in September 2017. The unusal high RNTB value might be explained if the exposure of that detector was started at delivery. This report replaces 4813904:1. Reason: new or corrected measurement information has been received.

This report replaces 4813904:2. Reason: new or corrected measurement information has been received.

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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United States

RADON MONITORING REPORT Issued by an Accredited Laboratory



107831-AL, 107830-RT REPORT NUMBER 4813904: 3 REPORT DATE 01/22/2018 MEASUREMENT PERFORMED FOR

REPORT PAGE 3(4)

01/22/2018

REPORT RECEIVER(S)

NTESS, LLC

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

Description of the measurement

The measurement was performed with a closed high-sensitivity alpha-track detector.

The detector(s) arrived to Radonova Laboratories AB 01/04/2018. They were measured 01/10/2018 .

Property data and address

AR/COC 618227

Transit Detector 1: Transit Detector 2: Transit Detector 3:

Measurement method: closed alpha-track high sensitivity 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. Transit detectors are used for the return delivery of the high-sensitivity detectors in order to make a more accurate background subtraction.

Radonova Laboratories AB 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 also given. For example a measurement result of 4.0 \pm 0.5 pCi/l means that the radon concentration is most likely contained in the range 3.5.4.5 pCi/l. If the start or end date of the measurement has not been provided, the radon concentration cannot be calculated. In such cases, the total exposure in pCi⁺days/l will be reported.

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

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

Signature on the report

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

JS_RT_HS_001 -V1.10 / 2017-05-04 / J/O / L/B

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RADON MONITORING REPORT

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Issued by an Accredited Laboratory REPORT PAGE 4(4) REPORT NUMBER 4813904:3 REPORT DATE PRINT DATE 01/22/2018 01/22/2018

Test results

	Detector	Start date	Stop date	Location	Detector comment	Location type	Avg Radon Conc. pCi/l	Total Radon Exp pCi-days/l
	129301-8	10/02/2017	01/02/2018	RN11			0.30 ± 0.11	28 ± 11
	234218-6	10/02/2017	01/02/2018	RN12			0.43 ± 0.11	39 ± 11
	673879-3	10/02/2017	01/02/2018	RN13			0.38 ± 0.11	35 ± 11
	772317-4	10/02/2017	01/02/2018	RN14			0.30 ± 0.11	28 ± 11
	163067-2	10/02/2017	01/02/2018	RN16			0.41 ± 0.11	37 ± 11
	251872-8	10/02/2017	01/02/2018	RN17			0.27 ± 0.11	26 ± 11
	207881-4	10/02/2017	01/02/2018	RNTB			1.3 ± 0.19	122 ± 18
8-04-/JO/LB	190531-4	10/02/2017	01/02/2018	RN15			0.30 ±0.11	28 ± 11
-VI.10 / 2017-0								
US_RT_HS_001								

Comment to the results

Detector 207881-4 (RNTB) was delivered in March 2017 compared to the other detectors which were delivered in September 2017. The unusal high RNTB value might be explained if the exposure of that detector was started at delivery. This report replaces 4813904:1. Reason: new or corrected measurement information has been received.

This report replaces 4813904:2. Reason: new or corrected measurement information has been received.

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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Radonova Inc. 900 Oakmont Lane Suite 207, Westmont IL 60559 Telephone: 331.814.2200 E-mail: help@radonova.com

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Figure 1. Location of Radon Detectors at the MWL

Mixed Waste Landfill Radon Detector Deployment / Collection Form

Activity (check all that apply): Name: Robert Ziock Signature: **Deployment** □ Collection Signature: Collection Name: Danielle Michel **D**eployment Mark hyon ARCOC #: 618180 Detector Type: Radtrack2 **Detector Serial** Sample Sampling Deployment Deployment Collection Collection Comments Number Number Location Date Time Date Time 651919-3 0955 10/2/17 1/alia 400000 . 1

726-753-70	103638	KNI	10/2/17	0830	2/2/10	0956	WINE
4960209	103639	RN2		0001	1	[000]	NONE
188184-6	103640	RN3		0843		0908	MICHE
003160-7	103641	RN4		6850		0914	NOME
178747-2	103642	RN5		6857		0919	NONE
2028074	103643	RN6		0903		0923	NONE
758051-7	103644	RN7		0908		6927	NENE
987084-1	103645	RN8		0913		0940	NOVE
203338-9	103646	RN9		0926		0946	NONE
524243-3	103647	RN10		0930		0951	NOVE
981385-8	103648	RN 11		1006		1011	NONE
200728-2	103649	R N12		1005		1015	NONE
607884-4	103650	RN13		1012		1024	Lesne
701773-4	103651	RN14		1020		1078	IUME
668352-0	103652	RN15		1015		(020	spide nest remained
726753-7	103653	RN16		0830		0900	Kone
760827-6	103654	R N17		6917		6932	Mone
401376-9	103655	RNTB	×	NA	N/	0900	NONE

Additional Comments:

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

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Mixed Waste Landfill Radon Detector Deployment / Collection Form

Activity (check all that apply): Signature: Name: Robert Ziock **D**eployment □ Collection Signature Collection Name: Danielle Michel **Z** Deployment Mark Lyon -Collection ARCOC #: 618001 Detector Type: Thoron **Detector Serial** Sample Sampling Deployment Deployment Collection Collection Comments Number Number Location Date Time Date Time 60573-7 0955 10/2/17 103050 RN1 18 2 2/17 101 956

660181-9	103051	RN2		1000	1 x	1000	NONE
660541-4	103052	RN3		0843		0903	NONE
466415-7	103053	RN4		0230		0914	NONE
466395-1	103054	RN5		6857		0919	NORE
660432-6	103055	RN6		0903		0923	NONE
660509-1	103056	RN7		0708		0927	NOKE
687144-6	103057	RN8		0913		0940	NONE
466397-7	103058	RN9		0926		59.46	NOVE
686936-6	103059	RN10		0930		0951	MME
660225-4	103060	RN11		1006	% .	1011	MORE
466355-5	103061	RN12		1605		1015	Norie
660542-2	103062	RN13		1012		1024	NONE
660127-2	103063	RN14		1000		1028	NONE
466382-9	103064	RN15		1015		1020	spider nest removed
466387-8	103065	RN16		6830		0900	LOVE
466408-2-	103066	RN17		0917	V	093Z	NISNE
660238-7	103067	RNTB	V	NA	X	0900	WORE

Additional Comments:

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

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Mixed Waste Landfill Radon Detector Deployment / Collection Form

Name: Robert Ziock

Activity (check all that apply): Signature □ Collection **D**eployment Deployment

Name: Danielle Michel Mark Lyon ARCOC #: 618227

Signature Detector Type: Rapidos Collection Collection

Detector Serial Number	Sample Number	Sampling Location	Deployment Date	Deployment Time	Collection Date	Collection Time	Comments
968916-7 H3067-20	103773	RN1	10/2/17	02305	1/2/18	0956	10/2/17 NONE
234134-5	103774	RN2		1000		600j	NONE
302633-7	103775	RN3		0843		0908	LOME
196111-9	103776	RN4		1850		0914	NOVE
373172-6	103777	RN5		feso		0919	WONF
693878-1	103778	RN6		0903		0923	NOVE
778752-6	103779	RN7		6908		6127	NONE
132850-9	103780	RN8		0913		0940	MONE
231269-8	103781	RN9		0926		6946	WSRE
767139-9	103782	RN10		6930		0951	NONF
129301-8	103783	RN 11		1006		PILSBA	INSNE
234218-6	103784	RN12		1005		1015	LISTE
673879-3	103785	RN 13		1012		1024	WONE
772317-4	103786	RN14		1020		1028	WSNE
190531-4	103787	RN15		1015		1020	spider nestremora
163067-2	103788	RN16		0630		0900	NORE
251872-8	103789	RN17		6917		6932	NOLE
207881.4	103790	RNTB	\checkmark	NA.	V	0900	NONE

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. 618001 & 618180	Analytical Lab Radonova	SDG No. 4813903-1

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

2.0 Analytical Laboratory Report

Line	Itom	Complete?		If no explain
No.	Item	Yes	No	ii no, explain
2.1	Data reviewed, signature	Х		
2.2	Method reference number(s) complete and correct	Х		
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	Х		
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	Х		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	Х		
2.10	Narrative provided	N/A		
2.11	TAT met	Х		
2.12	Holding times met	Х		
2.13	Contractual qualifiers provided	N/A		
2.14	All requested result and TIC (if requested) data provided	Х		

3.0 Data Quality Evaluation

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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	Х		
3.2	Quantitation limit met for all samples	N/A		
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	Х		

. . . .

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) lon 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	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	lf 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? O Yes O No					
Based on the review, this data package is complete. 💿 Yes 🔿 No					
Reviewed by: Wendy Palencia Date: 02-06-2018 12:51:00					
Closed by: Wendy Palencia Date: 02-06-2018 12:51	:00				

Contract Verification Form (CVR)

Project Leader Ziock	Project Name MWL Radon Monitoring	Project/Task No. 195122_10.11.08
ARCOC No. 618227	Analytical Lab Radonova	SDG No. 4813904-1

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	Itom		olete?	
No.	item	Yes	No	ii no, explain
1.1	All items on ARCOC complete - data entry clerk initialed and dated	Х		
1.2	Container type(s) correct for analyses requested	Х		
1.3	Sample volume adequate for # and types of analyses requested	Х		
1.4	Preservative correct for analyses requested	Х		
1.5	Custody records continuous and complete	Х		
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	х		Detector number on ARCOC for RN15 was 109531-4, but the actual detector was 190531-4. Detector number on ARCOC for RN11 was 1293201-8, but the actual detector was 129301-8.
1.7	Date samples received	Х		
1.8	Condition upon receipt information provided	х		

2.0 Analytical Laboratory Report

Line	Itom	Complete?		If no explain
No.		Yes	No	
2.1	Data reviewed, signature	Х		
2.2	Method reference number(s) complete and correct	Х		
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	Х		
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	Х		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	Х		
2.10	Narrative provided	х		
2.11	TAT met	х		
2.12	Holding times met	х		
2.13	Contractual qualifiers provided	N/A		
2.14	All requested result and TIC (if requested) data provided	Х		

3.0 Data Quality Evaluation

Line No.	ltem	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	Х		
3.2	Quantitation limit met for all samples	N/A		
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		

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		Х	Radon detected on RNTB
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		

Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	N/A		
	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) lon abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		

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

Î	Line No.	Item	Yes	No	lf 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		
#			ļ	ļ	

Line	Itom	Voo	No	If no exploin
No.	Item	res	INO	ii no, explain

6.0 Problem Resolution

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

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions					
Vere deficiencies unresolved? O Yes O No							
Based on the review, this data package is complete. 💿 Yes 🔿 No							
Reviewed by: Wendy Palencia Date: 02-06-2018 13:26:00							
Closed by: Wendy Palencia Date: 02-06-2018 13:26:00							
Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection Form

Name: MARK Lyon Date of Inspection: Nov. 2, 2017

Signature: Mpih Jaya

Inspection parameters: Identification labeling; mounting bracket and stainless steel clamp and post; radon detector; radon detector enclosure and internal attachment components.

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					
R N10	None					
RN 11	None					
RN 12	None					
RN13	None					
RN14	None					
RN15	None					
RN16	None					
R N17	None					

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

Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection Form

NorkLyon WICKER Quick Name: Signature: n Date of Inspection:

Inspection parameters: Identification labeling; mounting bracket and stainless steel clamp and post; radon detector; radon detector enclosure and internal attachment components.

Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	NOWE
RN2	NONE
RN3	NONE
RN4	NONE
RN5	NOVE
RN6	NONE
RN7	None
RN8	Noné
RN9	Noné
RN 10	NONO
RN11	Nont
RN12	NONE
RN13	NUNE
RN14	None
RN15	Nore
RN16	None
RN17	NOVE

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

Mixed Waste Landfill Radon Detector Collection Inspection Form

Name: Davi EIE Mickel	Signature: Du Le M Michel
Collection Date: 12/2	Detector Type: Radbrack 2
Radon Monitoring Frequency: 🔲 Quarterly	Semiannually

Rad	don Monitoring Location Inspection Parameters	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Action Required at Location Numbers
А.	Monitoring location identification labeling.	YES	NO	
В.	Radon detector condition.	VES	NO	
C.	Radon detector enclosure securely fastened (mounting bracket and stainless steel clamp) to post (fence or free standing).	YES	ND	
D.	Radon detector enclosure and internal attachment components.	YES	ND	
E.	Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	YES	ND	
Rad	lon Monitoring Detectors Inspection Parameters			
F.	Condition of radon detector at time of collection.	YES	NO	

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Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	NIME
RN2	NOVE
RN3	WORE
RN4	MORE
RN5	NOVE
RN6	MORE
RN7	Noné
RN8	REplaced plastic assembly
RN9	Noré
RN10	HENE
RN11	NOVE
RN12	Nove
RN13	Neve
RN14	NoME
RN15	secondary plastic assembly broke not used-notreplace
RN16	NIGNÉ
RN17	noné

Mixed Waste Landfill Radon Detector Collection Inspection Form

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

ANNEX B

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

April 2017-March 2018

Data Evaluation Memo

Data Validation Reports

Contract Verification Reviews

Sandia National Laboratories

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

Albuquerque, New Mexico 87185-

date: October 4, 2017

to: Mike Mitchell (8854), Robert Ziock (641), and Bonnie Little (631)

from: Kelly Green (6283)

Kelly Treen

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 8/30/17 sample event.

Summary of Tritium Results (EPA Method 906.0^a) Mixed Waste Landfill Surface Soil Monitoring August 30, 2017

Sample Location	Result (pCi/L)	Percent Soil Moisture	Laboratory Qualifier	Validation Qualifier	Trigger Level (pCi/L)
MWL TS-2NW	99.8 ± 263	6.96	U	BD, FR3	
MWL TS-2SW	51.8 ± 133	8.61	U	BD, FR3	
MWL TS-2SW (Duplicate)	195 ± 141	9.28	U	BD, FR3	20,000
MWL TS-2SE	201 ± 140	8.83	U	BD, FR3	
MWL TS-2NE	191 ± 141	6.88	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 slightly higher than the August 2016 monitoring data (MWL Annual LTMM Report, June 2017) which ranged from 28.3 pCi/L to 151 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



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447

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Revised Memorandum

Date: October 26, 2017

To: File

From: Mary Donivan

Subject: Radiochemical Data Review and Validation – SNL Site: MWL Surface Soil Monitoring ARCOC: 617998 SDG: 431847 Laboratory: GEL Project/Task: 195122.10.11.08 Analysis: RAD

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

Summary

Five soil samples were prepared and analyzed with approved procedures using method EPA 906.0 modified (tritium) [GL-RAD-A-002]. 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.**

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 met all QC acceptance criteria.

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Laboratory Control Sample (LCS)

The LCS recovery met QC acceptance criteria,

Detection Limits/Dilutions

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

Other QC

One set of field duplicates was submitted. 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 b	y: Linda Tł	al Level	I Date:	10/02 and 10/27/17



Sample Findings Summary



AR/COC: 617998

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
GL-RAD-A-002			
	103318-001/MWL TS-2NW	Tritium (10028-17-8)	BD, FR3
	103319-001/MWL TS-2SW	Tritium (10028-17-8)	BD, FR3
	103320-001/MWL TS-2SE	Tritium (10028-17-8)	BD, FR3
	103321-001/MWL TS-2NE	Tritium (10028-17-8)	BD, FR3
	103322-001/MWL TS-2SW	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#: 617998	Site/Project: MWL Surface	Validation Date: 10/02/2017 and 10/26/2017		
SDG #: 431847	Laboratory: GEL Laboratories, LLC		Validator: Mary Donivan	
Matrix: Soil	# of Samples: 5	CVR present: Yes		
ARCOC(s) present: Yes	Sample Container Integrity: OK			
Analysis Type:				
Organic Metals Genc	hem 🛛 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: 08/30/2017

Per client request, sample 431847001 (103318-001) was recounted with a longer count time in order to meet the required critical level.

Validated by:

Mary A. Donican

Sandia Radiochemistry Worksheet

ARCOC #(s): 617998	SDG #: 431847	Matrix: Soil				
Laboratory Sample IDs: see below						
Method/Batch#s: ASTM D 2216 (Modified) %moisture/GL-RAD-A-002(tritium)/1697555/1698009 Samples 431847001 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	I	MS/ MSD RER	Lab Rep. RER				
None														
				Tracer/Ca	rrier Reco	overy Outl	iers							
Sample ID	Tracer/Ca	arrier %	R	Sample ID	l	Tracer/	Carrier	%R		Sample	ID	Trac	er/Carrier	%R
NA									 					

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

MB, Dup and samples -001 through -005 were recounted due to high MDAs, recounts reported.

Sample -001 was recounted again with a longer count time in order to meet the critical level and this was reported in the revised report.

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab	,															Page 1 o	_i f 1
Batch No. /	VIA				SM	O Use									AR/COC	61	7998
Project Name:		MWL SURFACE SOIL	MON Date Sample	es Shipped	: 31	/ 30	117		SMO A	uthorization:	16			Was	te Characterization		
Project/Task M	Manager:	Robert Ziock	Carrier/Wayt	oill No.	2	706	16		SMO C	ontact Phon	e:	Concernance - your	¢		۹.		, on A
Project/Task N	Number:	195122.10.11.08	Lab Contact:		Edie	Kent/	843-769-738	35	1	Wendy P	alencia/50	5-844-3132		Rele	eased by COC No.	N/	A DER
Service Order	:	CF426-17	Lab Destinat	ion:	GEL				Send R	eport to SM	D:	****	eyd ddiwlaid o Diwlei Carlos y Ynwr o brydwynwr.		-	一一一	4º Celsius
			Contract No.	:	1303	3873				Stephanie	Montaño/5	505.284.255	3	Bill to: San	idia National Laborator	ies (Accou	ints Payable),
Tech Area:														P.O. Box 5	800, MS-0154		
Building:	ang tanang ayap ayar ini ana ini da	Room:	Operation	al Site:										Albuquerqu	ie, NM 87185-0154	1	43184
	1			Depth	1	Date	/Time	Sample	C	ontainer	Preserv-	Collection	Sample	P	arameter & Metho	d	Lab
Sample No.	Fraction	Sample Locatio	n Detail	(ft)		Coll	ected	Matrix	Туре	Volume	ative	Method	Туре		Requested		Sample ID
103318	001	MWL TS-2NW		N/A	R	130/17	0560 F	SOIL	Р	2x1 L	None	G	SA	TRITIUM	(EPA 906)		001
> 103319	001	MWL TS-2SW		N/A			0730	SOIL	Р	2x1 L	None	G	SA	TRITIUM	(EPA 906)		002
103320	001	MWL TS-2SE		N/A			(174)	SOIL	Р	2x1 L	None	G	SA	TRITIUM	(EPA 906)		003
103321	001	MWL TS-2NE		N/A			0745	SOIL	Р	2x1 L	None	G	SA	TRITIUM	(EPA 906)		004
103322	001	MWL TS-2SW	***	N/A		$\overline{\mathbb{V}}$	0730	SOIL	Р	2x1 L	None	G	υd	TRITIUM	(EPA 906)		005
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Sample	Danielle	Michel D L		Init. Company/Organization/Phone/Cell Sample Disposal Celent J Disposal by Lab													
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*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. 617998	Analytical Lab GWL	SDG No. 431847

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

2.0 Analytical Laboratory Report

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

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	Х		
3.2	Quantitation limit met for all samples	Х		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	Х		
	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	Х		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	Х		
	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	Х		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	N/A		

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Line No.	ltem	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	Х		
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) lon 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	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	Х		

5.0 Data Anomaly Report

Line No.	Item	Yes	No	lf 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					
Vere deficiencies unresolved? C Yes C No							
Based on the review, this data package is complete. 💿 Yes 🔿 No							
Reviewed by: Mark L Lyon Date: 10-31-2017 09:02	Reviewed by: Mark L Lyon Date: 10-31-2017 09:02:00						
Closed by: Mark L Lyon Date: 10-31-2017 09:02:00							

Mixed Waste Landfill

Biota Monitoring

September 2017 Sampling Event



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

Memorandum

Date:	September 29, 2017
To:	File
From:	Mary Donivan
Subject:	Inorganic Data Review and Validation – SNL Site: MWL Surface Soil Monitoring ARCOC: 617999 SDG: 431737 Laboratory: GEL Project/Task: 195122.10.11.08 Analysis: Metals

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

Summary

Five soil samples were prepared and analyzed with approved procedures using methods EPA 6020 (ICP-MS), EPA 6010B (ICP-AES) and EPA 7471A (CVAA-Hg). 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 %Rs did not meet acceptance criteria for Ba and Zn, and the parent sample results were >4X the spike amount. Therefore, the associated sample results will not be qualified for these failing recoveries. The associated sample results were detects and will be **qualified J,MS1** due to lack of matrix specific accuracy information.
- 2. The MS %Rs were >125% for Cr, Pb and V. The PS %R was ≤125%. The associated sample results were detects and will be **qualified J, MS2** due to the high MS and passing PS recoveries.
- 3. Cd was detected at \leq the PQL in a bracketing CCB. All associated sample results were detects \leq their respective PQLs and will be **qualified U,B3** at their respective PQLs.

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 LLCCV recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Be was detected at \leq the PQL in a bracketing CCB. All associated sample results were detects > the PQL and > 5X the CCB 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 except as noted above in the Summary section.

Laboratory Replicate

The replicates 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 and correctly adjusted for dilutions. The ICP-MS samples were diluted the standard 2X.

ICP Interference Check Sample (ICS A and AB)

Results of the ICP-MS and ICP-AES ICS A and AB analyses were not evaluated for any samples because the sample concentrations of Ca, Mg, Al and Fe were < those in the ICS solution.

ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

Other QC

One field duplicate was submitted with the ARCOC. 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 ThalLevel: IDate: 10/02/17



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447

www.aqainc.net

Memorandum

Date: October 2, 2017

To: File

From: Mary Donivan

Subject: Radiochemical Data Review and Validation – SNL Site: MWL Surface Soil Monitoring ARCOC: 617999 SDG: 431737 Laboratory: GEL Project/Task: 195122.10.11.08 Analysis: RAD

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

Summary

Five 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 Bi-212 result for sample 431737003 was rejected by the laboratory due to the peak not meeting identification criteria and will be **qualified R,Z2**.
- 4. According to the case narrative, no peaks were identified for Bi-212 in sample -001. The associated sample result is considered non-detect at the calculated MDA and will be **qualified BD,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.

<u>Blanks</u>

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

One set of field duplicates was submitted. 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 7	Thal Level:	Date: 10/	02/17
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AR/COC: 617999

Page 1 of 6

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE HASL 300, 4.5.2.3/Ga-			
	103324-001/MWL ABSS-01- 2017	Americium-241 (14596-10-2)	BD, FR3
	103324-001/MWL ABSS-01- 2017	Beryllium-7 (13966-02-4)	BD, FR3
	103324-001/MWL ABSS-01- 2017	Bismuth-212 (14913-49-6)	BD, Z2
	103324-001/MWL ABSS-01- 2017	Cobalt-60 (10198-40-0)	BD, FR3
	103324-001/MWL ABSS-01- 2017	Neptunium-237 (13994-20-2)	BD, FR3
	103324-001/MWL ABSS-01- 2017	Radium-223 (15623-45-7)	BD, FR3
	103324-001/MWL ABSS-01- 2017	Radium-224 (13233-32-4)	J, FR7
	103324-001/MWL ABSS-01- 2017	Sodium-22 (13966-32-0)	BD, FR3
	103324-001/MWL ABSS-01- 2017	Thorium-227 (15623-47-9)	BD, FR3
	103324-001/MWL ABSS-01- 2017	Thorium-231 (14932-40-2)	BD, FR3
	103324-001/MWL ABSS-01- 2017	Thorium-234 (15065-10-8)	BD, FR3
	103324-001/MWL ABSS-01- 2017	Uranium-235 (15117-96-1)	BD, FR3
	103324-001/MWL ABSS-01- 2017	Uranium-238 (7440-61-1)	BD, FR3
	103325-001/MWL ABSS-02- 2017	Americium-241 (14596-10-2)	BD, FR3
	103325-001/MWL ABSS-02- 2017	Beryllium-7 (13966-02-4)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	103325-001/MWL ABSS-02- 2017	Bismuth-212 (14913-49-6)	R, Z2
	103325-001/MWL ABSS-02- 2017	Cobalt-60 (10198-40-0)	BD, FR3
	103325-001/MWL ABSS-02- 2017	Neptunium-237 (13994-20-2)	BD, FR3
	103325-001/MWL ABSS-02- 2017	Radium-223 (15623-45-7)	BD, FR3
	103325-001/MWL ABSS-02- 2017	Sodium-22 (13966-32-0)	BD, FR3
	103325-001/MWL ABSS-02- 2017	Thorium-227 (15623-47-9)	BD, FR3
	103325-001/MWL ABSS-02- 2017	Thorium-231 (14932-40-2)	BD, FR3
	103325-001/MWL ABSS-02- 2017	Thorium-234 (15065-10-8)	BD, FR3
	103325-001/MWL ABSS-02- 2017	Uranium-235 (15117-96-1)	BD, FR3
	103325-001/MWL ABSS-02- 2017	Uranium-238 (7440-61-1)	BD, FR3
	103326-001/MWL AHSS-01- 2017	Americium-241 (14596-10-2)	BD, FR3
	103326-001/MWL AHSS-01- 2017	Beryllium-7 (13966-02-4)	J, FR7
	103326-001/MWL AHSS-01- 2017	Cobalt-60 (10198-40-0)	BD, FR3
	103326-001/MWL AHSS-01- 2017	Neptunium-237 (13994-20-2)	BD, FR3
	103326-001/MWL AHSS-01- 2017	Radium-223 (15623-45-7)	BD, FR3
	103326-001/MWL AHSS-01- 2017	Sodium-22 (13966-32-0)	BD, FR3
	103326-001/MWL AHSS-01- 2017	Thorium-227 (15623-47-9)	BD, FR3
	103326-001/MWL AHSS-01- 2017	Thorium-231 (14932-40-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	103326-001/MWL AHSS-01- 2017	Thorium-234 (15065-10-8)	J, FR7
	103326-001/MWL AHSS-01- 2017	Uranium-235 (15117-96-1)	BD, FR3
	103326-001/MWL AHSS-01- 2017	Uranium-238 (7440-61-1)	J, FR7
	103427-001/MWL AHSS-02- 2017	Americium-241 (14596-10-2)	BD, FR3
	103427-001/MWL AHSS-02- 2017	Beryllium-7 (13966-02-4)	J, FR7
	103427-001/MWL AHSS-02- 2017	Cobalt-60 (10198-40-0)	BD, FR3
	103427-001/MWL AHSS-02- 2017	Neptunium-237 (13994-20-2)	BD, FR3
	103427-001/MWL AHSS-02- 2017	Radium-223 (15623-45-7)	BD, FR3
	103427-001/MWL AHSS-02- 2017	Sodium-22 (13966-32-0)	BD, FR3
	103427-001/MWL AHSS-02- 2017	Thorium-227 (15623-47-9)	BD, FR3
	103427-001/MWL AHSS-02- 2017	Thorium-231 (14932-40-2)	BD, FR3
	103427-001/MWL AHSS-02- 2017	Thorium-234 (15065-10-8)	J, FR7
	103427-001/MWL AHSS-02- 2017	Uranium-235 (15117-96-1)	BD, FR3
	103427-001/MWL AHSS-02- 2017	Uranium-238 (7440-61-1)	J, FR7
	103428-001/MWL ABSS-01- 2017	Americium-241 (14596-10-2)	BD, FR3
	103428-001/MWL ABSS-01- 2017	Beryllium-7 (13966-02-4)	BD, FR3
	103428-001/MWL ABSS-01- 2017	Cobalt-60 (10198-40-0)	BD, FR3
	103428-001/MWL ABSS-01- 2017	Neptunium-237 (13994-20-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	103428-001/MWL ABSS-01- 2017	Radium-223 (15623-45-7)	BD, FR3
	103428-001/MWL ABSS-01- 2017	Sodium-22 (13966-32-0)	BD, FR3
	103428-001/MWL ABSS-01- 2017	Thorium-227 (15623-47-9)	BD, FR3
	103428-001/MWL ABSS-01- 2017	Thorium-231 (14932-40-2)	BD, FR3
	103428-001/MWL ABSS-01- 2017	Thorium-234 (15065-10-8)	BD, FR3
	103428-001/MWL ABSS-01- 2017	Uranium-235 (15117-96-1)	BD, FR3
	103428-001/MWL ABSS-01- 2017	Uranium-238 (7440-61-1)	BD, FR3
SW846 3050B/6020			
	103324-002/MWL ABSS-01- 2017	Barium (7440-39-3)	J, MS1
	103324-002/MWL ABSS-01- 2017	Cadmium (7440-43-9)	0.19U, B3
	103324-002/MWL ABSS-01- 2017	Chromium (7440-47-3)	J, MS2
	103324-002/MWL ABSS-01- 2017	Lead (7439-92-1)	J, MS2
	103324-002/MWL ABSS-01- 2017	Vanadium (7440-62-2)	J, MS2
	103324-002/MWL ABSS-01- 2017	Zinc (7440-66-6)	J, MS1
	103325-002/MWL ABSS-02- 2017	Barium (7440-39-3)	J, MS1
	103325-002/MWL ABSS-02- 2017	Cadmium (7440-43-9)	0.20U, B3
	103325-002/MWL ABSS-02- 2017	Chromium (7440-47-3)	J, MS2
	103325-002/MWL ABSS-02- 2017	Lead (7439-92-1)	J, MS2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	103325-002/MWL ABSS-02- 2017	Vanadium (7440-62-2)	J, MS2
	103325-002/MWL ABSS-02- 2017	Zinc (7440-66-6)	J, MS1
	103326-002/MWL AHSS-01- 2017	Barium (7440-39-3)	J, MS1
	103326-002/MWL AHSS-01- 2017	Cadmium (7440-43-9)	0.19U, B3
	103326-002/MWL AHSS-01- 2017	Chromium (7440-47-3)	J, MS2
	103326-002/MWL AHSS-01- 2017	Lead (7439-92-1)	J, MS2
	103326-002/MWL AHSS-01- 2017	Vanadium (7440-62-2)	J, MS2
	103326-002/MWL AHSS-01- 2017	Zinc (7440-66-6)	J, MS1
	103427-002/MWL AHSS-02- 2017	Barium (7440-39-3)	J, MS1
	103427-002/MWL AHSS-02- 2017	Cadmium (7440-43-9)	0.19U, B3
	103427-002/MWL AHSS-02- 2017	Chromium (7440-47-3)	J, MS2
	103427-002/MWL AHSS-02- 2017	Lead (7439-92-1)	J, MS2
	103427-002/MWL AHSS-02- 2017	Vanadium (7440-62-2)	J, MS2
	103427-002/MWL AHSS-02- 2017	Zinc (7440-66-6)	J, MS1
	103428-002/MWL ABSS-01- 2017	Barium (7440-39-3)	J, MS1
	103428-002/MWL ABSS-01- 2017	Cadmium (7440-43-9)	0.20U, B3
	103428-002/MWL ABSS-01- 2017	Chromium (7440-47-3)	J, MS2
	103428-002/MWL ABSS-01- 2017	Lead (7439-92-1)	J, MS2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	103428-002/MWL ABSS-01- 2017	Vanadium (7440-62-2)	J, MS2
	103428-002/MWL ABSS-01- 2017	Zinc (7440-66-6)	J, MS1

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

Sandia Data Validation Summary Worksheet

ARCOC#: 617999	Site/Project: MWL Surface Soil Monitoring		Validation Date: 09/29/2017
SDG #: 431737	Laboratory: GEL Laboratories, LLC		Validator: Mary Donivan
Matrix: Soil	# of Samples: 10 CVR present: Yes		
ARCOC(s) present: Yes	Sample Container Integrity: OK		
Analysis Type:	nem 🛛 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: Coll	ected: 08/28/2017
Validated by:	
	Mary R. Donican

Sandia Inorganic Metals Worksheet

ARCOC #(s): 617999										SDG #(s): 431737 Matrix: Soil									
Laborato	ry Samp	le ID	s: 4317	737002,	-004, -	006, -00	8, -010												
Method/I	Batch #s	: 305	0B/602	20 1697	160/169	97161	3050B/6(10B 1697191/	1697192	7471A 17	00926/170	00934							
ICPMS M	ass Cal:		Pass	🗌 Fail		NA	ICPM	S Resolution:	Pass		Fail	🗌 NA							
Analyte			Cali	bration	l		MB mg/kg	5X Blank (5X abs. val.) mg/kg	LCS	MS	Lab Rep	Serial Dil.	ICS A	AB	ICS A ±MDL ug/L	LLCCV	PS		
(outliers)	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L	8 8		%R	%R	RPD	%D	%F	2	(x50)	%R			
ICP-MS																			
Ba	NA	\checkmark	\checkmark	\checkmark	\checkmark	✓	✓	NA	\checkmark	570*	\checkmark	✓	NA	1	NA	\checkmark	NA		
Cr	NA	\checkmark	\checkmark	\checkmark	\checkmark	✓	\checkmark	NA	✓	163	\checkmark	✓	NA	1	NA	\checkmark	✓		
Pb	NA	\checkmark	\checkmark	✓	✓	✓	✓	NA	✓	135	\checkmark	✓	NA	1	NA	\checkmark	\checkmark		
V	NA	\checkmark	\checkmark	\checkmark	✓	✓	✓	NA	✓	178	\checkmark	✓	NA	1	NA	\checkmark	✓		
Zn	NA	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	✓	NA	\checkmark	159*	\checkmark	\checkmark	NA	1	NA	\checkmark	NA		
Be	NA	\checkmark	\checkmark	✓	\checkmark	.181J	✓	0.18	\checkmark	\checkmark	\checkmark	\checkmark	NA	1	NA	\checkmark	NA		
Cd	NA	\checkmark	\checkmark	\checkmark	\checkmark	.245J	\checkmark	0.24	\checkmark	\checkmark	\checkmark	\checkmark	NA	1	NA	\checkmark	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 -002 * MS parent sample concentration >4X spike concentration

Al, Ca, Fe and Mg ${\leq}$ ICSA conc. in all samples for ICP-MS and ICP-AES analysis

Dilutions: The samples were initially diluted the standard 2X for ICP-MS analysis.

Sandia Radiochemistry Worksheet

ARCOC #(s): 617999	SDG #: 431737	Matrix: Soil									
Laboratory Sample IDs: see below											
Method/Batch#s: DOE HASL 300, 4.5.2.3/Ga-01-R (Gamma spec) 1697072 (prep)/1697228 Samples 431737001, -003, -005, -007, -009											
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	I I	MS/ MSD RER	Lab Rep. RER				
None														
				Tracer/Ca	rrier Reco	overy Outl	iers							
Sample ID	Sample IDTracer/Carrier%R		R	Sample ID			Carrier	%R		Sample ID			Tracer/Carrier	
NA														

Comments: HTs OK; Dup on sample -001

Bi-212 result for sample -003 was rejected by the laboratory due to the peak not meeting identification criteria – R,Z2

No peaks were identified for Bi-212 in sample -001 - BD,Z2

	Internal Lab														Page 1 o	f 1
	Batch No.	i/IA				SM	O Use /					11	1	AR/COC	61	7999
	Project Name		MWI SURFACE SOIL MON	Date Sample	s Shipped	:	829117		SMO AL	uthorization;	\overline{D}	-9.0	•	Waste Characterization	000000000000000000000000000000000000000	
	Project/Task M	lanager:	Robert Ziock	vbill No. 170575					ontact Phone	9: 	E	Gnos				
	Project/Task N	Task Number: 195122 10 11 08			t Edie Kent/843-769-7385					Wendy Pa	alencia/50	5-844-3132	Released by COC No.			
	Service Order:		CF426-17	Lab Destinati	on:	GEL			Send R	eport to SMC	D:				V 4	4º Celsius
				Contract No.:		1303	873			Stephanie	Montaño/5	05.284.255	Bill to: Sandia National Laboratories (Accounts Payat			
	Tech Area:		****						8,				P.O. Box 5800, MS-0154	./	01-10-	
	Building:		Room:	Operationa	nal Site:									Albuquerque, NM 87185-0154	4.	21 13 1
	<u>_</u>	1		<u></u>	Depth	T	Date/Time	Sample	Co	ontainer	Preserv-	Collection	Sample	Parameter & Method	ł	Lab
	Sample No.	Fraction	Sample Location D	etail	(ft)]	Collected	Matrix	Type	Volume	ative	Method	Туре	Requested		Sample ID
,	103324	001	MWL ABSS-01-2017		NA	8/	28/170055	AN	Р	250 ml	None	G	SA	GAMMA SPEC (EPA 901)		001
	100004	000	MM/L ADSS 01 2017			1	1		P	250 ml	None	G	SA	METALS, RCRA (SW846-6020/7	470): Be,	602
·	103324	002	WWL AD55-01-2017		19/4	+				200 111			0,1	GAMMA SPEC (FPA 901)		00-
ť	103325	001	MWL ABSS-02-2017		NA		0705		P	250 ml	None	G	SA	METALS, RCRA (SW846-6020/7	470): Be,	005
<i>k</i> a	103325	002	MWL ABSS-02-2017		NA	ļ	<u> </u>	AN	Р	250 ml	None	G	SA	Co, Cu, Ni, V, Zn		004
A	103326	001	MWL AHSS-01-2017		NA		0911	AN	Р	250 ml	None	G	SA	GAMMA SPEC (EPA 901)		005
1	103326	002	MWL AHSS-01-2017	NA		()	AN	Р	250 ml	None	G	SA	METALS, RCRA (SW846-6020/7 Co, Cu, Ni, V, Zn	470): Be,	006	
1	103427	001	MWI_AHSS-02-2017	NA		2190	AN	Р	250 ml	None	G	SA	GAMMA SPEC (EPA 901)		007	
~	103427	002	MWI AHSS-02-2017		NA		T.	AN	Р	250 ml	None	G	SA	METALS, RCRA (SW846-6020/7 Co. Cu. Ni, V, Zn	470): Be,	008
4	402420	001	MML APSS 01 2017		ΝΔ	\mathbf{H}		ΔΝ	р	250 ml	None	G	DU	GAMMA SPEC (EPA 901)		009
,	103420		WWL AB33-01-2017				$-\frac{0633}{1}$			200 111				METALS, RCRA (SW846-6020/7	470): Be,	210
'	103428	002	MWL ABSS-01-2017		NA	LY	V			250 ml	None	G		Co, Cu, Ni, V, Zn		070
	Last Chain:				Sample	Trac	king	SMC) Use	Special In	structions		rements:		Cond	
	Validation R	leq'd:		1000-00-00-00-00-00-00-00-00-00-00-00-00	Date En	itered				EDD			*	45 Deut / 20 Deu	Ne	sceipt
	Background	1:			Entered	by:				Turnaroun				10-Day C1 30-Day		
	Confirmator	<u>y:</u>			QC inits	1.: T	·	tion/Ohon		Regoliated			n to Client	Disposal by Lab		
	Sample		Vame Signat	h. A		I C	00000000000000000000000000000000000000		le/Cell	Return Sa	mnlee Rv					
	Team	Danielle	Wicher Vary	Mallia	<u>u</u>	JOINE	/0041/303-043-110		****	Comments	inpico by.					
	Members									-						
						+				1						
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	Received by	-2	hy & an and	,Org. 000	63/Date	8	28117Time	005	Received by Or					. Date		
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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

Batch No.	NIA					0.44		2								,	Page 1	of 1	
Project Name		MWL SU	RFACE SOIL MO	NDete Samo	es Shinner		siza	7-1-		10.00		-	101	1		AR/COC	61	17999	
Project/Task Manager: Robert Ziock			Carrier/Way	Wavbill No. 201 10					ISMO A	SMO Authorization:					Waste Characterization		and the second se		
Project/Task Number: 198		195122.1	0.11.08	Lab Contact		Edia Kent/843-769-7385			Sivio Contact Phone:						RMA				
Service Order: CF426-17			7	Lab Destina	tion:	GEL			Wendy Palencia/505-844-3132					י 🗖 🖕	Released by COC No.				
	0.: 1303873					Send Report to SMO:					4º Celsius								
Tech Area:											Stephanie Montaño/505.284.2553					Bill to: Sandia National Laboratories (Accounts Payable			
Building: Room: O			Operation	al Site:					Mt 120117						P.O. Box 5800, MS-0154				
					Depth		Date/Time		Sample	Container				0	Albuque	erque, NM 87185-0154			
Sample No.	Fraction	Sa	Imple Location E)etail	(ft)		Collected		Matrix	Type Volume		ative	- Collection Method	Sample		Parameter & Method	1	Lab	
103324	001	MWL AB	SS-01-2017		NA	RI-	12.2		SOIL	1	· • • • • • • • • • • • • • • • • • • •	EIGI V G	wethod	Type		Requested		Sample II	
103324	002	LANALL AM	00.04.0047			912	1400	155	AN	P	250 ml	None	G	SA	GAMN	IA SPEC (EPA 901)		28 A D -	
100024	002	WWVL AB	55-01-2017		NA			V	AN-	P	250 ml	None	G	SA	METAL	S, RCRA (SW846-6020/74	170): Be,	1.1.1	
103325	001	MWL AB	ISS-02-2017		NA		090	3	TANK	D	2601		-		GAMN				
103325	002	MWI AR	ISS-02-2017		hin		1		7		250 111	None	G	SA	METAL	R SPEC (EPA 901)		1 S	
400000			00-02-2017		NA	+	2	-	AN	Р	250 ml	None	G	SA	Co. Cu.	S, RURA (SW846-6020/74 Ni, V. Zn	70): Be,	100	
103326	001	MWL AH	ISS-01-2017		NA		091		AN	P	250 ml	None	G	SA	GAMM	A SPEC (EPA 901)		1	
103326	002	MWL AHSS-01-2017			NA	NA			LANI		0.50				METAL	S. RCRA (SW846-6020/74	701: 80		
103427	001	MM/ AHEE 02 2047				i au			71144	٢	250 ml	None	G	SA	Co, Cu,	Ni, V, Zn	101.06	1000	
100 107	001		55-02-2017		NA			16	AND	P	250 ml	None	G	SA	GAMM	A SPEC (EPA 901)		월 17 LY	
103427	002	MWL AH	SS-02-2017		NA		1	/	AND	Р	250 ml	None	G	CA.	METALS, RCRA (SW846-6020/7		70): Be.	Contraction of	
103428	001	MWL AB	SS-01-2017		NA				Land			HONG		SA	SA Co, Cu, Ni, V, Zn				
102429	002				100		085	,5	AIN	P	250 ml	None	G	DU	GAMM	A SPEC (EPA 901)			
Last Chaint	002	MIVIL AB	\$5-01-2017		NA	Y	V		AN	P	250 ml	None	G	DU	METALS	S, RCRA (SW846-6020/74	70): Be,		
Validation B	ontal	L Yes			Sample	Tracki	ng		SMO	Use	Special Ins	tructions/	QC Requir	aments:	00, 00,	<u>Νι, ν, Ζη</u>	0		
Background	eq a:	Yes			Date Entered:						EDD		Yes		Con			mons on	
Confirmator		Yes			Entered	by:		(blogh			Turnaroun	d Time	7-Dav*		15-Dav	* 1 20 Day	PKE	scelpt	
Sample	y.	Yes	1 0:1		QC inits.	: 55.		201		87.94C	Negotiated	TAT			10 009	SO-Day		15 P 15	
Toom	Danielle	Aichel	i) Signat	Ire 1 A	Init.	Co	mpany/Orga	nizatio	n/Phone	/Cell	Sample Dis	sposal	Return	to Client	_	✓ Disposal by Lab		12. 25.	
Momboro	area nong r	mene michel Vall Muelle a SNL/0641/505-845-7706						_	Return San	nples By:				cab					
wempers			00								Comments:						Contraction of the	19 - 19 - 19 - 19 - 19 - 19 - 19 - 19 -	
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Received by		6 6		Org.	Date	10	Tim	e		Receive	d by			Org.	_	Date	Time		
Prior confirm	ation with	SMO req	uired for 7 and 1	5 day TAT										Org.		Date	Time		

Prior confirmation with SMO required for 7 and 15 day TAT

AOP 95-16
Contract Verification Form (CVR)

Project Leader Ziock	Project Name MWL SURFACE SOIL	Project/Task No. 195122 / 10.11.08
ARCOC No. 617999	Analytical Lab GEL	SDG No. 431737

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	ltem		olete?	lf no ovnloin	
No.	nem	Yes	No	ii iio, explain	
1.1	All items on ARCOC complete - data entry clerk initialed and dated	Х		Sample matrix edited, corrected and forwarded to the lab	
1.2	Container type(s) correct for analyses requested	Х			
1.3	Sample volume adequate for # and types of analyses requested	Х			
1.4	Preservative correct for analyses requested	Х			
1.5	Custody records continuous and complete	Х			
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	Х			
1.7	Date samples received	Х			
1.8	Condition upon receipt information provided	Х			

2.0 Analytical Laboratory Report

SMO-05-03

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

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	Х		
3.2	Quantitation limit met for all samples	Х		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	Х		
	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		Х	103324-002MS, Chromium (163%), Lead (135%), Vanadium (178%)
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	Х		
	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	Х		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	N/A		

Line No.	ltem	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	Х		
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) lon 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	Х		
	b) Continuing calibration provided	Х		
	c) ICP interference check sample data provided	Х		
	d) ICP serial dilution provided	Х		
	e) Instrument run logs provided	Х		
4.6	Radiochemistry and General Chemistry a) Instrument run logs provided	Х		

5.0 Data Anomaly Report

Line No.	Item	Yes	No	lf 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		

SMO-05-03

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
103324-002MS	EPA 6020	Chromium (163%), Lead (135%), Vanadium (178%) matrix spike recoveries exceed the upper acceptance limit of 125%. Data were flagged and reported. Sample heterogeneity narrated as a possible cause.

Were deficiencies unresolved? C Yes C No

Based on the review	, this data	package is	complete.	$oldsymbol{eta}$	Yes	О	No
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Reviewed by: Mark L Lyon Date: 09-29-2017 14:07:00

Closed by: Mark L Lyon Date: 09-29-2017 14:07:00

ANNEX C

Mixed Waste Landfill Soil-Vapor Monitoring Forms and Reports

April 2017-March 2018

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
Health & Safety Meeting Form	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

MAY 2017 SOIL-VAPOR MONITORING

LTS	2015-001	(6/201	5)
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HEALTH & SAFETY MEETING FORM

Dept: <u>064/</u> Facility: <u>MWL</u> Date: <u>05/30/17</u> Time: <u>0810</u>										
Activities: <u>50;//va?or Maniforing</u> (Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)										
Weather Conditions: Temp: <u>$64 \circ_F$</u> Wind Speed: <u>~ 3 MPH</u> Humidity: <u>27 %</u> Wind Chill: <u>$NA \circ_F$</u>										
Chemicals Used: \Box None \Box Preservatives in sample bottles \swarrow Other: \mathcal{N}_{2} $\mathcal{G}_{4,5}$ Hospital/Clinic:Sandia Medial Clinic Bldg. 831Phone:911 on LAN; 844-0911 on mobile										
Safety Topics Presented										
□ Wear leather gloves	Wear sunscreen									
□ Wear latex or nitrile gloves	□ No eating or drinking onsite									
Use safe lifting practices	□ Set up eye wash									
Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary	E Wear communication device (radio, cell phone, EOC alert enabled pager)									
Be aware of electrical hazards Be aware of pinch points (hose connections)										
Be aware of pressure hazards I Notify RCT when using neutron Practice ALARA										
probe Probe Probe Dress accordingly. Wear sunscreen if necessary. Stay hydrated.										
	Sility: MWL 'aniforing activities for safety concerns. The buddy Bldg. 831 Preservatives in sample bottles activities for safety concerns. Bldg. 831 Preservatives in sample bottles Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary Be aware of pinch points Be aware of pinch points Dother (list):									

Does anyone have any weight restrictions on lifting? Circle YES or NO. If answered YES explain.

Attendees Prin Signa Printe Si Print Printed 1 Signature Printed Name Signature Printed Name Signature Notes

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LTS 2015-004 (8_2016)

Page _____ of _____

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Location	Date	Time	Canister #	PID (ppm)	Flow Rate (Cu-F+/	Initial Canister Vacuum (P5))	Ending Canister Vacuum	Comments
MAR-SUDI-4-	5/3217	1130	7797	NA-	NA	-20	- 8	FB .
141-5001-42,5	1	1132	NA	0,0	8,0	NA	NA	
		+			1	1		
		1132	L L	F	1	Ţ	T	
1	4	1331	34000483	~#	NA	-26	- છ	ob split
NWL-5402	5/30/17	1133	34001274	NA	NA	-28	-&	FB
1WL-5NU2-41.5		1140	NA	0,0	ઝ	NA	NA	
		1		1	1	1	1	
		1141	Ţ	J	T	T	Ŧ	
\checkmark	1	1142	34000176	MA	NA	-27	-2	OB split
2.								
		_						
ield Notes: よい	eu ation	~ ~ 592-	5400 France -914642	s		3rck4	round	> 0.0
Con	ナ iy U	us PI	D reading	dus:	ns p	ulge		

Soil Vapor Sampling Log Form

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Page 2 of 4

Soil Vapor Sampling Log	Form	
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			Son (apor bar	in the second	5 × 01 m			
Location	Date	Time	Canister #	PID (ppm)	Flow Rate (C+4/)	Initial Canister Vacuum (?\$1)	Ending Canister Vacuum (p\$1)	Comments
Mare- 5003	5/30/17	826	34002553	NA	MA	- 25	- 8	FB
AUL-1003-50	1	849	NA	0.0	8	NA	NA	
		4	1		1	(1	
		850	4	L	F	T	1	
Ļ		851	34000341	NA	NA	-26	-8	
MWL- 5003-100		853	NA	0.0	8	PA	NA	
1			1	1		1	1	
		854	L	Ļ		J	T	
Ţ		859	34000342	NA	NA	-26	-3	
MWL- 5003-200		856	NA	10 ,0	B	NA	NA	
1		1	1	1	1)	1	
		850	Ļ	L	1	Ţ	Ť	
		900	34002085	NA	MA	-26	-6	
Ţ		4	34001363	1	4	76	-4	Duplicate
mhc-5003-300		402	NA	0.0	8	NOF	NA	
1		1	1	1	1	1	1	
		904	1	1	T	T	1	
L		907	34000856	NA	~#	-26	~8	NAGD OB
AM-5103 - 400		919	NA	0.0	15	NA	NA	
		L	1	1			1	
		920	1	Ļ	L	J	7	
		946	34001340	NA	NA	-26	-9	
L	Ļ	946	8119	NA	NA	-26	-1	Puplicate
								NEB 03
Field Notes:				Bre	k groun	1 = 0	, o ppr	-
eleveti	sn = 5	405 F	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	, ק	D#-	592-	9149	42
contin-	1005 1	PID	Foold readi	ings de	ing ,	punge		
3003	+ 5004)	slow samp	le f.	: 11			
	u _	0	Alam sale	incl	ense	43 51	5.6:1:	21.4100.
700		-1170	770 - 1971		(

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			Soil Vapor Sam	pling Lo	g Form			
Location	Date	Time	Canister #	PID (ppm)	Flow Rate	Initial Canister Vacuum	Ending Canister Vacuum (P5)	Comments
MUL-SV04	5/30/5	0101	8272	NA	NA	-25	-8	
Mar-5004-60	1	1013	~A	0.0	8	NA	NA	
		L	1		1	ĵ	1	
		1014	Ţ	1	1	1	Ţ	
V		1017	34000285	NA	NA	-26	- 9	
mur-5004 - 100		10/7	NA	0.0	8	r-A	NA	
		4	1				1	
		1019	T	Ţ	L	1	1	
J		1020	34000439	NA	NA	-27	-8	
mul-suuf-200		1020	NA	0.0	3	NA.	NA	
		+	1		1	1	1	
		1023	Ţ	L	4	T	1	
L L		1024	34000380	NA	NA	-27	-3	
MWL-5004-300		1025	NA	0.1	8	MA	NK	
1		T			1	1	í.	
		1027	Ļ	4	J	Ţ	L	
\downarrow		1028	8121	NA	NA	-77	- 3	ob split
MUL-5004-400		1031	NA	0.1	Y	NA	NA	
		J)	1	1	1	
		1033	1	T	Ţ	J	Ţ	
Ţ	Ų	1034	34000778	NH	NA	-27	- 9	OB SPilt
12								
Field Notes:	Backy, PID	the second	= 0.0 ppr 592-9140	ių ~	EU	evet io c	~ ~ 5	400 Lunsl
6	ontin-	005	PID read	lings	dur;	an P	७९५-०	

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LTS 2015-004 (8_2016)

Page 4 of 4 Ending

Location	Date	Time	: Canister #	PID (ppm)	Flow Rate	Initial Canister Vacuum (M)	Ending Canister Vacuum (p\$1)	Comments
Mul-5005	5/30/17	1049	34020247	NA	NA	-26	- %	FB
MWL-5005-50	1	1050	NA	0.0	8	NA	NA	
		1	1	1		1		
		1051	J	1	T	1	J	
V		1052	7573	NA	NA	-26	-0	
MWL-5005-100		1053	NA	0,0	Ŷ	~*	NA	
		Ļ					1	
		1054	Ţ	J	L	L	T	
L		1055	7844	NA	NA	-26	-8	
MWL-5005-200		1055	NA	0.0	B	NA	NA	
1		1)	1	1			
		1057	ل ل	T	L	L	L	
1		1058	34000530	NA	NA	-27	-3	
MWL-5005 -300		1100	NA	0,1	Q)	NA	NA	
1		L	1	1		1		
		1102	ſ	Ţ		T	L	
1 I		1103	7796	NA	NA	-27	- 4	OB SPIT + Dup
MW6-5005-400		1107	NA	0,1	8	NA	NR.	
1		L	1	1		1		
		1109	J	T	J	Ţ	1	
Ţ	V	ли 	34000510	NA	NA	-27	- 3	OB Split
Field Notes: דו ק	evatio D H	~ 592-	5400 far 914942	-51 -	Bno	ckgrou	nd = c	0, v pp-
continuous PID readings during purge								

Soil Vapor Sampling Log Form

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SUMMARY SHEET FOR

MAY 2017 SOIL-VAPOR SAMPLES

Sample Summary for MWL Soil Vapor Monitoring May 2017

			SUMMA		Sample		Associated Field Blank	
Well ID	Sample Date	Sample ID / Port	Number	ARCOC	Number	Sample Type	(ARCOC #/Sample #)	Comments
Mixed Waste	Landfill Soil	Vapor Monitoring: Project	Task Numbe	r 1 <mark>46422.</mark> 10.	11.08 / Serv	ice Order Numl	ber CF 01-16	
MWL-SV01	30-May-17	MWL-SV01-42.5	34000483	617838	102458	Environmental	617838 / 102457	
WWE-3001	50-1viay-17		7797	017030	102457	Field QC	n/a	Ultra Pure N2
MWL-SV02	20 May 17	MWL-SV02-41.5	34000176	617830	102460	Environmental	617839 / 102459	
WIVE-5V02	50-1viay-17	MWL-SV-FB2	34001274	017039	102459	Field QC	n/a	Ultra Pure N2
		MWL-SV03-50	34000341		102463	Environmental		
		MWL-SV03-100	34000342		102464	Environmental		
		MWL-SV03-200	34002085		102465	Environmental	617840 / 102462	
MWL-SV03	20 May 17	MWL-SV03-200	34001363	617940	102466	Duplicate		
WIVE-3003	30-1viay-17	MWL-SV03-300	34000856	017840	102467	Environmental		
		MWL-SV03-400	34001390		102468	Environmental		
		MWL-SV03-400	8119		102469	Duplicate		
		MWL-SV-FB3	34000553		102462	Field QC	n/a	Ultra Pure N2
		MWL-SV04-50	34000285		102471	Environmental		
		MWL-SV04-100	34000438		102472	Environmental		
MWL-SV04	30-May-17	MWL-SV04-200	34000386	6178/1	102473	Environmental	617841 / 102470	
WIVE-5V04	50-1viay-17	MWL-SV04-300	8121	017041	102474	Environmental		
		MWL-SV04-400	34000778		102475	Environmental		
		MWL-SV-FB4	8272		102470	Field QC	n/a	Ultra Pure N2
		MWL-SV05-50	7523		102478	Environmental		
		MWL-SV05-100	7844		102479	Environmental		
MWL-SV05	30-May-17	MWL-SV05-200	34000530	617842	102480	Environmental	617842 / 102477	
	50-iviay-17	MWL-SV05-300	7796	017042	102481	Environmental		
		MWL-SV05-400	34000510		102482	Environmental		
		MWL-SV-FB5	34000247		102477	Field QC	n/a	Ultra Pure N2

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

SOIL-VAPOR MONITORING

MAY 2017

AR/COC NUMBERS 617838, 617839, 617840, 617841, 617842



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

Memorandum

Date: July 17, 2017

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL Site: MWL SVM ARCOC: 617838, 617839, 617840, 617841 and 617842 SDG: 320-28713 and 320-28716 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 5.

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.

- Benzene was detected at < the PQL in FB3, sample 320-28713-1, associated with samples -2 through -8. The associated result for samples -2 through -7 were detects < the PQL and will be qualified 0.74U,B2; 1.1U,B2; 1.5U,B2; 1.4U,B2; 1.6U,B2 and 1.8U,B2 respectively at their PQLs.
- Acetone was detected at < the PQL in FB5, sample 320-28713-15, associated with samples -16 through -20. All associated sample results were detects < the PQL and will be qualified 5.0U,B2; 12U,B2; 25U,B2; 15U,B2 and 12U,B2 respectively at their PQLs.
- 3. Carbon disulfide was detected at < the PQL in FB5, sample -15, associated with samples -16 through -20. The associated result for sample -18 was a detect < the PQL and will be **qualified 3.9U,B2** at the PQL.
- 4. Methylene chloride was detected at < the PQL in FB5, sample -15, associated with samples -16 through -20. The associated result for samples -16 and -020 were detects < the PQL and will be **qualified 0.40U,B2 and 0.93U,B2** respectively at their PQLs.
- 5. Toluene was detected at < the PQL in FB5, sample -15, associated with samples -16 through -20. The associated result for samples -16, -18 and -019 were detects < the PQL and will be **qualified**

0.40U,B2; 2.0U,B2 and 1.2U,B2 respectively at their PQLs. The associated result for sample -20 was a detect <10X the FB value and will be **qualified J+,B2**.

- 6. Acetone and toluene were detected at < the PQL in FB1, sample 320-28716-1, associated with sample -2. The toluene result for sample -2 was a detect < the PQL and will be qualified 0.40U,B2 at the PQL. The acetone result for sample -2 was a detect > the PQL but <10X the FB value and will be qualified J+,B2.
- 7. Acetone was detected at < the PQL in FB2, sample 320-28716-3, associated with sample -4. The acetone result for sample -4 was a detect < the PQL and will be **qualified 27U,B2** at the PQL.
- 8. For the initial calibration associated with samples 320-28716-1 through -4, the intercept was positive and > the MDL for acetone. The acetone results for samples -1 and -3 were detects <3X the value of the intercept and will be **qualified J+,I5**.
- 9. For the LCS/LCSD associated with samples 320-28713-1 through -14, the relative percent difference was > laboratory acceptance criteria for 2-hexanone. The associated sample results were non-detect and will be **qualified UJ,RP2**.
- 10. Dichlorodifluoromethane and trichlorofluoromethane were detected at > the PQL in FB2, sample 320-28716-3. Sample -3 was analyzed immediately after the undiluted analysis of sample -2 and, therefore, these results should be **qualified J,X1** due to possible carry-over.
- 11. The vinyl acetate result for sample -17 was reported as a detect > the PQL and should be **qualified J,Z1** due to a poor mass spectral match.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows. For the initial calibration associated with samples 320-28716-1 through -4, the intercept was positive and > the MDL for acetone. The acetone results for samples -2 and -4 were detects >3X the value of the intercept and will not be qualified.

For the ICV associated with samples 320-28713-1 through -14, the %Ds were >30% with positive bias for 1,2,4-trichlorobenzene and hexachlorobutadiene. The associated sample results were non-detect and will not be qualified.

Blanks

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

Benzene was detected at < the PQL in FB3, sample 320-28713-1, associated with samples -2 through -8. The associated result for sample -8 was non-detect and will not be qualified.

Carbon disulfide was detected at < the PQL in FB5, sample 320-28713-15, associated with samples -16 through -20. The associated result for samples -16 and -20 were detects >5X the FB value and will not be qualified. The associated results for samples -17 and -19 were non-detect and will not be qualified.

Methylene chloride was detected at < the PQL in FB5, sample -15, associated with samples -16 through -20. The associated result for samples -018 and -019 were detects >10X the FB value and will not be qualified. The associated result for sample -17 was non-detect and will not be qualified.

Toluene was detected at < the PQL in FB5, sample -15, associated with samples -16 through -20. The associated result for sample -17 was non-detect and will not be qualified.

Dichlorodifluoromethane and trichlorofluoromethane were detected at > the PQL in FB2, sample 320-28716-3, associated with sample -4. The associated sample results were detects >5X the FB concentrations and will not be qualified.

Surrogates

All surrogate acceptance criteria were met.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

An MS/MSD was not performed.

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

The LCS/LCSD met all QC acceptance criteria except as noted above in the Summary section.

Detection Limits/Dilutions

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

Sample 320-28713-2 (1.85X), sample -3 (2.74X and 3.33X for trichloroethene); sample -4 (3.7X and 6.28X for trichloroethene); sample -5 (3.62X and 6.12X for trichloroethene); sample -6 (3.88X); sample -7 (4.54X and 7.87X for tetrachloroethene); sample -8 (5.93X); sample -10 (1.55X for 1,1,2-trichloro-1,2,2-trifluoroethane); sample -11 (1.54X and 2.81X for 1,1,2-trichloro-1,2,2-trifluoroethane and trichloroethene); sample -12 (4.69X); sample -13 (2.72X); sample -14 (2.78X); sample -16 (3.58 for trichlorofluoromethane); sample -17 (2.34X and 4.88X for trichlorofluoromethane); sample -18 (4.92X); sample -19 (3.02X); sample -20 (2.32X); sample 320-28716-2 (13.5X for dichlorodifluoromethane, tetrachloroethene, trichlorofluoromethane and 1,1,2-trichloro-1,2,2-trifluoroethane) and sample -4 (5.33X and 10.7 X for trichlorofluoromethane).

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Mass spectra acceptability were verified during data validation and met QC acceptance criteria except as noted above in the Summary section. 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 ARCOC. Two field duplicate pairs were submitted with ARCOC 617840. 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 I	Donivan	Level: I	Date: 07/17/17





AR/COC: 617838, 617839, 617840, 617841, 617842

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
T015			
	102457-001/MWL-SV-FB1	ACETONE (67-64-1)	J+, I5
	102458-001/MWL-SV01-42.5	ACETONE (67-64-1)	J+, B2
	102458-001/MWL-SV01-42.5	TOLUENE (108-88-3)	0.4U, B2
	102459-001/MWL-SV-FB2	ACETONE (67-64-1)	J+, 15
	102459-001/MWL-SV-FB2	DICHLORODIFLUOROMETHANE (75- 71-8)	J, X1
	102459-001/MWL-SV-FB2	TRICHLOROFLUOROMETHANE (75- 69-4)	J, X1
	102460-001/MWL-SV02-41.5	ACETONE (67-64-1)	27U, B2
	102462-001/MWL-SV-FB3	2-HEXANONE (591-78-6)	UJ, RP2
	102463-001/MWL-SV03-50	2-HEXANONE (591-78-6)	UJ, RP2
	102463-001/MWL-SV03-50	BENZENE (71-43-2)	0.74U, B2
	102464-001/MWL-SV03-100	2-HEXANONE (591-78-6)	UJ, RP2
	102464-001/MWL-SV03-100	BENZENE (71-43-2)	1.1U, B2
	102465-001/MWL-SV03-200	2-HEXANONE (591-78-6)	UJ, RP2
	102465-001/MWL-SV03-200	BENZENE (71-43-2)	1.5U, B2
	102466-001/MWL-SV03-200	2-HEXANONE (591-78-6)	UJ, RP2
	102466-001/MWL-SV03-200	BENZENE (71-43-2)	1.4U, B2
	102467-001/MWL-SV03-300	2-HEXANONE (591-78-6)	UJ, RP2
	102467-001/MWL-SV03-300	BENZENE (71-43-2)	1.6U, B2
	102468-001/MWL-SV03-400	2-HEXANONE (591-78-6)	UJ, RP2
	102468-001/MWL-SV03-400	BENZENE (71-43-2)	1.8U, B2
	102469-001/MWL-SV03-400	2-HEXANONE (591-78-6)	UJ, RP2
	102470-001/MWL-SV-FB4	2-HEXANONE (591-78-6)	UJ, RP2
	102471-001/MWL-SV04-50	2-HEXANONE (591-78-6)	UJ, RP2

AR/COC: 617838, 617839, 617840, 617841, 617842

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	102472-001/MWL-SV04-100	2-HEXANONE (591-78-6)	UJ, RP2
	102473-001/MWL-SV04-200	2-HEXANONE (591-78-6)	UJ, RP2
	102474-001/MWL-SV04-300	2-HEXANONE (591-78-6)	UJ, RP2
	102475-001/MWL-SV04-400	2-HEXANONE (591-78-6)	UJ, RP2
	102478-001/MWL-SV05-50	ACETONE (67-64-1)	5.0U, B2
	102478-001/MWL-SV05-50	METHYLENE CHLORIDE (75-09-2)	0.4U, B2
	102478-001/MWL-SV05-50	TOLUENE (108-88-3)	0.4U, B2
	102479-001/MWL-SV05-100	ACETONE (67-64-1)	12U, B2
	102479-001/MWL-SV05-100	VINYL ACETATE (108-05-4)	J, Z1
	102480-001/MWL-SV05-200	ACETONE (67-64-1)	25U, B2
	102480-001/MWL-SV05-200	CARBON DISULFIDE (75-15-0)	3.9U, B2
	102480-001/MWL-SV05-200	TOLUENE (108-88-3)	2.0U, B2
	102481-001/MWL-SV05-300	ACETONE (67-64-1)	15U, B2
	102481-001/MWL-SV05-300	TOLUENE (108-88-3)	1.2U, B2
	102482-001/MWL-SV05-400	ACETONE (67-64-1)	12U, B2
	102482-001/MWL-SV05-400	METHYLENE CHLORIDE (75-09-2)	0.93U, B2
	102482-001/MWL-SV05-400	TOLUENE (108-88-3)	J+, B2

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

Sandia Data Validation Summary Worksheet

ARCOC#: 617838, 617839, 617840, 617841 and 617842	Site/Project: MWL SVM	Validation Date: 07/14/2017			
SDG #:320-28713 and 320-28716	Laboratory: TA Laboratorie	Validator: Linda Thal			
Matrix: Air	# of Samples: 24	CVR present: Yes			
ARCOC(s) present: Yes	Sample Container Integrity: OK				
Analysis Type:					
Organic Metals Gencl	nem Rad				

		Requested Analys	ses Not Reported
Client Sample ID	Lab Sample ID	Analysis	Comments
none			

		Hold Time	e/Preservatio	n Outliers				
Client Sample ID	Lab Sample ID	Analysis	Pres.	Collection Date	Preparation Date	Analysis Date	Analysis <2X HT	Analysis ≥2X HT
none								

Comments: Collected 05/30/2017

ARCOC 617839 lists the field blank sample type as "SA" and the sample type for MWL-SVO2-41.5 as "FB".

Case narrative (job narrative) missing for 320-28716

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #:61783	8, 617839, 617840	, 61784	1 and	617842			SDG:3	20-28713	and	320-2871	6				Mat	rix: Air		
Laboratory Samp	le IDs:320-28713-1	l throug	gh -20	and 320-2	8716-1 throu	ıgh -4												
Method/Batch #s: (sampl and di (dilution	TO-15/169436 (sa les 28716-1 thru -4 lutions for -3, -4, -5 ons for 28716 -2 an	mples 2); 1703 5, -7, -1 id -4)	28713- 89 (sar 0, -11,	1 thru -14) nples 2871 -16, -17) :	9;169640 13 -15 thru -2 and 170534	20	Tuning	(pass/fail):pas	SS			TICs Re	quired	? (yes,	/no):no		
				Cali	bration													
	nalyte utliers)		Int.	RF/ Slope	RSD/r ²	(ICV CCV %D)/ V M	IB (10 M	K X) B	LCS %R	LCSD %R	LCS/ LCSD RPD	FB3 -1	X	5	FB4 -9	X5	
ATMS 9 05/02/20	017																	
batch 169436 (2	8713-1 thru -14)																	
Benzene			NA	✓	✓	√	~	/ N.	4	\checkmark	✓	✓	.081J	.40)5	✓	NA	
2-Hexanone			NA	✓	✓	✓	~	N.	4	✓	✓	29	✓	N.	A	✓	NA	
1,2,4-Trichlorob	benzene	vene NA V					') v	N.	4	✓	✓	 ✓ 	✓	N.	A	✓	NA	
Hexachlorobuta	diene		NA Ý Ý			(+35	5) •	N.	4	\checkmark	✓	✓	✓	N.	A	✓	NA	
	1				S	Surrog	ate Reco	overy Out	liers									
Sample ID	1,2-DCA-d4 %R	Т	Toluene-d8 %R BFB %R				Sample	e ID	1,2	2-DCA-d4	%R	Toluene-	d8 %R		BFB %R			
none	none																	
	i		i				IS O	utliers	-		_		1	-				
	FBZ Chl-d5				1,4-DC	CB-d4												
Sample ID	Area	RT		Area	RT		Area	RT										
none																		

Comments: HTs OK . LCS/LCSD (lab limits)

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #:61783	8, 617839, 617840	, 61784	41 and	617842			SDG:320	-28713 ai	nd 320-2	8716					Matri	x: Air		
Laboratory Samp	le IDs:320-28713-	1 throu	gh -20	and 320-28	8716-1 throu	gh -4												
Method/Batch #s (samp and di (diluti	TO-15/169436 (sa les 28716-1 thru -4 lutions for -3, -4, -5 ons for 28716 -2 ar	mples (); 1703 5, -7, -1 nd -4)	28713- 389 (sar 10, -11,	1 thru -14) nples 2871 -16, -17) a	;169640 3 -15 thru -2 and 170534	20	Tuning (p	pass/fail):	yes				TICs Re	equired?	(yes/n	io):no		
				Cali	bration													
A 1 (o	nalyte utliers)		Int.	RF/ Slope	RSD/r ²	(ICV CCV %D)/ W MB	5X (10X MB) LC %F	SLO R%	CSD %R	LCS/ LCSD RPD	FB5 -15	X5 (X1	5 0)			
ATMS 9 06/20/2	017																	
batch 170389 (2 + DL for -3, -4, -5 -17)	8713-15 thru -20 5, -7, -10, -11, -16,																	
Acetone			NA	✓	✓	√	✓	NA	√		✓	✓	.87J	(8.7	7)			
Carbon disulfide	e		NA	✓	✓	✓	✓	NA	~		✓	✓	.09J	.45	5			
Methylene chlor	ride		NA V V NA V V				✓	NA	✓		✓ ✓	✓	.1J	(1.0))			
Toluene			NA	~	✓	✓	✓	NA	~		✓	~	.26J	(2.6	5)			
		1		1	S	urrog	ate Recove	ry Outli	ers	1								
Sample ID	1,2-DCA-d4 %R	Т	oluene-	d8 %R		Sample	D	1,2-DC	CA-d4	%R	Toluene-	d8 %R	В	FB %R				
none																		
	1		1			-	IS Out	liers								_	-	
	FBZ Chl-d5					1,4-DCB-	d4											
Sample ID	Area	RT		Area	RT		Area	RT										
none						_												
<u> </u>																		

Comments: HTs OK . LCS/LCSD (lab limits)

-17 vinyl acetate mass spectra missing 86 ion sample result 2.9X > RL qualify J

-18 vinyl acetate mass spectra missing 86 ion sample result < RL J qualified by the lab

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #:617838, 617839, 617840, 617841 and 617842	SDG:320-28713 and 320-28716		Matrix: Air
Laboratory Sample IDs:320-28713-1 through -20 and 320-28716-1 through -4			
Method/Batch #s:TO-15/169436 (samples 28713-1 thru -14);169640 (samples 28716-1 thru -4); 170389 (samples 28713 -15 thru -20 and dilutions for -3, -4, -5, -7, -10, -11, -16, -17) and 170534 (dilutions for 28716 -2 and -4)	Tuning (pass/fail):yes	TICs Required	? (yes/no):no

				Cali	bration											
An (ou	alyte tliers)		Int.	RF/ Slope	RSD/r ²	(ICV)/ CCV %D	MB	5X (10X) MB	LCS %R	LCSD %R	LCS/ LCSD RPD	FB1 -1	X5 (X10)	FB2 -3	X5 (X10)	
ATMS 11 06/05/2	017															
batch 169640 (28	716-1 thru -4)															
Acetone			.85	✓	✓	\checkmark	✓	NA	✓	✓	✓	1.1J	(11)	.79J	(7.9)	
Toluene			NA	✓	✓	\checkmark	✓	NA	✓	✓	✓	.35J	(3.5)	✓	NA	
Dichlorodifluoro	methane		NA	✓	✓	\checkmark	✓	NA	✓	✓	✓	✓	NA	.65	3.25	
Trichlorofluorome	thane		NA	✓	✓	\checkmark	✓	NA	✓	✓	✓	✓	NA	.94	4.7	
ATMS 9 06/20/20	17															
batch 170534 (28	716-2 DL, -4 DL)															
none																
					S	urrogate	Recover	y Outlie	rs							
Sample ID	1,2-DCA-d4 %R	To	oluene-	d8 %R	BFB %R		8	Sample I	D	1,2-DCA-d4	%R	Toluene-	d8 %R	BFB %R		
none																
							IS Outli	ers								
	FBZ			Chl-c	15	1	,4-DCB-d	4								
Sample ID	Area	RT		Area	RT	Ar	ea	RT								
none																

Comments: HTs OK . LCS/LCSD

-3 (FB2) carryover of dichlorodifluoromethane and trichlorofluoromethane from undiluted sample -2 qualify J

ATMS 11 06/05/2017 Linear: Acetone

Internal Lab

3

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CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTORY



320-28713 Chain of Custody

Rotah No.	NIA					CMO II	-			- 520	20110 01				ABICOC	647940
Project Name	. 104	MWI GW	M / SVM	Date Sample	s Shinned	5/21	// 1		ISMO A	ithorization:	1-2	0		U Was	AR/COC	017040
Project/Task I	Manager	Timmie Ja	ckson	Carrier/Wavt		26	tago	-	ISMO C	antact Phone	10	6			A	
Project/Task I	Number	195122 10	11.08	I ab Contact		Lee Ann	leathcote/			Mondy D	alencia/50	5 844 3132			and by COC No.	
Service Order		CE01-17		I ab Destinat	ion	TA/ West	Sacramento		Sond R	enort to SM	3.	5-044-5152			eased by COC NO.	
Cervice Order	•		angester starte constraint of the	Contract No.		1636780	Gaciamento		Senara	Stophonio	J. Montaño/A	05 284 255	2	Dill to: Con	dia National Laboratori	4 Ceisit
Tech Area:			and the second second	Contract No.		1030700			1	Stephanie	Montano/	003.204.200	5	DO Dout	Idia National Laboratori	es (Accounts Payabi
Building:		Room:		Operation	al Site:									Albuquera	600, MS-0154	
Sample No.	Fraction	n Sa	mple Location D	Detail	Depth (ft)	Da	te/Time Ilected	Sample Matrix	С	ontainer Volume	Preserv	Collection Method	Sample Type	P	arameter & Method Requested	Lab Sample
102462	001	MWL-SV	-FB3		NA	5/30/17	0826	SG	S	6L	None	G	FB	VOC (TO	-15)	
102463	001	MWL-SV	03-50		50		0951	SG	S	6 L	None	G	SA	VOC (TO	-15)	
Pa 102464	001	MWL-SV	03-100		100		0855	SG	S	6 L	None	G	SA	VOC (TO	-15)	
n 102465	001	MWL-SV	03-200		200		0900	SG	S	6 L	None	G	SA	VOC (TO	-15)	
65 63 102466	001	MWL-SV	03-200	200			0900	SG	S	6 L	None	G	DU	VOC (TO	-15)	
0 102467	001	MWL-SV	03-300	300 300			0907	SG	S	6 L	None	G	SA	VOC (TO	-15)	
60 102468	001	MWL-SV	03-400		400		0946	SG	S	6 L	None	G	SA	VOC (TO	-15)	
102469	001	MWL-SV	03-400	en e	400	11	0946	SG	S	6L	None	G	DU	VOC (TO	-15)	
									-							
Last Chain:		□ Yes			Sample	Tracking		SMO	Clise	Special In	struction	OC Requi	rements.			Conditions on
Validation F	Rea'd:	☑ Yes			Date Er	tered		Chine	000	FDD	Struction	Ves Yes	cilicints.		1	Receipt
Background	d:	□ Yes			Entered	by:				Turnarour	nd Time	0 7-Day	* []	15-Dav*	2 30-Day	Receipt
Confirmato	rv.	D Yes			OC inits	<u></u>				Negotiate	H TAT	Π		To Day		
Sample	1 N	Jame	Signat	ture	e Init. Company/Organization/P					Sample Di	isposal	D Retur	n to Client	2	Disposal by Lab	
Team	John Co	chran	T=9-dcg- SNL/06234/505-844-5					256/505-2	39-1988	Return Sa	moles By		in to oneria		Disposal by Lab	
Team	Donald	Schofield	1-1-1-11	<u> </u>		SNL/041	11/505-044-4	000/505-2	59-7098	Comments	Request	each SLIMM	A canist	- is certifie	dicteau 91	
Wembers	William	Gibson	William	Belo.	Turs.	SNL/041	41/505-239-7	367/505-2	239-7367	Elever	4'on -	- 5400	FAMS	L. See	atta 3/30/17	
	Robert L	ynch	Kel Had	eh.	RC	SNL/041	41/505-844-4	013/505-2	250-7090	F.e	dfor-	-5.			21	
	Alfred S	antillanes	Alfalla	tille	-	SNL/041	41/505-284-6	870/505-2	228-0710	1						Lab Use
Belinquished	byTY	de	0rg. 063/ Date 5/30/17 Time/343					343	Relingu	ished by			Org		Date	Time
Received by	10-	0	Org. 063 Date 5/30/17 Time 34 3					143	Receive	ed by			Org		Date	Time
Belinquished	elinquished by TER Org. 063 Date 5/31/17 Time (240)						0408	Relinqu	ished by			Org		Date	Time	
Received by	Bring	wy		Org.	Date	6/6/1	7 Timel	020	Receive	ed by			Org		Date	Time

Prior confirmation with SMO required for 7 and 15 day TAT

Page 1 of 1

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Batch No. // A SMO Use CARCCO 6178- 6178- 512-17 Project Task Namager Timmie Jackson Date Sample Shipped Camer/Wayelike SMO Authorization: 265242 SMO Contact Phone: Use Aun Heathcote/ Use Aun Heathcote/ Service Order: Immie Jackson RNA Researce by CO No. RNA Service Order: Contract No. 1552742 SMO Contact Phone: Immie Researce by CO No. Researce by CO No. Service Order: Contract No. 1536780 Send Report to SMO. Researce by CO No. Researce by CO No. Building: Contract No. Operational Site: Po Box Son Microlina No. Absounce with Match Laboratorize (Accounts Po Box Son Microlina) 102470 Oo1 MWL-SV04-50 50 5/30/17 10:10 SG 6 None G SA VOC (TO-15) Imeret a Match and Laboratorize (Accounts Po Box Son Microlina) Sample No. 102470 Oo1 MWL-SV04-50 50 5/30/17 10:24 SG 6 L None G SA VOC (TO-15) Imeret a Match and Laboratorization 102471 Oo1 MWL-SV04-400 400	Internal Lab															Page 1	of 1
Project Name (' project/Task Number: MML GWM / SVM Date Samples Shipped 5 31 - 1 / 1 SMO Autoration Display Project/Task Number: PRA Project/Task Number: GF01-17 Lab Destination Lab Sequeration Send Report to SMO PRA Released by COC No.	Batch No. N	TA					SMO Use								AR/CO	C 6	17841
Project/Task Manager Timmle Jackson CamerWayels No. 2,5574-25 SMO Contract Phone: Image: Timmle Jackson CamerWayels No. 2,6574-25 SMO Contract Phone: Image: Timmle Jackson Released by COC No. Service Order: CF01-17 Lab Contact No. To // West Secramento Send Report to SMO Bill to: Sandia National Laboratories (Accounts Phone: Bill to: Sandia Phone: Bill to: San	Project Name:	(*	MWL GWI	M/SVM	Date Sample	s Shipped	5.31.	17		SMO A	uthorization:	TOF			U Waste Characterizatio	n	
Project Task Number: IPSI22 10.11.08 Lab Contact. Leab Contact. <thleab cont.<="" th=""> Leab Contact. Leab</thleab>	Project/Task M	lanager:	Timmie Ja	ickson	Carrier/Wayb	ill No.	26599	18		SMO C	ontact Phone	e:					
Service Order: CF01-17 Lub Destination TA / West Sacramento Send Report to SMC: Commetter SMC: SMC: SMC: SMC:	Project/Task N	lumber:	195122.10	.11.08	Lab Contact.		Lee Ann He	athcote/]	Wendy Pa	alencia/50	5-844-3132		Released by COC No.		
Contract No. 1636780 Stephanie Montaño/605.284.2563 Bit for Sanda National Laboratories (Accounts P.D. Box 8300, MS-0154 Building: Room: Operational Site: Sample No. Fraction Sample Location Detail Detail Detail Sample No. Fraction Sample Location Detail Depth Detail Detail P.D. Box 8300, MS-0154 102470 001 MVL-SV-FB4 NA 5/30/17 10:10 SG S 6 L None G FB VOC (TO-15) Image: Sample Sa	Service Order:		CF01-17		Lab Destinati	on:	TA / West S	acramento	D	Send R	eport to SMC):					4º Celsius
Tech. reaction Operational Site: Procession (MS-0154 Abougunge, NM 5/156-0164					Contract No .:		1636780			1	Stephanie I	Montaño/5	05.284.255	3	Bill to: Sandia National Labora	atories (Acc	ounts Payable
Building: Room: Operational Site: Abaugungue. NM 87185-0154 Sample No. Fraction Sample Location Detail Depth (ft) Date/Time Collected Sample Notion Perev- ative Collection Sample Notion Parameter & Method Requested Sample Notion Parameter & Method Sample Notion Sample Notion Parameter & Method Sample Notion Parameter & Method Sample Notion Sample Notin Notion Sample Notin Notion S	Tech Area:				1										P.O. Box 5800, MS-0154		
Sample No. Fraction Sample Location Detail Depth (ft) Date/Time Collected Sample Volume Preserv- Collection Sample Not Requested Sample Not Network 102470 001 MVVL-SV-FB4 NA \$/30/17 10:10 SG S 6 L None G FB VOC (T0-15) Image: Contrainer Frequested Sa 102471 001 MVVL-SV-FB4 NA \$/30/17 10:17 SG S 6 L None G SA VOC (T0-15) Image: Container Frequested Sa 102471 001 MVVL-SV04-500 200 5/30/17 10:12 SG S 6 L None G SA VOC (T0-15) Image: Container Frequested Sa VOC (T0-15) Image: Container Frequested Sa VOC (T0-15) Image: Container Image: Container Image: Container Sa VOC (T0-15) Image: C	Building:		Room:		Operationa	al Site:									Albuquerque, NM 87185-0154	1	
102470 001 MWL-SV-FB4 NA 5/30/17 10:10 SG S 6 L None G FB VOC (TO-15) Image: Constraint of the second of the se	Sample No.	Fraction	sa Sa	mple Location I	Detail	Depth (ft)	Date/ Colle	Time cted	Sample Matrix	С	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Met Requested	nod	Lab Sample I
102471 001 MWL-SV04-50 50 5/30/17 10:17 SG S 6 L None G SA VOC (T0-15) 0 102472 001 MWL-SV04-100 100 5/30/17 10:20 SG S 6 L None G SA VOC (T0-15) Image: Control (T0-15)	102470	001	MWL-SV	-FB4		NA	5/30/17	10:10	SG	S	6L	None	G	FB	VOC (TO-15)		
International conditional condition	102471	001	MWL-SV	04-50		50	5/30/17	10:17	SG	S	6 L	None	G	SA	VOC (TO-15)		
B 102473 001 MWL-SV04-200 200 5/30/17 10:24 SG S 6 L None G SA VOC (TO-15) Q 102474 001 MWL-SV04-300 300 5/30/17 10:24 SG S 6 L None G SA VOC (TO-15) Q 102475 001 MWL-SV04-300 400 5/30/17 10:24 SG S 6 L None G SA VOC (TO-15) 102475 001 MWL-SV04-400 400 5/30/17 10:24 SG S 6 L None G SA VOC (TO-15) 102475 001 MWL-SV04-400 400 5/30/17 10:34 SG S 6 L None G SA VOC (TO-15) 102475 001 MWL-SV04-400 400 5/30/17 10:34 SG S 6 L None G SA VOC (TO-15) 102475 001 MWL-SV04-400 400 5/30/17 10:34 SG S 6 L None G SA V	D 102472	001	MWL-SV	04-100		100	5/30/17	10.20	SG	S	61	None	G	SA	VOC (TO-15)		
Control Cold Note	0 0 102473	001	MWI-SV	04-200		200	5/30/17	10:24	SG	S	61	None	G	SA	VOC (TO-15)		
Housing Out Induction Induction <td>5 102474</td> <td>001</td> <td>MWI-SV</td> <td>04-300</td> <td></td> <td>300</td> <td>5/30/17</td> <td>10.28</td> <td>SG</td> <td>G</td> <td>61</td> <td>None</td> <td>G</td> <td>5A</td> <td>VOC (TO-15)</td> <td></td> <td></td>	5 102474	001	MWI-SV	04-300		300	5/30/17	10.28	SG	G	61	None	G	5A	VOC (TO-15)		
102473 001 invive-SV04-400 400 5/30/17 10.34 36 3 61 None G SA 100 (10.10) 001 invive-SV04-400 10 10.34 36 3 61 None G SA 100 (10.10) 001 invive-SV04-400 10 10.34 36 3 61 None G SA 100 (10.10) 001 invive-SV04-400 10 10.34 36 3 61 1	0 102475	001	MANA SV	04 400	an a	400	5/20/17	10:20	80	6	01	None	6	SA CA	VOC (TO-15)		-
Continuation Yes Sample Tracking SMO Use Special Instructions/QC Requirements: Condition Validation Req'd: Yes Date Entered: EDD Yes Received by: Condition Confirmatory: Yes QC inits: Turnaround Time 7-Day* 15-Day* 30-Day Sample Name Signature Init Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Members Gilbert Quintana Model1/505-284-2547/505-280-1265 Return Samples By: Comments: Elevation 5400 ft FAMSL See attached field forms. Lab U William Gibson Multury Audifier Miles SNL/0641/505-284-250-7090 Comments: Elevation 5400 ft FAMSL See attached field forms. Lab U Relinquished by Configuration Configuration/Phose-284-6870/505-228-7367 Relinquished by Org. Date Time Relinquished by Cong 0.65 1 Date 5/30/17 Time 13.4/3 Received by Org. Date Time		1001	IVIVL-SV	04-400		400	400 5/30/17 10:34			3	6L	None	G	SA			
Last Chain: Yes Sample Tracking SMO Use Special Instructions/QC Requirements: Condition Validation Req'd: Yes Date Entered: EDD Yes Condition Background: Yes Date Entered: Turnaround Time 7-Day* 15-Day* 30-Day Confirmatory: Yes QC inits: Negotiated TAT Disposal Return to Client Disposal by Lab Sample Tim Jackson TIMACSON TIMACSON TIMACSON Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Members Gibert Quintana Mature Law SNL/0631/505-284-2507/505-228-2607 Comments: Elevation 5400 ft FAMSL See attached field forms. Lab U William Gibson Walture Mature SNL/0641/505-844-2507/505-228-2607 Comments: Elevation 5400 ft FAMSL See attached field forms. Lab U Retired Santillanes Mature SNL/0641/505-284-2507/505-228-0710 Comments: Elevation 5400 ft FAMSL See attached field forms. Lab U Belinquished by Org.063 Date 5/30/17 Time 13/4/3 Retired by Org. Date Time Generived by Org.063 D	<u> </u>		<u></u>		ala con e consector a												-
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Last Chain: Yes Sample Tracking SMO Use Special Instructions/QC Requirements: Condition Validation Req'd: Yes Date Entered: EDD Yes Received by. Condition Background: Yes Date Entered by. Turnaround Time 7-Day* 15-Day* 30-Day Confirmatory: Yes QC inits: Negotiated TAT Image: Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Tim Jackson Total for the theorem of theorem of the theorem of theorem of the theo														_			
Last Chain: Image: Yes Sample Pracking SMO Use Special instructions/QC Requirements: Condition Validation Req'd: Yes Date Entered: EDD Yes Received by: Received by Received by Received by Org. 053 Date Time Alfred Santillanes Alfred Santillanes Alfred Santillanes Alfred Santillanes Alfred Santillanes Alfred Santillanes Org. 053 Date 5/30/17 Time 13 L/3 Received by Org. 053 Date 5/30/17 Time 13 L/3 Received by Org. 053 Date Time	Last Chains	l				Comple	Tasalia	-			0	<u> </u>					1
Validation Red U. Image: Confirmatory indication Red U. Date Entered. EDD Image: Yes Received by: Received by: Received by Image: Standard S	Validation P	log'd:				Sample	Tracking		SIMIC	JUse	Special ins	structions	QC Requi	ements:		Con	iditions on
Datkground. Image: Second	Background	1. 1.	U Vec			Entered	by:				Turnaroun	d Time		• •	15 Daut 17 20 Day	- '	Receipt
Sample Team Name Signature Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Team Tim Jackson TAArs- Ty SNL/0631/505-284-2547/505-280-1265 Return Samples By: Disposal by Lab Members Gilbert Quintana Solution of the state of the s	Confirmator	1. 				Cinite	by.				Negetieter	TAT	D 7-Day		15-Day 30-Day	4,335	
Sample Name Signade Int. Company/organization/Priority/Organization/Priority/Organiza	Sample	y.	lame	Signa	turo	Init	Compan	VOrganizo	ation/Phon		Sample Di	anagal		to Client	t Dispacel bul	-	
Team This backsoin Top arrow Lab U Belinquished by Top arrow Lab U Lab U Lab U Top arrow Top arrow Lab U Top arrow Top arrow Lab U Top arrow	Sample	Tim lac	keon	TA		- minc.	COMPan SNI /0631/5	05 294 25	47/505 29	0 1265	Daturn Con	sposal	L Return	Tto Chem		01	
Members Oldert Guintenta Output for an and for an an and for an an and for an an and for an	Team	Gilbert (Juintana	1-1-1-74	19-	17	SNL/06/1/5	05-204-25	07/505 22	2606	Commente	Elevation	5400 # EA	MSI Soo	attached field forms	-	
William Glosoft Lab U Alfred Santillanes Alfred Santillanes Alfred Santillanes SNL/0641/505-284-6870/505-228-0710 Villiam Glosoft Lab U Lab U Belinquished by Org.063 Date 5/30/17 Time 134/3 Received by Org. Date Time Received by Org.063 Date 5/30/17 Time 134/3 Received by Org. Da	Members	William	Cibson	the second	manging .	1. MA	SNL/0641/5	05-044-20	67/505-22	0 7267		. Lievatioi	1 5400 IL FA	WOL. See	attached held forms.		
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Belinquished by Table Org.063/ Date 5/30/17 Time 134/3 Relinquished by Org. Date Time Received by Org.063/ Date 5/30/17 Time 134/3 Received by Org. Date Time		Alfred S	antillanes	10115	210	mi	SNI /0641/5	05-284-68	70/505-23	8.0710	-					1 .	ab Llea
Received by To Crg. Org. Org. Date Time	Oelinguished k	Inited S	li	Alge Sa	Oranhz	Date	Ch2/17	Time	1701303-22	Relingu	lichod by			Ora	Data	Tim	.ab Use
Ung Date Time	Received by	IC	0117-		Org ALZ) Date	5122112	Time 1	7112	Receive	ad hy			Ora	Date	Tim	
Relinquished by C S Ora Data Time	Belinguished h	DV T	Z		Org 042	Date	5311	Time	09-1	Relingu	ished by		the state of the	Org	Date	Tim	10
Received by having - Org. Date //// Time /21- Received by Org. Date Time	Received by	2.1	d -		Org	Date	11612	- Time	101-	Receive	ad by			Ora	Date	Tim	

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CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab	1.0													Page 1 of 1
Batch No. /	VIA				SMO Use						<		AR/COC	617842
Project Name:	-12-1	MWL GWM / SVM	Date Samp	les Shipped:	5.31.	17		SMO A	thorization:	TG	No.	-	Waste Characterization	
Project/Task M	Aanager:	Timmie Jackson	Carrier/Wa	ybill No.	2659	98		SMO C	ontact Phone	e:				
Project/Task N	lumber:	195122.10.11.08	Lab Contac	t.	Lee Ann Hea	athcote/	State 1		Wendy P	alencia/505	5-844-3132		Released by COC No.	
Service Order		CF01-17	Lab Destina	ation:	TA / West S	acramento	0	Send R	eport to SMC	D:				4º Celsi
			Contract N	p.:	1636780				Stephanie	Montaño/5	05.284.255	3	Bill to: Sandia National Laborato	ries (Accounts Payab
Tech Area:							3.3 MA. 924 PA						P.O. Box 5800, MS-0154	
Building:	-	Room:	Operatio	nal Site:									Albuquerque, NM 87185-0154	
Sample No.	Fraction	Sample Loo	ation Detail	Depth (ft)	Date/ Colle	Time cted	Sample Matrix	Со Туре	Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Metho Requested	d Lab Sample
102477	001	MWL-SV-FB5		NA	5/30/17	10:49	SG	S	6 L	None	G	FB	VOC (TO-15)	
102478	001	MWL-SV05-50		50	5/30/17	10:52	SG	s	6 L	None	G	SA	VOC (TO-15)	
P 102479	001	MWL-SV05-100		100	5/30/17	10:55	SG	S	6 L	None	G	SA	VOC (TO-15)	
m → 102480	001	MWL-SV05-200		200	5/30/17	10:58	SG	S	6 L	None	G	SA	VOC (TO-15)	
មា អា មា 102481	001	MWL-SV05-300		300	5/30/17	11:03	SG	S	6 L	None	G	SA	VOC (TO-15)	
9 102482	001	MWL-SV05-400		400	5/30/17	11:11	SG	S	6 L	None	G	SA	VOC (TO-15)	SA
569							1							
	-													
														-
Last Chain:	1	□ Yes		Sample	Tracking		SMC) Use	Special In	structions	/QC Requir	ements:		Conditions on
Validation F	Rea'd:	☑ Yes		Date En	tered:				EDD		☑ Yes			Receipt
Background	d:	□ Yes		Entered	by:				Turnarour	nd Time	7-Dav	* 🗆	15-Dav* 🖾 30-Dav	
Confirmato	rv:	□ Yes	1999-1999 - 1999-1999-1999-1999-1999-19	QC inits					Negotiate	TAT				
Sample	IN	lame	Signature	Init.	Compan	y/Organiza	ation/Phon	e/Cell	Sample D	isposal	Return	n to Clien	t 🛛 Disposal by Lab	
Team	Tim Jac	kson T=4	119-	TI	SNL/0631/5	05-284-25	67/505-28	0-1265	Return Sa	mples By:				
Members	Gilbert (Quintana Mal	52 grabon	0 124	SNL/0641/5	05-844-25	607/505-22	8-2606	Comments	: Elevation	5400 ft FA	MSL. See	attached field forms.	
members	William	Gibson Will	ien with	WAS	SNL/0641/5	05-239-73	867/505-23	9-7367	1					性医前吸入的现
	Robert I	ynch Rol	13ach 1	101	SNL/0641/5	05-844-40	13/505-25	50-7090						
	Alfred S	antillanes All	1 Sontillo	-008	SNL/0641/5	05-284-68	370/505-22	8-0710					All the second se	Lab Use
Relinquished	by	4-114-1	Org.063	/ Date	5/30/17	Time	1343	Relingu	ished by			Org	. Date	Time
Received by	Tom	560	Org.06	31 Date	5/30/17	Time	1343	Receive	ed by			Org	. Date	Time
Relinquished	by To-	9900	Org.06	3 / Date	5/31/17	Time (5907	Relinqu	ished by			Org	. Date	Time
Received by	Bark	m	Org.	Date	6/6/17	Time	020	Receive	ed by			Org	. Date	Time

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab															Page 1 of 1	
Batch No. N	1A					SMO Use								AR/COC	61783	8
Project Name:		MWL GWM	M/SVM	Date Sample	s Shipped	5-31-	17		SMO A	uthorization:	To -	4	>	U Waste Characterization	1	
Project/Task M	lanager:	Timmie Ja	ckson	Carrier/Wayb	ill No.	2650	198		SMO C	ontact Phone	9:					
Project/Task N	umber:	195122.10	.11.08	Lab Contact		Lee Ann He	athcote/			Wendy Pa	alencia/505	5-844-3132		Released by COC No.		
Service Order:		CF01-17		Lab Destination	on:	TA/West Sa	cramento		Send R	eport to SMC):	Particular State State			2 4º Ce	elsiu
				Contract No.:		1636780				Stephanie I	Montaño/5	05.284.255	3	Bill to: Sandia National Labora	tories (Accounts Pa	ayable
Tech Area:														P.O. Box 5800, MS-0154		1.1
Building:		Room:		Operationa	I Site:									Albuquerque, NM 87185-0154		
Sample No.	Fraction	Sar	mple Location [Detail	Depth (ft)	Date/ Colle	Time cted	Sample Matrix	Со Туре	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Meth Requested	od L Sam	.ab iple l
102457	001	MWL-SV-	-FB1		NA	5/30/17	11:30	SG	S	6 L	None	G	FB	VOC (TO-15)		
102458	001	MWL-SV	01-42.5		42.5	5/30/17	11:33	SG	S	61	None	G	SA	VOC (TO-15)		
Pac							11.00				Hone			en enneted transmitter and an entertainteen entertainteen entertainteen entertainteen entertainteen entertainte		
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Last Chain:		D Yes	in president of the second	and the state of the	Sample	Tracking		SMC		Special Ins	structions		emente ·	1	Conditions	
Validation R	ea'd:	☑ Yes			Date En	tered:				EDD	Structions	☑ Yes	cincinto.		Receipt	t
Background	:	□ Yes	a laga ta faring a sa ang		Entered	by:		10.00		Turnaroun	d Time	D 7-Dav	* 🗆	15-Dav* 🛛 30-Dav	-	
Confirmator	y:	□ Yes			QC inits			R.S. M.		Negotiated	TAT	0				
Sample	N	ame	Signat	ture	Init.	Compan	y/Organiza	ation/Phon	e/Cell	Sample Di	sposal	D Return	n to Client	t 🛛 Disposal by La	b	
Team	Tim Jac	kson	TEAMO	5-	71	SNL/0631/5	05-284-25	47/505-28	0-1265	Return Sa	mples By:		-	ter anna ann an tarainn		
Members	Gilbert C	uintana	A Thy 24.	interna.	esisto	SNL/0641/5	05-844-25	07/505-22	8-2606	Comments	: Elevation	5400 ft FA	MSL. See	e attached field forms	ALC: NOTE:	
Members	William	Gibson	Willien	uls	WYA	SNL/0641/5	05-239-73	67/505-23	9-7367	1					Sec.	
	Robert L	ynch	Roltzing	ch	ni	SNL/0641/5	05-844-40	13/505-25	0-7090	1						
	Alfred S.	antillanes	Hefles.	alila	at	SNL/0641/5	05-284-68	70/505-22	8-0710	1					Lab Use	е
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Belinquished b	yTo	Rest		Org. 063) Date	\$13111	7 Time(908	Relinqu	ished by			Org	. Date	Time	ALC: NO
Received by	2mile	m		Org.	Date	6/6/17	- Time	1020	Receive	ed by			Org	Date	Time	

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CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab														F	Page 1 of 1	
Batch No. N	IA				SMO Use									AR/COC	61783	9
Project Name:		MWL GWM / SVM	Date Sam	les Shipped	531/17	1		SMO A	uthorization:	ier		-	D Was	te Characterization		
Project/Task M	Manager:	Timmie Jackson	Carrier/Wa	ybill No.	2659	98		SMO C	ontact Phone	ə:	designed and the second se	A				
Project/Task N	Number:	195122.10.11.08	Lab Conta	t	Lee Ann Hea	athcote/		1	Wendy P	alencia/50	5-844-3132		Rele	ased by COC No.		
Service Order	0	CF01-17	Lab Destin	ation:	TA/West Sa	cramento	- 1/2	Send R	eport to SMC	D:					☑ 4º Ce	Isiu
		- Trial designed and the second	Contract N	0.:	1636780			1	Stephanie	Montaño/5	05.284.255	3	Bill to: San	dia National Laboratori	es (Accounts Pa	avable
Tech Area:		are characterized as a						1	- top				P.O. Box 58	800. MS-0154		Jabie
Building:	and a second	Room:	Operatio	nal Site:									Albuquerqu	e, NM 87185-0154		
Sample No.	Fraction	Sample Lo	ocation Detail	Depth (ft)	Date/ Colle	Time cted	Sample Matrix	C Type	ontainer Volume	Preserv-	Collection	Sample Type	Pa	arameter & Method Requested	L Sam	.ab Iple I
102459	001	MWL-SV-FB2		NA	5/30/17	11:33	SG	s	6 L	None	G	SA	VOC (TO-	15)		
102460	001	MW -SV02-41 F		415	5/30/17	11.42	SG	G	61	Nono	G	EB	VOC (TO-	15)		
TU2400	1001	101002-41.0	alan a dara na antir a com a	41.5	5/50/17	11.42	00			None		- FB				
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56																******
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Last Chain	-	U Yes		Sample	Tracking		SMO	Olise	Special In	structions	OC Requi	rements.			Conditions	: 00
Validation F	Sea'd:	Ves		Date En	tered:		0	0 0 0 0 0	EDD	on donom	Ves Yes	emento.			Receipt	t
Background	d.		and the second	Entered	hv:				Turnarour	nd Time	0 7-Day	* 🗆	15-Dav*	2 30-Day	receip	
Confirmato	rv.	U Yes		OC inits					Negotiate	d TAT			10 Duy			
Sample	1 N	Jame	Signature	Init	Compan	v/Organiz	ation/Phor	ne/Cell	Sample Di	isposal	Retur	n to Client	t 🕅	Disposal by Lab		
Team	Tim Jac	kson F	1 115-	11	SNL/0631/5	05-284-25	547/505-28	30-1265	Return Sa	mples By				Dispecti of Lab		
Team	Gilbert (Duintana In Tr	24 -	Indle	SNI /0641/5	05-844-25	507/505-22	28-2606	Comments	Elevation	n 5400 ft FA	MSL See	attached f	ield forms.		
Members	William	Gibson	. AZILA	11/8	SNI /0641/5	05-239-73	367/505-23	39-7367	1							
	Robert I	vnch Ka	Adat	12	SNL/0641/5	05-844-40	013/505-25	50-7090	-							
	Alfred S	antillanes Da	25 800	de	SNL/0641/5	05-284-68	870/505-22	28-0710							Lab Us	e
Relinguished	by The	Ale T	Org. AL	Z / Date	5/20/17	Time	1343	Relingu	ished by	and the off the st		Ora		Date	Time	100
Received by	10-	6	Org. AL	3 Date	5/30/1-	Time	1247	Receiv	ed by			Ora		Date	Time	
Relinguished	by TOS=		Org. OA	31 Date	5/31/1-) Time	0908	Relingu	ished by			Org		Date	Time	
Received by	Brock	long	Org. Date (/6/)			Time	1020	Receiv	ed by	and the state of the second		Org		Date	Time	

CONTRACT VERIFICATION REVIEW FORMS

AR/COC Number	Sample Type
617838	Environmental*
617839	Environmental*
617840	Environmental*
617841	Environmental*
617842	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. 617838, 617839, 617840, 617841 & 617842

Analytical Lab TAL-WS

SDG No. 320-28713-1

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

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

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	Х		
3.2	Quantitation limit met for all samples	Х		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	Х		RPD for 2-hexanone outside acceptance range for LCS/LCSD (batch 169436)
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	Х		
	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		Х	Methylene chloride detected in method blank (batch 170534)

Line No.	Item			If no, Sample ID No./Fraction(s) and Analysis				
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		Х	Benzene detected in MWL-SV-FB3. Acetone, carbon disulfide, methylene chloride and toluene detected in MWL-SV-FB5. Acetone and toluene detected in MWL-SV-FB1. Acetone, dichlorodifluoromethane and trichlorofluoromethane detected in MWL-SV-FB2.				
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	Х						
3.7	Narrative addresses planchet flaming for gross alpha/beta	N/A						
3.8	Narrative included, correct, and complete	Х						
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	Х		
	b) Initial calibration provided	Х		

Line No.	e Item			Comments
	c) Continuing calibration provided	х		
	d) Internal standard performance data provided	х		
	e) Instrument run logs provided	х		
4.2	2 GC/HPLC (8330, 8082, 9070A, and 8010) a) Initial calibration provided			
	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			
	c) Continuing calibration provided			
	d) Internal standard performance data provided			
	e) Labeled compound recovery data provided			
	f) RRTs for samples and standards provided			
	g) lon abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided			
4.4	LC/MS/MS (6850) a) Initial calibration provided	N/A		

Line No.	Item	Yes	No	Comments
	b) Continuing calibration provided	N/A		
	c) CRI provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)			
4.5	Inorganics (metals) a) Initial calibration provided	N/A		
	b) Continuing calibration provided			
	c) ICP interference check sample data provided			
	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	lf no, explain
5.1	DAR completed for monitoring and surveillance sample data	N/A		
5.2	Problems or outliers noted	N/A		
J		1		1

Line No.	Item		No	lf no, explain
5.3	Verification or reanalysis requested from lab			

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				
102462-001	TO-15	Sample receipt date incorrect on COAs, lab chronicle and sample summary				
102463-001						
102464-001						
102465-001						

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

If no, provide nonconformance report or correction request number 19410 and date correction request was submitted: 06-30-2017

Reviewed by: Wendy Palencia Date: 06-30-2017 10:03:00

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

Closed by: Wendy Palencia Date: 07-19-2017 08:31:00

FIELD SAMPLING FORMS

OCTOBER 2017 SOIL-VAPOR MONITORING

LTS 2015-001	(6/2015)
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HEALTH & SAFETY MEETING FORM

Dept: 0641 Fac	ility: Da	tte: 10/26/17 Time: 08/2
Activities: Soil Vapor well Sam (Anyone has the right to cease field a	npling ctivities for safety concerns. The buddy	system will be used when needed.)
Weather Conditions: Temp: <u>43 °F</u> Wind Speed	d: <u>26 MPH</u> Humidity: <u>4</u>	54 Wind Chill: 73 °F
Chemicals Used: M None 🗆 Hospital/Clinic: Sandia Medial Clini	Preservatives in sample bottles Image: Constraint of the sample bottles Con	Other:
	Safety Topics Presented	
□ Wear safety glasses	□ Wear leather gloves	🗆 Wear sunscreen
☑ Wear safety boots	U Wear latex or nitrile gloves	□ No eating or drinking onsite
U Wear hearing protection	☑ Use safe lifting practices	□ Set up eye wash
☑ Be aware of biohazards (snakes, spiders, etc.)	Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary	Wear communication device (radio, cell phone, EOC alert enabled pager)
☑ Be aware of electrical hazards	☐ Be aware of pinch points	Avoid spilling leachate (hose connections)
☑ Be aware of pressure hazards	□ Notify RCT when using neutron probe	Practice ALARA
✓ Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	□ Other (list):	□ Other (list):
Does anyone have any weight restric	tions on lifting? Circle YES or NO. If a	answered YES explain.
Printed Name Printed Name Tim Jackson William bibson	h Attendees Ray Signature Signature Signature Signature U	Hynch moho Als-
Printed Name <u>OHEIS HULLEE</u> Printed Name Steven IVESON Printed Name <u>ALFRED</u> SANTA	Signature Signature Notes	20 Jun desceller

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

			Son vapor San	iping Lo	og Form			
Location	Date	Time	Canister #	PID (ppm)	Flow Rate (Lu-Ff)	Initial Canister Vacuum	Ending Canister Vacuum	Comments
MUL-FB1	10/20/17	1124	3400 1329	NA	NA	-26	-2	
MWL-SV01-42,5	1	1137	NA	0.3	e,	NA	NA	
		1)	1	1	
		1137	1		+		Ļ	
		1139	8012	NA	NA	-27	- 2	
J	J	+	34000349	1	L	-27	-8	
ANL-FBZ	10/26/17	1/25	34000303	NA	NA	-26	- V	
Mar - 5002-41.5	1	1146	NA	0,1	8	~#	NA	
		1]				1	
		146	L	Ţ	L	Ļ		
		1148	34000366	NA	NA	-27	-8	
V)	L	8263	Ł	Ŀ	-27	-8	
						1		
					Ad	14		
					1-4	0/17		
					1010			
Field Notes:	untio	~ ~	- 5400 fa	msl				
P10 H 17222								
Bullerund = 0.3pp								
17	101071							

Soil Vapor Sampling Log Form

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

			Soil Vapor San	npling Lo	og Form			
Location	Date	Time	Canister #	PID (ppm)	Flow Rate	Initial Canister Vacuum (P51)	Ending Canister Vacuum (<i>P</i> 5 ')	Comments
MWZ-FB3	10/26/17	824	34002027	NA	BAT9	-24	-3	
MW2-5103-50	1	910	NA	0,7	10/201	NA	NA	
		i		1		1		
		1	1		J	L		
L		912	7835	NA	NA	-26	-8	
MWL-3003- 100		913	NA	0.7	ÿ	NA	NM	
1		./	1	1		1		
		914	1	1		Ţ	J	
Ţ		916	34000113	NA	NA	-24	-5	
MWL-5003-200		917	NA	017	8	NA	NA	
1		1	í.)	1	1		
		1						
		912		1	Ţ	1	T	
J		920	3400 1274	NA	NA	-26	-8	
MAL-5003-300		92.0	NA	07	15	NA	NA	
)		1	1)	1		
		921	Ţ	1	l	1	T	
\downarrow		924	34000168	NA	NA	-24	-8	
MUL-5003-400		929	NA.	0,8	22	NA	NA	
[1		1	1	1	1	
		930	Ļ	1	L	7	L	
\downarrow	1	943	7521	NA	NA	-24	-8	Slow SEMPLY flow
					1	1.14		
						10/10	117	
Field Notes:			the second se					
ELE ZINI	vatio	· · · · ·	~ 5400 +a.	m 51 00 Mo	del #	ogm -	7320	
	1172	2, 10	INI FAC Je	,				
Buckgr	Jund	= 0	,7 ppm					
IH un	site	-> EF	1					

Lonfinuous PID purge meas

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

Location	Date	Time	Canister #	PID (ppm)	Flow Rate	Initial Canister Vacuum (アラい)	Ending Canister Vacuum (\$\rho \$1)	Comments
MUL-FB4	Notala	1004	34000171	NA	NA	-26	-8	
Mur- 3004-50		1008	NA	0.7	8	NA	NA	
1		1	1		1	1	1	
		1009	J	Ţ	1			
		1012	34000797	NA	NA	- 24	-9	flow
MWL-5004-100		1012	NA	0,6	43	~A	NA	
)		1		1	1	1	1	
		1073	L	L	L	L	L	
J.		1014	34001452	NA	NA	-26	-8	
MWL-5004-200		1015	NA	0,6	B	NA	NA	
		1	1	1)	1	1	
		1016	1	1	1	Ţ	Ţ	
		1019	34000124	NA	NA	-74	-9	
mul-5604-300		1019	NA	0.5	છ	NA	NA	
1		4	1	1	1	1	1	
		1021	L	1	Ţ	Ļ	L	
J		1023	7758	NA	NA	-26	-8	
Muc- 5004 -400		1026	NA	0,4	8	NA	NA	
1		1			1	1	1	
		1028	Ļ	1	Ļ	L	Ţ	
		1029	34020517	NA	NA	-25	-8	
						A 111	~	
					1-	12414	2	
						01001		
Field Notes: Field Notes: Fi	nt:00 # 172	~ 1	6400 from	s /				
Bircl	Lgros-	~ + =	0,7 ppm					

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Soil Vapor Sampling Log Form								
Location	Date	Time	Canister #	PID (ppm)	Flow Rate (2-44)	Initial Canister Vacuum	Ending Canister Vacuum	Comments
MUL-FBS	10/26/17	1048	34000160	NA	NA	-26	-8	
MWL-9005-50	- P	1046	NA	0.4	8	NA	NA	
1			1	1		1	1	
		L	1	1	L	J	J	
+		1049	3400/126	NA	NA	-24	-48	
MWL-5005-100		1049	NA	0,3	જ	NA	NA	
1		+	1		1)	
		1050	J	Ļ		1	L	
~		1051	34000017	NA	NA	-24	-9	
MWL-5405-700		1052	NA	0,3	ઝ	NA	NA	
1		4)		1			
		1054	L	Į,	L.	J	5	
\downarrow		1055	7526	NA	NA	-26	-8	
NWL-5005-300		1056	NA	0,3	Ø	NA	NA	
		1	1)		1)	
		,050	L_	L	L	T	L	
J		1100	34000170	NA	NA	-25	8	
hwr-5005-400		1102	NA	0,4	Ÿ	NA	NA	
		1	1	1)	
		1104	1	Ţ		J	L	
y	Ψ	1106	7701	NA	NA	-26	-9	
						- A .14	/	
					1	1-4 41	17	
						10/20		
Field Notes:	untio-	- ~	5400					
PID	H= 1	722	ι					
Buc	KGreu	nd =	0,4 ppm					
10000	/							

Sati 17. ... -

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SUMMARY SHEET FOR

OCTOBER 2017 SOIL-VAPOR SAMPLES

Sample Summary for MWL Soil Vapor Monitoring FY18 1st Quarter

			SUMMA		Sample		Associated Field Blank	
Well ID	Sample Date	Sample ID / Port	Number	ARCOC	Number	Sample Type	(ARCOC #/Sample #)	Comments
Mixed Waste	Landfill Soil	/apor Monitoring: Project	Task Number	195122.10.1	1.08 / Servi	ce Order Numb	er CF 01-18	
		MWL-SV01-42.5	8018		103911	Environmental	618269 / 103910	
MWL-SV01	26-Oct-17	MWL-SV01-42.5	34000349	618269	103912	Duplicate	0102037 103310	
		MWL-FB 1	34001329		103910	Field QC	n/a	Ultra Pure N2
		MWL-SV02-41.5	34000856		103914	Environmental	618270 / 103913	
MWL-SV02	26-Oct-17	MWL-SV02-41.5	8253	618270	103915	Duplicate	0102707 103313	
		MWL-FB 2	34000383		103913	Field QC	n/a	Ultra Pure N2
		MWL-SV03-50	7835		103917	Environmental		
		MWL-SV03-100	34000113		103918	Environmental		
MWL-SV03	26-Oct-17	MWL-SV03-200	34001274	618271	103919	Environmental	618271 / 103916	
	20 000 17	MWL-SV03-300	34000168	010271	103920	Environmental		
		MWL-SV03-400	7521	7521		Environmental		
		MWL-FB 3	34002027		103916	Field QC	n/a	Ultra Pure N2
		MWL-SV04-50	34000797		103923	Environmental		
		MWL-SV04-100	34001452		103924	Environmental		
MWL-SV04	26-Oct-17	MWL-SV04-200	34000128	618272	103925	Environmental	618272 / 103922	
MWE-0004	20 000 17	MWL-SV04-300	7758	010272	103926	Environmental		
		MWL-SV04-400	34000517		103927	Environmental		
		MWL-FB 4	34000171		103922	Field QC	n/a	Ultra Pure N2
		MWL-SV05-50	34001126		103930	Environmental		
		MWL-SV05-100	34000017		103931	Environmental		
MWL-SV05	26-Oct-17	MWL-SV05-200	7526	618268	103932	Environmental	618268 / 103929	
	20-001-17	MWL-SV05-300	34000170	010200	103933	Environmental		
		MWL-SV05-400	7701		103934	Environmental		
		MWL-FB 5	34000160		103929	Field QC	n/a	Ultra Pure N2

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

SOIL-VAPOR MONITORING

OCTOBER 2017



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

Memorandum

Date:	December 4, 2017
То:	File
From:	Linda Thal
Subject:	GC/MS Organic Data Review and Validation – SNL Site: MWL SVM ARCOC: 618268, 618269, 618270, 618271 and 618272 SDG: 320-32934 Laboratory: TestAmerica Laboratories, IncWest 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. This validation was performed according to SNL/NM SMO Procedure AOP 00-03 Rev 5.

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. Benzene was detected at > the PQL in FB5, sample 320-32934-1, associated with samples -2 through -6. The associated result for samples -5 and -6 were detects ≤ the PQL and will be **qualified 1.6U,B2 and 1.4U,B2** respectively at their PQLs.
- Acetone was detected at ≤ the PQL in FB5, sample -1, associated with samples -2 through -6. All associated sample results were detects ≤ the PQL and will be qualified 18U,B2; 23U,B2; 23U,B2; 23U,B2; 23U,B2; 20U,B2 and 18U,B2 respectively at their PQLs.
- Methylene chloride was detected at ≤ the PQL in FB1, sample -7, associated with samples -8 and -9. The methylene chloride result for sample -8 was a detect ≤ the PQL and will be qualified 4.1U,B2 at the PQL.
- Acetone was detected at ≤ the PQL in FB2, sample -10, associated with samples -11 and -12. The acetone results for samples -11 and -12 were detects ≤ the PQL and will be **qualified 38U,B2 and 37U,B2** respectively at their PQLs.
- Acetone was detected at ≤ the PQL in FB3, sample -13, associated with samples -14 through -18. All associated sample results were detects < the PQL and will be qualified 20U,B2; 20U,B2; 38U,B2; 37U,B2 and 55U,B2 respectively at their PQLs.

- 6. Chloromethane and toluene were detected at ≤ the PQL and benzene at > the PQL in FB3, sample -13, associated with samples -14 through -18. The benzene result for sample -14 was a detect ≤ the PQL and will be **qualified 1.6U,B2** at the PQL. The chloromethane results for samples -15 and -17 were detects ≤ the PQL and will be **qualified 3.3U,B2 and 5.9U,B2** at their respective PQLs. The toluene results for samples -15 and -18 were detects ≤ the PQL and will be **qualified 1.6U,B2 at** their respective PQLs. The toluene results for samples -15 and -18 were detects ≤ the PQL and will be **qualified 1.6U,B2 at** their respective PQLs.
- 7. Methylene chloride was detected at ≤ the PQL and benzene at > the PQL in FB4, sample -19, associated with samples -20 through -24. The benzene results for all samples *except* sample -22 were detects ≤ the PQL and will be **qualified 0.80U,B2; 1.8U,B2;1.2U,B2 and 1.2U,B2** at their respective PQLs. The methylene chloride results for all samples were detects ≤ the PQL and will be **qualified 0.80U,B2; 1.2U,B2 and 1.2U,B2** at their respective PQLs.

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. Benzene was detected at > the PQL in FB5, sample -1, associated with samples -2 through -6. The associated result for samples -2 through -4 were non-detect and will not be qualified.

Methylene chloride was detected at \leq the PQL and benzene at > the PQL in FB1, sample -7, associated with samples -8 and -9. The associated sample results *except* the methylene chloride result for sample -8 were non-detect and will not be qualified.

Acetone, tetrachloroethene and toluene were detected at \leq the PQL and benzene at > the PQL in FB2, sample -10, associated with samples -11 and -12. The tetrachloroethene results for samples -11 and -12 were detects > the PQL and >5X the FB value and will not be qualified. The benzene and toluene results for samples -11 and -12 were non-detect and will not be qualified.

Trichloroethene, tetrachloroethene, chloromethane and toluene were detected at \leq the PQL and benzene at > the PQL in FB3, sample -13, associated with samples -14 through -18. The tetrachloroethene and trichloroethene results for all associated samples were detects > the PQL and >5X the FB values and will not be qualified. The remaining associated sample results, *except* the benzene result for sample -14, the chloromethane results for samples -15 and -17 and the toluene results for sample -15 and -18, were non-detect and will not be qualified.

Trichloroethene and tetrachloroethene were detected at \leq the PQL and benzene at > the PQL in FB4, sample -19, associated with samples -20 through -24. The benzene result for sample -22 was non-detect and will not be qualified. The tetrachloroethene and trichloroethene results for all associated samples were detects > the PQL and >5X the FB values and will not be qualified.

Surrogates

All surrogate acceptance criteria were met.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

An MS/MSD was not performed.

Laboratory Control Sample (LCS)/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 (3.51X); sample -3 (4.52X); sample -4 (4.54X); sample -5 (4.01X); sample -6 (3.52X); sample -8 (10.2X); sample -9 (10.2X); sample -11 (7.65X); sample -12 (7.34X); sample -14 (4.05X); sample -15 (4.07X); sample -16 (7.59X); sample -17 (7.32X); sample -18 (10.94X); sample -20 (2X); sample -21 (4.48X); sample - 22 (5.51X); sample -23 (3X) and sample -24 (3X).

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 ARCOC. Two field duplicate pairs were submitted with ARCOC 618269 and 618270. 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 Doni	an Level: I	Date: 12/04/17



AR/COC: 618268, 618269, 618270, 618271, 618272

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC	
T015				
	103911-001/MWL-SV01-42.5	METHYLENE CHLORIDE (75-09-2)	4.1U, B2	
	103914-001/MWL-SV02-41.5	ACETONE (67-64-1)	38U, B2	
	103915-001/MWL-SV02-41.5	ACETONE (67-64-1)	37U, B2	
	103917-001/MWL-SV03-50	ACETONE (67-64-1)	20U, B2	
	103917-001/MWL-SV03-50	BENZENE (71-43-2)	1.6U, B2	
	103918-001/MWL-SV03-100	ACETONE (67-64-1)	20U, B2	
	103918-001/MWL-SV03-100	CHLOROMETHANE (74-87-3)	3.3U, B2	
	103918-001/MWL-SV03-100	TOLUENE (108-88-3)	1.6U, B2	
	103919-001/MWL-SV03-200	ACETONE (67-64-1)	38U, B2	
	103920-001/MWL-SV03-300	ACETONE (67-64-1)	37U, B2	
	103920-001/MWL-SV03-300	CHLOROMETHANE (74-87-3)	5.9U, B2	
	103921-001/MWL-SV03-400	ACETONE (67-64-1)	55U, B2	
	103921-001/MWL-SV03-400	TOLUENE (108-88-3)	4.4U, B2	
	103923-001/MWL-SV04-50	BENZENE (71-43-2)	0.80U, B2	
	103923-001/MWL-SV04-50	METHYLENE CHLORIDE (75-09-2)	0.80U, B2	
	103924-001/MWL-SV04-100	BENZENE (71-43-2)	1.8U, B2	
	103924-001/MWL-SV04-100	METHYLENE CHLORIDE (75-09-2)	1.8U, B2	
	103925-001/MWL-SV04-200	METHYLENE CHLORIDE (75-09-2)	2.2U, B2	
	103926-001/MWL-SV04-300	BENZENE (71-43-2)	1.2U, B2	
	103926-001/MWL-SV04-300	METHYLENE CHLORIDE (75-09-2)	1.2U, B2	
	103927-001/MWL-SV04-400	BENZENE (71-43-2)	1.2U, B2	
	103927-001/MWL-SV04-400	METHYLENE CHLORIDE (75-09-2)	1.2U, B2	
	103930-001/MWL-SV05-50	ACETONE (67-64-1)	18U, B2	
	103931-001/MWL-SV05-100	ACETONE (67-64-1)	23U, B2	

AR/COC: 618268, 618269, 618270, 618271, 618272

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	103932-001/MWL-SV05-200	ACETONE (67-64-1)	23U, B2
	103933-001/MWL-SV05-300	ACETONE (67-64-1)	20U, B2
	103933-001/MWL-SV05-300	BENZENE (71-43-2)	1.6U, B2
	103934-001/MWL-SV05-400	ACETONE (67-64-1)	18U, B2
	103934-001/MWL-SV05-400	BENZENE (71-43-2)	1.4U, B2

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

Sandia Data Validation Summary Worksheet

ARCOC#: 618268, 618269, 618270, 618271 and 618272	Site/Project: MWL SVM		Validation Date: 12/01/2017		
SDG #:320-32934	Laboratory: TA Laboratorie	Validator: Linda Thal			
Matrix: Air	# of Samples: 24	CVR present: Yes			
ARCOC(s) present: Yes	Sample Container Integrity: OK				
Analysis Type: Organic Metals Gench	nem 🗌 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 10/26/2017	
Validated by: & Mal	

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #:6182	68, 618269, 618270,	618271 ar	nd 618272			SDG: 320)-32934					1	Matrix: Air		
Laboratory Sam	ple IDs: 320-32934-	1 through -	24												
Method/Batch # thru -	s: TO-15/192764 (sa 17); 193020 (sample	mples -1 tl es -18 thru	nru -8);1927. -24)	36 (samples	-9	Tuning (p	bass/fail):p	ass			TICs Re	quired? (yes/no):no		
			Cal	ibration											
A (1	nalyte outliers)	Int.	RF/ Slope	RSD/r ²	(ICV) CCV %D)/ / MB	5X (10X) MB	LCS %R	LCSD %R	LCS/ LCSD RPD	FB2 -10	X5 (X10)) FB3 -13	X5 (X10)	
ATMS 7 10/05/2	2017														
batch 192736 -	9 thru -17)														
Acetone		NA	✓	✓	✓	✓	NA	✓	✓	✓	.43J	(4.3)) .42J	(4.2)	
Benzene		NA	✓	✓	✓	✓	NA	✓	✓	✓	5.9	29.5	4.7	23.5	
Tetrachloroethe	ene	NA	✓	✓	✓	✓	NA	✓	✓	✓	.25J	1.25	.079J	.395	
Toluene		NA	✓	✓	✓	✓	NA	✓	✓	✓	.058J	(.58)) .2J	(2.0)	
Chloromethane	•	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA	.2J	1.0	<u> </u>
Trichloroethen	e	NA	✓	✓	 ✓ 	✓	NA	✓	✓	✓	✓	NA	.34J	1.7	
<u></u>	- i	 	t		Surroga	te Recove	ery Outlie	rs					i		
Sample ID	1,2-DCA-d4 %R	Tolue	ne-d8 %R	BFB %R			Sample I	D 1	,2-DCA-d4	%R	Toluene-	d8 %R	BFB %R		
none															
	-					IS Out	liers				1				
	FBZ		1,4-DCB	-d4											
Sample ID	Area	RT	Area	RT		Area RT									
none	none														
L															

<u>Comments</u>: HTs OK. LCS/LCSD (lab limits) ATMS 7 All avg RF

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #: 61826	8, 618269, 618270	, 6182	71 and	618272			SDG: 320)-32934						Matrix:	Air		
Laboratory Samp	le IDs:320-32934-1	l throu	gh -24														
Method/Batch #s: -17); 1	TO-15/192764 (sa 93020 (samples -1	mples 8 thru	-1 thru -24)	-8);192736	5 (samples -) thru	Tuning (p	oass/fail):y	es			TICs Ree	quired?	(yes/no)	:no		
				Cali	bration												
A1 (ot	nalyte utliers)		Int.	RF/ Slope	RSD/r ²	(ICV CCV %D)/ / MB	5X (10X) MB	LCS %R	LCSD %R	LCS/ LCSD RPD	FB5 -1	X5 (X10))	F B 1 -7	X5 (X10)	
ATMS 9 10/26/20)17																
batch 192764 (-1	thru -8)																
Acetone			NA	✓	✓	\checkmark	✓	NA	✓	✓	✓	.24J	(2.4	.)	✓	NA	ļ
Benzene			NA	✓	✓	✓	✓	NA	✓	✓	\checkmark	4.8	24		5.0	25	<u> </u>
Methylene chlor	ide		NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA)76J	(.76)	
Dichlorodifluor	omethane		NA	✓	✓	 ✓ 	✓	NA	✓	✓	✓	 ✓ 	NA	<u>ــــــــــــــــــــــــــــــــــــ</u>	✓	NA	ļ
Trichlorofluorom	ethane		NA	✓	✓	✓	√	NA	✓	✓	✓	✓	NA	L	~	NA	
ATMS 9 10/26/20)17											FB4	X5	;			
batch 193020 (-1	8 thru -24)		NT A									-19	20				
Benzene	• 1		NA	v	✓	✓	• •	NA	v	v (✓	4.0	20				
Tetro ablance the	1de		NA	•	•	•	•	INA NA	•	•	•	.099J	(.99)			
Trichloroethene	le		NA	✓ ✓	✓ ✓	• •	· · · · · · · · · · · · · · · · · · ·	NA	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	✓ ✓	.11J	.55				
			1.111	L	S	Surrog	ate Recove	ry Outlie	rs	1		1150	170				
Sample ID	1,2-DCA-d4 %R	Т	oluene-	d8 %R	BFB %R			Sample II) 1	,2-DCA-d4	%R	Toluene-d	18 %R	BFB	8 %R		
none																-	
							IS Out	liers									
	FBZ			Chl-c	15		1,4-DCB-	d4									
Sample ID	Area	RT		Area	RT		Area	RT									
none																	
Comments: HTs (OK. LCS/LCSD (1)	b limi	ts)														

ATMS 9 All avg RF

Internal Lab													F	age 1 of 1
Batch No.					SMO Use								AR/COC	618268
Project Name		MWL GWM / SVM	Date Samp	les Shipped	10.	27.1	7	SMO A	uthorization:	Tese	20	-14	Waste Characterization	and the second second
Project/Task M	Aanager:	Timmie Jackson	Carrier/Wa	bill No.	273	752	1	SMO C	ontact Phon	e:				
Project/Task I	lumber:	195122 10.11.08	Lab Contac	t:	Lee Ann He	eathcote/	MAL NO.	1	Wendy F	alencia/50	5-844-3132		Released by COC No.	
Service Order		CF01-18	Lab Destina	ation:	TAL-WS	Self-holde	at the sta	Send R	eport to SM	D:				✓ 4º Celsi
			Contract No	o.:	1636780	alleg log h	State P		Stephanie	Montaño/	505.284.255	3	Bill to: Sandia National Laboratorie	s (Accounts Payab
Tech Area:													P.O. Box 5800, MS-0154	
Building:		Room:	Operation	nal Site:									Albuquerque, NM 87185-0154	
Sample No	Fraction	Sample Lo	ocation Detail	Depth (ft)	Date	/Time	Sample	C	ontainer Volume	Preserv-	Collection Method	Sample	Parameter & Method	Lab
	Tuction	Cumpic Le	1 16 G	(14)	1.1.1		Indita	Type	Volume		metriod	Type		oumpre
103929	001	MWL-FB 5 3	1000160	NA	10/26/17	1048	UPN	S	6 L	None	G	FB	VOC (10-15)	
103930	001	MWL-SV05-50	34001126	50	10/26/17	1049	SG	S	6 L	None	G	SA	VOC (TO-15)	
103931	001	MWL-SV05-100	34000017	100	20/20/17	1051	SG	S	6 L	None	G	SA	VOC (TO-15)	
103932	001	MWL-SV05-200	7526	200	w/26/17	1055	SG	S	6 L	None	G	SA	VOC (TO-15)	
103933	001	MWL-SV05-300	34000170	300	10/26/17	1100	SG	S	6 L	None	G	SA	VOC (TO-15)	
103934	001	MWL-SV05-400	1015	400	20/26/17	1106	SG	S	6 L	None	G	SA	VOC (TO-15)	
												320-329	34 Chain of Custody	
Last Chain:		Ves		Sample	Tracking	北方的合理	SMO	Use	Special Ins	structions	QC Require	ements:	1 million	Cunditions on
Validation R	eq'd:	✓ Yes		Date En	tered:		Sign D		EDD		V Yes			Receipt
Background	:	Yes		Entered	by:	ART RESIDENT		is The	Turnaroun	d Time	7-Day*		15-Day* 🗹 30-Day	
Confirmator	y:	Yes		QC inits				ARREST	Negotiated	TAT				
Sample	N	ame	Signature	Init.	Compar	ny/Organiza	ation/Phor	ne/Cell	Sample Di	sposal	Return	to Client	Disposal by Lat	
Team	Thomas I	Evans A	mon his	TE	AIS/00641/5	505-284-08	04		Return Sar	nples By:				
Members	Chris Hul William G	liger	Tim Bill	818	AIS/00641/5	505-284-33 505-239-73	09/505-38 367/505-23	2-0353 39-7367	Comments forms.	Elevation	and ambien	t pressure	e information on attached	
	Robert Ly	nch Lal	tallha	Per	SNL/00641/	505-844-40	013/505-25	50-7090	1					
	Alfred Sa	ntillanes	lisatill	-00	SNL/00641/	505-284-68	370/505-22	28-0710	1					Lab Use
Relinquished b	Y WW	her De	hn Org060	// Date	10-27.1	7 Time O	906	Relinqui	ished by			Org.	Date	Time
Received by	10	Sect.	Org. 063	Date	10.27.1	Time (406	Receive	d by ·			Org.	Date	Time
elinquished b	YTG-	A	Org. 06	5 Date	10-27:	DTime	230	Relinqui	ished by			Org.	Date	Time
eceived by	-	utt	Org.	Date	11/02/1	2 Time	09:30	Receive	d by			Org.	Date	Time

Internal Lab														Page 1 of 1
Batch No.					SMO Use					<	5		AR/COC	618269
Project Name		MWL GWM / SVM	Date Sample	es Shipped	10-2	7-17	No. No.	SMO A	uthorization:	TO=	15	-	Waste Characterization	
Project/Task N	Aanager:	Timmie Jackson	Carrier/Wayb	oill No.	277	375.	2	SMO C	ontact Phon	e:				
Project/Task N	lumber;	195122.10.11.08	Lab Contact:		Lee Ann Hea	thcote/	fre Photos		Wendy F	alencia/50	5-844-3132		Released by COC No.	
Service Order		CF01-18	Lab Destinat	ion:	TAL-WS		ALT NO.	Send R	eport to SM	0:				✓ 4º Cels
			Contract No.	and the	1636780	120 36	and the]	Stephanie	Montaño/	505.284.255	i3	Bill to: Sandia National Laboratori	es (Accounts Payal
Tech Area:													P.O. Box 5800, MS-0154	
Building:		Room:	Operationa	al Site:									Albuquerque, NM 87185-0154	
	1			Depth	Date/1	Time	Sample	C	ontainer	Preserv-	Collection	Sample	Parameter & Metho	i Lab
Sample No.	Fraction	Sample Locatio	on Detail	(ft)	Collec	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample
103910	001	MWL-FB 1 340	01329	NA	10/26/17	1124	UPN	S	6 L	None	G	FB	VOC (TO-15)	
103911	001	MWL-SV01-42.5	8018	42.5	10/20/17	1139	SG	S	6 L	None	G	SA	VOC (TO-15)	
103912	001	MWI-SV01-425 3	4000 349	42.5	10/21/17	1139	SG	S	61	None	G	SA	VOC (TO-15)	
100012	1001		1000 2 11	12.0	1-4111	1.01				Home		U, I		Design of
												0-80 eres - 11-00		
)														
<u> </u>														ALC: NO
3														
									<u> </u>					
.														
last Chain'				Sample	Tracking	AREADA NO	SMO	lleo	Special Inc	structions		ements.		Conditions or
Validation R	ea'd:	V Yes		Date Ent	ered:		OMO	030	EDD	50 060013	V Yes	cificility,		Receipt
Background		Yes		Entered I	by:	2. S. R. Barry		H-14-	Turnaroun	d Time	7-Day*		15-Day* 🗹 30-Day	
Confirmator	y:	Yes		QC inits.		Section of	and the second	2-12-0	Negotiated	TAT				
Sample	N	ame Sig	nature	Init.	Company	//Organiza	tion/Phor	e/Cell	Sample Di	sposal	Return	to Client	Disposal by Lab	
Team	Thomas	Evans Three	60	TE	AIS/00641/50	05-284-080)4		Return Sar	nples By:				
Members	Chris Hu	lliger at	en l	CHO	AIS/00641/50)5-284-33(9/505-38	2-0353	Comments	Request	each sample	conister	is certified clean 72' 14/26/17	
	William G	Sibson Willer	wall	WA	SNL/00641/5	05-239-73	67/505-23	39-7367	Elevat	ion and	ambient	pressu	ue information on	
	Robert L	inch Kalt	zuch	PC	SNL/00641/5	05-844-40	13/505-2	50-7090	attack	hed form	s. Te "	126/17		1-1-1-
Polinguished h	Alfred Sa	ntillanes Huss	Ville	COST	SNL/00641/5	U5-284-68	70/505-22	28-0/10 Relingui	chod by			Ora	Data	Lab Use
Received by T	Sun	man querf	Org 6/2	Date	10.21.11	Time ()	10 I 95 I	Receive	d by			Org.	Date	Time
elinquished b	V	- CP	Org (0)	7 (Date	0. 27	InTime 17	330	Relinqui	shed by			Org.	Date	Time
Dessived by	18	Find	019.00	Date	11/02/11	Time /	10:20	Receive	d by			Org.	Date	Time

Internal Lab														Page 1 of 1
Batch No.					SMO Use								AR/COC	618270
Project Name	5	MWL GWM / SVM	Date S	Samples Shipped	10-2-2	- 17	Junitaria)	SMO A	uthorization	70-7	15		Waste Characterization	and a second product operation
Project/Task	Manager:	Timmie Jackson	Carrie	r/Waybill No.	2737	252	N 423 181 3	SMO C	ontact Phon	e:				
Project/Task	Number:	195122.10.11.08	Lab C	ontact:	Lee Ann He	athcote/			Wendy F	alencia/50	5-844-3132		Released by COC No.	
Service Order	ek. R	CF01-18	Lab D	estination:	TAL-WS	0.3455		Send R	eport to SM	0;				✓ 4º Celsi
		4	Contra	act No.:	1636780	Charles A	中国法	1	Stephanie	Montaño/	505 284 255	53	Bill to: Sandia National Laboratori	es (Accounts Payabl
Tech Area:													P.O. Box 5800, MS-0154	
Building:		Room:	Oper	ational Site:									Albuquerque, NM 87185-0154	
	T			Depth	Date/	Time	Sample	C	ontainer	Preserv-	Collection	Sample	Parameter & Metho	d Lab
Sample No.	Fraction	Sample Lo	ocation Detail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample
103913	001	MWL-FB 2 3	4000383	NA	10/26/17	1125	UPN	S	6 L	None	G	FB	VOC (TO-15)	
103914	001	MWL-SV02-41.5	34000 85	6 41.5	10/26/17	1148	SG	S	6 L	None	G	SA	VOC (TO-15)	
103915	001	MWL-SV02-41.5	8253	41.5	10/26/17	1148	SG	S	6 L	None	G	SA	VOC (TO-15)	
9 4 4	1													and the second
) 														
9 9 9														aleste.
														A CONTRACTOR OF A CONTRACTOR A CONTRA
				81-24 A		- 1999 - 1999 - 1999								
							1		1					
Last Chain:		Yes		Sample	Tracking	and Spectro	SMC	Use	Special In:	structions	QC Requir	ements:		Conditions on
Validation F	Req'd:	✓ Yes		Date Ent	tered:		C. A. P.		EDD		V Yes			Receipt
Background	1:	Yes		Entered	by:		State of the		Turnaroun	d Time	7-Day		15-Day* 🗹 30-Day	
Confirmator	y:	Yes		QC inits.	: 00-1820a20a	AN THE REAL		TURCO	Negotiated	TAT				
Sample	N	ame	Signature	Init.	Company	y/Organiza	ation/Phor	ne/Cell	Sample Di	sposal	Return	to Client	Disposal by Lab	
Team	Thomas	Evans Z	maker	TE	AIS/00641/5	05-284-08	04		Return Sar	nples By:				
Members	Chris Hu	liger CC	K an	2 CM	AIS/00641/5	05-284-33	09/505-38	2-0353	Comments	Elevation	and ambier	t pressur	e information on attached	
	William G	Bibson Mil	lienthe	NWA	SNL/00641/5	05-239-73	367/505-2	39-7367	forms.					
	Robert L	Inch Ral	FRACK	De	SNL/00641/5	05-844-40	013/505-2	50-7090]					
	Alfred Sa	ntillanes AP	25-til	De Ch	SNL/00641/5	05-284-68	370/505-22	28-0710						Lab Use
Relinguished b	y Wil	Men Sill	L Org.E	64 Date	10-271	7 Time C	1900	Relinqui	ished by			Org.	Date	Time
Received by	16-		- Org. (1.6.5.1 Date	10-27-1	Time (900	Receive	d by			Org.	Date	Time
Relinquished b	Y TO	- XIK	Org.	0651 Date	10:27.1	7Time	330	Relinqui	ished by			Org.	Date	Time
Received by	futt	-	Org.	Date	11-02-20	DTime 0	19:30	Receive	d by			Org.	Date	Time

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal	Lab													Page 1 of 1
Batch N	lo.					SMO Use							AR/COC	618271
Project	Name:		MWL GWM / SVM	Date Sample	es Shipped	10.27.17	No lo ha	SMO A	uthorization	B	1		Waste Characterization	
Project/	Task M	anager:	Timmie Jackson	Carrier/Wayt	bill No.	773752	AN ANTAN	SMO C	ontact Phon	ie:				
Project/	Task N	umber:	195122.10.11.08	Lab Contact		Lee Ann Heathcote/	C. Strate		Wendy F	alencia/50	5-844-3132		Released by COC No.	
Service	Order:		CF01-18	Lab Destinat	ion:	TAL-WS	and the second	Send R	eport to SM	0:				✓ 4º Celsiu
				Contract No.		1636780		1	Stephanie	Montaño/	505.284.255	i3	Bill to: Sandia National Laboratori	es (Accounts Payable
Tech Ar	rea:												P.O. Box 5800, MS-0154	
Building	g:	-	Room:	Operation	al Site:								Albuquerque, NM 87185-0154	
		1			Depth	Date/Time	Sample	C	ontainer	Preserv-	Collection	Sample	Parameter & Metho	Lab
Sample	No.	Fraction	Sample Lo	cation Detail	(ft)	Collected	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample
1039	916	001	MWL-FB 3 34	100 2027	NA	10/26/17 0824	UPN	S	6 L	None	G	FB	VOC (TO-15)	
1039	917	001	MWL-SV03-50	7835	50	10/26/17 0912	SG	S	6 L	None	G	SA	VOC (TO-15)	
8 1039	918	001	MWL-SV03-100	34000113	100	10/26/17 0916	SG	S	6 L	None	G	SA	VOC (TO-15)	
1039	919	001	MWL-SV03-200	34000 1274	200	10/26/17 0920	SG	S	6 L	None	G	SA	VOC (TO-15)	
र्म 1039	920	001	MWL-SV03-300	34000 168	300	10/26/17 0924	SG	s	6 L	None	G	SA	VOC (TO-15)	
1039	921	001	MWL-SV03-400	7521	400	10/26/17 0943	SG	s	6 L	None	G	SA	VOC (TO-15)	
223						1	1							新建筑
-														
													COLUMN DESIGNATION AND	
										1				14104
Last Ch	hain:		T Yes		Sample	Tracking	SMC) Use	Special In	structions	QC Requir	ements:		Conditions on
Validat	ion Re	d'd.	V Yes	and the second second	Date Ent	ered.			EDD		V Yes			Receipt
Backor	ound		Ves		Entered	by:	QHY CON	a Veralitati	Turnarour	nd Time	7-Day		15-Dav*	
Confirm	natory	<i>r</i> :	Ves		OC inits		A COLL		Negotiated	TAT	Π			
Sam	ple	N	ame	Signature	Init.	Company/Organiza	ation/Phor	ne/Cell	Sample Di	sposal	Return	to Client	Disposal by Lab	
Tea	m	Thomas	Evans The	more from	TE	AIS/00641/505-284-08	04		Return Sa	mples By:				
Momh	are	Chris Hu	liger	200	CI	AIS/00641/505-284-33	09/505-38	32-0353	Comments	Elevation	and ambier	nt pressur	e information on attached	
Went		William G	Sibson Will	in while	WAR	SNL/00641/505-239-73	367/505-23	39-7367	forms.					
1	1	Robert Ly	Inch The	Huch	PU	SNL/00641/505-844-40	013/505-2	50-7090						
		Alfred Sa	ntillanes	1. Salilla	-06	SNL/00641/505-284-68	870/505-2	28-0710	1					Lab Use
Relinquis	shed by	Wil	tun All	2 Org0641	/ Date	10-27-17 Time 0	910	Relinqu	ished by			Org.	Date	Time
Received	d by			Org. 06 7	Date	10.27.17 Time 0	palo	Receive	d by			Org.	Date	Time
Relinquis	shed by	TO	-2-	Org. 063	\ Date	10:27.17 Time 1	304	Relinqu	ished by			Org.	Date	Time
Received	d by	10	fun	Org.	Date	11-02-17 Time &	19:30	Receive	d by			Org.	Date	Time

Internal Lab														Page 1 of 1
Batch No.					SMO Use								AR/COC	618272
Project Name:		MWL GWM / SVM	Date Sam	ples Shipped	1: 10.2	7.1	7	SMO A	uthorization	Te	6a	\supset	Waste Characterization	
Project/Task N	lanager:	Timmie Jackson	Carrier/Wa	aybill No.	273	752	Note Starting	SMO C	ontact Phon	e:			RMA	
Project/Task N	lumber:	195122.10.11.08	Lab Conta	ct:	Lee Ann He	athcote/			Wendy P	alencia/50	5-844-3132		Released by COC No.	
Service Order		CF01-18	Lab Destir	nation:	TAL-WS			Send R	eport to SM	0:				✓ 4º Celsi
			Contract N	lo.:	1636780	- Alerrane			Stephanie	Montaño/	505.284.255	i3	Bill to: Sandia National Laboratori	es (Accounts Payat
Tech Area:													P.O. Box 5800, MS-0154	
Building:		Room:	Operatio	nal Site:									Albuquerque, NM 87185-0154	
Sample No.	Fraction	Sample Lo	ocation Detail	Depth (ft)	Date/ Colle	Time	Sample Matrix	C Type	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Metho Requested	i Lab Sample
103922	001	MWL-FB4 3	4000171	NA	10/26/17	1004	UPN	S	6 L	None	G	FB	VOC (TO-15)	
103923	001	MWL-SV04-50	34000797	50	10/26/17	1012	SG	S	6 L	None	G	SA	VOC (TO-15)	and the
103924	001	MWL-SV04-100	34001452	100	10/26/17	1014	SG	S	6 L	None	G	SA	VOC (TO-15)	
103925	001	MWL-SV04-200	34000128	200	10/26/17	1019	SG	S	6 L	None	G	SA	VOC (TO-15)	
103926	001	MWL-SV04-300	7758	300	10/26/17	1023	SG	S	6 L	None	G	SA	VOC (TO-15)	
103927	001	MWL-SV04-400	34000517	400	10/26/17	1029	SG	S	6 L	None	G	SA	VOC (TO-15)	
3						*****								
Last Chain:	og'd:	Yes		Sample	Tracking		SMO	Use	Special Ins	structions	/QC Requir	ements:		Conditions or Receipt
Background		Vac		Entorod	bu:	Land of the	reitaise direct	ALL STREET	Turnaroun	d Time	TZ-Dav	- 17	15-Day* V 30-Day	neocipi
Confirmator	· /·			OC inite					Negotiater		\square			
Sample	N.	ame	Signature	Init.	Compar	v/Organiza	ation/Phor	e/Cell	Sample Di	sposal	Return	to Client	Disposal by Lab	
Team	Thomas	Evans 7	mahar	78	AIS/00641/5	505-284-08	04		Return Sar	nples By:				
Members	Chris Hul	liger	Ran	Cla	AIS/00641/5	505-284-33	09/505-38	2-0353	Comments	Elevation	and ambier	nt pressur	e information on attached	
membero	William G	Sibson WW	leenthelp	WAS	SNL/00641/	505-239-73	367/505-23	39-7367	forms.					
	Robert Ly	Inch Rol	tanch	pl and	SNL/00641/	505-844-40	013/505-2	50-7090 28-0710						Lab Use
Relinguished h	v Ali	Aller Aller	Orable	4/ Date	10.22	1 7Time /	YUN7	Relingu	I ished by			Org	Date	Time
Received by	1 -	2 Here	Ora ALZ	1 Date	10.17.1) Time c	MGF7	Receive	ed by			Ora	Date	Time
Relinguished b	V THE	6		3) Date	10.27	Time 1	2:40	Relingu	ished by			Org.	Date	Time
Received by	10	fund	Ora	Date	1-02	Time	29:30	Receive	d by			Ora	Date	Time

REVISED

AOP 95-16

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab														F	age 1 of	1
Batch No					SMO Use									AR/COC	618	269
Project Name	2	MW/ GWM/SVM	Date Samek	as Shipped	No. Contraction of			SMO A	uthorization	TO	R		Wast	e Characterization		_
Project/Task I	Manager	Timmie Jackson	Carrier/Wav	bill No		CAN DE T	2.11.15	SMO C	ontact Phon	e.						
Project/Task I	Number	195122 10 11 08	Lab Contact		Lee Ann Hea	athcote/	Sale Service	1	Wendy F	alencia/50	5-844-3132		Rele	ased by COC No.		
Service Order		CE01-18	Lab Destinat	tion:	TAL-WS		CHERNES IN	Send R	eport to SM	0:					V 4	Celsius
			Contract No		1636780		and the off	1	Stephanie	Montaño/	505 284 255	3	Bill to Sand	ia National Laboratorie	s (Accoun	(s Pavable)
Tech Area:	*****	tering and the statements and the second											PO Box 58	00 MS-0154		1
Building		Room:	Operation	al Site:									Albuquetour	NM 87185-0154		
Dunding.	1	Noom.	operation	Denth	Date/	Time	Sample	C	ontainer	Drécary	Collection	Sample	Pa	rameter & Method	1	Lab
Sample No.	Fraction	Sample Location	Detail	(ft)	Colle	cted	Matrix	Type	Volume	ative	Method	Type		Requested		Sample II
103910	001	MWL-FB 1 3400	1329	NA	10/26/17	1124	UPN	S	6 L	None	G	FB	VOC (TO-	15)		A TAR
103911	001	MWL-SV01-42.5	018	42.5	10/21/17	1139	SG	S	6 L	None	G	SA	VOC (TO-	15)		
102012	001	MANA SWOT ADE 31	1000 349	42 5	10/2/12	1129	00	c	61	Mana	G	01	VOC (TO-	15)		S. 68. (1)
103912	1001	WWL-SV01-42.5 J	1000 5-11	42.5	100111	1137	00	0	0 L	None		BU	-1			
													74			
							1		+							
												_				
										l				in an inclusion of the second		
				1												40.533
															AC SECTION OF	
							1									
Last Chain:				Sample	Tracking	the second	SMC	Use	Special In	structions	QC Requir	ements:			Condit	tions on
Validation B	en'd	V Yes		Date En	ered				EDD		V Yes				Ret	ceipt
Background	1:	1 Yes		Entered	by:				Turnaroun	d Time	7-Day		15-Day	⊻ 30-Day		
Confirmator	v:	Ves Ves		OC inits	and the second second	L. S. Mar		5173-5	Negotiated	TAT	<u> </u>					
Sample	N N	ame Sign	ature	Init	Company	v/Organiza	ation/Phor	ne/Cell	Sample Di	sposal	Return	to Client		Disposal by Lat		1.5
Team	Thomas	Evans There	60	TE	AIS/00641/50	05-284-08	04		Return Sa	mples By:						
Members	Chris Hu	lliger	22	Cito	AIS/00641/50	05-284-33	09/505-38	32-0353	Comments	Request	ach sample	oonister	is certified	cleam 72" 14/26/17	, en est	
Members	William C	Sibson Willing	Dalla	WYN	SNL/00641/5	05-239-73	367/505-2	39-7367	Plevat	ion and	ambient	pressu	se infor	mation on	The set of	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
	Robert L	ynch Ealt	ach	PET	SNL/00641/5	05-844-40	013/505-2	50-7090	6 the	had for	5. 771	olalin				
	Alfred Sa	intillanes AMLS	Title	Cost	SNL/00641/5	05-284-68	370/505-2	28-0710	~			/		1	Lab	Use
Relinquished t	y WW	them Bill	Org. 064	// Date	10-27-17) Time ()	901	Relinqui	ished by			Org.		Date	Time	
Received by 7	2		Org 663	1 Date	10.27.1) Time o	951	Receive	d by			Org		Date	Time	
Relinquished b	ed by Org. Date Time					Relinqui	ished by			Org.		Date	Time			
Received by			Ora.	Date		Time		Receive	d by			Org		Date	Time	

11/30/2017

SMO 2012-ARCOC (4-2012)

REVISED

AOP 95-16

Page 1 of 1

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No							SMO Use										AR/COC	61	8270
Project Name	9	MW	L GWM / SVM	1	Date Sample	es Shipped	0.2.8.8.6.08		RANGER ST	SMO A	uthorization:	107	X			Waste Cha	aracterization		
Project/Task	Manager.	Tim	mie Jackson		Carrier/Way	bill No.		Lan States		SMO C	ontact Phon	e				RMA			
Project/Task	Number.	195	122.10.11.08		Lab Contact		Lee Ann He	athcote/	S Statuture		Wendy F	alencia/50	05-844-3132	2	IT	Released I	by COC No.		
Service Order		CFC	1-18		Lab Destinal	lion:	TAL-WS		astrone and	Send R	Report to SM	0.			1			24	Celsius
			i and in the second second		Contract No		1636780	Menuel S-1			Stephanie	Montaño/	505 284 25	53	Bill to	Sandia Nal	tional Laboratorie	s (Accou	nts Payable),
Tech Area:			the second second		-										PO	Box 5800, M	S-0154		
Building		Roc	m.		Operation	al Site:									Albuc	uerque NM	87185-0154		
Sample No.	Fraction	1	Sample L	ocation [Detail	Depth (ft)	Date/ Colle	Time cted	Sample Matrix	C Type	ontainer Volume	Preserv- ative	Collection Method	Sample Type		Parame	eter & Method equested		Lab Sample ID
103913	001	MM	1-FR 2 3	4000	383	NA	10/26/17	1125	UPN	S	61	None	G	FB	voc	(TO-15)			
103914	001	MW	1-SV02-41 5	3400	0856	41.5	10/26/17	1148	SG	S	61	None	G	SA	voc	(TO-15)			
103015	001	1.410	A SV02 41 5	82	53	41.5	10/26/17	1148	SG	S	61	None G SA VOC (TO-15)							
105515	001	10101	12-3702-41.0		••	41.0	7.0111					DU	-	1					
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	-	+					-		1		-		1		1				100
	1														1				
Last Chain:		П	Yes		6	Sample	Tracking		SMC	Use	Special In:	structions	QC Requi	rements:	L		12	Cond	itions on
Validation F	Rea'd:	নি	Yes			Date En	tered				EDD		V Yes					Re	ceipt
Background	1:	Ē	Yes			Entered	by:			1.	Turnaroun	d Time	7-Day	· 🗆	15-D	ay.	⊻ 30-Day		
Confirmato	rv:	Ē	Yes			QC inits	En la de la la	A STREET		AND THE REAL	Negotiated	TAT					0	-dario	
Sample	1 1	lame		Signat	ure	Init.	Compan	v/Organiz	ation/Phor	ne/Cell	Sample Di	sposal	Return	to Client		V Dis	sposal by Lat		
Team	Thomas	Evan	s D	mark		TE	AIS/00641/5	05-284-08	304		Return Sa	mples By:							The state of
Mombors	Chris Hu	illiger	CC	ex (00	CIA	AIS/00641/5	05-284-33	09/505-38	32-0353	Comments	Elevation	and ambier	nt pressur	e info	mation on	attached		17-21
Members	William (Gibso	n VATA	tin	Allen	INS.	SNL/00641/5	505-239-7	367/505-2	39-7367	forms.								100
	Robert L	ynch	Las	ITA	an	De	SNL/00641/5	505-844-4	013/505-2	50-7090	8								
	Alfred Sa	antilla	nes Al	43	tilla	100	SNL/00641/5	505-284-6	870/505-2	28-0710								Lal	o Use
Relinguished I	y Wu	the	uspill	F	Org 664	/ Date	10-271	7 Time (2400	Relinqu	ished by			Org.		Date	е	Time	
Received by	TE-				Org. () 53) Date	11-27-1	7 Time (2900	Receive	ed by			Org.		Dat	e	Time	
Relinguished I	ру				Org.	Date	0 0	Time		Relinqu	ished by			Org.		Date	e	Time	
Received by	Induished by Org. Date Time					Receive	ed by			Org.		Date	e	Time					

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11/30/2017

CONTRACT VERIFICATION REVIEW FORMS

AR/COC Number	Sample Type
618268	Environmental*
618269	Environmental*
618270	Environmental*
618271	Environmental*
618272	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. 618268, 618269, 618270, 618271 & 618272

Analytical Lab TAL-WS

SDG No. 320-32934-1

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

2.0 Analytical Laboratory Report

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

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	Х		
3.2	Quantitation limit met for all samples	Х		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	Х		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	Х		
	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	Х		

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		Х	Acetone and benzene detected in MWL-FB5. Benzene and methylene chloride detected in MWL-FB1. Acetone, benzene, tetrachloroethene and toluene detected in MWL-FB2. Acetone, benzene, chloromethane, tetrachloroethene, toluene and trichloroethene detected in MWL-FB3. Benzene, methylene chloride, tetrachloroethene and trichloroethene detected in MWL-FB4.
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	Х		
3.7	Narrative addresses planchet flaming for gross alpha/beta	N/A		
3.8	Narrative included, correct, and complete	Х		
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	Х		
Line No.	Item	Yes	No	Comments
-------------	--	-----	----	----------
	b) Initial calibration provided	Х		
	c) Continuing calibration provided	Х		
	d) Internal standard performance data provided	Х		
	e) Instrument run logs provided	Х		
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) lon 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	lf 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? O Yes O No		
Based on the review, this data package is complete	. © Yes O No	
Reviewed by: Wendy Palencia Date: 12-01-2017 09	:53:00	
Closed by: Wendy Palencia Date: 12-01-2017 09:53	3:00	

SOIL-VAPOR SAMPLING RESULTS

CERTIFICATES OF ANALYSIS

Mixed Waste Landfill

April 2017-March 2018 Reporting Period

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

MAY 2017 SOIL-VAPOR SAMPLING RESULTS

CERTIFICATES OF ANALYSIS

Client Sample ID: 102462-001/MWL-SV-FB3 Date Collected: 05/30/17 08:26 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			06/15/17 19:03	1
Benzene	0.081	J	0.40	0.079	ppb v/v			06/15/17 19:03	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			06/15/17 19:03	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			06/15/17 19:03	1
Bromoform	ND		0.40	0.070	ppb v/v			06/15/17 19:03	1
Bromomethane	ND		0.80	0.34	ppb v/v			06/15/17 19:03	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			06/15/17 19:03	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			06/15/17 19:03	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			06/15/17 19:03	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			06/15/17 19:03	1
Chloroethane	ND		0.80	0.31	ppb v/v			06/15/17 19:03	1
Chloroform	ND		0.30	0.095	ppb v/v			06/15/17 19:03	1
Chloromethane	ND		0.80	0.20	ppb v/v			06/15/17 19:03	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			06/15/17 19:03	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			06/15/17 19:03	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			06/15/17 19:03	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			06/15/17 19:03	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			06/15/17 19:03	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			06/15/17 19:03	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			06/15/17 19:03	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			06/15/17 19:03	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			06/15/17 19:03	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			06/15/17 19:03	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			06/15/17 19:03	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			06/15/17 19:03	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			06/15/17 19:03	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			06/15/17 19:03	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			06/15/17 19:03	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			06/15/17 19:03	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			06/15/17 19:03	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			06/15/17 19:03	1
2-Hexanone	ND	*	0.40	0.087	ppb v/v			06/15/17 19:03	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			06/15/17 19:03	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			06/15/17 19:03	1
Styrene	ND		0.40	0.059	ppb v/v			06/15/17 19:03	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			06/15/17 19:03	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			06/15/17 19:03	1
Toluene	ND		0.40	0.051	ppb v/v			06/15/17 19:03	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			06/15/17 19:03	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			06/15/17 19:03	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			06/15/17 19:03	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			06/15/17 19:03	1
Trichloroethene	ND		0.40	0.11	ppb v/v			06/15/17 19:03	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			06/15/17 19:03	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			06/15/17 19:03	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			06/15/17 19:03	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			06/15/17 19:03	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			06/15/17 19:03	1

Lab Sample ID: 320-28713-1 Matrix: Air

Client Sample ID: 102462-001/MWL-SV-FB3 Date Collected: 05/30/17 08:26 Date Received: 06/06/17 10:20

Lab Sample ID: 320-28713-1 Matrix: Air

Sample Container: Summa Canister 6L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		0.80	0.10	ppb v/v			06/15/17 19:03	1
o-Xylene	ND		0.40	0.054	ppb v/v			06/15/17 19:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	126		70 - 130					06/15/17 19:03	1
1,2-Dichloroethane-d4 (Surr)	115		70 - 130					06/15/17 19:03	1
Toluono de (Surr)	100		70 130					06/15/17 10:03	1

Client Sample ID: 102463-001/MWL-SV03-50 Date Collected: 05/30/17 08:51 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-2 Matrix: Air

Method: TO-15 - Volatile Organ Analyte	nic Compo Result	u <mark>nds in Am</mark> l Qualifier	b ient Air RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	8.5	J	9.3	0.33	ppb v/v			06/15/17 19:57	1.85
Benzene	0.44	J	0.74	0.15	ppb v/v			06/15/17 19:57	1.85
Benzyl chloride	ND		1.5	0.30	ppb v/v			06/15/17 19:57	1.85
Bromodichloromethane	ND		0.56	0.12	ppb v/v			06/15/17 19:57	1.85
Bromoform	ND		0.74	0.13	ppb v/v			06/15/17 19:57	1.85
Bromomethane	ND		1.5	0.62	ppb v/v			06/15/17 19:57	1.85
2-Butanone (MEK)	0.63	J	1.5	0.37	ppb v/v			06/15/17 19:57	1.85
Carbon disulfide	ND		1.5	0.14	ppb v/v			06/15/17 19:57	1.85
Carbon tetrachloride	0.26	J	1.5	0.12	ppb v/v			06/15/17 19:57	1.85
Chlorobenzene	ND		0.56	0.12	ppb v/v			06/15/17 19:57	1.85
Chloroethane	ND		1.5	0.57	ppb v/v			06/15/17 19:57	1.85
Chloroform	1.6		0.56	0.18	ppb v/v			06/15/17 19:57	1.85
Chloromethane	ND		1.5	0.36	ppb v/v			06/15/17 19:57	1.85
Dibromochloromethane	ND		0.74	0.15	ppb v/v			06/15/17 19:57	1.85
1,2-Dibromoethane (EDB)	ND		1.5	0.14	ppb v/v			06/15/17 19:57	1.85
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.74	0.29	ppb v/v			06/15/17 19:57	1.85
1,2-Dichlorobenzene	ND		0.74	0.24	ppb v/v			06/15/17 19:57	1.85
1,3-Dichlorobenzene	ND		0.74	0.20	ppb v/v			06/15/17 19:57	1.85
1,4-Dichlorobenzene	ND		0.74	0.28	ppb v/v			06/15/17 19:57	1.85
Dichlorodifluoromethane	19		0.74	0.27	ppb v/v			06/15/17 19:57	1.85
1,1-Dichloroethane	3.1		0.56	0.13	ppb v/v			06/15/17 19:57	1.85
1,2-Dichloroethane	ND		1.5	0.16	ppb v/v			06/15/17 19:57	1.85
1,1-Dichloroethene	12		1.5	0.24	ppb v/v			06/15/17 19:57	1.85
cis-1,2-Dichloroethene	1.8		0.74	0.16	ppb v/v			06/15/17 19:57	1.85
trans-1,2-Dichloroethene	ND		0.74	0.19	ppb v/v			06/15/17 19:57	1.85
1,2-Dichloropropane	ND		0.74	0.44	ppb v/v			06/15/17 19:57	1.85
cis-1,3-Dichloropropene	ND		0.74	0.19	ppb v/v			06/15/17 19:57	1.85
trans-1,3-Dichloropropene	ND		0.74	0.16	ppb v/v			06/15/17 19:57	1.85
Ethylbenzene	ND		0.74	0.12	ppb v/v			06/15/17 19:57	1.85
4-Ethyltoluene	ND		0.74	0.35	ppb v/v			06/15/17 19:57	1.85
Hexachlorobutadiene	ND		3.7	0.80	ppb v/v			06/15/17 19:57	1.85
2-Hexanone	ND	*	0.74	0.16	ppb v/v			06/15/17 19:57	1.85
4-Methyl-2-pentanone (MIBK)	ND		0.74	0.25	ppb v/v			06/15/17 19:57	1.85
Methylene Chloride	0.81		0.74	0.13	ppb v/v			06/15/17 19:57	1.85

Client Sample ID: 102463-001/MWL-SV03-50 Date Collected: 05/30/17 08:51

Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Orga	nic Compo	unds in Ar	nbient Air (C	ontinue	d)				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		0.74	0.11	ppb v/v			06/15/17 19:57	1.85
1,1,2,2-Tetrachloroethane	ND		0.74	0.13	ppb v/v			06/15/17 19:57	1.85
Tetrachloroethene	100		0.74	0.094	ppb v/v			06/15/17 19:57	1.85
Toluene	ND		0.74	0.094	ppb v/v			06/15/17 19:57	1.85
1,1,2-Trichloro-1,2,2-trifluoroetha	72		0.74	0.30	ppb v/v			06/15/17 19:57	1.85
ne									
1,2,4-Trichlorobenzene	ND		3.7	0.80	ppb v/v			06/15/17 19:57	1.85
1,1,1-Trichloroethane	3.9		0.56	0.12	ppb v/v			06/15/17 19:57	1.85
1,1,2-Trichloroethane	ND		0.74	0.12	ppb v/v			06/15/17 19:57	1.85
Trichloroethene	98		0.74	0.19	ppb v/v			06/15/17 19:57	1.85
Trichlorofluoromethane	27		0.74	0.36	ppb v/v			06/15/17 19:57	1.85
1,2,4-Trimethylbenzene	ND		1.5	0.30	ppb v/v			06/15/17 19:57	1.85
1,3,5-Trimethylbenzene	ND		0.74	0.23	ppb v/v			06/15/17 19:57	1.85
Vinyl acetate	ND		1.5	0.27	ppb v/v			06/15/17 19:57	1.85
Vinyl chloride	ND		0.74	0.22	ppb v/v			06/15/17 19:57	1.85
m,p-Xylene	ND		1.5	0.19	ppb v/v			06/15/17 19:57	1.85
o-Xylene	ND		0.74	0.10	ppb v/v			06/15/17 19:57	1.85
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	123		70 - 130					06/15/17 19:57	1.85
1,2-Dichloroethane-d4 (Surr)	114		70 - 130					06/15/17 19:57	1.85
Toluene-d8 (Surr)	122		70 - 130					06/15/17 19:57	1.85

Client Sample ID: 102464-001/MWL-SV03-100 Date Collected: 05/30/17 08:55 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organ	ic Compo	unds in Aml	bient Air						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	4.7	J	14	0.49	ppb v/v			06/15/17 20:51	2.74
Benzene	0.22	J	1.1	0.22	ppb v/v			06/15/17 20:51	2.74
Benzyl chloride	ND		2.2	0.45	ppb v/v			06/15/17 20:51	2.74
Bromodichloromethane	ND		0.82	0.18	ppb v/v			06/15/17 20:51	2.74
Bromoform	ND		1.1	0.19	ppb v/v			06/15/17 20:51	2.74
Bromomethane	ND		2.2	0.92	ppb v/v			06/15/17 20:51	2.74
2-Butanone (MEK)	0.66	J	2.2	0.55	ppb v/v			06/15/17 20:51	2.74
Carbon disulfide	ND		2.2	0.21	ppb v/v			06/15/17 20:51	2.74
Carbon tetrachloride	0.40	J	2.2	0.18	ppb v/v			06/15/17 20:51	2.74
Chlorobenzene	ND		0.82	0.18	ppb v/v			06/15/17 20:51	2.74
Chloroethane	ND		2.2	0.84	ppb v/v			06/15/17 20:51	2.74
Chloroform	2.3		0.82	0.26	ppb v/v			06/15/17 20:51	2.74
Chloromethane	ND		2.2	0.54	ppb v/v			06/15/17 20:51	2.74
Dibromochloromethane	ND		1.1	0.22	ppb v/v			06/15/17 20:51	2.74
1,2-Dibromoethane (EDB)	ND		2.2	0.21	ppb v/v			06/15/17 20:51	2.74
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.1	0.42	ppb v/v			06/15/17 20:51	2.74
1,2-Dichlorobenzene	ND		1.1	0.36	ppb v/v			06/15/17 20:51	2.74
1,3-Dichlorobenzene	ND		1.1	0.30	ppb v/v			06/15/17 20:51	2.74
1,4-Dichlorobenzene	ND		1.1	0.41	ppb v/v			06/15/17 20:51	2.74

Lab Sample ID: 320-28713-3

Matrix: Air

TestAmerica Job ID: 320-28713-1

Lab Sample ID: 320-28713-2 Matrix: Air

Client Sample ID: 102464-001/MWL-SV03-100

Date Collected: 05/30/17 08:55 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Orga	nic Compo	unds in Ar	nbient Air (Co	ontinue	d)				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	39		1.1	0.40	ppb v/v			06/15/17 20:51	2.74
1,1-Dichloroethane	5.7		0.82	0.20	ppb v/v			06/15/17 20:51	2.74
1,2-Dichloroethane	ND		2.2	0.24	ppb v/v			06/15/17 20:51	2.74
1,1-Dichloroethene	23		2.2	0.35	ppb v/v			06/15/17 20:51	2.74
cis-1,2-Dichloroethene	3.4		1.1	0.24	ppb v/v			06/15/17 20:51	2.74
trans-1,2-Dichloroethene	ND		1.1	0.27	ppb v/v			06/15/17 20:51	2.74
1,2-Dichloropropane	ND		1.1	0.66	ppb v/v			06/15/17 20:51	2.74
cis-1,3-Dichloropropene	ND		1.1	0.28	ppb v/v			06/15/17 20:51	2.74
trans-1,3-Dichloropropene	ND		1.1	0.24	ppb v/v			06/15/17 20:51	2.74
Ethylbenzene	ND		1.1	0.17	ppb v/v			06/15/17 20:51	2.74
4-Ethyltoluene	ND		1.1	0.51	ppb v/v			06/15/17 20:51	2.74
Hexachlorobutadiene	ND		5.5	1.2	ppb v/v			06/15/17 20:51	2.74
2-Hexanone	ND	*	1.1	0.24	ppb v/v			06/15/17 20:51	2.74
4-Methyl-2-pentanone (MIBK)	ND		1.1	0.37	ppb v/v			06/15/17 20:51	2.74
Methylene Chloride	1.7		1.1	0.20	ppb v/v			06/15/17 20:51	2.74
Styrene	ND		1.1	0.16	ppb v/v			06/15/17 20:51	2.74
1,1,2,2-Tetrachloroethane	ND		1.1	0.19	ppb v/v			06/15/17 20:51	2.74
Tetrachloroethene	160		1.1	0.14	ppb v/v			06/15/17 20:51	2.74
Toluene	ND		1.1	0.14	ppb v/v			06/15/17 20:51	2.74
1,1,2-Trichloro-1,2,2-trifluoroetha	120		1.1	0.45	ppb v/v			06/15/17 20:51	2.74
ne									
1,2,4-Trichlorobenzene	ND		5.5	1.2	ppb v/v			06/15/17 20:51	2.74
1,1,1-Trichloroethane	4.8		0.82	0.18	ppb v/v			06/15/17 20:51	2.74
1,1,2-Trichloroethane	ND		1.1	0.18	ppb v/v			06/15/17 20:51	2.74
Trichlorofluoromethane	38		1.1	0.54	ppb v/v			06/15/17 20:51	2.74
1,2,4-Trimethylbenzene	ND		2.2	0.44	ppb v/v			06/15/17 20:51	2.74
1,3,5-Trimethylbenzene	ND		1.1	0.34	ppb v/v			06/15/17 20:51	2.74
Vinyl acetate	ND		2.2	0.40	ppb v/v			06/15/17 20:51	2.74
Vinyl chloride	ND		1.1	0.33	ppb v/v			06/15/17 20:51	2.74
m,p-Xylene	ND		2.2	0.27	ppb v/v			06/15/17 20:51	2.74
o-Xylene	ND		1.1	0.15	ppb v/v			06/15/17 20:51	2.74
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	124		70 - 130					06/15/17 20:51	2.74
1,2-Dichloroethane-d4 (Surr)	113		70 - 130					06/15/17 20:51	2.74
Toluene-d8 (Surr)	121		70 - 130					06/15/17 20:51	2.74

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	130		1.3	0.35	ppb v/v			06/21/17 19:05	3.33
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130					06/21/17 19:05	3.33
1,2-Dichloroethane-d4 (Surr)	104		70 - 130					06/21/17 19:05	3.33
Toluene-d8 (Surr)	105		70 - 130					06/21/17 19:05	3.33

Lab Sample ID: 320-28713-3 Matrix: Air

Client Sample ID: 102465-001/MWL-SV03-200

Date Collected: 05/30/17 09:00 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air Result Qualifier MDL Unit D Prepared Analyzed Dil Fac Analyte RL 19 J 0.66 ppb v/v 06/15/17 21:44 37 Acetone 5.4 0.29 1.5 0.29 3.7 **Benzene** J ppb v/v 06/15/17 21:44 ND 3.0 Benzyl chloride 0.60 ppb v/v 06/15/17 21:44 3.7 Bromodichloromethane ND 1.1 0.24 v/v dag 06/15/17 21:44 3.7 ND 0.26 ppb v/v Bromoform 1.5 06/15/17 21:44 3.7 Bromomethane ND 3.0 1.2 ppb v/v 06/15/17 21:44 3.7 2-Butanone (MEK) ND 3.0 0.74 ppb v/v 06/15/17 21:44 3.7 0.29 ppb v/v Carbon disulfide ND 3.0 06/15/17 21:44 37 3.0 0.24 ppb v/v 06/15/17 21:44 3.7 Carbon tetrachloride 0.53 .1 Chlorobenzene ND 1.1 0.24 ppb v/v 06/15/17 21:44 37 Chloroethane ND 3.0 1.1 ppb v/v 06/15/17 21.44 37 0.35 ppb v/v 06/15/17 21:44 37 Chloroform 2.5 1.1 Chloromethane ND 3.0 0.73 ppb v/v 06/15/17 21:44 37 Dibromochloromethane ND 0.29 ppb v/v 1.5 06/15/17 21:44 3.7 1,2-Dibromoethane (EDB) ND 3.0 0.28 ppb v/v 06/15/17 21:44 3.7 ND 1,2-Dichloro-1,1,2,2-tetrafluoroethane 1.5 0.57 ppb v/v 06/15/17 21:44 37 1.2-Dichlorobenzene ND 1.5 0.48 ppb v/v 06/15/17 21:44 3.7 1,3-Dichlorobenzene ND 1.5 0.41 ppb v/v 06/15/17 21:44 3.7 1.4-Dichlorobenzene ND 1.5 0.55 ppb v/v 06/15/17 21.44 37 1.5 0.54 ppb v/v 06/15/17 21:44 3.7 Dichlorodifluoromethane 51 0.27 ppb v/v 11 06/15/17 21.44 37 1,1-Dichloroethane 7.9 ND 3.0 0.33 ppb v/v 06/15/17 21:44 1,2-Dichloroethane 37 3.0 1,1-Dichloroethene 33 0.48 ppb v/v 06/15/17 21:44 37 cis-1.2-Dichloroethene 5.0 1.5 0.33 ppb v/v 06/15/17 21:44 37 trans-1,2-Dichloroethene ND 1.5 0.37 ppb v/v 06/15/17 21:44 3.7 ND 1.5 0.89 ppb v/v 06/15/17 21:44 37 1,2-Dichloropropane cis-1,3-Dichloropropene ND 1.5 0.38 ppb v/v 06/15/17 21:44 3.7 ND trans-1,3-Dichloropropene 1.5 0.33 ppb v/v 06/15/17 21:44 3.7 Ethylbenzene ND 1.5 0.23 ppb v/v 06/15/17 21:44 3.7 ND 0.69 ppb v/v 4-Ethyltoluene 1.5 06/15/17 21:44 3.7 Hexachlorobutadiene ND 7.4 1.6 ppb v/v 06/15/17 21:44 3.7 ND 2-Hexanone 1.5 0.32 ppb v/v 06/15/17 21:44 3.7 4-Methyl-2-pentanone (MIBK) ND 1.5 0.50 ppb v/v 06/15/17 21:44 3.7 3.4 1.5 0.27 ppb v/v 06/15/17 21:44 3.7 **Methylene Chloride** ND 1.5 06/15/17 21:44 3.7 Styrene 0.22 ppb v/v 1,1,2,2-Tetrachloroethane ND 1.5 0.26 ppb v/v 06/15/17 21:44 3.7 210 1.5 0.19 ppb v/v 37 **Tetrachloroethene** 06/15/17 21:44 **Toluene** 0.62 .1 1.5 0.19 ppb v/v 06/15/17 21:44 3.7 1.5 0.60 ppb v/v 06/15/17 21:44 3.7 1,1,2-Trichloro-1,2,2-trifluoroetha 170 ne ND 74 06/15/17 21:44 37 1,2,4-Trichlorobenzene 1.6 ppb v/v 1,1,1-Trichloroethane 3.2 1.1 0.24 ppb v/v 06/15/17 21:44 3.7 ND 0.25 ppb v/v 1,1,2-Trichloroethane 1.5 06/15/17 21:44 3.7 **Trichlorofluoromethane** 38 1.5 0.73 ppb v/v 06/15/17 21:44 3.7 1,2,4-Trimethylbenzene ND 3.0 0.60 ppb v/v 06/15/17 21:44 3.7 1,3,5-Trimethylbenzene ND 1.5 0.46 ppb v/v 06/15/17 21:44 3.7 Vinyl acetate ND 3.0 0.54 ppb v/v 06/15/17 21:44 3.7 Vinyl chloride ND 1.5 0.44 ppb v/v 06/15/17 21:44 3.7 m,p-Xylene ND 3.0 0.37 ppb v/v 06/15/17 21:44 3.7

Lab Sample ID: 320-28713-4 Matrix: Air

Client Sample ID: 102465-001/MWL-SV03-200 Date Collected: 05/30/17 09:00

Lab Sample ID: 320-28713-4 Matrix: Air

Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Xylene	ND		1.5	0.20	ppb v/v			06/15/17 21:44	3.7
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	121		70 - 130					06/15/17 21:44	3.7
1,2-Dichloroethane-d4 (Surr)	115		70 - 130					06/15/17 21:44	3.7
Toluene-d8 (Surr)	123		70 - 130					06/15/17 21:44	3.7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	240		2.5	0.66	ppb v/v			06/21/17 19:57	6.28
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130					06/21/17 19:57	6.28
1,2-Dichloroethane-d4 (Surr)	104		70 - 130					06/21/17 19:57	6.28
Toluene-d8 (Surr)	106		70 - 130					06/21/17 19:57	6.28

Client Sample ID: 102466-001/MWL-SV03-200 Date Collected: 05/30/17 09:00 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-5

Method: TO-15 - Volatile Organ	ethod: TO-15 - Volatile Organic Compounds in Ambient Air										
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac		
Acetone	6.5	J	18	0.64	ppb v/v			06/15/17 22:36	3.62		
Benzene	0.29	J	1.4	0.29	ppb v/v			06/15/17 22:36	3.62		
Benzyl chloride	ND		2.9	0.59	ppb v/v			06/15/17 22:36	3.62		
Bromodichloromethane	ND		1.1	0.24	ppb v/v			06/15/17 22:36	3.62		
Bromoform	ND		1.4	0.25	ppb v/v			06/15/17 22:36	3.62		
Bromomethane	ND		2.9	1.2	ppb v/v			06/15/17 22:36	3.62		
2-Butanone (MEK)	ND		2.9	0.72	ppb v/v			06/15/17 22:36	3.62		
Carbon disulfide	ND		2.9	0.28	ppb v/v			06/15/17 22:36	3.62		
Carbon tetrachloride	0.51	J	2.9	0.23	ppb v/v			06/15/17 22:36	3.62		
Chlorobenzene	ND		1.1	0.23	ppb v/v			06/15/17 22:36	3.62		
Chloroethane	ND		2.9	1.1	ppb v/v			06/15/17 22:36	3.62		
Chloroform	2.5		1.1	0.34	ppb v/v			06/15/17 22:36	3.62		
Chloromethane	ND		2.9	0.71	ppb v/v			06/15/17 22:36	3.62		
Dibromochloromethane	ND		1.4	0.29	ppb v/v			06/15/17 22:36	3.62		
1,2-Dibromoethane (EDB)	ND		2.9	0.27	ppb v/v			06/15/17 22:36	3.62		
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.56	ppb v/v			06/15/17 22:36	3.62		
1,2-Dichlorobenzene	ND		1.4	0.47	ppb v/v			06/15/17 22:36	3.62		
1,3-Dichlorobenzene	ND		1.4	0.40	ppb v/v			06/15/17 22:36	3.62		
1,4-Dichlorobenzene	ND		1.4	0.54	ppb v/v			06/15/17 22:36	3.62		
Dichlorodifluoromethane	55		1.4	0.52	ppb v/v			06/15/17 22:36	3.62		
1,1-Dichloroethane	7.9		1.1	0.26	ppb v/v			06/15/17 22:36	3.62		
1,2-Dichloroethane	ND		2.9	0.32	ppb v/v			06/15/17 22:36	3.62		
1,1-Dichloroethene	33		2.9	0.47	ppb v/v			06/15/17 22:36	3.62		
cis-1,2-Dichloroethene	5.2		1.4	0.32	ppb v/v			06/15/17 22:36	3.62		
trans-1,2-Dichloroethene	ND		1.4	0.36	ppb v/v			06/15/17 22:36	3.62		
1,2-Dichloropropane	ND		1.4	0.87	ppb v/v			06/15/17 22:36	3.62		

Client Sample ID: 102466-001/MWL-SV03-200

Date Collected: 05/30/17 09:00 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

TestAmerica Job ID: 320-28713-1

Lab Sample ID: 320-28713-5 Matrix: Air

Method: TO-15 - Volatile Orga	nic Compounds in Ar Result Qualifier	nbient Air (C	ontinueo	<mark>d)</mark> Unit	П	Prenared	Analyzed	Dil Fac
cis-1.3-Dichloropropene		1.4	0.38	ppb v/v		Topulou	06/15/17 22:36	3.62
trans-1,3-Dichloropropene	ND	1.4	0.32	ppb v/v			06/15/17 22:36	3.62
Ethylbenzene	ND	1.4	0.23	ppb v/v			06/15/17 22:36	3.62
4-Ethyltoluene	ND	1.4	0.68	ppb v/v			06/15/17 22:36	3.62
Hexachlorobutadiene	ND	7.2	1.6	ppb v/v			06/15/17 22:36	3.62
2-Hexanone	ND *	1.4	0.31	ppb v/v			06/15/17 22:36	3.62
4-Methyl-2-pentanone (MIBK)	ND	1.4	0.49	ppb v/v			06/15/17 22:36	3.62
Methylene Chloride	3.4	1.4	0.26	ppb v/v			06/15/17 22:36	3.62
Styrene	ND	1.4	0.21	ppb v/v			06/15/17 22:36	3.62
1,1,2,2-Tetrachloroethane	ND	1.4	0.25	ppb v/v			06/15/17 22:36	3.62
Tetrachloroethene	210	1.4	0.18	ppb v/v			06/15/17 22:36	3.62
Toluene	0.44 J	1.4	0.18	ppb v/v			06/15/17 22:36	3.62
1,1,2-Trichloro-1,2,2-trifluoroetha	170	1.4	0.59	ppb v/v			06/15/17 22:36	3.62
1,2,4-Trichlorobenzene	ND	7.2	1.6	ppb v/v			06/15/17 22:36	3.62
1,1,1-Trichloroethane	3.1	1.1	0.24	ppb v/v			06/15/17 22:36	3.62
1,1,2-Trichloroethane	ND	1.4	0.24	ppb v/v			06/15/17 22:36	3.62
Trichlorofluoromethane	38	1.4	0.71	ppb v/v			06/15/17 22:36	3.62
1,2,4-Trimethylbenzene	ND	2.9	0.59	ppb v/v			06/15/17 22:36	3.62
1,3,5-Trimethylbenzene	ND	1.4	0.45	ppb v/v			06/15/17 22:36	3.62
Vinyl acetate	ND	2.9	0.52	ppb v/v			06/15/17 22:36	3.62
Vinyl chloride	ND	1.4	0.43	ppb v/v			06/15/17 22:36	3.62
m,p-Xylene	ND	2.9	0.36	ppb v/v			06/15/17 22:36	3.62
o-Xylene	ND	1.4	0.20	ppb v/v			06/15/17 22:36	3.62
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac

0		-		
4-Bromofluorobenzene (Surr)	122	70 - 130	 06/15/17 22:36	3.62
1,2-Dichloroethane-d4 (Surr)	115	70 - 130	06/15/17 22:36	3.62
Toluene-d8 (Surr)	122	70 - 130	06/15/17 22:36	3.62

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	250		2.4	0.64	ppb v/v			06/21/17 20:49	6.12
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		70 - 130					06/21/17 20:49	6.12
1,2-Dichloroethane-d4 (Surr)	102		70 - 130					06/21/17 20:49	6.12
Toluene-d8 (Surr)	104		70 - 130					06/21/17 20:49	6.12

Client Sample ID: 102467-001/MWL-SV03-300 Date Collected: 05/30/17 09:07 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air Result Qualifier Analyte MDL Unit RL D Prepared Analyzed Dil Fac Acetone 6.9 J 19 0.69 ppb v/v 06/15/17 23:28 3.88 Benzene 0.40 J 1.6 0.31 ppb v/v 06/15/17 23:28 3.88 Benzyl chloride ND 3.1 0.63 ppb v/v 06/15/17 23:28 3.88 Bromodichloromethane ND 1.2 06/15/17 23:28 3.88 0.26 ppb v/v

TestAmerica Sacramento

Lab Sample ID: 320-28713-6

Client Sample ID: 102467-001/MWL-SV03-300

Date Collected: 05/30/17 09:07

Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-6

Method: TO-15 - Volatile Organ	nic Compo	unds in Am	bient Air (Co	ontinued)				
Analyte	Result	Qualifier	RL	MDL Ur	nit	D Prepared	Analyzed	Dil Fac
Bromoform	ND		1.6	0.27 pp	ob v/v		06/15/17 23:28	3.88
Bromomethane	ND		3.1	1.3 pp	ob v/v		06/15/17 23:28	3.88
2-Butanone (MEK)	ND		3.1	0.77 pp	ob v/v		06/15/17 23:28	3.88
Carbon disulfide	ND		3.1	0.30 pp	b v/v		06/15/17 23:28	3.88
Carbon tetrachloride	0.40	J	3.1	0.25 pp	b v/v		06/15/17 23:28	3.88
Chlorobenzene	ND		1.2	0.25 pp	ob v/v		06/15/17 23:28	3.88
Chloroethane	ND		3.1	1.2 pp	b v/v		06/15/17 23:28	3.88
Chloroform	1.5		1.2	0.37 pp	b v/v		06/15/17 23:28	3.88
Chloromethane	ND		3.1	0.76 pp	b v/v		06/15/17 23:28	3.88
Dibromochloromethane	ND		1.6	0.31 pp	b v/v		06/15/17 23:28	3.88
1.2-Dibromoethane (EDB)	ND		3.1	0.29 pp	b v/v		06/15/17 23:28	3.88
1.2-Dichloro-1.1.2.2-tetrafluoroethane	ND		1.6	0.60 pp	b v/v		06/15/17 23:28	3.88
1.2-Dichlorobenzene	ND		1.6	0.50 pp	b v/v		06/15/17 23:28	3.88
1 3-Dichlorobenzene	ND		16	0.43 pp	b v/v		06/15/17 23:28	3 88
1 4-Dichlorobenzene	ND		1.6	0.58 pp	b v/v		06/15/17 23:28	3 88
Dichlorodifluoromethane	27		1.6	0.56 pp	b v/v		06/15/17 23:28	3.88
1 1-Dichloroethane	37		1.0	0.00 pp	$\frac{1}{\sqrt{2}}$		06/15/17 23:28	3.88
1 2-Dichloroethane			3.1	0.20 pp			06/15/17 23:28	3.88
	21		3.1	0.54 pp			06/15/17 23:28	3.88
sis 1.2 Dichloroothono	21		1.6	0.35 pp			06/15/17 23:28	3.88
trans 1.2 Dichloroothono	2.0 ND		1.0	0.30 pp			06/15/17 23:20	3.00
1 2 Dichloropropago			1.0	0.39 pp			06/15/17 23:20	2.00
			1.0	0.93 pp			06/15/17 23.20	3.00 2.00
trans 1.2 Dishlaranranana			1.0	0.40 pp			06/15/17 23.20	3.00
	ND		1.0	0.34 pp			06/15/17 23.26	3.00 2.00
	ND		1.0	0.24 pp			00/15/17 23.20	3.00
4-Ethyltoluene	ND		1.0	0.73 pp			06/15/17 23:28	3.88
Hexachiorobutadiene	ND	_	7.8	1.7 pp			06/15/17 23:28	3.88
2-Hexanone	ND	^	1.6	0.34 pp			06/15/17 23:28	3.88
4-Metnyi-2-pentanone (MIBK)	ND		1.6	0.52 pp	DD V/V		06/15/17 23:28	3.88
Methylene Chloride	1.7		1.6	0.28 pp	bb v/v		06/15/17 23:28	3.88
Styrene	ND		1.6	0.23 pp	bb v/v		06/15/17 23:28	3.88
1,1,2,2-Tetrachloroethane	ND		1.6	0.27 pp	b v/v		06/15/17 23:28	3.88
Tetrachloroethene	220		1.6	0.20 pp	ob v/v		06/15/17 23:28	3.88
Toluene	0.38	J	1.6	0.20 pp	b v/v		06/15/17 23:28	3.88
1,1,2-Trichloro-1,2,2-trifluoroetha	110		1.6	0.63 pp	ob v/v		06/15/17 23:28	3.88
ne 1 2 4-Trichlorobenzene	ND		78	17 nn	h v/v		06/15/17 23:28	3 88
	1.4		1.0	0.25 pp			06/15/17 23:28	3.88
1 1 2-Trichloroethane			1.2	0.20 pp			06/15/17 23:28	3.88
	200		1.0	0.20 pp			06/15/17 23:28	3.00
Trichlorofluoromothono	200		1.0	0.41 pp			06/15/17 23:28	3.00
			2.1	0.70 pp			06/15/17 23:20	2.00
1,2,4-Thimethylbenzene			J.I	0.03 pp			06/15/17 23:20	3.00 2.00
Vinul agotato			1.0	0.49 pp			06/15/17 23.20	3.00 2.00
Vinyi aCelale	ND		3.1	0.50 pp			06/15/17 23:28	3.88
	ND		1.0	0.47 pp			00/15/1/ 23:28	3.88
m,p-xylene	ND		3.1	0.39 pp	ע/ע טע		06/15/17 23:28	3.88
o-Xylene	ND		1.6	0.21 pp	v/v do		06/15/17 23:28	3.88

Client Sample ID: 102467-001/MWL-SV03-300 Date Collected: 05/30/17 09:07 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	123		70 - 130		06/15/17 23:28	3.88
1,2-Dichloroethane-d4 (Surr)	114		70 - 130		06/15/17 23:28	3.88
Toluene-d8 (Surr)	123		70 - 130		06/15/17 23:28	3.88

Client Sample ID: 102468-001/MWL-SV03-400 Date Collected: 05/30/17 09:46 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-7 Matrix: Air

Method: TO-15 - Volatile Orgar Analyte	i <mark>ic Compo</mark> Result	unds in Amb Qualifier	<mark>pient Air</mark> RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	2.9	J	23	0.81	ppb v/v			06/16/17 00:20	4.54
Benzene	0.42	J	1.8	0.36	ppb v/v			06/16/17 00:20	4.54
Benzyl chloride	ND		3.6	0.74	ppb v/v			06/16/17 00:20	4.54
Bromodichloromethane	ND		1.4	0.30	ppb v/v			06/16/17 00:20	4.54
Bromoform	ND		1.8	0.32	ppb v/v			06/16/17 00:20	4.54
Bromomethane	ND		3.6	1.5	ppb v/v			06/16/17 00:20	4.54
2-Butanone (MEK)	ND		3.6	0.90	ppb v/v			06/16/17 00:20	4.54
Carbon disulfide	ND		3.6	0.35	ppb v/v			06/16/17 00:20	4.54
Carbon tetrachloride	ND		3.6	0.29	ppb v/v			06/16/17 00:20	4.54
Chlorobenzene	ND		1.4	0.29	ppb v/v			06/16/17 00:20	4.54
Chloroethane	ND		3.6	1.4	ppb v/v			06/16/17 00:20	4.54
Chloroform	1.2	J	1.4	0.43	ppb v/v			06/16/17 00:20	4.54
Chloromethane	ND		3.6	0.89	ppb v/v			06/16/17 00:20	4.54
Dibromochloromethane	ND		1.8	0.36	ppb v/v			06/16/17 00:20	4.54
1,2-Dibromoethane (EDB)	ND		3.6	0.34	ppb v/v			06/16/17 00:20	4.54
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.8	0.70	ppb v/v			06/16/17 00:20	4.54
1,2-Dichlorobenzene	ND		1.8	0.59	ppb v/v			06/16/17 00:20	4.54
1,3-Dichlorobenzene	ND		1.8	0.50	ppb v/v			06/16/17 00:20	4.54
1,4-Dichlorobenzene	ND		1.8	0.68	ppb v/v			06/16/17 00:20	4.54
Dichlorodifluoromethane	4.6		1.8	0.66	ppb v/v			06/16/17 00:20	4.54
1,1-Dichloroethane	4.6		1.4	0.33	ppb v/v			06/16/17 00:20	4.54
1,2-Dichloroethane	ND		3.6	0.40	ppb v/v			06/16/17 00:20	4.54
1,1-Dichloroethene	21		3.6	0.59	ppb v/v			06/16/17 00:20	4.54
cis-1,2-Dichloroethene	2.3		1.8	0.40	ppb v/v			06/16/17 00:20	4.54
trans-1,2-Dichloroethene	ND		1.8	0.45	ppb v/v			06/16/17 00:20	4.54
1,2-Dichloropropane	ND		1.8	1.1	ppb v/v			06/16/17 00:20	4.54
cis-1,3-Dichloropropene	ND		1.8	0.47	ppb v/v			06/16/17 00:20	4.54
trans-1,3-Dichloropropene	ND		1.8	0.40	ppb v/v			06/16/17 00:20	4.54
Ethylbenzene	ND		1.8	0.29	ppb v/v			06/16/17 00:20	4.54
4-Ethyltoluene	ND		1.8	0.85	ppb v/v			06/16/17 00:20	4.54
Hexachlorobutadiene	ND		9.1	2.0	ppb v/v			06/16/17 00:20	4.54
2-Hexanone	ND	*	1.8	0.39	ppb v/v			06/16/17 00:20	4.54
4-Methyl-2-pentanone (MIBK)	ND		1.8	0.61	ppb v/v			06/16/17 00:20	4.54
Methylene Chloride	1.5	J	1.8	0.33	ppb v/v			06/16/17 00:20	4.54
Styrene	ND		1.8	0.27	ppb v/v			06/16/17 00:20	4.54
1,1,2,2-Tetrachloroethane	ND		1.8	0.31	ppb v/v			06/16/17 00:20	4.54
Toluene	0.84	J	1.8	0.23	ppb v/v			06/16/17 00:20	4.54

Lab Sample ID: 320-28713-6

Client Sample ID: 102468-001/MWL-SV03-400

Date Collected: 05/30/17 09:46 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-7

TestAmerica Job ID: 320-28713-1

Matrix: Air

Method: TO-15 - Volatile Orga	nic Compo	unds in Ar	nbient Air (Co	ontinue	d)				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroetha	28		1.8	0.74	ppb v/v			06/16/17 00:20	4.54
ne									
1,2,4-Trichlorobenzene	ND		9.1	2.0	ppb v/v			06/16/17 00:20	4.54
1,1,1-Trichloroethane	1.8		1.4	0.30	ppb v/v			06/16/17 00:20	4.54
1,1,2-Trichloroethane	ND		1.8	0.30	ppb v/v			06/16/17 00:20	4.54
Trichloroethene	230		1.8	0.48	ppb v/v			06/16/17 00:20	4.54
Trichlorofluoromethane	7.8		1.8	0.89	ppb v/v			06/16/17 00:20	4.54
1,2,4-Trimethylbenzene	ND		3.6	0.74	ppb v/v			06/16/17 00:20	4.54
1,3,5-Trimethylbenzene	ND		1.8	0.57	ppb v/v			06/16/17 00:20	4.54
Vinyl acetate	ND		3.6	0.66	ppb v/v			06/16/17 00:20	4.54
Vinyl chloride	ND		1.8	0.54	ppb v/v			06/16/17 00:20	4.54
m,p-Xylene	ND		3.6	0.45	ppb v/v			06/16/17 00:20	4.54
o-Xylene	ND		1.8	0.25	ppb v/v			06/16/17 00:20	4.54
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	124		70 130					06/16/17 00:20	4 54

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4-Bromofluorobenzene (Surr)	124		70 - 130	-	 06/16/17 00:20	4.54
1,2-Dichloroethane-d4 (Surr)	115		70 - 130		06/16/17 00:20	4.54
Toluene-d8 (Surr)	122		70 - 130		06/16/17 00:20	4.54

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL U	nit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	390		3.1	0.40 pp	pb v/v	`		06/21/17 21:41	7.87
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130					06/21/17 21:41	7.87
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					06/21/17 21:41	7.87
Toluene-d8 (Surr)	105		70 - 130					06/21/17 21:41	7.87

Client Sample ID: 102469-001/MWL-SV03-400 Date Collected: 05/30/17 09:46 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-8 Matrix: Air

Method: TO-15 - Volatile	Organic Compo	unds in Amb	ient Air						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	2.9	J	30	1.1	ppb v/v			06/16/17 01:12	5.93
Benzene	ND		2.4	0.47	ppb v/v			06/16/17 01:12	5.93
Benzyl chloride	ND		4.7	0.97	ppb v/v			06/16/17 01:12	5.93
Bromodichloromethane	ND		1.8	0.39	ppb v/v			06/16/17 01:12	5.93
Bromoform	ND		2.4	0.42	ppb v/v			06/16/17 01:12	5.93
Bromomethane	ND		4.7	2.0	ppb v/v			06/16/17 01:12	5.93
2-Butanone (MEK)	ND		4.7	1.2	ppb v/v			06/16/17 01:12	5.93
Carbon disulfide	ND		4.7	0.46	ppb v/v			06/16/17 01:12	5.93
Carbon tetrachloride	0.43	J	4.7	0.38	ppb v/v			06/16/17 01:12	5.93
Chlorobenzene	ND		1.8	0.38	ppb v/v			06/16/17 01:12	5.93
Chloroethane	ND		4.7	1.8	ppb v/v			06/16/17 01:12	5.93
Chloroform	1.4	J	1.8	0.56	ppb v/v			06/16/17 01:12	5.93
Chloromethane	ND		4.7	1.2	ppb v/v			06/16/17 01:12	5.93
Dibromochloromethane	ND		2.4	0.47	ppb v/v			06/16/17 01:12	5.93
1,2-Dibromoethane (EDB)	ND		4.7	0.44	ppb v/v			06/16/17 01:12	5.93

Client Sample ID: 102469-001/MWL-SV03-400

Date Collected: 05/30/17 09:46 Date Received: 06/06/17 10:20

Toluene-d8 (Surr)

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Orga	nic Compo	unds in Ar	nbient Air (Co	ontinue) אוסא	d) Unit	п	Prepared	Analyzod	Dil Fac
12-Dichloro-1122-tetrafluoroethane		Quanner	24	0.92	$\frac{0}{nnh} \frac{v}{v}$		Tieparea	$-\frac{100}{06/16/17}$	5.93
1 2-Dichlorobenzene	ND		24	0.77	ppb v/v			06/16/17 01:12	5.00
1.3-Dichlorobenzene	ND		2.4	0.65	v/v dqq			06/16/17 01:12	5.93
1 4-Dichlorobenzene	ND		24	0.88	npb v/v			06/16/17 01.12	5.93
Dichlorodifluoromethane	5.4		2.4	0.86	v/v dqq			06/16/17 01:12	5.93
1.1-Dichloroethane	4.8		1.8	0.43	v/v dqq			06/16/17 01:12	5.93
1.2-Dichloroethane	ND		4.7	0.52	v/v dqq			06/16/17 01:12	5.93
1.1-Dichloroethene	22		4.7	0.76	v/v dqq			06/16/17 01:12	5.93
cis-1.2-Dichloroethene	2.4		2.4	0.53	ppb v/v			06/16/17 01:12	5.93
trans-1,2-Dichloroethene	ND		2.4	0.59	ppb v/v			06/16/17 01:12	5.93
1,2-Dichloropropane	ND		2.4	1.4	ppb v/v			06/16/17 01:12	5.93
cis-1,3-Dichloropropene	ND		2.4	0.62	ppb v/v			06/16/17 01:12	5.93
trans-1,3-Dichloropropene	ND		2.4	0.52	ppb v/v			06/16/17 01:12	5.93
Ethylbenzene	ND		2.4	0.37	ppb v/v			06/16/17 01:12	5.93
4-Ethyltoluene	ND		2.4	1.1	ppb v/v			06/16/17 01:12	5.93
Hexachlorobutadiene	ND		12	2.6	ppb v/v			06/16/17 01:12	5.93
2-Hexanone	ND	*	2.4	0.52	ppb v/v			06/16/17 01:12	5.93
4-Methyl-2-pentanone (MIBK)	ND		2.4	0.80	ppb v/v			06/16/17 01:12	5.93
Methylene Chloride	1.7	J	2.4	0.43	ppb v/v			06/16/17 01:12	5.93
Styrene	ND		2.4	0.35	ppb v/v			06/16/17 01:12	5.93
1,1,2,2-Tetrachloroethane	ND		2.4	0.41	ppb v/v			06/16/17 01:12	5.93
Tetrachloroethene	340		2.4	0.30	ppb v/v			06/16/17 01:12	5.93
Toluene	1.1	J	2.4	0.30	ppb v/v			06/16/17 01:12	5.93
1,1,2-Trichloro-1,2,2-trifluoroetha	29		2.4	0.97	ppb v/v			06/16/17 01:12	5.93
ne									
1,2,4-Trichlorobenzene	ND		12	2.6	ppb v/v			06/16/17 01:12	5.93
1,1,1-Trichloroethane	2.0		1.8	0.39	ppb v/v			06/16/17 01:12	5.93
1,1,2-Trichloroethane	ND		2.4	0.40	ppb v/v			06/16/17 01:12	5.93
Trichloroethene	250		2.4	0.62	ppb v/v			06/16/17 01:12	5.93
Trichlorofluoromethane	ND		2.4	1.2	ppb v/v			06/16/17 01:12	5.93
1,2,4-Trimethylbenzene	ND		4.7	0.96	ppb v/v			06/16/17 01:12	5.93
1,3,5-Trimethylbenzene	ND		2.4	0.74	ppb v/v			06/16/17 01:12	5.93
Vinyl acetate	ND		4.7	0.86	ppb v/v			06/16/17 01:12	5.93
Vinyl chloride	ND		2.4	0.71	ppb v/v			06/16/17 01:12	5.93
m,p-Xylene	ND		4.7	0.59	ppb v/v			06/16/17 01:12	5.93
o-Xylene	ND		2.4	0.32	ppb v/v			06/16/17 01:12	5.93
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	122		70 - 130					06/16/17 01:12	5.93
1,2-Dichloroethane-d4 (Surr)	118		70 - 130					06/16/17 01:12	5.93

06/16/17 01:12

5.93

70 - 130

125

Lab Sample ID: 320-28713-8 Matrix: Air

Lab Sample ID: 320-28713-9

Matrix: Air

Client Sample ID: 102470-001/MWL-SV-FB4 Date Collected: 05/30/17 10:10

Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air **Result Qualifier** MDL Unit Analyte RL D Prepared Analyzed Dil Fac ND 5.0 Acetone 0.18 ppb v/v 06/16/17 02:10 1 ND 0.40 Benzene 0.079 ppb v/v 06/16/17 02:10 1 ND 0.16 Benzyl chloride 0.80 ppb v/v 06/16/17 02:10 1 Bromodichloromethane ND 0.30 0.066 v/v dag 06/16/17 02:10 1 Bromoform ND 0.40 0.070 ppb v/v 06/16/17 02:10 1 ND 0.80 0.34 ppb v/v 06/16/17 02:10 Bromomethane 1 2-Butanone (MEK) ND 0.80 0.20 ppb v/v 06/16/17 02:10 1 Carbon disulfide ND 0.80 0.078 ppb v/v 06/16/17 02.10 1 Carbon tetrachloride ND 0.80 0.064 ppb v/v 06/16/17 02:10 1 Chlorobenzene ND 0.064 ppb v/v 06/16/17 02:10 0.30 1 Chloroethane ND 0.80 0.31 ppb v/v 06/16/17 02.10 1 0.095 ppb v/v Chloroform ND 0.30 06/16/17 02:10 1 Chloromethane ND 0.80 0.20 ppb v/v 06/16/17 02:10 1 0.079 ppb v/v Dibromochloromethane ND 0.40 06/16/17 02:10 1 1,2-Dibromoethane (EDB) ND 0.80 0.075 ppb v/v 06/16/17 02:10 1 1,2-Dichloro-1,1,2,2-tetrafluoroethane ND 0.40 0.16 ppb v/v 06/16/17 02:10 1 ND 06/16/17 02:10 12-Dichlorobenzene 0 4 0 0.13 ppb v/v 1 1,3-Dichlorobenzene ND 0.40 0.11 ppb v/v 06/16/17 02:10 1 1 4-Dichlorobenzene ND 0.40 0.15 ppb v/v 06/16/17 02.10 1 Dichlorodifluoromethane ND 0.40 0.15 ppb v/v 06/16/17 02:10 1 ND 0.072 ppb v/v 1,1-Dichloroethane 0.30 06/16/17 02.10 1 0.088 ppb v/v 1,2-Dichloroethane ND 0.80 06/16/17 02:10 1 1.1-Dichloroethene ND 0.80 0.13 ppb v/v 06/16/17 02:10 1 cis-1,2-Dichloroethene ND 0.40 0.089 ppb v/v 06/16/17 02:10 1 trans-1,2-Dichloroethene ND 0.40 0.10 ppb v/v 06/16/17 02:10 1 ND 0 4 0 06/16/17 02:10 1,2-Dichloropropane 0.24 ppb v/v 1 ND 0.40 06/16/17 02:10 cis-1,3-Dichloropropene 0.10 ppb v/v 1 trans-1,3-Dichloropropene ND 0.40 0.088 ppb v/v 06/16/17 02:10 1 Ethylbenzene ND 0.40 0.063 ppb v/v 06/16/17 02:10 1 ND 4-Ethyltoluene 0.40 0.19 ppb v/v 06/16/17 02:10 1 Hexachlorobutadiene ND 2.0 0.43 ppb v/v 06/16/17 02:10 1 ND 2-Hexanone 0.40 0.087 ppb v/v 06/16/17 02:10 1 4-Methyl-2-pentanone (MIBK) ND 0.40 0.14 ppb v/v 06/16/17 02:10 1 Methylene Chloride ND 0.40 0.072 ppb v/v 06/16/17 02:10 1 ND 1 Styrene 0.40 0.059 ppb v/v 06/16/17 02:10 1,1,2,2-Tetrachloroethane ND 0.40 0.069 ppb v/v 06/16/17 02:10 1 ND 0 40 Tetrachloroethene 0.051 ppb v/v 06/16/17 02:10 1 Toluene ND 0.40 0.051 ppb v/v 06/16/17 02:10 1 ND 1,1,2-Trichloro-1,2,2-trifluoroethane 0.40 ppb v/v 06/16/17 02:10 0.16 1 ND 1,2,4-Trichlorobenzene 2.0 0.43 ppb v/v 06/16/17 02:10 1 ND 0.30 1,1,1-Trichloroethane 0.065 ppb v/v 06/16/17 02:10 1 1,1,2-Trichloroethane ND 0.40 0.067 ppb v/v 06/16/17 02:10 1 Trichloroethene ND 0.40 0.11 ppb v/v 06/16/17 02:10 1 ND 0.40 Trichlorofluoromethane 0.20 ppb v/v 06/16/17 02:10 1 1,2,4-Trimethylbenzene ND 0.80 0.16 ppb v/v 06/16/17 02:10 1 1,3,5-Trimethylbenzene ND 1 0.40 0.13 ppb v/v 06/16/17 02:10 Vinyl acetate ND 0.80 0.15 ppb v/v 06/16/17 02:10 1 Vinyl chloride ND 0.40 0.12 ppb v/v 06/16/17 02:10 1

Lab Sample ID: 320-28713-9

Matrix: Air

Client Sample ID: 102470-001/MWL-SV-FB4 Date Collected: 05/30/17 10:10 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		0.80	0.10	ppb v/v			06/16/17 02:10	1
o-Xylene	ND		0.40	0.054	ppb v/v			06/16/17 02:10	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	124		70 - 130					06/16/17 02:10	1
1,2-Dichloroethane-d4 (Surr)	118		70 - 130					06/16/17 02:10	1
Taluana da (Quum)	105		70 120					06/16/17 02:10	1

Client Sample ID: 102471-001/MWL-SV04-50 Date Collected: 05/30/17 10:17 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-10 Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air Result Qualifier Analyta

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	3.8	J	5.0	0.18	ppb v/v			06/16/17 03:09	1
Benzene	0.39	J	0.40	0.079	ppb v/v			06/16/17 03:09	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			06/16/17 03:09	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			06/16/17 03:09	1
Bromoform	ND		0.40	0.070	ppb v/v			06/16/17 03:09	1
Bromomethane	ND		0.80	0.34	ppb v/v			06/16/17 03:09	1
2-Butanone (MEK)	0.59	J	0.80	0.20	ppb v/v			06/16/17 03:09	1
Carbon disulfide	0.10	J	0.80	0.078	ppb v/v			06/16/17 03:09	1
Carbon tetrachloride	0.23	J	0.80	0.064	ppb v/v			06/16/17 03:09	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			06/16/17 03:09	1
Chloroethane	ND		0.80	0.31	ppb v/v			06/16/17 03:09	1
Chloroform	1.9		0.30	0.095	ppb v/v			06/16/17 03:09	1
Chloromethane	ND		0.80	0.20	ppb v/v			06/16/17 03:09	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			06/16/17 03:09	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			06/16/17 03:09	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			06/16/17 03:09	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			06/16/17 03:09	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			06/16/17 03:09	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			06/16/17 03:09	1
Dichlorodifluoromethane	13		0.40	0.15	ppb v/v			06/16/17 03:09	1
1,1-Dichloroethane	1.4		0.30	0.072	ppb v/v			06/16/17 03:09	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			06/16/17 03:09	1
1,1-Dichloroethene	6.8		0.80	0.13	ppb v/v			06/16/17 03:09	1
cis-1,2-Dichloroethene	0.56		0.40	0.089	ppb v/v			06/16/17 03:09	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			06/16/17 03:09	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			06/16/17 03:09	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			06/16/17 03:09	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			06/16/17 03:09	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			06/16/17 03:09	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			06/16/17 03:09	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			06/16/17 03:09	1
2-Hexanone	ND	*	0.40	0.087	ppb v/v			06/16/17 03:09	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			06/16/17 03:09	1
Methylene Chloride	0.14	J	0.40	0.072	ppb v/v			06/16/17 03:09	1

TestAmerica Job ID: 320-28713-1

Client Sample ID: 102471-001/MWL-SV04-50

Date Collected: 05/30/17 10:17 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-10 Matrix: Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		0.40	0.059	ppb v/v			06/16/17 03:09	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			06/16/17 03:09	1
Tetrachloroethene	52		0.40	0.051	ppb v/v			06/16/17 03:09	1
Toluene	0.051	J	0.40	0.051	ppb v/v			06/16/17 03:09	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			06/16/17 03:09	1
1,1,1-Trichloroethane	7.9		0.30	0.065	ppb v/v			06/16/17 03:09	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			06/16/17 03:09	1
Trichloroethene	54		0.40	0.11	ppb v/v			06/16/17 03:09	1
Trichlorofluoromethane	29		0.40	0.20	ppb v/v			06/16/17 03:09	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			06/16/17 03:09	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			06/16/17 03:09	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			06/16/17 03:09	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			06/16/17 03:09	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			06/16/17 03:09	1
o-Xylene	ND		0.40	0.054	ppb v/v			06/16/17 03:09	1

Surrogate	%Recovery (Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	125		70 - 130		06/16/17 03:09	1
1,2-Dichloroethane-d4 (Surr)	117		70 - 130		06/16/17 03:09	1
Toluene-d8 (Surr)	125		70 - 130		06/16/17 03:09	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroetha ne	61		0.62	0.25	ppb v/v			06/21/17 22:36	1.55
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					06/21/17 22:36	1.55
1,2-Dichloroethane-d4 (Surr)	104		70 - 130					06/21/17 22:36	1.55
Toluene-d8 (Surr)	107		70 - 130					06/21/17 22:36	1.55

Client Sample ID: 102472-001/MWL-SV04-100 Date Collected: 05/30/17 10:20 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

wiethou: 10-15 - volatile O	rganic Compo	unus in Ami	Jient Air						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	3.2	J	7.7	0.27	ppb v/v			06/16/17 04:04	1.54
Benzene	0.28	J	0.62	0.12	ppb v/v			06/16/17 04:04	1.54
Benzyl chloride	ND		1.2	0.25	ppb v/v			06/16/17 04:04	1.54
Bromodichloromethane	ND		0.46	0.10	ppb v/v			06/16/17 04:04	1.54
Bromoform	ND		0.62	0.11	ppb v/v			06/16/17 04:04	1.54
Bromomethane	ND		1.2	0.52	ppb v/v			06/16/17 04:04	1.54
2-Butanone (MEK)	0.45	J	1.2	0.31	ppb v/v			06/16/17 04:04	1.54
Carbon disulfide	2.2		1.2	0.12	ppb v/v			06/16/17 04:04	1.54
Carbon tetrachloride	0.40	J	1.2	0.099	ppb v/v			06/16/17 04:04	1.54
Chlorobenzene	ND		0.46	0.099	ppb v/v			06/16/17 04:04	1.54
Chloroethane	ND		1.2	0.47	ppb v/v			06/16/17 04:04	1.54
Chloroform	2.0		0.46	0.15	ppb v/v			06/16/17 04:04	1.54

TestAmerica Sacramento

Matrix: Air

Lab Sample ID: 320-28713-11

Client Sample ID: 102472-001/MWL-SV04-100

Date Collected: 05/30/17 10:20 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-11 Matrix: Air

Method: TO-15 - Volatile Orga Analyte	nic Compounds in A Result Qualifier	Ambient Air (C RL	ontinued MDL	<mark>1)</mark> Unit	D	Prepared	Analyzed	Dil Fac
Chloromethane	ND	1.2	0.30	ppb v/v			06/16/17 04:04	1.54
Dibromochloromethane	ND	0.62	0.12	ppb v/v			06/16/17 04:04	1.54
1,2-Dibromoethane (EDB)	ND	1.2	0.12	ppb v/v			06/16/17 04:04	1.54
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	0.62	0.24	ppb v/v			06/16/17 04:04	1.54
1,2-Dichlorobenzene	ND	0.62	0.20	ppb v/v			06/16/17 04:04	1.54
1,3-Dichlorobenzene	ND	0.62	0.17	ppb v/v			06/16/17 04:04	1.54
1,4-Dichlorobenzene	ND	0.62	0.23	ppb v/v			06/16/17 04:04	1.54
Dichlorodifluoromethane	24	0.62	0.22	ppb v/v			06/16/17 04:04	1.54
1,1-Dichloroethane	3.1	0.46	0.11	ppb v/v			06/16/17 04:04	1.54
1,2-Dichloroethane	ND	1.2	0.14	ppb v/v			06/16/17 04:04	1.54
1,1-Dichloroethene	16	1.2	0.20	ppb v/v			06/16/17 04:04	1.54
cis-1,2-Dichloroethene	1.8	0.62	0.14	ppb v/v			06/16/17 04:04	1.54
trans-1,2-Dichloroethene	ND	0.62	0.15	ppb v/v			06/16/17 04:04	1.54
1,2-Dichloropropane	ND	0.62	0.37	ppb v/v			06/16/17 04:04	1.54
cis-1,3-Dichloropropene	ND	0.62	0.16	ppb v/v			06/16/17 04:04	1.54
trans-1,3-Dichloropropene	ND	0.62	0.14	ppb v/v			06/16/17 04:04	1.54
Ethylbenzene	ND	0.62	0.097	ppb v/v			06/16/17 04:04	1.54
4-Ethyltoluene	ND	0.62	0.29	ppb v/v			06/16/17 04:04	1.54
Hexachlorobutadiene	ND	3.1	0.67	ppb v/v			06/16/17 04:04	1.54
2-Hexanone	ND *	0.62	0.13	ppb v/v			06/16/17 04:04	1.54
4-Methyl-2-pentanone (MIBK)	ND	0.62	0.21	ppb v/v			06/16/17 04:04	1.54
Methylene Chloride	0.49 J	0.62	0.11	ppb v/v			06/16/17 04:04	1.54
Styrene	ND	0.62	0.091	ppb v/v			06/16/17 04:04	1.54
1,1,2,2-Tetrachloroethane	ND	0.62	0.11	ppb v/v			06/16/17 04:04	1.54
Tetrachloroethene	89	0.62	0.079	ppb v/v			06/16/17 04:04	1.54
Toluene	ND	0.62	0.079	ppb v/v			06/16/17 04:04	1.54
1,2,4-Trichlorobenzene	ND	3.1	0.67	ppb v/v			06/16/17 04:04	1.54
1,1,1-Trichloroethane	6.4	0.46	0.10	ppb v/v			06/16/17 04:04	1.54
1,1,2-Trichloroethane	ND	0.62	0.10	ppb v/v			06/16/17 04:04	1.54
Trichlorofluoromethane	40	0.62	0.30	ppb v/v			06/16/17 04:04	1.54
1,2,4-Trimethylbenzene	ND	1.2	0.25	ppb v/v			06/16/17 04:04	1.54
1,3,5-Trimethylbenzene	ND	0.62	0.19	ppb v/v			06/16/17 04:04	1.54
Vinyl acetate	ND	1.2	0.22	ppb v/v			06/16/17 04:04	1.54
Vinyl chloride	ND	0.62	0.18	ppb v/v			06/16/17 04:04	1.54
m,p-Xylene	ND	1.2	0.15	ppb v/v			06/16/17 04:04	1.54
o-Xylene	ND	0.62	0.083	ppb v/v			06/16/17 04:04	1.54
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	121	70 - 130					06/16/17 04:04	1.54
1,2-Dichloroethane-d4 (Surr)	113	70 - 130					06/16/17 04:04	1.54
Toluene-d8 (Surr)	125	70 - 130					06/16/17 04:04	1.54

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroetha	100		1.1	0.46	ppb v/v			06/21/17 23:30	2.81
ne Trichloroethene	120		1.1	0.30	ppb v/v			06/21/17 23:30	2.81

Client Sample ID: 102472-001/MWL-SV04-100 Date Collected: 05/30/17 10:20 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130		06/21/17 23:30	2.81
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		06/21/17 23:30	2.81
Toluene-d8 (Surr)	100		70 - 130		06/21/17 23:30	2.81

Client Sample ID: 102473-001/MWL-SV04-200 Date Collected: 05/30/17 10:24 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-12 Matrix: Air

Acetone ND 23 0.83 ppb v/v 06/16/17.04:57 44 Benzene ND 1.9 0.37 ppb v/v 06/16/17.04:57 44 Benzeni choride ND 1.4 0.31 ppb v/v 06/16/17.04:57 44 Bromodorm ND 1.4 0.31 ppb v/v 06/16/17.04:57 44 Bromoderitane ND 3.8 1.6 ppb v/v 06/16/17.04:57 44 Bromoteritane ND 3.8 0.37 ppb v/v 06/16/17.04:57 44 Carbon disulfide ND 3.8 0.39 pb v/v 06/16/17.04:57 44 Carbon disulfide ND 3.8 0.30 pb v/v 06/16/17.04:57 44 Chlorothane ND 3.8 0.30 pb v/v 06/16/17.04:57 44 Chlorothane ND 3.8 0.82 pb v/v 06/16/17.04:57 44 Lorothane ND 3.8 0.82 pb v/v 06/16/17.04:57	Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene ND 1.9 0.37 pp bv/v 06/16/17.04:57 4.4 Benzyl chloride ND 1.4 0.31 ppb v/v 06/16/17.04:57 4.4 Bromodichloromethane ND 1.4 0.31 ppb v/v 06/16/17.04:57 4.4 Bromodichloromethane ND 3.8 0.93 ppb v/v 06/16/17.04:57 4.4 Bromodichloromethane ND 3.8 0.93 ppb v/v 06/16/17.04:57 4.4 Carbon tetrachloride 0.59 J 3.8 0.37 ppb v/v 06/16/17.04:57 4.4 Chlorobenzene ND 3.8 1.4 ppb v/v 06/16/17.04:57 4.4 Chlorobenzene ND 3.8 0.92 ppb v/v 06/16/17.04:57 4.4 Chlorobenzene ND 1.9 0.37 ppb v/v 06/16/17.04:57 4.4 Dibromochloromethane ND 1.9 0.73 ppb v/v 06/16/17.04:57 4.4 1.2-Dichorobenzene ND 1.9 <td>Acetone</td> <td>ND</td> <td>23</td> <td>0.83</td> <td>ppb v/v</td> <td></td> <td></td> <td>06/16/17 04:57</td> <td>4.69</td>	Acetone	ND	23	0.83	ppb v/v			06/16/17 04:57	4.69
Benzy chloride ND 3.8 0.76 ppb v/v 06/16/17 04:57 4.4 Bromodichloromethane ND 1.4 0.31 ppb v/v 06/16/17 04:57 4.4 Bromodichloromethane ND 3.8 1.6 pb v/v 06/16/17 04:57 4.4 2-Butanone (MEK) ND 3.8 0.33 ppb v/v 06/16/17 04:57 4.4 Carbon disulfide ND 3.8 0.30 ppb v/v 06/16/17 04:57 4.4 Chlorobenzene ND 3.8 0.30 ppb v/v 06/16/17 04:57 4.4 Chlorobenzene ND 3.8 1.4 ppb v/v 06/16/17 04:57 4.4 Chloroform 1.6 1.4 0.45 ppb v/v 06/16/17 04:57 4.4 Chloromethane ND 3.8 0.35 ppb v/v 06/16/17 04:57 4.4 1.2-Dichoro-1,1,2.2-tetrafluoroethane ND 1.9 0.73 ppb v/v 06/16/17 04:57 4.4 1.2-Dichoroethane ND 1.9 <	Benzene	ND	1.9	0.37	ppb v/v			06/16/17 04:57	4.69
Bromodichloromethane ND 1.4 0.31 pp/w/w 06/16/17 04:57 4.4 Bromordm ND 1.9 0.33 ppb v/w 06/16/17 04:57 4.4 Bromorefinane ND 3.8 1.6 ppb v/w 06/16/17 04:57 4.4 Carbon disulfide ND 3.8 0.33 ppb v/w 06/16/17 04:57 4.4 Carbon disulfide 0.59 J 3.8 0.30 ppb v/w 06/16/17 04:57 4.4 Chlorobenzene ND 1.4 0.30 ppb v/w 06/16/17 04:57 4.4 Chloroform 1.6 1.4 0.45 ppb v/w 06/16/17 04:57 4.4 Chloroform 1.6 1.4 0.45 ppb v/w 06/16/17 04:57 4.4 Dibromochloromethane ND 3.8 0.32 ppb v/w 06/16/17 04:57 4.4 Liborobenzene ND 1.9 0.37 ppb v/w 06/16/17 04:57 4.4 1.2-Dichlorobenzene ND 1.9 0.52<	Benzyl chloride	ND	3.8	0.76	ppb v/v			06/16/17 04:57	4.69
Bromoform ND 19 0.33 pp v/v 06/16/17 04:57 44 Bromomethane ND 3.8 1.6 pp v/v 06/16/17 04:57 44 Carbon disulfide ND 3.8 0.37 ppb v/v 06/16/17 04:57 44 Carbon disulfide ND 3.8 0.37 ppb v/v 06/16/17 04:57 44 Chorobenzene ND 1.4 0.30 ppb v/v 06/16/17 04:57 44 Chlorobenzene ND 3.8 1.4 ppb v/v 06/16/17 04:57 44 Chlorothane ND 3.8 0.4 ppb v/v 06/16/17 04:57 44 Chlorothane ND 3.8 0.5 ppb v/v 06/16/17 04:57 44 1.2-Dichorothane (EDB) ND 3.8 0.5 ppb v/v 06/16/17 04:57 44 1.2-Dichorothane ND 1.9 0.61 ppb v/v 06/16/17 04:57 44 1.2-Dichorothane 5.2 1.4 0.34 ppb v/v	Bromodichloromethane	ND	1.4	0.31	ppb v/v			06/16/17 04:57	4.69
Bromomethane ND 38 16 pb v/v 06/16/17 04:57 4. 2-Butanone (MEK) ND 3.8 0.93 pb v/v 06/16/17 04:57 4. Carbon disulfide ND 3.8 0.37 pb v/v 06/16/17 04:57 4. Carbon tetrachloride 0.59 J 3.8 0.30 pb v/v 06/16/17 04:57 4. Chlorobenzene ND 1.4 0.30 pb v/v 06/16/17 04:57 4. Chlorothrane ND 3.8 1.4 pb v/v 06/16/17 04:57 4. Chlorothrane ND 3.8 0.92 pb v/v 06/16/17 04:57 4. Chlorothrane ND 1.9 0.37 pb v/v 06/16/17 04:57 4. 1.2-Dichlorobenzene ND 1.9 0.73 pb v/v 06/16/17 04:57 4. 1.2-Dichlorobenzene ND 1.9 0.61 pb v/v 06/16/17 04:57 4. 1.2-Dichlorobenzene ND 1.9 0.61	Bromoform	ND	1.9	0.33	ppb v/v			06/16/17 04:57	4.69
2-Butanone (MEK) ND 3.8 0.93 ppb v/v 06/16/17 04:57 4.4 Carbon tetrachoride 0.59 3.8 0.30 ppb v/v 06/16/17 04:57 4.4 Chlorobenzene ND 3.8 0.30 ppb v/v 06/16/17 04:57 4.4 Chlorobenzene ND 3.8 1.4 ppb v/v 06/16/17 04:57 4.4 Chloroform 1.6 1.4 0.45 ppb v/v 06/16/17 04:57 4.4 Chloroform 1.6 1.4 0.45 ppb v/v 06/16/17 04:57 4.4 Chloromethane ND 3.8 0.92 ppb v/v 06/16/17 04:57 4.4 L2-Dichloro-1, 1, 2, 2-tetrafloroethane ND 1.9 0.37 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloro-1, 1, 2, 2-tetrafloroethane ND 1.9 0.61 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloro-1, 1, 2, 2-tetrafloroethane ND 1.9 0.73 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethane	Bromomethane	ND	3.8	1.6	ppb v/v			06/16/17 04:57	4.69
Carbon disulfide ND 3.8 0.37 pp V/V 06/16/17 04:57 4.4 Carbon tetrachloride 0.59 J 3.8 0.30 pp V/V 06/16/17 04:57 4.4 Chlorobenzene ND 1.4 0.30 pp V/V 06/16/17 04:57 4.4 Chlorobenzene ND 3.8 1.4 pp V/V 06/16/17 04:57 4.4 Chlorobenzene ND 3.8 0.92 pp V/V 06/16/17 04:57 4.4 Chlorobenzene ND 3.8 0.92 pp V/V 06/16/17 04:57 4.4 Dibromochloromethane ND 1.9 0.37 pp V/V 06/16/17 04:57 4.4 1.2-Dichorobenzene ND 1.9 0.73 pp V/V 06/16/17 04:57 4.4 1.2-Dichorobenzene ND 1.9 0.73 pp V/V 06/16/17 04:57 4.4 1.2-Dichorobenzene ND 1.9 0.61 pp V/V 06/16/17 04:57 4.4 1.2-Dichorobenzene ND 1.9	2-Butanone (MEK)	ND	3.8	0.93	ppb v/v			06/16/17 04:57	4.69
Carbon tetrachloride 0.59 J 3.8 0.30 pp V/V 06/16/17 04:57 4.4 Chlorobenzene ND 1.4 0.30 pp V/V 06/16/17 04:57 4.4 Chlorobenzene ND 3.8 1.4 ppb V/V 06/16/17 04:57 4.4 Chloromethane ND 3.8 0.92 ppb V/V 06/16/17 04:57 4.4 Chloromethane ND 3.8 0.92 ppb V/V 06/16/17 04:57 4.4 1.2-Dichoromethane (EDB) ND 3.8 0.35 ppb V/V 06/16/17 04:57 4.4 1.2-Dichoron-1,1,2.2-tetrafluoroethane ND 1.9 0.61 ppb V/V 06/16/17 04:57 4.4 1.2-Dichorobenzene ND 1.9 0.61 ppb V/V 06/16/17 04:57 4.4 1.3-Dichorobenzene ND 1.9 0.70 ppb V/V 06/16/17 04:57 4.4 1.4-Dichorobenzene ND 1.9 0.70 ppb V/V 06/16/17 04:57 4.4 1.4-Dichorobenzene N	Carbon disulfide	ND	3.8	0.37	ppb v/v			06/16/17 04:57	4.69
Chlorobenzene ND 1.4 0.30 ppb v/v 06/16/17 04:57 4.4 Chloroform 1.6 1.4 0.45 ppb v/v 06/16/17 04:57 4.4 Chloroform 1.6 1.4 0.45 ppb v/v 06/16/17 04:57 4.4 Chloroform ND 3.8 0.92 ppb v/v 06/16/17 04:57 4.4 Dibromochloromethane ND 1.9 0.37 ppb v/v 06/16/17 04:57 4.4 1,2-Dichoro-1,1,2,2-tetrafluoroethane ND 1.9 0.73 ppb v/v 06/16/17 04:57 4.4 1,2-Dichorobenzene ND 1.9 0.61 ppb v/v 06/16/17 04:57 4.4 1,2-Dichorobenzene ND 1.9 0.70 ppb v/v 06/16/17 04:57 4.4 1,4-Dichorobenzene ND 1.9 0.70 ppb v/v 06/16/17 04:57 4.4 1,4-Dichorobenzene ND 3.8 0.41 ppb v/v 06/16/17 04:57 4.4 1,4-Dichorobethane 5.2 1.4	Carbon tetrachloride	0.59 J	3.8	0.30	ppb v/v			06/16/17 04:57	4.69
Chloroethane ND 3.8 1.4 pp v/v 06/16/17 04:57 4.4 Chloroform 1.6 1.4 0.45 pp v/v 06/16/17 04:57 4.0 Chloromethane ND 3.8 0.92 pp v/v 06/16/17 04:57 4.0 Dibromochloromethane ND 1.9 0.37 ppb v/v 06/16/17 04:57 4.0 1,2-Dichloro-1,1,2,2-tetrafiloroethane ND 1.9 0.61 ppb v/v 06/16/17 04:57 4.0 1,3-Dichlorobenzene ND 1.9 0.61 ppb v/v 06/16/17 04:57 4.0 1,3-Dichlorobenzene ND 1.9 0.61 ppb v/v 06/16/17 04:57 4.0 1,4-Dichlorobenzene ND 1.9 0.70 ppb v/v 06/16/17 04:57 4.0 1,4-Dichloroethane 5.2 1.4 0.34 ppb v/v 06/16/17 04:57 4.0 1,2-Dichloroethane 3.0 1.9 0.42 ppb v/v 06/16/17 04:57 4.0 1,2-Dichloroethane ND 1.	Chlorobenzene	ND	1.4	0.30	ppb v/v			06/16/17 04:57	4.69
Chloroform 1.6 1.4 0.45 pp v/v 06/16/17 04:57 4.4 Chloromethane ND 3.8 0.92 pp v/v 06/16/17 04:57 4.4 Dibromochloromethane ND 3.8 0.35 ppb v/v 06/16/17 04:57 4.4 1,2-Dichmoethane (EDB) ND 3.8 0.35 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloro-1,1,2,2-tetrafluoroethane ND 1.9 0.73 ppb v/v 06/16/17 04:57 4.1 1,3-Dichlorobenzene ND 1.9 0.73 ppb v/v 06/16/17 04:57 4.1 1,4-Dichlorobenzene ND 1.9 0.70 ppb v/v 06/16/17 04:57 4.1 1,4-Dichlorobenzene ND 3.8 0.41 ppb v/v 06/16/17 04:57 4.1 1,4-Dichloroethane 5.2 1.4 0.34 ppb v/v 06/16/17 04:57 4.1 1,4-Dichloroethane 3.0 1.9 0.42 ppb v/v 06/16/17 04:57 4.1 1,2-Dichloroethane 3.0	Chloroethane	ND	3.8	1.4	ppb v/v			06/16/17 04:57	4.69
Chloromethane ND 3.8 0.92 pp v/v 06/16/17 04:57 4.1 Dibromochloromethane ND 1.9 0.37 ppb v/v 06/16/17 04:57 4.1 1,2-Dibromoethane (EDB) ND 3.8 0.35 ppb v/v 06/16/17 04:57 4.1 1,2-Dichloro-1,1,2,2-tetrafluoroethane ND 1.9 0.73 ppb v/v 06/16/17 04:57 4.1 1,2-Dichlorobenzene ND 1.9 0.61 ppb v/v 06/16/17 04:57 4.1 1,4-Dichlorobenzene ND 1.9 0.52 ppb v/v 06/16/17 04:57 4.1 1,4-Dichloroethane 42 1.9 0.88 pbb v/v 06/16/17 04:57 4.1 1,1-Dichloroethane ND 3.8 0.41 ppb v/v 06/16/17 04:57 4.1 1,2-Dichloroethane ND 3.8 0.41 ppb v/v 06/16/17 04:57 4.1 1,2-Dichloroethane ND 1.9 0.42 ppb v/v 06/16/17 04:57 4.1 1,2-Dichloroethene ND </td <td>Chloroform</td> <td>1.6</td> <td>1.4</td> <td>0.45</td> <td>ppb v/v</td> <td></td> <td></td> <td>06/16/17 04:57</td> <td>4.69</td>	Chloroform	1.6	1.4	0.45	ppb v/v			06/16/17 04:57	4.69
Dibromochloromethane ND 1.9 0.37 ppb v/v 06/16/17 04:57 4.4 1,2-Dibromoethane (EDB) ND 3.8 0.35 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloro-1,1,2,2-tetrafluoroethane ND 1.9 0.61 ppb v/v 06/16/17 04:57 4.4 1,2-Dichlorobenzene ND 1.9 0.61 ppb v/v 06/16/17 04:57 4.4 1,3-Dichlorobenzene ND 1.9 0.52 ppb v/v 06/16/17 04:57 4.4 1,4-Dichlorobenzene ND 1.9 0.70 ppb v/v 06/16/17 04:57 4.4 1,4-Dichloroethane 42 1.9 0.68 ppb v/v 06/16/17 04:57 4.4 1,1-Dichloroethane 5.2 1.4 0.34 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethane 3.0 1.9 0.42 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethene 3.0 1.9 0.42 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloropropane	Chloromethane	ND	3.8	0.92	ppb v/v			06/16/17 04:57	4.69
1,2-Dibromoethane (EDB) ND 3.8 0.35 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloro-1,1,2,2-tetrafluoroethane ND 1.9 0.73 ppb v/v 06/16/17 04:57 4.4 1,2-Dichlorobenzene ND 1.9 0.61 ppb v/v 06/16/17 04:57 4.4 1,3-Dichlorobenzene ND 1.9 0.52 ppb v/v 06/16/17 04:57 4.4 1,4-Dichlorobenzene ND 1.9 0.70 ppb v/v 06/16/17 04:57 4.4 1,4-Dichlorobenzene ND 1.9 0.70 ppb v/v 06/16/17 04:57 4.4 1,4-Dichloroethane 42 1.9 0.68 ppb v/v 06/16/17 04:57 4.4 1,1-Dichloroethane 31 3.8 0.61 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethene 30 1.9 0.42 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethene ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethene ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4	Dibromochloromethane	ND	1.9	0.37	ppb v/v			06/16/17 04:57	4.69
1,2-Dichloro-1,1,2,2-tetrafluoroethane ND 1.9 0.73 ppb v/v 06/16/17 04:57 4.4 1,2-Dichlorobenzene ND 1.9 0.61 ppb v/v 06/16/17 04:57 4.4 1,3-Dichlorobenzene ND 1.9 0.52 ppb v/v 06/16/17 04:57 4.4 1,4-Dichloroethane ND 1.9 0.70 ppb v/v 06/16/17 04:57 4.4 1,4-Dichloroethane 42 1.9 0.68 ppb v/v 06/16/17 04:57 4.4 1,1-Dichloroethane 5.2 1.4 0.34 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethane ND 3.8 0.41 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethane ND 3.8 0.61 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethene 3.0 1.9 0.42 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethene ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroptenpene ND 1.9 0.41 ppb v/v 06/16/17 04:57 4.4 <t< td=""><td>1,2-Dibromoethane (EDB)</td><td>ND</td><td>3.8</td><td>0.35</td><td>ppb v/v</td><td></td><td></td><td>06/16/17 04:57</td><td>4.69</td></t<>	1,2-Dibromoethane (EDB)	ND	3.8	0.35	ppb v/v			06/16/17 04:57	4.69
1,2-Dichlorobenzene ND 1.9 0.61 pb v/v 06/16/17 04:57 4.4 1,3-Dichlorobenzene ND 1.9 0.52 ppb v/v 06/16/17 04:57 4.4 1,4-Dichlorobenzene ND 1.9 0.70 ppb v/v 06/16/17 04:57 4.4 Dichlorodifluoromethane 42 1.9 0.68 ppb v/v 06/16/17 04:57 4.4 1,1-Dichloroethane 5.2 1.4 0.34 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethane ND 3.8 0.41 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethane 3.0 1.9 0.42 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethene 3.0 1.9 0.47 pbb v/v 06/16/17 04:57 4.4 1,2-Dichloropropane ND 1.9 0.47 pbb v/v 06/16/17 04:57 4.4 1,2-Dichloropropane ND 1.9 0.41 pbb v/v 06/16/17 04:57 4.4 trans-1,3-Dichloropropane	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	1.9	0.73	ppb v/v			06/16/17 04:57	4.69
1,3-Dichlorobenzene ND 1.9 0.52 ppb v/v 06/16/17 04:57 4.4 1,4-Dichlorobenzene ND 1.9 0.70 ppb v/v 06/16/17 04:57 4.4 Dichlorodifluoromethane 42 1.9 0.68 pb v/v 06/16/17 04:57 4.4 1,1-Dichloroethane 5.2 1.4 0.34 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethane ND 3.8 0.41 ppb v/v 06/16/17 04:57 4.4 1,1-Dichloroethane 3.0 1.9 0.42 ppb v/v 06/16/17 04:57 4.4 cis-1,2-Dichloroethene 3.0 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroptene ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroptene ND 1.9 0.41 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroptene ND 1.9 0.41 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroptopene ND 1.9 0.41 ppb v/v 06/16/17 04:57 4.4 Et	1,2-Dichlorobenzene	ND	1.9	0.61	ppb v/v			06/16/17 04:57	4.69
1,4-Dichlorobenzene ND 1.9 0.70 ppb v/v 06/16/17 04:57 4.4 Dichlorodifluoromethane 42 1.9 0.68 ppb v/v 06/16/17 04:57 4.4 1,1-Dichloroethane 5.2 1.4 0.34 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethane ND 3.8 0.41 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethane ND 3.8 0.61 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethene 3.0 1.9 0.42 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethene ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroptopane ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroptopene ND 1.9 0.49 pb v/v 06/16/17 04:57 4.4 trans-1,3-Dichloroptopene ND 1.9 0.41 pb v/v 06/16/17 04:57 4.4 4-Ethyltoluene ND 1.9 0.30 pb v/v 06/16/17 04:57 4.4 4-M	1,3-Dichlorobenzene	ND	1.9	0.52	ppb v/v			06/16/17 04:57	4.69
Dichlorodifluoromethane 42 1.9 0.68 ppb v/v 06/16/17 04:57 4.1 1,1-Dichloroethane 5.2 1.4 0.34 ppb v/v 06/16/17 04:57 4.1 1,2-Dichloroethane ND 3.8 0.41 ppb v/v 06/16/17 04:57 4.1 1,1-Dichloroethene 31 3.8 0.61 ppb v/v 06/16/17 04:57 4.1 cis-1,2-Dichloroethene 30 1.9 0.42 ppb v/v 06/16/17 04:57 4.1 1,2-Dichloroethene ND 1.9 0.42 ppb v/v 06/16/17 04:57 4.1 1,2-Dichloropthene ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.1 1,2-Dichloroptopane ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.1 cis-1,3-Dichloropropane ND 1.9 0.41 ppb v/v 06/16/17 04:57 4.1 trans-1,3-Dichloropropane ND 1.9 0.30 ppb v/v 06/16/17 04:57 4.1 4-Ethyltouene ND	1,4-Dichlorobenzene	ND	1.9	0.70	ppb v/v			06/16/17 04:57	4.69
1,1-Dichloroethane 5.2 1.4 0.34 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethane ND 3.8 0.41 ppb v/v 06/16/17 04:57 4.4 1,1-Dichloroethane 31 3.8 0.61 ppb v/v 06/16/17 04:57 4.4 cis-1,2-Dichloroethene 3.0 1.9 0.42 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethene ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloropthene ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroptopane ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,3-Dichloropropane ND 1.9 0.41 ppb v/v 06/16/17 04:57 4.4 Ethylbenzene ND 1.9 0.30 ppb v/v 06/16/17 04:57 4.4 4-Ethyltoluene ND 1.9 0.88 ppb v/v 06/16/17 04:57 4.4 4-Methyl-2-pentanone (MIBK) ND	Dichlorodifluoromethane	42	1.9	0.68	ppb v/v			06/16/17 04:57	4.69
1,2-Dichloroethane ND 3.8 0.41 ppb v/v 06/16/17 04:57 4.4 1,1-Dichloroethene 31 3.8 0.61 ppb v/v 06/16/17 04:57 4.4 cis-1,2-Dichloroethene 3.0 1.9 0.42 ppb v/v 06/16/17 04:57 4.4 trans-1,2-Dichloroethene ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroethene ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroptopane ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroptopene ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 trans-1,3-Dichloroptopene ND 1.9 0.49 ppb v/v 06/16/17 04:57 4.4 Ethylbenzene ND 1.9 0.30 ppb v/v 06/16/17 04:57 4.4 Hexachlorobutadiene ND 1.9 0.88 ppb v/v 06/16/17 04:57 4.4 4-Methyl-2-pentanone (MIBK) ND 1.9 0.63 ppb v/v 06/16/17 04:57 4.4	1,1-Dichloroethane	5.2	1.4	0.34	ppb v/v			06/16/17 04:57	4.69
1,1-Dichloroethene 31 3.8 0.61 ppb v/v 06/16/17 04:57 4.4 cis-1,2-Dichloroethene 3.0 1.9 0.42 ppb v/v 06/16/17 04:57 4.4 trans-1,2-Dichloroethene ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroptopane ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloroptopane ND 1.9 0.49 ppb v/v 06/16/17 04:57 4.4 cis-1,3-Dichloroptopene ND 1.9 0.41 ppb v/v 06/16/17 04:57 4.4 trans-1,3-Dichloroptopene ND 1.9 0.41 ppb v/v 06/16/17 04:57 4.4 Ethylbenzene ND 1.9 0.30 ppb v/v 06/16/17 04:57 4.4 -Ethyltoluene ND 1.9 0.38 ppb v/v 06/16/17 04:57 4.4 -Hexachlorobutadiene ND 9.4 2.0 ppb v/v 06/16/17 04:57 4.4 -Hexanone ND 1.9 0.41 ppb v/v 06/16/17 04:57 4.4 -Hexanone ND 1.9 0.41 ppb v/v 06/16/17 04:57 4.4 Methylene Chlo	1,2-Dichloroethane	ND	3.8	0.41	ppb v/v			06/16/17 04:57	4.69
cis-1,2-Dichloroethene 3.0 1.9 0.42 ppb v/v 06/16/17 04:57 4.4 trans-1,2-Dichloroethene ND 1.9 0.47 ppb v/v 06/16/17 04:57 4.4 1,2-Dichloropropane ND 1.9 1.1 ppb v/v 06/16/17 04:57 4.4 cis-1,3-Dichloropropene ND 1.9 0.49 ppb v/v 06/16/17 04:57 4.4 trans-1,3-Dichloropropene ND 1.9 0.49 ppb v/v 06/16/17 04:57 4.4 Ethylbenzene ND 1.9 0.41 ppb v/v 06/16/17 04:57 4.4 Ethylbenzene ND 1.9 0.30 ppb v/v 06/16/17 04:57 4.4 4-Ethyltoluene ND 1.9 0.30 ppb v/v 06/16/17 04:57 4.4 Hexachlorobutadiene ND 1.9 0.88 ppb v/v 06/16/17 04:57 4.4 4-Methyl-2-pentanone (MIBK) ND 1.9 0.41 ppb v/v 06/16/17 04:57 4.4 Methylene Chloride 1.7	1,1-Dichloroethene	31	3.8	0.61	ppb v/v			06/16/17 04:57	4.69
trans-1,2-DichloroetheneND1.90.47ppb v/v06/16/17 04:574.11,2-DichloropropaneND1.91.1ppb v/v06/16/17 04:574.1cis-1,3-DichloropropeneND1.90.49ppb v/v06/16/17 04:574.1trans-1,3-DichloropropeneND1.90.41ppb v/v06/16/17 04:574.1EthylbenzeneND1.90.30ppb v/v06/16/17 04:574.14-EthyltolueneND1.90.30ppb v/v06/16/17 04:574.14-EthyltolueneND1.90.88ppb v/v06/16/17 04:574.14-EthyltolueneND9.42.0ppb v/v06/16/17 04:574.14-EthyltolueneND9.42.0ppb v/v06/16/17 04:574.14-HexachlorobutadieneND9.42.0ppb v/v06/16/17 04:574.12-HexanoneND1.90.41ppb v/v06/16/17 04:574.14-Methyl-2-pentanone (MIBK)ND1.90.63ppb v/v06/16/17 04:574.1Methylene Chloride1.7J1.90.34ppb v/v06/16/17 04:574.11,1,2,2-TetrachloroethaneND1.90.32ppb v/v06/16/17 04:574.11,1,2,2-TetrachloroethaneND1.90.24ppb v/v06/16/17 04:574.1TolueneND1.90.24ppb v/v06/16/17 04:574.1	cis-1,2-Dichloroethene	3.0	1.9	0.42	ppb v/v			06/16/17 04:57	4.69
1,2-Dichloropropane ND 1.9 1.1 ppb v/v 06/16/17 04:57 4. cis-1,3-Dichloropropene ND 1.9 0.49 ppb v/v 06/16/17 04:57 4. trans-1,3-Dichloropropene ND 1.9 0.41 ppb v/v 06/16/17 04:57 4. Ethylbenzene ND 1.9 0.30 ppb v/v 06/16/17 04:57 4. 4-Ethylboluene ND 1.9 0.30 ppb v/v 06/16/17 04:57 4. 4-Ethylboluene ND 1.9 0.88 ppb v/v 06/16/17 04:57 4. Hexachlorobutadiene ND 9.4 2.0 ppb v/v 06/16/17 04:57 4. 2-Hexanone ND 1.9 0.41 ppb v/v 06/16/17 04:57 4. 4-Methyl-2-pentanone (MIBK) ND 1.9 0.41 ppb v/v 06/16/17 04:57 4. Methylene Chloride 1.7 J 1.9 0.34 ppb v/v 06/16/17 04:57 4. Styrene ND 1.9 0.28 ppb v/v 06/16/17 04:57 4. 1,1,2,2-Tetrachlor	trans-1,2-Dichloroethene	ND	1.9	0.47	ppb v/v			06/16/17 04:57	4.69
cis-1,3-DichloropropeneND1.90.49ppb v/v06/16/17 04:574.trans-1,3-DichloropropeneND1.90.41ppb v/v06/16/17 04:574.EthylbenzeneND1.90.30ppb v/v06/16/17 04:574.4-EthyltolueneND1.90.88ppb v/v06/16/17 04:574.HexachlorobutadieneND9.42.0ppb v/v06/16/17 04:574.2-HexanoneND9.42.0ppb v/v06/16/17 04:574.4-Methyl-2-pentanone (MIBK)ND1.90.63ppb v/v06/16/17 04:574.Methylene Chloride1.7J1.90.34ppb v/v06/16/17 04:574.1,1,2,2-TetrachloroethaneND1.90.32ppb v/v06/16/17 04:574.1,101.90.24ppb v/v06/16/17 04:574.TolueneND1.90.24ppb v/v06/16/17 04:574.	1,2-Dichloropropane	ND	1.9	1.1	ppb v/v			06/16/17 04:57	4.69
trans-1,3-DichloropropeneND1.90.41ppb v/v06/16/17 04:574.EthylbenzeneND1.90.30ppb v/v06/16/17 04:574.4-EthyltolueneND1.90.88ppb v/v06/16/17 04:574.HexachlorobutadieneND9.42.0ppb v/v06/16/17 04:574.2-HexanoneND *1.90.41ppb v/v06/16/17 04:574.4-Methyl-2-pentanone (MIBK)ND1.90.63ppb v/v06/16/17 04:574.Methylene Chloride1.7J1.90.34ppb v/v06/16/17 04:574.StyreneND1.90.32ppb v/v06/16/17 04:574.1,1,2,2-TetrachloroethaneND1.90.32ppb v/v06/16/17 04:574.TolueneND1.90.24ppb v/v06/16/17 04:574.	cis-1,3-Dichloropropene	ND	1.9	0.49	ppb v/v			06/16/17 04:57	4.69
EthylbenzeneND1.90.30ppb v/v06/16/17 04:574.4-EthyltolueneND1.90.88ppb v/v06/16/17 04:574.HexachlorobutadieneND9.42.0ppb v/v06/16/17 04:574.2-HexanoneND *1.90.41ppb v/v06/16/17 04:574.4-Methyl-2-pentanone (MIBK)ND1.90.63ppb v/v06/16/17 04:574.Methylene Chloride1.7J1.90.34ppb v/v06/16/17 04:574.StyreneND1.90.32ppb v/v06/16/17 04:574.1,1,2,2-TetrachloroethaneND1.90.32ppb v/v06/16/17 04:574.TolueneND1.90.24ppb v/v06/16/17 04:574.	trans-1,3-Dichloropropene	ND	1.9	0.41	ppb v/v			06/16/17 04:57	4.69
4-Ethyltoluene ND 1.9 0.88 ppb v/v 06/16/17 04:57 4. Hexachlorobutadiene ND 9.4 2.0 ppb v/v 06/16/17 04:57 4. 2-Hexanone ND * 1.9 0.41 ppb v/v 06/16/17 04:57 4. 4-Methyl-2-pentanone (MIBK) ND 1.9 0.63 ppb v/v 06/16/17 04:57 4. Methylene Chloride 1.7 J 1.9 0.34 ppb v/v 06/16/17 04:57 4. Styrene ND 1.9 0.32 ppb v/v 06/16/17 04:57 4. 1,1,2,2-Tetrachloroethane ND 1.9 0.32 ppb v/v 06/16/17 04:57 4. Tetrachloroethene 110 1.9 0.24 ppb v/v 06/16/17 04:57 4. Toluene ND 1.9 0.24 ppb v/v 06/16/17 04:57 4.	Ethylbenzene	ND	1.9	0.30	ppb v/v			06/16/17 04:57	4.69
Hexachlorobutadiene ND 9.4 2.0 ppb v/v 06/16/17 04:57 4.1 2-Hexanone ND * 1.9 0.41 ppb v/v 06/16/17 04:57 4.1 4-Methyl-2-pentanone (MIBK) ND 1.9 0.63 ppb v/v 06/16/17 04:57 4.1 Methylene Chloride 1.7 J 1.9 0.34 ppb v/v 06/16/17 04:57 4.1 Styrene ND 1.9 0.34 ppb v/v 06/16/17 04:57 4.1 1,1,2,2-Tetrachloroethane ND 1.9 0.32 ppb v/v 06/16/17 04:57 4.1 Toluene ND 1.9 0.24 ppb v/v 06/16/17 04:57 4.1	4-Ethyltoluene	ND	1.9	0.88	ppb v/v			06/16/17 04:57	4.69
2-Hexanone ND * 1.9 0.41 ppb v/v 06/16/17 04:57 4. 4-Methyl-2-pentanone (MIBK) ND 1.9 0.63 ppb v/v 06/16/17 04:57 4. Methylene Chloride 1.7 J 1.9 0.34 ppb v/v 06/16/17 04:57 4. Styrene ND 1.9 0.28 ppb v/v 06/16/17 04:57 4. 1,1,2,2-Tetrachloroethane ND 1.9 0.32 ppb v/v 06/16/17 04:57 4. Tetrachloroethane ND 1.9 0.32 ppb v/v 06/16/17 04:57 4. Toluene ND 1.9 0.24 ppb v/v 06/16/17 04:57 4.	Hexachlorobutadiene	ND	9.4	2.0	ppb v/v			06/16/17 04:57	4.69
4-Methyl-2-pentanone (MIBK) ND 1.9 0.63 ppb v/v 06/16/17 04:57 4.1 Methylene Chloride 1.7 J 1.9 0.34 ppb v/v 06/16/17 04:57 4.1 Styrene ND 1.9 0.28 ppb v/v 06/16/17 04:57 4.1 1,1,2,2-Tetrachloroethane ND 1.9 0.32 ppb v/v 06/16/17 04:57 4.1 Tetrachloroethene 110 1.9 0.24 ppb v/v 06/16/17 04:57 4.1 Toluene ND 1.9 0.24 ppb v/v 06/16/17 04:57 4.1	2-Hexanone	ND *	1.9	0.41	ppb v/v			06/16/17 04:57	4.69
Methylene Chloride 1.7 J 1.9 0.34 ppb v/v 06/16/17 04:57 4. Styrene ND 1.9 0.28 ppb v/v 06/16/17 04:57 4. 1,1,2,2-Tetrachloroethane ND 1.9 0.32 ppb v/v 06/16/17 04:57 4. Tetrachloroethene 110 1.9 0.24 ppb v/v 06/16/17 04:57 4. Toluene ND 1.9 0.24 ppb v/v 06/16/17 04:57 4.	4-Methyl-2-pentanone (MIBK)	ND	1.9	0.63	ppb v/v			06/16/17 04:57	4.69
Styrene ND 1.9 0.28 ppb v/v 06/16/17 04:57 4.1 1,1,2,2-Tetrachloroethane ND 1.9 0.32 ppb v/v 06/16/17 04:57 4.1 Tetrachloroethene 110 1.9 0.24 ppb v/v 06/16/17 04:57 4.1 Toluene ND 1.9 0.24 ppb v/v 06/16/17 04:57 4.1	Methylene Chloride	1.7 J	1.9	0.34	ppb v/v			06/16/17 04:57	4.69
1,1,2,2-Tetrachloroethane ND 1.9 0.32 ppb v/v 06/16/17 04:57 4.1 Tetrachloroethene 110 1.9 0.24 ppb v/v 06/16/17 04:57 4.1 Toluene ND 1.9 0.24 ppb v/v 06/16/17 04:57 4.1	Styrene	ND	1.9	0.28	ppb v/v			06/16/17 04:57	4.69
Tetrachloroethene 110 1.9 0.24 ppb v/v 06/16/17 04:57 4. Toluene ND 1.9 0.24 ppb v/v 06/16/17 04:57 4.	1,1,2,2-Tetrachloroethane	ND	1.9	0.32	ppb v/v			06/16/17 04:57	4.69
Toluene ND 1.9 0.24 ppb v/v 06/16/17 04:57 4.	Tetrachloroethene	110	1.9	0.24	ppb v/v			06/16/17 04:57	4.69
	Toluene	ND	1.9	0.24	ppb v/v			06/16/17 04:57	4.69

07/18/2017

Lab Sample ID: 320-28713-11 Matrix: Air

Client Sample ID: 102473-001/MWL-SV04-200

Date Collected: 05/30/17 10:24 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-12

TestAmerica Job ID: 320-28713-1

Matrix: Air

Method: TO-15 - Volatile Orga	nic Compo	unds in Ar	nbient Air (Co	ontinue	d)	_	<u> </u>		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroetha	150		1.9	0.76	ppb v/v			06/16/17 04:57	4.69
ne									
1,2,4-Trichlorobenzene	ND		9.4	2.0	ppb v/v			06/16/17 04:57	4.69
1,1,1-Trichloroethane	2.7		1.4	0.30	ppb v/v			06/16/17 04:57	4.69
1,1,2-Trichloroethane	ND		1.9	0.31	ppb v/v			06/16/17 04:57	4.69
Trichloroethene	180		1.9	0.49	ppb v/v			06/16/17 04:57	4.69
Trichlorofluoromethane	38		1.9	0.92	ppb v/v			06/16/17 04:57	4.69
1,2,4-Trimethylbenzene	ND		3.8	0.76	ppb v/v			06/16/17 04:57	4.69
1,3,5-Trimethylbenzene	ND		1.9	0.59	ppb v/v			06/16/17 04:57	4.69
Vinyl acetate	ND		3.8	0.68	ppb v/v			06/16/17 04:57	4.69
Vinyl chloride	ND		1.9	0.56	ppb v/v			06/16/17 04:57	4.69
m,p-Xylene	ND		3.8	0.47	ppb v/v			06/16/17 04:57	4.69
o-Xylene	ND		1.9	0.25	ppb v/v			06/16/17 04:57	4.69
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	122		70 - 130			-		06/16/17 04:57	4.69
1,2-Dichloroethane-d4 (Surr)	113		70 - 130					06/16/17 04:57	4.69
Toluene-d8 (Surr)	124		70 - 130					06/16/17 04:57	4.69

Client Sample ID: 102474-001/MWL-SV04-300 Date Collected: 05/30/17 10:28 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-13

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	5.0	J	14	0.48	ppb v/v			06/16/17 05:51	2.72
Benzene	0.30	J	1.1	0.21	ppb v/v			06/16/17 05:51	2.72
Benzyl chloride	ND		2.2	0.44	ppb v/v			06/16/17 05:51	2.72
Bromodichloromethane	ND		0.82	0.18	ppb v/v			06/16/17 05:51	2.72
Bromoform	ND		1.1	0.19	ppb v/v			06/16/17 05:51	2.72
Bromomethane	ND		2.2	0.91	ppb v/v			06/16/17 05:51	2.72
2-Butanone (MEK)	ND		2.2	0.54	ppb v/v			06/16/17 05:51	2.72
Carbon disulfide	ND		2.2	0.21	ppb v/v			06/16/17 05:51	2.72
Carbon tetrachloride	0.36	J	2.2	0.17	ppb v/v			06/16/17 05:51	2.72
Chlorobenzene	ND		0.82	0.17	ppb v/v			06/16/17 05:51	2.72
Chloroethane	ND		2.2	0.84	ppb v/v			06/16/17 05:51	2.72
Chloroform	0.66	J	0.82	0.26	ppb v/v			06/16/17 05:51	2.72
Chloromethane	ND		2.2	0.54	ppb v/v			06/16/17 05:51	2.72
Dibromochloromethane	ND		1.1	0.21	ppb v/v			06/16/17 05:51	2.72
1,2-Dibromoethane (EDB)	ND		2.2	0.20	ppb v/v			06/16/17 05:51	2.72
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.1	0.42	ppb v/v			06/16/17 05:51	2.72
1,2-Dichlorobenzene	ND		1.1	0.35	ppb v/v			06/16/17 05:51	2.72
1,3-Dichlorobenzene	ND		1.1	0.30	ppb v/v			06/16/17 05:51	2.72
1,4-Dichlorobenzene	ND		1.1	0.41	ppb v/v			06/16/17 05:51	2.72
Dichlorodifluoromethane	24		1.1	0.39	ppb v/v			06/16/17 05:51	2.72
1,1-Dichloroethane	1.3		0.82	0.20	ppb v/v			06/16/17 05:51	2.72
1,2-Dichloroethane	ND		2.2	0.24	ppb v/v			06/16/17 05:51	2.72
1,1-Dichloroethene	15		2.2	0.35	ppb v/v			06/16/17 05:51	2.72

Client Sample ID: 102474-001/MWL-SV04-300

Date Collected: 05/30/17 10:28 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-13 Matrix: Air

Method: TO-15 - Volatile Orga	nic Compo	unds in Ar	nbient Air (C	ontinue	d)				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.88	J	1.1	0.24	ppb v/v			06/16/17 05:51	2.72
trans-1,2-Dichloroethene	ND		1.1	0.27	ppb v/v			06/16/17 05:51	2.72
1,2-Dichloropropane	ND		1.1	0.65	ppb v/v			06/16/17 05:51	2.72
cis-1,3-Dichloropropene	ND		1.1	0.28	ppb v/v			06/16/17 05:51	2.72
trans-1,3-Dichloropropene	ND		1.1	0.24	ppb v/v			06/16/17 05:51	2.72
Ethylbenzene	ND		1.1	0.17	ppb v/v			06/16/17 05:51	2.72
4-Ethyltoluene	ND		1.1	0.51	ppb v/v			06/16/17 05:51	2.72
Hexachlorobutadiene	ND		5.4	1.2	ppb v/v			06/16/17 05:51	2.72
2-Hexanone	ND	*	1.1	0.24	ppb v/v			06/16/17 05:51	2.72
4-Methyl-2-pentanone (MIBK)	ND		1.1	0.37	ppb v/v			06/16/17 05:51	2.72
Methylene Chloride	0.39	J	1.1	0.20	ppb v/v			06/16/17 05:51	2.72
Styrene	ND		1.1	0.16	ppb v/v			06/16/17 05:51	2.72
1,1,2,2-Tetrachloroethane	ND		1.1	0.19	ppb v/v			06/16/17 05:51	2.72
Tetrachloroethene	95		1.1	0.14	ppb v/v			06/16/17 05:51	2.72
Toluene	ND		1.1	0.14	ppb v/v			06/16/17 05:51	2.72
1,1,2-Trichloro-1,2,2-trifluoroetha	76		1.1	0.44	ppb v/v			06/16/17 05:51	2.72
ne									
1,2,4-Trichlorobenzene	ND		5.4	1.2	ppb v/v			06/16/17 05:51	2.72
1,1,1-Trichloroethane	1.3		0.82	0.18	ppb v/v			06/16/17 05:51	2.72
1,1,2-Trichloroethane	ND		1.1	0.18	ppb v/v			06/16/17 05:51	2.72
Trichloroethene	87		1.1	0.29	ppb v/v			06/16/17 05:51	2.72
Trichlorofluoromethane	16		1.1	0.53	ppb v/v			06/16/17 05:51	2.72
1,2,4-Trimethylbenzene	ND		2.2	0.44	ppb v/v			06/16/17 05:51	2.72
1,3,5-Trimethylbenzene	ND		1.1	0.34	ppb v/v			06/16/17 05:51	2.72
Vinyl acetate	ND		2.2	0.39	ppb v/v			06/16/17 05:51	2.72
Vinyl chloride	ND		1.1	0.33	ppb v/v			06/16/17 05:51	2.72
m,p-Xylene	ND		2.2	0.27	ppb v/v			06/16/17 05:51	2.72
o-Xylene	ND		1.1	0.15	ppb v/v			06/16/17 05:51	2.72
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	126		70 - 130					06/16/17 05:51	2.72
1,2-Dichloroethane-d4 (Surr)	114		70 - 130					06/16/17 05:51	2.72

Client Sample ID: 102475-001/MWL-SV04-400 Date Collected: 05/30/17 10:34 Date Received: 06/06/17 10:20

123

Sample Container: Summa Canister 6L

Toluene-d8 (Surr)

Method: TO-15 - Volatile Organic Compounds in Ambient Air									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	11	J	14	0.49	ppb v/v			06/16/17 06:45	2.78
Benzene	0.50	J	1.1	0.22	ppb v/v			06/16/17 06:45	2.78
Benzyl chloride	ND		2.2	0.45	ppb v/v			06/16/17 06:45	2.78
Bromodichloromethane	ND		0.83	0.18	ppb v/v			06/16/17 06:45	2.78
Bromoform	ND		1.1	0.19	ppb v/v			06/16/17 06:45	2.78
Bromomethane	ND		2.2	0.93	ppb v/v			06/16/17 06:45	2.78
2-Butanone (MEK)	1.4	J	2.2	0.55	ppb v/v			06/16/17 06:45	2.78
Carbon disulfide	2.0	J	2.2	0.22	ppb v/v			06/16/17 06:45	2.78

70 - 130

TestAmerica Sacramento

06/16/17 05:51

Lab Sample ID: 320-28713-14

2.72

Client Sample ID: 102475-001/MWL-SV04-400

Date Collected: 05/30/17 10:34 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Orga Analyte	nic Compo Result	unds in Ar Qualifier	nbient Air (Co RL	ontinue MDL	<mark>d)</mark> Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	0.23	J	2.2	0.18	ppb v/v			06/16/17 06:45	2.78
Chlorobenzene	ND		0.83	0.18	ppb v/v			06/16/17 06:45	2.78
Chloroethane	ND		2.2	0.86	ppb v/v			06/16/17 06:45	2.78
Chloroform	0.67	J	0.83	0.26	ppb v/v			06/16/17 06:45	2.78
Chloromethane	ND		2.2	0.55	ppb v/v			06/16/17 06:45	2.78
Dibromochloromethane	ND		1.1	0.22	ppb v/v			06/16/17 06:45	2.78
1,2-Dibromoethane (EDB)	ND		2.2	0.21	ppb v/v			06/16/17 06:45	2.78
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.1	0.43	ppb v/v			06/16/17 06:45	2.78
1,2-Dichlorobenzene	ND		1.1	0.36	ppb v/v			06/16/17 06:45	2.78
1,3-Dichlorobenzene	ND		1.1	0.31	ppb v/v			06/16/17 06:45	2.78
1,4-Dichlorobenzene	ND		1.1	0.41	ppb v/v			06/16/17 06:45	2.78
Dichlorodifluoromethane	17		1.1	0.40	ppb v/v			06/16/17 06:45	2.78
1.1-Dichloroethane	1.3		0.83	0.20	ppb v/v			06/16/17 06:45	2.78
1,2-Dichloroethane	ND		2.2	0.24	ppb v/v			06/16/17 06:45	2.78
1.1-Dichloroethene	11		2.2	0.36	ppb v/v			06/16/17 06:45	2.78
cis-1.2-Dichloroethene	0.81	J	1.1	0.25	ppb v/v			06/16/17 06:45	2.78
trans-1,2-Dichloroethene	ND		1.1	0.28	ppb v/v			06/16/17 06:45	2.78
1,2-Dichloropropane	ND		1.1	0.67	ppb v/v			06/16/17 06:45	2.78
cis-1,3-Dichloropropene	ND		1.1	0.29	ppb v/v			06/16/17 06:45	2.78
trans-1,3-Dichloropropene	ND		1.1	0.24	ppb v/v			06/16/17 06:45	2.78
Ethylbenzene	ND		1.1	0.18	ppb v/v			06/16/17 06:45	2.78
4-Ethyltoluene	ND		1.1	0.52	v/v daa			06/16/17 06:45	2.78
Hexachlorobutadiene	ND		5.6	1.2	ppb v/v			06/16/17 06:45	2.78
2-Hexanone	ND	*	1.1	0.24	v/v daa			06/16/17 06:45	2.78
4-Methyl-2-pentanone (MIBK)	ND		1.1	0.38	v/v daa			06/16/17 06:45	2.78
Methylene Chloride	0.44	J	1.1	0.20	v/v daa			06/16/17 06:45	2.78
Styrene	ND	-	1.1	0.16	ppb v/v			06/16/17 06:45	2.78
1.1.2.2-Tetrachloroethane	ND		1.1	0.19	ppb v/v			06/16/17 06:45	2.78
Tetrachloroethene	100		1.1	0.14	v/v daa			06/16/17 06:45	2.78
Toluene	0.17	J	1.1	0.14	v/v daa			06/16/17 06:45	2.78
1.1.2-Trichloro-1.2.2-trifluoroetha	66	-	1.1	0.45	v/v daa			06/16/17 06:45	2.78
ne					PP-2				
1,2,4-Trichlorobenzene	ND		5.6	1.2	ppb v/v			06/16/17 06:45	2.78
1,1,1-Trichloroethane	1.3		0.83	0.18	ppb v/v			06/16/17 06:45	2.78
1,1,2-Trichloroethane	ND		1.1	0.19	ppb v/v			06/16/17 06:45	2.78
Trichloroethene	85		1.1	0.29	ppb v/v			06/16/17 06:45	2.78
Trichlorofluoromethane	14		1.1	0.54	ppb v/v			06/16/17 06:45	2.78
1,2,4-Trimethylbenzene	ND		2.2	0.45	ppb v/v			06/16/17 06:45	2.78
1,3,5-Trimethylbenzene	ND		1.1	0.35	ppb v/v			06/16/17 06:45	2.78
Vinyl acetate	ND		2.2	0.40	ppb v/v			06/16/17 06:45	2.78
Vinyl chloride	ND		1.1	0.33	ppb v/v			06/16/17 06:45	2.78
m,p-Xylene	ND		2.2	0.28	ppb v/v			06/16/17 06:45	2.78
o-Xylene	ND		1.1	0.15	ppb v/v			06/16/17 06:45	2.78
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	125		70 - 130			-		06/16/17 06:45	2.78
1,2-Dichloroethane-d4 (Surr)	119		70 - 130					06/16/17 06:45	2.78
Toluene-d8 (Surr)	122		70 - 130					06/16/17 06:45	2.78

Matrix: Air

Lab Sample ID: 320-28713-14

07/18/2017

Matrix: Air

Lab Sample ID: 320-28713-15

Client Sample ID: 102477-001/MWL-SV-FB5 Date Collected: 05/30/17 10:49

Date Received: 06/06/17 10:40

Sample Container: Summa Canister 6L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	0.87	J	5.0	0.18	ppb v/v			06/22/17 00:27	1
Benzene	ND		0.40	0.079	ppb v/v			06/22/17 00:27	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			06/22/17 00:27	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			06/22/17 00:27	1
Bromoform	ND		0.40	0.070	ppb v/v			06/22/17 00:27	1
Bromomethane	ND		0.80	0.34	ppb v/v			06/22/17 00:27	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			06/22/17 00:27	1
Carbon disulfide	0.090	J	0.80	0.078	ppb v/v			06/22/17 00:27	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			06/22/17 00:27	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			06/22/17 00:27	1
Chloroethane	ND		0.80	0.31	ppb v/v			06/22/17 00:27	1
Chloroform	ND		0.30	0.095	ppb v/v			06/22/17 00:27	1
Chloromethane	ND		0.80	0.20	ppb v/v			06/22/17 00:27	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			06/22/17 00:27	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			06/22/17 00:27	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			06/22/17 00:27	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			06/22/17 00:27	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			06/22/17 00:27	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			06/22/17 00:27	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			06/22/17 00:27	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			06/22/17 00:27	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			06/22/17 00:27	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			06/22/17 00:27	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			06/22/17 00:27	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			06/22/17 00:27	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			06/22/17 00:27	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			06/22/17 00:27	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			06/22/17 00:27	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			06/22/17 00:27	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			06/22/17 00:27	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			06/22/17 00:27	1
2-Hexanone	ND		0.40	0.087	ppb v/v			06/22/17 00:27	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			06/22/17 00:27	1
Methylene Chloride	0.10	J	0.40	0.072	ppb v/v			06/22/17 00:27	1
Styrene	ND		0.40	0.059	ppb v/v			06/22/17 00:27	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			06/22/17 00:27	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			06/22/17 00:27	1
Toluene	0.26	J	0.40	0.051	ppb v/v			06/22/17 00:27	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			06/22/17 00:27	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			06/22/17 00:27	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			06/22/17 00:27	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			06/22/17 00:27	1
Trichloroethene	ND		0.40	0.11	ppb v/v			06/22/17 00:27	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			06/22/17 00:27	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			06/22/17 00:27	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			06/22/17 00:27	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			06/22/17 00:27	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			06/22/17 00:27	1

Client Sample ID: 102477-001/MWL-SV-FB5 Date Collected: 05/30/17 10:49 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-15 Matrix: Air

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 06/22/17 00:27 1 ND o-Xylene 0.40 0.054 ppb v/v 06/22/17 00:27 1 Limits Prepared Dil Fac Surrogate %Recovery Qualifier Analyzed 96 1 4-Bromofluorobenzene (Surr) 70 - 130 06/22/17 00:27 1,2-Dichloroethane-d4 (Surr) 106 70 - 130 06/22/17 00:27 1 06/22/17 00:27 Toluene-d8 (Surr) 103 70 - 130 1

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Client Sample ID: 102478-001/MWL-SV05-50 Date Collected: 05/30/17 10:52 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-16 Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air Analyte Result Qualifier RL

Analyte	Result	Qualifier	RL	NDL	Unit	U	Prepared	Analyzed	DIIFac
Acetone	2.8	J	5.0	0.18	ppb v/v			06/22/17 01:25	1
Benzene	0.18	J	0.40	0.079	ppb v/v			06/22/17 01:25	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			06/22/17 01:25	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			06/22/17 01:25	1
Bromoform	ND		0.40	0.070	ppb v/v			06/22/17 01:25	1
Bromomethane	ND		0.80	0.34	ppb v/v			06/22/17 01:25	1
2-Butanone (MEK)	0.48	J	0.80	0.20	ppb v/v			06/22/17 01:25	1
Carbon disulfide	0.88		0.80	0.078	ppb v/v			06/22/17 01:25	1
Carbon tetrachloride	0.33	J	0.80	0.064	ppb v/v			06/22/17 01:25	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			06/22/17 01:25	1
Chloroethane	ND		0.80	0.31	ppb v/v			06/22/17 01:25	1
Chloroform	1.3		0.30	0.095	ppb v/v			06/22/17 01:25	1
Chloromethane	ND		0.80	0.20	ppb v/v			06/22/17 01:25	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			06/22/17 01:25	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			06/22/17 01:25	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			06/22/17 01:25	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			06/22/17 01:25	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			06/22/17 01:25	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			06/22/17 01:25	1
Dichlorodifluoromethane	23		0.40	0.15	ppb v/v			06/22/17 01:25	1
1,1-Dichloroethane	1.7		0.30	0.072	ppb v/v			06/22/17 01:25	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			06/22/17 01:25	1
1,1-Dichloroethene	10		0.80	0.13	ppb v/v			06/22/17 01:25	1
cis-1,2-Dichloroethene	0.64		0.40	0.089	ppb v/v			06/22/17 01:25	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			06/22/17 01:25	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			06/22/17 01:25	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			06/22/17 01:25	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			06/22/17 01:25	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			06/22/17 01:25	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			06/22/17 01:25	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			06/22/17 01:25	1
2-Hexanone	ND		0.40	0.087	ppb v/v			06/22/17 01:25	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			06/22/17 01:25	1
Methylene Chloride	0.25	J	0.40	0.072	ppb v/v			06/22/17 01:25	1

Client Sample ID: 102478-001/MWL-SV05-50 Date Collected: 05/30/17 10:52

Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-16

TestAmerica Job ID: 320-28713-1

Matrix: Air

Method: TO-15 - Volatile Organ Analyte	ic Compou Result	unds in Amb Qualifier	b <mark>ient Air (C</mark> RL	ontinue MDL	d <mark>)</mark> Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		0.40	0.059	ppb v/v		•	06/22/17 01:25	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			06/22/17 01:25	1
Tetrachloroethene	44		0.40	0.051	ppb v/v			06/22/17 01:25	1
Toluene	0.085	J	0.40	0.051	ppb v/v			06/22/17 01:25	1
1,1,2-Trichloro-1,2,2-trifluoroetha	44		0.40	0.16	ppb v/v			06/22/17 01:25	1
ne									
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			06/22/17 01:25	1
1,1,1-Trichloroethane	14		0.30	0.065	ppb v/v			06/22/17 01:25	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			06/22/17 01:25	1
Trichloroethene	49		0.40	0.11	ppb v/v			06/22/17 01:25	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			06/22/17 01:25	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			06/22/17 01:25	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			06/22/17 01:25	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			06/22/17 01:25	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			06/22/17 01:25	1
o-Xylene	ND		0.40	0.054	ppb v/v			06/22/17 01:25	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130		06/22/17 01:25	1
1,2-Dichloroethane-d4 (Surr)	105		70 - 130		06/22/17 01:25	1
Toluene-d8 (Surr)	104		70 - 130		06/22/17 01:25	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL Unit	D	Prepared	Analyzed	Dil Fac
Trichlorofluoromethane	110		1.4	0.70 ppb v/v			06/22/17 08:41	3.58
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130				06/22/17 08:41	3.58
1,2-Dichloroethane-d4 (Surr)	101		70 - 130				06/22/17 08:41	3.58
Toluene-d8 (Surr)	99		70 - 130				06/22/17 08:41	3.58

Client Sample ID: 102479-001/MWL-SV05-100 Date Collected: 05/30/17 10:55 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Wethou. 10-13 - Volatile Of	nethou. 10-13 - Volatile Organic Compounds in Ambient An											
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac			
Acetone	2.7	J	12	0.42	ppb v/v			06/22/17 02:20	2.34			
Benzene	0.22	J	0.94	0.18	ppb v/v			06/22/17 02:20	2.34			
Benzyl chloride	ND		1.9	0.38	ppb v/v			06/22/17 02:20	2.34			
Bromodichloromethane	ND		0.70	0.15	ppb v/v			06/22/17 02:20	2.34			
Bromoform	ND		0.94	0.16	ppb v/v			06/22/17 02:20	2.34			
Bromomethane	ND		1.9	0.78	ppb v/v			06/22/17 02:20	2.34			
2-Butanone (MEK)	ND		1.9	0.47	ppb v/v			06/22/17 02:20	2.34			
Carbon disulfide	ND		1.9	0.18	ppb v/v			06/22/17 02:20	2.34			
Carbon tetrachloride	0.58	J	1.9	0.15	ppb v/v			06/22/17 02:20	2.34			
Chlorobenzene	ND		0.70	0.15	ppb v/v			06/22/17 02:20	2.34			
Chloroethane	ND		1.9	0.72	ppb v/v			06/22/17 02:20	2.34			
Chloroform	2.1		0.70	0.22	ppb v/v			06/22/17 02:20	2.34			

TestAmerica Sacramento

Lab Sample ID: 320-28713-17

Client Sample ID: 102479-001/MWL-SV05-100

Date Collected: 05/30/17 10:55 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-17 Matrix: Air

Analyte	Result	Qualifier		MDI	unit	п	Prepared	Analyzed	Dil Fac
Chloromethane			1.9	0.46	ppb v/v		Tiopulou	$-\frac{100}{06/22/17}$	2 34
Dibromochloromethane	ND		0.94	0.18	ppb v/v			06/22/17 02:20	2.34
1.2-Dibromoethane (EDB)	ND		1.9	0.18	ppb v/v			06/22/17 02:20	2.34
1 2-Dichloro-1 1 2 2-tetrafluoroethane	ND		0.94	0.36	ppb v/v			06/22/17 02:20	2 34
1.2-Dichlorobenzene	ND		0.94	0.30	ppb v/v			06/22/17 02:20	2.34
1.3-Dichlorobenzene	ND		0.94	0.26	v/v dag			06/22/17 02:20	2.34
1.4-Dichlorobenzene	ND		0.94	0.35	v/v dag			06/22/17 02:20	2.34
Dichlorodifluoromethane	57		0.94	0.34	v/v daa			06/22/17 02:20	2.34
1.1-Dichloroethane	3.6		0.70	0.17	ppb v/v			06/22/17 02:20	2.34
1,2-Dichloroethane	ND		1.9	0.21	ppb v/v			06/22/17 02:20	2.34
1.1-Dichloroethene	23		1.9	0.30	ppb v/v			06/22/17 02:20	2.34
cis-1.2-Dichloroethene	1.6		0.94	0.21	ppb v/v			06/22/17 02:20	2.34
trans-1,2-Dichloroethene	ND		0.94	0.23	ppb v/v			06/22/17 02:20	2.34
1,2-Dichloropropane	ND		0.94	0.56	ppb v/v			06/22/17 02:20	2.34
cis-1,3-Dichloropropene	ND		0.94	0.24	ppb v/v			06/22/17 02:20	2.34
trans-1,3-Dichloropropene	ND		0.94	0.21	ppb v/v			06/22/17 02:20	2.34
Ethylbenzene	ND		0.94	0.15	ppb v/v			06/22/17 02:20	2.34
4-Ethyltoluene	ND		0.94	0.44	ppb v/v			06/22/17 02:20	2.34
Hexachlorobutadiene	ND		4.7	1.0	ppb v/v			06/22/17 02:20	2.34
2-Hexanone	ND		0.94	0.20	ppb v/v			06/22/17 02:20	2.34
4-Methyl-2-pentanone (MIBK)	ND		0.94	0.32	ppb v/v			06/22/17 02:20	2.34
Methylene Chloride	ND		0.94	0.17	ppb v/v			06/22/17 02:20	2.34
Styrene	ND		0.94	0.14	ppb v/v			06/22/17 02:20	2.34
1,1,2,2-Tetrachloroethane	ND		0.94	0.16	ppb v/v			06/22/17 02:20	2.34
Tetrachloroethene	89		0.94	0.12	ppb v/v			06/22/17 02:20	2.34
Toluene	ND		0.94	0.12	ppb v/v			06/22/17 02:20	2.34
1,1,2-Trichloro-1,2,2-trifluoroetha	91		0.94	0.38	ppb v/v			06/22/17 02:20	2.34
1.2.4-Trichlorobenzene	ND		4.7	1.0	v/v daa			06/22/17 02:20	2.34
1.1.1-Trichloroethane	14		0.70	0.15	ppb v/v			06/22/17 02:20	2.34
1.1.2-Trichloroethane	ND		0.94	0.16	v/v dag			06/22/17 02:20	2.34
Trichloroethene	110		0.94	0.25	v/v dag			06/22/17 02:20	2.34
1.2.4-Trimethylbenzene	ND		1.9	0.38	v/v dag			06/22/17 02:20	2.34
1,3,5-Trimethylbenzene	ND		0.94	0.29	ppb v/v			06/22/17 02:20	2.34
Vinvl acetate	5.5		1.9	0.34	ppb v/v			06/22/17 02:20	2.34
Vinyl chloride	ND		0.94	0.28	ppb v/v			06/22/17 02:20	2.34
m,p-Xylene	ND		1.9	0.23	ppb v/v			06/22/17 02:20	2.34
o-Xylene	ND		0.94	0.13	ppb v/v			06/22/17 02:20	2.34
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					06/22/17 02:20	2.34
1,2-Dichloroethane-d4 (Surr)	106		70 - 130					06/22/17 02:20	2.34
Toluene-d8 (Surr)	104		70 - 130					06/22/17 02:20	2.34
Method: TO-15 - Volatile Orga	nic Compo	unds in Ar	nbient Air - D	L					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichlorofluoromethane	150		2.0	0.96	ppb v/v			06/22/17 09:34	4.88

07/18/2017

Client Sample ID: 102479-001/MWL-SV05-100 Date Collected: 05/30/17 10:55 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		70 - 130		06/22/17 09:34	4.88
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		06/22/17 09:34	4.88
Toluene-d8 (Surr)	101		70 - 130		06/22/17 09:34	4.88

Client Sample ID: 102480-001/MWL-SV05-200 Date Collected: 05/30/17 10:58 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-18 Matrix: Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	3.3	J	25	0.88	ppb v/v			06/22/17 03:12	4.92
Benzene	ND		2.0	0.39	ppb v/v			06/22/17 03:12	4.92
Benzyl chloride	ND		3.9	0.80	ppb v/v			06/22/17 03:12	4.92
Bromodichloromethane	ND		1.5	0.32	ppb v/v			06/22/17 03:12	4.92
Bromoform	ND		2.0	0.34	ppb v/v			06/22/17 03:12	4.92
Bromomethane	ND		3.9	1.6	ppb v/v			06/22/17 03:12	4.92
2-Butanone (MEK)	ND		3.9	0.98	ppb v/v			06/22/17 03:12	4.92
Carbon disulfide	1.0	J	3.9	0.38	ppb v/v			06/22/17 03:12	4.92
Carbon tetrachloride	1.1	J	3.9	0.31	ppb v/v			06/22/17 03:12	4.92
Chlorobenzene	ND		1.5	0.31	ppb v/v			06/22/17 03:12	4.92
Chloroethane	ND		3.9	1.5	ppb v/v			06/22/17 03:12	4.92
Chloroform	2.2		1.5	0.47	ppb v/v			06/22/17 03:12	4.92
Chloromethane	1.2	J	3.9	0.97	ppb v/v			06/22/17 03:12	4.92
Dibromochloromethane	ND		2.0	0.39	ppb v/v			06/22/17 03:12	4.92
1,2-Dibromoethane (EDB)	ND		3.9	0.37	ppb v/v			06/22/17 03:12	4.92
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0	0.76	ppb v/v			06/22/17 03:12	4.92
1,2-Dichlorobenzene	ND		2.0	0.64	ppb v/v			06/22/17 03:12	4.92
1,3-Dichlorobenzene	ND		2.0	0.54	ppb v/v			06/22/17 03:12	4.92
1,4-Dichlorobenzene	ND		2.0	0.73	ppb v/v			06/22/17 03:12	4.92
Dichlorodifluoromethane	66		2.0	0.71	ppb v/v			06/22/17 03:12	4.92
1,1-Dichloroethane	5.5		1.5	0.35	ppb v/v			06/22/17 03:12	4.92
1,2-Dichloroethane	ND		3.9	0.43	ppb v/v			06/22/17 03:12	4.92
1,1-Dichloroethene	42		3.9	0.63	ppb v/v			06/22/17 03:12	4.92
cis-1,2-Dichloroethene	2.8		2.0	0.44	ppb v/v			06/22/17 03:12	4.92
trans-1,2-Dichloroethene	ND		2.0	0.49	ppb v/v			06/22/17 03:12	4.92
1,2-Dichloropropane	ND		2.0	1.2	ppb v/v			06/22/17 03:12	4.92
cis-1,3-Dichloropropene	ND		2.0	0.51	ppb v/v			06/22/17 03:12	4.92
trans-1,3-Dichloropropene	ND		2.0	0.43	ppb v/v			06/22/17 03:12	4.92
Ethylbenzene	ND		2.0	0.31	ppb v/v			06/22/17 03:12	4.92
4-Ethyltoluene	ND		2.0	0.92	ppb v/v			06/22/17 03:12	4.92
Hexachlorobutadiene	ND		9.8	2.1	ppb v/v			06/22/17 03:12	4.92
2-Hexanone	ND		2.0	0.43	ppb v/v			06/22/17 03:12	4.92
4-Methyl-2-pentanone (MIBK)	ND		2.0	0.66	ppb v/v			06/22/17 03:12	4.92
Methylene Chloride	2.9		2.0	0.35	ppb v/v			06/22/17 03:12	4.92
Styrene	ND		2.0	0.29	ppb v/v			06/22/17 03:12	4.92
1,1,2,2-Tetrachloroethane	ND		2.0	0.34	ppb v/v			06/22/17 03:12	4.92
Tetrachloroethene	140		2.0	0.25	ppb v/v			06/22/17 03:12	4.92
Toluene	0.28	J	2.0	0.25	ppb v/v			06/22/17 03:12	4.92

TestAmerica Sacramento

Lab Sample ID: 320-28713-17 Matrix: Air

Client Sample ID: 102480-001/MWL-SV05-200

Date Collected: 05/30/17 10:58 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-18

TestAmerica Job ID: 320-28713-1

Matrix: Air

Method: TO-15 - Volatile Orga	nic Compo	u <mark>nds in A</mark> r	nbient Air (Co	ontinue	d)				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroetha	150		2.0	0.80	ppb v/v			06/22/17 03:12	4.92
ne									
1,2,4-Trichlorobenzene	ND		9.8	2.1	ppb v/v			06/22/17 03:12	4.92
1,1,1-Trichloroethane	4.0		1.5	0.32	ppb v/v			06/22/17 03:12	4.92
1,1,2-Trichloroethane	ND		2.0	0.33	ppb v/v			06/22/17 03:12	4.92
Trichloroethene	190		2.0	0.52	ppb v/v			06/22/17 03:12	4.92
Trichlorofluoromethane	85		2.0	0.96	ppb v/v			06/22/17 03:12	4.92
1,2,4-Trimethylbenzene	ND		3.9	0.80	ppb v/v			06/22/17 03:12	4.92
1,3,5-Trimethylbenzene	ND		2.0	0.62	ppb v/v			06/22/17 03:12	4.92
Vinyl acetate	1.4	J	3.9	0.71	ppb v/v			06/22/17 03:12	4.92
Vinyl chloride	ND		2.0	0.59	ppb v/v			06/22/17 03:12	4.92
m,p-Xylene	ND		3.9	0.49	ppb v/v			06/22/17 03:12	4.92
o-Xylene	ND		2.0	0.27	ppb v/v			06/22/17 03:12	4.92
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130			-		06/22/17 03:12	4.92
1,2-Dichloroethane-d4 (Surr)	104		70 - 130					06/22/17 03:12	4.92
Toluene-d8 (Surr)	101		70 - 130					06/22/17 03:12	4.92

Client Sample ID: 102481-001/MWL-SV05-300 Date Collected: 05/30/17 11:03 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-19

Matrix: Air

Method: TO-15 - Volatile Organic Comp	ounds in Am	ibient Air						
Analyte Resu	It Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone 5.	5 J	15	0.54	ppb v/v			06/22/17 04:06	3.02
Benzene 0.2	5 J	1.2	0.24	ppb v/v			06/22/17 04:06	3.02
Benzyl chloride N	C	2.4	0.49	ppb v/v			06/22/17 04:06	3.02
Bromodichloromethane N	0	0.91	0.20	ppb v/v			06/22/17 04:06	3.02
Bromoform N	C	1.2	0.21	ppb v/v			06/22/17 04:06	3.02
Bromomethane N	C	2.4	1.0	ppb v/v			06/22/17 04:06	3.02
2-Butanone (MEK) N	D	2.4	0.60	ppb v/v			06/22/17 04:06	3.02
Carbon disulfide N	C	2.4	0.24	ppb v/v			06/22/17 04:06	3.02
Carbon tetrachloride 1.	0 J	2.4	0.19	ppb v/v			06/22/17 04:06	3.02
Chlorobenzene N	0	0.91	0.19	ppb v/v			06/22/17 04:06	3.02
Chloroethane N	C	2.4	0.93	ppb v/v			06/22/17 04:06	3.02
Chloroform 1.	0	0.91	0.29	ppb v/v			06/22/17 04:06	3.02
Chloromethane N	D	2.4	0.59	ppb v/v			06/22/17 04:06	3.02
Dibromochloromethane N	C	1.2	0.24	ppb v/v			06/22/17 04:06	3.02
1,2-Dibromoethane (EDB) N	C	2.4	0.23	ppb v/v			06/22/17 04:06	3.02
1,2-Dichloro-1,1,2,2-tetrafluoroethane N	C	1.2	0.47	ppb v/v			06/22/17 04:06	3.02
1,2-Dichlorobenzene N	C	1.2	0.39	ppb v/v			06/22/17 04:06	3.02
1,3-Dichlorobenzene N	C	1.2	0.33	ppb v/v			06/22/17 04:06	3.02
1,4-Dichlorobenzene N	D	1.2	0.45	ppb v/v			06/22/17 04:06	3.02
Dichlorodifluoromethane 4	0	1.2	0.44	ppb v/v			06/22/17 04:06	3.02
1,1-Dichloroethane 2.	5	0.91	0.22	ppb v/v			06/22/17 04:06	3.02
1,2-Dichloroethane N	5	2.4	0.27	ppb v/v			06/22/17 04:06	3.02
1,1-Dichloroethene 3	1	2.4	0.39	ppb v/v			06/22/17 04:06	3.02

Client Sample ID: 102481-001/MWL-SV05-300

Date Collected: 05/30/17 11:03 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-19 Matrix: Air

Method: TO-15 - Volatile Orga	nic Compo	unds in Ar	nbient Air (C	ontinue	d)				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	1.2		1.2	0.27	ppb v/v			06/22/17 04:06	3.02
trans-1,2-Dichloroethene	ND		1.2	0.30	ppb v/v			06/22/17 04:06	3.02
1,2-Dichloropropane	ND		1.2	0.72	ppb v/v			06/22/17 04:06	3.02
cis-1,3-Dichloropropene	ND		1.2	0.31	ppb v/v			06/22/17 04:06	3.02
trans-1,3-Dichloropropene	ND		1.2	0.27	ppb v/v			06/22/17 04:06	3.02
Ethylbenzene	ND		1.2	0.19	ppb v/v			06/22/17 04:06	3.02
4-Ethyltoluene	ND		1.2	0.56	ppb v/v			06/22/17 04:06	3.02
Hexachlorobutadiene	ND		6.0	1.3	ppb v/v			06/22/17 04:06	3.02
2-Hexanone	ND		1.2	0.26	ppb v/v			06/22/17 04:06	3.02
4-Methyl-2-pentanone (MIBK)	ND		1.2	0.41	ppb v/v			06/22/17 04:06	3.02
Methylene Chloride	1.2		1.2	0.22	ppb v/v			06/22/17 04:06	3.02
Styrene	ND		1.2	0.18	ppb v/v			06/22/17 04:06	3.02
1,1,2,2-Tetrachloroethane	ND		1.2	0.21	ppb v/v			06/22/17 04:06	3.02
Tetrachloroethene	110		1.2	0.15	ppb v/v			06/22/17 04:06	3.02
Toluene	0.19	J	1.2	0.15	ppb v/v			06/22/17 04:06	3.02
1,1,2-Trichloro-1,2,2-trifluoroetha	130		1.2	0.49	ppb v/v			06/22/17 04:06	3.02
ne									
1,2,4-Trichlorobenzene	ND		6.0	1.3	ppb v/v			06/22/17 04:06	3.02
1,1,1-Trichloroethane	1.8		0.91	0.20	ppb v/v			06/22/17 04:06	3.02
1,1,2-Trichloroethane	ND		1.2	0.20	ppb v/v			06/22/17 04:06	3.02
Trichloroethene	120		1.2	0.32	ppb v/v			06/22/17 04:06	3.02
Trichlorofluoromethane	37		1.2	0.59	ppb v/v			06/22/17 04:06	3.02
1,2,4-Trimethylbenzene	ND		2.4	0.49	ppb v/v			06/22/17 04:06	3.02
1,3,5-Trimethylbenzene	ND		1.2	0.38	ppb v/v			06/22/17 04:06	3.02
Vinyl acetate	ND		2.4	0.44	ppb v/v			06/22/17 04:06	3.02
Vinyl chloride	ND		1.2	0.36	ppb v/v			06/22/17 04:06	3.02
m,p-Xylene	ND		2.4	0.30	ppb v/v			06/22/17 04:06	3.02
o-Xylene	ND		1.2	0.16	ppb v/v			06/22/17 04:06	3.02
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130					06/22/17 04:06	3.02
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					06/22/17 04:06	3.02

Client Sample ID: 102482-001/MWL-SV05-400 Date Collected: 05/30/17 11:11 Date Received: 06/06/17 10:20

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Sample Container: Summa Canister 6L

Toluene-d8 (Surr)

Method: TO-15 - Volatile Organic Compounds in Ambient Air									
Analyte Res	ult Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Acetone	6.4 J	12	0.41	ppb v/v			06/22/17 05:00	2.32	
Benzene 0	34 J	0.93	0.18	ppb v/v			06/22/17 05:00	2.32	
Benzyl chloride	ND	1.9	0.38	ppb v/v			06/22/17 05:00	2.32	
Bromodichloromethane	ND	0.70	0.15	ppb v/v			06/22/17 05:00	2.32	
Bromoform	ND	0.93	0.16	ppb v/v			06/22/17 05:00	2.32	
Bromomethane	ND	1.9	0.78	ppb v/v			06/22/17 05:00	2.32	
2-Butanone (MEK) 0	74 J	1.9	0.46	ppb v/v			06/22/17 05:00	2.32	
Carbon disulfide	14	1.9	0.18	ppb v/v			06/22/17 05:00	2.32	

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TestAmerica Sacramento

06/22/17 04:06

Lab Sample ID: 320-28713-20

3.02

Client Sample ID: 102482-001/MWL-SV05-400

Date Collected: 05/30/17 11:11 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Lab Sample ID: 320-28713-20 Matrix: Air

Method: TO-15 - Volatile Orga Analyte	nic Compo Result	unds in Ar Qualifier	nbient Air (Co RL	ontinue MDL	d) Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	0.61	J	1.9	0.15	ppb v/v			06/22/17 05:00	2.32
Chlorobenzene	ND		0.70	0.15	ppb v/v			06/22/17 05:00	2.32
Chloroethane	ND		1.9	0.71	ppb v/v			06/22/17 05:00	2.32
Chloroform	0.75		0.70	0.22	ppb v/v			06/22/17 05:00	2.32
Chloromethane	ND		1.9	0.46	ppb v/v			06/22/17 05:00	2.32
Dibromochloromethane	ND		0.93	0.18	ppb v/v			06/22/17 05:00	2.32
1,2-Dibromoethane (EDB)	ND		1.9	0.17	ppb v/v			06/22/17 05:00	2.32
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.93	0.36	ppb v/v			06/22/17 05:00	2.32
1.2-Dichlorobenzene	ND		0.93	0.30	ppb v/v			06/22/17 05:00	2.32
1,3-Dichlorobenzene	ND		0.93	0.26	ppb v/v			06/22/17 05:00	2.32
1,4-Dichlorobenzene	ND		0.93	0.35	ppb v/v			06/22/17 05:00	2.32
Dichlorodifluoromethane	9.4		0.93	0.34	ppb v/v			06/22/17 05:00	2.32
1.1-Dichloroethane	1.8		0.70	0.17	ppb v/v			06/22/17 05:00	2.32
1,2-Dichloroethane	ND		1.9	0.20	ppb v/v			06/22/17 05:00	2.32
1.1-Dichloroethene	22		1.9	0.30	v/v dag			06/22/17 05:00	2.32
cis-1.2-Dichloroethene	0.78	J	0.93	0.21	v/v dag			06/22/17 05:00	2.32
trans-1.2-Dichloroethene	ND		0.93	0.23	v/v dqq			06/22/17 05:00	2.32
1.2-Dichloropropane	ND		0.93	0.56	v/v dqq			06/22/17 05:00	2.32
cis-1.3-Dichloropropene	ND		0.93	0.24	v/v dqq			06/22/17 05:00	2.32
trans-1.3-Dichloropropene	ND		0.93	0.20	ppb v/v			06/22/17 05:00	2.32
Ethylbenzene	ND		0.93	0.15	v/v dqq			06/22/17 05:00	2.32
4-Ethyltoluene	ND		0.93	0.43	ppb v/v			06/22/17 05:00	2 32
Hexachlorobutadiene	ND		4.6	10	ppb v/v			06/22/17 05:00	2 32
2-Hexanone	ND		0.93	0.20	ppb v/v			06/22/17 05:00	2 32
4-Methyl-2-pentanone (MIBK)	ND		0.93	0.31	ppb v/v			06/22/17 05:00	2 32
Methylene Chloride	0.85		0.93	0.17	nnh v/v			06/22/17 05:00	2.32
Styrene	ND	•	0.93	0.14	ppb v/v			06/22/17 05:00	2 32
1 1 2 2-Tetrachloroethane	ND		0.93	0.16	ppb v/v			06/22/17 05:00	2 32
Tetrachloroethene	100		0.93	0.12	nnh v/v			06/22/17 05:00	2.32
Toluene	16		0.93	0.12	nnh v/v			06/22/17 05:00	2.32
1 1 2-Trichloro-1 2 2-trifluoroetha	36		0.93	0.38	nnh v/v			06/22/17 05:00	2.32
ne			0.00	0.00	pp5 ///			00/22/11 00:00	2.02
1,2,4-Trichlorobenzene	ND		4.6	1.0	ppb v/v			06/22/17 05:00	2.32
1,1,1-Trichloroethane	1.6		0.70	0.15	ppb v/v			06/22/17 05:00	2.32
1,1,2-Trichloroethane	ND		0.93	0.16	ppb v/v			06/22/17 05:00	2.32
Trichloroethene	87		0.93	0.24	ppb v/v			06/22/17 05:00	2.32
Trichlorofluoromethane	23		0.93	0.45	ppb v/v			06/22/17 05:00	2.32
1,2,4-Trimethylbenzene	ND		1.9	0.38	ppb v/v			06/22/17 05:00	2.32
1,3,5-Trimethylbenzene	ND		0.93	0.29	ppb v/v			06/22/17 05:00	2.32
Vinyl acetate	ND		1.9	0.34	ppb v/v			06/22/17 05:00	2.32
Vinyl chloride	ND		0.93	0.28	ppb v/v			06/22/17 05:00	2.32
m,p-Xylene	ND		1.9	0.23	ppb v/v			06/22/17 05:00	2.32
o-Xylene	ND		0.93	0.13	ppb v/v			06/22/17 05:00	2.32
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130					06/22/17 05:00	2.32
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					06/22/17 05:00	2.32
Toluene-d8 (Surr)	102		70 - 130					06/22/17 05:00	2.32

Client Sample ID: 102457-001/MWL-SV-FB1 Date Collected: 05/30/17 11:30

Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Analyte	Compour Result C	n <mark>ds in Amb</mark> Qualifier	bient Air RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	1.1 J	J	5.0	0.18	ppb v/v			06/16/17 20:03	1
Benzene	ND		0.40	0.079	ppb v/v			06/16/17 20:03	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			06/16/17 20:03	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			06/16/17 20:03	1
Bromoform	ND		0.40	0.070	ppb v/v			06/16/17 20:03	1
Bromomethane	ND		0.80	0.34	ppb v/v			06/16/17 20:03	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			06/16/17 20:03	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			06/16/17 20:03	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			06/16/17 20:03	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			06/16/17 20:03	1
Chloroethane	ND		0.80	0.31	ppb v/v			06/16/17 20:03	1
Chloroform	ND		0.30	0.095	ppb v/v			06/16/17 20:03	1
Chloromethane	ND		0.80	0.20	ppb v/v			06/16/17 20:03	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			06/16/17 20:03	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			06/16/17 20:03	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			06/16/17 20:03	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			06/16/17 20:03	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			06/16/17 20:03	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			06/16/17 20:03	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			06/16/17 20:03	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			06/16/17 20:03	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			06/16/17 20:03	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			06/16/17 20:03	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			06/16/17 20:03	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			06/16/17 20:03	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			06/16/17 20:03	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			06/16/17 20:03	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			06/16/17 20:03	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			06/16/17 20:03	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			06/16/17 20:03	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			06/16/17 20:03	1
2-Hexanone	ND		0.40	0.087	ppb v/v			06/16/17 20:03	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			06/16/17 20:03	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			06/16/17 20:03	1
Styrene	ND		0.40	0.059	ppb v/v			06/16/17 20:03	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			06/16/17 20:03	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			06/16/17 20:03	1
Toluene	0.35 J	J	0.40	0.051	ppb v/v			06/16/17 20:03	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			06/16/17 20:03	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			06/16/17 20:03	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			06/16/17 20:03	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			06/16/17 20:03	1
Trichloroethene	ND		0.40	0.11	ppb v/v			06/16/17 20:03	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			06/16/17 20:03	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			06/16/17 20:03	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			06/16/17 20:03	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			06/16/17 20:03	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			06/16/17 20:03	1

TestAmerica Job ID: 320-28713-1

Lab Sample ID: 320-28716-1 Matrix: Air

Sample Container: Summa Canister 6L

Client Sample ID: 102457-001/MWL-SV-FB1 Date Collected: 05/30/17 11:30 Date Received: 06/06/17 10:20

Lab Sample ID: 320-28716-1 Matrix: Air

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 06/16/17 20:03 1 ND o-Xylene 0.40 0.054 ppb v/v 06/16/17 20:03 1 Surrogate Limits Prepared Dil Fac %Recovery Qualifier Analyzed 06/16/17 20:03 1 4-Bromofluorobenzene (Surr) 121 70 - 130 1,2-Dichloroethane-d4 (Surr) 107 70 - 130 06/16/17 20:03 1 Toluene-d8 (Surr) 101 06/16/17 20:03 70 - 130 1

Client Sample ID: 102458-001/MWL-SV01-42.5 Date Collected: 05/30/17 11:33 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Lab Sample ID: 320-28716-2 Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	8.6		5.0	0.18	ppb v/v			06/16/17 20:54	1
Benzene	0.15	J	0.40	0.079	ppb v/v			06/16/17 20:54	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			06/16/17 20:54	1
Bromodichloromethane	0.64		0.30	0.066	ppb v/v			06/16/17 20:54	1
Bromoform	0.10	J	0.40	0.070	ppb v/v			06/16/17 20:54	1
Bromomethane	ND		0.80	0.34	ppb v/v			06/16/17 20:54	1
2-Butanone (MEK)	3.1		0.80	0.20	ppb v/v			06/16/17 20:54	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			06/16/17 20:54	1
Carbon tetrachloride	0.39	J	0.80	0.064	ppb v/v			06/16/17 20:54	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			06/16/17 20:54	1
Chloroethane	ND		0.80	0.31	ppb v/v			06/16/17 20:54	1
Chloroform	17		0.30	0.095	ppb v/v			06/16/17 20:54	1
Chloromethane	ND		0.80	0.20	ppb v/v			06/16/17 20:54	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			06/16/17 20:54	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			06/16/17 20:54	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			06/16/17 20:54	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			06/16/17 20:54	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			06/16/17 20:54	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			06/16/17 20:54	1
1,1-Dichloroethane	2.9		0.30	0.072	ppb v/v			06/16/17 20:54	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			06/16/17 20:54	1
1,1-Dichloroethene	7.6		0.80	0.13	ppb v/v			06/16/17 20:54	1
cis-1,2-Dichloroethene	1.4		0.40	0.089	ppb v/v			06/16/17 20:54	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			06/16/17 20:54	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			06/16/17 20:54	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			06/16/17 20:54	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			06/16/17 20:54	1
Ethylbenzene	0.085	J	0.40	0.063	ppb v/v			06/16/17 20:54	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			06/16/17 20:54	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			06/16/17 20:54	1
2-Hexanone	0.33	J	0.40	0.087	ppb v/v			06/16/17 20:54	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			06/16/17 20:54	1
Methylene Chloride	0.53		0.40	0.072	ppb v/v			06/16/17 20:54	1
Styrene	ND		0.40	0.059	ppb v/v			06/16/17 20:54	1

Client Sample ID: 102458-001/MWL-SV01-42.5

Date Collected: 05/30/17 11:33 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued) Analyte **Result Qualifier** MDL Unit D Prepared Analyzed Dil Fac RL ND 0.40 1,1,2,2-Tetrachloroethane 0.069 ppb v/v 06/16/17 20:54 1 0.23 J 0.40 0.051 ppb v/v 06/16/17 20:54 **Toluene** 1 ND 1,2,4-Trichlorobenzene 2.0 0.43 ppb v/v 06/16/17 20:54 1 1,1,1-Trichloroethane 44 0.30 0.065 ppb v/v 06/16/17 20:54 1 0.40 0.067 ppb v/v 1,1,2-Trichloroethane 0.19 J 06/16/17 20:54 1 06/16/17 20:54 0.39 J 0.80 0.16 ppb v/v 1 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene ND 0.40 0.13 ppb v/v 06/16/17 20:54 1 ND 0.80 0.15 ppb v/v Vinyl acetate 06/16/17 20:54 1 Vinyl chloride ND 0.40 0.12 ppb v/v 06/16/17 20:54 1 0.80 0.10 ppb v/v 06/16/17 20:54 m,p-Xylene 0.22 J 1 0.40 0.054 ppb v/v 06/16/17 20:54 o-Xylene 0.098 J 1 Surroasta Analyzad % Basayary Qualifiar Limita Droporod Dil Eac

Surrogale	%Recovery Quaimer	Linnis	Prepared	Analyzed	DIIFac
4-Bromofluorobenzene (Surr)	124	70 - 130		06/16/17 20:54	1
1,2-Dichloroethane-d4 (Surr)	105	70 - 130		06/16/17 20:54	1
Toluene-d8 (Surr)	101	70 - 130		06/16/17 20:54	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

105

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	78		5.4	2.0	ppb v/v			06/22/17 17:32	13.5
Tetrachloroethene	300		5.4	0.69	ppb v/v			06/22/17 17:32	13.5
1,1,2-Trichloro-1,2,2-trifluoroetha	64		5.4	2.2	ppb v/v			06/22/17 17:32	13.5
Trichloroethene	71		5.4	1.4	ppb v/v			06/22/17 17:32	13.5
Trichlorofluoromethane	140		5.4	2.6	ppb v/v			06/22/17 17:32	13.5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130					06/22/17 17:32	13.5
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					06/22/17 17:32	13.5

70 - 130

Client Sample ID: 102459-001/MWL-SV-FB2 Date Collected: 05/30/17 11:33 Date Received: 06/06/17 10:20 Sample Container: Summa Canister 6L

Toluene-d8 (Surr)

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	0.79	J	5.0	0.18	ppb v/v			06/16/17 21:45	1
Benzene	ND		0.40	0.079	ppb v/v			06/16/17 21:45	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			06/16/17 21:45	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			06/16/17 21:45	1
Bromoform	ND		0.40	0.070	ppb v/v			06/16/17 21:45	1
Bromomethane	ND		0.80	0.34	ppb v/v			06/16/17 21:45	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			06/16/17 21:45	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			06/16/17 21:45	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			06/16/17 21:45	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			06/16/17 21:45	1
Chloroethane	ND		0.80	0.31	ppb v/v			06/16/17 21:45	1
Chloroform	ND		0.30	0.095	ppb v/v			06/16/17 21:45	1

TestAmerica Sacramento

TestAmerica Job ID: 320-28713-1

Lab Sample ID: 320-28716-2 Matrix: Air

Matrix: Air

13.5

06/22/17 17:32

Lab Sample ID: 320-28716-3

Client Sample ID: 102459-001/MWL-SV-FB2

Date Collected: 05/30/17 11:33 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Lab Sample ID: 320-28716-3 Matrix: Air

Method: TO-15 - Volatile Orga	inic Compo	unds in Ar	nbient Air (C	ontinue	d)	_			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloromethane	ND		0.80	0.20	ppb v/v			06/16/17 21:45	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			06/16/17 21:45	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			06/16/17 21:45	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			06/16/17 21:45	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			06/16/17 21:45	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			06/16/17 21:45	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			06/16/17 21:45	1
Dichlorodifluoromethane	0.65		0.40	0.15	ppb v/v			06/16/17 21:45	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			06/16/17 21:45	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			06/16/17 21:45	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			06/16/17 21:45	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			06/16/17 21:45	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			06/16/17 21:45	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			06/16/17 21:45	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			06/16/17 21:45	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			06/16/17 21:45	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			06/16/17 21:45	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			06/16/17 21:45	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			06/16/17 21:45	1
2-Hexanone	ND		0.40	0.087	ppb v/v			06/16/17 21:45	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			06/16/17 21:45	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			06/16/17 21:45	1
Styrene	ND		0.40	0.059	ppb v/v			06/16/17 21:45	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			06/16/17 21:45	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			06/16/17 21:45	1
Toluene	ND		0.40	0.051	ppb v/v			06/16/17 21:45	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			06/16/17 21:45	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			06/16/17 21:45	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			06/16/17 21:45	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			06/16/17 21:45	1
Trichloroethene	ND		0.40	0.11	ppb v/v			06/16/17 21:45	1
Trichlorofluoromethane	0.94		0.40	0.20	ppb v/v			06/16/17 21:45	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			06/16/17 21:45	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			06/16/17 21:45	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			06/16/17 21:45	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			06/16/17 21:45	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			06/16/17 21:45	1
o-Xylene	ND		0.40	0.054	ppb v/v			06/16/17 21:45	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	116		70 - 130			-		06/16/17 21:45	1
1,2-Dichloroethane-d4 (Surr)	106		70 - 130					06/16/17 21:45	1
Toluene-d8 (Surr)	99		70 - 130					06/16/17 21:45	1
Lab Sample ID: 320-28716-4

Matrix: Air

Client Sample ID: 102460-001/MWL-SV02-41.5

Date Collected: 05/30/17 11:42 Date Received: 06/06/17 10:20

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air Result Qualifier MDL Unit D Prepared Analyzed Dil Fac Analyte RL 27 5.33 13 J 0.95 ppb v/v 06/16/17 22:32 Acetone Benzene ND 2.1 06/16/17 22:32 5.33 0.42 ppb v/v ND 4.3 0.87 Benzyl chloride ppb v/v 06/16/17 22:32 5.33 Bromodichloromethane ND 1.6 0.35 ppb v/v 06/16/17 22:32 5.33 ND Bromoform 2.1 0.37 ppb v/v 06/16/17 22:32 5 33 ND 4.3 1.8 ppb v/v 06/16/17 22:32 5.33 Bromomethane 4.3 1.1 ppb v/v 06/16/17 22:32 5.33 2-Butanone (MEK) 7.4 ND 4.3 06/16/17 22:32 5.33 Carbon disulfide 0.42 ppb v/v Carbon tetrachloride ND 4.3 0.34 ppb v/v 06/16/17 22:32 5.33 Chlorobenzene ND 1.6 0.34 ppb v/v 06/16/17 22:32 5 33 Chloroethane ND 06/16/17 22:32 5.33 43 1.6 ppb v/v 5.33 1.6 0.51 ppb v/v 06/16/17 22:32 Chloroform 3.1 Chloromethane ND 4.3 1.1 ppb v/v 06/16/17 22:32 5 33 Dibromochloromethane ND 2.1 0.42 ppb v/v 06/16/17 22:32 5.33 1,2-Dibromoethane (EDB) ND 4.3 0.40 ppb v/v 06/16/17 22:32 5.33 ND 2.1 1,2-Dichloro-1,1,2,2-tetrafluoroethane 0.83 ppb v/v 06/16/17 22:32 5 33 1.2-Dichlorobenzene ND 2.1 0.69 ppb v/v 06/16/17 22:32 5.33 1,3-Dichlorobenzene ND 2.1 0.59 ppb v/v 06/16/17 22:32 5.33 1.4-Dichlorobenzene ND 2.1 0.79 ppb v/v 06/16/17 22:32 5.33 2.1 0.77 ppb v/v 06/16/17 22:32 5.33 Dichlorodifluoromethane 100 1.6 0.38 ppb v/v 06/16/17 22:32 5 33 1,1-Dichloroethane 2.6 ND 4.3 0.47 06/16/17 22:32 5.33 1,2-Dichloroethane ppb v/v 4.3 5.33 1,1-Dichloroethene 12 0.69 ppb v/v 06/16/17 22:32 cis-1.2-Dichloroethene 0.84 2.1 0.47 ppb v/v 06/16/17 22:32 5 33 J trans-1,2-Dichloroethene ND 2.1 0.53 ppb v/v 06/16/17 22:32 5.33 ND 2.1 1.3 ppb v/v 06/16/17 22:32 5 33 1,2-Dichloropropane ND 2.1 0.55 ppb v/v 06/16/17 22:32 5.33 cis-1,3-Dichloropropene ND 2.1 trans-1,3-Dichloropropene 0.47 ppb v/v 06/16/17 22:32 5.33 Ethylbenzene ND 2.1 0.34 ppb v/v 06/16/17 22:32 5.33 1.0 ppb v/v ND 2.1 5.33 4-Ethyltoluene 06/16/17 22:32 ND Hexachlorobutadiene 11 2.3 ppb v/v 06/16/17 22:32 5.33 2.1 2-Hexanone 0.50 J 0.46 ppb v/v 06/16/17 22:32 5.33 0.72 4-Methyl-2-pentanone (MIBK) ND 2.1 ppb v/v 06/16/17 22:32 5.33 ND Methylene Chloride 2.1 0.38 ppb v/v 06/16/17 22:32 5.33 Styrene ND 2.1 5.33 0.31 ppb v/v 06/16/17 22:32 1,1,2,2-Tetrachloroethane ND 2.1 0.37 ppb v/v 06/16/17 22:32 5.33 71 2.1 0.27 ppb v/v 5.33 **Tetrachloroethene** 06/16/17 22:32 Toluene ND 2.1 0.27 ppb v/v 06/16/17 22:32 5.33 2.1 5.33 52 0.87 ppb v/v 06/16/17 22:32 1,1,2-Trichloro-1,2,2-trifluoroetha ne ND 11 5.33 06/16/17 22:32 1,2,4-Trichlorobenzene 2.3 ppb v/v 1,1,1-Trichloroethane 80 1.6 0.35 ppb v/v 06/16/17 22:32 5.33 ND 1,1,2-Trichloroethane 2.1 0.36 ppb v/v 06/16/17 22:32 5.33 **Trichloroethene** 70 2.1 0.56 ppb v/v 06/16/17 22:32 5.33 1,2,4-Trimethylbenzene ND 4.3 0.86 ppb v/v 06/16/17 22:32 5.33 1,3,5-Trimethylbenzene ND 2.1 0.67 ppb v/v 06/16/17 22:32 5.33 Vinyl acetate ND 4.3 0.77 ppb v/v 06/16/17 22:32 5.33 Vinyl chloride ND 2.1 06/16/17 22:32 5.33 0.64 ppb v/v m,p-Xylene ND 4.3 0.53 ppb v/v 06/16/17 22:32 5.33

Client Sample ID: 102460-001/MWL-SV02-41.5 Date Collected: 05/30/17 11:42 Date Received: 06/06/17 10:20

Lab Sample ID: 320-28716-4 Matrix: Air

Sample Container: Summa	Canister 6L								
Method: TO-15 - Volatile O	rganic Compo	unds in Ar	nbient Air (C	ontinue	d)	_	_		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Xylene	ND		2.1	0.29	ppb v/v			06/16/17 22:32	5.33
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	128		70 - 130					06/16/17 22:32	5.33
1,2-Dichloroethane-d4 (Surr)	105		70 - 130					06/16/17 22:32	5.33
Toluene-d8 (Surr)	98		70 - 130					06/16/17 22:32	5.33
Method: TO-15 - Volatile O	rganic Compo	unds in Ar	nbient Air - D	L					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichlorofluoromethane	230		4.3	2.1	ppb v/v			06/22/17 18:24	10.7
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		70 - 130					06/22/17 18:24	10.7
1,2-Dichloroethane-d4 (Surr)	102		70 - 130					06/22/17 18:24	10.7
Toluene-d8 (Surr)	106		70 - 130					06/22/17 18:24	10.7

OCTOBER 2017 SOIL-VAPOR SAMPLING RESULTS

CERTIFICATES OF ANALYSIS

Client Sample ID: 103929-001/MWL-FB5 Date Collected: 10/26/17 10:48

Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organi Analyte	i <mark>c Compo</mark> Result	unds in Am Qualifier	bient Air _{RL}	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	0.24	J	5.0	0.18	ppb v/v			11/03/17 19:46	1
Benzene	4.8		0.40	0.079	ppb v/v			11/03/17 19:46	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			11/03/17 19:46	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			11/03/17 19:46	1
Bromoform	ND		0.40	0.070	ppb v/v			11/03/17 19:46	1
Bromomethane	ND		0.80	0.34	ppb v/v			11/03/17 19:46	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			11/03/17 19:46	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			11/03/17 19:46	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			11/03/17 19:46	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			11/03/17 19:46	1
Chloroethane	ND		0.80	0.31	ppb v/v			11/03/17 19:46	1
Chloroform	ND		0.30	0.095	ppb v/v			11/03/17 19:46	1
Chloromethane	ND		0.80	0.20	ppb v/v			11/03/17 19:46	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			11/03/17 19:46	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			11/03/17 19:46	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			11/03/17 19:46	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			11/03/17 19:46	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			11/03/17 19:46	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			11/03/17 19:46	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			11/03/17 19:46	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			11/03/17 19:46	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			11/03/17 19:46	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			11/03/17 19:46	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			11/03/17 19:46	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			11/03/17 19:46	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			11/03/17 19:46	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			11/03/17 19:46	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			11/03/17 19:46	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			11/03/17 19:46	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			11/03/17 19:46	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			11/03/17 19:46	1
2-Hexanone	ND		0.40	0.087	ppb v/v			11/03/17 19:46	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			11/03/17 19:46	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			11/03/17 19:46	1
Styrene	ND		0.40	0.059	ppb v/v			11/03/17 19:46	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			11/03/17 19:46	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			11/03/17 19:46	1
Toluene	ND		0.40	0.051	ppb v/v			11/03/17 19:46	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			11/03/17 19:46	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			11/03/17 19:46	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			11/03/17 19:46	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			11/03/17 19:46	1
Trichloroethene	ND		0.40	0.11	ppb v/v			11/03/17 19:46	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			11/03/17 19:46	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			11/03/17 19:46	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			11/03/17 19:46	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			11/03/17 19:46	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			11/03/17 19:46	1

Lab Sample ID: 320-32934-1 Matrix: Air

Lab Sample ID: 320-32934-1

Matrix: Air

Client Sample ID: 103929-001/MWL-FB5

Date Collected: 10/26/17 10:48 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		0.80	0.10	ppb v/v			11/03/17 19:46	1
o-Xylene	ND		0.40	0.054	ppb v/v			11/03/17 19:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					11/03/17 19:46	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					11/03/17 19:46	1
T / /0 /)	100		70 120					11/02/17 10:46	1

Client Sample ID: 103930-001/MWL-SV05-50 Date Collected: 10/26/17 10:49 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-2 Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	2.6	J	18	0.62	ppb v/v			11/03/17 20:38	3.51
Benzene	ND		1.4	0.28	ppb v/v			11/03/17 20:38	3.51
Benzyl chloride	ND		2.8	0.57	ppb v/v			11/03/17 20:38	3.51
Bromodichloromethane	ND		1.1	0.23	ppb v/v			11/03/17 20:38	3.51
Bromoform	ND		1.4	0.25	ppb v/v			11/03/17 20:38	3.51
Bromomethane	ND		2.8	1.2	ppb v/v			11/03/17 20:38	3.51
2-Butanone (MEK)	ND		2.8	0.70	ppb v/v			11/03/17 20:38	3.51
Carbon disulfide	1.1	J	2.8	0.27	ppb v/v			11/03/17 20:38	3.51
Carbon tetrachloride	0.26	J	2.8	0.22	ppb v/v			11/03/17 20:38	3.51
Chlorobenzene	ND		1.1	0.22	ppb v/v			11/03/17 20:38	3.51
Chloroethane	ND		2.8	1.1	ppb v/v			11/03/17 20:38	3.51
Chloroform	1.1		1.1	0.33	ppb v/v			11/03/17 20:38	3.51
Chloromethane	ND		2.8	0.69	ppb v/v			11/03/17 20:38	3.51
Dibromochloromethane	ND		1.4	0.28	ppb v/v			11/03/17 20:38	3.51
1,2-Dibromoethane (EDB)	ND		2.8	0.26	ppb v/v			11/03/17 20:38	3.51
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.54	ppb v/v			11/03/17 20:38	3.51
1,2-Dichlorobenzene	ND		1.4	0.46	ppb v/v			11/03/17 20:38	3.51
1,3-Dichlorobenzene	ND		1.4	0.39	ppb v/v			11/03/17 20:38	3.51
1,4-Dichlorobenzene	ND		1.4	0.52	ppb v/v			11/03/17 20:38	3.51
Dichlorodifluoromethane	36		1.4	0.51	ppb v/v			11/03/17 20:38	3.51
1,1-Dichloroethane	1.6		1.1	0.25	ppb v/v			11/03/17 20:38	3.51
1,2-Dichloroethane	ND		2.8	0.31	ppb v/v			11/03/17 20:38	3.51
1,1-Dichloroethene	9.7		2.8	0.45	ppb v/v			11/03/17 20:38	3.51
cis-1,2-Dichloroethene	0.66	J	1.4	0.31	ppb v/v			11/03/17 20:38	3.51
trans-1,2-Dichloroethene	ND		1.4	0.35	ppb v/v			11/03/17 20:38	3.51
1,2-Dichloropropane	ND		1.4	0.84	ppb v/v			11/03/17 20:38	3.51
cis-1,3-Dichloropropene	ND		1.4	0.37	ppb v/v			11/03/17 20:38	3.51
trans-1,3-Dichloropropene	ND		1.4	0.31	ppb v/v			11/03/17 20:38	3.51
Ethylbenzene	ND		1.4	0.22	ppb v/v			11/03/17 20:38	3.51
4-Ethyltoluene	ND		1.4	0.66	ppb v/v			11/03/17 20:38	3.51
Hexachlorobutadiene	ND		7.0	1.5	ppb v/v			11/03/17 20:38	3.51
2-Hexanone	ND		1.4	0.31	ppb v/v			11/03/17 20:38	3.51
4-Methyl-2-pentanone (MIBK)	ND		1.4	0.47	ppb v/v			11/03/17 20:38	3.51
Methylene Chloride	0.47	J	1.4	0.25	ppb v/v			11/03/17 20:38	3.51

TestAmerica Job ID: 320-32934-1

Client Sample ID: 103930-001/MWL-SV05-50 Date Collected: 10/26/17 10:49

Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Orga	nic Compo	unds in Ar	nbient Air (Co	ontinue	d)				
Analyte	Result	Qualifier	RL	MDL	Únit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		1.4	0.21	ppb v/v			11/03/17 20:38	3.51
1,1,2,2-Tetrachloroethane	ND		1.4	0.24	ppb v/v			11/03/17 20:38	3.51
Tetrachloroethene	21		1.4	0.18	ppb v/v			11/03/17 20:38	3.51
Toluene	ND		1.4	0.18	ppb v/v			11/03/17 20:38	3.51
1,1,2-Trichloro-1,2,2-trifluoroetha	40		1.4	0.57	ppb v/v			11/03/17 20:38	3.51
ne									
1,2,4-Trichlorobenzene	ND		7.0	1.5	ppb v/v			11/03/17 20:38	3.51
1,1,1-Trichloroethane	12		1.1	0.23	ppb v/v			11/03/17 20:38	3.51
1,1,2-Trichloroethane	ND		1.4	0.24	ppb v/v			11/03/17 20:38	3.51
Trichloroethene	42		1.4	0.37	ppb v/v			11/03/17 20:38	3.51
Trichlorofluoromethane	96		1.4	0.69	ppb v/v			11/03/17 20:38	3.51
1,2,4-Trimethylbenzene	ND		2.8	0.57	ppb v/v			11/03/17 20:38	3.51
1,3,5-Trimethylbenzene	ND		1.4	0.44	ppb v/v			11/03/17 20:38	3.51
Vinyl acetate	ND		2.8	0.51	ppb v/v			11/03/17 20:38	3.51
Vinyl chloride	ND		1.4	0.42	ppb v/v			11/03/17 20:38	3.51
m,p-Xylene	ND		2.8	0.35	ppb v/v			11/03/17 20:38	3.51
o-Xylene	ND		1.4	0.19	ppb v/v			11/03/17 20:38	3.51
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					11/03/17 20:38	3.51
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					11/03/17 20:38	3.51
Toluene-d8 (Surr)	104		70 - 130					11/03/17 20:38	3.51

Client Sample ID: 103931-001/MWL-SV05-100 Date Collected: 10/26/17 10:51 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organi	ic Compo								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	2.9	J	23	0.80	ppb v/v			11/03/17 21:30	4.52
Benzene	ND		1.8	0.36	ppb v/v			11/03/17 21:30	4.52
Benzyl chloride	ND		3.6	0.74	ppb v/v			11/03/17 21:30	4.52
Bromodichloromethane	ND		1.4	0.30	ppb v/v			11/03/17 21:30	4.52
Bromoform	ND		1.8	0.32	ppb v/v			11/03/17 21:30	4.52
Bromomethane	ND		3.6	1.5	ppb v/v			11/03/17 21:30	4.52
2-Butanone (MEK)	ND		3.6	0.90	ppb v/v			11/03/17 21:30	4.52
Carbon disulfide	ND		3.6	0.35	ppb v/v			11/03/17 21:30	4.52
Carbon tetrachloride	0.52	J	3.6	0.29	ppb v/v			11/03/17 21:30	4.52
Chlorobenzene	ND		1.4	0.29	ppb v/v			11/03/17 21:30	4.52
Chloroethane	ND		3.6	1.4	ppb v/v			11/03/17 21:30	4.52
Chloroform	2.1		1.4	0.43	ppb v/v			11/03/17 21:30	4.52
Chloromethane	ND		3.6	0.89	ppb v/v			11/03/17 21:30	4.52
Dibromochloromethane	ND		1.8	0.36	ppb v/v			11/03/17 21:30	4.52
1,2-Dibromoethane (EDB)	ND		3.6	0.34	ppb v/v			11/03/17 21:30	4.52
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.8	0.70	ppb v/v			11/03/17 21:30	4.52
1,2-Dichlorobenzene	ND		1.8	0.59	ppb v/v			11/03/17 21:30	4.52
1,3-Dichlorobenzene	ND		1.8	0.50	ppb v/v			11/03/17 21:30	4.52
1,4-Dichlorobenzene	ND		1.8	0.67	ppb v/v			11/03/17 21:30	4.52

Lab Sample ID: 320-32934-2 Matrix: Air

Lab Sample ID: 320-32934-3

Matrix: Air

Client Sample ID: 103931-001/MWL-SV05-100

Date Collected: 10/26/17 10:51 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Orga	nic Compo	unds in Ar	nbient Air (C	ontinue	d)				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	67		1.8	0.66	ppb v/v			11/03/17 21:30	4.52
1,1-Dichloroethane	3.4		1.4	0.33	ppb v/v			11/03/17 21:30	4.52
1,2-Dichloroethane	ND		3.6	0.40	ppb v/v			11/03/17 21:30	4.52
1,1-Dichloroethene	23		3.6	0.58	ppb v/v			11/03/17 21:30	4.52
cis-1,2-Dichloroethene	1.6	J	1.8	0.40	ppb v/v			11/03/17 21:30	4.52
trans-1,2-Dichloroethene	ND		1.8	0.45	ppb v/v			11/03/17 21:30	4.52
1,2-Dichloropropane	ND		1.8	1.1	ppb v/v			11/03/17 21:30	4.52
cis-1,3-Dichloropropene	ND		1.8	0.47	ppb v/v			11/03/17 21:30	4.52
trans-1,3-Dichloropropene	ND		1.8	0.40	ppb v/v			11/03/17 21:30	4.52
Ethylbenzene	ND		1.8	0.28	ppb v/v			11/03/17 21:30	4.52
4-Ethyltoluene	ND		1.8	0.85	ppb v/v			11/03/17 21:30	4.52
Hexachlorobutadiene	ND		9.0	2.0	ppb v/v			11/03/17 21:30	4.52
2-Hexanone	ND		1.8	0.39	ppb v/v			11/03/17 21:30	4.52
4-Methyl-2-pentanone (MIBK)	ND		1.8	0.61	ppb v/v			11/03/17 21:30	4.52
Methylene Chloride	1.1	J	1.8	0.33	ppb v/v			11/03/17 21:30	4.52
Styrene	ND		1.8	0.27	ppb v/v			11/03/17 21:30	4.52
1,1,2,2-Tetrachloroethane	ND		1.8	0.31	ppb v/v			11/03/17 21:30	4.52
Tetrachloroethene	70		1.8	0.23	ppb v/v			11/03/17 21:30	4.52
Toluene	ND		1.8	0.23	ppb v/v			11/03/17 21:30	4.52
1,1,2-Trichloro-1,2,2-trifluoroetha	90		1.8	0.74	ppb v/v			11/03/17 21:30	4.52
1,2,4-Trichlorobenzene	ND		9.0	2.0	ppb v/v			11/03/17 21:30	4.52
1.1.1-Trichloroethane	13		1.4	0.29	ppb v/v			11/03/17 21:30	4.52
1,1,2-Trichloroethane	ND		1.8	0.30	ppb v/v			11/03/17 21:30	4.52
Trichloroethene	100		1.8	0.47	ppb v/v			11/03/17 21:30	4.52
Trichlorofluoromethane	140		1.8	0.89	ppb v/v			11/03/17 21:30	4.52
1,2,4-Trimethylbenzene	ND		3.6	0.73	ppb v/v			11/03/17 21:30	4.52
1,3,5-Trimethylbenzene	ND		1.8	0.57	ppb v/v			11/03/17 21:30	4.52
Vinyl acetate	ND		3.6	0.66	ppb v/v			11/03/17 21:30	4.52
Vinyl chloride	ND		1.8	0.54	ppb v/v			11/03/17 21:30	4.52
m,p-Xylene	ND		3.6	0.45	ppb v/v			11/03/17 21:30	4.52
o-Xylene	ND		1.8	0.24	ppb v/v			11/03/17 21:30	4.52
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130			-		11/03/17 21:30	4.52
1,2-Dichloroethane-d4 (Surr)	105		70 - 130					11/03/17 21:30	4.52
Toluene-d8 (Surr)	104		70 - 130					11/03/17 21:30	4.52

Client Sample ID: 103932-001/MWL-SV05-200 Date Collected: 10/26/17 10:55 Date Received: 11/02/17 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 5.1 J 23 0.81 ppb v/v 11/03/17 22:22 4.54 Benzene ND 1.8 4.54 0.36 ppb v/v 11/03/17 22:22 Benzyl chloride ND 3.6 0.74 ppb v/v 11/03/17 22:22 4.54 ND 1.4 0.30 ppb v/v 11/03/17 22:22 Bromodichloromethane 4.54

TestAmerica Sacramento

Lab Sample ID: 320-32934-4

11/30/2017

Matrix: Air

TestAmerica Job ID: 320-32934-1

Lab Sample ID: 320-32934-3 Matrix: Air

Client Sample ID: 103932-001/MWL-SV05-200

Date Collected: 10/26/17 10:55

Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-4 Matrix: Air

Analyte	Result	Qualifier	RL	MDL	u) Unit	D	Prepared	Analyzed	Dil Fac
Bromoform	ND		1.8	0.32	ppb v/v			11/03/17 22:22	4.54
Bromomethane	ND		3.6	1.5	ppb v/v			11/03/17 22:22	4.54
2-Butanone (MEK)	ND		3.6	0.90	ppb v/v			11/03/17 22:22	4.54
Carbon disulfide	0.62	J	3.6	0.35	ppb v/v			11/03/17 22:22	4.54
Carbon tetrachloride	0.87	J	3.6	0.29	ppb v/v			11/03/17 22:22	4.54
Chlorobenzene	ND		1.4	0.29	ppb v/v			11/03/17 22:22	4.54
Chloroethane	ND		3.6	1.4	ppb v/v			11/03/17 22:22	4.54
Chloroform	1.9		1.4	0.43	ppb v/v			11/03/17 22:22	4.54
Chloromethane	ND		3.6	0.89	ppb v/v			11/03/17 22:22	4.54
Dibromochloromethane	ND		1.8	0.36	ppb v/v			11/03/17 22:22	4.54
1,2-Dibromoethane (EDB)	ND		3.6	0.34	ppb v/v			11/03/17 22:22	4.54
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.8	0.70	ppb v/v			11/03/17 22:22	4.54
1,2-Dichlorobenzene	ND		1.8	0.59	ppb v/v			11/03/17 22:22	4.54
1,3-Dichlorobenzene	ND		1.8	0.50	ppb v/v			11/03/17 22:22	4.54
1,4-Dichlorobenzene	ND		1.8	0.68	ppb v/v			11/03/17 22:22	4.54
Dichlorodifluoromethane	51		1.8	0.66	ppb v/v			11/03/17 22:22	4.54
1,1-Dichloroethane	4.8		1.4	0.33	ppb v/v			11/03/17 22:22	4.54
1,2-Dichloroethane	ND		3.6	0.40	ppb v/v			11/03/17 22:22	4.54
1,1-Dichloroethene	37		3.6	0.59	ppb v/v			11/03/17 22:22	4.54
cis-1,2-Dichloroethene	2.2		1.8	0.40	ppb v/v			11/03/17 22:22	4.54
trans-1,2-Dichloroethene	ND		1.8	0.45	ppb v/v			11/03/17 22:22	4.54
1,2-Dichloropropane	ND		1.8	1.1	ppb v/v			11/03/17 22:22	4.54
cis-1,3-Dichloropropene	ND		1.8	0.47	ppb v/v			11/03/17 22:22	4.54
trans-1,3-Dichloropropene	ND		1.8	0.40	ppb v/v			11/03/17 22:22	4.54
Ethylbenzene	ND		1.8	0.29	ppb v/v			11/03/17 22:22	4.54
4-Ethyltoluene	ND		1.8	0.85	ppb v/v			11/03/17 22:22	4.54
Hexachlorobutadiene	ND		9.1	2.0	ppb v/v			11/03/17 22:22	4.54
2-Hexanone	ND		1.8	0.39	ppb v/v			11/03/17 22:22	4.54
4-Methyl-2-pentanone (MIBK)	ND		1.8	0.61	ppb v/v			11/03/17 22:22	4.54
Methylene Chloride	2.5		1.8	0.33	ppb v/v			11/03/17 22:22	4.54
Styrene	ND		1.8	0.27	ppb v/v			11/03/17 22:22	4.54
1,1,2,2-Tetrachloroethane	ND		1.8	0.31	ppb v/v			11/03/17 22:22	4.54
Tetrachloroethene	100		1.8	0.23	ppb v/v			11/03/17 22:22	4.54
Toluene	ND		1.8	0.23	ppb v/v			11/03/17 22:22	4.54
1,1,2-Trichloro-1,2,2-trifluoroetha	140		1.8	0.74	ppb v/v			11/03/17 22:22	4.54
1,2,4-Trichlorobenzene	ND		9.1	2.0	ppb v/v			11/03/17 22:22	4.54
1,1,1-Trichloroethane	3.6		1.4	0.30	ppb v/v			11/03/17 22:22	4.54
1,1,2-Trichloroethane	ND		1.8	0.30	ppb v/v			11/03/17 22:22	4.54
Trichloroethene	150		1.8	0.48	ppb v/v			11/03/17 22:22	4.54
Trichlorofluoromethane	79		1.8	0.89	ppb v/v			11/03/17 22:22	4.54
1,2,4-Trimethylbenzene	ND		3.6	0.74	ppb v/v			11/03/17 22:22	4.54
1,3,5-Trimethylbenzene	ND		1.8	0.57	ppb v/v			11/03/17 22:22	4.54
Vinyl acetate	ND		3.6	0.66	ppb v/v			11/03/17 22:22	4.54
Vinyl chloride	ND		1.8	0.54	ppb v/v			11/03/17 22:22	4.54
m,p-Xylene	ND		3.6	0.45	ppb v/v			11/03/17 22:22	4.54
o-Xylene	ND		1.8	0.25	ppb v/v			11/03/17 22:22	4.54

Client Sample ID: 103932-001/MWL-SV05-200 Date Collected: 10/26/17 10:55 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130		11/03/17 22:22	4.54
1,2-Dichloroethane-d4 (Surr)	101		70 - 130		11/03/17 22:22	4.54
Toluene-d8 (Surr)	102		70 - 130		11/03/17 22:22	4.54

Client Sample ID: 103933-001/MWL-SV05-300 Date Collected: 10/26/17 11:00 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-5 Matrix: Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	14	J	20	0.71	ppb v/v			11/03/17 23:15	4.01
Benzene	0.38	J	1.6	0.32	ppb v/v			11/03/17 23:15	4.01
Benzyl chloride	ND		3.2	0.65	ppb v/v			11/03/17 23:15	4.01
Bromodichloromethane	ND		1.2	0.26	ppb v/v			11/03/17 23:15	4.01
Bromoform	ND		1.6	0.28	ppb v/v			11/03/17 23:15	4.01
Bromomethane	ND		3.2	1.3	ppb v/v			11/03/17 23:15	4.01
2-Butanone (MEK)	1.2	J	3.2	0.80	ppb v/v			11/03/17 23:15	4.01
Carbon disulfide	1.8	J	3.2	0.31	ppb v/v			11/03/17 23:15	4.01
Carbon tetrachloride	ND		3.2	0.26	ppb v/v			11/03/17 23:15	4.01
Chlorobenzene	ND		1.2	0.26	ppb v/v			11/03/17 23:15	4.01
Chloroethane	ND		3.2	1.2	ppb v/v			11/03/17 23:15	4.01
Chloroform	1.4		1.2	0.38	ppb v/v			11/03/17 23:15	4.01
Chloromethane	1.1	J	3.2	0.79	ppb v/v			11/03/17 23:15	4.01
Dibromochloromethane	ND		1.6	0.32	ppb v/v			11/03/17 23:15	4.01
1,2-Dibromoethane (EDB)	ND		3.2	0.30	ppb v/v			11/03/17 23:15	4.01
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.6	0.62	ppb v/v			11/03/17 23:15	4.01
1,2-Dichlorobenzene	ND		1.6	0.52	ppb v/v			11/03/17 23:15	4.01
1,3-Dichlorobenzene	ND		1.6	0.44	ppb v/v			11/03/17 23:15	4.01
1,4-Dichlorobenzene	ND		1.6	0.60	ppb v/v			11/03/17 23:15	4.01
Dichlorodifluoromethane	32		1.6	0.58	ppb v/v			11/03/17 23:15	4.01
1,1-Dichloroethane	2.4		1.2	0.29	ppb v/v			11/03/17 23:15	4.01
1,2-Dichloroethane	ND		3.2	0.35	ppb v/v			11/03/17 23:15	4.01
1,1-Dichloroethene	28		3.2	0.52	ppb v/v			11/03/17 23:15	4.01
cis-1,2-Dichloroethene	1.2	J	1.6	0.36	ppb v/v			11/03/17 23:15	4.01
trans-1,2-Dichloroethene	ND		1.6	0.40	ppb v/v			11/03/17 23:15	4.01
1,2-Dichloropropane	ND		1.6	0.96	ppb v/v			11/03/17 23:15	4.01
cis-1,3-Dichloropropene	ND		1.6	0.42	ppb v/v			11/03/17 23:15	4.01
trans-1,3-Dichloropropene	ND		1.6	0.35	ppb v/v			11/03/17 23:15	4.01
Ethylbenzene	ND		1.6	0.25	ppb v/v			11/03/17 23:15	4.01
4-Ethyltoluene	ND		1.6	0.75	ppb v/v			11/03/17 23:15	4.01
Hexachlorobutadiene	ND		8.0	1.7	ppb v/v			11/03/17 23:15	4.01
2-Hexanone	ND		1.6	0.35	ppb v/v			11/03/17 23:15	4.01
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.54	ppb v/v			11/03/17 23:15	4.01
Methylene Chloride	1.4	J	1.6	0.29	ppb v/v			11/03/17 23:15	4.01
Styrene	ND		1.6	0.24	ppb v/v			11/03/17 23:15	4.01
1,1,2,2-Tetrachloroethane	ND		1.6	0.28	ppb v/v			11/03/17 23:15	4.01
Tetrachloroethene	91		1.6	0.20	ppb v/v			11/03/17 23:15	4.01
Toluene	ND		1.6	0.20	ppb v/v			11/03/17 23:15	4.01

TestAmerica Sacramento

Lab Sample ID: 320-32934-4 Matrix: Air

Client Sample ID: 103933-001/MWL-SV05-300

Date Collected: 10/26/17 11:00 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

TestAmerica Job ID: 320-32934-1

Lab Sample ID: 320-32934-5 Matrix: Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroetha	120		1.6	0.65	ppb v/v		•	11/03/17 23:15	4.01
ne									
1,2,4-Trichlorobenzene	ND		8.0	1.7	ppb v/v			11/03/17 23:15	4.01
1,1,1-Trichloroethane	2.0		1.2	0.26	ppb v/v			11/03/17 23:15	4.01
1,1,2-Trichloroethane	ND		1.6	0.27	ppb v/v			11/03/17 23:15	4.01
Trichloroethene	120		1.6	0.42	ppb v/v			11/03/17 23:15	4.01
Trichlorofluoromethane	37		1.6	0.79	ppb v/v			11/03/17 23:15	4.01
1,2,4-Trimethylbenzene	ND		3.2	0.65	ppb v/v			11/03/17 23:15	4.01
1,3,5-Trimethylbenzene	ND		1.6	0.50	ppb v/v			11/03/17 23:15	4.01
Vinyl acetate	ND		3.2	0.58	ppb v/v			11/03/17 23:15	4.01
Vinyl chloride	ND		1.6	0.48	ppb v/v			11/03/17 23:15	4.01
m,p-Xylene	ND		3.2	0.40	ppb v/v			11/03/17 23:15	4.01
o-Xylene	ND		1.6	0.22	ppb v/v			11/03/17 23:15	4.01
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130					11/03/17 23:15	4.01
1,2-Dichloroethane-d4 (Surr)	102		70 - 130					11/03/17 23:15	4.01
Toluene-d8 (Surr)	103		70 - 130					11/03/17 23:15	4.01

Client Sample ID: 103934-001/MWL-SV05-400 Date Collected: 10/26/17 11:06 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-6

Matrix: Air

Method: TO-15 - Volatile Organi	c Compo	unds in Amb	ient Air			_	_		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	6.9	J	18	0.63	ppb v/v			11/04/17 00:08	3.52
Benzene	0.33	J	1.4	0.28	ppb v/v			11/04/17 00:08	3.52
Benzyl chloride	ND		2.8	0.57	ppb v/v			11/04/17 00:08	3.52
Bromodichloromethane	ND		1.1	0.23	ppb v/v			11/04/17 00:08	3.52
Bromoform	ND		1.4	0.25	ppb v/v			11/04/17 00:08	3.52
Bromomethane	ND		2.8	1.2	ppb v/v			11/04/17 00:08	3.52
2-Butanone (MEK)	ND		2.8	0.70	ppb v/v			11/04/17 00:08	3.52
Carbon disulfide	ND		2.8	0.27	ppb v/v			11/04/17 00:08	3.52
Carbon tetrachloride	0.61	J	2.8	0.23	ppb v/v			11/04/17 00:08	3.52
Chlorobenzene	ND		1.1	0.23	ppb v/v			11/04/17 00:08	3.52
Chloroethane	ND		2.8	1.1	ppb v/v			11/04/17 00:08	3.52
Chloroform	0.92	J	1.1	0.33	ppb v/v			11/04/17 00:08	3.52
Chloromethane	ND		2.8	0.69	ppb v/v			11/04/17 00:08	3.52
Dibromochloromethane	ND		1.4	0.28	ppb v/v			11/04/17 00:08	3.52
1,2-Dibromoethane (EDB)	ND		2.8	0.26	ppb v/v			11/04/17 00:08	3.52
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.55	ppb v/v			11/04/17 00:08	3.52
1,2-Dichlorobenzene	ND		1.4	0.46	ppb v/v			11/04/17 00:08	3.52
1,3-Dichlorobenzene	ND		1.4	0.39	ppb v/v			11/04/17 00:08	3.52
1,4-Dichlorobenzene	ND		1.4	0.52	ppb v/v			11/04/17 00:08	3.52
Dichlorodifluoromethane	15		1.4	0.51	ppb v/v			11/04/17 00:08	3.52
1,1-Dichloroethane	2.4		1.1	0.25	ppb v/v			11/04/17 00:08	3.52
1,2-Dichloroethane	ND		2.8	0.31	ppb v/v			11/04/17 00:08	3.52
1,1-Dichloroethene	18		2.8	0.45	ppb v/v			11/04/17 00:08	3.52

Client Sample ID: 103934-001/MWL-SV05-400

Date Collected: 10/26/17 11:06 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-6 Matrix: Air

Method: TO-15 - Volatile Orga	nic Compo	unds in Ar	nbient Air (C	ontinue	d)				
Analyte	Result	Qualifier	RL	MDL	Únit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.97	J	1.4	0.31	ppb v/v			11/04/17 00:08	3.52
trans-1,2-Dichloroethene	ND		1.4	0.35	ppb v/v			11/04/17 00:08	3.52
1,2-Dichloropropane	ND		1.4	0.84	ppb v/v			11/04/17 00:08	3.52
cis-1,3-Dichloropropene	ND		1.4	0.37	ppb v/v			11/04/17 00:08	3.52
trans-1,3-Dichloropropene	ND		1.4	0.31	ppb v/v			11/04/17 00:08	3.52
Ethylbenzene	ND		1.4	0.22	ppb v/v			11/04/17 00:08	3.52
4-Ethyltoluene	ND		1.4	0.66	ppb v/v			11/04/17 00:08	3.52
Hexachlorobutadiene	ND		7.0	1.5	ppb v/v			11/04/17 00:08	3.52
2-Hexanone	ND		1.4	0.31	ppb v/v			11/04/17 00:08	3.52
4-Methyl-2-pentanone (MIBK)	ND		1.4	0.48	ppb v/v			11/04/17 00:08	3.52
Methylene Chloride	1.2	J	1.4	0.25	ppb v/v			11/04/17 00:08	3.52
Styrene	ND		1.4	0.21	ppb v/v			11/04/17 00:08	3.52
1,1,2,2-Tetrachloroethane	ND		1.4	0.24	ppb v/v			11/04/17 00:08	3.52
Tetrachloroethene	92		1.4	0.18	ppb v/v			11/04/17 00:08	3.52
Toluene	0.63	J	1.4	0.18	ppb v/v			11/04/17 00:08	3.52
1,1,2-Trichloro-1,2,2-trifluoroetha	38		1.4	0.57	ppb v/v			11/04/17 00:08	3.52
ne									
1,2,4-Trichlorobenzene	ND		7.0	1.5	ppb v/v			11/04/17 00:08	3.52
1,1,1-Trichloroethane	2.7		1.1	0.23	ppb v/v			11/04/17 00:08	3.52
1,1,2-Trichloroethane	ND		1.4	0.24	ppb v/v			11/04/17 00:08	3.52
Trichloroethene	97		1.4	0.37	ppb v/v			11/04/17 00:08	3.52
Trichlorofluoromethane	26		1.4	0.69	ppb v/v			11/04/17 00:08	3.52
1,2,4-Trimethylbenzene	ND		2.8	0.57	ppb v/v			11/04/17 00:08	3.52
1,3,5-Trimethylbenzene	ND		1.4	0.44	ppb v/v			11/04/17 00:08	3.52
Vinyl acetate	ND		2.8	0.51	ppb v/v			11/04/17 00:08	3.52
Vinyl chloride	ND		1.4	0.42	ppb v/v			11/04/17 00:08	3.52
m,p-Xylene	ND		2.8	0.35	ppb v/v			11/04/17 00:08	3.52
o-Xylene	ND		1.4	0.19	ppb v/v			11/04/17 00:08	3.52
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130			-		11/04/17 00:08	3.52

Client Sample ID: 103910-001/MWL-FB1 Date Collected: 10/26/17 11:24

103

103

Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

1,2-Dichloroethane-d4 (Surr)

Toluene-d8 (Surr)

Method: TO-15 - Volatile Organic Compo	unds in Ambient Air						
Analyte Result	Qualifier RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone ND	5.0	0.18	ppb v/v			11/04/17 01:05	1
Benzene 5.0	0.40	0.079	ppb v/v			11/04/17 01:05	1
Benzyl chloride ND	0.80	0.16	ppb v/v			11/04/17 01:05	1
Bromodichloromethane ND	0.30	0.066	ppb v/v			11/04/17 01:05	1
Bromoform ND	0.40	0.070	ppb v/v			11/04/17 01:05	1
Bromomethane ND	0.80	0.34	ppb v/v			11/04/17 01:05	1
2-Butanone (MEK) ND	0.80	0.20	ppb v/v			11/04/17 01:05	1
Carbon disulfide ND	0.80	0.078	ppb v/v			11/04/17 01:05	1

70 - 130

70 - 130

TestAmerica Sacramento

11/04/17 00:08

11/04/17 00:08

Lab Sample ID: 320-32934-7

3.52

3.52

Matrix: Air

RL

MDL Unit

D

Prepared

Client Sample ID: 103910-001/MWL-FB1

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

Result Qualifier

Date Collected: 10/26/17 11:24 Date Received: 11/02/17 09:30

Analyte

Sample Container: Summa Canister 6L

Toluene-d8 (Surr)	103		70 - 130				11/04/17 01:05	1
1,2-Dichloroethane-d4 (Surr)	105		70 - 130				11/04/17 01:05	1
4-Bromofluorobenzene (Surr)	96		70 - 130				11/04/17 01:05	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
o-Xyiene	ND		0.40	0.054	ppb v/v		11/04/17 01:05	1
m,p-Xylene	ND		0.80	0.10	ppb v/v		11/04/17 01:05	1
Vinyi chloride	ND		0.40	0.12	ppb v/v		11/04/17 01:05	
Vinyl acetate	ND		0.80	0.15	ppb v/v		11/04/17 01:05	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v		11/04/17 01:05	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v		11/04/17 01:05	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v		11/04/17 01:05	1
Trichloroethene	ND		0.40	0.11	ppb v/v		11/04/17 01:05	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v		11/04/17 01:05	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v		11/04/17 01:05	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v		11/04/17 01:05	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v		11/04/17 01:05	1
Toluene	ND		0.40	0.051	ppb v/v		11/04/17 01:05	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v		11/04/17 01:05	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v		11/04/17 01:05	1
Styrene	ND		0.40	0.059	ppb v/v		11/04/17 01:05	1
Methylene Chloride	0.076	J	0.40	0.072	ppb v/v		11/04/17 01:05	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v		11/04/17 01:05	1
2-Hexanone	ND		0.40	0.087	ppb v/v		11/04/17 01:05	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v		11/04/17 01:05	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v		11/04/17 01:05	1
Ethylbenzene	ND		0.40	0.063	ppb v/v		11/04/17 01:05	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v		11/04/17 01:05	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v		11/04/17 01:05	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v		11/04/17 01:05	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v		11/04/17 01:05	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v		11/04/17 01:05	1
1.1-Dichloroethene	ND		0.80	0.13	v/v dag		11/04/17 01:05	1
1.2-Dichloroethane	ND		0.80	0.088	ppb v/v		11/04/17 01:05	1
1 1-Dichloroethane			0.40	0.13	ppb v/v		11/04/17 01:05	1
Dichlorodifluoromethane	חא		0.40	0.15	nnh v/v		11/04/17 01:05	1
1,3-Dichlorobenzene			0.40	0.11	ppb v/v		11/04/17 01:05	ا 1
1,2-Dichlorobenzene			0.40	0.13	ppb v/v		11/04/17 01:05	1
1,2-Dichlorobanzana	ND		0.40	0.10	ppb v/v		11/04/17 01:05	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v		11/04/17 01:05	۱ ۱
Dibromochloromethane	ND		0.40	0.079	ppb v/v		11/04/17 01:05	1
Chioromethane	ND		0.80	0.20			11/04/17 01:05	1
Chiorotorm	ND		0.30	0.095	ppb v/v		11/04/17 01:05	1 م
Chloroethane	ND		0.80	0.31	ppb v/v		11/04/17 01:05	1
Chlorobenzene	ND		0.30	0.064	ppb v/v		11/04/17 01:05	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v		11/04/17 01:05	1
Carbon totrachlarida			0.00	0.064	nnhydy		11/04/17 01:05	

Lab Sample ID: 320-32934-7 Matrix: Air

Analyzed

Dil Fac

Lab Sample ID: 320-32934-8

Matrix: Air

Client Sample ID: 103911-001/MWL-SV01-42.5 Date Collected: 10/26/17 11:39

Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organi Analyte	c Compo Result	u <mark>nds in Am</mark> t Qualifier	pient Air RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	4.7	J	51	1.8	ppb v/v			11/04/17 01:56	10.2
Benzene	ND		4.1	0.81	ppb v/v			11/04/17 01:56	10.2
Benzyl chloride	ND		8.2	1.7	ppb v/v			11/04/17 01:56	10.2
Bromodichloromethane	ND		3.1	0.67	ppb v/v			11/04/17 01:56	10.2
Bromoform	ND		4.1	0.71	ppb v/v			11/04/17 01:56	10.2
Bromomethane	ND		8.2	3.4	ppb v/v			11/04/17 01:56	10.2
2-Butanone (MEK)	ND		8.2	2.0	ppb v/v			11/04/17 01:56	10.2
Carbon disulfide	ND		8.2	0.80	ppb v/v			11/04/17 01:56	10.2
Carbon tetrachloride	ND		8.2	0.65	ppb v/v			11/04/17 01:56	10.2
Chlorobenzene	ND		3.1	0.65	ppb v/v			11/04/17 01:56	10.2
Chloroethane	ND		8.2	3.1	ppb v/v			11/04/17 01:56	10.2
Chloroform	14		3.1	0.97	ppb v/v			11/04/17 01:56	10.2
Chloromethane	ND		8.2	2.0	ppb v/v			11/04/17 01:56	10.2
Dibromochloromethane	ND		4.1	0.81	ppb v/v			11/04/17 01:56	10.2
1,2-Dibromoethane (EDB)	ND		8.2	0.77	ppb v/v			11/04/17 01:56	10.2
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.1	1.6	ppb v/v			11/04/17 01:56	10.2
1,2-Dichlorobenzene	ND		4.1	1.3	ppb v/v			11/04/17 01:56	10.2
1,3-Dichlorobenzene	ND		4.1	1.1	ppb v/v			11/04/17 01:56	10.2
1,4-Dichlorobenzene	ND		4.1	1.5	ppb v/v			11/04/17 01:56	10.2
Dichlorodifluoromethane	84		4.1	1.5	ppb v/v			11/04/17 01:56	10.2
1.1-Dichloroethane	2.4	J	3.1	0.73	ppb v/v			11/04/17 01:56	10.2
1,2-Dichloroethane	ND		8.2	0.90	ppb v/v			11/04/17 01:56	10.2
1.1-Dichloroethene	6.5	J	8.2	1.3	ppb v/v			11/04/17 01:56	10.2
cis-1.2-Dichloroethene	1.2	J	4.1	0.91	ppb v/v			11/04/17 01:56	10.2
trans-1,2-Dichloroethene	ND		4.1	1.0	ppb v/v			11/04/17 01:56	10.2
1,2-Dichloropropane	ND		4.1	2.4	ppb v/v			11/04/17 01:56	10.2
cis-1,3-Dichloropropene	ND		4.1	1.1	ppb v/v			11/04/17 01:56	10.2
trans-1,3-Dichloropropene	ND		4.1	0.90	ppb v/v			11/04/17 01:56	10.2
Ethylbenzene	ND		4.1	0.64	ppb v/v			11/04/17 01:56	10.2
4-Ethyltoluene	ND		4.1	1.9	ppb v/v			11/04/17 01:56	10.2
Hexachlorobutadiene	ND		20	4.4	ppb v/v			11/04/17 01:56	10.2
2-Hexanone	ND		4.1	0.89	ppb v/v			11/04/17 01:56	10.2
4-Methyl-2-pentanone (MIBK)	ND		4.1	1.4	ppb v/v			11/04/17 01:56	10.2
Methylene Chloride	0.81	J	4.1	0.73	ppb v/v			11/04/17 01:56	10.2
Styrene	ND		4.1	0.60	ppb v/v			11/04/17 01:56	10.2
1,1,2,2-Tetrachloroethane	ND		4.1	0.70	ppb v/v			11/04/17 01:56	10.2
Tetrachloroethene	340		4.1	0.52	ppb v/v			11/04/17 01:56	10.2
Toluene	ND		4.1	0.52	ppb v/v			11/04/17 01:56	10.2
1,1,2-Trichloro-1,2,2-trifluoroetha	67		4.1	1.7	ppb v/v			11/04/17 01:56	10.2
1,2,4-Trichlorobenzene	ND		20	4.4	ppb v/v			11/04/17 01:56	10.2
1,1,1-Trichloroethane	34		3.1	0.66	ppb v/v			11/04/17 01:56	10.2
1,1,2-Trichloroethane	ND		4.1	0.68	ppb v/v			11/04/17 01:56	10.2
Trichloroethene	74		4.1	1.1	ppb v/v			11/04/17 01:56	10.2
Trichlorofluoromethane	160		4.1	2.0	ppb v/v			11/04/17 01:56	10.2
1,2,4-Trimethylbenzene	ND		8.2	1.7	ppb v/v			11/04/17 01:56	10.2
1,3,5-Trimethylbenzene	ND		4.1	1.3	ppb v/v			11/04/17 01:56	10.2
Vinyl acetate	ND		8.2	1.5	ppb v/v			11/04/17 01:56	10.2
Vinyl chloride	ND		4.1	1.2	ppb v/v			11/04/17 01:56	10.2

Result Qualifier

ND

ND

%Recovery Qualifier

99

100

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

Analyte

o-Xylene

Surrogate

4-Bromofluorobenzene (Surr)

1,2-Dichloroethane-d4 (Surr)

m,p-Xylene

Lab Sample ID: 320-32934-8 Matrix: Air

Date Collected: 10/26/17 11:39 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Client Sample ID: 103911-001/MWL-SV01-42.5

Analyzed

11/04/17 01:56

11/04/17 01:56

Analyzed

11/04/17 01:56

11/04/17 01:56

11/04/17 01:56

Dil Fac

Dil Fac

10.2

10.2

10.2

10.2

10.2

Toluene-d8 (Surr) 104 70 - 130 Client Sample ID: 103912-001/MWL-SV01-42.5 Date Collected: 10/26/17 11:39 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-9 Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	5.1	J	51	1.8	ppb v/v			11/03/17 18:17	10.2
Benzene	ND		4.1	0.81	ppb v/v			11/03/17 18:17	10.2
Benzyl chloride	ND		8.2	1.7	ppb v/v			11/03/17 18:17	10.2
Bromodichloromethane	ND		3.1	0.67	ppb v/v			11/03/17 18:17	10.2
Bromoform	ND		4.1	0.71	ppb v/v			11/03/17 18:17	10.2
Bromomethane	ND		8.2	3.4	ppb v/v			11/03/17 18:17	10.2
2-Butanone (MEK)	ND		8.2	2.0	ppb v/v			11/03/17 18:17	10.2
Carbon disulfide	ND		8.2	0.80	ppb v/v			11/03/17 18:17	10.2
Carbon tetrachloride	ND		8.2	0.65	ppb v/v			11/03/17 18:17	10.2
Chlorobenzene	ND		3.1	0.65	ppb v/v			11/03/17 18:17	10.2
Chloroethane	ND		8.2	3.1	ppb v/v			11/03/17 18:17	10.2
Chloroform	14		3.1	0.97	ppb v/v			11/03/17 18:17	10.2
Chloromethane	ND		8.2	2.0	ppb v/v			11/03/17 18:17	10.2
Dibromochloromethane	ND		4.1	0.81	ppb v/v			11/03/17 18:17	10.2
1,2-Dibromoethane (EDB)	ND		8.2	0.77	ppb v/v			11/03/17 18:17	10.2
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.1	1.6	ppb v/v			11/03/17 18:17	10.2
1,2-Dichlorobenzene	ND		4.1	1.3	ppb v/v			11/03/17 18:17	10.2
1,3-Dichlorobenzene	ND		4.1	1.1	ppb v/v			11/03/17 18:17	10.2
1,4-Dichlorobenzene	ND		4.1	1.5	ppb v/v			11/03/17 18:17	10.2
Dichlorodifluoromethane	84		4.1	1.5	ppb v/v			11/03/17 18:17	10.2
1,1-Dichloroethane	2.3	J	3.1	0.73	ppb v/v			11/03/17 18:17	10.2
1,2-Dichloroethane	ND		8.2	0.90	ppb v/v			11/03/17 18:17	10.2
1,1-Dichloroethene	6.6	J	8.2	1.3	ppb v/v			11/03/17 18:17	10.2
cis-1,2-Dichloroethene	1.1	J	4.1	0.91	ppb v/v			11/03/17 18:17	10.2
trans-1,2-Dichloroethene	ND		4.1	1.0	ppb v/v			11/03/17 18:17	10.2
1,2-Dichloropropane	ND		4.1	2.4	ppb v/v			11/03/17 18:17	10.2
cis-1,3-Dichloropropene	ND		4.1	1.1	ppb v/v			11/03/17 18:17	10.2
trans-1,3-Dichloropropene	ND		4.1	0.90	ppb v/v			11/03/17 18:17	10.2
Ethylbenzene	ND		4.1	0.64	ppb v/v			11/03/17 18:17	10.2
4-Ethyltoluene	ND		4.1	1.9	ppb v/v			11/03/17 18:17	10.2
Hexachlorobutadiene	ND		20	4.4	ppb v/v			11/03/17 18:17	10.2
2-Hexanone	ND		4.1	0.89	ppb v/v			11/03/17 18:17	10.2
4-Methyl-2-pentanone (MIBK)	ND		4.1	1.4	ppb v/v			11/03/17 18:17	10.2
Methylene Chloride	ND		4.1	0.73	ppb v/v			11/03/17 18:17	10.2

RL

8.2

4.1

Limits

70 - 130

70 - 130

MDL Unit

1.0 ppb v/v

0.55 ppb v/v

D

Prepared

Prepared

Client Sample ID: 103912-001/MWL-SV01-42.5

Date Received: 11/02/17 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		4.1	0.60	ppb v/v			11/03/17 18:17	10.2			
1,1,2,2-Tetrachloroethane	ND		4.1	0.70	ppb v/v			11/03/17 18:17	10.2			
Tetrachloroethene	420		4.1	0.52	ppb v/v			11/03/17 18:17	10.2			
Toluene	ND		4.1	0.52	ppb v/v			11/03/17 18:17	10.2			
1,1,2-Trichloro-1,2,2-trifluoroetha	72		4.1	1.7	ppb v/v			11/03/17 18:17	10.2			
ne												
1,2,4-Trichlorobenzene	ND		20	4.4	ppb v/v			11/03/17 18:17	10.2			
1,1,1-Trichloroethane	37		3.1	0.66	ppb v/v			11/03/17 18:17	10.2			
1,1,2-Trichloroethane	ND		4.1	0.68	ppb v/v			11/03/17 18:17	10.2			
Trichloroethene	86		4.1	1.1	ppb v/v			11/03/17 18:17	10.2			
Trichlorofluoromethane	170		4.1	2.0	ppb v/v			11/03/17 18:17	10.2			
1,2,4-Trimethylbenzene	ND		8.2	1.7	ppb v/v			11/03/17 18:17	10.2			
1,3,5-Trimethylbenzene	ND		4.1	1.3	ppb v/v			11/03/17 18:17	10.2			
Vinyl acetate	ND		8.2	1.5	ppb v/v			11/03/17 18:17	10.2			
Vinyl chloride	ND		4.1	1.2	ppb v/v			11/03/17 18:17	10.2			
m,p-Xylene	ND		8.2	1.0	ppb v/v			11/03/17 18:17	10.2			
o-Xylene	ND		4.1	0.55	ppb v/v			11/03/17 18:17	10.2			
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac			
4-Bromofluorobenzene (Surr)	96		70 - 130			-		11/03/17 18:17	10.2			
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					11/03/17 18:17	10.2			
Toluene-d8 (Surr)	92		70 - 130					11/03/17 18:17	10.2			

Client Sample ID: 103913-001/MWL-FB2 Date Collected: 10/26/17 11:25 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air Analyte **Result Qualifier** MDL Unit RL D Prepared Analyzed Dil Fac Acetone 0.43 5.0 0.18 ppb v/v 11/03/17 19:15 1 J 0.40 0.079 ppb v/v 11/03/17 19:15 **Benzene** 5.9 1 ND Benzyl chloride 0.80 0.16 ppb v/v 11/03/17 19:15 1 ND Bromodichloromethane 0.30 0.066 ppb v/v 11/03/17 19:15 1 Bromoform ND 0.40 0.070 ppb v/v 11/03/17 19:15 1 Bromomethane ND 0.80 0.34 ppb v/v 11/03/17 19:15 1 2-Butanone (MEK) ND 0.80 0.20 ppb v/v 11/03/17 19:15 1 ND Carbon disulfide 0.80 0.078 ppb v/v 11/03/17 19:15 1 ND 0.064 ppb v/v Carbon tetrachloride 0.80 11/03/17 19:15 1 Chlorobenzene ND 0.30 0.064 ppb v/v 11/03/17 19:15 1 Chloroethane ND 0.80 0.31 ppb v/v 11/03/17 19:15 1 ND Chloroform 0.30 0.095 ppb v/v 11/03/17 19:15 1 Chloromethane ND 0.80 0.20 ppb v/v 11/03/17 19:15 1 Dibromochloromethane ND 0.40 0.079 ppb v/v 11/03/17 19:15 1 1,2-Dibromoethane (EDB) ND 0.80 0.075 ppb v/v 11/03/17 19:15 1 1,2-Dichloro-1,1,2,2-tetrafluoroethane ND 0.40 0.16 ppb v/v 11/03/17 19:15 1 ND 1,2-Dichlorobenzene 0.40 0.13 ppb v/v 1 11/03/17 19:15 1,3-Dichlorobenzene ND 0.40 0.11 ppb v/v 11/03/17 19:15 1 11/03/17 19:15 ND 0.40 0.15 ppb v/v 1 1,4-Dichlorobenzene

Date Collected: 10/26/17 11:39

Lab Sample ID: 320-32934-9 Matrix: Air

Lab Sample ID: 320-32934-10

Matrix: Air

TestAmerica Job ID: 320-32934-1

Client Sample ID: 103913-001/MWL-FB2

Date Collected: 10/26/17 11:25 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Orga	anic Compour	nds in Am	bient Air (C	ontinue	d)				
Analyte	Result C	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			11/03/17 19:15	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			11/03/17 19:15	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			11/03/17 19:15	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			11/03/17 19:15	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			11/03/17 19:15	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			11/03/17 19:15	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			11/03/17 19:15	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			11/03/17 19:15	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			11/03/17 19:15	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			11/03/17 19:15	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			11/03/17 19:15	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			11/03/17 19:15	1
2-Hexanone	ND		0.40	0.087	ppb v/v			11/03/17 19:15	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			11/03/17 19:15	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			11/03/17 19:15	1
Styrene	ND		0.40	0.059	ppb v/v			11/03/17 19:15	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			11/03/17 19:15	1
Tetrachloroethene	0.25 J	,	0.40	0.051	ppb v/v			11/03/17 19:15	1
Toluene	0.058 J	I	0.40	0.051	ppb v/v			11/03/17 19:15	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			11/03/17 19:15	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			11/03/17 19:15	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			11/03/17 19:15	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			11/03/17 19:15	1
Trichloroethene	ND		0.40	0.11	ppb v/v			11/03/17 19:15	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			11/03/17 19:15	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			11/03/17 19:15	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			11/03/17 19:15	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			11/03/17 19:15	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			11/03/17 19:15	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			11/03/17 19:15	1
o-Xylene	ND		0.40	0.054	ppb v/v			11/03/17 19:15	1
Surrogate	%Recovery G	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130			-		11/03/17 19:15	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					11/03/17 19:15	1
Toluene-d8 (Surr)	96		70 - 130					11/03/17 19:15	1

Client Sample ID: 103914-001/MWL-SV02-41.5 Date Collected: 10/26/17 11:48 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.3	J	38	1.4	ppb v/v			11/03/17 20:07	7.65
Benzene	ND		3.1	0.60	ppb v/v			11/03/17 20:07	7.65
Benzyl chloride	ND		6.1	1.2	ppb v/v			11/03/17 20:07	7.65
Bromodichloromethane	ND		2.3	0.50	ppb v/v			11/03/17 20:07	7.65
Bromoform	ND		3.1	0.54	ppb v/v			11/03/17 20:07	7.65

TestAmerica Sacramento

11/30/2017

Lab Sample ID: 320-32934-10

TestAmerica Job ID: 320-32934-1

Matrix: Air

Lab Sample ID: 320-32934-11 Matrix: Air



Client Sample ID: 103914-001/MWL-SV02-41.5

Date Collected: 10/26/17 11:48 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-11 Matrix: Air

Method: 10-15 - Volatile Orga	Result	UNOS IN AN Qualifier	NDIENT AIF (C		<mark>1)</mark> Unit	П	Prenared	Analyzed	Dil Fac
Bromomethane	ND	Quaimer	<u> </u>	26			Flepaleu	11/03/17 20:07	7 65
2-Butanone (MEK)	3.5		6.1	1.5	nnh v/v			11/03/17 20:07	7.65
Carbon disulfide		•	6.1	0.60	nnh v/v			11/03/17 20:07	7.65
Carbon tetrachloride	ND		6.1	0.00	ppb v/v			11/03/17 20:07	7.65
Chlorobenzene	ND		23	0.49	ppb v/v			11/03/17 20:07	7 65
Chloroethane	ND		6 1	24	pps v/v			11/03/17 20:07	7 65
Chloroform	2.8		2.3	0.73	ppb v/v			11/03/17 20:07	7.65
Chloromethane	ND		6.1	1.5	ppb v/v			11/03/17 20:07	7.65
Dibromochloromethane	ND		3.1	0.60	v/v dag			11/03/17 20:07	7.65
1.2-Dibromoethane (EDB)	ND		6.1	0.57	v/v dag			11/03/17 20:07	7.65
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.1	1.2	ppb v/v			11/03/17 20:07	7.65
1,2-Dichlorobenzene	ND		3.1	0.99	ppb v/v			11/03/17 20:07	7.65
1,3-Dichlorobenzene	ND		3.1	0.84	ppb v/v			11/03/17 20:07	7.65
1,4-Dichlorobenzene	ND		3.1	1.1	ppb v/v			11/03/17 20:07	7.65
Dichlorodifluoromethane	80		3.1	1.1	ppb v/v			11/03/17 20:07	7.65
1.1-Dichloroethane	2.3		2.3	0.55	ppb v/v			11/03/17 20:07	7.65
1,2-Dichloroethane	ND		6.1	0.67	ppb v/v			11/03/17 20:07	7.65
1,1-Dichloroethene	11		6.1	0.99	ppb v/v			11/03/17 20:07	7.65
cis-1,2-Dichloroethene	ND		3.1	0.68	ppb v/v			11/03/17 20:07	7.65
trans-1,2-Dichloroethene	ND		3.1	0.77	ppb v/v			11/03/17 20:07	7.65
1,2-Dichloropropane	ND		3.1	1.8	ppb v/v			11/03/17 20:07	7.65
cis-1,3-Dichloropropene	ND		3.1	0.80	ppb v/v			11/03/17 20:07	7.65
trans-1,3-Dichloropropene	ND		3.1	0.67	ppb v/v			11/03/17 20:07	7.65
Ethylbenzene	ND		3.1	0.48	ppb v/v			11/03/17 20:07	7.65
4-Ethyltoluene	ND		3.1	1.4	ppb v/v			11/03/17 20:07	7.65
Hexachlorobutadiene	ND		15	3.3	ppb v/v			11/03/17 20:07	7.65
2-Hexanone	ND		3.1	0.67	ppb v/v			11/03/17 20:07	7.65
4-Methyl-2-pentanone (MIBK)	ND		3.1	1.0	ppb v/v			11/03/17 20:07	7.65
Methylene Chloride	ND		3.1	0.55	ppb v/v			11/03/17 20:07	7.65
Styrene	ND		3.1	0.45	ppb v/v			11/03/17 20:07	7.65
1,1,2,2-Tetrachloroethane	ND		3.1	0.53	ppb v/v			11/03/17 20:07	7.65
Tetrachloroethene	69		3.1	0.39	ppb v/v			11/03/17 20:07	7.65
Toluene	ND		3.1	0.39	ppb v/v			11/03/17 20:07	7.65
1,1,2-Trichloro-1,2,2-trifluoroetha	49		3.1	1.2	ppb v/v			11/03/17 20:07	7.65
ne 1.2.4-Trichlorobenzene	ND		15	3.3	v/v daa			11/03/17 20:07	7.65
1.1.1-Trichloroethane	72		2.3	0.50	ppb v/v			11/03/17 20:07	7.65
1.1.2-Trichloroethane	ND		3.1	0.51	v/v dag			11/03/17 20:07	7.65
Trichloroethene	65		3.1	0.80	ppb v/v			11/03/17 20:07	7.65
Trichlorofluoromethane	300		3.1	1.5	ppb v/v			11/03/17 20:07	7.65
1,2,4-Trimethylbenzene	ND		6.1	1.2	ppb v/v			11/03/17 20:07	7.65
1,3,5-Trimethylbenzene	ND		3.1	0.96	ppb v/v			11/03/17 20:07	7.65
Vinyl acetate	ND		6.1	1.1	ppb v/v			11/03/17 20:07	7.65
Vinyl chloride	ND		3.1	0.92	ppb v/v			11/03/17 20:07	7.65
m,p-Xylene	ND		6.1	0.77	ppb v/v			11/03/17 20:07	7.65
o-Xylene	ND		3.1	0.41	ppb v/v			11/03/17 20:07	7.65
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130					11/03/17 20:07	7.65

Client Sample ID: 103914	Lal	Lab Sample ID: 320-32934-11							
Date Collected: 10/26/17 11:48	Date Collected: 10/26/17 11:48								rix Air
Date Received: 11/02/17 09:30								Wat	
Sample Container: Summa Ca	anistar fl								
Method: TO-15 - Volatile Orga	anic Compou	unds in An	nbient Air (C	ontinue	d)				
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	101		70 - 130			-		11/03/17 20:07	7.65
Toluene-d8 (Surr)	97		70 - 130					11/03/17 20:07	7.65
Client Comple ID: 402045	004/84\8/	CV/02 44	F				Comple	10.200.200	24 42
Client Sample ID: 103915		-3702-41	.5			Lai	o Sample	ID: 320-328	134-12
Date Collected: 10/26/17 11:48								Mat	rix: Air
Date Received: 11/02/17 09:30	niotor Cl								
Method: TO-15 - Volatile Orga	anic Compou	unds in An	nbient Air						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	5.9	J	37	1.3	ppb v/v			11/03/17 20:58	7.34
Benzene	ND		2.9	0.58	ppb v/v			11/03/17 20:58	7.34
Benzyl chloride	ND		5.9	1.2	ppb v/v			11/03/17 20:58	7.34
Bromodichloromethane	ND		2.2	0.48	ppb v/v			11/03/17 20:58	7.34
Bromoform	ND		2.9	0.51	ppb v/v			11/03/17 20:58	7.34
Bromomethane	ND		5.9	2.5	ppb v/v			11/03/17 20:58	7.34
2-Butanone (MEK)	ND		5.9	1.5	ppb v/v			11/03/17 20:58	7.34
Carbon disulfide	ND		5.9	0.57	ppb v/v			11/03/17 20:58	7.34
Carbon tetrachloride	ND		5.9	0.47	ppb v/v			11/03/17 20:58	7.34
Chlorobenzene	ND		2.2	0.47	ppb v/v			11/03/17 20:58	7.34
Chloroethane	ND		5.9	2.3	ppb v/v			11/03/17 20:58	7.34
Chloroform	2.9		2.2	0.70	v/v dag			11/03/17 20:58	7.34
Chloromethane	ND		5.9	1.4	ppb v/v			11/03/17 20:58	7.34
Dibromochloromethane	ND		2.9	0.58	ppb v/v			11/03/17 20:58	7 34
1 2-Dibromoethane (EDB)	ND		5.9	0.55	ppb v/v			11/03/17 20:58	7 34
1 2-Dichloro-1 1 2 2-tetrafluoroethane	ND		2.9	1 1	nnh v/v			11/03/17 20:58	7.34
1 2-Dichlorobenzene	ND		2.0	0.95	nnh v/v			11/03/17 20:58	7.34
1 3-Dichlorobenzene	ND		29	0.81	nnh v/v			11/03/17 20:58	7 34
1 4-Dichlorobenzene	ND		2.0	1 1	nnh v/v			11/03/17 20:58	7 34
Dichlorodifluoromothano	79		2.0	1.1	nnh v/v			11/03/17 20:58	7 34
1.1 Dichloroothana	70		2.0	0.53	ppb v/v			11/03/17 20:58	7.34
1.2 Dichloroothano	2. 4		5.0	0.00				11/03/17 20:58	7.34
			5.9	0.05				11/03/17 20:50	7.34
r, 1-Dichloroethene			5.9	0.95				11/03/17 20.36	7.34
trans 1.2 Dichloroethene			2.9	0.05				11/03/17 20.56	7.34
1.2 Dichlerenzenene			2.9	0.73				11/03/17 20.50	7.34
r,2-Dichloropropane			2.9	0.76				11/03/17 20.50	7.34
cis-1,3-Dichloropropene	ND		2.9	0.76				11/03/17 20:58	7.34
trans-1,3-Dicnioropropene	ND		2.9	0.65				11/03/17 20:58	7.34
Ethylbenzene	0.54	J	2.9	0.46				11/03/17 20:58	7.34
4-Etnyitoiuene	ND		2.9	1.4	ppb v/v			11/03/17 20:58	7.34
Hexachiorobutadiene	ND		15	3.2	v/v dqq			11/03/17 20:58	7.34
	ND		2.9	0.64	ν/ν αqq			11/03/17 20:58	7.34
4-Metnyi-2-pentanone (MIBK)	ND		2.9	0.99	v/v aqq			11/03/17 20:58	<i>1</i> .34
	ND		2.9	0.53	v/v aqq			11/03/17 20:58	<i>1</i> .34
Styrene	ND		2.9	0.43	v/v aqq			11/03/17 20:58	<i>1</i> .34
1,1,2,2-I etrachloroethane	ND		2.9	0.51	ppb v/v			11/03/17 20:58	7.34
Tetrachloroethene	72		2.9	0.37	ppb v/v			11/03/17 20:58	7.34
loluene	ND		2.9	0.37	ppb v/v			11/03/17 20:58	7.34

Client Sample ID: 103915-001/MWL-SV02-41.5

Date Collected: 10/26/17 11:48 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-12

TestAmerica Job ID: 320-32934-1

Matrix: Air

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-trifluoroetha	50		2.9	1.2	ppb v/v			11/03/17 20:58	7.34			
ne												
1,2,4-Trichlorobenzene	ND		15	3.2	ppb v/v			11/03/17 20:58	7.34			
1,1,1-Trichloroethane	74		2.2	0.48	ppb v/v			11/03/17 20:58	7.34			
1,1,2-Trichloroethane	ND		2.9	0.49	ppb v/v			11/03/17 20:58	7.34			
Trichloroethene	67		2.9	0.77	ppb v/v			11/03/17 20:58	7.34			
Trichlorofluoromethane	310		2.9	1.4	ppb v/v			11/03/17 20:58	7.34			
1,2,4-Trimethylbenzene	3.1	J	5.9	1.2	ppb v/v			11/03/17 20:58	7.34			
1,3,5-Trimethylbenzene	1.4	J	2.9	0.92	ppb v/v			11/03/17 20:58	7.34			
Vinyl acetate	ND		5.9	1.1	ppb v/v			11/03/17 20:58	7.34			
Vinyl chloride	ND		2.9	0.88	ppb v/v			11/03/17 20:58	7.34			
m,p-Xylene	2.5	J	5.9	0.73	ppb v/v			11/03/17 20:58	7.34			
o-Xylene	1.1	J	2.9	0.40	ppb v/v			11/03/17 20:58	7.34			
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac			
4-Bromofluorobenzene (Surr)	104		70 - 130					11/03/17 20:58	7.34			
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					11/03/17 20:58	7.34			
Toluene-d8 (Surr)	97		70 - 130					11/03/17 20:58	7.34			

Client Sample ID: 103916-001/MWL-FB3 Date Collected: 10/26/17 08:24 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-13

Matrix: Air

Method: TO-15 - Volatile Organ	ic Compo	unds in Aml	oient Air			_	. .		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	0.42	J	5.0	0.18	ppb v/v			11/03/17 21:57	1
Benzene	4.7		0.40	0.079	ppb v/v			11/03/17 21:57	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			11/03/17 21:57	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			11/03/17 21:57	1
Bromoform	ND		0.40	0.070	ppb v/v			11/03/17 21:57	1
Bromomethane	ND		0.80	0.34	ppb v/v			11/03/17 21:57	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			11/03/17 21:57	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			11/03/17 21:57	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			11/03/17 21:57	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			11/03/17 21:57	1
Chloroethane	ND		0.80	0.31	ppb v/v			11/03/17 21:57	1
Chloroform	ND		0.30	0.095	ppb v/v			11/03/17 21:57	1
Chloromethane	0.20	J	0.80	0.20	ppb v/v			11/03/17 21:57	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			11/03/17 21:57	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			11/03/17 21:57	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			11/03/17 21:57	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			11/03/17 21:57	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			11/03/17 21:57	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			11/03/17 21:57	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			11/03/17 21:57	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			11/03/17 21:57	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			11/03/17 21:57	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			11/03/17 21:57	1

Client Sample ID: 103916-001/MWL-FB3

Date Collected: 10/26/17 08:24 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-13

TestAmerica Job ID: 320-32934-1

Matrix: Air

Method: TO-15 - Volatile Org	anic Compo	unds in Ar	nbient Air (Continue	d)				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			11/03/17 21:57	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			11/03/17 21:57	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			11/03/17 21:57	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			11/03/17 21:57	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			11/03/17 21:57	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			11/03/17 21:57	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			11/03/17 21:57	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			11/03/17 21:57	1
2-Hexanone	ND		0.40	0.087	ppb v/v			11/03/17 21:57	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			11/03/17 21:57	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			11/03/17 21:57	1
Styrene	ND		0.40	0.059	ppb v/v			11/03/17 21:57	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			11/03/17 21:57	1
Tetrachloroethene	0.079	J	0.40	0.051	ppb v/v			11/03/17 21:57	1
Toluene	0.20	J	0.40	0.051	ppb v/v			11/03/17 21:57	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			11/03/17 21:57	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			11/03/17 21:57	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			11/03/17 21:57	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			11/03/17 21:57	1
Trichloroethene	0.34	J	0.40	0.11	ppb v/v			11/03/17 21:57	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			11/03/17 21:57	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			11/03/17 21:57	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			11/03/17 21:57	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			11/03/17 21:57	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			11/03/17 21:57	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			11/03/17 21:57	1
o-Xylene	ND		0.40	0.054	ppb v/v			11/03/17 21:57	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		70 - 130					11/03/17 21:57	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					11/03/17 21:57	1

Client Sample ID: 103917-001/MWL-SV03-50 Date Collected: 10/26/17 09:12 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Toluene-d8 (Surr)

Method: TO-15 - Volatile Organic Compounds in Ambient Air

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Analyte Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone 1.2	J	20	0.72	ppb v/v			11/03/17 22:49	4.05
Benzene 0.56	J	1.6	0.32	ppb v/v			11/03/17 22:49	4.05
Benzyl chloride ND		3.2	0.66	ppb v/v			11/03/17 22:49	4.05
Bromodichloromethane ND		1.2	0.27	ppb v/v			11/03/17 22:49	4.05
Bromoform ND		1.6	0.28	ppb v/v			11/03/17 22:49	4.05
Bromomethane ND		3.2	1.4	ppb v/v			11/03/17 22:49	4.05
2-Butanone (MEK) ND		3.2	0.81	ppb v/v			11/03/17 22:49	4.05
Carbon disulfide ND		3.2	0.32	ppb v/v			11/03/17 22:49	4.05
Carbon tetrachloride ND		3.2	0.26	ppb v/v			11/03/17 22:49	4.05

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TestAmerica Sacramento

11/03/17 21:57

Lab Sample ID: 320-32934-14

1

Matrix: Air

Client Sample ID: 103917-001/MWL-SV03-50

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

Date Collected: 10/26/17 09:12 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-14 Matrix: Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	ND		1.2	0.26	ppb v/v			11/03/17 22:49	4.05
Chloroethane	ND		3.2	1.2	ppb v/v			11/03/17 22:49	4.05
Chloroform	1.8		1.2	0.38	ppb v/v			11/03/17 22:49	4.05
Chloromethane	ND		3.2	0.80	ppb v/v			11/03/17 22:49	4.05
Dibromochloromethane	ND		1.6	0.32	ppb v/v			11/03/17 22:49	4.05
1,2-Dibromoethane (EDB)	ND		3.2	0.30	ppb v/v			11/03/17 22:49	4.05
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.6	0.63	ppb v/v			11/03/17 22:49	4.05
1,2-Dichlorobenzene	ND		1.6	0.53	ppb v/v			11/03/17 22:49	4.05
1,3-Dichlorobenzene	ND		1.6	0.45	ppb v/v			11/03/17 22:49	4.05
1,4-Dichlorobenzene	ND		1.6	0.60	ppb v/v			11/03/17 22:49	4.05
Dichlorodifluoromethane	24		1.6	0.59	ppb v/v			11/03/17 22:49	4.05
1,1-Dichloroethane	3.7		1.2	0.29	ppb v/v			11/03/17 22:49	4.05
1,2-Dichloroethane	ND		3.2	0.36	ppb v/v			11/03/17 22:49	4.05
1,1-Dichloroethene	14		3.2	0.52	ppb v/v			11/03/17 22:49	4.05
cis-1,2-Dichloroethene	1.8		1.6	0.36	ppb v/v			11/03/17 22:49	4.05
trans-1,2-Dichloroethene	ND		1.6	0.41	ppb v/v			11/03/17 22:49	4.05
1,2-Dichloropropane	ND		1.6	0.97	ppb v/v			11/03/17 22:49	4.05
cis-1,3-Dichloropropene	ND		1.6	0.42	ppb v/v			11/03/17 22:49	4.05
trans-1,3-Dichloropropene	ND		1.6	0.36	ppb v/v			11/03/17 22:49	4.05
Ethylbenzene	ND		1.6	0.26	ppb v/v			11/03/17 22:49	4.05
4-Ethyltoluene	ND		1.6	0.76	ppb v/v			11/03/17 22:49	4.05
Hexachlorobutadiene	ND		8.1	1.7	ppb v/v			11/03/17 22:49	4.05
2-Hexanone	ND		1.6	0.35	ppb v/v			11/03/17 22:49	4.05
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ppb v/v			11/03/17 22:49	4.05
Methylene Chloride	1.1	J	1.6	0.29	ppb v/v			11/03/17 22:49	4.05
Styrene	ND		1.6	0.24	ppb v/v			11/03/17 22:49	4.05
1,1,2,2-Tetrachloroethane	ND		1.6	0.28	ppb v/v			11/03/17 22:49	4.05
Tetrachloroethene	140		1.6	0.21	ppb v/v			11/03/17 22:49	4.05
Toluene	ND		1.6	0.21	ppb v/v			11/03/17 22:49	4.05
1,1,2-Trichloro-1,2,2-trifluoroetha	86		1.6	0.66	ppb v/v			11/03/17 22:49	4.05
1,2,4-Trichlorobenzene	ND		8.1	1.8	ppb v/v			11/03/17 22:49	4.05
1,1,1-Trichloroethane	4.1		1.2	0.26	ppb v/v			11/03/17 22:49	4.05
1,1,2-Trichloroethane	ND		1.6	0.27	ppb v/v			11/03/17 22:49	4.05
Trichloroethene	120		1.6	0.43	ppb v/v			11/03/17 22:49	4.05
Trichlorofluoromethane	32		1.6	0.79	ppb v/v			11/03/17 22:49	4.05
1,2,4-Trimethylbenzene	ND		3.2	0.66	ppb v/v			11/03/17 22:49	4.05
1,3,5-Trimethylbenzene	ND		1.6	0.51	ppb v/v			11/03/17 22:49	4.05
Vinyl acetate	ND		3.2	0.59	ppb v/v			11/03/17 22:49	4.05
Vinyl chloride	ND		1.6	0.49	ppb v/v			11/03/17 22:49	4.05
m,p-Xylene	0.68	J	3.2	0.41	ppb v/v			11/03/17 22:49	4.05
o-Xylene	ND		1.6	0.22	ppb v/v			11/03/17 22:49	4.05
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	108		70 - 130			-		11/03/17 22:49	4.05
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					11/03/17 22:49	4.05
Toluene-d8 (Surr)	91		70 - 130					11/03/17 22:49	4.05

Client Sample ID: 103918-001/MWL-SV03-100

Date Collected: 10/26/17 09:16

Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-15 Matrix: Air

Actione 33 3 20 0.72 pp iv/ 1103/17/2342 407 Benzen ND 1.6 0.32 pp iv/ 1103/17/2342 407 Benzen ND 1.6 0.32 pp iv/ 1103/17/2342 407 Bromotiorm ND 1.2 0.27 pp iv/ 1103/17/2342 407 Bromotiorm ND 1.8 0.28 pp iv/ 1103/17/2342 407 Bromotiorm ND 3.3 0.41 pp iv/ 1103/17/2342 407 Carbon tetrachloride 0.31 J 3.3 0.32 pp iv/ 1103/17/2342 407 Chioroberane ND 3.3 0.32 pp iv/ 1103/17/2342 407 Chioroberane ND 1.6 0.53 pp iv/ 1103/17/2342 407 Chioroberane ND 1.6 0.53 pp iv/ 1103/17/2342 407 12-Dichorochioromethane ND 1.6 0.53 pp iv/ 1	Method: TO-15 - Volatile Organi Analyte	c Compou Result	unds in Amb Qualifier	i <mark>ent Air</mark> RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene ND 16 0.32 Opb w/ 1100/17/23/42 4.07 Bernyl chloride ND 3.3 0.66 pb w/ 1103/17/23/42 4.07 Bromadchiroromethane ND 1.6 0.28 pb w/ 1103/17/23/42 4.07 Bromanethane ND 3.3 1.4 pb w/ 1103/17/23/42 4.07 2-Butanone (MEK) ND 3.3 0.81 pb w/ 1103/17/23/42 4.07 Carbon dsulfde ND 3.3 0.81 pb w/ 1103/17/23/42 4.07 Chlorothane ND 1.2 0.26 pb w/ 1103/17/23/42 4.07 Chlorothane 0.3 1.3 pb w/ 1103/17/23/42 4.07 Chlorothane 0.83 J 3.3 0.09 pb w/ 1103/17/23/42 4.07 12-0bronothane(EDB) ND 1.6 0.32 pb w/ 1103/17/23/42 4.07 12-0bronothane(EDB) ND 1.6 0.53 pb w/ 1103/	Acetone	3.3	J	20	0.72	ppb v/v		-	11/03/17 23:42	4.07
Bency chincide ND 3.3 0.66 ppb v/v 1103/17 23:42 4.07 Bromodichloromethane ND 1.2 0.27 pb v/v 1103/17 23:42 4.07 Bromodichloromethane ND 3.3 1.4 pb v/v 1103/17 23:42 4.07 Bromodick ND 3.3 0.81 pb v/v 1103/17 23:42 4.07 Carbon tetrachione ND 3.3 0.81 pb v/v 1103/17 23:42 4.07 Carbon tetrachione ND 3.3 0.32 pb v/v 1103/17 23:42 4.07 Chiorobenzene ND 1.2 0.26 pb v/v 1103/17 23:42 4.07 Chiorobenzene ND 1.3 0.35 0.95 v/v 1103/17 23:42 4.07 Chiorobenzene ND 1.6 0.32 pb v/v 1103/17 23:42 4.07 1.2.0ibromochizane (DB) ND 1.6 0.32 pb v/v 1103/17 23:42 4.07 1.2.0ibromochizane (ND 1.6 0.53 pb v/v<	Benzene	ND		1.6	0.32	ppb v/v			11/03/17 23:42	4.07
Borndolthomethane ND 12 0.27 0.27 0.28 <th0.28< th=""> 0.28 0.28</th0.28<>	Benzyl chloride	ND		3.3	0.66	ppb v/v			11/03/17 23:42	4.07
Bornoform ND 1.6 0.28 pp v/v 1103/17 23/2 4.07 Bromomethane ND 3.3 1.4 pp v/v 1103/17 23/2 4.07 Stuanone (MEK) ND 3.3 0.32 pp v/v 1103/17 23/2 4.07 Carbon tetrachloride 0.31 J 3.3 0.32 pp v/v 1103/17 23/2 4.07 Chiorobarzene ND 1.2 0.26 pp v/v 1103/17 23/2 4.07 Chioroform 2.3 1.2 0.39 pp v/v 1103/17 23/2 4.07 Chioroform 2.3 1.3 0.80 pp v/v 1103/17 23/2 4.07 Dichorochizomethane ND 1.6 0.32 pp v/v 1103/17 23/2 4.07 1.2-Dichorochizomethane ND 1.6 0.45 pp v/v 1103/17 23/2 4.07 1.2-Dichorochizomethane ND 1.6 0.53 pp v/v 1103/17 23/2 4.07 1.2-Dichorochenzene ND 1.6 0.45	Bromodichloromethane	ND		1.2	0.27	ppb v/v			11/03/17 23:42	4.07
Bromomethane ND 3.3 1.4 pp v/v 1103/17 23.42 4.07 2 Butanone (MEK) ND 3.3 0.81 pp v/v 11103/17 23.42 4.07 Carbon disultide ND 3.3 0.26 pp v/v 11103/17 23.42 4.07 Chloroethane ND 1.2 0.26 pp v/v 11103/17 23.42 4.07 Chloroethane ND 3.3 0.33 pp v/v 11103/17 23.42 4.07 Chloroethane ND 3.3 0.80 pp v/v 11103/17 23.42 4.07 Chloroethane ND 1.6 0.32 pb v/v 11103/17 23.42 4.07 1.2-Dichoroethane (EDB) ND 1.6 0.63 pb v/v 1103/17 23.42 4.07 1.2-Dichoroethane ND 1.6 0.63 pb v/v 1103/17 23.42 4.07 1.2-Dichoroethane ND 1.6 0.61 pb v/v 1103/17 23.42 4.07 1.2-Dichoroethane S1 1.6 0.65 p	Bromoform	ND		1.6	0.28	ppb v/v			11/03/17 23:42	4.07
2 Bulanone (MEK) ND 3.3 0.81 ppb v/v 1103/17 23.42 4.07 Carbon tetrachioride 0.31 3.3 0.32 ppb v/v 11103/17 23.42 4.07 Chlorobenzene ND 1.2 0.26 ppb v/v 11103/17 23.42 4.07 Chlorobenzene ND 3.3 1.3 pb v/v 11103/17 23.42 4.07 Chlorobenzene ND 3.3 1.3 pb v/v 11103/17 23.42 4.07 Chlorobentene 0.83 J 3.3 0.80 pb v/v 11103/17 23.42 4.07 1.2-Dibromochtomethane ND 1.6 0.33 pb v/v 11103/17 23.42 4.07 1.2-Dichlorobenzene ND 1.6 0.45 pb v/v 1103/17 23.42 4.07 1.2-Dichlorobenzene ND 1.6 0.45 pb v/v 1103/17 23.42 4.07 1.2-Dichlorobenzene ND 1.6 0.45 pb v/v 1103/17 23.42 4.07 1.2-Dichlorobenzene ND <td< td=""><td>Bromomethane</td><td>ND</td><td></td><td>3.3</td><td>1.4</td><td>ppb v/v</td><td></td><td></td><td>11/03/17 23:42</td><td>4.07</td></td<>	Bromomethane	ND		3.3	1.4	ppb v/v			11/03/17 23:42	4.07
Carbon disuitide ND 3.3 0.32 ppb viv 11/03/17 2342 4.07 Carbon disuitide 0.31 J 3.3 0.26 ppb viv 11/03/17 2342 4.07 Chorobenzene ND 1.2 0.26 ppb viv 11/03/17 2342 4.07 Chloroform 2.3 1.2 0.39 ppb viv 11/03/17 2342 4.07 Chloromethane ND 1.6 0.32 ppb viv 11/03/17 2342 4.07 Chloromethane (EDB) ND 3.3 0.30 ppb viv 11/03/17 2342 4.07 1.2-Dichlorochtane (EDB) ND 1.6 0.63 ppb viv 11/03/17 2342 4.07 1.2-Dichlorochtane ND 1.6 0.65 ppb viv 11/03/17 2342 4.07 1.2-Dichlorochtane ND 1.6 0.61 ppb viv 11/03/17 2342 4.07 1.2-Dichlorochtane 3.1 1.6 0.61 ppb viv 11/03/17 2342 4.07 1.4-Dichlorochtane 5.7 <td< td=""><td>2-Butanone (MEK)</td><td>ND</td><td></td><td>3.3</td><td>0.81</td><td>ppb v/v</td><td></td><td></td><td>11/03/17 23:42</td><td>4.07</td></td<>	2-Butanone (MEK)	ND		3.3	0.81	ppb v/v			11/03/17 23:42	4.07
Carbon tetrachloride 0.31 J 3.3 0.26 ppb viv 11/03/17 23:42 4.07 Chiorobenzene ND 1.2 0.26 ppb viv 11/03/17 23:42 4.07 Chiorobenzene ND 3.3 1.3 ppb viv 11/03/17 23:42 4.07 Chiorobentane 0.83 J 3.3 0.80 ppb viv 11/03/17 23:42 4.07 Ditromochionmethane ND 1.6 0.32 ppb viv 11/03/17 23:42 4.07 1,2-Dichioro-1,12-2-tetrafiloroethane ND 1.6 0.63 ppb viv 11/03/17 23:42 4.07 1,2-Dichiorobenzene ND 1.6 0.65 ppb viv 11/03/17 23:42 4.07 1,3-Dichiorobenzene ND 1.6 0.64 ppb viv 11/03/17 23:42 4.07 1,1-Dichiorobenzene ND 1.6 0.65 ppb viv 11/03/17 23:42 4.07 1,1-Dichiorobenzene ND 3.3 0.36 ppb viv 11/03/17 23:42 4.07 1	Carbon disulfide	ND		3.3	0.32	ppb v/v			11/03/17 23:42	4.07
Chlorobenzene ND 12 0.26 ppb v/v 11/03/17 23:42 4.07 Chloroform 2.3 1.2 0.39 pb v/v 11/03/17 23:42 4.07 Chloroform 2.3 1.2 0.39 pb v/v 11/03/17 23:42 4.07 Dibromochloromethane 0.83 J 3.3 0.80 pb v/v 11/03/17 23:42 4.07 L'obtomochloromethane (EDB) ND 3.3 0.31 pb v/v 11/03/17 23:42 4.07 1.2-Obtomochloromethane (EDB) ND 1.6 0.63 pb v/v 11/03/17 23:42 4.07 1.2-Obtohorobenzene ND 1.6 0.65 pb v/v 11/03/17 23:42 4.07 1.4-Dichloroethane 31 1.6 0.61 pb v/v 11/03/17 23:42 4.07 1.4-Dichloroethane 33 0.35 pb v/v 11/03/17 23:42 4.07 1.4-Dichloroethane 3.3 0.36 pb v/v 11/03/17 23:42 4.07 1.4-Dichloroethane 3.3 0.36	Carbon tetrachloride	0.31	J	3.3	0.26	ppb v/v			11/03/17 23:42	4.07
Chloroethane ND 3.3 1.2 ppb v/v 11/03/17 23.42 4.07 Chloroethane 0.63 J 3.3 0.80 ppb v/v 11/03/17 23.42 4.07 Dibromochane ND 1.6 0.32 ppb v/v 11/03/17 23.42 4.07 1.2-Dibromethane ND 1.6 0.33 0.80 ppb v/v 11/03/17 23.42 4.07 1.2-Dichioro-1,1,2-24terafluoroethane ND 1.6 0.63 ppb v/v 11/03/17 23.42 4.07 1.2-Dichiorobenzene ND 1.6 0.65 ppb v/v 11/03/17 23.42 4.07 1.2-Dichiorobenzene ND 1.6 0.64 ppb v/v 11/03/17 23.42 4.07 1.2-Dichioroethane 3.7 1.2 0.29 ppb v/v 11/03/17 23.42 4.07 1.2-Dichioroethane 3.3 0.36 ppb v/v 11/03/17 23.42 4.07 1.2-Dichioroethane ND 1.6 0.34 ppb v/v 11/03/17 23.42 4.07 1.2-Dichioroethane	Chlorobenzene	ND		1.2	0.26	ppb v/v			11/03/17 23:42	4.07
Chloroform 2.3 1.2 0.39 ppb v/v 1103/17 23/42 4.07 Chloromethane ND 1.6 0.32 ppb v/v 1103/17 23/42 4.07 1.2-Dibromochtomethane ND 3.3 0.31 ppb v/v 1103/17 23/42 4.07 1.2-Dichlorochtane ND 1.6 0.63 ppb v/v 1103/17 23/42 4.07 1.2-Dichlorochenzene ND 1.6 0.63 ppb v/v 1103/17 23/42 4.07 1.3-Dichlorochenzene ND 1.6 0.45 ppb v/v 1103/17 23/42 4.07 1.3-Dichlorochenzene ND 1.6 0.61 ppb v/v 1103/17 23/42 4.07 1.4-Dichlorochenzene ND 1.6 0.61 ppb v/v 1103/17 23/42 4.07 1.2-Dichlorochene 3.3 0.35 ppb v/v 1103/17 23/42 4.07 1.2-Dichlorochene 3.3 0.6 0.38 ppb v/v 1103/17 23/42 4.07 1.2-Dichlorochene 3.3 1.6 0.39 <td>Chloroethane</td> <td>ND</td> <td></td> <td>3.3</td> <td>1.3</td> <td>ppb v/v</td> <td></td> <td></td> <td>11/03/17 23:42</td> <td>4.07</td>	Chloroethane	ND		3.3	1.3	ppb v/v			11/03/17 23:42	4.07
Chloromethane 0.83 J 3.3 0.80 pp v/v 11/03/17/23:42 4.07 Dibromochloromethane ND 1.6 0.32 pp v/v 11/03/17/23:42 4.07 1.2-Dichloro-1,1,2.2-tetrafluoroethane ND 1.6 0.63 pp v/v 11/03/17/23:42 4.07 1.2-Dichlorobenzene ND 1.6 0.63 pp v/v 11/03/17/23:42 4.07 1.2-Dichlorobenzene ND 1.6 0.61 pp v/v 11/03/17/23:42 4.07 1.3-Dichlorobenzene ND 1.6 0.61 pp v/v 11/03/17/23:42 4.07 1.4-Dichloroethane 3.1 1.6 0.61 pp v/v 11/03/17/23:42 4.07 1.1-Dichloroethane 5.7 1.2 0.29 pp v/v 11/03/17/23:42 4.07 1.2-Dichloroethane ND 1.6 0.41 pp v/v 11/03/17/23:42 4.07 1.2-Dichloroethane ND 1.6 0.42 pp v/v 11/03/17/23:42 4.07 1.2-Dichloroethane </td <td>Chloroform</td> <td>2.3</td> <td></td> <td>1.2</td> <td>0.39</td> <td>ppb v/v</td> <td></td> <td></td> <td>11/03/17 23:42</td> <td>4.07</td>	Chloroform	2.3		1.2	0.39	ppb v/v			11/03/17 23:42	4.07
Dibromochloromethane ND 1.6 0.32 pp v/v 11/03/17 23:42 4.07 1.2-Ditoromothane (EDB) ND 3.3 0.31 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloro-1.1.2tetrafluoroethane ND 1.6 0.63 ppb v/v 11/03/17 23:42 4.07 1.2-Dichlorobenzene ND 1.6 0.45 ppb v/v 11/03/17 23:42 4.07 1.3-Dichlorobenzene ND 1.6 0.45 ppb v/v 11/03/17 23:42 4.07 1.4-Dichlorobenzene ND 1.6 0.59 ppb v/v 11/03/17 23:42 4.07 1.4-Dichlorobethane 5.7 1.2 0.29 ppb v/v 11/03/17 23:42 4.07 1.1-Dichloroethane 2.2 3.3 0.53 ppb v/v 11/03/17 23:42 4.07 1.1.2-Dichloroethane ND 1.6 0.36 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroethane ND 1.6 0.41 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroethane </td <td>Chloromethane</td> <td>0.83</td> <td>J</td> <td>3.3</td> <td>0.80</td> <td>ppb v/v</td> <td></td> <td></td> <td>11/03/17 23:42</td> <td>4.07</td>	Chloromethane	0.83	J	3.3	0.80	ppb v/v			11/03/17 23:42	4.07
1.2-Dibromoethane (EDB) ND 3.3 0.31 ppb v/v 11/03/17/23/42 4.07 1.2-Dichlorobenzene ND 1.6 0.65 ppb v/v 11/03/17/23/42 4.07 1.2-Dichlorobenzene ND 1.6 0.45 ppb v/v 11/03/17/23/42 4.07 1.3-Dichlorobenzene ND 1.6 0.45 ppb v/v 11/03/17/23/42 4.07 1.4-Dichlorobenzene ND 1.6 0.45 ppb v/v 11/03/17/23/42 4.07 1.4-Dichlorobethane 3.1 1.6 0.59 ppb v/v 11/03/17/23/42 4.07 1.1-Dichloroethane ND 3.3 0.36 ppb v/v 11/03/17/23/42 4.07 1.2-Dichloroethane ND 1.6 0.36 ppb v/v 11/03/17/23/42 4.07 1.2-Dichloroethane ND 1.6 0.41 ppb v/v 11/03/17/23/42 4.07 1.2-Dichloroethane ND 1.6 0.42 ppb v/v 11/03/17/23/42 4.07 1.2-Dichloroptopene ND 1.6 0.42 ppb v/v 11/03/17/23/42 4.07	Dibromochloromethane	ND		1.6	0.32	ppb v/v			11/03/17 23:42	4.07
1.2-Dichloro-1,1,2,2-tetrafluoroethane ND 1.6 0.63 ppb v/v 11/03/17 23:42 4.07 1.2-Dichlorobenzene ND 1.6 0.53 ppb v/v 11/03/17 23:42 4.07 1.3-Dichlorobenzene ND 1.6 0.45 ppb v/v 11/03/17 23:42 4.07 1.4-Dichlorobenzene ND 1.6 0.61 ppb v/v 11/03/17 23:42 4.07 1.4-Dichlorobenzene ND 1.6 0.59 ppb v/v 11/03/17 23:42 4.07 1.4-Dichloroethane 5.7 1.2 0.29 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroethane ND 3.3 0.56 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroethane ND 1.6 0.41 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroptopene ND 1.6 0.42 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroptopene ND 1.6 0.36 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroptopene	1,2-Dibromoethane (EDB)	ND		3.3	0.31	ppb v/v			11/03/17 23:42	4.07
1.2-Dichlorobenzene ND 1.6 0.53 ppb v/v 11/03/17 23:42 4.07 1.3-Dichlorobenzene ND 1.6 0.45 ppb v/v 11/03/17 23:42 4.07 1.4-Dichlorobenzene ND 1.6 0.61 ppb v/v 11/03/17 23:42 4.07 1.4-Dichlorobetnane 31 1.6 0.59 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroethane 5.7 1.2 0.29 ppb v/v 11/03/17 23:42 4.07 1.4-Dichloroethane ND 3.3 0.36 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroethane 3.3 1.6 0.36 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroethene 3.3 1.6 0.36 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroptopane ND 1.6 0.98 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroptopene ND 1.6 0.36 ppb v/v 11/03/17 23:42 4.07 Tams-1.3-Dichloroptopene ND	1.2-Dichloro-1.1.2.2-tetrafluoroethane	ND		1.6	0.63	v/v dag			11/03/17 23:42	4.07
ND 1.6 0.45 ppb v/v 11/03/17 23:42 4.07 1.4-Dichlorobenzene ND 1.6 0.61 ppb v/v 11/03/17 23:42 4.07 Dichlorodifluoromethane 31 1.6 0.59 ppb v/v 11/03/17 23:42 4.07 1.1-Dichloroethane 5.7 1.2 0.29 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroethane ND 3.3 0.36 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroethane 22 3.3 0.53 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroethene 3.3 1.6 0.36 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloroethene ND 1.6 0.98 ppb v/v 11/03/17 23:42 4.07 1.2-Dichloropropene ND 1.6 0.98 ppb v/v 11/03/17 23:42 4.07 Tans-1.3-Dichloropropene ND 1.6 0.36 ppb v/v 11/03/17 23:42 4.07 Hyberzene ND 1.6 0.26 </td <td>1.2-Dichlorobenzene</td> <td>ND</td> <td></td> <td>1.6</td> <td>0.53</td> <td>v/v dag</td> <td></td> <td></td> <td>11/03/17 23:42</td> <td>4.07</td>	1.2-Dichlorobenzene	ND		1.6	0.53	v/v dag			11/03/17 23:42	4.07
ND 1.6 0.61 pp v/v 11/03/17 23:42 4.07 Dichlorodifluoromethane 31 1.6 0.59 pp v/v 11/03/17 23:42 4.07 1,1-Dichloroethane 5.7 1.2 0.29 pp v/v 11/03/17 23:42 4.07 1,2-Dichloroethane ND 3.3 0.36 pp v/v 11/03/17 23:42 4.07 1,1-Dichloroethane 22 3.3 0.53 pp v/v 11/03/17 23:42 4.07 rians-1,2-Dichloroethene 3.3 1.6 0.36 pp v/v 11/03/17 23:42 4.07 rians-1,2-Dichloroethene ND 1.6 0.41 pp v/v 11/03/17 23:42 4.07 rians-1,2-Dichloropropane ND 1.6 0.42 pp v/v 11/03/17 23:42 4.07 trans-1,3-Dichloropropene ND 1.6 0.36 pp v/v 11/03/17 23:42 4.07 trans-1,3-Dichloropropene ND 1.6 0.36 pp v/v 11/03/17 23:42 4.07 Hexachloroethane ND 1.6 </td <td>1.3-Dichlorobenzene</td> <td>ND</td> <td></td> <td>1.6</td> <td>0.45</td> <td>v/v dag</td> <td></td> <td></td> <td>11/03/17 23:42</td> <td>4.07</td>	1.3-Dichlorobenzene	ND		1.6	0.45	v/v dag			11/03/17 23:42	4.07
Dichlorodifiluoromethane 31 1.6 0.59 pb v/v 11/03/17 23:42 4.07 1,1-Dichloroethane 5.7 1.2 0.29 ppb v/v 11/03/17 23:42 4.07 1,2-Dichloroethane ND 3.3 0.36 ppb v/v 11/03/17 23:42 4.07 1,1-Dichloroethane 22 3.3 0.53 ppb v/v 11/03/17 23:42 4.07 cis-1,2-Dichloroethane ND 1.6 0.41 ppb v/v 11/03/17 23:42 4.07 cis-1,3-Dichloroethane ND 1.6 0.41 ppb v/v 11/03/17 23:42 4.07 cis-1,3-Dichloropropane ND 1.6 0.42 ppb v/v 11/03/17 23:42 4.07 cis-1,3-Dichloropropene ND 1.6 0.42 ppb v/v 11/03/17 23:42 4.07 4-Ethytoluene ND 1.6 0.62 ppb v/v 11/03/17 23:42 4.07 4-Ethytoluene ND 1.6 0.35 ppb v/v 11/03/17 23:42 4.07 4-Ethytoluene ND	1.4-Dichlorobenzene	ND		1.6	0.61	v/v dag			11/03/17 23:42	4.07
1,1-Dichloroethane 5.7 1.2 0.29 pb v/v 11/03/17 23:42 4.07 1,2-Dichloroethane ND 3.3 0.36 pb v/v 11/03/17 23:42 4.07 1,1-Dichloroethane 22 3.3 0.53 pb v/v 11/03/17 23:42 4.07 cis-1,2-Dichloroethane 3.3 1.6 0.36 pb v/v 11/03/17 23:42 4.07 rians-1,2-Dichloroethane ND 1.6 0.41 pb v/v 11/03/17 23:42 4.07 rians-1,3-Dichloropropane ND 1.6 0.42 pb v/v 11/03/17 23:42 4.07 rians-1,3-Dichloropropane ND 1.6 0.42 pb v/v 11/03/17 23:42 4.07 rians-1,3-Dichloropropane ND 1.6 0.26 pb v/v 11/03/17 23:42 4.07 rians-1,3-Dichloropropane ND 1.6 0.26 pb v/v 11/03/17 23:42 4.07 rishtylotene ND 1.6 0.35 pb v/v 11/03/17 23:42 4.07 4-Ethylotolene <	Dichlorodifluoromethane	31		1.6	0.59	v/v dqq			11/03/17 23:42	4.07
J.2-Dichloroethane ND 3.3 0.36 ppb v/v 11/03/17 23:42 4.07 1,1-Dichloroethane 3.3 1.6 0.36 ppb v/v 11/03/17 23:42 4.07 trans-1,2-Dichloroethane 3.3 1.6 0.36 ppb v/v 11/03/17 23:42 4.07 trans-1,2-Dichloroethane ND 1.6 0.41 ppb v/v 11/03/17 23:42 4.07 trans-1,3-Dichloropropane ND 1.6 0.49 ppb v/v 11/03/17 23:42 4.07 trans-1,3-Dichloropropane ND 1.6 0.42 ppb v/v 11/03/17 23:42 4.07 trans-1,3-Dichloropropane ND 1.6 0.36 ppb v/v 11/03/17 23:42 4.07 tehylenzene ND 1.6 0.26 ppb v/v 11/03/17 23:42 4.07 Hexachlorobutadiene ND 1.6 0.76 ppb v/v 11/03/17 23:42 4.07 4-Methyl-2-pentanone (MIBK) ND 1.6 0.35 ppb v/v 11/03/17 23:42 4.07 1,1,2,2-Tetrach	1.1-Dichloroethane	5.7		1.2	0.29	v/v dqq			11/03/17 23:42	4.07
1.1-Dichloroethene 22 3.3 0.53 ppt 11/03/17 23:42 4.07 cis-1,2-Dichloroethene 3.3 1.6 0.36 ppt v/v 11/03/17 23:42 4.07 trans-1,2-Dichloroethene ND 1.6 0.41 ppt v/v 11/03/17 23:42 4.07 1,2-Dichloropropene ND 1.6 0.41 ppt v/v 11/03/17 23:42 4.07 cis-1,3-Dichloropropene ND 1.6 0.42 ppt v/v 11/03/17 23:42 4.07 trans-1,3-Dichloropropene ND 1.6 0.42 ppt v/v 11/03/17 23:42 4.07 Ethylbenzene ND 1.6 0.26 ppt v/v 11/03/17 23:42 4.07 Hexachlorobutadiene ND 1.6 0.26 ppt v/v 11/03/17 23:42 4.07 Hexachlorobutadiene ND 1.6 0.35 ppt v/v 11/03/17 23:42 4.07 Hexachlorobutadiene ND 1.6 0.29 pb v/v 11/03/17 23:42 4.07 Styrene ND	1.2-Dichloroethane	ND		3.3	0.36	v/v dqq			11/03/17 23:42	4.07
Instruction Instruction <thinstruction< th=""> <thinstruction< th=""></thinstruction<></thinstruction<>	1.1-Dichloroethene	22		3.3	0.53	v/v dqq			11/03/17 23:42	4.07
Tans-1,2-Dichloroethene ND 1.6 0.41 ppb v/v 11/03/17 23:42 4.07 1,2-Dichloropropane ND 1.6 0.98 ppb v/v 11/03/17 23:42 4.07 rians-1,3-Dichloropropene ND 1.6 0.42 ppb v/v 11/03/17 23:42 4.07 trans-1,3-Dichloropropene ND 1.6 0.36 ppb v/v 11/03/17 23:42 4.07 Ethylbenzene ND 1.6 0.36 ppb v/v 11/03/17 23:42 4.07 4-Ethylbluene ND 1.6 0.76 ppb v/v 11/03/17 23:42 4.07 4-Ethylbluene ND 1.6 0.76 ppb v/v 11/03/17 23:42 4.07 4-Hethyl-2-pentanone (MIBK) ND 1.6 0.35 ppb v/v 11/03/17 23:42 4.07 4-Methyl-2-pentanone (MIBK) ND 1.6 0.24 ppb v/v 11/03/17 23:42 4.07 1,1,2-Z-Tetrachloroethane ND 1.6 0.24 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane <td>cis-1 2-Dichloroethene</td> <td>3.3</td> <td></td> <td>1.6</td> <td>0.36</td> <td>v/v dqq</td> <td></td> <td></td> <td>11/03/17 23:42</td> <td>4.07</td>	cis-1 2-Dichloroethene	3.3		1.6	0.36	v/v dqq			11/03/17 23:42	4.07
ND 1.6 0.18 pp v/v 11/03/17 23:42 4.07 cis-1,3-Dichloropropene ND 1.6 0.42 pp v/v 11/03/17 23:42 4.07 cis-1,3-Dichloropropene ND 1.6 0.36 ppb v/v 11/03/17 23:42 4.07 Ethylbenzene ND 1.6 0.26 ppb v/v 11/03/17 23:42 4.07 4-Ethylbourene ND 1.6 0.26 ppb v/v 11/03/17 23:42 4.07 4-Ethylbourene ND 1.6 0.76 ppb v/v 11/03/17 23:42 4.07 4-Ethylbourene ND 1.6 0.76 ppb v/v 11/03/17 23:42 4.07 4-Hexanone ND 1.6 0.55 ppb v/v 11/03/17 23:42 4.07 4-Hethyl-2-pentanone (MIBK) ND 1.6 0.29 ppb v/v 11/03/17 23:42 4.07 1,1,2,2-Tetrachloroethane ND 1.6 0.28 ppb v/v 11/03/17 23:42 4.07 1,1,2,2-Tetrachloroethane 0.37 J 1.6 <td>trans-1 2-Dichloroethene</td> <td>ND</td> <td></td> <td>1.6</td> <td>0.41</td> <td>nnh v/v</td> <td></td> <td></td> <td>11/03/17 23:42</td> <td>4 07</td>	trans-1 2-Dichloroethene	ND		1.6	0.41	nnh v/v			11/03/17 23:42	4 07
N.D. 1.6 0.42 ppb v/v 11/03/17 23:42 4.07 trans-1,3-Dichloropropene ND 1.6 0.42 ppb v/v 11/03/17 23:42 4.07 Ethylbenzene ND 1.6 0.26 ppb v/v 11/03/17 23:42 4.07 4-Ethylbourene ND 1.6 0.76 ppb v/v 11/03/17 23:42 4.07 4-Ethylbourene ND 1.6 0.76 ppb v/v 11/03/17 23:42 4.07 4-Ethylbourene ND 1.6 0.76 ppb v/v 11/03/17 23:42 4.07 2-Hexanone ND 1.6 0.35 ppb v/v 11/03/17 23:42 4.07 4-Methyl-2-pentanone (MIBK) ND 1.6 0.55 pb v/v 11/03/17 23:42 4.07 Styrene ND 1.6 0.24 ppb v/v 11/03/17 23:42 4.07 1,1,2-Tetrachloroethane ND 1.6 0.24 pb v/v 11/03/17 23:42 4.07 retachloroethane ND 1.6 0.24 pb v/v 11/03/17 23:42 4.07 1,2,4-Trichloroethane ND	1 2-Dichloropropane	ND		1.6	0.98	nnh v/v			11/03/17 23:42	4 07
trans-1.3-Dichloropropene ND 1.6 0.36 ppb viv 11/03/17 23:42 4.07 Ethylbenzene ND 1.6 0.26 ppb v/v 11/03/17 23:42 4.07 4-Ethylboure ND 1.6 0.76 ppb v/v 11/03/17 23:42 4.07 4-Ethylboure ND 1.6 0.76 ppb v/v 11/03/17 23:42 4.07 4-Ethylboure ND 1.6 0.35 ppb v/v 11/03/17 23:42 4.07 2-Hexanone ND 1.6 0.35 ppb v/v 11/03/17 23:42 4.07 4-Methyl-2-pentanone (MIBK) ND 1.6 0.55 ppb v/v 11/03/17 23:42 4.07 Methylene Chloride 1.8 1.6 0.29 ppb v/v 11/03/17 23:42 4.07 1,1,2,2-Tetrachloroethane ND 1.6 0.24 ppb v/v 11/03/17 23:42 4.07 1,1,2,2-Tetrachloroethane ND 1.6 0.24 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trichloroethane ND 1.6 0.21 ppb v/v 11/03/17 23:42 4.07	cis-1.3-Dichloropropene	ND		1.6	0.00	nnh v/v			11/03/17 23:42	4 07
allis bit 1.6 bit 1.6 bit 1.10 <td< td=""><td>trans-1 3-Dichloropropene</td><td>ND</td><td></td><td>1.0</td><td>0.36</td><td>nnh v/v</td><td></td><td></td><td>11/03/17 23:42</td><td>4 07</td></td<>	trans-1 3-Dichloropropene	ND		1.0	0.36	nnh v/v			11/03/17 23:42	4 07
Ling Ling <thling< th=""> Ling Ling <thl< td=""><td>Ethylbenzene</td><td>ND</td><td></td><td>1.0</td><td>0.00</td><td>nnh v/v</td><td></td><td></td><td>11/03/17 23:42</td><td>4.07</td></thl<></thling<>	Ethylbenzene	ND		1.0	0.00	nnh v/v			11/03/17 23:42	4.07
ND 1.0 1.	4-Ethyltoluene	ND		1.0	0.20	nnh v/v			11/03/17 23:42	4.07
ND 1.6 0.35 ppb v/v 11/03/17 23:42 4.07 2-Hexanone ND 1.6 0.35 ppb v/v 11/03/17 23:42 4.07 4-Methyl-2-pentanone (MIBK) ND 1.6 0.55 ppb v/v 11/03/17 23:42 4.07 Methylene Chloride 1.8 1.6 0.29 ppb v/v 11/03/17 23:42 4.07 Styrene ND 1.6 0.24 ppb v/v 11/03/17 23:42 4.07 1,1,2,2-Tetrachloroethane ND 1.6 0.24 ppb v/v 11/03/17 23:42 4.07 Tetrachloroethane ND 1.6 0.21 pbb v/v 11/03/17 23:42 4.07 1,1,2,-Trichloro-1,2,2-trifluoroetha 120 1.6 0.21 pbb v/v 11/03/17 23:42 4.07 1,1,2,4-Trichlorobenzene ND 8.1 1.8 pbb v/v 11/03/17 23:42 4.07 1,1,2,4-Trichloroethane 4.4 1.2 0.26 pbb v/v 11/03/17 23:42 4.07 1,1,2,2-Trichloroethane ND 1.6 0.27 pbb v/v 11/03/17 23:42 4.07 1,1,	Hexachlorobutadiene	ND		8.1	1.8	nnh v/v			11/03/17 23:42	4.07
2-Inclandic ND 1.6 0.55 ppb v/v 11/03/17 23:42 4.07 4-Methyl-2-pentanone (MIBK) ND 1.6 0.55 ppb v/v 11/03/17 23:42 4.07 Methylene Chloride 1.8 1.6 0.29 ppb v/v 11/03/17 23:42 4.07 Styrene ND 1.6 0.24 ppb v/v 11/03/17 23:42 4.07 1,1,2.2-Tetrachloroethane ND 1.6 0.24 ppb v/v 11/03/17 23:42 4.07 Tetrachloroethane ND 1.6 0.28 ppb v/v 11/03/17 23:42 4.07 Toluene 0.37 J 1.6 0.21 ppb v/v 11/03/17 23:42 4.07 ne 1,1,2-Trichloroethane 120 1.6 0.21 ppb v/v 11/03/17 23:42 4.07 ne 1,2,4-Trichloroethane ND 8.1 1.8 ppb v/v 11/03/17 23:42 4.07 ne 1,2,4-Trichloroethane ND 8.1 1.8 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane ND 1.6 0.27 ppb v/v	2-Hexanone			1.6	0.35	nnh v/v			11/03/17 23:42	4.07
Methylene Chloride 1.8 1.6 0.35 ppb v/v 11/03/17 23:42 4.07 Styrene ND 1.6 0.29 ppb v/v 11/03/17 23:42 4.07 Styrene ND 1.6 0.24 ppb v/v 11/03/17 23:42 4.07 1,1,2,2-Tetrachloroethane ND 1.6 0.28 ppb v/v 11/03/17 23:42 4.07 Tetrachloroethene 220 1.6 0.21 ppb v/v 11/03/17 23:42 4.07 Toluene 0.37 J 1.6 0.21 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloro-1,2,2-trifluoroetha 120 1.6 0.66 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trichlorobenzene ND 8.1 1.8 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trichloroethane 4.4 1.2 0.26 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane ND 1.6 0.27 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trinchloroethane ND 1.6 0.27 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trichloroethane ND 1.6 0.43 ppb v/v 11/03/17 23:42 4.07	4-Methyl-2-pentanone (MIBK)			1.0	0.55	nnh v/v			11/03/17 23:42	4.07
Nuclifyeite Chloride 1.0 <th1.0< th=""> <th1.0< th=""> <th1.0< th=""></th1.0<></th1.0<></th1.0<>	Mothylono Chlorido	1 9		1.0	0.00	nnh v/v			11/03/17 23:42	4.07
Stylene ND 1.0 0.24 ppb v/v 11/03/17 23:42 4.07 1,1,2,2-Tetrachloroethane ND 1.6 0.28 ppb v/v 11/03/17 23:42 4.07 Tetrachloroethene 220 1.6 0.21 ppb v/v 11/03/17 23:42 4.07 Toluene 0.37 J 1.6 0.21 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloro-1,2,2-trifluoroetha 120 1.6 0.66 ppb v/v 11/03/17 23:42 4.07 ne 1,2,4-Trichlorobenzene ND 8.1 1.8 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane 4.4 1.2 0.26 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane ND 1.6 0.27 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane ND 1.6 0.27 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane ND 1.6 0.27 ppb v/v 11/03/17 23:42 4.07 Trichloroethane ND 1.6 0.43 ppb v/v 11/03/17 23:42 <td>Styrene</td> <td></td> <td></td> <td>1.0</td> <td>0.20</td> <td>ppb v/v</td> <td></td> <td></td> <td>11/03/17 23:42</td> <td>4.07</td>	Styrene			1.0	0.20	ppb v/v			11/03/17 23:42	4.07
Tetrachloroethene 220 1.6 0.21 ppb v/v 11/03/17 23:42 4.07 Toluene 0.37 J 1.6 0.21 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloro-1,2,2-trifluoroetha 120 1.6 0.66 ppb v/v 11/03/17 23:42 4.07 ne 1.2,4-Trichlorobenzene ND 8.1 1.8 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trichloroethane 4.4 1.2 0.26 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane 4.4 1.2 0.26 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane 1.6 0.27 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane ND 1.6 0.27 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane ND 1.6 0.43 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trichloroethane 180 1.6 0.43 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trimethylbenzene ND 3.3 0.66 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trimethylbenzene ND 3.3 0.66 ppb v/v 11/03/17 23:42	1 1 2 2-Tetrachloroethane			1.0	0.24	ppb v/v			11/03/17 23:42	4.07
Toluene 0.37 J 1.6 0.21 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloro-1,2,2-trifluoroetha 120 1.6 0.66 ppb v/v 11/03/17 23:42 4.07 ne 1,2,4-Trichloroethane 4.4 1.2 0.26 ppb v/v 11/03/17 23:42 4.07 1,1,1-Trichloroethane 4.4 1.2 0.26 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane ND 8.1 1.8 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane 1.6 0.27 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane ND 1.6 0.27 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trichloroethane ND 1.6 0.43 ppb v/v 11/03/17 23:42 4.07 Trichloroethene 180 1.6 0.43 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trimethylbenzene ND 3.3 0.66 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trimethylbenzene ND 3.3 0.66 ppb v/v 11/03/17 23:42 4.07	Totrachloroothono	220		1.0	0.20	ppb v/v			11/03/17 23:42	4.07
Indication Image: U.37 J Image: U.37	Teluene	0.27		1.0	0.21				11/03/17 23:42	4.07
1,1,2-Trichloroethane ND 8.1 1.8 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trichloroethane ND 8.1 1.8 ppb v/v 11/03/17 23:42 4.07 1,1,1-Trichloroethane 4.4 1.2 0.26 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane ND 1.6 0.27 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane ND 1.6 0.43 ppb v/v 11/03/17 23:42 4.07 Trichloroethane 180 1.6 0.43 ppb v/v 11/03/17 23:42 4.07 Trichlorofluoromethane 38 1.6 0.80 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trimethylbenzene ND 3.3 0.66 ppb v/v 11/03/17 23:42 4.07	1 1 2 Tricklere 1 2 2 triffuoreethe	420	3	1.0	0.21				11/03/17 23:42	4.07
Indext ND 8.1 1.8 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trichlorobenzene 4.4 1.2 0.26 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane ND 1.6 0.27 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane ND 1.6 0.27 ppb v/v 11/03/17 23:42 4.07 Trichloroethene 180 1.6 0.43 ppb v/v 11/03/17 23:42 4.07 Trichlorofluoromethane 38 1.6 0.80 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trimethylbenzene ND 3.3 0.66 ppb v/v 11/03/17 23:42 4.07 1,3 5-Trimethylbenzene ND 1.6 0.51 ppb v/v 11/03/17 23:42 4.07	1,1,2-1 richioro-1,2,2-trimuoroetha	120		1.0	0.00	hhn M			11/03/17 23.42	4.07
1,1,1-Trichloroethane 4.4 1.2 0.26 ppb v/v 11/03/17 23:42 4.07 1,1,2-Trichloroethane ND 1.6 0.27 ppb v/v 11/03/17 23:42 4.07 Trichloroethene 180 1.6 0.43 ppb v/v 11/03/17 23:42 4.07 Trichloroethane 38 1.6 0.80 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trimethylbenzene ND 3.3 0.66 ppb v/v 11/03/17 23:42 4.07 1,3 5-Trimethylbenzene ND 1.6 0.51 ppb v/v 11/03/17 23:42 4.07	1,2,4-Trichlorobenzene	ND		8.1	1.8	ppb v/v			11/03/17 23:42	4.07
ND 1.6 0.27 ppb v/v 11/03/17 23:42 4.07 Trichloroethene 180 1.6 0.43 ppb v/v 11/03/17 23:42 4.07 Trichloroethene 180 1.6 0.43 ppb v/v 11/03/17 23:42 4.07 Trichloroethene 38 1.6 0.80 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trimethylbenzene ND 3.3 0.66 ppb v/v 11/03/17 23:42 4.07 1,3 5-Trimethylbenzene ND 1.6 0.51 ppb v/v 11/03/17 23:42 4.07	1.1.1-Trichloroethane	4.4		1.2	0.26	ppb v/v			11/03/17 23:42	4.07
Trichloroethene 180 1.6 0.43 ppb v/v 11/03/17 23:42 4.07 Trichlorofluoromethane 38 1.6 0.80 ppb v/v 11/03/17 23:42 4.07 1,2,4-Trimethylbenzene ND 3.3 0.66 ppb v/v 11/03/17 23:42 4.07 1 3.5-Trimethylbenzene ND 1.6 0.51 ppb v/v 11/03/17 23:42 4.07	1.1.2-Trichloroethane	ND		1.6	0.27	v/v dag			11/03/17 23:42	4.07
Trichlorofluoromethane 38 1.6 0.80 pp v/v 11/03/17 23:42 4.07 1,2,4-Trimethylbenzene ND 3.3 0.66 pp v/v 11/03/17 23:42 4.07 1,3 5-Trimethylbenzene ND 1.6 0.51 pp v/v 11/03/17 23:42 4.07	Trichloroethene	180		1.6	0.43	v/v dqq			11/03/17 23:42	4.07
1,2,4-Trimethylbenzene ND 3.3 0.66 pp //v 11/03/17 23:42 4.07 1 3 5-Trimethylbenzene ND 16 0.51 pp //v 11/03/17 23:42 4.07	Trichlorofluoromethane	38		1.6	0.80	v/v dqq			11/03/17 23:42	4.07
1 3 5-Trimethylhenzene ND 1 6 0 51 nnh v/v 11/03/17 23:42 4 07	1,2,4-Trimethylbenzene	ND		3.3	0.66	ppb v/v			11/03/17 23:42	4.07
	1.3.5-Trimethylbenzene	ND		1.6	0.51	v/v dqq			11/03/17 23:42	4.07
Vinyl acetate ND 3.3 0.59 ppb v/v 11/03/17 23:42 4.07	Vinyl acetate	ND		3.3	0.59	ppb v/v			11/03/17 23:42	4.07
Vinyl chloride ND 1.6 0.49 ppb v/v 11/03/17 23:42 4.07	Vinyl chloride	ND		1.6	0.49	ppb v/v			11/03/17 23:42	4.07

Client Sample ID: 103918-001/MWL-SV03-100 Date Collected: 10/26/17 09:16

Lab Sample ID: 320-32934-15 Matrix: Air

Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		3.3	0.41	ppb v/v			11/03/17 23:42	4.07
o-Xylene	ND		1.6	0.22	ppb v/v			11/03/17 23:42	4.07
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					11/03/17 23:42	4.07
1,2-Dichloroethane-d4 (Surr)	102		70 - 130					11/03/17 23:42	4.07
			70 (00					44/00/47 00.40	4 07

Client Sample ID: 103919-001/MWL-SV03-200 Date Collected: 10/26/17 09:20 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-16 Matrix: Air

Me	thod:	TO-15 -	Volatile	Organic	Com	oou	nd	s in	Ambient	Ai
-					_		-			

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	2.2	J	38	1.4	ppb v/v			11/04/17 00:34	7.59
Benzene	ND		3.0	0.60	ppb v/v			11/04/17 00:34	7.59
Benzyl chloride	ND		6.1	1.2	ppb v/v			11/04/17 00:34	7.59
Bromodichloromethane	ND		2.3	0.50	ppb v/v			11/04/17 00:34	7.59
Bromoform	ND		3.0	0.53	ppb v/v			11/04/17 00:34	7.59
Bromomethane	ND		6.1	2.5	ppb v/v			11/04/17 00:34	7.59
2-Butanone (MEK)	ND		6.1	1.5	ppb v/v			11/04/17 00:34	7.59
Carbon disulfide	ND		6.1	0.59	ppb v/v			11/04/17 00:34	7.59
Carbon tetrachloride	ND		6.1	0.49	ppb v/v			11/04/17 00:34	7.59
Chlorobenzene	ND		2.3	0.49	ppb v/v			11/04/17 00:34	7.59
Chloroethane	ND		6.1	2.3	ppb v/v			11/04/17 00:34	7.59
Chloroform	2.3		2.3	0.72	ppb v/v			11/04/17 00:34	7.59
Chloromethane	ND		6.1	1.5	ppb v/v			11/04/17 00:34	7.59
Dibromochloromethane	ND		3.0	0.60	ppb v/v			11/04/17 00:34	7.59
1,2-Dibromoethane (EDB)	ND		6.1	0.57	ppb v/v			11/04/17 00:34	7.59
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.0	1.2	ppb v/v			11/04/17 00:34	7.59
1,2-Dichlorobenzene	ND		3.0	0.99	ppb v/v			11/04/17 00:34	7.59
1,3-Dichlorobenzene	ND		3.0	0.83	ppb v/v			11/04/17 00:34	7.59
1,4-Dichlorobenzene	ND		3.0	1.1	ppb v/v			11/04/17 00:34	7.59
Dichlorodifluoromethane	50		3.0	1.1	ppb v/v			11/04/17 00:34	7.59
1,1-Dichloroethane	7.4		2.3	0.55	ppb v/v			11/04/17 00:34	7.59
1,2-Dichloroethane	ND		6.1	0.67	ppb v/v			11/04/17 00:34	7.59
1,1-Dichloroethene	30		6.1	0.98	ppb v/v			11/04/17 00:34	7.59
cis-1,2-Dichloroethene	4.1		3.0	0.68	ppb v/v			11/04/17 00:34	7.59
trans-1,2-Dichloroethene	ND		3.0	0.76	ppb v/v			11/04/17 00:34	7.59
1,2-Dichloropropane	ND		3.0	1.8	ppb v/v			11/04/17 00:34	7.59
cis-1,3-Dichloropropene	ND		3.0	0.79	ppb v/v			11/04/17 00:34	7.59
trans-1,3-Dichloropropene	ND		3.0	0.67	ppb v/v			11/04/17 00:34	7.59
Ethylbenzene	ND		3.0	0.48	ppb v/v			11/04/17 00:34	7.59
4-Ethyltoluene	ND		3.0	1.4	ppb v/v			11/04/17 00:34	7.59
Hexachlorobutadiene	ND		15	3.3	ppb v/v			11/04/17 00:34	7.59
2-Hexanone	ND		3.0	0.66	ppb v/v			11/04/17 00:34	7.59
4-Methyl-2-pentanone (MIBK)	ND		3.0	1.0	ppb v/v			11/04/17 00:34	7.59
Methylene Chloride	3.4		3.0	0.55	ppb v/v			11/04/17 00:34	7.59

Client Sample ID: 103919-001/MWL-SV03-200 Date Collected: 10/26/17 09:20

Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Orga	nic Compo	unds in Ar	nbient Air (C	ontinue	d)				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		3.0	0.45	ppb v/v			11/04/17 00:34	7.59
1,1,2,2-Tetrachloroethane	ND		3.0	0.52	ppb v/v			11/04/17 00:34	7.59
Tetrachloroethene	260		3.0	0.39	ppb v/v			11/04/17 00:34	7.59
Toluene	ND		3.0	0.39	ppb v/v			11/04/17 00:34	7.59
1,1,2-Trichloro-1,2,2-trifluoroetha	160		3.0	1.2	ppb v/v			11/04/17 00:34	7.59
ne									
1,2,4-Trichlorobenzene	ND		15	3.3	ppb v/v			11/04/17 00:34	7.59
1,1,1-Trichloroethane	2.7		2.3	0.49	ppb v/v			11/04/17 00:34	7.59
1,1,2-Trichloroethane	ND		3.0	0.51	ppb v/v			11/04/17 00:34	7.59
Trichloroethene	230		3.0	0.80	ppb v/v			11/04/17 00:34	7.59
Trichlorofluoromethane	36		3.0	1.5	ppb v/v			11/04/17 00:34	7.59
1,2,4-Trimethylbenzene	ND		6.1	1.2	ppb v/v			11/04/17 00:34	7.59
1,3,5-Trimethylbenzene	ND		3.0	0.95	ppb v/v			11/04/17 00:34	7.59
Vinyl acetate	ND		6.1	1.1	ppb v/v			11/04/17 00:34	7.59
Vinyl chloride	ND		3.0	0.91	ppb v/v			11/04/17 00:34	7.59
m,p-Xylene	ND		6.1	0.76	ppb v/v			11/04/17 00:34	7.59
o-Xylene	ND		3.0	0.41	ppb v/v			11/04/17 00:34	7.59
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		70 - 130			-		11/04/17 00:34	7.59
1,2-Dichloroethane-d4 (Surr)	105		70 - 130					11/04/17 00:34	7.59
Toluene-d8 (Surr)	90		70 - 130					11/04/17 00:34	7.59

Client Sample ID: 103920-001/MWL-SV03-300 Date Collected: 10/26/17 09:24 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air Analyte **Result Qualifier** MDL Unit RL D Prepared Analyzed Dil Fac 37 7.32 Acetone 5.2 1.3 ppb v/v 11/04/17 01:26 J Benzene ND 2.9 0.58 ppb v/v 11/04/17 01:26 7.32 ND Benzyl chloride 5.9 1.2 ppb v/v 11/04/17 01:26 7.32 ND 2.2 Bromodichloromethane 0.48 ppb v/v 11/04/17 01:26 7.32 Bromoform ND 2.9 0.51 ppb v/v 11/04/17 01:26 7.32 Bromomethane ND 5.9 2.5 ppb v/v 11/04/17 01:26 7.32 2-Butanone (MEK) ND 5.9 1.5 ppb v/v 11/04/17 01:26 7.32 ND 7.32 Carbon disulfide 5.9 0.57 ppb v/v 11/04/17 01:26 ND Carbon tetrachloride 5.9 0.47 ppb v/v 11/04/17 01:26 7.32 Chlorobenzene ND 2.2 0.47 ppb v/v 11/04/17 01:26 7.32 Chloroethane ND 5.9 2.3 ppb v/v 11/04/17 01:26 7.32 2.2 Chloroform 1.4 J 0.70 ppb v/v 11/04/17 01:26 7.32 5.9 1.4 ppb v/v 7.32 Chloromethane 1.5 J 11/04/17 01:26 Dibromochloromethane ND 2.9 0.58 ppb v/v 11/04/17 01:26 7.32 1,2-Dibromoethane (EDB) ND 5.9 0.55 ppb v/v 11/04/17 01:26 7.32 1,2-Dichloro-1,1,2,2-tetrafluoroethane ND 2.9 1.1 ppb v/v 11/04/17 01:26 7.32 ND 1,2-Dichlorobenzene 2.9 0.95 ppb v/v 7.32 11/04/17 01:26 1,3-Dichlorobenzene ND 2.9 0.81 ppb v/v 11/04/17 01:26 7.32 ND 2.9 11/04/17 01:26 7.32 1,4-Dichlorobenzene 1.1 ppb v/v

Lab Sample ID: 320-32934-16 Matrix: Air

Lab Sample ID: 320-32934-17

Matrix: Air

TestAmerica Job ID: 320-32934-1

Client Sample ID: 103920-001/MWL-SV03-300

Date Collected: 10/26/17 09:24 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Orga	nic Compou	unds in Ar	nbient Air (C	Continue	d)				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	39		2.9	1.1	ppb v/v			11/04/17 01:26	7.32
1,1-Dichloroethane	3.4		2.2	0.53	ppb v/v			11/04/17 01:26	7.32
1,2-Dichloroethane	ND		5.9	0.64	ppb v/v			11/04/17 01:26	7.32
1,1-Dichloroethene	22		5.9	0.94	ppb v/v			11/04/17 01:26	7.32
cis-1,2-Dichloroethene	ND		2.9	0.65	ppb v/v			11/04/17 01:26	7.32
trans-1,2-Dichloroethene	ND		2.9	0.73	ppb v/v			11/04/17 01:26	7.32
1,2-Dichloropropane	ND		2.9	1.8	ppb v/v			11/04/17 01:26	7.32
cis-1,3-Dichloropropene	ND		2.9	0.76	ppb v/v			11/04/17 01:26	7.32
trans-1,3-Dichloropropene	ND		2.9	0.64	ppb v/v			11/04/17 01:26	7.32
Ethylbenzene	ND		2.9	0.46	ppb v/v			11/04/17 01:26	7.32
4-Ethyltoluene	ND		2.9	1.4	ppb v/v			11/04/17 01:26	7.32
Hexachlorobutadiene	ND		15	3.2	ppb v/v			11/04/17 01:26	7.32
2-Hexanone	ND		2.9	0.64	ppb v/v			11/04/17 01:26	7.32
4-Methyl-2-pentanone (MIBK)	ND		2.9	0.99	ppb v/v			11/04/17 01:26	7.32
Methylene Chloride	1.5	J	2.9	0.53	ppb v/v			11/04/17 01:26	7.32
Styrene	ND		2.9	0.43	ppb v/v			11/04/17 01:26	7.32
1,1,2,2-Tetrachloroethane	ND		2.9	0.51	ppb v/v			11/04/17 01:26	7.32
Tetrachloroethene	280		2.9	0.37	ppb v/v			11/04/17 01:26	7.32
Toluene	ND		2.9	0.37	ppb v/v			11/04/17 01:26	7.32
1,1,2-Trichloro-1,2,2-trifluoroetha	140		2.9	1.2	ppb v/v			11/04/17 01:26	7.32
ne 4.9.4 Trichlandhannana	ND				and wheel			44/04/47 04:00	
	ND		15	3.2				11/04/17 01:26	7.32
1,1,1-I richloroethane	1.1	J	2.2	0.48				11/04/17 01:26	7.32
1,1,2-1 richloroethane	ND		2.9	0.49	ppb v/v			11/04/17 01:26	7.32
	210		2.9	0.77				11/04/17 01:26	7.32
I richlorofluoromethane	18		2.9	1.4				11/04/17 01:26	7.32
1,2,4- I rimetnyibenzene	ND		5.9	1.2	ppb v/v			11/04/17 01:26	7.32
1,3,5- I rimethylbenzene	ND		2.9	0.92	ppb v/v			11/04/17 01:26	7.32
Vinyl acetate	ND		5.9	1.1	ppb v/v			11/04/17 01:26	7.32
Vinyl chloride	ND		2.9	0.88	ppb v/v			11/04/17 01:26	7.32
m,p-Xylene	ND		5.9	0.73	ppb v/v			11/04/17 01:26	7.32
o-Xylene	ND		2.9	0.40	ppb v/v			11/04/17 01:26	7.32
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		70 - 130			-		11/04/17 01:26	7.32
1,2-Dichloroethane-d4 (Surr)	104		70 - 130					11/04/17 01:26	7.32
Toluene-d8 (Surr)	97		70 - 130					11/04/17 01:26	7.32

Client Sample ID: 103921-001/MWL-SV03-400 Date Collected: 10/26/17 09:43 Date Received: 11/02/17 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 12 J 55 1.9 ppb v/v 11/06/17 15:47 10.94 Benzene ND 4.4 10.94 0.86 ppb v/v 11/06/17 15:47 Benzyl chloride ND 8.8 1.8 ppb v/v 11/06/17 15:47 10.94 ND 3.3 10.94 Bromodichloromethane 0.72 ppb v/v 11/06/17 15:47

Matrix: Air

TestAmerica Sacramento

Lab Sample ID: 320-32934-18

Matrix: Air

Lab Sample ID: 320-32934-17

TestAmerica Job ID: 320-32934-1

Date Collected: 10/26/17 09:43 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-18 Matrix: Air

Bromoform ND 4 0.77 pp v/v 1106/171547 10.92 Bromontance ND 8.8 3.7 pp v/v 1106/171547 10.92 Bromontance ND 8.8 3.7 pp v/v 1106/171547 10.94 Carbon disulfide ND 8.8 0.85 pp v/v 1106/171547 10.94 Chiorobarane ND 8.8 0.85 pp v/v 1106/171547 10.94 Chiorobarane ND 8.8 0.47 pp v/v 1106/171547 10.94 Chiorobarane ND 8.8 0.47 pp v/v 1106/171547 10.94 Chiorobarane ND 8.8 0.82 pp v/v 1106/171547 10.94 1.2-Dichoron-1.2-Lifeat/Jucroethane ND 4.4 1.4 pp v/v 1106/171547 10.94 1.2-Dichorod-1.2-Lifeat/Jucroethane ND 4.4 1.6 pp v/v 1106/171547 10.94 1.2-Dichorod-1.2-Lifeat/Jucroethane 1.5 8.14 pp v/v </th <th>Analyte</th> <th>Result Qualifier</th> <th></th> <th>MDI</th> <th>u) Unit</th> <th>D</th> <th>Prepared</th> <th>Analyzed</th> <th>Dil Fac</th>	Analyte	Result Qualifier		MDI	u) Unit	D	Prepared	Analyzed	Dil Fac
Bronomethane ND 8.8 3.7 ppb v/v 1108/17 15.47 10.94 2 Butanone (MEK) ND 8.8 2.2 ppb v/v 1108/17 15.47 10.94 Carbon disulfide ND 8.8 0.70 ppb v/v 1108/17 15.47 10.94 Carbon disulfide ND 8.8 0.70 ppb v/v 1108/17 15.47 10.94 Chloroderane ND 8.8 3.4 ppb v/v 1108/17 15.47 10.94 Chloroderane ND 8.8 3.2 ppb v/v 1108/17 15.47 10.94 Chloroderane ND 8.8 3.2 ppb v/v 1108/17 15.47 10.94 L2-Dichorobethane ND 4.4 0.86 0.82 ppb v/v 1108/17 15.47 10.94 L2-Dichorobethane ND 4.4 1.7 ppb v/v 1108/17 15.47 10.94 L2-Dichorobethane ND 4.4 1.6 ppb v/v 1108/17 16.47 10.94 L2-Dichorobethane ND 4.4	Bromoform		44	0.77	nnh v/v		Tiopulou	11/06/17 15:47	10.94
2.Butanone (MEK) ND 8.8 2.2 ppb v/v 1106/17 15.47 10.9.4 Carbon elsatified ND 8.8 0.55 ppb v/v 1106/17 15.47 10.9.4 Chiorobenzene ND 3.3 0.70 ppb v/v 1106/17 15.47 10.9.4 Chiorobenzene ND 8.8 0.70 ppb v/v 1106/17 15.47 10.9.4 Chiorobenzene ND 8.8 4.2.2 ppb v/v 1106/17 15.47 10.9.4 Chiorobentane ND 8.8 0.2.2 ppb v/v 1106/17 15.47 10.9.4 L2-Ditomochionemtane ND 4.4 0.8.6 ppb v/v 1106/17 15.47 10.9.4 L2-Ditomochionemtane ND 4.4 1.4 ppb v/v 1106/17 15.47 10.9.4 L2-Ditomochionemtane ND 4.4 1.6 ppb v/v 1106/17 15.47 10.9.4 L2-Ditohorochionemtane ND 4.4 1.6 ppb v/v 1106/17 15.47 10.9.4 L2-Ditohorochiane 3.5 3.3 0.79 ppb v/v 1106/17 15.47 10.9.4 L2-Ditohorochiane 3.1	Bromomethane	ND	8.8	37	ppb v/v			11/06/17 15:47	10.94
Carbon disulifie ND 8.8 0.85 ppb v/v 1108/17 15.47 10.94 Carbon disulifie ND 8.8 0.70 ppb v/v 1108/17 15.47 10.94 Chiorobenzene ND 8.8 3.4 ppb v/v 1108/17 15.47 10.94 Chiorofenne 1.5 J 3.3 10 pb v/v 1108/17 15.47 10.94 Chioromethane ND 8.8 3.4 pb v/v 1108/17 15.47 10.94 Chioromethane ND 4.4 0.86 pb v/v 1108/17 15.47 10.94 1.2.Dichoromethane (EDB) ND 4.4 1.7 pb v/v 1108/17 15.47 10.94 1.2.Dichoromethane ND 4.4 1.6 pb v/v 1108/17 15.47 10.94 1.2.Dichoromethane ND 4.4 1.6 pb v/v 1108/17 15.47 10.94 1.2.Dichoromethane 3.5 3.3 0.79 pb v/v 1108/17 15.47 10.94 1.4.Dichoromethane S.5 8.8	2-Butanone (MEK)	ND	8.8	22	ppb v/v			11/06/17 15:47	10.94
Carbon tetrachionide ND 8.8 0.70 ppb v/v 1108/17 15.47 10.94 Chiorobenzene ND 3.3 0.70 ppb v/v 1108/17 15.47 10.94 Chiorobenzene ND 8.8 3.4 ppb v/v 1108/17 15.47 10.94 Chioroform 1.5 J 3.3 10 ppb v/v 1108/17 15.47 10.94 Chioroform 1.5 J 3.3 10 ppb v/v 1108/17 15.47 10.94 Chioromethane ND 4.4 0.86 ppb v/v 1108/17 15.47 10.94 1.2-Dichorochioromethane (EDB) ND 4.4 1.4 ppb v/v 1108/17 15.47 10.94 1.2-Dichorochinzene ND 4.4 1.4 ppb v/v 1108/17 15.47 10.94 1.2-Dichorochinzene ND 4.4 1.6 ppb v/v 1108/17 15.47 10.94 1.2-Dichorochinze 3.5 3.0.79 ppb v/v 1108/17 15.47 10.94 1.2-Dichorochinze 3.1 <td< td=""><td>Carbon disulfide</td><td>ND</td><td>8.8</td><td>0.85</td><td>nnh v/v</td><td></td><td></td><td>11/06/17 15:47</td><td>10.94</td></td<>	Carbon disulfide	ND	8.8	0.85	nnh v/v			11/06/17 15:47	10.94
Chiorobenzene ND 3.3 0.70 pp bvv 1106/17 15.47 10.9 Chiorobenzene ND 8.8 3.4 pp bvv 1106/17 15.47 10.9 Chiorobenzene ND 8.8 2.2 pp bvv 1106/17 15.47 10.9 Dikomochkomethane ND 4.8 0.82 pp bvv 1106/17 15.47 10.9 1.2-Dikomochkomethane ND 4.4 0.7 pp vv 1106/17 15.47 10.9 1.2-Dichorobenzene ND 4.4 1.4 pp vv 1106/17 15.47 10.9 1.2-Dichorobenzene ND 4.4 1.4 pp vv 1106/17 15.47 10.9 1.3-Dichorobenzene ND 4.4 1.6 pp vv 1106/17 15.47 10.9 1.1-Dichorobenzene ND 8.8 0.46 pp vv 1106/17 15.47 10.9 1.1-Dichorobenzene ND 8.8 1.4 pp vv 1106/17 15.47 10.9 1.1-Dichorobenzene ND 4.4 0.97	Carbon tetrachloride	ND	8.8	0.00	nnh v/v			11/06/17 15:47	10.94
Base Status ND 8.8 3.4 pp bv/v 1106/17 15.47 10.8 Chlorodernane ND 8.8 3.4 pp bv/v 1106/17 15.47 10.9 Dibromothane ND 8.8 2.2 pp bv/v 1106/17 15.47 10.9 1.2.Dibromothane (EDB) ND 8.8 0.82 pp bv/v 1106/17 15.47 10.9 1.2.Dibromothane (EDB) ND 4.4 1.4 pp bv/v 1106/17 15.47 10.9 1.2.Dichlorobenzene ND 4.4 1.4 pp bv/v 1106/17 15.47 10.9 1.3.Dichlorobenzene ND 4.4 1.6 pp bv/v 1106/17 15.47 10.9 1.4.Dichlorobenzene ND 4.4 1.6 pp bv/v 1106/17 15.47 10.9 1.2.Dichlorobenzene ND 8.8 0.36 pp bv/v 1106/17 15.47 10.9 1.2.Dichloroptene S 8.8 0.46 pp bv/v 1106/17 15.47 10.9 1.2.Dichloroptene ND 4.4 0.	Chlorobenzene	ND	3.3	0.70	nnh v/v			11/06/17 15:47	10.01
Chiordorm 1.5 J 3.3 1.0 ppb v/v 1106/17 15.47 10.84 Chioromethane ND 8.8 2.2 ppb v/v 1106/17 15.47 10.94 L2-Dibromethane (EDB) ND 4.8 0.82 ppb v/v 1106/17 15.47 10.94 1.2-Dibromethane (EDB) ND 4.4 1.7 ppb v/v 1106/17 15.47 10.94 1.2-Dibriorezne ND 4.4 1.4 ppb v/v 1106/17 15.47 10.94 1.2-Dibriorezne ND 4.4 1.4 ppb v/v 1106/17 15.47 10.94 1.2-Dibrioresne ND 4.4 1.6 ppb v/v 1106/17 15.47 10.94 1.1-Dichorestene 3.5 3.3 0.79 ppb v/v 1106/17 15.47 10.94 1.2-Dichorestene 3.1 J 4.4 0.97 ppb v/v 1106/17 15.47 10.94 1.2-Dichorestene ND 4.4 0.97 <td>Chloroethane</td> <td>ND</td> <td>8.8</td> <td>34</td> <td>nnh v/v</td> <td></td> <td></td> <td>11/06/17 15:47</td> <td>10.04</td>	Chloroethane	ND	8.8	34	nnh v/v			11/06/17 15:47	10.04
Discretion ND 6.5 0.5 0.50 <	Chloroform	15 1	33	1.0	nnh v/v			11/06/17 15:47	10.04
Ontomiculation ND 4.4 0.86 pbp V/v 1106/17 15.47 10.37 1,2-Dibromochiane (EDB) ND 6.8 0.82 pbp V/v 1106/17 15.47 10.34 1,2-Dibromochiane (EDB) ND 4.4 1.7 pbp V/v 1106/17 15.47 10.34 1,2-Dichloro-1,1,2.2-Istrafluoroethane ND 4.4 1.2 pbp V/v 1106/17 15.47 10.34 1,3-Dichlorochenzene ND 4.4 1.6 pbp V/v 1106/17 15.47 10.34 1,4-Dichlorobenzene ND 4.4 1.6 pbp V/v 1106/17 15.47 10.34 1,4-Dichlorobenzene ND 8.8 0.96 pbp V/v 1106/17 15.47 10.34 1,1-Dichloroethane 15 8.8 1.4 pbp V/v 1106/17 15.47 10.34 1,2-Dichloroethane ND 4.4 0.96 pbp V/v 1106/17 15.47 10.34 1,2-Dichloroethane ND 4.4 1.4 pbp V/v 1106/17 15.47 10.34 1,2-Dichloroethane	Chloromethane	ND	8.8	22	nnh v/v			11/06/17 15:47	10.04
Labbronethane (EDB) ND 8.8 0.82 ppb v/v 1106/17 15.47 10.94 1.2.Dichtoro-1,1,2,24trafluoroethane ND 4.4 1.7 ppb v/v 1106/17 15.47 10.94 1.2.Dichtoroethareane ND 4.4 1.4 ppb v/v 1106/17 15.47 10.94 1.3.Dichtoroethareane ND 4.4 1.4 ppb v/v 1106/17 15.47 10.94 1.4.Dichtoroethareane ND 4.4 1.6 ppb v/v 1106/17 15.47 10.94 1.4.Dichtoroethane 3.5 3.3 0.79 ppb v/v 1106/17 15.47 10.94 1.4.Dichtoroethane 3.5 8.8 1.4 ppb v/v 1106/17 15.47 10.94 1.2.Dichtoroethane 1.5 8.8 1.4 ppb v/v 1106/17 15.47 10.94 1.2.Dichtoroethane ND 4.4 0.97 ppb v/v 1106/17 15.47 10.94 1.2.Dichtoroethane ND 4.4 0.96 pb v/v 1106/17 15.47 10.94 1.2.Dichtoroethane	Dibromochloromethane	ND	4.4	0.86	nnh v/v			11/06/17 15:47	10.04
1.2.Dichioro-1,1,2.2-letrafuloroethane ND 4.4 1.7. pbb viv 11/06/17 15.47 10.9 1.2.Dichioro-1,1,2.2-letrafuloroethane ND 4.4 1.4 pbb viv 11/06/17 15.47 10.9 1.2.Dichioro-thane ND 4.4 1.6 pbb viv 11/06/17 15.47 10.9 1.4.Dichioroethane 1.3 4.4 1.6 pbb viv 11/06/17 15.47 10.94 1.4.Dichioroethane 3.5 3.3 0.79 pbb viv 11/06/17 15.47 10.94 1.4.Dichioroethane 3.5 3.3 0.79 pbb viv 11/06/17 15.47 10.94 1.4.Dichioroethane 3.5 6.8 1.4 pbb viv 11/06/17 15.47 10.94 1.2.Dichioroethane 1.5 6.8 1.4 pbb viv 11/06/17 15.47 10.94 1.2.Dichioroethane ND 4.4 0.97 pbb viv 11/06/17 15.47 10.94 1.3.Dichiorophopene ND 4.4 1.1 pbb viv 11/06/17 15.47 10.94 1.3.Dichiorophopene ND 4.4 0.96 pbb viv 11/06/17 15.47 10.94 1.4.Dichiorophopene ND 4.4 0.96 pbb viv 11/06/17 15.47 <td>1 2-Dibromoethane (EDB)</td> <td>ND</td> <td>8.8</td> <td>0.00</td> <td>nnh v/v</td> <td></td> <td></td> <td>11/06/17 15:47</td> <td>10.04</td>	1 2-Dibromoethane (EDB)	ND	8.8	0.00	nnh v/v			11/06/17 15:47	10.04
1.2.Dichloroberzene ND 4.4 1.4 ppb v/v 11/06/17 15.47 10.94 1.3.Dichloroberzene ND 4.4 1.2 ppb v/v 11/06/17 15.47 10.94 1.4.Dichloroberzene ND 4.4 1.6 ppb v/v 11/06/17 15.47 10.94 1.4.Dichloroberzene ND 4.4 1.6 ppb v/v 11/06/17 15.47 10.94 1.4.Dichloroethane 3.5 3.3 0.79 ppb v/v 11/06/17 15.47 10.94 1.4.Dichloroethane 3.5 8.8 0.96 ppb v/v 11/06/17 15.47 10.94 1.4.Dichloroethene 3.1 J 4.4 0.97 ppb v/v 11/06/17 15.47 10.94 cis-1.2.Dichloroethene ND 4.4 0.97 ppb v/v 11/06/17 15.47 10.94 cis-1.3.Dichloropropene ND 4.4 0.97 ppb v/v 11/06/17 15.47 10.94 cis-1.3.Dichloropropene ND 4.4 0.69 ppb v/v 11/06/17 15.47 10.94 cis-1.3.Dichloropropene ND 4.4 0.96 ppb v/v 11/06/17 15.47 10.94 4.Ethylloulene ND 4.4 0.96 ppb v/v 11/06/17 15.47	1.2-Dichloro-1.1.2.2-tetrafluoroethane	ND	0.0 4 4	17	nnh v/v			11/06/17 15:47	10.04
1.2.Dichloroberzene ND 4.4 1.2. ppb v/v 1106/17 15:47 10.2. 1.4.Dichloroberzene ND 4.4 1.6 ppb v/v 1106/17 15:47 10.9. 1.4.Dichloroberzene ND 4.4 1.6 ppb v/v 1106/17 15:47 10.9. 1.4.Dichloroethane 1.3 4.4 1.6 ppb v/v 1106/17 15:47 10.9. 1.2.Dichloroethane ND 8.8 0.96 ppb v/v 1106/17 15:47 10.9. 1.2.Dichloroethane 1.5 8.8 1.4 ppb v/v 1106/17 15:47 10.9. 1.2.Dichloroethane 1.1 1.4 4.4 0.97 ppb v/v 1106/17 15:47 10.9. 1.2.Dichloroethane ND 4.4 0.97 ppb v/v 1106/17 15:47 10.9. 1.2.Dichloroptopene ND 4.4 0.96 ppb v/v 1106/17 15:47 10.9. 1.2.Dichloroptopene ND 4.4 0.96 ppb v/v 1106/17 15:47 10.9. 1.2.Dichloroptopene ND 4.4 0.96 ppb v/v 1106/17 15:47 10.9. Ethylbenzene ND 4.4 0.96 ppb v/v 1106/17 15:47 10.9.	1 2-Dichlorobenzene	ND	4.4	1.7	nnh v/v			11/06/17 15:47	10.04
1.4 Dicklobelenzene ND 4.4 1.2 pp VV 1106/171547 10.54 Dichlorodifluoromethane 3.5 3.3 0.79 pp VV 1106/171547 10.94 1.4 Dicklobelenzene ND 8.8 0.96 pp VV 1106/171547 10.94 1.4 Dicklobelenzene ND 8.8 0.96 pp VV 1106/171547 10.94 1.4 Dicklobelenzene ND 8.8 0.49 pp VV 1106/171547 10.94 1.4 Dicklobelenzene ND 8.8 0.49 pp VV 1106/171547 10.94 1.4 Dicklobelenzene ND 4.4 0.97 pp VV 1106/171547 10.94 1.2 Dickloropropene ND 4.4 0.97 pp VV 1106/171547 10.94 1.2 Dickloropropene ND 4.4 0.96 pp VV 1106/171547 10.94 1.3 Dickloropropene ND 4.4 0.69 pp VV 1106/171547 10.94 4-Ethyltoluene ND 4.4 0.69 pp VV 1106/171547 10.94 4-Ethyltoluene ND <td>1 3-Dichlorobenzene</td> <td>ND</td> <td>4.4</td> <td>1.4</td> <td>nnh v/v</td> <td></td> <td></td> <td>11/06/17 15:47</td> <td>10.04</td>	1 3-Dichlorobenzene	ND	4.4	1.4	nnh v/v			11/06/17 15:47	10.04
Indext of the second	1.4-Dichlorobenzene		н.н Л Л	1.2				11/06/17 15:47	10.04
Dictionation Display 11/00/11/15/47 10.5 10.5 1,1-Dichloroethane ND 8.8 0.96 ppb v/v 11/06/17 15.47 10.94 1,2-Dichloroethane 15 8.8 0.96 ppb v/v 11/06/17 15.47 10.94 1,2-Dichloroethane 15 8.8 0.96 ppb v/v 11/06/17 15.47 10.94 cis-1,2-Dichloroethane ND 4.4 0.97 ppb v/v 11/06/17 15.47 10.94 1,2-Dichloropropane ND 4.4 1.9 ppb v/v 11/06/17 15.47 10.94 1,2-Dichloropropane ND 4.4 0.96 ppb v/v 11/06/17 15.47 10.94 trans-1.3-Dichloropropane ND 4.4 0.96 ppb v/v 11/06/17 15.47 10.94 trans-1.3-Dichloropropane ND 4.4 0.96 ppb v/v 11/06/17 15.47 10.94 4-Ethylouene ND 4.4 0.96 ppb v/v 11/06/17	Dichlorodifluoromothano	12	4.4	1.0	ppb v/v			11/06/17 15:47	10.94
1,1-Dichloroethane 3.3 3.3 0.15 pb v/v 1100017 15.47 10.99 1,2-Dichloroethane 15 8.8 1.4 pb v/v 1100017 15.47 10.99 1,2-Dichloroethane ND 4.4 0.97 pb v/v 1100017 15.47 10.99 1,2-Dichloroethane ND 4.4 1.1 pb v/v 1100017 15.47 10.94 1,2-Dichloroethane ND 4.4 1.1 pb v/v 1100017 15.47 10.94 1,2-Dichloroethane ND 4.4 1.1 pb v/v 1100017 15.47 10.94 1,2-Dichloropropane ND 4.4 0.96 pb v/v 1100017 15.47 10.94 trans-1,3-Dichloropropane ND 4.4 0.96 pb v/v 1100017 15.47 10.94 trans-1,3-Dichloropropane ND 4.4 0.59 pb v/v 1100017 15.47 10.94 4-Ethyloluene ND 4.4 0.59 pb v/v 1100617 15.47 10.94 2-Hexanone ND 4.4 0.75 pb v/v 1100617 15.47 10.94 4-Hexanone <td>1.1 Dichloroothana</td> <td>15</td> <td>4.4</td> <td>0.70</td> <td>ppb v/v</td> <td></td> <td></td> <td>11/06/17 15:47</td> <td>10.94</td>	1.1 Dichloroothana	15	4.4	0.70	ppb v/v			11/06/17 15:47	10.94
1,2-Dichlorosethene 15 0.5 0.50 0.5	1.2 Dichloroothano	3.5 ND	0.0	0.75				11/06/17 15:47	10.04
International (international international internationaly intera international internation international international		15	0.0	0.90				11/06/17 15:47	10.94
Class 1, 2-Dichloroethene ND 4.4 0.5 ppb v/v 1106/17 15.47 10.5-4 1,2-Dichloropropane ND 4.4 1.1 ppb v/v 1106/17 15.47 10.94 1,2-Dichloropropane ND 4.4 1.1 ppb v/v 1106/17 15.47 10.94 trans-1,3-Dichloropropene ND 4.4 0.69 ppb v/v 1106/17 15.47 10.94 trans-1,3-Dichloropropene ND 4.4 0.69 ppb v/v 1106/17 15.47 10.94 thylbenzene ND 4.4 0.69 ppb v/v 1106/17 15.47 10.94 4-Ethyltoluene ND 4.4 0.09 ppb v/v 1106/17 15.47 10.94 4-Methyl-2-pentanone (MIBK) ND 4.4 0.79 ppb v/v 1106/17 15.47 10.94 4-Methyl-2-pentanone (MIBK) ND 4.4 0.79 ppb v/v 1106/17 15.47 10.94 1,1,2.2-Tetrachloroethane ND 4.4 0.56 ppb v/v 1106/17 15.47 10.94 1,1,2.2-Trichloroe	i, i-Dichloroethene	10	0.0	0.07				11/06/17 15:47	10.94
talastic	trans 1.2 Dichloroothono		4.4	0.97				11/06/17 15:47	10.94
1,2-Ditability optigate ND 4.4 2.5 pb 0/v 11/06/17 15.47 10.94 cis-1,3-Ditchloropropene ND 4.4 1.1 pb v/v 11/06/17 15.47 10.94 Ethylbenzene ND 4.4 0.69 pb v/v 11/06/17 15.47 10.94 Ethylbenzene ND 4.4 0.69 pb v/v 11/06/17 15.47 10.94 4-Ethylbourene ND 4.4 0.69 pb v/v 11/06/17 15.47 10.94 4-Ethylbourene ND 4.4 0.95 pb v/v 11/06/17 15.47 10.94 4-Hexachlorobutadiene ND 4.4 0.95 pb v/v 11/06/17 15.47 10.94 4-Hextonone ND 4.4 0.95 pb v/v 11/06/17 15.47 10.94 4-Hextonone ND 4.4 0.75 pb v/v 11/06/17 15.47 10.94 5tyrene ND 4.4 0.75 pb v/v 11/06/17 15.47 10.94 1,1,2,2-Treftarchloroethane ND 4.4 0.56 pb v/v 11/06/17 15.47 10.94 1,1,2-Trichloro-1,2,2-trif			4.4	1.1				11/06/17 15:47	10.94
Ids-1,3-bicklohopopene ND 4.4 1.1 pb/v/v 11/06/17 15.47 10.3-47 Ethylbenzene ND 4.4 0.69 pb/v/v 11/06/17 15.47 10.94 Ethylbenzene ND 4.4 0.69 pb/v/v 11/06/17 15.47 10.94 4-Ethylbenzene ND 4.4 2.0 pb/v/v 11/06/17 15.47 10.94 4-Ethylbenzene ND 4.4 0.95 pb/v/v 11/06/17 15.47 10.94 4-Methyl-2-pentanone (MIBK) ND 4.4 0.79 pb/v/v 11/06/17 15.47 10.94 4-Methyl-2-pentanone (MIBK) ND 4.4 0.75 pb/v/v 11/06/17 15.47 10.94 5tyrene ND 4.4 0.75 pb v/v 11/06/17 15.47 10.94 1.1,2-Trichloroethane 3.9 J 4.4 0.56 pb v/v 11/06/17 15.47 10.94 1.1,1_2-Trichloroethane 3.9 J 3.			4.4	2.0				11/06/17 15:47	10.94
Italia 1,3-bit Holypipere ND 4.4 0.36 ppb v/v 11/06/17 15.47 10.3-4 Ethylbenzene ND 4.4 0.69 ppb v/v 11/06/17 15.47 10.94 4-Ethylbourene ND 4.4 2.0 ppb v/v 11/06/17 15.47 10.94 4-Ethylbourene ND 4.4 0.95 ppb v/v 11/06/17 15.47 10.94 4-Methyl-2-pentanone (MIBK) ND 4.4 0.95 ppb v/v 11/06/17 15.47 10.94 4-Methyl-2-pentanone (MIBK) ND 4.4 0.79 pbb v/v 11/06/17 15.47 10.94 1,1,2.2-Tetrachloroethane ND 4.4 0.75 ppb v/v 11/06/17 15.47 10.94 1,1,2.2-Tetrachloroethane ND 4.4 0.75 ppb v/v 11/06/17 15.47 10.94 1,1,2.2-Tetrachloroethane ND 4.4 0.56 pb v/v 11/06/17 15.47 10.94 1,1,2-Trichloroethane 3.9 J 4.4 0.56 pb v/v 11/06/17 15.47 10.94	trans 1.2 Dishlaranranana		4.4	0.06				11/06/17 15:47	10.94
Entyleitzene ND 4.4 0.59 pp v/v 11/06/17 15.47 10.34 4-Ethyltoluene ND 4.4 2.0 ppb v/v 11/06/17 15.47 10.94 4-Ethyltoluene ND 22 4.7 ppb v/v 11/06/17 15.47 10.94 2-Hexanone ND 4.4 0.95 ppb v/v 11/06/17 15.47 10.94 4-Methyl-2-pentanone (MIBK) ND 4.4 0.79 ppb v/v 11/06/17 15.47 10.94 4-Methylene Chloride 2.2 J 4.4 0.79 ppb v/v 11/06/17 15.47 10.94 Styrene ND 4.4 0.65 ppb v/v 11/06/17 15.47 10.94 1,1,2.2-Tetrachloroethane ND 4.4 0.56 ppb v/v 11/06/17 15.47 10.94 1,1,2.2-Trichloroethane 3.9 J 4.4 0.56 ppb v/v 11/06/17 15.47 10.94 1,1,2-Trichloroethane ND 22 4.7 ppb v/v 11/06/17 15.47 10.94 1,1,1-Trichloroethane ND 22 4.7 ppb v/v 11/06/17 15.47 10.94 1,1,1-Trichloroethane <td< td=""><td></td><td>ND</td><td>4.4</td><td>0.90</td><td></td><td></td><td></td><td>11/00/17 15.47</td><td>10.94</td></td<>		ND	4.4	0.90				11/00/17 15.47	10.94
Hexachlorobutadiene ND 4.4 2.0 pb v/v 11/06/17 15.47 10.94 Hexachlorobutadiene ND 22 4.7 pbb v/v 11/06/17 15.47 10.94 2-Hexanone ND 4.4 0.95 pbb v/v 11/06/17 15.47 10.94 4-Methyl-2-pentanone (MIBK) ND 4.4 0.59 pbb v/v 11/06/17 15.47 10.94 Methylene Chloride 2.2 J 4.4 0.79 pbb v/v 11/06/17 15.47 10.94 Styrene ND 4.4 0.65 pbb v/v 11/06/17 15.47 10.94 1,1,2-Tetrachloroethane ND 4.4 0.56 pb v/v 11/06/17 15.47 10.94 Toluene 3.9 J 4.4 0.56 pb v/v 11/06/17 15.47 10.94 1,1,2-Trichloro-1,2,2-trifluoroetha 42 4.4 1.8 pb v/v 11/06/17 15.47 10.94 1,1,2-Trichloroethane 1.3		ND	4.4	0.09				11/00/17 15.47	10.94
Hexachorobutatione ND 22 4.7 pp V/v 11/06/17 15.47 10.34 2-Hexanone ND 4.4 0.95 ppb v/v 11/06/17 15.47 10.94 4-Methyl-2-pentanone (MIBK) ND 4.4 0.79 ppb v/v 11/06/17 15.47 10.94 Methylene Chloride 2.2 J 4.4 0.79 ppb v/v 11/06/17 15.47 10.94 Styrene ND 4.4 0.65 ppb v/v 11/06/17 15.47 10.94 1,1,2.2-Tetrachloroethane ND 4.4 0.56 ppb v/v 11/06/17 15.47 10.94 Toluene 3.9 J 4.4 0.56 ppb v/v 11/06/17 15.47 10.94 ne 11,1,2-Trichloro-1,2,2-trifluoroetha 42 4.4 0.76 ppb v/v 11/06/17 15.47 10.94 ne 1,2-Trichloroethane 1.3 J 3.3 0.71 ppb v/v 11/06/17 15.47 10.94 <tr< td=""><td>4-Ethyllouene</td><td></td><td>4.4</td><td>2.0</td><td></td><td></td><td></td><td>11/00/17 15.47</td><td>10.94</td></tr<>	4-Ethyllouene		4.4	2.0				11/00/17 15.47	10.94
2-Hexanone ND 4.4 0.95 ppb v/v 11/06/17 15:47 10.94 4-Methyl-2-pentanone (MIBK) ND 4.4 1.5 ppb v/v 11/06/17 15:47 10.94 Methylene Chloride 2.2 J 4.4 0.79 ppb v/v 11/06/17 15:47 10.94 Methylene Chloride ND 4.4 0.65 ppb v/v 11/06/17 15:47 10.94 1,1,2.2-Tetrachloroethane ND 4.4 0.65 ppb v/v 11/06/17 15:47 10.94 Tetrachloroethane ND 4.4 0.56 ppb v/v 11/06/17 15:47 10.94 Toluene 3.9 J 4.4 0.56 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloro-1,2,2-trifluoroethan 42 4.4 1.8 ppb v/v 11/06/17 15:47 10.94 1,1,1-Trichloroethane ND 22 4.7 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 4.4 0.73 ppb v/v 11/06/17 15:47 10.94	Hexachiorobutadiene	ND	22	4.7	ppb v/v			11/06/17 15:47	10.94
4-Methyl-2-pentanone (MBK) ND 4.4 1.5 ppb v/v 11/06/17 15:47 10.94 Methylene Chloride 2.2 J 4.4 0.79 ppb v/v 11/06/17 15:47 10.94 Styrene ND 4.4 0.65 ppb v/v 11/06/17 15:47 10.94 1,1,2,2-Tetrachloroethane ND 4.4 0.75 ppb v/v 11/06/17 15:47 10.94 Tetrachloroethene 310 4.4 0.56 ppb v/v 11/06/17 15:47 10.94 Toluene 3.9 J 4.4 0.56 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloro-1,2,2-trifiluoroetha 42 4.4 0.56 ppb v/v 11/06/17 15:47 10.94 ne	2-Hexanone	ND	4.4	0.95	v/v dqq			11/06/17 15:47	10.94
Methylene Chloride 2.2 J 4.4 0.79 ppb v/v 11/06/17 15:47 10.94 Styrene ND 4.4 0.65 ppb v/v 11/06/17 15:47 10.94 1,1,2,2-Tetrachloroethane ND 4.4 0.75 ppb v/v 11/06/17 15:47 10.94 Tetrachloroethene 310 4.4 0.56 ppb v/v 11/06/17 15:47 10.94 Toluene 3.9 J 4.4 0.56 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloro-1,2,2-trifluoroetha 42 4.4 1.8 ppb v/v 11/06/17 15:47 10.94 ne	4-Methyl-2-pentanone (MIBK)	ND	4.4	1.5	ppb v/v			11/06/17 15:47	10.94
Styrene ND 4.4 0.65 pp v/v 11/06/17 15:47 10.94 1,1,2,2-Tetrachloroethane ND 4.4 0.75 pp v/v 11/06/17 15:47 10.94 Tetrachloroethane 310 4.4 0.56 pp v/v 11/06/17 15:47 10.94 Toluene 3.9 J 4.4 0.56 pp v/v 11/06/17 15:47 10.94 1,1,2-Trichloro-1,2,2-trifluoroetha 42 4.4 1.8 pp v/v 11/06/17 15:47 10.94 ne	Methylene Chloride	2.2 J	4.4	0.79	ppb v/v			11/06/17 15:47	10.94
1,1,2,2-1 etrachloroethane ND 4.4 0.75 ppb v/v 11/06/17 15:47 10.94 Tetrachloroethene 310 4.4 0.56 ppb v/v 11/06/17 15:47 10.94 Toluene 3.9 J 4.4 0.56 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloro-1,2,2-trifluoroetha 42 4.4 0.56 ppb v/v 11/06/17 15:47 10.94 ne 1,2,4-Trichloroethane 42 4.4 1.8 ppb v/v 11/06/17 15:47 10.94 1,1,1-Trichloroethane ND 22 4.7 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 22 4.7 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 4.4 0.73 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 4.4 0.73 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 4.4 0.73 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 8.8 1.8 ppb v/v	Styrene	ND	4.4	0.65	ppb v/v			11/06/17 15:47	10.94
Tetrachloroethene 310 4.4 0.56 ppb v/v 11/06/17 15:47 10.94 Toluene 3.9 J 4.4 0.56 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloro-1,2,2-trifluoroetha 42 4.4 0.56 ppb v/v 11/06/17 15:47 10.94 ne 1 1.1/06/17 15:47 10.94 1.0/06/17 15:47 10.94 1,2,4-Trichloroethane 1.3 J 3.3 0.71 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 22 4.7 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 4.4 0.73 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 4.4 0.73 ppb v/v 11/06/17 15:47 10.94 1,2,4-Trimethoroethane 7.7 4.4 2.1 ppb v/v 11/06/17 15:47 10.94 1,2,4-Trimethylbenzene ND 8.8 1.8 ppb v/v 11/06/17 15:47 10.94 1,3,5-Trimethylbenzene ND 4.4 1.4 ppb v/v 11/06/17 15:47	1,1,2,2- I etrachloroethane	ND	4.4	0.75	ppb v/v			11/06/17 15:47	10.94
Toluene 3.9 J 4.4 0.56 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloro-1,2,2-trifluoroetha 42 4.4 1.8 ppb v/v 11/06/17 15:47 10.94 ne	Tetrachloroethene	310	4.4	0.56	ppb v/v			11/06/17 15:47	10.94
1,1,2-Trichloro-1,2,2-trifluoroetha 42 4.4 1.8 ppb v/v 11/06/17 15:47 10.94 ne 1,2,4-Trichlorobenzene ND 22 4.7 ppb v/v 11/06/17 15:47 10.94 1,1,1-Trichloroethane 1.3 J 3.3 0.71 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 4.4 0.73 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 4.4 0.73 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 4.4 0.73 ppb v/v 11/06/17 15:47 10.94 1,2,4-Trimethoroethane ND 4.4 1.1 ppb v/v 11/06/17 15:47 10.94 1,2,4-Trimethylbenzene ND 8.8 1.8 ppb v/v 11/06/17 15:47 10.94 1,3,5-Trimethylbenzene ND 4.4 1.4 ppb v/v 11/06/17 15:47 10.94 Vinyl acetate ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 Vinyl chloride ND 4.4 1.3 ppb v/v 11/06/17 15:47 10.94 Vinyl chloride ND 8.8 1.6 ppb v/v 11/06/17 15:4	Toluene	3.9 J	4.4	0.56	ppb v/v			11/06/17 15:47	10.94
ne 1,2,4-Trichlorobenzene ND 22 4.7 ppb v/v 11/06/17 15:47 10.94 1,1,1-Trichloroethane 1.3 J 3.3 0.71 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 4.4 0.73 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 4.4 0.73 ppb v/v 11/06/17 15:47 10.94 Trichloroethene 230 4.4 1.1 ppb v/v 11/06/17 15:47 10.94 Trichlorofluoromethane 7.7 4.4 2.1 ppb v/v 11/06/17 15:47 10.94 1,2,4-Trimethylbenzene ND 8.8 1.8 ppb v/v 11/06/17 15:47 10.94 1,3,5-Trimethylbenzene ND 4.4 1.4 ppb v/v 11/06/17 15:47 10.94 Vinyl acetate ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 Vinyl chloride ND 4.4 1.3 ppb v/v 11/06/17 15:47 10.94 Vinyl chloride ND 4.4 1.3 ppb v/v 11/06/17 15:47 10.94	1,1,2-Trichloro-1,2,2-trifluoroetha	42	4.4	1.8	ppb v/v			11/06/17 15:47	10.94
1,1,1-Trichloroethane 1.3 J 3.3 0.71 ppb v/v 11/06/17 15:47 10.94 1,1,2-Trichloroethane ND 4.4 0.73 ppb v/v 11/06/17 15:47 10.94 Trichloroethene 230 4.4 1.1 ppb v/v 11/06/17 15:47 10.94 Trichloroethene 230 4.4 1.1 ppb v/v 11/06/17 15:47 10.94 Trichlorofluoromethane 7.7 4.4 2.1 ppb v/v 11/06/17 15:47 10.94 1,2,4-Trimethylbenzene ND 8.8 1.8 ppb v/v 11/06/17 15:47 10.94 1,3,5-Trimethylbenzene ND 4.4 1.4 ppb v/v 11/06/17 15:47 10.94 1,3,5-Trimethylbenzene ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 Vinyl acetate ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 Vinyl chloride ND 4.4 1.3 ppb v/v 11/06/17 15:47 10.94 vinyl-chloride ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 vinyl-chloride ND 8.8 1.1 ppb v/v 11/06/17 15:47 10.94	ne 124-Trichlorobenzene	ΝD	22	47	nnh v/v			11/06/17 15:47	10 94
1,1,2-Trichloroethane ND 4.4 0.73 ppb v/v 11/06/17 15:47 10.94 Trichloroethene 230 4.4 1.1 ppb v/v 11/06/17 15:47 10.94 Trichloroethene 7.7 4.4 2.1 ppb v/v 11/06/17 15:47 10.94 1,2,4-Trimethylbenzene ND 8.8 1.8 ppb v/v 11/06/17 15:47 10.94 1,3,5-Trimethylbenzene ND 8.8 1.8 ppb v/v 11/06/17 15:47 10.94 Vinyl acetate ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 Vinyl chloride ND 4.4 1.4 ppb v/v 11/06/17 15:47 10.94 vinyl chloride ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 vinyl chloride ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 vinyl chloride ND 4.4 1.3 ppb v/v 11/06/17 15:47 10.94 vinyl chloride ND 8.8 1.1 ppb v/v 11/06/17 15:47 10.94 vinyl chloride ND 8.8 1.1 ppb v/v 11/06/17 15:47 10.94 o-Xvlene	1 1 1-Trichloroethane	13 1	3.3	0.71	nnh v/v			11/06/17 15:47	10.01
Trichloroethene 230 4.4 1.1 ppb v/v 11/06/17 15:47 10.94 Trichlorofluoromethane 7.7 4.4 2.1 ppb v/v 11/06/17 15:47 10.94 1,2,4-Trimethylbenzene ND 8.8 1.8 ppb v/v 11/06/17 15:47 10.94 1,3,5-Trimethylbenzene ND 4.4 1.4 ppb v/v 11/06/17 15:47 10.94 Vinyl acetate ND 4.4 1.4 ppb v/v 11/06/17 15:47 10.94 Vinyl acetate ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 Vinyl chloride ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 vinyl chloride ND 4.4 1.3 ppb v/v 11/06/17 15:47 10.94 vinyl chloride ND 8.8 1.1 ppb v/v 11/06/17 15:47 10.94 o-Xvlene ND 8.8 1.1 ppb v/v 11/06/17 15:47 10.94 o-Xvlene ND 4.4 0.59 ppb v/v 11/06/17 15:47 10.94	1 1 2-Trichloroethane		4 4	0.73	nnh v/v			11/06/17 15:47	10.01
Trichlorofluoromethane 7.7 4.4 2.1 ppb v/v 11/06/17 15:47 10.94 1,2,4-Trimethylbenzene ND 8.8 1.8 ppb v/v 11/06/17 15:47 10.94 1,3,5-Trimethylbenzene ND 4.4 1.4 ppb v/v 11/06/17 15:47 10.94 1,3,5-Trimethylbenzene ND 4.4 1.4 ppb v/v 11/06/17 15:47 10.94 Vinyl acetate ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 Vinyl chloride ND 4.4 1.3 ppb v/v 11/06/17 15:47 10.94 m,p-Xylene ND 8.8 1.1 ppb v/v 11/06/17 15:47 10.94 o-Xylene ND 8.8 1.1 ppb v/v 11/06/17 15:47 10.94	Trichloroothene	230	4.4	11	nnh v/v			11/06/17 15:47	10.04
1,2,4-Trimethylbenzene ND 8.8 1.8 ppb v/v 11/06/17 15:47 10.94 1,3,5-Trimethylbenzene ND 4.4 1.4 ppb v/v 11/06/17 15:47 10.94 1,3,5-Trimethylbenzene ND 4.4 1.4 ppb v/v 11/06/17 15:47 10.94 Vinyl acetate ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 Vinyl chloride ND 4.4 1.3 ppb v/v 11/06/17 15:47 10.94 m,p-Xylene ND 8.8 1.1 ppb v/v 11/06/17 15:47 10.94 o-Xylene ND 8.8 1.1 ppb v/v 11/06/17 15:47 10.94	Trichlorofluoromethane	7 7	4.4	21	nnh v/v			11/06/17 15:47	10.04
ND 4.4 1.4 ppb v/v 11/06/17 15:47 10:34 1,3,5-Trimethylbenzene ND 4.4 1.4 ppb v/v 11/06/17 15:47 10.94 Vinyl acetate ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 Vinyl acetate ND 4.4 1.3 ppb v/v 11/06/17 15:47 10.94 Vinyl chloride ND 4.4 1.3 ppb v/v 11/06/17 15:47 10.94 m,p-Xylene ND 8.8 1.1 ppb v/v 11/06/17 15:47 10.94 o-Xylene ND 4.4 0.59 ppb v/v 11/06/17 15:47 10.94	1.2.4-Trimethylbenzene		8.8	1.1	nnh v/v			11/06/17 15:47	10.04
Vinyl acetate ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 Vinyl acetate ND 8.8 1.6 ppb v/v 11/06/17 15:47 10.94 Vinyl chloride ND 4.4 1.3 ppb v/v 11/06/17 15:47 10.94 m,p-Xylene ND 8.8 1.1 ppb v/v 11/06/17 15:47 10.94 o-Xylene ND 4.4 0.59 ppb v/v 11/06/17 15:47 10.94	1.3.5-Trimethylbenzene	ND	0.0 4 A	1.0	nnh v/v			11/06/17 15:47	10.04
Vinit doctation ND 6.6 1.6 ppb v/v 11/06/17 15.47 10.94 Vinyl chloride ND 4.4 1.3 ppb v/v 11/06/17 15:47 10.94 m,p-Xylene ND 8.8 1.1 ppb v/v 11/06/17 15:47 10.94 o-Xylene ND 4.4 0.59 ppb v/v 11/06/17 15:47 10.94	Vinyl acetate	ND	4.4 8.8	1.4	nnh v/v			11/06/17 15:47	10.04
m,p-Xylene ND 8.8 1.1 ppb v/v 11/06/17 15:47 10.94 o-Xylene ND 4.4 0.59 ppb v/v 11/06/17 15:47 10.94	Vinyl chloride	ND	0.0 <i>A A</i>	1.0	nnh v/v			11/06/17 15:47	10.04
o-Xvlene ND 4.4 0.50 ppb v/v 11/06/17 15:47 10.34	m n-Xvlene	ND	ד.ד ג ג	1.3	nnh y/y			11/06/17 15:47	10.04
			0.0 A A	0.50				11/06/17 15.47	10.94

Client Sample ID: 103921-001/MWL-SV03-400 Date Collected: 10/26/17 09:43 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		70 - 130		11/06/17 15:47	10.94
1,2-Dichloroethane-d4 (Surr)	101		70 - 130		11/06/17 15:47	10.94
Toluene-d8 (Surr)	104		70 - 130		11/06/17 15:47	10.94

Client Sample ID: 103922-001/MWL-FB4 Date Collected: 10/26/17 10:04 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L Lab Sample ID: 320-32934-19 Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air **Result Qualifier** MDL Unit D Dil Fac Analyte RL Prepared Analyzed ND 5.0 Acetone 0.18 ppb v/v 11/06/17 16:45 1 **Benzene** 4.0 0.40 0.079 ppb v/v 11/06/17 16:45 1 ND 0.80 0.16 ppb v/v 11/06/17 16:45 Benzyl chloride 1 ND 0.066 ppb v/v Bromodichloromethane 0.30 11/06/17 16:45 1 0.070 ppb v/v Bromoform ND 0 4 0 11/06/17 16:45 1 Bromomethane ND 0.80 0.34 ppb v/v 11/06/17 16:45 1 2-Butanone (MEK) ND 0.80 0.20 ppb v/v 11/06/17 16:45 1 ND 0.80 0.078 ppb v/v Carbon disulfide 11/06/17 16:45 1 ND 0.064 ppb v/v Carbon tetrachloride 0.80 11/06/17 16:45 1 Chlorobenzene ND 0.30 0.064 ppb v/v 11/06/17 16:45 1 Chloroethane ND 0.80 0.31 ppb v/v 11/06/17 16:45 1 Chloroform ND 0.30 0.095 ppb v/v 11/06/17 16:45 1 Chloromethane ND 0.80 0.20 ppb v/v 11/06/17 16:45 1 Dibromochloromethane ND 0.40 0.079 ppb v/v 11/06/17 16:45 1 1,2-Dibromoethane (EDB) ND 0.80 0.075 ppb v/v 11/06/17 16:45 1 ND 0.40 0.16 ppb v/v 11/06/17 16:45 1 1,2-Dichloro-1,1,2,2-tetrafluoroethane 1.2-Dichlorobenzene ND 0.40 0.13 ppb v/v 11/06/17 16:45 1 ND 0 4 0 0.11 ppb v/v 1 3-Dichlorobenzene 11/06/17 16:45 1 ND 0.40 1,4-Dichlorobenzene 0.15 ppb v/v 11/06/17 16:45 1 Dichlorodifluoromethane ND 0 4 0 0.15 ppb v/v 11/06/17 16:45 1 1,1-Dichloroethane ND 0.30 0.072 ppb v/v 11/06/17 16:45 1 1,2-Dichloroethane ND 0.80 v/v dqg 880.0 11/06/17 16:45 1 ND 1,1-Dichloroethene 0.80 0.13 ppb v/v 11/06/17 16:45 1 cis-1,2-Dichloroethene ND 0.40 0.089 ppb v/v 11/06/17 16:45 1 ND trans-1,2-Dichloroethene 0.40 0.10 ppb v/v 11/06/17 16:45 1 ND 1,2-Dichloropropane 0.40 0.24 ppb v/v 11/06/17 16:45 1 ND cis-1,3-Dichloropropene 0.40 0.10 ppb v/v 11/06/17 16:45 1 ND trans-1,3-Dichloropropene 0.40 v/v dqg 880.0 11/06/17 16:45 1 Ethylbenzene ND 0.40 0.063 ppb v/v 11/06/17 16:45 1 4-Ethyltoluene ND 0.40 0.19 ppb v/v 1 11/06/17 16:45 Hexachlorobutadiene ND 2.0 0.43 ppb v/v 11/06/17 16:45 1 ND 0.40 2-Hexanone 0.087 ppb v/v 11/06/17 16:45 1 4-Methyl-2-pentanone (MIBK) ND 0.40 0.14 ppb v/v 11/06/17 16:45 1 **Methylene Chloride** 0.099 0.40 0.072 ppb v/v 11/06/17 16:45 1 ND 0.40 0.059 ppb v/v 11/06/17 16:45 Styrene 1 ND 0.40 1,1,2,2-Tetrachloroethane 0.069 ppb v/v 11/06/17 16:45 1 0.40 **Tetrachloroethene** 0.11 J 0.051 ppb v/v 11/06/17 16:45 1 Toluene ND 0.40 0.051 ppb v/v 11/06/17 16:45 1

TestAmerica Sacramento

TestAmerica Job ID: 320-32934-1

Lab Sample ID: 320-32934-18 Matrix: Air

Client Sample ID: 103922-001/MWL-FB4

Date Collected: 10/26/17 10:04 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Org	anic Compo	unds in Ar	nbient Air (C	ontinue	d)				
Analyte	Result	Qualifier	RL	MDL	Únit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			11/06/17 16:45	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			11/06/17 16:45	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			11/06/17 16:45	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			11/06/17 16:45	1
Trichloroethene	0.19	J	0.40	0.11	ppb v/v			11/06/17 16:45	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			11/06/17 16:45	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			11/06/17 16:45	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			11/06/17 16:45	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			11/06/17 16:45	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			11/06/17 16:45	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			11/06/17 16:45	1
o-Xylene	ND		0.40	0.054	ppb v/v			11/06/17 16:45	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					11/06/17 16:45	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 130					11/06/17 16:45	1
Toluene-d8 (Surr)	104		70 - 130					11/06/17 16:45	1

Client Sample ID: 103923-001/MWL-SV04-50 Date Collected: 10/26/17 10:12 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

ND

ND

ND

ND

ND

17

1.6

ND

7.8

0.72 J

1,2-Dibromoethane (EDB)

1,2-Dichlorobenzene

1,3-Dichlorobenzene

1,4-Dichlorobenzene

1,1-Dichloroethane

1,1-Dichloroethene

cis-1,2-Dichloroethene

1,2-Dichloroethane

Dichlorodifluoromethane

1,2-Dichloro-1,1,2,2-tetrafluoroethane

Lab Sample ID: 320-32934-20 Matrix: Air

Method: TO-15 - Volatile O	rganic Compo	inds in Amb	bient Air						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	2.4	J	10	0.36	ppb v/v			11/06/17 17:39	2
Benzene	0.49	J	0.80	0.16	ppb v/v			11/06/17 17:39	2
Benzyl chloride	ND		1.6	0.33	ppb v/v			11/06/17 17:39	2
Bromodichloromethane	ND		0.60	0.13	ppb v/v			11/06/17 17:39	2
Bromoform	ND		0.80	0.14	ppb v/v			11/06/17 17:39	2
Bromomethane	ND		1.6	0.67	ppb v/v			11/06/17 17:39	2
2-Butanone (MEK)	ND		1.6	0.40	ppb v/v			11/06/17 17:39	2
Carbon disulfide	ND		1.6	0.16	ppb v/v			11/06/17 17:39	2
Carbon tetrachloride	0.21	J	1.6	0.13	ppb v/v			11/06/17 17:39	2
Chlorobenzene	ND		0.60	0.13	ppb v/v			11/06/17 17:39	2
Chloroethane	ND		1.6	0.62	ppb v/v			11/06/17 17:39	2
Chloroform	1.9		0.60	0.19	ppb v/v			11/06/17 17:39	2
Chloromethane	ND		1.6	0.39	ppb v/v			11/06/17 17:39	2
Dibromochloromethane	ND		0.80	0.16	ppb v/v			11/06/17 17:39	2

11/30/2017

11/06/17 17:39

11/06/17 17:39

11/06/17 17:39

11/06/17 17:39

11/06/17 17:39

11/06/17 17:39

11/06/17 17:39

11/06/17 17:39

11/06/17 17:39

11/06/17 17:39

1.6

0.80

0.80

0.80

0.80

0.80

0.60

1.6

1.6

0.80

0.15 ppb v/v

0.31 ppb v/v

0.26 ppb v/v

0.22 ppb v/v

0.30 ppb v/v

0.29 ppb v/v

0.14 ppb v/v

0.18 ppb v/v

0.26 ppb v/v

0.18 ppb v/v

Lab Sample ID: 320-32934-19 Matrix: Air

Ju	
7:39	 2
7:39	2

2

2 2

2

2

2

2

2

2

2

Client Sample ID: 103923-001/MWL-SV04-50

Date Collected: 10/26/17 10:12 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

TestAmerica Job ID: 320-32934-1

Lab Sample ID: 320-32934-20 Matrix: Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,2-Dichloroethene	ND		0.80	0.20	ppb v/v			11/06/17 17:39	2
1,2-Dichloropropane	ND		0.80	0.48	ppb v/v			11/06/17 17:39	2
cis-1,3-Dichloropropene	ND		0.80	0.21	ppb v/v			11/06/17 17:39	2
trans-1,3-Dichloropropene	ND		0.80	0.18	ppb v/v			11/06/17 17:39	2
Ethylbenzene	ND		0.80	0.13	ppb v/v			11/06/17 17:39	2
4-Ethyltoluene	ND		0.80	0.37	ppb v/v			11/06/17 17:39	2
Hexachlorobutadiene	ND		4.0	0.86	ppb v/v			11/06/17 17:39	2
2-Hexanone	ND		0.80	0.17	ppb v/v			11/06/17 17:39	2
4-Methyl-2-pentanone (MIBK)	ND		0.80	0.27	ppb v/v			11/06/17 17:39	2
Methylene Chloride	0.22	J	0.80	0.14	ppb v/v			11/06/17 17:39	2
Styrene	ND		0.80	0.12	ppb v/v			11/06/17 17:39	2
1,1,2,2-Tetrachloroethane	ND		0.80	0.14	ppb v/v			11/06/17 17:39	2
Tetrachloroethene	63		0.80	0.10	ppb v/v			11/06/17 17:39	2
Toluene	ND		0.80	0.10	ppb v/v			11/06/17 17:39	2
1,1,2-Trichloro-1,2,2-trifluoroetha	67		0.80	0.33	ppb v/v			11/06/17 17:39	2
ne 1.2.4-Trichlorobenzene	ND		4.0	0.87	ppb v/v			11/06/17 17:39	2
1.1.1-Trichloroethane	7.1		0.60	0.13	v/v dqq			11/06/17 17:39	2
1.1.2-Trichloroethane	ND		0.80	0.13	v/v dqq			11/06/17 17:39	2
Trichloroethene	58		0.80	0.21	v/v dqq			11/06/17 17:39	2
Trichlorofluoromethane	29		0.80	0.39	v/v dqq			11/06/17 17:39	2
1,2,4-Trimethylbenzene	ND		1.6	0.32	ppb v/v			11/06/17 17:39	2
1,3,5-Trimethylbenzene	ND		0.80	0.25	ppb v/v			11/06/17 17:39	2
Vinyl acetate	ND		1.6	0.29	ppb v/v			11/06/17 17:39	2
Vinyl chloride	ND		0.80	0.24	ppb v/v			11/06/17 17:39	2
m,p-Xylene	ND		1.6	0.20	ppb v/v			11/06/17 17:39	2
o-Xylene	ND		0.80	0.11	ppb v/v			11/06/17 17:39	2
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130					11/06/17 17:39	2
1,2-Dichloroethane-d4 (Surr)	105		70 - 130					11/06/17 17:39	2

Toluene-d8 (Surr) Client Sample ID: 103924-001/MWL-SV04-100 Date Collected: 10/26/17 10:14 Date Received: 11/02/17 09:30

105

Sample Container: Summa Canister 6L Mothod: TO-15 - Volatilo Organic Compounds in Ambient Air

Method. 10-15 - Volatile Organic Compounds in Ambient An								
Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
3.8	J	22	0.80	ppb v/v			11/06/17 18:31	4.48
0.44	J	1.8	0.35	ppb v/v			11/06/17 18:31	4.48
ND		3.6	0.73	ppb v/v			11/06/17 18:31	4.48
ND		1.3	0.30	ppb v/v			11/06/17 18:31	4.48
ND		1.8	0.31	ppb v/v			11/06/17 18:31	4.48
ND		3.6	1.5	ppb v/v			11/06/17 18:31	4.48
ND		3.6	0.89	ppb v/v			11/06/17 18:31	4.48
1.2	J	3.6	0.35	ppb v/v			11/06/17 18:31	4.48
ND		3.6	0.29	ppb v/v			11/06/17 18:31	4.48
	Result 3.8 0.44 ND ND ND ND ND 1.2 ND	Result Qualifier 3.8 J 0.44 J ND ND ND ND	Result Qualifier RL 3.8 J 22 0.44 J 1.8 ND 3.6 ND 1.3 ND 3.6 ND 3.6	Result Qualifier RL MDL 3.8 J 22 0.80 0.44 J 1.8 0.35 ND 3.6 0.73 ND 1.3 0.30 ND 1.8 0.31 ND 3.6 1.5 ND 3.6 0.89 1.2 J 3.6 0.35 ND 3.6 0.29	Result Qualifier RL MDL Unit 3.8 J 22 0.80 ppb v/v 0.44 J 1.8 0.35 ppb v/v ND 3.6 0.73 ppb v/v ND 1.3 0.30 ppb v/v ND 1.3 0.31 ppb v/v ND 3.6 1.5 ppb v/v ND 3.6 0.89 ppb v/v ND 3.6 0.35 ppb v/v ND 3.6 0.89 ppb v/v ND 3.6 0.35 ppb v/v ND 3.6 0.35 ppb v/v ND 3.6 0.35 ppb v/v	Result Qualifier RL MDL Unit D 3.8 J 22 0.80 ppb v/v D 0.44 J 1.8 0.35 ppb v/v D ND 3.6 0.73 ppb v/v D ND 1.3 0.30 ppb v/v ND 1.8 0.31 ppb v/v ND 3.6 1.5 ppb v/v ND 3.6 0.89 ppb v/v ND 3.6 0.35 ppb v/v ND 3.6 0.29 ppb v/v	Result Qualifier RL MDL Unit D Prepared 3.8 J 22 0.80 ppb v/v D Prepared 0.44 J 1.8 0.35 ppb v/v D Prepared ND 3.6 0.73 ppb v/v D Prepared ND 3.6 0.73 ppb v/v D Prepared ND 3.6 0.73 ppb v/v P Prepared ND 3.6 0.73 ppb v/v P P ND 3.6 0.31 ppb v/v P P ND 3.6 0.89 ppb v/v P P ND 3.6 0.35 ppb v/v P P ND 3.6 0.35 ppb v/v P P ND 3.6 0.29 ppb v/v P P P	Result Qualifier RL MDL Unit D Prepared Analyzed 3.8 J 22 0.80 ppb v/v 11/06/17 18:31 11/06/17 18:31 0.44 J 1.8 0.35 ppb v/v 11/06/17 18:31 ND 3.6 0.73 ppb v/v 11/06/17 18:31 ND 1.3 0.30 ppb v/v 11/06/17 18:31 ND 1.3 0.30 ppb v/v 11/06/17 18:31 ND 1.8 0.31 ppb v/v 11/06/17 18:31 ND 3.6 1.5 ppb v/v 11/06/17 18:31 ND 3.6 0.89 ppb v/v 11/06/17 18:31 ND 3.6 0.35 ppb v/v 11/06/17 18:31 ND 3.6 0.29 ppb v/v

70 - 130

TestAmerica Sacramento

Lab Sample ID: 320-32934-21 Matrix: Air

11/06/17 17:39

2

Client Sample ID: 103924-001/MWL-SV04-100

Date Collected: 10/26/17 10:14 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-21 Matrix: Air

TestAmerica Job ID: 320-32934-1

Method: TO-15 - Volatile Orga	nic Compo	unds in Ar	nbient Air (C	ontinue	d)				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	ND		1.3	0.29	ppb v/v			11/06/17 18:31	4.48
Chloroethane	ND		3.6	1.4	ppb v/v			11/06/17 18:31	4.48
Chloroform	1.9		1.3	0.43	ppb v/v			11/06/17 18:31	4.48
Chloromethane	ND		3.6	0.88	ppb v/v			11/06/17 18:31	4.48
Dibromochloromethane	ND		1.8	0.35	ppb v/v			11/06/17 18:31	4.48
1,2-Dibromoethane (EDB)	ND		3.6	0.34	ppb v/v			11/06/17 18:31	4.48
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.8	0.69	ppb v/v			11/06/17 18:31	4.48
1,2-Dichlorobenzene	ND		1.8	0.58	ppb v/v			11/06/17 18:31	4.48
1,3-Dichlorobenzene	ND		1.8	0.49	ppb v/v			11/06/17 18:31	4.48
1,4-Dichlorobenzene	ND		1.8	0.67	ppb v/v			11/06/17 18:31	4.48
Dichlorodifluoromethane	32		1.8	0.65	ppb v/v			11/06/17 18:31	4.48
1.1-Dichloroethane	3.3		1.3	0.32	v/v dag			11/06/17 18:31	4.48
1.2-Dichloroethane	ND		3.6	0.39	ppb v/v			11/06/17 18:31	4.48
1.1-Dichloroethene	17		3.6	0.58	v/v dag			11/06/17 18:31	4.48
cis-1.2-Dichloroethene	2.0		1.8	0.40	ppb v/v			11/06/17 18:31	4.48
trans-1 2-Dichloroethene	ND		18	0.45	ppb v/v			11/06/17 18:31	4 48
1 2-Dichloropropane	ND		1.8	11	ppb v/v			11/06/17 18:31	4 48
cis-1.3-Dichloropropene	ND		1.8	0.47	nnh v/v			11/06/17 18:31	4 48
trans-1 3-Dichloropropene	ND		1.8	0.39	nnh v/v			11/06/17 18:31	4 48
Ethylbenzene	ND		1.8	0.00	nnh v/v			11/06/17 18:31	4 48
4-Ethyltoluene	ND		1.8	0.20	nnh v/v			11/06/17 18:31	4.48
Hexachlorobutadiene	ND		۱ <u>.</u> ۵	1 0	nnh v/v			11/06/17 18:31	4 48
2-Hevanone			1.8	0.30	ppb v/v			11/06/17 18:31	4.40
4 Mothyl 2 poptonono (MIRK)			1.0	0.59				11/06/17 18:31	4.40
Methylene Chloride	0.76	<mark>.</mark>	1.0	0.00				11/06/17 10:31	4.40
Shirese	0.70	3	1.0	0.32				11/00/17 10.31	4.40
	ND		1.0	0.20				11/06/17 10.31	4.40
1, 1, 2, 2-1 etrachioroethane	ND		1.8	0.31				11/06/17 18:31	4.48
Tetrachioroethene	110		1.8	0.23				11/06/17 18:31	4.48
loluene	ND		1.8	0.23				11/06/17 18:31	4.48
1,1,2-Irichloro-1,2,2-trifluoroetha	100		1.8	0.73	עע מקק			11/06/17 18:31	4.48
1 2 4-Trichlorobenzene	ND		9.0	19	nnh v/v			11/06/17 18:31	4 48
1 1 1 Trichloroothano	5 2		13	0.20	nnh v/v			11/06/17 18:31	4.48
1 1 2-Trichloroethane			1.8	0.20	nnh v/v			11/06/17 18:31	4.48
Trichloroethene	120		1.8	0.00	nnh v/v			11/06/17 18:31	4 48
Trichlorofluoromothano	120		1.0	0.97	nnh v/v			11/06/17 18:31	4 48
			3.6	0.00	ppb v/v			11/06/17 18:31	4.40
1 3 5-Trimethylbenzene			1.0	0.75				11/06/17 18:31	1.10
Vinyl acetate			3.6	0.50	ppb v/v			11/06/17 18:31	4.40
			1.8	0.05	ppb v/v			11/06/17 18:31	4.40
m n Xvlono			1.0	0.54				11/06/17 18:31	4.40
			1.0	0.45				11/06/17 10:31	4.40
U-Ayiche	ND		1.0	0.24	իրը ուռ			11/00/17 10.31	4.48
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130					11/06/17 18:31	4.48
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					11/06/17 18:31	4.48
Toluene-d8 (Surr)	103		70 - 130					11/06/17 18:31	4.48

RL

MDL Unit

D

Prepared

Client Sample ID: 103925-001/MWL-SV04-200

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Result Qualifier

Date Collected: 10/26/17 10:19

Analyte

Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

28 5.2 J 0.98 ppb v/v 11/06/17 19:23 5 51 Acetone Benzene ND 2.2 11/06/17 19:23 5.51 0.44 ppb v/v ND 0.90 Benzyl chloride 4.4 ppb v/v 11/06/17 19:23 5.51 Bromodichloromethane ND 1.7 0.36 ppb v/v 11/06/17 19:23 5.51 ND Bromoform 2.2 0.39 ppb v/v 11/06/17 19:23 5 51 Bromomethane ND 4.4 1.8 ppb v/v 11/06/17 19:23 5.51 2-Butanone (MEK) ND 4.4 1.1 ppb v/v 11/06/17 19:23 5.51 ND 11/06/17 19:23 5.51 Carbon disulfide 44 0.43 ppb v/v 4.4 0.35 ppb v/v 11/06/17 19:23 5.51 Carbon tetrachloride 0.47 .1 Chlorobenzene ND 1.7 0.35 ppb v/v 11/06/17 19:23 5 51 Chloroethane ND 11/06/17 19:23 44 1.7 ppb v/v 5 51 1.7 0.52 ppb v/v 11/06/17 19:23 5 51 Chloroform 1.5 J Chloromethane ND 44 1.1 ppb v/v 11/06/17 19:23 5 51 Dibromochloromethane ND 2.2 11/06/17 19:23 5.51 0.44 ppb v/v 1,2-Dibromoethane (EDB) ND 4.4 0.41 ppb v/v 11/06/17 19:23 5.51 ND 2.2 1,2-Dichloro-1,1,2,2-tetrafluoroethane 0.85 ppb v/v 11/06/17 19:23 5 51 1.2-Dichlorobenzene ND 2.2 0.72 ppb v/v 11/06/17 19:23 5.51 1,3-Dichlorobenzene ND 2.2 0.61 ppb v/v 11/06/17 19:23 5.51 1.4-Dichlorobenzene ND 2.2 0.82 ppb v/v 11/06/17 19:23 5.51 2.2 0.80 ppb v/v 11/06/17 19:23 5.51 Dichlorodifluoromethane 41 1.7 0.40 ppb v/v 11/06/17 19:23 5 51 1,1-Dichloroethane 5.2 ND 4.4 11/06/17 19:23 1,2-Dichloroethane 0.48 ppb v/v 5 51 1,1-Dichloroethene 30 44 0.71 ppb v/v 11/06/17 19:23 5 51 cis-1.2-Dichloroethene 3.1 2.2 0.49 ppb v/v 11/06/17 19:23 5 51 trans-1,2-Dichloroethene ND 2.2 0.55 ppb v/v 11/06/17 19:23 5.51 ND 22 1.3 ppb v/v 11/06/17 19:23 5.51 1,2-Dichloropropane ND 2.2 0.57 ppb v/v 5.51 cis-1,3-Dichloropropene 11/06/17 19:23 ND 2.2 trans-1,3-Dichloropropene 0.48 ppb v/v 11/06/17 19:23 5.51 2.2 Ethylbenzene ND 0.35 ppb v/v 11/06/17 19:23 5.51 1.0 ppb v/v ND 2.2 4-Ethyltoluene 11/06/17 19:23 5.51 Hexachlorobutadiene ND 11 2.4 ppb v/v 11/06/17 19:23 5.51 ND 2.2 2-Hexanone 0.48 ppb v/v 11/06/17 19:23 5.51 4-Methyl-2-pentanone (MIBK) ND 2.2 0.74 ppb v/v 11/06/17 19:23 5.51 1.6 2.2 0.40 ppb v/v 11/06/17 19:23 5.51 **Methylene Chloride** .1 ND 2.2 Styrene 0.33 ppb v/v 11/06/17 19:23 5.51 1,1,2,2-Tetrachloroethane ND 2.2 0.38 ppb v/v 11/06/17 19:23 5.51 130 2.2 0.28 ppb v/v 11/06/17 19:23 5.51 Tetrachloroethene Toluene ND 2.2 0.28 ppb v/v 11/06/17 19:23 5.51 2.2 140 0.90 ppb v/v 11/06/17 19:23 5.51 1,1,2-Trichloro-1,2,2-trifluoroetha ne ND 11 5.51 11/06/17 19:23 1,2,4-Trichlorobenzene 2.4 ppb v/v 1,1,1-Trichloroethane 2.4 1.7 0.36 ppb v/v 11/06/17 19:23 5.51 ND 1,1,2-Trichloroethane 2.2 0.37 ppb v/v 11/06/17 19:23 5.51 **Trichloroethene** 170 2.2 0.58 ppb v/v 11/06/17 19:23 5.51 **Trichlorofluoromethane** 34 2.2 1.1 ppb v/v 11/06/17 19:23 5.51 1,2,4-Trimethylbenzene ND 4.4 0.89 ppb v/v 11/06/17 19:23 5.51 1,3,5-Trimethylbenzene ND 2.2 0.69 ppb v/v 11/06/17 19:23 5.51 Vinyl acetate ND 4.4 11/06/17 19:23 5.51 0.80 ppb v/v Vinyl chloride ND 2.2 0.66 ppb v/v 11/06/17 19:23 5.51

Lab Sample ID: 320-32934-22 Matrix: Air

Analyzed

Dil Fac

Lab Sample ID: 320-32934-22

Client Sample ID: 103925-001/MWL-SV04-200 Date Collected: 10/26/17 10:19

Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		4.4	0.55	ppb v/v			11/06/17 19:23	5.51
o-Xylene	ND		2.2	0.30	ppb v/v			11/06/17 19:23	5.51
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130					11/06/17 19:23	5.51
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					11/06/17 19:23	5.51
Toluono de (Surr)	104		70 120					11/06/17 10.23	5 51

MDL Unit

Client Sample ID: 103926-001/MWL-SV04-300 Date Collected: 10/26/17 10:23 Date Received: 11/02/17 09:30 Sample Container: Summa Canister 6L

Lab Sample ID: 320-32934-23

Analvzed

Prepared

D

Matrix: Air

Dil Fac

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air Result Qualifier Analyte RL

Acetone	4.2 J	15	0.53	ppb v/v	11/06/17 20:16	3
Benzene	0.37 J	1.2	0.24	ppb v/v	11/06/17 20:16	3
Benzyl chloride	ND	2.4	0.49	ppb v/v	11/06/17 20:16	3
Bromodichloromethane	ND	0.90	0.20	ppb v/v	11/06/17 20:16	3
Bromoform	ND	1.2	0.21	ppb v/v	11/06/17 20:16	3
Bromomethane	ND	2.4	1.0	ppb v/v	11/06/17 20:16	3
2-Butanone (MEK)	ND	2.4	0.60	ppb v/v	11/06/17 20:16	3
Carbon disulfide	0.51 J	2.4	0.23	ppb v/v	11/06/17 20:16	3
Carbon tetrachloride	0.29 J	2.4	0.19	ppb v/v	11/06/17 20:16	3
Chlorobenzene	ND	0.90	0.19	ppb v/v	11/06/17 20:16	3
Chloroethane	ND	2.4	0.92	ppb v/v	11/06/17 20:16	3
Chloroform	0.64 J	0.90	0.29	ppb v/v	11/06/17 20:16	3
Chloromethane	ND	2.4	0.59	ppb v/v	11/06/17 20:16	3
Dibromochloromethane	ND	1.2	0.24	ppb v/v	11/06/17 20:16	3
1,2-Dibromoethane (EDB)	ND	2.4	0.23	ppb v/v	11/06/17 20:16	3
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	1.2	0.47	ppb v/v	11/06/17 20:16	3
1,2-Dichlorobenzene	ND	1.2	0.39	ppb v/v	11/06/17 20:16	3
1,3-Dichlorobenzene	ND	1.2	0.33	ppb v/v	11/06/17 20:16	3
1,4-Dichlorobenzene	ND	1.2	0.45	ppb v/v	11/06/17 20:16	3
Dichlorodifluoromethane	18	1.2	0.44	ppb v/v	11/06/17 20:16	3
1,1-Dichloroethane	1.6	0.90	0.22	ppb v/v	11/06/17 20:16	3
1,2-Dichloroethane	ND	2.4	0.26	ppb v/v	11/06/17 20:16	3
1,1-Dichloroethene	16	2.4	0.39	ppb v/v	11/06/17 20:16	3
cis-1,2-Dichloroethene	0.88 J	1.2	0.27	ppb v/v	11/06/17 20:16	3
trans-1,2-Dichloroethene	ND	1.2	0.30	ppb v/v	11/06/17 20:16	3
1,2-Dichloropropane	ND	1.2	0.72	ppb v/v	11/06/17 20:16	3
cis-1,3-Dichloropropene	ND	1.2	0.31	ppb v/v	11/06/17 20:16	3
trans-1,3-Dichloropropene	ND	1.2	0.26	ppb v/v	11/06/17 20:16	3
Ethylbenzene	ND	1.2	0.19	ppb v/v	11/06/17 20:16	3
4-Ethyltoluene	ND	1.2	0.56	ppb v/v	11/06/17 20:16	3
Hexachlorobutadiene	ND	6.0	1.3	ppb v/v	11/06/17 20:16	3
2-Hexanone	ND	1.2	0.26	ppb v/v	11/06/17 20:16	3
4-Methyl-2-pentanone (MIBK)	ND	1.2	0.41	ppb v/v	11/06/17 20:16	3
Methylene Chloride	0.45 J	1.2	0.22	ppb v/v	11/06/17 20:16	3

Client Sample ID: 103926-001/MWL-SV04-300

Date Collected: 10/26/17 10:23 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Orga	Aethod: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		1.2	0.18	ppb v/v			11/06/17 20:16	3
1,1,2,2-Tetrachloroethane	ND		1.2	0.21	ppb v/v			11/06/17 20:16	3
Tetrachloroethene	120		1.2	0.15	ppb v/v			11/06/17 20:16	3
Toluene	0.20	J	1.2	0.15	ppb v/v			11/06/17 20:16	3
1,1,2-Trichloro-1,2,2-trifluoroetha	82		1.2	0.49	ppb v/v			11/06/17 20:16	3
ne									
1,2,4-Trichlorobenzene	ND		6.0	1.3	ppb v/v			11/06/17 20:16	3
1,1,1-Trichloroethane	1.3		0.90	0.20	ppb v/v			11/06/17 20:16	3
1,1,2-Trichloroethane	ND		1.2	0.20	ppb v/v			11/06/17 20:16	3
Trichloroethene	94		1.2	0.32	ppb v/v			11/06/17 20:16	3
Trichlorofluoromethane	16		1.2	0.59	ppb v/v			11/06/17 20:16	3
1,2,4-Trimethylbenzene	ND		2.4	0.49	ppb v/v			11/06/17 20:16	3
1,3,5-Trimethylbenzene	ND		1.2	0.38	ppb v/v			11/06/17 20:16	3
Vinyl acetate	ND		2.4	0.44	ppb v/v			11/06/17 20:16	3
Vinyl chloride	ND		1.2	0.36	ppb v/v			11/06/17 20:16	3
m,p-Xylene	ND		2.4	0.30	ppb v/v			11/06/17 20:16	3
o-Xylene	ND		1.2	0.16	ppb v/v			11/06/17 20:16	3
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130			-		11/06/17 20:16	3
1,2-Dichloroethane-d4 (Surr)	102		70 - 130					11/06/17 20:16	3
Toluene-d8 (Surr)	104		70 - 130					11/06/17 20:16	3

Client Sample ID: 103927-001/MWL-SV04-400 Date Collected: 10/26/17 10:29 Date Received: 11/02/17 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	5.9	J	15	0.53	ppb v/v			11/06/17 21:09	3
Benzene	0.67	J	1.2	0.24	ppb v/v			11/06/17 21:09	3
Benzyl chloride	ND		2.4	0.49	ppb v/v			11/06/17 21:09	3
Bromodichloromethane	ND		0.90	0.20	ppb v/v			11/06/17 21:09	3
Bromoform	ND		1.2	0.21	ppb v/v			11/06/17 21:09	3
Bromomethane	ND		2.4	1.0	ppb v/v			11/06/17 21:09	3
2-Butanone (MEK)	0.85	J	2.4	0.60	ppb v/v			11/06/17 21:09	3
Carbon disulfide	4.2		2.4	0.23	ppb v/v			11/06/17 21:09	3
Carbon tetrachloride	0.20	J	2.4	0.19	ppb v/v			11/06/17 21:09	3
Chlorobenzene	ND		0.90	0.19	ppb v/v			11/06/17 21:09	3
Chloroethane	ND		2.4	0.92	ppb v/v			11/06/17 21:09	3
Chloroform	0.62	J	0.90	0.29	ppb v/v			11/06/17 21:09	3
Chloromethane	ND		2.4	0.59	ppb v/v			11/06/17 21:09	3
Dibromochloromethane	ND		1.2	0.24	ppb v/v			11/06/17 21:09	3
1,2-Dibromoethane (EDB)	ND		2.4	0.23	ppb v/v			11/06/17 21:09	3
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.2	0.47	ppb v/v			11/06/17 21:09	3
1,2-Dichlorobenzene	ND		1.2	0.39	ppb v/v			11/06/17 21:09	3
1,3-Dichlorobenzene	ND		1.2	0.33	ppb v/v			11/06/17 21:09	3
1,4-Dichlorobenzene	ND		1.2	0.45	ppb v/v			11/06/17 21:09	3

TestAmerica Sacramento

Lab Sample ID: 320-32934-23 Matrix: Air

Lab Sample ID: 320-32934-24

Matrix: Air

Client Sample ID: 103927-001/MWL-SV04-400

Date Collected: 10/26/17 10:29 Date Received: 11/02/17 09:30

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Orga Analyte	nic Compo Result	unds in Ar Qualifier	nbient Air (Co RL	ontinue MDL	d <mark>)</mark> Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	19		1.2	0.44	ppb v/v			11/06/17 21:09	3
1,1-Dichloroethane	1.3		0.90	0.22	ppb v/v			11/06/17 21:09	3
1,2-Dichloroethane	ND		2.4	0.26	ppb v/v			11/06/17 21:09	3
1,1-Dichloroethene	12		2.4	0.39	ppb v/v			11/06/17 21:09	3
cis-1,2-Dichloroethene	0.83	J	1.2	0.27	ppb v/v			11/06/17 21:09	3
trans-1,2-Dichloroethene	ND		1.2	0.30	ppb v/v			11/06/17 21:09	3
1,2-Dichloropropane	ND		1.2	0.72	ppb v/v			11/06/17 21:09	3
cis-1,3-Dichloropropene	ND		1.2	0.31	ppb v/v			11/06/17 21:09	3
trans-1,3-Dichloropropene	ND		1.2	0.26	ppb v/v			11/06/17 21:09	3
Ethylbenzene	ND		1.2	0.19	ppb v/v			11/06/17 21:09	3
4-Ethyltoluene	ND		1.2	0.56	ppb v/v			11/06/17 21:09	3
Hexachlorobutadiene	ND		6.0	1.3	ppb v/v			11/06/17 21:09	3
2-Hexanone	ND		1.2	0.26	ppb v/v			11/06/17 21:09	3
4-Methyl-2-pentanone (MIBK)	ND		1.2	0.41	ppb v/v			11/06/17 21:09	3
Methylene Chloride	0.41	J	1.2	0.22	ppb v/v			11/06/17 21:09	3
Styrene	ND		1.2	0.18	ppb v/v			11/06/17 21:09	3
1,1,2,2-Tetrachloroethane	ND		1.2	0.21	ppb v/v			11/06/17 21:09	3
Tetrachloroethene	110		1.2	0.15	ppb v/v			11/06/17 21:09	3
Toluene	0.22	J	1.2	0.15	ppb v/v			11/06/17 21:09	3
1,1,2-Trichloro-1,2,2-trifluoroetha	76		1.2	0.49	ppb v/v			11/06/17 21:09	3
1,2,4-Trichlorobenzene	ND		6.0	1.3	ppb v/v			11/06/17 21:09	3
1,1,1-Trichloroethane	1.2		0.90	0.20	ppb v/v			11/06/17 21:09	3
1,1,2-Trichloroethane	ND		1.2	0.20	ppb v/v			11/06/17 21:09	3
Trichloroethene	81		1.2	0.32	ppb v/v			11/06/17 21:09	3
Trichlorofluoromethane	16		1.2	0.59	ppb v/v			11/06/17 21:09	3
1,2,4-Trimethylbenzene	ND		2.4	0.49	ppb v/v			11/06/17 21:09	3
1,3,5-Trimethylbenzene	ND		1.2	0.38	ppb v/v			11/06/17 21:09	3
Vinyl acetate	ND		2.4	0.44	ppb v/v			11/06/17 21:09	3
Vinyl chloride	ND		1.2	0.36	ppb v/v			11/06/17 21:09	3
m,p-Xylene	ND		2.4	0.30	ppb v/v			11/06/17 21:09	3
o-Xylene	ND		1.2	0.16	ppb v/v			11/06/17 21:09	3
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130			-		11/06/17 21:09	3
1,2-Dichloroethane-d4 (Surr)	104		70 - 130					11/06/17 21:09	3
Toluene-d8 (Surr)	104		70 - 130					11/06/17 21:09	3

Lab Sample ID: 320-32934-24 Matrix: Air

ANNEX D

Mixed Waste Landfill Soil-Moisture Monitoring Forms

April 2017-March 2018

Field Forms and Tables

Dept: Fac	ility: Mull Da	ate: <u>41717</u> Time: <u>0900</u>
Activities: MWL So (Anyone Kas the right to cease field a	activities for safety concerns. The buddy	system will be used when needed.)
Weather Conditions: Temp: <u>°F</u> Wind Spee	d: <u>MPH</u> Humidity:	% Wind Chill:%
Chemicals Used: Vone Chemicals Used: Chemicals	Preservatives in sample bottles	Other:
	Safety Topics Presented	
U Wear safety glasses	□ Wear leather gloves	□ Wear sunscreen
Wear safety boots	U Wear latex or nitrile gloves	☐ No eating or drinking onsite
U Wear hearing protection	Use safe lifting practices	□ Set up eye wash
Be aware of biohazards (snakes, spiders, etc.)	Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary	Wear communication device (radio, cell phone, EOC alert enabled pager)
□ Be aware of electrical hazards	Be aware of pinch points	Avoid spilling leachate (hose connections)
□ Be aware of pressure hazards	□ Notify RCT when using neutron probe	Practice ALARA
Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	□ Other (list):	□ Other (list):
Does anyone have any weight restric	ctions on lifting? Circle YES or NO., If a	answered YES explain.
Printed Name	Attendees Signature	And June
Printed Name	Signature	
	Notes)

IMPORTANT NOTICE: A printed copy of this form may not be the document currently in effect. The official version is located on the Sandia Restricted Network (SRN), 4100 Controlled Documents homepage.
Name: Danielle Michel Standard Count:		t: 6741	HH Chi: 0,95		
Name: 2002	+ ZTOCK	Previous Count	t: 6580	Count Time: 30 seconds	
Notes:					
Vartical			VZ 2 Counta	NZ 2 Commen	VZ 1 Commenter
Depth Below	Linear Depth	Winch	(E Side)	(SW Corner)	VZ-1 Counts
Top of	Along	Counter	Date/Time	Date/Time	Date/Time
Casing (ft)	Casing (ft)	Reading (ft)	4-17-17/0925	417-191245	4-17-17/ 1253
0.0	0	0			
0.9	1	9999	3467	2873	2840
1.7	2	9998	3796	2719	2974
2.6	3	9997	3431	2417	1708
3.5	4	9996	3090	2398	2516
4.3	5	9995	2120	2264	2091
5.2	6	9994	1971	1851	1666
6.1	7	9993	1657	1690	1658
6.9	8	9992	1784	1686	14.87
7.8	9	9991	1794	1711	1703
8.7	10	9990	1852	1535	2003
9.5	11	9989	1810	2038	2083
10.4	12	9988	1693	1846	1860
11.3	13	9987	1825	1761	1795
12.1	14	9986	1795	1582	1899
13.0	15	9985	1861	1852	1983
13.9	16	9984	1668	1710	2124
14.7	17	9983	1696	1784	1743
15.6	18	9982	1762	1847	1475
16.5	19	9981	1426	2102	1938
17.3	20	9980	1445	2009	1519
18.2	21	9979	1781	1762	1723
19.1	22	9978	1633	1923	2381
19.9	23	9977	153B	2027	2241
20.8	24	9976	1429	1674	2004
21.7	25	9975	1688	1723	1787

Mixed Waste Landfill Neutron Logging Data Field Form

Page 1 of 2

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Winch Counter Reading (ft)	VZ-3 Counts (E Side)	VZ-2 Counts (SW Corner)	VZ-1 Counts (NW Corner)
26.0	30	9970	1666	1720	1725
30.3	35	9965	1710	1817	2149
34.6	40	9960	1744	1/0/9	1767
39.0	45	9955	1740	1554	2218
43.3	50	9950	2057	litz	1209
47.6	55	9945	1789	1990	1759
52.0	60	9940	1734	1893	1884
56.3	65	9935	2186	2089	1915
60.6	70	9930	1269	1535	1802
65.0	75	9925	2339	2263	2013
69.3	80	9920	2335	11049	1943
73.6	85	9915	1980	1855	2141
77.9	90	9910	1449	2446	1999
82.3	95	9905	2/22	2233	12.36
86.6	100	9900	2148	2226	2747
90.9	105	9895	1990	2385	2424
95.3	110	9890	2235	1875	2010
99.6	115	9885	1934	17-52	1901
103.9	120	9880	1607	2024	200/
108.3	125	9875	1786	2334	1590
112.6	130	9870	2139	2/8/	1945
116.9	135	9865	2/66	2715	ITIB
121.2	140	9860	1648	2049	1504
125.6	145	9855	1487	2521	2235
129.9	150	9850	\$2884	2531	2077
134.2	155	9845	\$ 2195	2227	1743
138.6	160	9840	2651	2159	1587
142.9	165	9835	2618	1884	2265
147.2	170	9830	2371	1622	1589
151.6	175	9825	2353	1643.	3046
155.9	180	9820	3190 23	2020362	2975
160.2	185	9815	3151	2530	2532
164.5	190	9810	1700	1972	1877
168.9	195	9805	1866	2058	3465
173.2	200	9800	2035	3111	2583

Mixed Waste Landfill Neutron Logging Data Field Form

Page 2 of 2

MIXED WASTE LANDFILL

SOIL MOISTURE MONITORING

Soil Moisture Monitoring Results Tables

Table D-1 VZ-1 Soil-Moisture Monitoring Results April 2017

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period April 2017	Baseline Average (2004-2006) Soil-Moisture (% content by yolu	Difference between Baseline Average & April 2017	Soil-Moisture Trigger Level (% content by yolume)
(1)	(11)	4.6		17	
3.5	5	4.0	2.9	0.5	NA
4.3 5.2	6	23	2.9	-0.6	
6.1	7	2.3	2.9	-0.0	NA
6.0	0	1.9	2.0	-0.3	NA
7.9	0	2.4	1.0	-0.4	NA
7.0	9	2.4	1.9	0.5	NA
8.7	10	3.2	1.7	1.5	23
9.5	11	3.4	2.0	1.4	23
10.4	12	2.8	2.7	0.1	23
11.3	13	2.7	3.1	-0.4	23
12.1	14	2.9	2.6	0.3	23
13.0	15	3.2	2.4	0.8	23
13.9	16	3.5	2.6	0.9	23
14.7	17	2.5	2.8	-0.3	23
15.6	18	1.8	2.9	-1.1	23
16.5	19	2.0	2.4	-0.4	23
17.3	20	1.9	2.0	-0.1	23
18.2	21	2.5	2.0	0.5	23
19.1	22	4.2	2.1	2.1	23
19.9	23	3.8	3.0	0.8	23
20.8	24	3.2	4.3	-1.1	23
21.7	25	2.6	4.0	-1.4	23
26.0	30	2.5	2.9	-0.4	23
30.3	35	3.6	2.7	0.9	23
34.6	40	2.6	2.3	0.3	23
39.0	45	3.8	3.0	0.8	23
43.3	50	2.4	2.9	-0.5	23
47.6	55	2.6	2.8	-0.2	23
52.0	60	2.9	3.4	-0.5	23
56.3	65	3.0	2.9	0.1	23

Table D-1 (Concluded) VZ-1 Soil-Moisture Monitoring Results April 2017

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period April 2017	Baseline Average (2004-2006) Soil-Moisture (% content by volu	Difference between Baseline Average & April 2017	Soil-Moisture Trigger Level (% content by volume)
60.6	70	2.7	2.1	0.6	23
65.0	75	3.2	5.6	-2.4	23
69.3	80	3.0	2.8	0.2	23
73.6	85	3.6	3.1	0.5	23
77.9	90	3.2	3.7	-0.5	23
82.3	95	3.8	3.7	0.1	23
86.6	100	5.2	5.4	-0.2	23
90.9	105	4.3	5.0	-0.7	NA
95.3	110	3.2	3.0	0.2	NA
99.6	115	2.9	3.6	-0.7	NA
103.9	120	3.2	2.2	1.0	NA
108.3	125	2.1	2.7	-0.6	NA
112.6	130	3.1	3.3	-0.2	NA
116.9	135	2.5	3.1	-0.6	NA
121.2	140	1.9	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	2.5	2.7	-0.2	NA
138.6	160	2.1	2.1	0.0	NA
142.9	165	3.9	3.8	0.1	NA
147.2	170	2.1	2.0	0.1	NA
151.6	175	6.0	6.0	0.0	NA
155.9	180	5.8	5.5	0.3	NA
160.2	185	4.6	4.4	0.2	NA
164.5	190	2.9	3.0	-0.1	NA
168.9	195	7.1	7.0	0.1	NA
173.2	200	4.7	5.4	-0.7	NA
	Average	3.2	3.2		

Note: Shaded area represents depths where 23% soil moisture trigger applies.

NA = Not applicable.

Table D-2 VZ-2 Soil-Moisture Monitoring Results April 2017

Vertical Depth Below Top of Casing	Linear Depth Along Casing	Collection Period April 2017	Baseline Average (2004-2006) Soil-Moisture	Difference between Baseline Average & April 2017	Soil-Moisture Trigger Level
(11)	(11)			inne)	(% content by volume)
3.5	4	4.2	2.7	1.5	NA
4.3	5	3.9	3.3	0.6	NA
5.2	6	2.8	3.6	-0.8	NA
6.1	7	2.4	3.6	-1.2	NA
6.9	8	2.4	3.5	-1.1	NA
7.8	9	2.4	3.1	-0.7	NA
8.7	10	2.0	2.4	-0.4	23
9.5	11	3.3	2.2	1.1	23
10.4	12	2.8	2.2	0.6	23
11.3	13	2.6	2.1	0.5	23
12.1	14	2.1	2.5	-0.4	23
13.0	15	2.8	3.0	-0.2	23
13.9	16	2.5	2.8	-0.3	23
14.7	17	2.6	2.4	0.2	23
15.6	18	2.8	2.6	0.2	23
16.5	19	3.5	2.7	0.8	23
17.3	20	3.2	2.9	0.3	23
18.2	21	2.6	3.1	-0.5	23
19.1	22	3.0	3.6	-0.6	23
19.9	23	3.3	3.7	-0.4	23
20.8	24	2.3	3.1	-0.8	23
21.7	25	2.5	2.7	-0.2	23
26.0	30	2.5	2.4	0.1	23
30.3	35	2.7	2.9	-0.2	23
34.6	40	2.2	2.7	-0.5	23
39.0	45	2.0	2.3	-0.3	23
43.3	50	2.2	2.1	0.1	23
47.6	55	3.2	3.1	0.1	23
52.0	60	2.9	3.0	-0.1	23
56.3	65	3.4	5.5	-2.1	23

Table D-2 (Concluded) VZ-2 Soil-Moisture Monitoring Results April 2017

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period April 2017	Baseline Average (2004-2006) Soil-Moisture (% content by yolu	Difference between Baseline Average & April 2017	Soil-Moisture Trigger Level (% content by yolume)
60.6	70	4.6	4.8	-0.2	23
65.0	75	3.9	5.1	-1.2	23
69.3	80	2.3	2.6	-0.3	23
73.6	85	2.8	2.6	0.2	23
77.9	90	4.4	3.1	1.3	23
82.3	95	3.8	36	0.2	23
86.6	100	3.8	4 7	-0.9	23
90.9	105	4.2	3.4	0.8	NA
95.3	110	2.9	3.1	-0.2	NA
99.6	115	2.5	36	-1 1	NA
103.9	120	3.3	2.0	1.3	NA
108.3	125	4 1	3.8	0.3	NA
112.6	120	37	3.6	0.1	ΝΔ
116.9	135	51	3.4	17	ΝΔ
121.2	140	3.3	2.4	0.9	NA
125.6	145	4.6	5.9	-1.3	NA
129.9	150	4.6	7.0	-2.4	NA
134.2	155	3.8	3.6	0.2	NA
138.6	160	3.6	3.8	-0.2	NA
142.9	165	2.9	3.0	-0.1	NA
147.2	170	2.2	2.9	-0.7	NA
151.6	175	2.3	2.4	-0.1	NA
155.9	180	4.0	5.4	-1.4	NA
160.2	185	4.6	5.4	-0.8	NA
164.5	190	3.1	4.1	-1.0	NA
168.9	195	3.3	3.5	-0.2	NA
173.2	200	6.1	6.3	-0.2	NA
	Average	3.2	3.4		1

Note: Shaded area represents depths where 23% soil moisture trigger applies.

NA = Not applicable.

Table D-3 VZ-3 Soil-Moisture Monitoring Results April 2017

Vertical Depth Below Top of Casing	Linear Depth Along Casing	Collection Period April 2017	Baseline Average (2004-2006) Soil-Moisture	Difference between Baseline Average & April 2017	Soil-Moisture Trigger Level
(ft)	(ft)		(% content by volu	ime)	(% content by volume)
3.5	4	6.1	4.6	1.5	NA
4.3	5	3.5	4.5	-1.0	NA
5.2	6	3.1	3.7	-0.6	NA
6.1	7	2.3	2.9	-0.6	NA
6.9	8	2.6	3.1	-0.5	NA
7.8	9	2.7	2.3	0.4	NA
8.7	10	2.8	2.4	0.4	23
9.5	11	2.7	2.6	0.1	23
10.4	12	2.4	2.7	-0.3	23
11.3	13	2.7	3.0	-0.3	23
12.1	14	2.7	2.6	0.1	23
13.0	15	2.8	2.8	0.0	23
13.9	16	2.3	2.9	-0.6	23
14.7	17	2.4	3.1	-0.7	23
15.6	18	2.6	3.1	-0.5	23
16.5	19	1.7	2.3	-0.6	23
17.3	20	1.7	2.7	-1.0	23
18.2	21	2.6	2.7	-0.1	23
19.1	22	2.2	1.8	0.4	23
19.9	23	2.0	2.7	-0.7	23
20.8	24	1.7	2.8	-1.1	23
21.7	25	2.4	2.1	0.3	23
26.0	30	2.3	2.5	-0.2	23
30.3	35	2.4	2.8	-0.4	23
34.6	40	2.5	2.1	0.4	23
39.0	45	2.5	2.7	-0.2	23
43.3	50	3.3	2.9	0.4	23
47.6	55	2.6	3.4	-0.8	23
52.0	60	2.5	2.9	-0.4	23
56.3	65	3.7	3.5	0.2	23

Table D-3 (Concluded) VZ-3 Soil-Moisture Monitoring Results April 2017

Vertical Depth Below Top	Linear Depth	Collection Period April 2017	Baseline Average (2004-2006)	Difference between Baseline Average & April 2017	Soil-Moisture
of Casing (ft)	Along Casing (ft)		Soil-Moisture (% content by volu	ıme)	Trigger Level (% content by volume)
60.6	70	1.3	1.9	-0.6	23
65.0	75	4.1	4.3	-0.2	23
69.3	80	4.1	4.5	-0.4	23
73.6	85	3.1	3.5	-0.4	23
77.9	90	1.7	1.9	-0.2	23
82.3	95	3.5	3.3	0.2	23
86.6	100	3.6	3.4	0.2	23
90.9	105	3.2	3.3	-0.1	NA
95.3	110	3.8	4.7	-0.9	NA
99.6	115	3.0	3.6	-0.6	NA
103.9	120	2.2	2.1	0.1	NA
108.3	125	2.6	1.8	0.8	NA
112.6	130	3.6	4.3	-0.7	NA
116.9	135	3.7	4.0	-0.3	NA
121.2	140	2.3	2.3	0.0	NA
125.6	145	1.8	2.0	-0.2	NA
129.9	150	5.5	4.4	1.1	NA
134.2	155	3.7	3.6	0.1	NA
138.6	160	4.9	4.4	0.5	NA
142.9	165	4.8	5.2	-0.4	NA
147.2	170	4.2	4.1	0.1	NA
151.6	175	4.1	4.3	-0.2	NA
155.9	180	6.3	6.6	-0.3	NA
160.2	185	6.2	5.6	0.6	NA
164.5	190	2.4	2.7	-0.3	NA
168.9	195	2.8	3.1	-0.3	NA
173.2	200	3.3	4.1	-0.8	NA
	Average	3.1	3.2		

Note: Shaded area represents depths where 23% soil moisture trigger applies.

NA = Not applicable.

ANNEX E

Mixed Waste Landfill Groundwater Monitoring Forms and Reports

April 2017-March 2018

Field Forms

Data Validation Reports

Contract Verification Reviews

FIELD SAMPLING FORMS

MWL LONG-TERM MONITORING AND MAINTENANCE GROUNDWATER MONITORING

Form Title	Corresponding Procedure
Health & Safety Meeting Form	PLA 05-09
Groundwater Sample Collection Field Equipment Check Log	FOP 05-02
Portable Pump and Tubing/Water Level Indicator Decontamination Log Form	FOP 05-03
Field Measurement Log For Groundwater Sample Collection	FOP 05-01
Analysis Request and Chain of Custody*	LOP 94-03

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

FIELD SAMPLING FORMS

MAY 2017 GROUNDWATER MONITORING

HEALTH & SAFETY MEETING FORM

Dept: <u>641</u> Faci	lity: <u>mwL-BW</u> Da	te: 05/00/17 Time: 0813		
Activities:				
Weather Conditions: Temp: <u>1</u> 8 ° <u>F</u> Wind Speed	d: <u>S MPH</u> Humidity:	26 % Wind Chill: <u>MA</u> • F		
Chemicals Used: None H	Preservatives in sample bottles	Other:		
Hospital/Clinic: Sandia Medial Clini	c Bldg. 831 Pho	one: 911 on LAN; 844-0911 on mobile		
	Safety Topics Presented			
Wear safety glasses	□ Wear leather gloves	U Wear sunscreen		
Wear safety boots	U Wear latex or nitrile gloves	□ No eating or drinking onsite		
U Wear hearing protection	□ Use safe lifting practices	□ Set up eye wash		
Be aware of biohazards	Be aware of slips, trips, and falls.	■ Wear communication device (radio,		
(snakes, spiders, etc.)	Keep work area clean and use a step stool when necessary	cell phone, EOC alert enabled pager)		
Be aware of electrical hazards	Be aware of pinch points	□ Avoid spilling leachate		
		(hose connections)		
Be aware of pressure hazards	□ Notify RCT when using neutron probe	Practice ALARA		
Be aware of environmental Image: Other (list): conditions (heat/cold stress). Image: Other (list): Dress accordingly. Wear sunscreen if necessary. Stay hvdrated. Image: Other (list):				
Does anyone have any weight restric	ctions on lifting? Circle YES or NO. If	answered YES explain.		
RoberTLynch	Attendees	Huch		

 Printed Name
 Signature

 Printed Name
 Signature

HEALTH & SAFETY MEETING FORM

Dept: <u>64+64</u> Fac	ility: MWL-MW9 Da	te: 05/03/17 Time: 0815				
Activities:	Activities:					
Weather Conditions: Temp: <u>66 °F</u> Wind Spee	d: <u>5 MPH</u> Humidity: <u> </u>	28 % Wind Chill: MA •F				
Chemicals Used: 🗆 None	Preservatives in sample bottles	Other:				
Hospital/Clinic: Sandia Medial Clin	ic Bldg. 831 Pho	one: 911 on LAN; 844-0911 on mobile				
	Safety Topics Presented					
Wear safety glasses	□ Wear leather gloves	U Wear sunscreen				
Wear safety boots	□ Wear latex or nitrile gloves □ No eating or drinking onsite					
U Wear hearing protection	□ Use safe lifting practices □ Set up eye wash					
Be aware of biohazards	Be aware of slips, trips, and falls. Wear communication device (rate					
(snakes, spiders, etc.)	Keep work area clean and use a step stool when necessary					
Be aware of electrical hazards	s Be aware of pinch points Davoid spilling leachate					
		(hose connections)				
Be aware of pressure hazards	□ Notify RCT when using neutron □ Practice ALARA					
Be aware of environmental	☐ Other (list):					
conditions (heat/cold stress).	ons (heat/cold stress).					
Dress accordingly. Wear						
sunscreen if necessary. Stay						
Does anyone have any weight restri	ictions on lifting? Circle VES of NO If	answered VES explain				
Does anyone have any weight restrictions on mening. Chere The of the in answered The explain.						

Printed Name Printed Name William Gibson Printed Name Brinted Name	Attendees	Signature Signature
Printed Name	1	Signature
	Notes	

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Activities:

HEALTH & SAFETY MEETING FORM Date: 05/04/17 Time: 08/4 Dept: 0641 Facility: MWL-MW7 (Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.) Weather Conditions: Wind Speed: Humidity: <u>38</u>% Temp: <u>60 °F</u> MPH Wind Chill: <u>AIA</u>

Preservatives in sample bottles Chemicals Used:
None Hospital/Clinic: Sandia Medial Clinic Bldg. 831

Phone: 911 on LAN; 844-0911 on mobile

Other:_____

۰F

Safety Topics Presented								
Wear safety glasses	□ Wear leather gloves	U Wear sunscreen						
Wear safety boots	U Wear latex or nitrile gloves	□ No eating or drinking onsite						
U Wear hearing protection	Use safe lifting practices	□ Set up eye wash						
Be aware of biohazards (snakes, spiders, etc.)	Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary	Wear communication device (radio, cell phone, EOC alert enabled pager)						
Be aware of electrical hazards	Be aware of pinch points	□ Avoid spilling leachate (hose connections)						
Be aware of pressure hazards	□ Notify RCT when using neutron probe	Practice ALARA						
Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	□ Other (list):	□ Other (list):						
Does anyone have any weight restri	ctions on lifting? Circle YES or NO. If a	answered YES explain.						

Printed Name Printed Name Printed Name Printed Name Printed Name	signature
Printed Name	Signature
Printed Name	Signature
	Notes
	-

HEALTH & SAFETY MEETING FORM

Dept: 0641 Faci	lity: <u>mwL-mw8</u> Da	te: <u>05/08/17</u> Time: <u>0812</u>		
Activities:	ctivities for safety concerns. The buddy	system will be used when needed.)		
Weather Conditions: Temp: <u>70 °F</u> Wind Speed	l: <u>8 MPH</u> Humidity:	∂6 % Wind Chill: ▲1 ●F		
Chemicals Used: None P	reservatives in sample bottles	Other:		
Hospital/Clinic: Sandia Medial Clinic	c Bldg. 831 Pho	one: 911 on LAN; 844-0911 on mobile		
	Safety Topics Presented			
Wear safety glasses	□ Wear leather gloves	🗆 Wear sunscreen		
Wear safety boots	U Wear latex or nitrile gloves	□ No eating or drinking onsite		
□ Wear hearing protection	□ Use safe lifting practices	□ Set up eye wash		
Be aware of biohazards (snakes, spiders, etc.)	☐ Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary	Wear communication device (radio, cell phone, EOC alert enabled pager)		
Be aware of electrical hazards	Be aware of pinch points	☐ Avoid spilling leachate (hose connections)		
Be aware of pressure hazards	Notify RCT when using neutron probe			
Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	□ Other (list):	□ Other (list):		
Does anyone have any weight restric	tions on lifting? Circle YES or NO. If	answered YES explain.		

Printed Name Printed Name Printed Name WILLIAMES Printed Name Printed Name Printed Name	Attendees	Signature Signature Signature Signature Signature
Printed Name		Signature
Printed Name	9	Signature
Printed Name	0	Signature
	Notes	

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FOP 05-01

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MWL		
Well I.D.: MWL-BW 2	Date: 05/02/17	
Method: Portable pump X	Dedicated pump	Pump depth: 496'

Depth to Water (ft)	Time 24 hr	Vol. (L(gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pН	Turbidity (NTU)	DO (%)	DO (mg/L)		
481.03	0828	Start —							\rightarrow		
4183.69	0852	5	19.82	688.3	183.0	7.39	0.73	13.1	1.19		
484.76	0907	10	20.57	681.9	152.3	7.41	1.25	13.1	1.18		
485.41	0923	15	20.97	691.	139.2	7.41	1.37	13.7	1.22		
486.14	0939	20	21.07	703.6	131.7	7.39	1.07	11.2	0.99		
487.21	0954	25	21.07	707.9	126.0	7.39	1.65	12.5	1-11		
488.25	1010	30	21.20	709.4	126.9	7.20	7.72	21.5	1.9)		
488.64	1017	32	21.29	210.2	13.8.6	7.40	6.40	23.9	2.12		
488.85	1020	33	21.31	710.5	130.0	7.210	6.30	26.4	2.35		
489 01	1024	34	21.30	709.9	131.0	7.41	5.21	30.0	2.66		
489.21	1027	35	21.27	708.9	132.6	7.41	5.51	30.7	2.72		
48937	1030	36	21.27	709.0	132.4	7.41	5.00	34.5	3.06		
489.54	1033	37	21.30	708.	130.5	7.42	4.54	37.1	3.28		
489.88	1037	38	21.32	709.2	132.8	7.42	4.11	38.5	3.41		
409.99	1040	39	21.34	7.06.2	132.7	7.42	3.78	44,0	.3.69		
490.34	10413	40	21.35	705.9	132-9	2.42	3.62	39.9	3.52		
	1044		SAMP	2/ing-					>		
				J							
Comments	Comments: ~1.5 gals purged from tubing 0836										

PURGE MEASUREMENTS

FB LOT # 061

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MLW		
Well I.D.: MWL-MW 7	Date: 05/04/17	
Method: Portable pump X	Dedicated pump	Pump depth: 496'

Depth to Water (ft)	Time 24 hr	Vol. (Lgal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pН	Turbidity (NTU)	DO (%)	DO (mg/L)	
490.52	0831	Start —							$ \rightarrow $	
491.76	0902	2	19.04	562.9	209.0	7.65	1.09	72.0	6.66	
492.02	0918	4	20.04	576.9	198.7	7.64	1.22	71.4	6.48	
492.02	0926	5	20.40	581.9	196.1	7.64	1.12	71.4	6.43	
492.10	0933	6	20.65	585-1	193.2	7.64	0.93	71.3	6.39	
492.20	0939	7	20.61	584.6	190.8	7.64	4.49	70.9	6.36	
492.26	0946	8	20.81	586.9	190.3	7.64	2.66	72.1	6.43	
492.34	0935	9	21.09	591.8	189.2	7.64	1.83	718	6.37	
492.39	1001	10	21.30	592.1	188.5	7.64	1.53	71.8	6.34	
492.37	1008	11	21.40	592.2	187.9	7.63	1.37	72.4	6.38	
492.39	1015	12	21.22	590.3	187.1	7.64	1.22	71.6	6.35	
	1016		SAMP	pling					\rightarrow	
			/	0						
Comments	^{Comments:} ~1.5 gals purged from tubing <i>ס 847</i>									

PURGE MEASUREMENTS

FOP 05-01

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MWL						
Well I.D.: MWL-MW 8	Date: 05/08/17					
Method: Portable pump X	Dedicated pump	Pump depth:				

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pН	Turbidity (NTU)	DO (%)	DO (mg/L)	
491.85	0829	Start ~							\longrightarrow	
493.75	0854	2	21.15	594.6	185.6	7.61	0.69	49.5	4.39	
494.48	0910	4	22.38	609.3	168.3	7.61	0.87	47.9	4.15	
494.76	0918	5	22.67	614.3	1647	7.60	0.69	46.4	4.00	
495.07	0927	6	22.30	614.1	161.1	7.59	0.61	43.0	3.73	
495.43	0936	7	22.25	618.6	159.0	7.59	0.75	38.5	3.34	
495-60	0945	8	22.26	626.5	155.2	7.57	0.5	32.0	2.77	
495.95	0954	9	22.15	629.0	150.3	7.57	1.36	36.9	2.34	
496.05	1001	10	22.18	629.9	148.6	7.57	2.35	24.9	2.16	
496.26	1003	11	22.19	629.3	148.5	7.56	1.63	22.6	2.00	
	1009		SAM	plino	v					
8 IO15 5/8	117		1]					
496.44	1015									
496.58	1022									
Comments	Comments: ~1.5 gals purged from tubing ^840									
	-									
FBL	ot# 0.	57								

PURGE MEASUREMENTS

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MWL		
Well I.D.: MWL-MW 9	Date: 05/03/17	
Method: Portable pump X	Dedicated pump	Pump depth: <u>497'</u>

Depth to Water (ft)	Time 24 hr	Vol (Lgal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pН	Turbidity (NTU)	DO (%)	DO (mg/L)
492.22	0830	Start —							~>
494.83	0852	2	20.09	571.2	194.3	7.57	0.78	22.3	2.02
495.52	0906	4	21.12	587.6	172.9	7.57	1.89	26.0	2.30
495.82	0915	5	21.52	597.1	162.5	7.56	1.44	21.7	1.91
496.03	0923	6	20.87	591.6	154.6	7.55	1.35	18.2	1.62
496.26	0932	7	20.91	592.5	147.1	7.55	0.85	15.7	1.40
496.39	0942	8	91.91	598.5	138.8	7.55	0.78	13.7	1.22
496.47	0952	9	21:27	598.5	132.8	7.55	0.54	12.9	1.14
496.52	1003	10	21.33	597.5	134.6	7.55	0.46	12.4	1.09
496.56	1014	11	21.36	598.4	132-1	7.55	0.49	13.7	1.20
	1015	/	SAM	p)ing					\rightarrow
496.56	1020			0					
496.58	1030								
Comments	[:] ∼1.5 gals	purged fro	m tubing	0841					

PURGE MEASUREMENTS

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: MV	VL						
Calibrations done by: R Lynch Date: 65/02/17							
Make & Model: EXO 1							
Sonde (S/N) with DO, Ec, pH,	ORP, and temperature	probes: 13C10	1167				
Other (S/N): NA	•						
		pH Ca	libration/Check				-
pH Calibrated to (std): 7.00			pH sloped to (^{std):} 10.00			-
Reference value:	4	.00		7.00	1	10.00	-
	Value	Temp	Value	Temp	Value	Temp	-
1. Time: 0615	3.99	20.6	7.00	20.6	9.99	20.6	1
2. Time: 1133	4.01	20.8	7.00	20.8	10.00	20.8	
3. Time:							
4. Time:							1
Standard lot no.:	5GE740 (Ø	GH 909	5AD829	666018	-5GE556	66F797	5/22/
Expiration date:	547- 8	1103	ALIZ	7/18	5717	6115	4
		SC Ca	libration/Check				
Reference Value: 1413 uS			Standard Lot	No.: 5AD820	6GH0	152	T1.
	Value	Temp	Expiration Dat	te: 4/17-	4/17		5/22/1
1. Time: 6613	1412.8	20.6			01.1		1
2. Time: 1131	1413.3	20.8					1
3. Time:		1					
4. Time:							
		ORP C	alibration/Check				
Reference Value: 220 mV			Standard Lot N	No. 5GH308°	66495	27661123	74 ,
	Value	Temp	Expiration Dat	te: 5/18 /	2/17		5/22/17
1. Time: 0617	220.1	20.6					1
2. Time: 1135	219,9	20.8					
3. Time:							
4. Time:							
		DO Ca	libration/Check				1
Calibration Value:	81% air satura	tion @ 5200 ft.		Atmosphe	eric Pressure in H	g	1
1. Time: 0612	81.	7	20	1.64			
2. Time: 1130	81.9	9	21	1.69	37		1
3. Time:							1
4			-				-

IMPORTANT NOTICE:

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

SNL/NM Project Name: MWL								
Calibration done by: R Lynch Date: 05/02/17								
TURBIDIMETER								
Make & Model: HA(CH 2100Q		Serial No. S	^{5/N} 14060C0332	.38			
Reference Value	10		20	100	800			
Standard Lot No.	A6055	A60	56	46064	A6104			
1. Time 0 820	10.3	10	9.7	104	802			
2. Time	10.1	2	0.3	101	810			
3. Time								
4. Time								
Comments:								

IMPORTANT NOTICE.

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: MW	L						7
Calibrations done by: R Lyn	ch		Date: 05	103/17			
Make & Model: EXO 1			1	/			
Sonde (S/N) with DO, Ec, pH, O	RP, and temperature	probes: 13C101	167				
Other (S/N): NA							
		pH Cali	bration/Check				-
pH Calibrated to (std): 7.00			pH sloped to (s	^{std):} 10.00			-
Reference value:	4	.00	5	7.00		10.00	-
	Value	Temp	Value	Temp	Value	Temp	
1. Time: 0612	4.02	20.8	7.00	20.8	0,01	20.8	
2. Time: 1322	4.01	20.9	6.99	20.9	10,01	20-9	
4. Time:							-
Standard lot no .:	5CE740- 66	4404	5AD829, 10	66018	5GE556 10 (4F797	- 51
Expiration date:	5/17- E	3/10	447 7	118	5/47	6/18	5/22/17
		SC Cali	bration/Check				
Reference Value: 1413 uS			Standard Lot N	Io.: 5AD820	66496	2	71
	Value	Temp	Expiration Date	e: 4/17-	8/17	-	5/22/17
1. Time: 0610	1412.7	20.8		11.15			
2. Time: 13 21	1414.0	20.9					
3. Time:							
4. 1ime:							
		ORP Cal	ibration/Check				
Reference Value: 220 mV			Standard Lot N	o. 5 6H308	66119	F7661123	TI.
	Value	Temp	Expiration Date	5/18	12/17		5/2/17
1. Time: 6614	219.6	20.8					
2. Time: 1324	220,1	20.9					
3. Time:							
4. Time:							
		DO Calil	bration/Check				1
Calibration Value:	81% air saturat	tion @ 5200 ft.		Atmosphe	ric Pressure in Hg		1
1. Time: 0609	81.9		24	.72			1
2. Time: 13 20	82.0		24	74]
3. Time:							
4. Time:							1
							-

IMPORTANT NOTICE:

SNL/NM Project Name: MWL							
Calibration done by: R Lynch Date: 05/03/17							
TURBIDIMETER							
Make & Model: HA(CH 2100Q		Serial No.	s/N 16040C049	087		
Reference Value	10		20	100	800		
Standard Lot No.	A6055	A60	56	A6064	A6104		
1. Time 0820	10.2	2	0.3	104	798		
2. Time 10 35	10.1	2	10.4	101	803		
3. Time							
4. Time							
Comments:							

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

IMPORTANT NOTICE:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: MV	VL						
Calibrations done by: R Ly	nch		Date: 05/	04/17			
Make & Model: EXO 1							
Sonde (S/N) with DO, Ec, pH,	ORP, and temperature	probes: 13C101	1167				
Other (S/N): NA							
		pH Ca	libration/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: 0623	3.99	20.6	7.00	20.6	9.99	20.6	
2. Time: 11 21	4.01	20.6	7.00	2016	10:00	20.6	
3. Time:							
4. Time:		1 to Co					
Expiration date:	5GE740 0 G	H 909	5 AD829 (066018	5 GE55 6 66	F797	-7/2
Expiration date.	5/17 8/	18	4/17	118	5717 61	18	
		SC Cal	ibration/Check				
Reference Value: 1413 uS			Standard Lot 1	No.: 5AD82 0	66495	2	71
	Value	Temp	Expiration Dat	^{e:} 4/17	8/17		5/22/
1. Time: 0622	1413.3	20.6	C. V. ZERE	11 11 201	0111	1997 A. 1978-	1156
2. Time: 1120	1413.7	20.6					
3. Time:			1. A.				1.21
4. Time:						- Anno and	
		ORP Ca	libration/Check				
Reference Value: 220 mV			Standard Lot N	o. 5 GH308	76611	23	54
	Value	Temp	Expiration Date	: 5/16	12/17		5/22
1. Time: 0625	219.8	20.6					
2. Time: 1123	220,2	20,6					1
3. Time:		11					
4. Time:							
		DO Cal	ibration/Check				
Calibration Value:	81% air satura	tion @ 5200 ft.		Atmosphe	ric Pressure in Hg		-
1. Time: 0621	82.0)	2	4.8%			-
2. Time: 1/19	82.	1	2	4.89			-
3. Time:				1 - 1	1		

IMPORTANT NOTICE:

SNL/NM Project Name: MWL								
Calibration done by: R Lynch Date: 05/04/17								
TURBIDIMETER								
Make & Model: HA(CH 2100Q		Serial No.	s/N 16040C0490)87			
Reference Value	10		20	100	800			
Standard Lot No.	A6055	A60	56	A6064	A6104			
1. Time 0820	9.96	2	0.3	101	797			
2. Time 1034	10.2	20	0.1	104	795			
3. Time								
4. Time								
Comments:					1.			

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

IMPORTANT NOTICE:

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: MW	L						
Calibrations done by: R Lynch Date: 05/08/17							
Make & Model: EXO 1							
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167							
pH Calibrated to (std): 7 00		pH Cal	nH sloped to ((std): 40.00			
Reference value:	1 4	00	pri stopen to (7.00	1	10.00	_
	Value	Temp	Value	Temp	Value	Temp	_
1. Time: 0620	3.99	20.8	7.00	20,8	10.01	20.8	-
2. Time: 1122	3.98	20.8	7.00	20.8	10.00	20.8	
3. Time:							
4. Time: Standard lot no.:	505707 /	611606	EADero /	66010		65762	TA
Expiration date:		19	4/17 7	118	5/17 b	11B	shali
	0/	SC Cal	ibration/Check	110	1		_
Reference Value: 1413 US			Standard Lot	No - 540820	6/2110	٤c	-
	Value	Temp	Expiration Da	te: 4/17	BUITY	74	
1. Time: 01,19	1413.3	20.8	1251320452	-11.17	0/1/	1000	115
2. Time: 1121	1412.9	20.8					1
3. Time:							
4. Time:			Style 2917	HI TALI			
		ORP Ca	libration/Check				
Reference Value: 220 mV			Standard Lot N	No. 5 GI 1308	- 7GC	1123	T1
	Value	Temp	Expiration Dat	te: 5/18-	12/17		5/22/1
1. Time: 0/022	219.6	20.8					
2. Time: 1124	226.4	20.8					1
3. Time:							4
4. Time:							
		DO Cal	ibration/Check				_
Calibration Value:	81% air satura	tion @ 5200 ft.		Atmosphe	eric Pressure in Hg		
1. Time: 0618	\$2.0)	2	4.5%			_
2. Time: 1120	82.1		2	4.54			_
3. Time:				1	1		
4. Time:							-

IMPORTANT NOTICE:

SNL/NM Project Name: MWL								
Calibration done by: R Lynch Date: 05/08/17								
TURBIDIMETER								
Make & Model: HA(CH 2100Q		Serial No.	^{s/N} 16040C0490	87			
Reference Value	10		20	100	800			
Standard Lot No.	A6055	A60	56	A6064	A6104			
^{1. Time} 0815	9.96	2	0.3	99.4	807			
2. Time 1030	(0.2	20	1.9	103	802			
3. Time								
4. Time			۵					
Comments:		1.						
			ð					

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

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.

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Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: MWL-GWM	Monitoring Well ID # :	MWL-BW2		Date: 05/02/17			
The following equipment wa	The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03						
Pump and Tubing Bundle ID #: 1806-814	_	Water Level Indi	cator ID #: 210272				
Personnel Performing Decontamination: Image: Test and te							
	Condition	of Equipment					
Pump: Excellent Tub	ing Bundle: Exceller	nt	Water Level Indicator:	ood			
	List of Deconta	amination Materials					
· · · · · · · · · · · · · · · · · · ·			HNO ₃				
Deonized Water		Grade:	Reagent				
Source: 1090		UN #:	2031				
Lot Number: 028,025,071,010,006,	050	Manufacturer:	ACROS				
		Lot Number:	A0358899				

FOP 05-03

Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: MWL-GWM	Monitoring Well ID # :	Date: 05/03/17					
The following equipment was	The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03						
Pump and Tubing Bundle ID #: 1806-814 Water Level Indicator ID #: 210272							
Personnel Performing Decontamination: Robert Lynch		RL					
Print Name:		Initial:					
William Gibson		WYA					
Print Name:		Initial:					
	Condition of E	Equipment					
Pump: Excellent Tubi	ing Bundle: Excellent		Water Level Indicator:	bod			
	List of Decontamina	ation Materials					
			HNO ₃				
Deonized water		Grade:	Reagent				
Source: Bldg. 1090		UN #:	2031				
Lot Number: 061,020,024,048,059,	039 Ma	anufacturer:	ACROS				
	L	Lot Number:	A0358899				

Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: MWL-GWM	Aonitoring Well ID # : MWL-MW7	Date: 05/04/17		
The following equipment was de	lecontaminated at completion of sampling a	ctivities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: 1806-814 Water Level Indicator ID #: 210272				
Personnel Performing Decontamination: Robert Lynch Print Name: Alfred Santillanes Print Name: Initial: Initial:				
	Condition of Equipment			
Pump: Excellent Tubing	g Bundle: Excellent	_Water Level Indicator:		
	List of Decontamination Materials			
		HNO3		
Deonized water	Grade:	Reagent		
Source: Bldg.1090	UN #:	2031		
Lot Number: 030,052,011,002,005,02	22 Manufacturer:	ACROS		
	Lot Number:	A0358899		

Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: MWL-GWM	Monitoring Well ID # :	/WL-MW8		Date: 05/08/17			
The following equipment was	The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03						
Pump and Tubing Bundle ID #: 1806-814 Water Level Indicator ID #: 210272							
Personnel Performing Decontamination: Robert Lynch Print Name: Alfred Santillanes Print Name: Initial: Initial:							
	Condition of	Equipment					
Pump: Excellent Tubi	ing Bundle:		Water Level Indicator: G	ood			
	List of Decontam	ination Materials					
			HNO ₃				
Deonized Water		Grade:	Reagent				
Source: Bldg.1090		UN #:	2031				
Lot Number: 003,044,012,013	068,055 M	Manufacturer:	ACROS				
		Lot Number:	A0358899				

SUMMARY SHEET FOR

MAY 2017 GROUNDWATER SAMPLES

Sample Summary for May 2017 Mixed Waste Landfill Groundwater Monitoring

	Sample		Sample		Associated Equipment Blank	Associated Trip	Associated Field	
Well ID	Date	ARCOC	Number	Sample Type	(ARCOC #/Sample #)	Sample #)	Sample #)	Comments
GEL Analytical Data: Project Task # 195122.10.11.08, Service Order # CF01-17								
MWL-BW2	2-May-17	617845	102593	Environmental	n/a	617845 / 102594	617845 / 102592	
MWL-MW7	4-May-17	617848	102602	Environmental	n/a	617848 / 102603	617848 / 102601	
MWL-MW8	8-May-17	617850	102606	Environmental	n/a	617850 / 102610	n/a	at 1-gallon purge
MWL-MW8	8-May-17	617850	102607	Environmental	n/a	617850 / 102610	n/a	at 5-gallon purge
MWL-MW8	8-May-17	617850	102609	Environmental	n/a	617850 / 102610	617850 / 102608	
MWL-MW9	3-May-17	617847	102598	Environmental	617846 / 102595	617847 / 102600	617847 / 102597	
MWL-MW9	3-May-17	617847	102599	Duplicate	617846 / 102595	617847 / 102600	617847 / 102597	
MWL-EB1	2-May-17	617846	102595	Equipment Blank	n/a	617846 / 102596	n/a	Equipment blank sample prior to MWL-MW9.
MWL QC/DIW	2-May-17	617849	102604	DIW QC	n/a	617849 / 102605	n/a	DIW - source water for EB-1
MWL FB-1	2-May-17	617845	102592	Field Blank	n/a	617845 / 102594	n/a	at MWL-BW2
MWL FB-2	3-May-17	617847	102597	Field Blank	n/a	617847 / 102600	n/a	at MWL-MW9
MWL FB-3	4-May-17	617848	102601	Field Blank	n/a	617848 / 102603	n/a	at MWL-MW7
MWL FB-4	8-May-17	617850	102608	Field Blank	n/a	617850 / 102610	n/a	at MWL-MW8

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

GROUNDWATER MONITORING

MAY 2017

AR/COC NUMBERS 617845, 617846, 617847, 617848, 617849


PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

Memorandum

Date: June 7, 2017

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL Site: MWL GWM ARCOC: 617845, 617846, 617847, 617848 and 617849 SDG: 422295 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

Fourteen 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 ICAL intercepts were > the MDL and positive for cis-1,3-dichloropropylene and trans-1,3-dichloropropylene. 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

Five TBs were submitted, one for each ARCOC. FBs were submitted with ARCOCs 617845, 617847 and 617848 and were associated with the samples on their respective ARCOCs. A DIW QC sample was submitted with ARCOC 617849 and was the source water for the EB submitted on ARCOC 617846. The EB submitted with ARCOC 617846 was associated with samples submitted with ARCOC 617847. A field duplicate pair was submitted with ARCOC 617847. 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	y: Mar	y Donivan	Level: I	Date: 06/07/17
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PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

Memorandum

Date: June 7, 2017

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL Site: MWL GWM ARCOC: 617845, 617846, 617847, 617848 and 617849 SDG: 422295 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.

<u>Summary</u>

Six 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.

<u>Blanks</u>

No target analytes were detected in any of the blanks except as follows. U was detected at < the PQL in the continuing calibration blanks bracketing the samples. The associated sample results were either non-detect or detects >5X the highest blank value and will not be qualified.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria.

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

A DIW QC sample was submitted with ARCOC 617849 and was the source water for the EB submitted on ARCOC 617846. The EB submitted with ARCOC 617846 was associated with samples submitted with ARCOC 617847. A field duplicate pair was submitted with ARCOC 617847. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan Level: I Date: 06/07



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

Memorandum

Date: June 7, 2017

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL Site: MWL GWM ARCOC: 617845, 617846, 617847, 617848 and 617849 SDG: 422295 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.

<u>Summary</u>

Six samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list), EPA 900.0 (gross alpha/beta), SM 7500 Rn B (Radon-222) and EPA 906.0 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 A/B:

1. The gross alpha result for sample 422295005 was > the MDA but \leq 3X the MDA and will be **qualified J,FR7.**

Holding Times and Preservation

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

Quantification

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

Calibration

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

<u>Blanks</u>

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/ Laboratory Control Sample Duplicate (LCS/LCSD)

All LCS and/or LCSD recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

A DIW QC sample was submitted with ARCOC 617849 and was the source water for the EB submitted on ARCOC 617846. The EB submitted with ARCOC 617846 was associated with samples submitted with ARCOC 617847. A field duplicate pair was submitted with ARCOC 617847. 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 DonivanLevel: IDate: 06/07/17



AR/COC: 617845, 617846, 617847, 617848, 617849

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	102593-004/MWL-BW2	ALPHA (12587-46-1)	J, FR7
	102595-004/MWL EB-1	ALPHA (12587-46-1)	BD, FR3
	102595-004/MWL EB-1	BETA (12587-47-2)	BD, FR3
	102604-004/MWL QC/DIW	ALPHA (12587-46-1)	BD, FR3
	102604-004/MWL QC/DIW	BETA (12587-47-2)	BD, FR3
EPA 901.1			
	102593-003/MWL-BW2	Americium-241 (14596-10-2)	BD, FR3
	102593-003/MWL-BW2	Cesium-137 (10045-97-3)	BD, FR3
	102593-003/MWL-BW2	Cobalt-60 (10198-40-0)	BD, FR3
	102593-003/MWL-BW2	Potassium-40 (13966-00-2)	BD, FR3
	102595-003/MWL EB-1	Americium-241 (14596-10-2)	BD, FR3
	102595-003/MWL EB-1	Cesium-137 (10045-97-3)	BD, FR3
	102595-003/MWL EB-1	Cobalt-60 (10198-40-0)	BD, FR3
	102595-003/MWL EB-1	Potassium-40 (13966-00-2)	BD, FR3
	102598-003/MWL-MW9	Americium-241 (14596-10-2)	BD, FR3
	102598-003/MWL-MW9	Cesium-137 (10045-97-3)	BD, FR3
	102598-003/MWL-MW9	Cobalt-60 (10198-40-0)	BD, FR3
	102598-003/MWL-MW9	Potassium-40 (13966-00-2)	BD, FR3
	102599-003/MWL-MW9	Americium-241 (14596-10-2)	BD, FR3
	102599-003/MWL-MW9	Cesium-137 (10045-97-3)	BD, FR3
	102599-003/MWL-MW9	Cobalt-60 (10198-40-0)	BD, FR3
	102599-003/MWL-MW9	Potassium-40 (13966-00-2)	BD, FR3
	102602-003/MWL-MW7	Americium-241 (14596-10-2)	BD, FR3
	102602-003/MWL-MW7	Cesium-137 (10045-97-3)	BD, FR3

AR/COC: 617845, 617846, 617847, 617848, 617849

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	102602-003/MWL-MW7	Cobalt-60 (10198-40-0)	BD, FR3
	102602-003/MWL-MW7	Potassium-40 (13966-00-2)	BD, FR3
	102604-003/MWL QC/DIW	Americium-241 (14596-10-2)	BD, FR3
	102604-003/MWL QC/DIW	Cesium-137 (10045-97-3)	BD, FR3
	102604-003/MWL QC/DIW	Cobalt-60 (10198-40-0)	BD, FR3
	102604-003/MWL QC/DIW	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	102593-005/MWL-BW2	Tritium (10028-17-8)	BD, FR3
	102595-005/MWL EB-1	Tritium (10028-17-8)	BD, FR3
	102598-005/MWL-MW9	Tritium (10028-17-8)	BD, FR3
	102599-005/MWL-MW9	Tritium (10028-17-8)	BD, FR3
	102602-005/MWL-MW7	Tritium (10028-17-8)	BD, FR3
	102604-005/MWL QC/DIW	Tritium (10028-17-8)	BD, FR3
SM 7500 Rn B			
	102595-006/MWL EB-1	Radon-222 (14859-67-7)	BD, FR3
	102604-006/MWL QC/DIW	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

ARCOC#(s): 617845, 617846, 617847, 617848 and 617849	Site/Project: MWL GWM	Validation Date: 06/07/2017					
SDG: 422295	Laboratory: GEL Laborator	ies, LLC	Validator: Linda Thal				
Matrix: Aqueous	# of Samples: 44 CVR present: Yes						
ARCOC(s) present: Yes	Sample Container Integrity:	ОК					
Analysis Type:							
\Box Organic \Box Metals \Box Gencl	nem 🛛 Rad						

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

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

Comments: Collected: 05/02 through 05/04/2017

ARCOC 617847 (corrected copy) is missing the final received by signature date and time.

The client was notified that 1 vial for sample 422295015(102596-001) and 2 vials each for samples 422295029(102600-001) and 422295036(102605-001) were received with headspace.

Validated by:

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Sandia Organic Worksheet (GC/MS VOC)

ARCOC #(s): 617	7845, 617846, 6	17847, 617848 and 617849					SDG: 422295							Matrix: Aqueous			
Laboratory Samp	le IDs: 4222950	01, -002	2, -008, -009	016, -017, -02	23, -029	9, -030, -0	36, -037	, -038, -0	44								
Method/Batch #s:8260B/1664377								ss/fail):p	oass			TICs Re	equired?	(yes/no):no			
				Calibrati	ion								TB1				
Analyte (outliers) Int.		RF/ Slope	RSD/ r ²	(ICV)/CCV %D		MB	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	-008 TB2 -015 TB3 -029 TB4 -044 TB5 -036	FB1 -001 FB2 -016 FB3 -037	EB1 -009	DIW QC -030		
cis -1,3-Dichloropropylene $+0.51$ \checkmark \checkmark					✓ ✓		✓	NA	✓	✓	✓	✓	 ✓ 	✓	✓	✓	
trans-1,3-Dichloropropylene $+0.60$ \checkmark \checkmark				 ✓ 	✓		✓	NA	✓	✓	✓	✓	√	✓	✓	✓	
Acetone	etone NA V		 ✓ 	$+33^{1}$		✓	NA	✓	✓	✓	✓	✓	✓	✓	✓		
2-Butanone	anone NA V V		•	+26		•	NA	•	•	•	•	•	• •	•	•		
2-nexalione	Hexanone NA V V		•	+23		•	NA	•	•	•	•	•	•	v	•		
					Sur	rogate	e Recover	y Outlie	rs								
Sample ID	1,2-DCA-d4 9	-d4 %R Toluene-d8 %R BFB %R					Sample ID 1,2-DCA-d4 %R				4 %R	Toluene-d8 %R		BFB %	R		
None																	
							IS Outli	ers				1					
	FBZ	-	Chl-d		15		1,4-DCB-d	14									
Sample ID	Area	RT	Are	Area		Α	rea	RT									
None																	

Comments: HTs OK. MS/MSD -002

ICAL VOA1.I 04/19/2017. Linear: cis and trans-1,3-dichloropropylene

¹ associated with the MS/MSD only

Mass spectra NA-all sample results ND

Sandia Inorganic Metals Worksheet

ARCOC	#(s):): 0	61784	45, 617	846, 61	7847, 6	17848 and	617849			SDG #(s):	422295				Matrix	: Aqueous			
Laborato	Laboratory Sample IDs: 422295003, -010, -018, -024, -031, -039 (Cd, Cr, Ni, U)																		
Method/Batch #s: 3005A/6020/1662483/1662484																			
ICPMS Mass Cal: Pass Fail NA ICPMS Resolution: Pass Fail NA																			
Calibration							MB mg/L	5X Blank (5X	LCS	MS	DUP	DUP Serial	ICS	ICS A ±MDL ug/L	CRI	EB1 -010	DIW		
(outliers)	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L		MDL) mg/L	%R	%K	RPD	%D	%R	(x50)	%K		-031		
U	NA	✓	✓	✓	✓	.085J	√	.00043	✓	✓	✓	✓	NA	NA	✓	✓	~		
																			<u> </u>
																			<u> </u>

	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 -003 Ca, Mg, Fe, Al < ICS A.

Sandia Radiochemistry Worksheet

ARCOC #(s): 617845, 617846, 617847, 617848 and 617849 SDG #:422295 Matrix: Aqueous												
Laboratory Sample IDs:422295 – see below												
Method/Batch#s: EPA 901.1 (gammaspec)/1663341 Samples -004, -011, -019, -025, -032, -040												
Method/Batch#s: EPA 900.0/SW846 9310 (gross A/B)/1665158 Samples -005, -012, -020, -026, -033, -041												
Method/Batch#s: SM 7500 Rn B (Rn-222)/1662059 Samples -007, -014 and 1662460 Samples -022, -028, -035, -043												
Method/Batch#s: EPA 906.0 Modified (tritium)/1664463 Samples -006, -013, -0	21, -027, -034, -042											

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS %R	MS %R	MSD %R	MS MS REI	/ Lab D Rep. R RER	EB1	DIW QC		
None													
				Tracer/Ca	rrier Rec	overy Outl	iers						
Sample ID	Tracer/Ca	arrier %	R	Sample ID)	Tracer/	Carrier	%R	Sample	ID	Trac	er/Carrier	%R
NA													

Comments: HTs OK. Matrix QC on this SDG for all

Tritium: Parent and dup sample 50ml; MS 25ml; 2X dilution – no data qualified.

Gross A/B: Parent and dup sample 150ml; MS/MSD 50ml; 3X dilution – no data qualified.

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CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Inter	nal Lab	,														Page 1 (of 1
Batc	h No	NIA					SMO Use	1					101	/	AR/COC	61	7845
Proie	oct Name		MWI GWM	A/SVM	Date Sample	s Shinped:	5/2	117		SMO AL	thorization:	214	4.6	~~~	Waste Characterization	นี้อุษาสารและสมเทศสารกระ	
Proje	ct/Task M	lanager:	Timmie Jac	ckson	Carrier/Wavb	ill No.	6178	15		SMO Co	ontact Phone).		540			
Proje	ect/Task N	lumber:	195122.10	.11.08	Lab Contact:		Edie Kent/8	43-769-738	35		Wendy Pa	alencia/505	5-844-3132		□ Released by COC No.		
Serv	ice Order:		CF01-17		Lab Destinati	ion:	GEL			Send Re	eport to SMC):	****			Ø	4º Celsius
					Contract No.:		1303873				Stephanie I	Montaño/5	05.284.255	3	Bill to: Sandia National Laborato	ories (Acco	unts Payable)
Tect	Area:														P.O. Box 5800, MS-0154	,	
Buil	dina:		Room:		Operationa	al Site:									Albuquerque, NM 87185-0154	4	22295
		1	1		1	Depth	Date	Time	Sample	Co	ontainer	Preserv-	Collection	Sample	Parameter & Metho	d	Lab
Sam	ple No.	Fraction	san	nple Location D)etail	(ft)	Colle	ected	Matrix	Туре	Volume	ative	Method	Туре	Requested		Sample ID
é <u>1</u>	02592	001	MWL FB-	1		NA	5/2/17	10:44	DIW	G	3x40 ml	НСІ	G	FB	VOC-LTMMP (SW846-8260	/B)	001
/ 1	02593	001	MWL-BW	2		496	5/2/17	10:44	GW	G	3x40 ml	нсі	G	SA	VOC-LTMMP (SW846-8260	IB)	002
/ 1	02593	002	MWL-BW	2		496	5/2/17	10:46	GW	Р	500 ml	HNO3	G	SA	METALS, TAL (SW846-6020 Cd, Cr, Ni, U)/7470):	003
1	02593	003	MWL-BW	2		496	5/2/17	10:47	GW	Р	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIS	31 (EPA	004
1	02593	004	MWL-BW	2		496	5/2/17	10:48	GW	Р	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EP	4 900)	005
1	102593 005 MWL-BW2					496	5/2/17	10:49	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)		006
1	102593 006 MWL-BW2					496	5/2/17	10:50	GŴ	AG	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)		007
1	102594 001 MWL-TB1					NA	5/2/17	10:44	DIW	G	3x40 ml	HCI	G	ТВ	VOC-LTMMP (SW846-8260)B)	008
Las	t Chain:		□ Yes		<u>(</u>	Sample	Tracking		SMC) Use	Special Ins	structions	/QC Requir	rements:		Con	ditions on
Vali	dation R	Req'd:	☑ Yes			Date En	tered:				EDD		☑ Yes		· · · · · · · · · · · · · · · · · · ·	R	Receipt
Bac	kground	1:	□ Yes			Entered	by:			- serve	Turnaroun	d Time	🗆 7-Day	* 🗆	15-Day* 🛛 30-Day		
Cor	firmator	γ:	□ Yes	<u></u>		QC inits	 A set of a set of				Negotiated	I TAT					
S	ample	N N	lame	Signat	ure	Init.	Compar	iy/Organiza	ition/Phon	e/Cell	Sample Di	sposal	Return	n to Client	Disposal by Lat	บ	
	Геат	William	Gibson 🦩	Willes	Gent	WYX	SNL/04141	/505-284-3	307/505-2	39-7367	Return Sar	mples By:					
Me	embers	Robert I	ynch	Ralter	Ker-	PU	SNL/04141	/505-844-4	013/505-2	50-7090	Comments	: Report sp	ecific list o	f VOCs (L	TMMP list provided by		
		Alfred S	antillanes	Alfalson	alles	1024	SNL/04141	/505-284-6	870/505-2	28-0710	SNL/NM SI	MO). It Me st reanalys	CI, acetone	, toluene,	or MEK detected > MDL,		
				. 0		.l			****		-	screanarys	13.				
ļ		$\square A$				1	C / C /		1 1 mm 1 5		<u> </u>	****			Data	<u> [</u>	ad Use
Reli	nquished I	oy M	<u> </u>	<u>GUL</u>	Org. 4/9	/ Date	3/2/1	≁ lime	1124	Relinqu	ISNED DY			Org.	. Date		3
Rec	eived by	Ä	ZIE	= juré	Org. 7/ 2	Uate	5/2/1	- lime /	<u>11 67</u>	Receive	ichod by			Org.	Date	Time	
Reli	nquished I	by 12	5-0-	>	0rg.0065	Date	2/3/1		ディー	Receive	isrieu by			Org.	. Date	Time	- -
Rec	eived by		ypm		Ulg.	Date	<u>J-4-1</u>	1 11116	1100	Intereive	su by			Uig		1 1110	·

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal I ah	\sim														P	age 1 of 1
Batch No	n					SMO Use								AI	R/COC	617846
Project Name: Project/Task Ma	anager:	MWL GWM / Timmie Jack	/ SVM son	Date Samples Carrier/Wayb	s Shipped: II No.	5/3	47		SMO Au SMO Co	thorization: Intact Phone	 ::	<u> </u>		Waste Charac RMA	terization	
Project/Task Nu	umber:	195122.10.1	1.08	Lab Contact:		Edie Kent/8	43-769-738	5		Wendy Pa	alencia/505	-844-3132		Released by C	COC No.	
Service Order:		CF01-17		Lab Destination	on:	GEL			Send Re	eport to SMC):				11.1	
				Contract No.:		1303873			<u> </u>	Stephanie I	Montaño/50)5.284.2553	5	Bill to: Sandia Nation	iai Laboratorie 154	s (Accounts Payable),
Tech Area:		T			1.0%									Albuquerque NM 87	185-0154	422290
Building:		Room:		Operationa	Site:	Data	Time -	Romalo		ntainar	Preserva	Collection	Sample	Parameter	r & Method	
Sample No.	Fractior	samı	ple Location D	etail	Depth (ft)	Date Colle	ected	Matrix	Туре	Volume	ative	Method	Туре	Requ	lested	Sample ID
102595	001	MWL EB-1			NA	5/2/17	13:35	DIW	G	3x40 ml	нсі	G	EB	VOC-LTMMP (SW	/846-8260B)	009
102595	002	MWL EB-1			NA	5/2/17	13:36	DIW	P	500 ml	ниоз	G	EB	METALS, TAL (SM 6020/7470): Cd. C	v846- sr. Ni. U	010
102595	003	MWL EB-1			NA	5/2/17	13:37	DIW	Р	1 L	HNO3	G	EB	GAMMA SPEC, S	HORT	011
102595	004	MWL EB-1			NA	5/2/17	13:38	DIW	Р	1 L	HNO3	G	EB	GROSS-ALPHA/E (EPA 900)	BETA	012
102595	005	MWL EB-1	*****		NA	5/2/17	13:39	DIW	AG	250 ml	NONE	G	EB	TRITIUM (EPA 90	6)	013
102595	102595 006 MWL EB-1					5/2/17	13:40	DIW	AG	2x40 ml	NONE	G	EB	RADON (SM7500	Rn B)	014
102596	001	MWL-TB 2			NA	5/2/17	13:35	DIW	G	3x40 ml	НСІ	G	ТВ	VOC-LTMMP (SW	/846-8260B)	015
\															,	
Last Chain:					Sample	Tracking		SMC) Use	Special Ins	structions	/QC Requir	· ements:			Conditions on
Validation R	eu,q.	 ☑ Yes			Date En	tered:				EDD		Yes				Receipt
Background		□ Yes			Entered	by:				Turnaroun	d Time	D 7-Day	* 🗆	15-Day* ☑	30-Day	
Confirmator	v	□ Yes			QC inits					Negotiated	TAT E	۵				
Sample	j. I I	Name	Signat	ure	Init	Compai	ny/Organiza	ition/Phon	e/Cell	Sample Di	sposal	Returi	n to Client	: 🛛 Dispo	sal by Lab	
Team	William	Gibson	Willind	Jall.	228	SNL/0641/	505-284-33	07/505-23	9-7367	Return Sa	mples By:					
Memhere	Gilbert	Quintana	Mar 24	hitna	Sel	SNL/0641/	505-844-25	07/505-22	8-2606	Comments	: Report sp	pecific list of	f VOCs (L	TMMP list provided	I by	
members	Alfred S	Santillanes	Hlfesh	t:ll_	alt	SNL/0641/	505-284-68	70/505-22	8-0710	Then reque	st reanalys	u, acetone	, toluene,	VI WER VELECIED >		
			~		+	+		******		1						Lab Use
Relinquished h		to st	ma	Ora O he	/ Date	5/21	7 Time /	423	Relingu	ished by			Org	. Date		Time
Received by	~ <u>_</u>		<u>X425</u>	Ora.On/	31 Date	5/2/1	Time /	423	Receive	ed by			Org	. Date		Time
Relinguished h	O V DS	Ż	i i i i i i i i i i i i i i i i i i i	Org/1/3	Date	5/3/1) Time (1830	Relinqu	ished by			Org	. Date		Time
Peceived by	- faire	TERS		Ora.	Date	5-4-1	7 Time	7:35	Receive	ed 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	1.														l	Page 1 c	of 2
	Batch No. N	A					SMO _/ Use	1.				_	1 6			AR/COC	61	7847
	Project Name:		MWL GWM	M/SVM	Date Sample	s Shipped:	514	117		SMO AL	thorization	Sq. 1	1 li	the	U Wast	e Characterization	**************	
	Project/Task M	anager:	Timmie Ja	ckson	Carrier/Wayb	ill No.	26	472	6	SMO Co	ontact Phone	÷	4	GMG.				
	Project/Task N	umber:	195122.10	.11.08	Lab Contact:		Edie Kent/8	43-769-738	5		Wendy Pa	alencia/505	5-844-3132	1 40	🗆 Relea	sed by COC No.		
	Service Order:		CF01-16		Lab Destinati	ion:	GEL			Send Re	eport to SMC	D:					Ø,	4º Celsius
			++++++++++++++++++++++++++++++++++++++		Contract No.		1303873				Stephanie I	Montaño/5	05.284.255	3	Bill to: Sand	ia National Laboratori	ies (Accou	unts Payable),
	Tech Area:														P.O. Box 58	00, MS-0154		
	Building:		Room:		Operation	al Site:									Albuquerque	, NM 87185-0154	4	22295
						Depth	Date/	Time	Sample	Co	ontainer	Preserv-	Collection	Sample	Pa	rameter & Method	ł	Lab
	Sample No.	Fraction	n Sar	nple Location D	etail	(ft)	Colle	ected	Matrix	Туре	Volume	ative	Method	Туре	ļ	Requested		Sample ID
ł	102597	001	MWL FB-	3	~	NA	5/3/17	10:15	DIW	G	3x40 ml	НСІ	G	FB	VOC-LTM	MP (SW846-8260E	3)	016
k	102598	001	MWL-MW	/9		497	5/3/17	10:15	GW	G	3x40 ml	HCI	G	SA	VOC-LTM	MP (SW846-8260E	3)	017
1	102598	002	MWL-MW	/9		497	5/3/17	10:17	GW	Р	500 ml	HNO3	G	SA	METALS, T Cd, Cr, Ni,	AL (SW846-6020/ U	7470):	018
¢.	102598	003	MWL-MW	/9		497	5/3/17	10:20	GW	Р	1 L	HNO3	G	SA	GAMMA S 901)	PEC, SHORT LIST	Г (ЕРА	019
l	102598	102598 004 MWL-MW9					5/3/17	10:25	GW	Р	1 L	HNO3	G	SA	GROSS-A	LPHA/BETA (EPA	900)	020
1	102598	102598 005 MWL-MW9					5/3/17	10:30	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)		021
ſ,	102598	006	MWL-MM	/9		497	5/3/17	10:33	GW	AG	2x40 ml	NONE	G	SA	RADON (S	M7500 Rn B)		022
	102599	102599 001 MWL-MW9					5/3/17	10:15	GW	G	3x40 ml	нсі	G	DU	VOC-LTM	MP (SW846-8260E	3) 7470):	023
	102599	002	MWL-MW	/9		497	5/3/17	10:17	GW	Р	500 ml	HNO3	G	DU	Cd, Cr, Ni,	U	/4/0).	024
۲	102599	003	MWL-MW	/9		497	5/3/17	10:20	GW	Р	1 L	HNO3	G	DU	901)	FEC, SHORT LIST		025
	Last Chain:		□ Yes			Sample	Tracking		SMO	Use	Special Ins	structions	QC Requi	rements:			Cond	litions on
	Validation R	eq'd:	☑ Yes			Date Ent	ered:				EDD		Yes				Re	eceipt
	Background	:	O Yes		******	Entered	by:				Turnaroun	d Time	D 7-Day	* 🛛	15-Day*	☑ 30-Day		
	Confirmator	y:	🗆 Yes			QC inits.					Negotiated	I TAT						
	Sample	Sample Name Signature					Compar	y/Organiza	tion/Phone	e/Cell	Sample Dis	sposal	Retur	n to Client	Ø	Disposal by Lab		
	Team	Team William Gibson William Sel					SNL/04141	/505-284-33	07/505-23	39-7367	Return Sar	nples By:						
	Members	Robert L	.ynch	Fayyon	ELE_	en	SNL/04141	/505-844-40	13/505-2	50-7090	Comments:	Report sp	ecific list o	f VOCs (L	TMMP list p	rovided by		
		Alfred S	antillanes	Highdon	hele-	als -	SNL/04141	/505-284-68	370/505-22	28-0710	SNL/NM SP	VIO). IT Me st reanalys	Ji, acetone	, toluene,	or MEK dete	ected > MDL,		
				0							linen requee	screanarys						
		A	tot	+00-	On Old		stat.	Time	108	Doline	 	-	*******	0		Data	La	D USE
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	Received by	's le		8 -	Org. Drg.	Z/ Date	15-61	1 Time	8.15	Receive	d by			Org.		Date	Time	******
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*Prior confirmation with SMO required for 7 and 15 day TAT

Page 9 of 724

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2

													AR/COC 6	17847
Project Name	:	MWL GWM / SVM	Project/Ta	ask Manag	jer:	Timmie Ja	ckson		Project/Tas	sk No.:	195122	2.10.11.08		
Tech Area:														
Building:		Room:				*				1		r		Labuse
				Depth	Date	Time	Sample	Co	ntainer	Preserv-	Collection	Sample	Parameter & Method	Lab Sample II
Sample No.	Fraction	Sample Location	Detail	(ft)	Coll	ected	Matrix	Туре	volume	auve	wethod	туре		Sample IL
102599	004	MWL-MW9		497	5/3/17	10:25	GW	P	1 L	HNO3	G	DU		Udb
102599	005	MWL-MW9		497	5/3/17	10:30	GW	AG	250 ml	NONE	G	DU		027
102599	006	MWL-MW9		497	5/3/17	10:33	GW	AG	2x40 ml	NONE	G	DU	RADON (SM7500 Rn B)	028
102600	001	MWL-TB3	*****	NA	5/3/17	10:15	DIW	G	3x40 ml	НСІ	G	ТВ	VOC-LTMMP (SW846-8260B)	029
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CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

	Internal Lab	11												. 1		1	Page 1 c	of 2
	Batch No. N	'IA					SMO/Use				s	_	10			AR/COC	61	7847
	Project Name:		MWL GWI	M/SVM	Date Sample	s Shipped	514	117		SMO A	uthorization	-G.A	44	the	🗆 Waste	Characterization	Sa nainan t ta b ilada barre	**************************************
	Project/Task N	Aanager:	Timmie Ja	ckson	Carner/Wayt	all No.	26	472	6	SMO C	ontact Phone); <i>V</i>		GNV.				
	Project/Task N	lumber:	195122.10	.11.08	Lab Contact		Edie Kent/	843-769-738	15		Wendy Pa	alencia/50	5-844-3132	1 4	🗆 Releas	sed by COC No.		
	Service Order:		CF01-16		Lab Destinati	ion	GEL			Send R	eport to SMC):					2 4	4º Celsius
					Contract No.		1303873		La h	ļ	Stephanie	Montaño/5	05.284.255	3	Bill to: Sandi	a National Laboratori	ies (Accou	unts Payable),
	Tech Area:														P.O. Box 580	0, MS-0154		
	Building:		Room:		Operationa	al Site:									Albuquerque,	NM 87185-0154		
						Depth	Date	/Time	Sample	C	ontainer	Preserv-	Collection	Sample	Par	ameter & Methoc	i	Lab
	Sample No.	Fraction	Sar	nple Location D	etail	(ft)	Coll	ected	Matrix	Туре	Volume	ative	Method	Туре		Requested		Sample ID
(102597	001	MWL-FB-	s- FB-2	5/25/19	NA	5/3/17	10:15	DIW	G	3x40 ml	нсі	G	FB	VOC-LTMM	IP (SW846-8260B	3)	
*	102598	001	MWL-MW	/9	<u> </u>	497	5/3/17	10:15	GW	G	3x40 ml	HCI	G	SA	VOC-LTMM	IP (SW846-8260B	3)	
1	102598	002	MWL-MW	/9		497	5/3/17	10:17	GW	Р	500 ml	HNO3	G	SA	METALS, TA	גר (SW846-6020/) 1	7470):	
4	102598	003	MWL-MW	/9		497	5/3/17	10:20	GW	Р	1 L	HNO3	G	SA	GAMMA SP 901)	EC, SHORT LIST	(EPA	
ŧ	102598	102598 004 MWL-MW9					5/3/17	10:25	GW	Р	1 L	HNO3	G	SA	GROSS-AL	PHA/BETA (EPA	900)	
/	102598 005 MWL-MW9					497	5/3/17	10:30	GW	AG	250 ml	NONE	G	SA	TRITIUM (E	PA 906)		
1	102598	006	MWL-MW	/9		497	5/3/17	10:33	GW	AG	2x40 ml	NONE	G	SA	RADON (SI	Л7500 Rn B)		
	102599 001 MWL-MW9					497	5/3/17	10:15	GW	G	3x40 ml	HCI	G	DU	VOC-LTMM	P (SW846-8260B)	
	102599 002 MWL-MW9					497	5/3/17	10:17	GW	Р	500 ml	HNO3	G	DU	METALS, TA Cd, Cr, Ni, L	L (SW846-6020/7 J	7470):	
-	102599	003	MWL-MW	/9		497	5/3/17	10:20	GW	Р	1 L	HNO3	G	DU	GAMMA SP 901)	EC, SHORT LIST	(EPA	
	Last Chain:		O Yes			Sample	Tracking	1-100	SMO	Use	Special Ins	tructions/	QC Requir	ements:			Condi	itions on
	Validation Re	eq'd:	I Yes			Date Ent	ered:	<u>1911</u>			EDD		☑ Yes	·····			Re	ceipt
ļ	Background:	•	O Yes			Entered I	N KI	11			Turnaround	d Time	D 7-Day*	0	15-Day*	2 30-Day		
	Confirmatory	Confirmatory: 🗆 Yes				QC inits	MI	· ····			Negotiated	TAT	0					
	Sample	Na	ame	Signatu	re,	Init.	Compan	y/Organizati	on/Phone	/Cell	Sample Dis	posal	Return	to Client	9	Disposal by Lab		
	Team	William G	Sibson	Willing;	El 1	WZA	SNL/04141/	505-284-330	07/505-23	9-7367	Return Sam	ples By:						
	Members	Robert Ly	rnch	Tayson		en	SNL/04141	505-844-40	13/505-25	0-7090	Comments:	Report spe	ecific list of	VOCs (LT	MMP list pro	vided by		
		Alfred Sa	ntillanes	Hlfdod	ela-	als .	SNL/04141/	505-284-687	70/505-22	8-0710	SNL/NW SIV	IO). IT MEC	acetone,	toluene, o	r MEK detec	ted > MDL,		
	}			V							then reques	(Teanaiyon	ο.					
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*Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

-										AR/COC 6	17847				
F	roject Name:		MWL GWM / SVM	Project/Ta	sk Manag	ger:	Timmie Ja	ckson		Project/Ta:	sk No.:	195122	2.10.11.08		
Ī	ech Area:		y				_								
E	luilding:	r	Room:	1											Lab use
	Sample No	Eraction	Sample Location (Jotail	Depth (ft)	Date/	lime	Sample	Type	Volume	Preserv-	Method	Sample	Parameter & Method	Lab
┢	400500	004		Jetan	407	E/9/47	10.25	GW	0	11		G		GROSS-ALPHA/BETA (FPA 900)	Sample i
+	102599	004			497	5/3/17	10.25	GW				6			+
-	102599	005	MVVL-MVV9		497	5/3/17	10:30	GVV	AG	250 mi	NONE	G	00		+
F	102599	006	MWL-MW9		497	5/3/17	10:33	GW	AG	2x40 ml	NONE	G	DU		
1	102600	001	MWL-TB3	·*******	NA	5/3/17	10:15	DIW	G	3x40 ml	HCI	G	ТВ	VOC-LIMMP (SW846-8260B)	
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AOP 95-16

Page 2 of 2

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

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Internal Lab													2	Page 1	of 1
Batch No. A	/1A				SMO Use	1					100	1	AR/COC	61	7848
Project Name:	-10-1	MWL GWM / SVM	Date Samples	s Shipped:	5/4	117		SMO Au	Ithorization	-0,N	Telin		Waste Characterization		
Project/Task M	lanager:	Timmie Jackson	- Carrier/Wavb	ill No.	26	411	9	SMO Co	ontact Phone	e:		Swo	🗆 RMA		
Project/Task N	umher:	195122.10.11.08	Lab Contact:		Edie Kent/84	13-769-738	5		Wendy Pa	alencia/50	5-844-3132		Released by COC No.		
Service Order		CF01-17	Lab Destination	on:	GEL			Send Re	eport to SMC):				Ø	4º Celsius
			Contract No.:		1303873				Stephanie I	Montaño/5	05.284.255	3	Bill to: Sandia National Laborato	ies (Acco	unts Payable),
Tooh Aroa:													P.O. Box 5800, MS-0154		
Duilding:		Boom:	Operationa	I Site:									Albuquerque, NM 87185-0154		42229
Building.	Г		Toperatione	Depth	Date/	Time	Sample	Co	ontainer	Preserv-	Collection	Sample	Parameter & Metho	d	Lab
Sample No.	Fraction	Sample Location I	Detail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested		Sample ID
102601	001	MWL FB-3		NA	5/4/17	10:16	DIW	G	3x40 ml	HCI	G	FB	VOC-LTMMP (SW846-8260	3)	037
102602	001	M\\\/I_M\\\/7		496	5/4/17	10:16	GW	G	3x40 ml	нсі	G	SA	VOC-LTMMP (SW846-8260	3)	038
102602 002 MWL-MW7 496 5/4/17 10:18 GW P 500 mi HNO3 G SA Cd, Cr, Ni, U GAMMA SPEC, SHORT LIST (EP/											/7470):	039			
102602	003	MWL-MW7		496	5/4/17	10:19	GW	Р	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIS	Т (ЕРА	040
102602	004	MWL-MW7	496	5/4/17	10:21	GW	Р	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA	900)	041	
102602	Mode Mode <th< td=""><td>SA</td><td>TRITIUM (EPA 906)</td><td>an an a</td><td>042</td></th<>								SA	TRITIUM (EPA 906)	an a	042			
102602	006	MWL-MW7	496	5/4/17	10:24	GW	AG	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)		043	
102603	001	MWL-TB4	NA	5/4/17	10:16	DIW	G	3x40 ml	нсі	G	ТВ	VOC-LTMMP (SW846-8260	B)	044	
	t									***					
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l ast Chain:	1	⊥ □ Yes		Sample	Tracking		SMC	Use	Special In	structions	/QC Requi	rements:		Con	ditions on
Validation R	eu,q.	2 Yes		Date En	tered:				EDD		Yes			F	Receipt
Background	1. 1.		***	Entered	by:			(Care	Turnarour	nd Time	□ 7-Day	/* 🗆	15-Day* 🗹 30-Day		
Confirmatory:															
Comple	<u>y.</u> I N	lame Signa	Init.	Compan	v/Organiza	tion/Phon	e/Cell	Sample Di	sposal	Retur	n to Client	Disposal by Lab			
Sample	William	Gibson Alla	119	SNL/0641/5	05-284-330	07/505-23	9-7367	Return Sa	mples By:						
Team	Members Robert Lynch Fortench E					05-844-40	13/505-25	0-7090	Comments	: Report s	pecific list o	f VOCs (L	TMMP list provided by		
Wembers	Alfred S	antillanes	ell.	100	SNL/0641/5	05-284-687	70/505-22	8-0710	SNL/NM S	MO). If Me	Cl, acetone	, toluene,	or MEK detected > MDL,		
					1				then reque	st reanalys	sis.				
*****	—	7		1	1 1				1					<u> </u>	ab Use
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*Prior confirmation with SMO required for 7 and 15 day TAT

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CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Barten No. MAIL SMO Use AR/COC 617849 Project Name MVL.GVM// SVM Date Sambes SMPeter 5 H <		uto un al Lab							×							Page 1	of 1
Batch No. // (r) ⁴ Weak Characterization Weak Characterization Project Name: Site And Site Site Site Site Site Site Site Site	I	nternal Lab	ΛA				SMO Lico					,	111	1	AR		17849
Project Name: MMC GWM / SVM Date Sample Single C / / / / / / / / / / / / / / / / / / /	E	Batch No. /	104		T		SWUUSe	1.7		SMO AU	thorization:	-Dh	6f		Waste Charact	erization	
Project/Task Manage: Timming Lackson Caractivity RVNC Construction Construction <t< td=""><td>F</td><td>Project Name:</td><td></td><td>MWL GWM / SVM</td><td>Date Samples</td><td>Shipped:</td><td>-217</td><td>JE5</td><td>1</td><td>SMO Co</td><td>intact Phone</td><td>- Agric</td><td>6.00</td><td>anne)</td><td></td><td></td><td></td></t<>	F	Project Name:		MWL GWM / SVM	Date Samples	Shipped:	-217	JE5	1	SMO Co	intact Phone	- Agric	6.00	anne)			
Project/13sk Number: 155/12:10:11.08 Lab Determistor: CFED:17 Lab Determistor: Sample Not Free Collection State Project 24:253 Project 24:253 <td>F</td> <td>Project/Task M</td> <td>anager:</td> <td>Timmie Jackson</td> <td>Carrier/Waybil</td> <td>I No.</td> <td><u> </u></td> <td>10 700 720</td> <td>b —</td> <td>3100 00</td> <td>Mondy Da</td> <td>lancia/505</td> <td>-844-3132</td> <td>Juno</td> <td>Released by C</td> <td>DC No.</td> <td></td>	F	Project/Task M	anager:	Timmie Jackson	Carrier/Waybil	I No.	<u> </u>	10 700 720	b —	3100 00	Mondy Da	lancia/505	-844-3132	Juno	Released by C	DC No.	
Service Order: CP11.7 Lab Destination Stephanic Motion SMC Incommerx.w Incommerx.w Incommerx.w Stephanic Motion SMC PC (Box 3800, MS-014 Building: Room: Operational Site: Contract.w Preserv. Collection Sample PC (Box 3800, MS-014 Sample No. Fraction Sample Location Detail Op Date/Time Sample Motioner Preserv. Collection Sample Parameter & Method Lab 102604 001 MVL QC/DIW NA 5/2/17 13:20 DIW G 3:40 ml HCl G EB VOC-LTMMP (SWR46-92007) 0:3/2 102604 002 MVL QC/DIW NA 5/2/17 13:22 DIW P 1 L HN03 G EB 90(3) 0:3/2 102604 003 MVL QC/DIW NA 5/2/17 13:22 DIW P 1 L HN03 G EB 90(3) 0:3/2 102604 004 MVL QC/DIW NA 5/2/17 13:26 DIW AG 2/2/	F	Project/Task N	umber:	195122.10.11.08	Lab Contact:		Edie Kent/84	43-769-738	<u>ə</u>	Cond Do	vvenuy Fa	10101a/000	-044-0102				4º Celsius
Icenter Noc. July Jame July July July July July July July July	1	Service Order:		CF01-17	Lab Destinatio	n:	GEL			Senu Re	Stenhonio I	/. Montaño/Fi	15 284 2553	2	Bill to: Sandia Nationa	I aboratories (Aco	counts Pavable).
Tech. Area: Operational Site: Operational Site: <th< td=""><td></td><td></td><td></td><td></td><td>Contract No.:</td><td></td><td>1303873</td><td></td><td></td><td>l</td><td>Stephanie i</td><td>viontano/5</td><td>JJ.204.2JJ.</td><td>J</td><td>D O Poy 5800 MS 01</td><td>54</td><td></td></th<>					Contract No.:		1303873			l	Stephanie i	viontano/5	JJ.204.2JJ.	J	D O Poy 5800 MS 01	54	
Building: Room: Operational Site: Auduque, Market Mark	F	Tech Area:													P.O. BOX 5000, 1415-01	05 0151 L	422295
Sample No. Fraction Sample Location Detail Depth (ft) Date/Time Collected Sample Watrix Container Type Preserv. Collectors Container Method Preserv. Collectors Sample D Method Sample D M	h	Building:		Room:	Operationa	I Site:				T		T=	r <u></u> 1		Albuquerque, NM 871	80-0104	100010
Sample No. Fraction Sample Location Detail (tr) Concered Multity Pp Volume action System			[Depth	Date/	Time	Sample	Co	ontainer	Preserv-	Collection	Sample	Parameter	ested	Sample ID
102604 001 MWL QC/DIW NA 5/2/17 13:20 DIW G 3:40 mi HCl G E WOL-LINAWP (Worde-5020/7470) 02:0 102604 002 MWL QC/DIW NA 5/2/17 13:21 DIW P 500 mi HN33 G EB GAC (F, N, U METASTAL (SW086-5020/7470) 03:1 102604 003 MWL QC/DIW NA 5/2/17 13:22 DIW P 1 L HN03 G EB GROSS-ALPHA//BETA (EPA 900) 03:3 102604 004 MWL QC/DIW NA 5/2/17 13:23 DIW P 1 L HN03 G EB GROSS-ALPHA//BETA (EPA 900) 03:3 102604 005 M/VL QC/DIW NA 5/2/17 13:25 DIW AG 2x40 mi NONE G EB RADON (SM7500 Rn B) 0:35/2 102605 001 M/VL TB 5 NA 5/2/17 13:20 DIW G 3x40 mi HCl G TB </td <td>Ŀ</td> <td>Sample No.</td> <td>Fractior</td> <td>Sample Location E</td> <td>Detail</td> <td>(tt)</td> <td>Colle</td> <td>ectea</td> <td>Watrix</td> <td>Type</td> <td>Volume</td> <td>auve</td> <td>metriou</td> <td>.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</td> <td>VOC I TRAND (SW/</td> <td></td> <td>1.50</td>	Ŀ	Sample No.	Fractior	Sample Location E	Detail	(tt)	Colle	ectea	Watrix	Type	Volume	auve	metriou	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	VOC I TRAND (SW/		1.50
10200 002 MWL QC/DIW NA 5/2/17 13.21 DIW P 500 ml HNO3 G EB CME PAC, PAL OB / CV NL OD / CV NL OD / CV NL	,	102604	001	MWI OC/DIW		NĂ	5/2/17	13:20	DIW	G	3x40 ml	HCI	G	EB	VOC-LININF (SWC	040-0200B)	030
102604 002 MWL QC/DIW NA 5/2/17 13.21 D/W P 300 min Incode C <thc< th=""> C <thc< th=""> <thc< th=""></thc<></thc<></thc<>	-	102004					E 10/47	40.04			500 ml		G	FR	METALS, TAL (SW	846-6020/7470)	031
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*Prior confirmation with SMO required for 7 and 15 day TAT

3

AR/COC NUMBERS 617850



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

Memorandum

Date: June 16, 2017

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL Site: MWL GWM ARCOC: 617850 SDG: 422628 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

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

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

Holding Times

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 ICAL intercepts were > the MDL and positive for cis-1,3-dichloropropylene and trans-1,3-dichloropropylene. The associated sample results were non-detect and will not be qualified.

The CCV %Ds were >20% and positive for dichlorodifluoromethane, 2-hexanone and bromoform. The associated sample results were non-detect and will not be qualified.

<u>Blanks</u>

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

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

A TB and an FB were submitted with ARCOC 617850 and were associated with the samples on the same ARCOC.

No other specific issues that affect data quality were identified.

	Reviewed by	y: Mar	y Donivan	Level: I	Date: 06/19/1
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PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

Memorandum

Date:	June 16, 2017
То:	File
From:	Linda Thal
Subject:	Inorganic Data Review and Validation – SNL Site: MWL GWM ARCOC: 617850 SDG: 422628 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.

<u>Summary</u>

One sample was 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 sample was 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.

<u>Blanks</u>

No target analytes were detected in any of the blanks.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria.

Laboratory Replicate

The replicate met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

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

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were not evaluated because the sample concentrations 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	/ Donivan	Level: I	Date: 06/19/17



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

Memorandum

Date: June 16, 2017

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL Site: MWL GWM ARCOC: 617850 SDG: 422628 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.

<u>Summary</u>

One sample was 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.

Gammaspec and tritium:

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

Radon-222:

1. The Rn-222 result for sample 422628009 was > the MDA but \leq 3X the MDA and will be **qualified J,FR7.**

Holding Times and Preservation

The sample was 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.

<u>Blanks</u>

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 MS/MSD analyses were performed on SNL samples of similar matrix from other SDGs. Data will not be qualified.

Laboratory Replicate

All replicate error ratio acceptance criteria were met. It should be noted that the replicate analyses for all target analytes *except* Rn-222 were performed on SNL samples of similar matrix from other SDGs. Data will not be qualified.

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

All LCS and/or LCSD recoveries met QC acceptance criteria.

Detection Limits/Dilutions

The sample was not diluted. All required detection limits were met.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan Level: I Date: 06/19/17



Sample Findings Summary



AR/COC: 617850

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 901.1			
	102609-003/MWL-MW8	Americium-241 (14596-10-2)	BD, FR3
	102609-003/MWL-MW8	Cesium-137 (10045-97-3)	BD, FR3
	102609-003/MWL-MW8	Cobalt-60 (10198-40-0)	BD, FR3
	102609-003/MWL-MW8	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	102609-005/MWL-MW8	Tritium (10028-17-8)	BD, FR3
SM 7500 Rn B			
	102609-006/MWL-MW8	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

ARCOC#(s): 617850	Site/Project: MWL GWM		Validation Date: 06/16/2017				
SDG: 422628	Laboratory: GEL Laborator	ies, LLC	Validator: Linda Thal				
Matrix: Aqueous	# of Samples: 10	CVR present: Yes					
ARCOC(s) present: Yes	Sample Container Integrity:	ОК					
Analysis Type: ⊠ Organic ⊠ Metals □ Gencl	nem 🛛 Rad						

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

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

Comments: Collected: 05/08/2017

All 3 vials for sample 422628010 (102610-001) were received with headspace.

Validated by:

& Mal

Sandia Organic Worksheet (GC/MS VOC)

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cis -1,3-Dichloropropylene $+0.51$ \checkmark \land \checkmark \checkmark \checkmark \checkmark \land \checkmark \checkmark \checkmark \checkmark \land \checkmark <t< td=""><td>X5</td><th>34 03</th><td>FB -00</td><td>X5</td><td>TB6 -010</td><td>MS/ MSD RPD</td><td>MSD %R</td><td>MS %R</td><td>LCS %R</td><td>5X (10X) MB</td><td>MB</td><td>CV</td><td>(ICV)/C %D</td><td>RSD/ r²</td><td>RF/ Slope</td><td>Int.</td><td>rs)</td><td>Analy (outlie</td></t<>	X5	34 03	FB -00	X5	TB6 -010	MS/ MSD RPD	MSD %R	MS %R	LCS %R	5X (10X) MB	MB	CV	(ICV)/C %D	RSD/ r ²	RF/ Slope	Int.	rs)	Analy (outlie
trans-1,3-Dichloropropylene+0.60 \checkmark \checkmark \checkmark \checkmark NA \checkmark \checkmark \checkmark NA \checkmark \checkmark \checkmark \checkmark NA \checkmark \checkmark \checkmark \checkmark NA \checkmark \checkmark \checkmark \checkmark \checkmark NA \checkmark \checkmark	NA	-	<u>↓</u> ✓	NA	√	✓	✓	✓	✓	NA	✓		✓	✓	✓	+0.51	ropylene -	cis -1,3-Dichlorop
DichlorodifluoromethaneNA \checkmark \checkmark $+21$ \checkmark NA \checkmark \checkmark \checkmark NA \checkmark 2-HexanoneNA \checkmark \checkmark $+21/+32^1$ \checkmark NA \checkmark \checkmark \checkmark \checkmark NA \checkmark BromoformNA \checkmark \checkmark $+23/+23^1$ \checkmark NA \checkmark \checkmark \checkmark \checkmark NA \checkmark AcetoneNA \checkmark \checkmark $+32^1$ \checkmark NA \checkmark \checkmark \checkmark \checkmark NA \checkmark	NA	/	↓ ✓	NA	✓	✓	✓	\checkmark	~	NA	\checkmark		✓	✓	✓	+0.60	propylene -	trans-1,3-Dichloro
2-HexanoneNA \checkmark \checkmark $+21/+32^1$ \checkmark NA \checkmark \checkmark \checkmark NA \checkmark BromoformNA \checkmark \checkmark $+23/+23^1$ \checkmark NA \checkmark \checkmark \checkmark \checkmark NA \checkmark AcetoneNA \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \land \land	NA	/	↓ ✓	NA	\checkmark	✓	\checkmark	\checkmark	\checkmark	NA	\checkmark		+21	✓	✓	NA	ethane	Dichlorodifluoron
BromoformNA \checkmark \checkmark $+23/+23^1$ \checkmark NA \checkmark \checkmark \checkmark \checkmark NA \checkmark AcetoneNA \checkmark \checkmark $+32^1$ \checkmark NA \checkmark \checkmark \checkmark \checkmark NA \checkmark	NA	/	↓ ✓	NA	✓	✓	~	✓	~	NA	\checkmark	2^{1}	+21/+3	✓	✓	NA		2-Hexanone
Acetone NA \checkmark \checkmark $+32^{1}$ \checkmark NA \checkmark \checkmark \checkmark \checkmark NA \checkmark	NA	<u> </u>	<u>↓</u> ✓	NA	\checkmark	✓	\checkmark	\checkmark	\checkmark	NA	\checkmark	3 ¹	+23/+231		✓	NA		Bromoform
	NA	<i>·</i>	<u>↓</u> ✓	NA	~	✓	\checkmark	✓	\checkmark	NA	\checkmark		ne NA \checkmark \checkmark $+32^1$		Acetone			
2-Butanone NA \checkmark \checkmark +24 ¹ \checkmark NA \checkmark \checkmark \checkmark \checkmark NA \checkmark	NA		<u>↓</u> ✓	NA	✓	~	✓	\checkmark	\checkmark	NA	✓		+241	✓	✓	NA		2-Butanone
										0.41	D							
Surrogate Recovery Outliers				1					5	Outlier	Recover	rrogate	Su					
Sample ID 1,2-DCA-d4 %R Toluene-d8 %R BFB %R Sample ID 1,2-DCA-d4 %R Toluene-d8 %R BFB %R			3 %R	BFB	Toluene-d8 %R		%R	D 1,2-DCA-d4 %R		mple ID	5		BFB %R	%R	oluene-d8	R T	1,2-DCA-d4 %R	Sample ID
None																		None
IS Outliers										`S	IS Outli							
FBZ Chl-d5 1,4-DCB-d4											4-DCB-d	1	5	Chl-d			FBZ	
Sample ID Area RT Area RT										RT	ea	A	RT	ea	Ar	RT	Area	Sample ID
None		-																None
		1																

Comments: HTs OK. MS/MSD -001

ICAL VOA1.I 04/19/2017. Linear: cis and trans-1,3-dichloropropylene

Mass spectra reviewed -002 PCE

-010 had head-space > pea size

¹ associated with the MS/MSD only

Sandia Inorganic Metals Worksheet

ARCOC	ARCOC #(s):): 617850								S	SDG #(s): 422628 Ma					Matrix	: Aqueous		
Laborato	ry Samp	le ID	s: 4220	528005	(Cd, Cr	, Ni, U)												
Method/	Batch #s	: 300	5A/602	20 /1663	233/16	63234												
ICPMS Mass Cal: Pass Fail NA ICPMS Resolution:								Pass	8	🗌 Fail	ι [] NA						
Analyte	yte Calibration 5X MB Blank mg/L (5X Ld			LCS	S MS	DUP	Serial Dil.	ICS AB	ICS A ±MDL ug/L	CRI								
(outliers)	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L		MDL) mg/L	%K	%K	RPD	%D	%R	(x50)	%R			
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 -005 Ca, Mg, Fe, Al < ICS A.

Sandia Radiochemistry Worksheet

ARCOC #(s): 617850 SDG #:422628 Matrix: Aqueous								
Laboratory Sample IDs:422628 – see below								
Method/Batch#s: EPA 901.1 (gammaspec)/1663341 Sample -006								
Method/Batch#s: EPA 900.0/SW846 9310 (gross A/B)/1665158 Sample -007	Method/Batch#s: EPA 900.0/SW846 9310 (gross A/B)/1665158 Sample -007							
Method/Batch#s: SM 7500 Rn B (Rn-222)/1664358 Sample -009								
Method/Batch#s: EPA 906.0 Modified (tritium)/1664463 Sample -008								

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS %R	MS %R	MSD %R	N N R	MS/ ASD RER	Lab Rep. RER	EB1	DIW QC		
None														
				Tracer/Ca	rrier Rec	overy Outl	iers							
Sample ID	Tracer/Ca	arrier %	R	Sample ID	1	Tracer/	Carrier	%R		Sample	ID	Trac	er/Carrier	%R
NA														-

Comments: HTs OK. Matrix QC on another SNL SDG for all except Rn-222 (LCS/LCSD DUP)

Tritium: Parent and dup sample 50ml; MS 25ml; 2X dilution – no data qualified.

Gross A/B: Parent and dup sample 150ml; MS/MSD 50ml; 3X dilution – no data qualified.

.

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

														Page 1 o	of 1
Internal Lab													AR/COC	61	7850
Ratch No NK					SMO Use							A ~]	Waste Characterization		
Decident Nomo:		MW/L GWM / SVM	Date Samples	Shipped:	51813	617		SMO Aut	horization:	œ		smo_	RMA		
Project Name.	lanader:	Timmie Jackson	Carrier/Waybill	No.	12640	123		SMO Col	ntact Phone:		044 2122		Released by COC No.		
Project/Task N	lumber:	195122 10.11.08	Lab Contact:		Edie Kent/84	13-769-738	5		Wendy Pa	iencia/505	-044-3132				4º Celsius
Sonvice Order	umber.	CF01-17	Lab Destinatio	n:	GEL			Send Re	port to SIVIU	: Anntoño/El	15 284 2553	2	Bill to: Sandia National Laborato	ries (Accor	unts Payable),
Service Oraci:			Contract No.:		1303873				Stephanie k	/iontano/st			P O Box 5800, MS-0154		
Toch Area:			1										Albuquerque NM 87185-0154	4	422628
Ruilding:		Room:	Operational	Site:				r		Broconte	Collection	Sample	Parameter & Metho	d	Lab
Bulluling.	<u> </u>	Comple Location	Detail	Depth (ft)	Date/ Colle	Time cted	Sample Matrix	Со Туре	ntainer Volume	ative	Method	Туре	Requested		Sample ID
Sample No.	Fraction		Tectan	497	5/8/17	08:47	GW	G	3x40 ml	нсі	G	SA	VOC-LTMMP (SW846-8260	B)	001
∼ <u>102606</u>	001	MWL-MW8 (5)		497	5/8/17	09:18	GW	G	3x40 ml	нсі	G	SA	VOC-LTMMP (SVV846-8260	D) 	1002
102607 7 102608	001	MW/L FB-4		NA	5/8/17	10:09	DIW	G	3x40 ml	HCI	G	FB	VOC-LIMMP (SVV846-8260	 	1003
102608	001	MIN/L-M/W8		497	5/8/17	10:09	GW	Р	3x40 ml	-	5.5 G	SA	IVOC-LTMMP (SW846-8260 IMETALS, TAL (SW846-602	ир) 0/7470):	009
102609	007	M\\/L_M\\/8		497	5/8/17	10:11	GW	Р	500 ml	HNO3	G	SA	Cd, Cr, Ni, U IGAMMA SPEC, SHORT LI	ST (EPA	005
102009	002			497	5/8/17	10:12	GW	AG	1/L	NONE	G	SA	901)		000
102609	004			497	5/8/17	10:14	GW	AG	1 L	NONE	G	SA	GROSS-ALPHA/BETA (EP	A 900)	1001
102609	005	MWL-MW8		497	5/8/17	10:16	GW	G	250 ml	NONE	G	SA	TRITIUM (EPA 906)		800
× 102609	005			497	5/8/17	10:17	GW	AG	2x40 ml	NONE	G	SA	RADON (SM7500 RH B)	<u></u>	007
102009	000	MWL TB-6		NA	5/8/17	10:09	DIW	G	3x40 ml	нсі	G	TB	VOC-LTMMP (SVV640-620		nditions on
/ 102010	. 1001			Sample	Tracking		SM	O Use	Special In	structions	s/QC Requ	irements.	•		Receipt
Last Cham	Deald:			Date Er	ntered:				EDD		V Yes		45 Dav* 🛛 30-Dav	1.5	
Valluation	Ney u.			Entered	l by:		4		Turnarou	nd Time	U 7-Da	<u>y</u>	10-Day 00 Day	1	
Backgroun	iu.			QC inits	S.:				Negotiate	d TAT	<u> </u>		nt Disposal by La	ы	
Contirmate	<u>J. J. J</u>	Name Si	anature	Init	Compa	ny/Organiz	ation/Pho	ne/Cell	Sample D	isposal				-	
Sample	William	n Gibson TalaMan	Azela	WAX	SNL/0641/	505-284-3	307/505-2	39-7367	Return Sa	amples By	r:	of VOCe (I TMMP list provided by		
Team	Robert	Lynch Califs	ind the	18C	SNL/0641/	/505-844-4	013/505-2	50-7090		S. Report S	eCL aceton	e, toluene	e, or MEK detected > MDL,		
Members	Alfred	Santillanes HILL	still	SNL/0641/505-284-6870/505-228-07					then requ	est reanaly	/sis.				
							1					<u> </u>	Lab Use		
	And a the and the Date of					17 Time	10:4	7 Reling	uished by			OI	rgDate	l ir	ne
Relinquished	d by H	HESOLA KA		Dat	est sti	7 Time	10:47	Receiv	red by			01	rg. Date	<u> 11</u>	
Received by	Tes		019.083		te5/8/1	7 Time	1145	Reling	uished by			0	rg. Date		me
Relinquished	d by 1		Org.	Dal	te 5/9/17	Time	7:30	Receiv	ved by			0	rg. Date	111	

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

CONTRACT VERIFICATION REVIEW FORMS

GROUNDWATER MONITORING

MAY 2017

AR/COC Number	Sample Type
617845	Environmental*
617846	Field Quality Control*
617847	Environmental*
617848	Environmental*
617849	Field Quality Control*
617850	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. 617845, 617846, 617847, 617848 & 617849

Analytical Lab GEL

SDG No. 422295

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	ltom	Com	olete?	If no ovalain
No.	itein	Yes	No	
1.1	All items on ARCOC complete - data entry clerk initialed and dated	Х		
1.2	Container type(s) correct for analyses requested	Х		
1.3	Sample volume adequate for # and types of analyses requested	Х		
1.4	Preservative correct for analyses requested	Х		
1.5	Custody records continuous and complete	Х		
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	х		Sample 102597-001 reported incorrectly as MWL FB-3
1.7	Date samples received	Х		
1.8	Condition upon receipt information provided	Х		

2.0 Analytical Laboratory Report

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

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	Х		
3.2	Quantitation limit met for all samples	Х		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	Х		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	Х		
	c) Matrix spike recovery data reported and met	Х		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	Х		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	Х		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	Х		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	Х		

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	Х		
3.8	Narrative included, correct, and complete	Х		
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	Х		
	b) Initial calibration provided	Х		
	c) Continuing calibration provided	Х		
	d) Internal standard performance data provided	Х		

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

5.0 Data Anomaly Report

Line No.	Item	Yes	No	lf 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			
102597-001	VOCs	Sample location detail incorrect			
Were deficiencies	unresolved? Yes No 				
Based on the revie					
If no, provide nonconformance report or correction request number 19407 and date correction request was submitted: 06-06-2017					
Reviewed by: Wendy Palencia Date: 06-06-2017 08:04:00					
Were resolutions adequate and data package complete? 💿 Yes 🔿 No					
Closed by: Wendy	Closed by: Wendy Palencia Date: 06-08-2017 14:20:00				

Contract Verification Form (CVR)

Project Leader Jackson	Project Name MWL GWM	Project/Task No. 195122_10.11.08
ARCOC No. 617850	Analytical Lab GEL	SDG No. 422628

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	ltom	Comp	olete?	If no ovaloin
No.	nem	Yes	No	ii no, explain
1.1	All items on ARCOC complete - data entry clerk initialed and dated	Х		
1.2	Container type(s) correct for analyses requested	Х		
1.3	Sample volume adequate for # and types of analyses requested	Х		
1.4	Preservative correct for analyses requested	Х		
1.5	Custody records continuous and complete	Х		
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	Х		
1.7	Date samples received	Х		
1.8	Condition upon receipt information provided	Х		All 3 vials for sample 102610-001 (trip blank) received with headspace

2.0 Analytical Laboratory Report

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

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	Х		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	×		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	Х		
	c) Matrix spike recovery data reported and met	Х		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	Х		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	Х		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	Х		

Line No.

3.6

	•		
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	Х		
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	х		

	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			
3.7	Narrative addresses planchet flaming for gross alpha/beta	Х		
3.8	Narrative included, correct, and complete		Х	General narrative did not discuss headspace issue for VOC trip banks
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	Х		
	b) Initial calibration provided	Х		
	c) Continuing calibration provided	Х		

Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	Х		
	e) Instrument run logs provided	Х		
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) lon abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		

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

5.0 Data Anomaly Report

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

Line	Itom	Voo	No	If no exploin
No.	Item	162	INO	ii iio, explain

6.0 Problem Resolution

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

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions			
102610-001	VOCs	Headspace in trip blanks not addressed in narrative			
Were deficiencies	Were deficiencies unresolved? S Yes No				
Based on the review, this data package is complete. O Yes O No					
If no, provide nonconformance report or correction request number 19408 and date correction request was submitted: 06-08-2017					
Reviewed by: Wendy Palencia Date: 06-08-2017 14:28:00					
Were resolutions adequate and data package complete? Yes No 					
Closed by: Wendy Palencia Date: 06-12-2017 07:23:00					

FIELD SAMPLING FORMS

OCTOBER 2017 GROUNDWATER MONITORING

HEALTH & SAFETY MEETING FORM

Dept: Fac.	Date: 10/16/17 Time: 1230						
Activities: Pump Decon (In gill GG25 High Bay) (Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)							
Weather Conditions: Temp: \cancel{PA} °F Wind Speed: \cancel{NA} MPH Humidity: \cancel{NA} Wind Chill: \cancel{PA} °F							
Chemicals Used: \Box None \blacksquare I	Preservatives in sample bottles	□ Other:					
Hospital/Clinic: Sandia Medial Clini	c Bldg. 831	Phone: 911 on LAN; 844-0911 on mobile					
Safety Topics Presented							
☑ Wear safety glasses	□ Wear sunscreen						
☑ Wear safety boots	Wear safety boots If Wear latex or nitrile gloves						
□ Wear hearing protection	Use safe lifting practices	☐ Set up eye wash					
Be aware of biohazards (snakes, spiders, etc.)	s. Wear communication device (radio, cell phone, EOC alert enabled pager)						
Be aware of electrical hazards	☑ Be aware of pinch points	☐ Avoid spilling leachate (hose connections)					
☑ Be aware of pressure hazards	Practice ALARA						
☑ Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	□ Other (list):	□ Other (list):					
Does anyone have any weight restric	tions on lifting? Circle YES or NO.	If answered YES explain.					

Printed Name Willie A Woosh Printed Name Thomas Evans Printed Name Printed Name Printed Name Printed Name Printed Name	Attendees Signature
Printed Name	Signature
	Notes

HEALTH & SAFETY MEETING FORM

Dept: 0641 Faci	ate: 10/17 Time: 8:20 Am					
Activities: <u>Graund Water monitoring and Sampling</u> (Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)						
Weather Conditions: Temp: <u>71 °F</u> Wind Speed: <u>3 MPH</u> Humidity: <u>2 %</u> Wind Chill: <u>71 °F</u>						
Chemicals Used: None Preservatives in sample bottles Hospital/Clinic: Sandia Medial Clinic Bldg. 831 Phone: 911 on LAN; 844-0911 on mobile						
Safety Topics Presented						
Wear safety glasses	U Wear leather gloves	□ Wear sunscreen				
Wear safety boots	Wear latex or nitrile gloves	□ No eating or drinking onsite				
U Wear hearing protection	Use safe lifting practices	□ Set up eye wash				
Be aware of biohazards (snakes, spiders, etc.)	Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary	Wear communication device (radio, cell phone, EOC alert enabled pager)				
Be aware of electrical hazards	Be aware of pinch points	□ Avoid spilling leachate (hose connections)				
Be aware of pressure hazards	□ Notify RCT when using neutron probe					
Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	□ Other (list):	□ Other (list):				
Does anyone have any weight restrictions on lifting? Circle YES o NO. If answered YES explain.						

CHRIS HULLHE	Attendees
Printed Name William Gibson	Signature Signature Signature
Printed Name	- Signature
Printed Name	Signature

HEALTH & SAFETY MEETING FORM

Dept: 0641 Fac	Facility: $MWL^{-}MWq$ Date: $10/18/17$ 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: <u>56 °F</u> Wind Spee	d: <u>~ 2 MPH</u> Humidity: _	32 % Wind Chill: NA %								
Chemicals Used: \Box None \blacksquare	Preservatives in sample bottles	Other:								
Hospital/Clinic: Sandia Medial Clin	ic Bldg. 831 P	hone: 911 on LAN; 844-0911 on mobile								
	Safety Topics Presented									
☑ Wear safety glasses	□ Wear leather gloves	U Wear sunscreen								
U Wear safety boots	✓ Wear latex or nitrile gloves	□ No eating or drinking onsite								
U Wear hearing protection	Use safe lifting practices	□ Set up eye wash								
☑ Be aware of biohazards (snakes, spiders, etc.)	Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary	Wear communication device (radio, cell phone, EOC alert enabled pager)								
☑ Be aware of electrical hazards	Be aware of pinch points	Avoid spilling leachate (hose connections)								
☑ Be aware of pressure hazards	□ Notify RCT when using neutron probe	Practice ALARA								
✓ Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	□ Other (list):	☐ Other (list):								
Does anyone have any weight restri	ctions on lifting? Circle YES or NO. I	f answered YES explain.								

RobertLunch	Attendees	Not the up to
Printed Jame	8	Signature 1 10 5 1 Mg
Printed Jame	÷ -	Signature
William Gibson		William Sila
Printed Name		Signature Signature
Printed Name	0	Signature
Printed Name	N .	Signature
	Notes	

_	HEALTH & SAFETY MEETING	FORM		
Dept: Fa	cility: MWL-MW7 D	ate: 10-23-17 Time:1818		
Activities: Groundwater Monito	pring and Sampling			
(Anyone has the right to cease field	activities for safety concerns. The buddy	y system will be used when needed.)		
Weather Conditions: Temp: <u>56</u> •F Wind Spe	ed: <u>5 MPH</u> Humidity: _	31 % Wind Chill: 56		
Chemicals Used: □ None ☑ Hospital/Clinic: Sandia Medial Clin	Preservatives in sample bottles nic Bldg. 831 Ph	Other: one: 911 on LAN; 844-0911 on mobile		
	Safety Topics Presented			
☑ Wear safety glasses	□ Wear leather gloves	□ Wear sunscreen		
□ Wear safety boots	Wear latex or nitrile gloves	□ No eating or drinking onsite		
□ Wear hearing protection	Use safe lifting practices	Set up eve wash		
Be aware of biohazards	Be aware of slips, trips, and falls	Wear communication device (and in		
(snakes, spiders, etc.)	Keep work area clean and use a step stool when necessary	cell phone, EOC alert enabled pager)		
Be aware of electrical hazards	☑ Be aware of pinch points	Avoid spilling leachate (hose connections)		
☑ Be aware of pressure hazards	□ Notify RCT when using neutron probe	Practice ALARA		
☐ Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	☐ Öther (list):	□ Other (list):		
Does anyone have any weight restrie	ctions on lifting? Circle YES or NO. If a	nswered YES explain.		
RobertLynch	Attendees	tynch		
ALLIS HULLITIER	Signature	RO		
HAF RED SANTILIA	Signature Wil	Mun Jolo		
Thomas Evans	Signatur	Souther -		
nted Name	Signature			
	Notes			
ORTANT NOTICE: A printed conv of this form				

LTS 2015-001 (6/2015)

HEALTH & SAFETY MEETING FORM									
Dept: 0641 Fac	ility: MWL-MW8 D	ate: 10/24/17 Time: 0826							
Activities: Groundwater Monitor	ing and Sampling								
(Anyone has the right to cease field a	activities for safety concerns. The buddy	/ system will be used when needed.)							
Weather Conditions: Temp: <u>55</u> °F Wind Spee	d: <u>13 MPH</u> Humidity: _	31 % Wind Chill: <u>51 °F</u>							
Chemicals Used: 🗆 None 🗹 🛛	Preservatives in sample bottles	Other:							
Hospital/Clinic: Sandia Medial Clini	ic Bldg. 831 Ph	one: 911 on LAN; 844-0911 on mobile							
	Safety Topics Presented								
☑ Wear safety glasses	□ Wear leather gloves	Wear sunscreen							
U Wear safety boots	☑ Wear latex or nitrile gloves	□ No eating or drinking onsite							
□ Wear hearing protection	Use safe lifting practices	□ Set up eye wash							
Be aware of biohazards	\mathbf{M} Be aware of slips, trips, and falls.	Wear communication device (radio,							
(snakes, spiders, etc.)	Keep work area clean and use a step stool when necessary	cell phone, EOC alert enabled pager)							
☑ Be aware of electrical hazards	Be aware of pinch points	Avoid spilling leachate (hose connections)							
☑ Be aware of pressure hazards	□ Notify RCT when using neutron probe	Practice ALARA							
☑ Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay	□ Other (list):	□ Other (list):							
Does anyone have any weight restric	tions on lifting? Circle YES or NO. If a	answered YES explain.							
Printed Name	Attendees	Hynsh							
Prince Annue GIBSON Prince Annue FRED SANTILLE	Signature	Signaphe Stand							
Printed Name CHEIS HOLLIGER Printed Name	Signatur	- HOD							
Printed Name	Signature	olo							
Printed Name	Signature								

LTS 2015-001 (6/2015)

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Notes

Project Name: MUL		
Well I.D.: MILL-BLZ	Date: 10/17/17	
Method: Portable pump X	Dedicated pump	Pump depth: 496

Depth to Water (ft)	Time 24 hr	Vol. (Lgal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pН	Turbidity (NTU)	DO (%)	DO (mg/L)	
481.24	0832	START							>	
484.13	0903	5	19.62	652.4	103.3	7.25	1.58	13-0	1.19	
484.97	0921	10	20.14	653.7	133.4	7.26	1.75	12.8	1.16	
485.63	0938	15	20.62	669.4	1336	7.25	0.91	11.1	1.00	
486.45	0956	20	20.69	674.0	134.7	7.25	1.22	10.0	0-89	
487.25	1010	24	20.90	677.9	83.6	7.24	1.28	12,9	1.15	
487.64	1017	26	20.99	678.8	1037	7.25	2.67	17.5	1.57	
488.03	1024	28	20.99	678.3	119.6	7.25	3.81	21.2	1.89	
488.43	1031	30	20.97	677.1	129.7	7.26	5.55	23.3	2.07	
488.82	1038	32	20.96	676.0	135.0	7.27	4.41	30.4	2.71	
489.15	10 45	34	20.90	674.9	142.6	7.28	3.89	36.5	3.25	
489.49	1052	36	20.86	675.0	140.8	7.29	3.96	39.1	3.49	
489.63	1056	37	20.85	675.0	140.2	7.29	3.72	38.0	3-39	
	1057		SA	mpli	NG					
Comments:	Comments: ~ 1.590 DURGED PROMITURING 0844									
		FB-1	05	7 b	RIdg. 109	TO DIW				

PURGE MEASUREMENTS

Project Name: MWL		
Well I.D.: MWL-MW 7	Date: 10/23/17	
Method: Portable pump X	Dedicated pump	Pump depth: 496'

Depth to Water (ft)	Time 24 hr	Vol (Lgal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pН	Turbidity (NTU)	DO (%)	DO (mg/L)	
498.56	0835	Start							\rightarrow	
491.77	0909	2	19.99	551.0	147.7	7.47	0.87	77.5	7.03	
492.03	0924	4	20.31	555.5	131.4	7.48	2.67	74.9	6.76	
492.11	0932	5	20.56	558.7	123.9	7.48	2.12	74-8	6.71	
492.14	0941	6	20.73	560.8	119.2	7.48	2.03	74.6	6.67	
492.16	0947	7	20.67	560.2	115.4	7.48	1.55	74.3	6.65	
492-18	6955	8	20.63	559.6	110.8	7.48	1.44	73.7	6.60	
492.19	1003	9	20.70	560.5	107.8	7.48	1.28	73.6	6.59	
492.20	[0]]	10	20.83	561.3	107.2	7.48	1.26	72.6	6.56	
492.19	1019	11	20.84	561.6	107.3	7.48	1.20	73.6	6.54	
492.19	1026	12	20.91	561.4	107.7	7.48	1.13	73.6	6.54	
	1027	/	SAM	Dling	ž				\rightarrow	
			V	9	2					
~										
Comments	Comments: 1.5 gals purged from tubing 0853									
FBL	ot # 20	1 (1090	water)							

PURGE MEASUREMENTS

Project Name: MWL		
Well I.D.: MWL-MW 8	Date: 10/24/17	
Method: Portable pump X	Dedicated pump	Pump depth: 497'

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pН	Turbidity (NTU)	DO (%)	DO (mg/L)		
492.33	0843	Start —							->		
493.88	0905	1	17.29	502.5	215.5	7.38	0.38	47.5	4.54		
494,27	0912	2	17.66	516.9	206.7	7.45	0.71	46.8	4.45		
494.67	0919	3	17.99	519.3	200,0	7.47	1.04	47.6	4.50		
495.05	0928	4	18.15	517.4	193.5	7.46	0.80	47.3	4.46		
495.41	0937	5	18.58	533.8	187.9	7.43	1.00	42-1	4.00		
495.69	0944	6	18.82	537.9	182.6	7.43	0.60	43.0	3.99		
495.95	0952	7	19.09	547.9	177.3	7.42	0.85	37:3	3.44		
496.19	1001	8	19.58	548.1	1759	7.42	0.56	31.0	2.84		
496.41	1009	9	19.35	549.0	175.2	7.41	0.55	26.4	2.42		
496.59	1017	10	19.20	550.0	175.1	7.42	0.91	23.1	2.15		
	1018		- 51	AMP)	ng-				\rightarrow		
				l	٥						
Comments:	Comments: ~1.5 gals purged from tubing 0858 FB Lot# 063 1090 PIM										

PURGE MEASUREMENTS

Project Name: MWL		
Well I.D.: MWL-MW 9	Date: 1018/17	
Method: Portable pump X	Dedicated pump	Pump depth: 497'

Depth to Water (ft)	Time 24 hr	Vol (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pН	Turbidity (NTU)	DO (%)	DO (mg/L)
492.23	0830	Start —							
494.39	0905	2	20.72	557.2	296.2	7.25	0.34	37.8	3-38
495.07	0924	4	21.66	573.5	274.4	7.29	0.41	28.9	2.54
495.31	0936	5	21.92	578.0	270.7	7.29	6.35	26.9	2.35
495.47	0947	6	22.10	585.0	266.9	7.29	0.33	23.3	2.02
495.62	1000	7	22.60	593.3	261.5	7.28	0.27	20.3	1.75
495.64	1011	8	22.72	595.0	257.3	7.28	0.63	18.6	1-60
495.72	1025	9	22.87	597.1	254.0	7.28	0.51	17.2	1.48
495.74	1038	10	22.89	598.7	253.8	7.28	0.37	16.3	1.40
495.71	1052	11	22.91	599.1	253.9	7.28	0.46	15.9	1.34
	1053		SAM	pling					\rightarrow
			1	0					
Comments:	~1.5 gals	purged fro	om tubing	0847					
	2	F	B-3+10	90 D I W	069				

PURGE MEASUREMENTS

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: MW	/L					
Calibrations done by: R Lynch			Date: 10/17/17			
Make & Model: EXO 1						
Sonde (S/N) with DO, Ec, pH, C	ORP, and temperature	probes: 16D101	840			
Other (S/N): NA						
		nH Cal	libration/Check			
pH Calibrated to (std): 7 00		par cu	pH sloped to (s	std): 10 00		
Reference value:	- 4	.00		7.00	T	10.00
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0652	3.99	21.4	7.00	21.4	9.99	21.3
2. Time: 1312	4.01	22.9	7.02	23.0	9.94	23.0
3. Time:						
4. Time:						
Standard lot no.:	6GH909		6GG018		6GF797	
	AUG/18		JUL/18		JUN/18	
		SC Cal	ibration/Check			
Reference Value: 1413 uS			Standard Lot N	Io.: 7GG624		
	Value	Temp	Expiration Date	" JUL/18		
1. Time: 0659	1412.9	21.7	EV SUES	Cale States	and the second	11.000.000
2. Time: 1315	1413.1	23.1	14 분원 영상			
3. Time:						
4. 1 ime:						
		ORP Cal	ibration/Check			
Reference Value: 220 mV			Standard Lot No. 7GG707			
	Value	Temp	Expiration Date	APR/18		
1. Time: 0704	220,0	21.5				
2. Time: 1313	219.4	22.9	19-19-29			
3. Time:						
I. Time:						
		DO Cali	bration/Check			
Calibration Value:	81% air saturati	on @ 5200 ft.		Atmosphe	ric Pressure in Hg	
. Time: 6712	82.2		24.1	0		
. Time: 1322	82.3		24	70		
. Time:				φ.		
. Time:						

IMPORTANT NOTICE:

SNL/NM Project Nam	e: MWL						
Calibration done by: R Lynch				Date: 10/17/17			
TURBIDIMETER							
Make & Model: HA(CH 2100Q		Serial N	o. S/N 16040C04	.9087		
Reference Value	10		20	100	800		
Standard Lot No.	A6055	A605	56	A6064	A6104		
1. Time 0834	9.94	2	0-0	101	800		
^{2. Time} 1323	10.3	20	1.4	101	784		
3. Time							
4. Time							
Comments:							

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

IMPORTANT NOTICE:

LTS GW-2012-002 (2-2	015))
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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: MWL						
Calibrations done by: R Lync	Date: 10/18/17					
Make & Model: EXO 1				/		
Sonde (S/N) with DO, Ec, pH, OR	P, and temperature	probes: 16D101	840			
Other (S/N): NA						
		pH Cal	ibration/Check			
pH Calibrated to (std): 7.00			pH sloped to (^{std):} 10.00		
Reference value:	4	1.00		7.00		10.00
	Value	Temp	Value	Temp	Value	Temp
1. Time: 06/9	3.99	21.3	7.00	21.3	9.99	21.4
2. Time: 1312	4.02	23.8	7.02	23.4	9.98	23.5
3. Time:						
4. Time.						
Expiration date:	6GH909		6GG018		6GF797	
	AUG/16		JUL/18		JUN/18	
		SC Cal	ibration/Check			
Reference Value: 1309 uS @	21 C		Standard Lot I	No.: 7GG624		
	Value	Temp	Expiration Dat	^{te:} JUL/18		
1. Time: 0621	1308.8	21.3				
2. Time: 1321	1307.9	23.8				
3. Time:						
4. Time:						
		ORP Ca	libration/Check			
Reference Value: 220 mV			Standard Lot No. 7GG707			
	Value	Temp	Expiration Dat	e: APR/18		
1. Time: 0625	219.8	21.3				
2. Time: 1326	219.8	22.1				6. (FS) - 3
3. Time:						
4. Time:						1
		DO Cali	ibration/Check			
Calibration Value:	81% air satura	ation @ 5200 ft.		Atmosphe	ric Pressure in Hg	
1. Time: 0617	82	.2	24	. 20		
2. Time: 1331	82	· C	35	.74		
3. Time:						
4. Time:						

IMPORTANT NOTICE:

SNL/NM Project Nam	^{le:} MWL							
Calibration done by: R Lynch Date: 10/18/17								
	TURBIDIMETER							
Make & Model: HA(CH 2100Q		Serial No	. s/N 16040C04	9087			
Reference Value	10		20	100	800			
Standard Lot No.	A6055	A60	56	A6064	A6104			
1. Time 065B	9.85	19	. 8	99.9	789			
2. Time 1312	9.93	19	.9	100	800			
3. Time								
4. Time								
Comments:					1			

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

IMPORTANT NOTICE:

GROUNDWATER SAM	IPLE COLLE	CTION FIEL	D EQUIPME	NT CHECK L	OG Pag	e 1 of 2
SNL/NM Project Name: MWL						
Calibrations done by: C. Hull	iger 7.4	EVAns	Date: 10/23	/17		
Make & Model: YSI Exo 1						
Sonde (S/N) with DO, Ec, pH, OR	P, and temperature	probes: 16D101	840			
Other (S/N):						
4		pH Cal	ibration/Check			
pH Calibrated to (std):			pH sloped to (s	std):		
Reference value:	4.	.00	7	7.00		10.00
	Value	Temp	Value	Temp	Value	Temp
1. Time: 06:32	4,01	22.3	7.0	21.6	9.9.9	21,4
2. Time: 12:30	4.03	22.13	7.0	22.01	9.99	22.14
3. Time:						
4. Time:						
Standard lot no.:	6GH909		7GG488 6GF797			
Expiration date:	AUG/18		JUL/19		JUN/18	
		SC Cali	bration/Check			
Reference Value: 1309@21c			Standard Lot N	Io.: 7GC297		
	Value	Temp	Expiration Date	* MAR/18		
1. Time: 06:4/3	1304.4	21.7		10,110		
2. Time: 12:35	13112 1	22.3				
3. Time:	1.5/0-0					
4. Time:						
		ORP Cal	ibration/Check			
Reference Value: 220mV			Standard Lot N	•. 7GG707		
	Value	Temp	Expiration Date	APR/18		
1. Time: 06:45	219.9	21.9	1955-151-1	741010		
2. Time: 12:37	219.2	22.2				
3. Time:			1.1.241			19 19 19 19
4. Time:						
		DO Cali	bration/Check			
Calibration Value:	81% air saturat	ion @ 5200 ft.		Atmospher	ic Pressure in Hg	
1. Time: 06:27 66:48	82.3	3	24	.64		
2. Time: 12:41	82.2	7	2	1.64		
3. Time:						

IMPORTANT NOTICE:

4. Time:

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

SNL/NM Project Nam	e: MWL					
Calibration done by: C. Hulliger				23/17		
TURBIDIMETER						
Make & Model: HA(CH 2100Q		Serial No.	^{s/N} 10060C0030)35	
Reference Value	10		20	. 100	800	
Standard Lot No.	A6055	A605	56	A6064	A6104	
1. Time 0623	9.88	20.0		100	796	
2. Time 1045	10.2	19.2	2	101	795	
3. Time						
4. Time						
Comments:	1	1				

IMPORTANT NOTICE:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: MWL						
Calibrations done by: C. Hulliger Date: 10/24/17						
Make & Model: YSI Exo 1						
Sonde (S/N) with DO, Ec, pH, OR	P, and temperature	probes: 16D10	1840			
Other (S/N):						
		рН Са	libration/Check			
pH Calibrated to (std):			pH sloped to (st	d):		
Reference value:	4	.00	7.	00		10.00
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0.020	4.00	21.9	7.01	21.8	9.98	21.7
2. Time: 12.55	4.04	21.4	700	21.6	9.93	21.6
3. Time:						
4. Time:						
Expiration date:	6GH909		7GG488		6GF797	
	A00/10				JUN/18	
		SC Ca	ibration/Check			
Reference Value: 1309@21c	;		Standard Lot No	o.: 7GC297		
	Value	Temp	Expiration Date:	MAR/18		
1. Time: 0629	1321	22.1				
2. Time: 1304	1311	21.6				
3. Time:						
4. 11me:					57 N. C.M.	
		ORP Ca	libration/Check			
Reference Value: 220mV			Standard Lot No	- 7GG707		
	Value	Temp	Expiration Date:	APR/18		
1. Time: 0631	218.9	21.9	1.0.1			
2. Time: 1305	219.7	21.7				
3. Time:						11. N. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.
4. Time:						
		DO Cal	ibration/Check			
Calibration Value:	81% air satura	tion @ 5200 ft.		Atmosphe	ric Pressure in Hg	
1. Time: 0635	\$2	7	2	4.44		
2. Time: 1254	\$2.3	3	2	4.50		
3. Time:				1		
4. Time:						

IMPORTANT NOTICE:

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

SNL/NM Project Nam	e: MWL					
Calibration done by: C. Hulliger Date: 10/24/17						
TURBIDIMETER						
Make & Model: HA(CH 2100Q		Serial No.	^{s/N} 10060C0030	35	
Reference Value	10		20	100	800	
Standard Lot No.	A6055	ALOD	56	ALODIOY	A6104	
1. Time 0152	9.72	20	D	101	804	
2. Time 1250	10.8	22	.3	106	794	
3. Time						
4. Time						
Comments:						

IMPORTANT NOTICE:

Project Name: MWL	Monitoring Well ID # :	Pre-Decon		Date: 10-16-17			
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03							
Pump and Tubing Bundle ID #: 1806-814		Water Level Indicator ID #: NA					
Personnel Performing Decontamination: Robert Lynch Print Name: William Gibson Print Name:		Initial: Initial Initial					
	Condition	of Equipment					
Pump: Excellent Tul	bing Bundle: Exceller	nt	Water Level Indicator:	θ			
	List of Deconta	mination Materials					
Deonized Water			HNO ₃				
Deomized Water		Grade:	Reagent				
Source: 1090		UN #:	2031				
Lot Number: 023,042,019,002,041	,063	Manufacturer:	ACROS				
		Lot Number:	A0358899				

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Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: MWL-GWM	Monitoring Well ID # : MWL-BW2			Date: 10/17/17			
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03							
Pump and Tubing Bundle ID #: 1806-814	ater Level Indi	dicator ID #: 210272					
Personnel Performing Decontamination: Robert Lynch Print Name: William Gibson Print Name:		Initial: Initial: Initial:					
	Condition of E	Quipment					
Pump: Excellent Tubi	ing Bundle: Excellent		Water Level Indicator:	bod			
	List of Decontamina	ation Materials					
Despired Wester			HNO ₃				
Deonized water		Grade:	Reagent				
Source: Culligan		UN #:	2031				
Lot Number: /0 - 11 - 17	Ma	anufacturer:	ACROS				
	L	ot Number:	A0358899				

Project Name: MWL-GWM	Monitoring Well ID # : MWL-MWS)	Date: 10/18/17				
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03							
Pump and Tubing Bundle ID #: 1806-814 Water Level Indicator ID #: 210272							
Personnel Performing Decontamination: Robert Lynch Print Name: Alfred Santillanes Print Name:	The Initial:						
Excellent	Condition of Equipment		_				
Pump: Tubi		_ Water Level Indicator:	bod				
	List of Decontamination Materials						
Deonized Water		HNO ₃					
2017 10/10/17 (UII	igan Grade:	Reagent					
Source: Culligar Bldg. 10	090 UN #:	2031					
Lot Number: 069,058,031,029	003,052 Manufacturer:	ACROS					
10/14/17	Lot Number:	A0358899					

Project Name: MWL-GWM	Monitoring Well ID # : MWL-MW7	7 Date: _1(0/23/17			
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03						
Pump and Tubing Bundle ID #: 1806-814	Water Level Ind	Water Level Indicator ID #: 210272				
Personnel Performing Decontamination:						
Chris Hulliger	CAS					
Print Name:	Initial:					
Print Name:	my h					
	Initial(/ /					
Condition of Equipment						
Pump: Excellent Tubi	ng Bundle: Excellent	Water Level Indicator: GOOD				
List of Decontamination Materials						
Deonized Water		HNO ₃				
	Grade:	Reagent				
Source: 1090 DIW	UN #:	2031				
Lot Number: 069,058,031,029,0	<u>U3, 05</u> 2 Manufacturer:	ACROS				
	Lot Number:	A0358899				

Project Name: MWL-GWM	Monitoring Well ID # : MWL-MW8			Date: 10/24/17		
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03						
Pump and Tubing Bundle ID #: 1806-814		Water Level Indicator ID #: 210272				
Personnel Performing Decontamination: Tom Evans Print Name: Robert Lynch Print Name:		TE Initial: TU Initial:				
Condition of Equipment Pump: Excellent Tubing Bundle: Excellent Water Level Indicator: Good						
List of Decontamination Materials						
Deonized Water		HNO ₃				
		Grade:	Reagent			
Source: Culligan		UN #:	2031			
Lot Number: 10/11/17		Manufacturer:	ACROS			
		Lot Number:	A0358899			

SUMMARY SHEET FOR

OCTOBER 2017 GROUNDWATER SAMPLES
Sample Summary for October 2017 Mixed Waste Landfill Groundwater Monitoring

					Associated Equipment	Associated Trip	Associated Field	
	Sample		Sample		Blank	Blank (ARCOC # /	Blank (ARCOC # /	
Well ID	Date	ARCOC	Number	Sample Type	(ARCOC #/Sample #)	Sample #)	Sample #)	Comments
GEL Analytic								
MWL-BW2	17-Oct-17	618263	103885	Environmental	n/a	618263 / 103886	618263 / 103884	
MWL-MW7	23-Oct-17	618264	103888	Environmental	n/a	618264 / 103889	618264 / 103887	
MWL-MW8	24-Oct-17	618259	103894	Environmental	618260 / 103897	618259 / 103896	618259 / 103893	
MWL-MW8	24-Oct-17	618259	103895	Duplicate	618260 / 103897	618259 / 103896	618259 / 103893	
MWL-MW9	18-Oct-17	618258	103891	Environmental	n/a	618258 / 103892	618258 / 103890	
MWL EB-1	23-Oct-17	618260	103897	Equipment Blank	n/a	618260 / 103898	n/a	Equipment blank sample prior to MWL-MW8.
MWL QC/DIW	23-Oct-17	618261	103899	DIW QC	n/a	618261 / 103900	n/a	DIW - source water for EB-1
MWL FB-1	17-Oct-17	618263	103884	Field Blank	n/a	618263 / 103886	n/a	at MWL-BW2
MWL FB-2	23-Oct-17	618264	103887	Field Blank	n/a	618264 / 103889	n/a	at MWL-MW7
MWL FB-3	18-Oct-17	618258	103890	Field Blank	n/a	618258 / 103892	n/a	at MWL-MW9
MWL FB-4	24-Oct-17	618259	103893	Field Blank	n/a	618259 / 103896	n/a	at MWL-MW8

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

GROUNDWATER MONITORING

OCTOBER 2017

AR/COC NUMBERS 618259, 618260, 618261, 618264



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

Memorandum

Date:	November 30, 2017
То:	File
From:	Linda Thal
Subject:	GC/MS Organic Data Review and Validation – SNL Site: MWL GWM ARCOC: 618259, 618260, 618261 and 618264 SDG: 436011 Laboratory: GEL Project/Task: 195122.10.11.08 Analysis: VOCs

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

Summary

Eleven 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. Acetone was detected at ≤ the PQL in EB1, sample 436011030, associated with samples -017 and -023. The acetone result for sample -023 was a detect ≤ the PQL and will be **qualified 10U,B2**, non-detect at the PQL.

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

Holding Times

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. For the ICAL associated with samples -001, -002, -008, -009, -015 and -030, the intercepts were > the MDL and

positive for dibromochloromethane and bromoform. The associated sample results were non-detect and will not be qualified.

Blanks

No target analytes were detected in any of the blanks except as noted above in the Summary section and as follows. Acetone and toluene were detected at \leq the PQL in EB1, sample -030, associated with samples -017 and -023. All associated sample results, *except* the acetone result for sample -023, were non-detect and will not be qualified.

Acetone was detected at the PQL in FB2, sample -001 associated with sample -002. The associated sample result was 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 with the following exceptions. The MS and/or MSD recoveries were > the upper acceptance limit for ten target analytes (see attached WS). The associated sample results were non-detect and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Mass spectra were verified during data validation.

Four TBs were submitted, one for each ARCOC. FB2 and FB4 were submitted with ARCOCs 618264 and 618259 and were associated with the samples on their respective ARCOCs. EB1 was submitted with ARCOC 618260 and was associated with the samples on ARCOC 618259. A distilled water sample, the source water for EB1, was submitted with ARCOC 618261 and was not associated with any field samples. A field duplicate pair was submitted with ARCOC 618259. 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 DonivanLevel: IDate: 11/30/17



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.aqainc.net

Memorandum

Date:	November 30, 2017
То:	File
From:	Linda Thal
Subject:	Inorganic Data Review and Validation – SNL Site: MWL GWM ARCOC: 618259, 618260, 618261 and 618264 SDG: 436011 Laboratory: GEL Project/Task: 195122.10.11.08 Analysis: Metals

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

Summary

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

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tune met QC acceptance criteria.

Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

Reporting Limit Verification

All LLCCV recoveries met QC acceptance criteria.

<u>Blanks</u>

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

EB1 was submitted with ARCOC 618260 and was associated with the samples on ARCOC 618259. A distilled water sample, the source water for EB1, was submitted with ARCOC 618261 and was not associated with any field samples. A field duplicate pair was submitted with ARCOC 618259. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan Level: I Date: 11/30/17



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

Memorandum

Date:	November 30, 2017	
	,	

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL Site: MWL GWM ARCOC: 618259, 618260, 618261 and 618264 SDG: 436011 Laboratory: GEL Project/Task: 195122.10.11.08 Analysis: RAD

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

<u>Summary</u>

Five samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list), EPA 900.0 (gross alpha/beta), SM 7500 Rn B (Radon-222) and EPA 906.0 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.**

Radon-222:

1. The sample results which were > the MDA but $\leq 3X$ the MDA will be **qualified J,FR7**.

Gross Alpha/Beta:

1. The relative dilution factor between the parent sample and the gross alpha/beta MS/MSD QC samples was >5 and, as a result, the MS/MSD analyses were not used to evaluate gross alpha and gross beta sample data. The associated sample results that were ≥ the MDA will be **qualified J,MS1** and those that were < the MDA will be **qualified BD,MS1**.

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 except as noted above in the Summary section. It should be noted that the MS/MSD analyses for gross A/B and tritium were performed on SNL samples of similar matrix from other SDGs. No data will be qualified.

Laboratory Replicate

All replicate error ratio acceptance criteria were met. It should be noted that the replicate analyses for gross A/B and tritium were performed on SNL samples of similar matrix from other SDGs. No data will be qualified.

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

All LCS and/or LCSD recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

EB1 was submitted with ARCOC 618260 and was associated with the samples on ARCOC 618259. A distilled water sample, the source water for EB1, was submitted with ARCOC 618261 and was not associated with any field samples. A field duplicate pair was submitted with ARCOC 618259. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan Level: I Date: 11/30/17





AR/COC: 618259, 618260, 618261, 618264

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	103888-004/MWL-MW7	ALPHA (12587-46-1)	J, MS1
	103888-004/MWL-MW7	BETA (12587-47-2)	J, MS1
	103894-004/MWL-MW8	ALPHA (12587-46-1)	J, MS1
	103894-004/MWL-MW8	BETA (12587-47-2)	J, MS1
	103895-004/MWL-MW8	ALPHA (12587-46-1)	J, MS1
	103895-004/MWL-MW8	BETA (12587-47-2)	J, MS1
	103897-004/MWL EB-1	ALPHA (12587-46-1)	BD, FR3,MS1
	103897-004/MWL EB-1	BETA (12587-47-2)	BD, FR3,MS1
	103899-004/MWL QC/DIW	ALPHA (12587-46-1)	BD, FR3,MS1
	103899-004/MWL QC/DIW	BETA (12587-47-2)	BD, FR3,MS1
EPA 901.1			
	103888-003/MWL-MW7	Americium-241 (14596-10-2)	BD, FR3
	103888-003/MWL-MW7	Cesium-137 (10045-97-3)	BD, FR3
	103888-003/MWL-MW7	Cobalt-60 (10198-40-0)	BD, FR3
	103888-003/MWL-MW7	Potassium-40 (13966-00-2)	BD, FR3
	103894-003/MWL-MW8	Americium-241 (14596-10-2)	BD, FR3
	103894-003/MWL-MW8	Cesium-137 (10045-97-3)	BD, FR3
	103894-003/MWL-MW8	Cobalt-60 (10198-40-0)	BD, FR3
	103894-003/MWL-MW8	Potassium-40 (13966-00-2)	BD, FR3
	103895-003/MWL-MW8	Americium-241 (14596-10-2)	BD, FR3
	103895-003/MWL-MW8	Cesium-137 (10045-97-3)	BD, FR3
	103895-003/MWL-MW8	Cobalt-60 (10198-40-0)	BD, FR3
	103895-003/MWL-MW8	Potassium-40 (13966-00-2)	BD, FR3
	103897-003/MWL EB-1	Americium-241 (14596-10-2)	BD, FR3

AR/COC: 618259, 618260, 618261, 618264

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	103897-003/MWL EB-1	Cesium-137 (10045-97-3)	BD, FR3
	103897-003/MWL EB-1	Cobalt-60 (10198-40-0)	BD, FR3
	103897-003/MWL EB-1	Potassium-40 (13966-00-2)	BD, FR3
	103899-003/MWL QC/DIW	Americium-241 (14596-10-2)	BD, FR3
	103899-003/MWL QC/DIW	Cesium-137 (10045-97-3)	BD, FR3
	103899-003/MWL QC/DIW	Cobalt-60 (10198-40-0)	BD, FR3
	103899-003/MWL QC/DIW	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	103888-005/MWL-MW7	Tritium (10028-17-8)	BD, FR3
	103894-005/MWL-MW8	Tritium (10028-17-8)	BD, FR3
	103895-005/MWL-MW8	Tritium (10028-17-8)	BD, FR3
	103897-005/MWL EB-1	Tritium (10028-17-8)	BD, FR3
	103899-005/MWL QC/DIW	Tritium (10028-17-8)	BD, FR3
SM 7500 Rn B			
	103888-006/MWL-MW7	Radon-222 (14859-67-7)	J, FR7
	103894-006/MWL-MW8	Radon-222 (14859-67-7)	J, FR7
	103897-006/MWL EB-1	Radon-222 (14859-67-7)	BD, FR3
	103899-006/MWL QC/DIW	Radon-222 (14859-67-7)	BD, FR3
SW846 8260B DOE-AL			
	103895-001/MWL-MW8	Acetone (67-64-1)	10U, B2

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

Sandia Data Validation Summary Worksheet

ARCOC#(s): 618259, 618260, 618261 and 618264	Site/Project: MWL GWM	Validation Date: 11/30/2017				
SDG: 436011	Laboratory: GEL Laborator	ies, LLC	Validator: Linda Thal			
Matrix: Aqueous	# of Samples: 36	CVR present: Yes				
ARCOC(s) present: Yes	Sample Container Integrity: OK					
Analysis Type: ⊠ Organic ⊠ Metals	iem 🛛 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: 10/23 and 10/24/2017

According to the case narrative and emails: Samples 436011008(103889-001) and 436011029(103896-001) were received with two of three vials with headspace and samples 436011015(103900-001) and 436011036(103898-001) were received with all three vials with headspace.

According to the sample receipt form: Sample 436011015(103900-001) was received with headspace in two of three vials

Validated by:

& Mal

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #(s): 618259, 618260, 618261 and 618264							36011							Matrix: Aqu	ieous	
Laboratory Sample IDs: 4	36011001,	-002,	-008, -009	, -015,	-016, -017, -023,	-029, -030,	, -036									
Method/Batch #s:8260B/1	1715347					Tuning	Tuning (pass/fail):pass					TICs Re	equired?	(yes/no):no		
	ion															
Analyte (outliers)		Int.	RF/ Slope	RSD/ r ²	(ICV)/CCV %D	MI	B (102 MI	(X) 3	LCS %R	MS %R	MSD %R	MS/ MSD RPD	FB2 -001	TB2 -008 TB6 -015	DIW QC -009	EB1 -030
VOA6.I 10/19/2017		-00)1, -002, -	008, -0	09, -015, -030, M	S/MSD										
Dibromochloromethane		+.69	✓	✓	✓	✓	Í NA	1	\checkmark	~	✓	✓	✓	\checkmark	✓	\checkmark
Bromoform		+.88	✓	✓	✓	✓	Í NA	1	✓	\checkmark	✓	✓	✓	✓	✓	✓
Toluene		NA	✓	✓	✓	√	Í NA	1	✓	\checkmark	✓	✓	✓	✓	✓	.32J
Acetone		NA	✓	✓	✓	√	Í NA	1	✓	\checkmark	✓	✓	2.57J	✓	✓	3.74J
1,1,1-Trichloroethane		NA	✓	✓	✓	√	Í NA	1	✓	144	✓	✓	✓	√	✓	\checkmark
1,1-Dichloroethane		NA	$\mathbf{N}\mathbf{A}$ \checkmark \checkmark \checkmark				Í NA	1	✓	130	✓	✓	✓	✓	✓	\checkmark
1, 1-Dichloroethylene		NA	✓	✓	✓	√	Í NA	1	✓	138	136	✓	✓	√	✓	\checkmark
1, 2-Dichloroethane		NA	✓	✓	✓	√	Í NA	1	✓	144	136	✓	✓	✓	✓	✓
Bromodichloromethane		NA	✓	✓	✓	√	Í NA	1	✓	145	139	✓	✓	✓	✓	\checkmark
Carbon tetrachloride		NA	✓	✓	✓	√	Í NA	1	✓	153	148	✓	✓	✓	✓	✓
Chloroform		NA	✓	✓	✓	√	Í NA	1	✓	134	✓	✓	✓	√	✓	\checkmark
Methylene chloride		\checkmark	✓	✓	✓	√	Í NA	1	✓	126	124	✓	✓	√	✓	\checkmark
cis-1, 2-Dichloroethylene		NA	✓	✓	✓	√	Í NA	1	✓	132	128	✓	✓	✓	✓	\checkmark
trans-1, 2-Dichloroethylen	ie	NA	✓	✓	✓	√	Í NA	1	✓	133	131	✓	✓	✓	✓	\checkmark
VOAAT 10/20/2017		01	(017/M	GAICD	Domont) 022 (20 026							FB4	TB4	TB5	
VOA4.1 10/29/2017		-01	0, -01 7(1 01)	5/1VISD	Parent), -023, -0	129, -030							-010	-029	-030	
none					Surro	gate Recov	very Outl	iers			[[
Sample ID 1,2-D	CA-d4 %R	Т	oluene-d8 '	%R	BFB %R	_	Sample	ID	1,2-	-DCA-d4	%R	Toluene-	d8 %R	BFB %I	R	
None																
					·	IS Ou	utliers								•	
	FBZ			Chl-o	d5	1,4-DC	B-d4									
Sample ID A	rea	RT	Are	ea	RT	Area	RT									
None																

Comments: HTs OK. MS/MSD -017. Mass spectra validated

ICAL VOA6.I 10/19/2017. Linear: MeCl2, dibromochloromethane, bromomethane. ICAL VOA4.I 10/29/2017 All avg RF

Sandia Inorganic Metals Worksheet

ARCOC	ARCOC #(s): 618259, 618260, 618261 and 618264										SDG #(s): 436011				Matrix: Aqueous				
Laborato	ory Samp	ole ID	s: 4360	011003,	-010, -	018, -024, -	031												
Method/	Batch #s	: 300	5A/602	20 /1713	866/171	13868													
ICPMS M	lass Cal:		Pass	🗌 Fail	I [NA I	CPMS R	esolution:	🛛 Pas	s	🗌 Fail	. [NA						
Analyte	Calibration					MB Blank mg/((5y LC	LCS	CS MS	DUP Serial Dil	ICS A ICS ±MDL AB ug/L	ICS A ±MDL ug/L	LLCCV EB1	EB1	X5	DIW OC	X5			
(outliers)	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L		MDL) %I mg/L	%K	K %0K	RPD	%D	%R	(x50)	%K	-031		-010	
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 -003 Ca, Mg, Fe, Al < ICS A.

Sandia Radiochemistry Worksheet

ARCOC #(s): 618259, 618260, 618261 and 618264	SDG #:436011	Matrix: Aqueous					
Laboratory Sample IDs:436011 – see below							
Method/Batch#s: EPA 901.1 (gammaspec)/1717928 Samples -004, -011, -019, -025, -032							
Method/Batch#s: EPA 900.0/SW846 9310 (gross A/B)/1714195 Samples -005, -012, -020, -026, -033							
Method/Batch#s: SM 7500 Rn B (Rn-222)/1712415 Samples -007, -014, -022, -028, -035							
Method/Batch#s: EPA 906.0 Modified (tritium)/1713790 Samples -006, -013, -021, -027, -034							

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS %R	MS %R	MSD %R	I N F	MS/ MSD RER	Lab Rep. RER	EB1	X5	DIW QC	X5
None														
				Tracer/Ca	rrier Rec	overy Outl	iers							
Sample ID	Tracer/Ca	arrier %	R	Sample ID	1	Tracer/	Carrier	%R		Sample	ID	Trac	er/Carrier	%R
NA									ļ					

Comments: HTs OK. Matrix QC on this SDG for all except A/B and tritium

Tritium: Parent and dup sample 50ml; MS 25ml; 2X dilution – no data qualified.

Gross A/B: Parent and dup sample 150ml; MS/MSD 25ml; 6X dilution -data qualified.

Internal Lab																Page 1	of 2
Batch No.						SMO Use									AR/COC	61	18259
Project Name:		MWL GWN	M/SVM	Date Sample	es Shipped	10-24	.17		SMO A	uthorization:	10-72			🗆 Was	te Characterization	lassociation and	
Project/Task N	/lanager:	Timmie Ja	ckson	Carrier/Way	bill No.	2735	514		SMO C	ontact Phone	9:		 		\		
Project/Task N	lumber:	195122.10	.11.08	Lab Contact	:	Edie Kent/8-	43-769-738	35		Wendy Pa	alencia/50	5-844-3132		C Rele	ased by COC No.		
Service Order:	:	CF01-18		Lab Destinal	tion:	GEL			Send R	eport to SMC	D:		*****	1	•	Ø	4º Celsius
				Contract No.	:	1303873				Stephanie	Montaño/5	05.284.255	3	Bill to: San	dia National Laborato	ries (Acco	ounts Payable)
Tech Area:														P.O. Box 58	300, MS-0154		1
Building:		Room:		Operation	al Site:									Albuquerqu	e, NM 87185-0154	4	:36011
					Depth	Date/	Time	Sample	C	ontainer	Preserv-	Collection	Sample	Pa	arameter & Metho	d	Lab
Sample No.	Fraction	Sar	mple Location D	etail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре		Requested		Sample ID
103893	001	MWL FB-	4		NA	10/24/17	10:18	DIW	G	3x40 ml	нсі	G	FB	VOC-LTM	MP (SW846-8260)	3)	Olb
103894	001	MWL-MW	/8		497	10/24/17	10:18	GW	G	3x40 ml	нсі	G	SA	VOC-LTM	MP (SW846-8260)	3)	017
103894	002	MWL-MW	/8		497	10/24/17	10:20	GW	Р	500 ml	HNO3	G	SA	METALS,	LTMMP - Cd, Cr, I	4i, U	1518
103894	003	MWL-MW	/8		497	10/24/17	10:24	GW	Р	1 L	HNO3	G	SA	GAMMA S 901)	SPEC, SHORT LIS	T (EPA	019
103894	004	MWL-MW	/8	1997 - 1891 - 1911 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 -	497	10/24/17	10:28	GW	Р	1 L	HNO3	G	SA	GROSS-A	LPHA/BETA (EPA	900)	020
103894	005	MWL-MW	/8		497	10/24/17	10:32	GW	AG	250 ml	NONE	NE G SA TRITIUM (EPA 906)					021
103894	006	MWL-MW	/8		497	10/24/17	10:34	GW	G	2x40 ml	NONE	G	SA RADON (SM7500 Rn				022
103895	001	MWL-MW	/8		497	10/24/17	10:18	GW	G	3x40 ml	НСІ	G	DU	VOC-LTM	MP (SW846-8260E	3)	023
103895	002	MWL-MW	/8		497	10/24/17	10:20	GW	Р	500 ml	HNO3	G	DU	METALS,	LTMMP - Cd, Cr, N	√i, U	024
103895	003	MWL-MW	/8		497	10/24/17	10:24	GW	Р	1L	HNO3	G	DU	GAMMA S 901)	PEC, SHORT LIS	Г (EPA	025
Last Chain:		Yes			Sample	Tracking		SMO	Use	Special Ins	tructions/	QC Requir	ements:			Conc	litions on
Validation R	eq'd:	Yes			Date Ent	ered:				EDD		Yes				R	eceipt
Background	:	Yes			Entered	by:				Turnaroun	d Time	D 7-Day	• 0	15-Day*	☑ 30-Day		
Confirmator	y:	Yes			QC inits.	:				Negotiated	TAT						
Sample	N	ame	Signatu	ire 🔪	Init.	Company	/Organizat	tion/Phone	e/Cell	Sample Dis	sposal	Return	to Client	Ø	Disposal by Lab		
Team	Robert L	ynch	faltym	yr-	SNL/00641/505-844-4013/505-250-7090 Return Samples By:												
Members	William (Sibson	Willing	fill	WIA	SNL/00641/5	505-239-73	867/505-23	9-7367	Comments:							
	Alfred Sa	ntillanes	Hlfgl Sa	<u>ril-</u>	- Cot	SNL/00641/5	505-284-68	370/505-22	28-0710								
	Thomas	Evans	1 Agert Se	535	72	AIS/00641/5	05-284-080	04									
	Chris Hu	lliger	CLAS		icis-	AIS/00641/5	05-284-330	09/505-382	2-0353	<u> </u>	·····	·····				La	b Use
Relinquished b	y /ag	morenze	<u>></u>	Urg. OGM	Date 10/24/17 Time 103 Relinquished by Org. Date						Time						
Polinguiched by Org. Org. Org. Date (0'A'') I'lime (103) [Received by Org. Date Time						Time											
Received by	y Tom			Org. 06 5	Date	10.24.1		<u> 2001</u>	Kelinqui	shed by			Org.		Date	Time	
Inteceived by		511-	······································	Org.	Date	10-23-1	I Ime 7	1:50	Receive	d by			Org.		Date	Time	

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

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

Project Name:		MWL GWM / SVM	Project/	Task Mana	ger:	Timmie Ja	ckson		Project/Ta	sk No.:	195122	2 10 11 08		
Tech Area:					Manual				1					
Building:		Room:												Lab use
Sample No.	Fraction	Sample Locatio	n Detail	Depth (ft)	Date/ Colle	Time ected	Sample Matrix	Co Type	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample II
103895	004	MWL-MW8		497	10/24/17	10:28	GW	Р	1 L	ниоз	G	DU	GROSS-ALPHA/BETA (EPA 900)	026
103895	005	MWL-MW8		497	10/24/17	10:32	GW	AG	250 ml	NONE	G	DU	TRITIUM (EPA 906)	027
103895	006	MWL-MW8		497	10/24/17	10:34	GW	G	2x40 ml	NONE	G	DU	RADON (SM7500 Rn B)	128
103896	001	MWL-TB4		NA	10/24/17	10:18	DIW	G	3x40 ml	нсі	G	ТВ	VOC-LTMMP (SW846-8260B)	029
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Internal Lab														i	Page 1	of 1
Batch No. N/	'A				SMO Use	,					10	\mathcal{O}		AR/COC	61	8260 -
Project Name:		MWL GWM / SVM	Date Sample	es Shipped:	10/24	1/17		SMO A	uthorization	2/	17	<u></u>	U Was	te Characterization	58312122903953555555555	
Project/Task N	/lanager:	Timmie Jackson	Carrier/Way	bill No.	2735	14		SMO C	ontact Phone	e:		GAME				
Project/Task N	lumber:	195122.10.11.08	Lab Contact		Edie Kent/84	13-769-738	5		Wendy Pa	alencia/50	5-844-3132	10.00	C Rele	ased by COC No.		
Service Order:	:	CF01-18	Lab Destinal	ion:	GEL			Send R	eport to SMC):	****		1	•	Q	4º Celsius
		······	Contract No.		1303873]	Stephanie I	Montaño/5	05.284.255	3	Bill to: San	dia National Laboratori	es (Acco	unts Payable
Tech Area:												*****	P.O. Box 58	00, MS-0154		122
Building:	work	Room:	Operation	al Site:									Albuquerqu	e, NM 87185-0154		1360]
Sample No.	Fractior	Sample Location D	etail	Depth (ft)	Date/7 Colled	lime Cted	Sample Matrix	Co Type	ontainer Volume	Preserv- ative	Collection Method	Sample	Pa	rameter & Method Requested	i	Lab Sample II
103897 -	001	MWL EB-1		NA	10/23/17	13:13	DIW	G	3x40 ml	- HCI -	G	EB	VOC-LTM	MP (SW846-8260B	.) ,	1030
103897	002 /	MWL EB-1		NA	10/23/17	13:14 /	DIW	P <	500 ml	HNO3	G	EB	METALS,	LTMMP - Cd, Cr, N	i, U 🦟	131
103897	003⁄	MWL EB-1		NA	10/23/17	13:15	DIW	Р	1L -	HNO3	G	EB	GAMMA S	PEC, SHORT LIST	(EPA	032
103897	004 🗸	MWL EB-1		NA	10/23/17	13:17	DIW	Р	11.~	HNO3	G	EB	GROSS-A	LPHA/BETA (EPA	900)	035
103897	005 🧹	MWL EB-1		NA	10/23/17	13:19 -	DIW	AG-	250 ml 1	NONE	G	EB	TRITIUM	EPA 906)		034
103897	006 🦯	MWL EB-1		NA	10/23/17	13:20 <	DIW	G	2x40 ml	NONE	G	EB	RADON (S	SM7500 Rn B) 🦟		035
103898 🦟	001 C	MWL TB-5		NA	10/23/17	13:13	DIW	G	3x40 ml 4	- HCI	G	ТВ	VOC-LTM	MP (SW846-8260B))~	036
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and the second				· · ·											*****	
Last Chain:		□ Yes		Sample	Tracking		SMO	Use	Special Ins	tructions/	QC Requir	ements:	I		Cond	litions on
Validation R	eq'd:	☑ Yes		Date Ent	ered:				EDD		☑ Yes				R	aceint
Background	:	□ Yes		Entered	by:				Turnaroun	d Time	0 7-Dav	* 🛛	15-Dav*	2 30-Dav		,ocipt
Confirmator	y:	□ Yes		QC inits.	:				Negotiated	TAT			10 249			
Sample	N	ame Signatu	ure 🖌	Init,	Company	/Organizati	ion/Phone	e/Cell	Sample Dis	sposal	Return	n to Client		Disposal by Lab		
Team	m Robert Lynch Rel March PL SNL/00641/505-844-4013/505-250-7090 Return Samples By:															
Members William Gibson Wyllich July SNL/00641/505-239-7367/505-239-7367 Comments:																
	Alfred Sa	antillanes Heffel 522	:22-	diff	SNL/00641/5	05-284-68	70/505-22	28-0710								
	Thomas	Evans There h	~~	FE	AIS/00641/50	05-284-080	4									
	Chris Hu	Iliger CCRC		CBS	AIS/00641/50	05-284-330	9/505-38	2-0353							La	b Use
Relinquished b	y W	deen Thelen	Org.064	/ Date	10/23/17	Time /	10	Relinqui	shed by 🗊	52 9		- Org.	0631	Date 10.24.17	Time	1300
Received by	T =	Hulley + 1	Org.063	Date	10/23/17	Time /	410	Receive	d by	58-		Org.		Date 10-25-17	Time	750
Relinquished b	Y TE	12/15-	Org.063	/ Date	10/23/17	Time /2	515	Relinqui	shed by	<u> </u>		Org.		Date	Time	
Received by	<u>Sabp</u>	en VIbartica	Org. 006	3 Date	10/03/17) Time	SIS	Receive	d by			Org.		Date	Time	

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

Batch No. // A SMO Use AR/COC 61 Project Task Manage: Timme Jackson Carries/Value No. 2 + 3 3 + 2 SMO Autorization U. / 23 I + 3 3 + 2 SMO Contact Phone: 0 Wate Obtarcetrization 0 Wate Obtarcetrization 0 Wate Obtarcetrization 0 Released by COC No. 0 0 0 No.	f 1						
Project Name: MWL QVM/I VSVM Date Samples Shipped: 1.0 2.4 3.1 4.7 SMO Authorization Image: Time tableson Time tableson Ti	3261						
Project/Task Manager: Timmle Jackson Cartler/Weybil No. 2 7 3 7 4 2 SMO Contact Phone: S MA Released by COC No. Service Order:	NORTHING COOL OF COMPLEX ON COMPLEX						
Project/Task Number: 195122.10.11.08 Lab Contact. Edie Kent/83-769-7385 Wendy Palencia/505-844-3132 Image: CF01-18 Released by COC No. Service Order: CF01-18 Lab Contact. Contract.No. GEL Send Report to SMO. Bill to: Sandia National Laborations (CF01-18) Bill to: Sandia National Laborations (CF01-18) Pale Released by COC No. Bill to: Sandia National Laborations (CF01-18) Pale No. Pale No. Project No. Pale No.							
Service Order: CF01-18 Lab Destination: GEL Send Report to SMO: Stephanie Montaño/505.284.2553 Buil to: Sandia Aborationes (Acco P. 0. Box Soato, NS.0154 Tech Area: Operational Site: Operational Site: P1.0 Sample Montaño/505.284.2553 Parameter & Method Abouquerque, NM 87185-0154 P0. Box Soato, NS.0154 Abouquerque, NM 87185-0154 P0. Box Soato, NS.0154 Abouquerque, NM 87185-0154 P1.0 Abouquerque, NM 87185-0154 P1.0 Abouquerque, NM 87185-0154 P0. Box Soato, NS.0154 Abouquerque, NM 87185-0154 P0. Box Soato, NS.0154 Abouquerque, NM 87185-0154 P1.0 P1.0 Abouquerque, NM 87185-0154 P1.0 P1.0							
Contract No. 1303873 Stephanie Montaño/505.284.2583 Bill for: Sandia National Laboratories (Acco PO Box 6800, MS-0154 Albuquerque, NM 87185-0154 Sample No. Fraction Sample Location Detail Depth (ft) Date/Time Collected Sample Matrix Container Type Preserv- ative Collection Method Sample Type VOC_LTMMP (SW846-8260B) 103899 001 MWL QC/DIW NA 10/23/17 10:12 DIW G 3x40 ml HCl G Depth Method Type VOC_LTMMP (SW846-8260B) VOC_LTMMP (SW846-8260B) 103899 002 MWL QC/DIW NA 10/23/17 10:13 DIW P 500 ml HNO3 G Depth 9011 GAMMASPEC, SHORT LIST (EPA 9011 103899 004 MWL QC/DIW NA 10/23/17 10:15 DIW P 1 L HNO3 G Depth 9011 GAMMASPEC, SHORT LIST (EPA 9011 103899 006 MWL QC/DIW NA 10/23/17 10:16 DIW P 1 L HNO3 G Depth 9011 GAMMASPEC,	° Celsiu						
Tech Area: P.0. Box 5900, MS-0154 Building: Room: Operational Site: P.0. Box 5900, MS-0154 ADloqueque, M. 47185-0154 ADlocue, ADlop ADloguegaa ADlogue	nts Pavable						
Building: Room: Operational Site: Abuquerque, NM 87185-0154 Abuquerque, NM 87185-0154 Abuquerque, NM 87185-0154 Abuquerque, NM 87185-0154 103899 001 MVL QC/DIW NA 10/23/17 10:12 DIW G 3x40 ml HCI G Depth Parameter & Method Requested 103899 001 MVL QC/DIW NA 10/23/17 10:12 DIW G 3x40 ml HCI G Depth Requested Requested NU Requested Requested <t< td=""><td></td></t<>							
Sample No. Fraction Sample Location Detail Depth (ft) Date/Time Collected Sample Matrix Type Volume Sample ative Preserve ative Collection ative Preserve ative Collection ative Sample Method Type Volume Ative Type Volume Ative Type Volume Ative Type Volume Ative Method Type Volume Ative At	360,						
103899 001 MWL QC/DIW NA 10/23/17 10:12 DIW G 3x40 ml HCl G PEB VOC-LTMMP (SW846-8260B) 103899 002 MWL QC/DIW NA 10/23/17 10:13 DIW P 500 ml HNO3 G PEB METALS, LTMMP - Cd, Cr, Ni, U 103899 003 MWL QC/DIW NA 10/23/17 10:14 DIW P 1 L HNO3 G PEB GROSS-ALPHA/BETA (EPA 900) 103899 004 MWL QC/DIW NA 10/23/17 10:16 DIW P 1 L HNO3 G PEB GROSS-ALPHA/BETA (EPA 900) 103899 005 MWL QC/DIW NA 10/23/17 10:16 DIW AG 250 ml NONE G PEB TRITIUM (EPA 906)	Lab Sample I						
103899 002 MWL QC/DIW NA 10/23/17 10:13 DIW P 500 ml HNO3 G METALS, LTMMP - Cd, Cr, Ni, U 103899 003 MWL QC/DIW NA 10/23/17 10:14 DIW P 1 L HNO3 G G GAMMA SPEC, SHORT LIST (EPA 900) 103899 004 MWL QC/DIW NA 10/23/17 10:15 DIW P 1 L HNO3 G	mag						
103899 003 MWL QC/DIW NA 10/23/17 10:14 DIW P 1 L HNO3 G Feb GAMMA SPEC, SHORT LIST (EPA 103899 004 MWL QC/DIW NA 10/23/17 10:15 DIW P 1 L HNO3 G Feb gAMMA SPEC, SHORT LIST (EPA 103899 004 MWL QC/DIW NA 10/23/17 10:15 DIW P 1 L HNO3 G Feb gAMMA SPEC, SHORT LIST (EPA 103899 005 MWL QC/DIW NA 10/23/17 10:16 DIW AG 250 ml NONE G Feb TRITIUM (EPA 906) 103899 006 MWL QC/DIW NA 10/23/17 10:17 DIW G 2x40 ml NONE G Feb FADON (SM7500 Rn B) 103900 001 MWL TB-6 NA 10/23/17 10:12 DIW G 3x40 ml HCl G TB VC-LTMMP (SW846-8260B) Last Chain: Yes Sample Tracking SMO Use Special Instructions/QC Requirements: ED ED Yes 30-D	<u>our</u>						
103899 004 MWL QC/DIW NA 10/23/17 10:15 DIW P 1 L HN03 G DEE GROSS-ALPHA/BETA (EPA 900) 103899 005 MWL QC/DIW NA 10/23/17 10:16 DIW AG 250 ml NONE G DEE GROSS-ALPHA/BETA (EPA 900) 103899 006 MWL QC/DIW NA 10/23/17 10:16 DIW AG 250 ml NONE G DEE TRITIUM (EPA 906) 103899 006 MWL QC/DIW NA 10/23/17 10:17 DIW G 2x40 ml NONE G DEE TRITIUM (EPA 906) 103900 001 MWL TB-6 NA 10/23/17 10:12 DIW G 3x40 ml HCl G TB VOC-LTMMP (SW846-8260B) 103900 001 MWL TB-6 NA 10/23/17 10:12 DIW G 3x40 ml HCl G TB VOC-LTMMP (SW846-8260B) Interval	010						
103899 005 MWL QC/DIW NA 10/23/17 10:16 DIW AG 250 ml NONE G PER TRITIUM (EPA 906) 103899 006 MWL QC/DIW NA 10/23/17 10:17 DIW G 2x40 ml NONE G PER TRITIUM (EPA 906) 103809 006 MWL QC/DIW NA 10/23/17 10:17 DIW G 2x40 ml NONE G PER ADON (SM7500 Rn B) 103900 001 MWL TB-6 NA 10/23/17 10:12 DIW G 3x40 ml HCl G TB VOC-LTMMP (SW846-8260B) I I I I IIII IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	1117						
103899 006 MWL QC/DIW NA 10/23/17 10:17 DIW G 2x40 ml NONE G DEE RADON (SM7500 Rn B) 103900 001 MWL TB-6 NA 10/23/17 10:12 DIW G 3x40 ml HCl G TB VOC-LTMMP (SW846-8260B) I Image: Solid control of the solid c	01=						
103900 001 MWL TB-6 NA 10/23/17 10:12 DIW G 3x40 ml HCl G TB VOC-LTMMP (SW846-8260B) Image: Start of the start	014						
Image: Sample Tracking SMO Use Special Instructions/QC Requirements: Cond Last Chain: Yes Sample Tracking SMO Use Special Instructions/QC Requirements: Cond Validation Req'd: Yes Date Entered: EDD Yes Cond Background: Yes Date Entered: Turnaround Time 7-Day* 15-Day* 30-Day Confirmatory: Yes QC inits: Name Signature, Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Nobert Lynch Multime Charae SNL/00641/505-844-4013/505-250-7090 Return Sample By: Disposal on the company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab	NIC						
Last Chain: Yes Sample Tracking SMO Use Special Instructions/QC Requirements: Cond Validation Req'd: Yes Date Entered: EDD Yes Re Background: Yes Date Entered: Turnaround Time 7-Day* 15-Day* 30-Day Confirmatory: Yes QC inits: Negotiated TAT Image: Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Sample Name Signature, Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Nulliand Under Lynch Image: Lynch Image: Lynch Image: Lynch Image: Lynch SNL/00641/505-844-4013/505-250-7090 Return Samples By:							
Validation Req'd: Yes Date Entered: EDD Yes Re Background: Yes Entered by: Turnaround Time 7-Day* 15-Day* 30-Day Confirmatory: Yes QC inits Negotiated TAT Image: Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Team Robert Lynch Full Participation Full Participation Partic							
Background: Yes Entered by: Turnaround Time 7-Day* 15-Day* 30-Day Confirmatory: Yes QC inits.: Negotiated TAT Sample Name Signature, Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Team Metric Lynch Culfortune N. SNL/00641/505-844-4013/505-250-7090 Return Samples By:	ions on						
Confirmatory: Yes QC inits: Negotiated TAT Image: Signature Sample Name Signature Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Team Robert Lynch Cut/Buch PC SNL/00641/505-844-4013/505-250-7090 Return Samples By:	ælpt						
Sample Name Signature Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Team Robert Lynch Full Succession Full Succession Full Succession Full Succession Return Samples By:							
Team Robert Lynch Company/Company/Conganization/Phone/Cell Sample Disposal Return to Client Disposal by Lab William Olihoan William Olihoan William Olihoan William Olihoan William Olihoan Out A & A & A & A & A & A & A & A & A & A &							
We will be a start of the start							
Members William Gibson M. Mar. Aska Miles SNL/00641/505-239-7367/505-239-7367 Comments							
Alfred Santillanes							
Thomas Evans 1/4/1-5 - 05 AIS/00644/505 204-0004							
Chris Hullinger							
Chris Hulliger Ch. Als/00641/505-284-3309/505-382-0353	Use						
Described by Org. Date Time							
Policeview by 99, 97, 97, 97, 97, 00, 00, 00, 10, 10, 10, 10, 10, 10, 10							
Reiniquisned by 0rg. Org. Date Time 1240 Relinquished by Org. Date Time							
Received by Org. Date 10/24/17 Time 7:36 Received by Org. Date Time							

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

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Internal Lab	1.											1		Page	1 of 1
Batch No.	1A				SMO Use	_1					1 1 1	9	AI	R/COC	618264
Project Náme	:	MWL GWM / SVM	Date Sample	es Shipped	10/23	117		SMO A	uthorization;	0/4	1.1.		Waste Charac	terization	
Project/Task N	Manager:	Timmie Jackson	Carrier/Wayl	bill No.	27	337	-2	SMO C	ontact Phone	э:		gno			
Project/Task N	Number:	195122.10.11.08	Lab Contact		Edie Kent/8	43-769-73	85		Wendy P	alencia/50	5-844-3132		Released by C	COC No.	
Service Order	:	CF01-18	Lab Destinat	tion:	GEL			Send R	eport to SM	D:			1	Ø	4º Celsius
			Contract No.	4	1303873				Stephanie	Montaño/5	05.284.255	3	Bill to: Sandia Nation	al Laboratories (Ar	counts Pavable)
Tech Area:						******	******		*****				P.O. Box 5800 MS-0	154	counts r uyable)
Building:		Room:	Operation	al Site:									Albuquerque NM 87	195 0154	436011
Sample No.	Fractio	n Sample Location	Detail	Depth (ft)	Date/ Colle	Time cted	Sample	C	ontainer	Preserv-	Collection	Sample	Parameter	*& Method	Lab
103887	001				10/00/47	40.07					meanou	Type			
103007	001				10/23/17	10:27	DIW	G	3x40 ml		G	FB	VOC-LTWIMP (SW	546-8260B)	001
103000	001			496	10/23/17	10:27	GW	G	3x40 ml	HCI	G	SA	VOC-LIMMP (SW	846-8260B)	002
103888	1002			496	10/23/17	10:29	GW	P	500 ml	HNO3	G	SA	METALS, LTMMP	- Cd, Cr, Ni, U	003
103888	003	MWL-MW7		496	10/23/17	10:30	GW	P	1 L	HNO3	G	SA	901)		1 004
103888	004	MWL-MW7		496	10/23/17	10:32	GW	P	<u>1L</u>	HNO3	G	SA	A GROSS-ALPHA/BETA (EPA 900)		
103888	005	MWL-MW7		496	10/23/17	10:34	GW	AG	250 ml	NONE	G	SA	A TRITIUM (EPA 906)		
103888	006	MWL-MW7		496	10/23/17	10:35	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 I	Rn B)	007
103889	001	MWL TB-2		NA	10/23/17	10:27	DIW	G	3x40 ml	нсі	G	TB	VOC-LTMMP (SW8	346-8260B)	008
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Last Chain:		Yes		Sample	Tracking		SMO	Use	Special Ins	tructions/	QC Requir	ements:		<u></u>	nditions on
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Background	:	Yes		Entered	bv:				Turnaroun		7 Dav	·	15 Dout 17		Receipt
Confirmator	y:	🗆 Yes		OC inits					Negotiated	TAT			15-Day	50-Day	
Sample	Ι Ν	lame Signa	ture 🖌	Init	Company	/Organizat	tion/Phone		Sample Die			to Client			
Team	Robert L	vnch Calffan	rela	RC	SNI /00641/5	05-844-40	13/505-24	50-7000	Paturn San	posal	u netum	to chefit			
Momboro	William	Gibson ////////	9.LT	2.68	SNI /00641/5	05-239-73	67/505-23	30-7367	Comments:	ipies by.					
Members	Alfred S	antillanes Alle	2 6.120-	Elle	SNI /00641/5	05-284-68	70/505-22	28-0710	oonninonto.						
	Thomas	Evans		The	AIS/00641/50	15-284-080	70/000-22	20-0710							
	Chris H	Illiger	75	The	AIS/00641/50	15 284 330	10/505 29	2 0252							
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equired for 7 and 15 day IAT

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AR/COC NUMBERS 618258, 618263

AR/COC NUMBERS 618258, 618263



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

Memorandum

Date:	November 20, 2017
То:	File
From:	Linda Thal
Subject:	GC/MS Organic Data Review and Validation – SNL Site: MWL GWM ARCOC: 618258 and 618263 SDG: 435369 Laboratory: GEL Project/Task: 195122.10.11.08 Analysis: VOCs

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

Summary

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

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

Holding Times

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 ICAL intercepts were > the MDL and positive for dibromochloromethane and bromoform. The associated sample results were non-detect and will not be qualified.

For the CCV associated with sample 435369009, the %D was >20% and positive for dichlorodifluoromethane. The associated sample result was non-detect and will not be qualified.

For the CCV associated with sample -009, the %Ds were >20% but \leq 40% with negative bias for acetone and 2-butanone. The associated sample results were non-detect, and since no other calibration infractions occurred, will not be qualified.

<u>Blanks</u>

No target analytes were detected in any of the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

All associated sample results were non-detect and, therefore, mass spectra were not verified during data validation.

A TB and an FB were submitted with ARCOCs 618258 and 618263 and were associated with the samples on the same ARCOC.

No other specific issues that affect data quality were identified.

Reviewed by:Mary DonivanLevel: IDate: 11/20/17



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Memorandum

Date:	November 20, 2017
То:	File
From:	Linda Thal
Subject:	Inorganic Data Review and Validation – SNL Site: MWL GWM ARCOC: 618258 and 618263 SDG: 435369 Laboratory: GEL Project/Task: 195122.10.11.08 Analysis: Metals

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

Summary

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

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tune met QC acceptance criteria.

Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

Reporting Limit Verification

All LLCCV recoveries met QC acceptance criteria.

<u>Blanks</u>

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: Mar	ry Donivan	Level: I	Date: 11/20/17
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Memorandum

Date: November 20, 2017

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL Site: MWL GWM ARCOC: 618258 and 618263 SDG: 435369 Laboratory: GEL Project/Task: 195122.10.11.08 Analysis: RAD

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

<u>Summary</u>

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.

Gammaspec and tritium:

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

Gross Alpha/Beta:

The relative dilution factor between the parent sample and the gross alpha/beta MS/MSD QC samples was >5 and, as a result, the MS/MSD analyses were not used to evaluate gross alpha and gross beta sample data. The associated sample results were > the MDA and will be qualified J,MS1.

Holding Times and Preservation

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

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.

<u>Blanks</u>

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 except as noted above in the Summary section.

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

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

All LCS and/or LCSD 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 DonivanLevel: IDate: 11/20/17





AR/COC: 618258, 618263

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	103885-004/MWL-BW2	ALPHA (12587-46-1)	J, MS1
	103885-004/MWL-BW2	BETA (12587-47-2)	J, MS1
	103891-004/MWL-MW9	ALPHA (12587-46-1)	J, MS1
	103891-004/MWL-MW9	BETA (12587-47-2)	J, MS1
EPA 901.1			
	103885-003/MWL-BW2	Americium-241 (14596-10-2)	BD, FR3
	103885-003/MWL-BW2	Cesium-137 (10045-97-3)	BD, FR3
	103885-003/MWL-BW2	Cobalt-60 (10198-40-0)	BD, FR3
	103885-003/MWL-BW2	Potassium-40 (13966-00-2)	BD, FR3
	103891-003/MWL-MW9	Americium-241 (14596-10-2)	BD, FR3
	103891-003/MWL-MW9	Cesium-137 (10045-97-3)	BD, FR3
	103891-003/MWL-MW9	Cobalt-60 (10198-40-0)	BD, FR3
	103891-003/MWL-MW9	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	103885-005/MWL-BW2	Tritium (10028-17-8)	BD, FR3
	103891-005/MWL-MW9	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#(s): 618258 and 618263	Site/Project: MWL GWM		Validation Date: 11/20/2017
SDG: 435369	Laboratory: GEL Laborator	ies, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 16	CVR present: Yes	
ARCOC(s) present: Yes	Sample Container Integrity:	OK	
Analysis Type:			
☐ Organic ☐ Metals ☐ Genc	hem 🛛 Rad		

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

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

<u>Comments</u>: Collected: 10/17 and 10/18/2017

One vial from sample 435369010(103891-001) and all three vials from sample 435369016(103892-001) contained headspace.

Validated by:

& Mal

Sandia Organic Worksheet (GC/MS VOC)

3263				SD	G: 4353	369							Matrix:	Aqueous		
69001, -00	2, -008, -009	9, -010, -	-016													
937				Tur	Tuning (pass/fail):passTICs Required? (yes/no):no											
		Calibrati	ion													
Int.	RF/ Slope	RSD/ r ²	(ICV)/CC %D	CV	МВ	5X (10X) MB	LC %l	S R	MS %R	MSD %R	MS/ MSD RPD	FB1 -001	TB1 -008	l F 3 -(FB3 009	TB3 -016
+.69) 🗸	✓	✓		✓	NA	~		✓	~	✓	~	✓		✓	✓
+.88	} ✓	✓	✓		\checkmark	NA	✓		\checkmark	✓	✓	\checkmark	✓		✓	✓
NA	✓	✓	-25 ¹		\checkmark	NA	✓		\checkmark	✓	✓	✓	✓		\checkmark	✓
NA	✓	✓	-21 ¹		\checkmark	NA	✓		\checkmark	✓	✓	\checkmark	✓		\checkmark	✓
Dichlorodifluoromethane NA 🗸						NA	✓		\checkmark	✓	✓	✓	✓		\checkmark	✓
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d4 %R	Toluene-d8	%R	BFB %R			Sample I	D	1,2-D	CA-d4	%R	Toluene-	d8 %R	BFB	%R		
				I	S Outli	ers										
FBZ Chl-d5																
R	Г Ar	ea	RT	Are	a	RT										
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Comments: HTs OK. MS/MSD on SNL sample from another SDG

ICAL VOA6.I 10/19/2017. Linear: MeCl₂, dibromochloromethane, bromomethane

¹associated with sample -009 only

Sandia Inorganic Metals Worksheet

ARCOC	#(s):): 6	51825	58 and	618263					S	DG #(s):	435369				Matrix: Aqueous				
Laborato	ry Samp	le ID	s: 4353	369003,	-011														
Method/	Batch #s	: 300	5A/602	20 /1711	433/17	11434 (Cd,	Cr, Ni) aı	nd 171357	5/17135′	76 (U)									
ICPMS M	ass Cal:		Pass	🗌 Fail		NA I	CPMS R	esolution:	Pass	ss 🗌 Fail 🗌 NA									
Analyte	e MB mg/L			5X Blank (5X LCS	LCS	MS	S DUP R RPD	Serial Dil.	ICS AB	ICS A ±MDL ug/L	CRI								
(outliers)	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L		MDL) mg/L	%K	% K	RPD	%D	%R	(x50)	%K				
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 -003 Ca, Mg, Fe, Al < ICS A.

Sandia Radiochemistry Worksheet

ARCOC #(s): 618258 and 618263	Matrix: Aqueous								
Laboratory Sample IDs:435369 – see below									
Method/Batch#s: EPA 901.1 (gammaspec)/1711864 Samples -004, -012									
Method/Batch#s: EPA 900.0/SW846 9310 (gross A/B)/1714195 Samples -005, -	013								
Method/Batch#s: SM 7500 Rn B (Rn-222)/1710602 Samples -007, -015									
Method/Batch#s: EPA 906.0 Modified (tritium)/1713790 Samples -006, -014									

Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS %R	MS %R	MSD %R	MS/ MSI REF	/ Lab D Rep. R RER				
			Tracer/Ca	rrier Reco	overy Outl	iers						
Tracer/Ca	rrier %	R	Sample ID		Tracer/	Carrier	%R	Sample	ID	Trac	er/Carrier	%R
	Control Freq.	Control Freq. Control Eval. Image: Control Eval. Image: Control Eval. Image: Control Eval. Image: Control Ev	Control Freq. Control Eval. Method Blank Image: Strategy of the strateg	Control Freq. Control Eval. Method Blank SA Diank or 5X MDC Image: State of the state of t	Control Freq. Control Eval. Method Blank SX brank or 5X MDC LCS %R	Control Freq. Control Eval. Method Blank SA brank or 5X MDC LCS %R MS %R	Control Freq. Control Eval. Method Blank SA brank or 5X MDC LCS %R MS %R MSD %R Image: Strain of the strain of th	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

Comments: HTs OK. Matrix QC on this SDG for all

Tritium: Parent and dup sample 50ml; MS 25ml; 2X dilution – no data qualified.

Gross A/B: Parent and dup sample 150ml; MS/MSD 25ml; 6X dilution -data qualified.

Internal Lab

Batch No	NIA									,			rayeloll
Batch Nomo:	105			SMO Uşe				****		10	1	AR/COC	618258
Project/Task N	Janagar	Timmia Jackson	Date Samples Shipp	ed: <u>10 /</u>	18/17		SMO A	uthorization:	4/	194		□ Waste Characterization	
Project/Task N	Jumbor:	105122 40 44 09	Carrier/Waybill No.		+32	03	SMO Contact Phone:						
Service Order		CE01.19	Lab Contact:	Edie Kent/8	343-769-73	85	<u> </u>	Wendy P	alencia/50	5-844-3132		□ Released by COC No.	
Dervice Order.	•	0501-10	Lab Destination:	GEL	Send Report to SMO:							4º Celsiu	
Toch Areas			Contract No.:	1303873				Stephanie	Montaño/5	05.284.255	3	Bill to: Sandia National Laborator	ries (Accounts Payable
Duilding	***************	<u>1</u>	i									P.O. Box 5800, MS-0154	•
Building:	1	Room:	Operational Site:							Albuquerque, NM 87185-0154	435369		
Sample No.	Fractior	Sample Location	n Detail (ft)	h Date Colle	/Time ected	Sample Matrix	C Type	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Methoo Requested	d Lab
103890	001	MWL FB-3	NA	10/18/17	10:53	DIW	G	3x40 ml	HCI	G	FB	VOC-LTMMP (SW846-8260E	3) 009
103891	001	MWL-MW9	497	10/18/17	10:53	GW	G	3x40 ml	HCI	G	SA	VOC-LTMMP (SW846-8260E	3) 010
103891	002	MWL-MW9	497	10/18/17	10:55	GW	Р	500 ml	HNO3	G	SA	METALS, LTMMP - Cd, Cr, N	νi, U Δ//
103891	003	MWL-MW9	497	10/18/17	10:56	GW	Р	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST	Г(ЕРА <u>1/2</u>
103891	004	MWL-MW9	497	10/18/17	10:58	GW	Р	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA	900) 0/3
103891	005	MWL-MW9	497	10/18/17	11:00	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	014
103891	006	MWL-MW9	497	10/18/17	11:01	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	010
103892	001	MWL TB-3	NA	10/18/17	10:53	DIW	G	3x40 ml	HCI	G	TB	VOC-LTMMP (SW846-8260B) 016
Last Chain:				<u> </u>									
Validation D	!-!-		Sampl	e Tracking		SMO	Use	Special Ins	tructions/	QC Requir	ements:	1	Conditions on
	eq a:	e Yes	Date E	ntered:				EDD		Yes			Receipt
Background:		U Yes	Entere	d by:				Turnaround	d Time	D 7-Day*		15-Day* 🗹 30-Day	
Confirmatory	<u>/:</u>	U Yes	QC init	5.:				Negotiated	TAT	0			
Sample	Na Dub db	ame Signa	ture Init.	Company	y/Organiza	tion/Phone	/Cell	Sample Dis	posal	Return	to Client	Disposal by Lab	
Team	Robert Ly	/ncn	12-1-1-10	SNL/00641/	505-844-40	013/505-25	0-7090	Return San	ples By:				
Members	Alfred Co	Sibson William	All WA	SNL/00641/	505-239-73	367/505-23	9-7367	Comments:					
	Allied Sa	ntilianes Hegel 34	ue de	SNL/00641/	505-284-68	370/505-22	8-0710						
ŀ		<i>v</i>											
	. Att	- 0 - 4 00-		1									Lab Use
Received by	34	<u> <u> <u> </u></u></u>	Org. OOD9/ Date	10/18/17	<u>7 Time /</u>	130 1	Relinqui	shed by			Org.	Date	Time
Relinquished by	- Ale	y the and	Org. 00 p 7 / Date	10/18/13	7 Time /	(30 1	Receive	d by			Org.	Date	Time
Received hy	-app	+ To In any		10/18/11	Time /	1071	Relinqui	shed by		*****	Org.	Date	Time
		men	Dig. Date	: 10/19/17	/ Time 7	740 H	Received	d by			Ora	Date	Timo

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

Internal Lab	nal Lab
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Page 5 of 524

Batch No 4/	IA											10	\square	7		Page 1	of 1
Project Name						SMO Use	1.2		·			14			AR/COC	; 6'	18263
Project/Task I	Manager	Timmio In		Date Sampl	es Shipped	10/17	51 <u>17</u>	~ 1	SMO A	uthorization	$\leq \downarrow$	lg 6 -	tim	U Was	te Characterization	-Senstratoristication	and the second secon
Project/Task I	Number	105122 10	111.09	-Carner/Way	Dill No.	-2t	30	96	SMO Contact Phone: SmD								
Service Order		CE01-18	.11.00	Lab Contact	1	Edie Kent/8	43-769-73	85	Wendy Palencia/505-844-3132					🗆 Rele	ased by COC No.		
	•	0101-10		-Lab Destina	tion:	GEL			Send R	eport to SM	D:]		Ø	4º Celsiu
Tech Area:				Contract No	4	1303873			<u> </u>	Stephanie	Montaño/5	05.284.255	3	Bill to: Sand	tia National Laborato	ories (Accc	ounts Payable
Building:		Beemi												P.O. Box 58	00, MS-0154		
Dunung.	1	Room:		Operation	al Site:	T								Albuquerque	e, NM 87185-0154		43536
Sample No.	Fraction	Sa	mple Location [Detail	Depth (ft)	Date/ Colle	Time cted	Sample Matrix	Co Type	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Pa	rameter & Metho Requested	d	Lab
103884	001	MWL FB-	-1		NA	10/17/17	10:57	DIW	G	3x40 ml	HCI	G	FB	VOC-LTM	MP (SW846-8260	 іВ)	
103885	001	MWL-BW	/2		496	10/17/17	10:57	GW	G	3x40 ml	HCI	G	SA	VOC-LTM	MP (SW846-8260	 B)	007
103885	002	MWL-BW	12		496	10/17/17	10:59	GW	Р	500 ml	HNO3	G	SA	METALS,	LTMMP - Cd, Cr,	Ni, U	003
103885	003	MWL-BW	/2		496	10/17/17	11:00	GW	Р	1 L	HNO3	G	. SA	GAMMA S	PEC, SHORT LIS	T (EPA	104
103885	004	MWL-BW	/2		496	10/17/17	11:02	GW	Р	1 L	HNO3	G	SA	GROSS-A	LPHA/BETA (EPA	4 900)	LOOF
103885	005	MWL-BW			496	10/17/17	11:04	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)		006
103885	006	MWL-BW	/2		496	10/17/17	11:05	GW	G	2x40 ml	NONE	G	SA	RADON (S	M7500 Rn B)		007
103886	001	MWL TB-	1		NA	10/17/17	10:57	DIW	G	3x40 ml	HCI	G	TB	VOC-LTM	/IP (SW846-8260	B)	008
				******												A-944.00000000000000000000000000000000000	
Last Chain:																,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Validation R	eu'd:				Sample	Гаскіпд		SMO	Use	Special Ins	tructions/	QC Require	ements:			Cond	litions on
Background					Date Ent	ered:				EDD		☑ Yes				R	eceipt
Confirmator					Entered	oy:				Turnaround	d Time	□ 7-Day*		15-Day*	☑ 30-Day		
Sample	y.		Circut		QC inits.					Negotiated	TAT						
Jampie	Robert L	ine	Point		Init.	Company	/Organizat	tion/Phone	/Cell	Sample Dis	posal	Return	to Client	Ø	Disposal by Lab		
lean	William G	libeon	1.1.7	FAT	1.100	SNL/00641/5	05-844-40	13/505-25	0-7090	Return Sam	ples By:						
wembers	Alfred Sa	ntillanes	Maray	12 m	WA	SNL/00641/5	05-239-73	67/505-23	9-7367	Comments:							
		nunaries	14945 <u>~</u>	alle-	-000	SNL/00641/5	05-284-68	70/505-22	8-0710								
	Chris Hul	liger	TAC	\rightarrow		A10/0004/100											
Relinguished b	v Alla		Spel	× nnn	UNO 1	AIS/00641/50	15-284-330	19/505-382	2-0353							La	b Use
Received by	<u>5</u> A.	4. 12	GAR	Ora OChi	1 Date	10/14/17	Time 1	120	<u>Relinquis</u>	shed by			Org.		Date	Time	
Relinguished b	V D	16.1	- Cran	Ora Dala	/ Date	10/11/11	Time /	120 1	Received	by		-	Org.		Date	Time	
Received by	Tta 1	in the	<u> </u>	Ora	Date	10 10 17	Time /		Relinquis	sned by			Org.		Date	Time	
*Prior confirm	ation with	SMO requ	ired for 7 and 1	5 day TAT				, 00 F	received	зру			Org.		Date	Time	
CONTRACT VERIFICATION REVIEW FORMS

GROUNDWATER MONITORING

OCTOBER 2017

AR/COC Number	Sample Type
618258	Environmental*
618259	Environmental*
618260	Field Quality Control*
618261	Field Quality Control*
618263	Environmental*
618264	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. 618259, 618260, 618261 & 618264
 Analytical Lab GEL
 SDG No. 436011

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	Itom	Complete?		If no ovalain
No.	nem		No	ii iio, explain
1.1	All items on ARCOC complete - data entry clerk initialed and dated	Х		
1.2	Container type(s) correct for analyses requested	Х		
1.3	Sample volume adequate for # and types of analyses requested	Х		
1.4	Preservative correct for analyses requested	Х		
1.5	Custody records continuous and complete	Х		
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	Х		
1.7	Date samples received	Х		
1.8	Condition upon receipt information provided	Х		Samples 103889-001 and 103896-001 were received with two of three vials with headspace and samples 103900-001 and 103898-001 were received with all three vials with headspace

2.0 Analytical Laboratory Report

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

Line No.	ltem	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	Х		
3.2	Quantitation limit met for all samples	Х		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	х		
	 b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique 	Х		
	c) Matrix spike recovery data reported and met		Х	1, 1, 1-Trichloroethane, 1,1-Dichloroethane, 1,1,1-Dichloroethylene, 1,2-Dichloroethane, Bromodichloromethane, Carbon tetrachloride, Chloroform, Methylene chloride, cis-1,2-Dichloroethylene and trans-1, 2-Dichloroethylene failed recovery limits for PS (QC1203910910). 1, 1- Dichloroethylene, 1, 2-Dichloroethane, Bromodichloromethane, Carbon tetrachloride, Methylene chloride, cis-1, 2-Dichloroethylene and trans-1, 2-Dichloroethylene failed recovery limits for PSD (QC1203910912).
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	×		

SMO-05-03

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
	b) Matrix spike duplicate RPD data reported and met for all organic samples	Х		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	Х		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		Х	Acetone detected in MWL FB-2. Acetone and toluene detected in MWL EB-1.
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits	X		
3.7	Narrative addresses planchet flaming for gross alpha/beta	Х		
3.8	Narrative included, correct, and complete	Х		
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	х		
	b) Initial calibration provided	Х		
	c) Continuing calibration provided	Х		
	d) Internal standard performance data provided	Х		
	e) Instrument run logs provided	Х		
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) lon abundance ratios for samples and standards provided	N/A		

Line No.	Item	Yes	No	Comments
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		
	c) CRI provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals) a) Initial calibration provided	Х		
	b) Continuing calibration provided	Х		
	c) ICP interference check sample data provided	Х		
	d) ICP serial dilution provided	Х		
	e) Instrument run logs provided	Х		
4.6	Radiochemistry and General Chemistry a) Instrument run logs provided	Х		

5.0 Data Anomaly Report

Line No.	Item	Yes	No	lf 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? O Yes O No							
Based on the review, this data package is complete	Based on the review, this data package is complete. 💿 Yes 🔿 No						
Reviewed by: Wendy Palencia Date: 11-29-2017 01:10:00							
Closed by: Wendy Palencia Date: 11-29-2017 01:10:00							

Contract Verification Form (CVR)

Project Leader Jackson	Project Name MWL GWM	Project/Task No. 195122_10.11.08
ARCOC No. 618258 & 618263	Analytical Lab GEL	SDG No. 435369

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	ltom	Complete?		If no exploin
No.	item	Yes	No	ii no, explain
1.1	All items on ARCOC complete - data entry clerk initialed and dated	Х		
1.2	Container type(s) correct for analyses requested	Х		
1.3	Sample volume adequate for # and types of analyses requested	Х		
1.4	Preservative correct for analyses requested	Х		
1.5	Custody records continuous and complete	Х		
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	Х		
1.7	Date samples received	Х		
1.8	Condition upon receipt information provided	Х		One vial from sample 103891-001 and all three vials from sample 103892-001 contained headspace

2.0 Analytical Laboratory Report

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

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	Х		
3.2	Quantitation limit met for all samples	Х		
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 	х		
	c) Matrix spike recovery data reported and met	Х		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	Х		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	х		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	Х		

SMO-05-03

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	Х		
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	Х		
3.7	Narrative addresses planchet flaming for gross alpha/beta	Х		
3.8	Narrative included, correct, and complete	Х		
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	Х		
	b) Initial calibration provided	Х		
	c) Continuing calibration provided	Х		

Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	Х		
	e) Instrument run logs provided	Х		
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) lon abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		

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

5.0 Data Anomaly Report

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

Line	Itom	Voo	No	If no exploin
No.	Item	res	INO	ii no, explain

6.0 Problem Resolution

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

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions					
/ere deficiencies unresolved? O Yes O No							
Based on the review, this data package is complete. 💿 Yes 🔿 No							
Reviewed by: Wendy Palencia Date: 11-17-2017 10:35:00							
losed by: Wendy Palencia Date: 11-17-2017 10:35:00							

ANNEX F

Mixed Waste Landfill Inspection Forms

April 2017-March 2018

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

Date of Inspection <u>05/30/17</u>
 Time of Inspection <u>0800</u>
 Name of Inspector <u>Robert Lynch</u>

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required.

I. SOIL-VAPOR MONITORING LOCATIONS [Semiannua	ally or Annuall	y]	
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	YES	1/10	
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]			
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
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			
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
Uncorrected/undocumented previous deficiencies.	NA	NA	

Mixed Waste Landfill Soil-Vapor Monitoring Network Checklist/Form (Continued)

Note Number	Description

NOTES

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 1 dA 1

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	10/26/17
2.	Time of Inspection	_0804
3.	Name of Inspector	RobertLynch

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Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required.

I. SOIL-VAPOR MONITORING LOCATIONS [Semiannual	ly or Annually	y]	
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
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]			
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
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			
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
Uncorrected/undocumented previous deficiencies.	NA	IVA	

Mixed Waste Landfill Soil-Vapor Monitoring Network Checklist/Form (Continued)

Description	

NOTES

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:

low Inspector's Signature

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

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Mixed Waste Landfill Soil-Moisture Monitoring Network Checklist/Form

 Date of Inspection <u>April 17, 2017</u>
 Time of Inspection <u>09:25</u> 3. Name of Inspector Robert Ziock

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Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required.

nnually or An	nually]	
Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
Tes	No	
yes	No	
1		
Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
yes	No	
yes	No	
Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
NA	NA	
	nnually or Am Parameter Inspected (Yes or No) 725 725 726 725 72	nnually or Annually] Parameter Inspected (Yes or No) Action Required (Yes or No) 7e5 Mo 7e5 Mo 9e5 Mo

Mixed Waste Landfill Soil-Moisture Monitoring Network Checklist/Form (Continued)

Note Number	Description

NOTES

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

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Mixed Waste Landfill Groundwater Monitoring Network Checklist/Form

1.	Date of Inspection	05/02/17
2.	Time of Inspection	0808
3.	Name of Inspector	Roberthynch
		0

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Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required.

I. GROUNDWATER MONITORING LOCATIONS [Semian	nually]		
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
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 [Semiannu	ally]		
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
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			
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
Uncorrected/undocumented previous deficiencies.	NA	NA	

Mixed Waste Landfill Groundwater Monitoring Network Checklist/Form (Continued)

Note Number	Description
١	Baroball assembles instaled 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 0

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 _	10-17-17
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Time of Inspection 1028
 Name of Inspector William Gibson

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required.

I. GROUNDWATER MONITORING LOCATIONS [Semian	nually]		
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	Yes	No	
B. Well cover caps in need of repair/maintenance.	Yes	No]
C. Well casing in need of repair/maintenance.	Yes	No	
D. Monitoring well properly labeled.	Yes	No	
E. Locks in need of cleaning or replacement.	Yes	No	
II. GROUNDWATER SAMPLING EQUIPMENT [Semiannu	ally]		
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
A. Sampling pump in need of repair/maintenance.	Yes	No	
B. Sampling assembly (e.g., tubing, gauges, and valves) in need of repair/maintenance.			
III. PREVIOUS DEFICIENCIES			
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
Uncorrected/undocumented previous deficiencies.	NA	NA	

Mixed Waste Landfill Groundwater Monitoring Network Checklist/Form (Continued)

Note Number	Description				
1	Baro ball	assembly	installed	s	a 1 (
	wells				

NOTES

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 William Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

Mixed Waste Landfill Cover Inspection Checklist/Form

- Date of Inspection <u>6/14/17</u>
 Time of Inspection <u>0920 0953</u>

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3. Name of Inspector Robert Ziock, 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] Parameter Action Note **Inspection Parameter Inspected** Required Number (Yes or No) (Yes or No) A. Visible settlement of the soil cover in excess of 6 inches. B. Erosion of the soil cover in excess of 6 inches deep. C. Evidence of water ponding on the MWL cover surface in excess of No 100 square feet. 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. 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. 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. II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly] Parameter Action Note **Inspection Parameter** Inspected Required Number (Yes or No) (Yes or No) A. Channel or sidewall erosion in excess of 6 inches deep. B. Channel sediment accumulation in excess of 6 inches deep.

C. Debris that blocks more than 1/3 of the channel width.

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III. SECURITY FENCE [Quarterly]			
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
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			
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
Uncorrected/undocumented previous deficiencies.	NA	NA	

Mixed Waste Landfill Cover Inspection Checklist/Form (continued)

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Mixed Waste Landfill Cover Inspection Checklist/Form (continued)

INUILD		
Note Number	Description	
1.	Eleven snake weed plants were identified	
	and pulled at time of the inspection as	
	a best management practice as	
	recommended by the staff biblegist.	

NOTES

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	Mixed V	Vaste Landfill		
Cover Inspection Checklist/Form (continued)				
Action (Note Number) _/	_ assigned to <u>Aryce</u>	ert Ziock <u>Reavis</u> Date action completed <u>6/14/17</u>		
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. Eleven snakeweed plants were identified and pulled at time of the inspection (1)4/17 45 a best management practice as recommended by the staff biblogis.

Bene Reavis Inspector's Signature

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



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

Albuquerque, New Mexico 87185-0104

date: June 27, 2017

to: Mike Mitchell (08854)

from: Jennifer Payne (00643) jjpayne@sandia.gov

subject: June 2017 Quarterly Inspections - Biology Follow-Up

Biological Requirement:

Biological Surveys are required prior to driving across any area of native vegetation, spraying herbicides or initiating other work activities that disturb wildlife. Please submit request three weeks to prior work at: <u>https://info.sandia.gov/esh/ecoticket/request.php</u>

Should personnel find a bird's nest during any of the work associated with these sites, they will need to halt work, and contact the Ecology Program at <u>https://info.sandia.gov/esh/ecoticket/request.php</u> If other wildlife is encountered that may cause a health and safety issue, contact the Ecology Program.

All proposed project activities will be conducted in keeping with Corporate Procedure ESH100.2.ENV.2, "Comply with Environmental Requirements for Migratory Birds, Protected Species, and Other Biota".

Nesting Birds Biological Survey: I did not observe any nesting birds on any of the three ET Covers. ET Cover work activities, including driving, needs to begin by July 3nd. If the work begins after July 3rd, you will need contact me prior to beginning work.

Post-emergent herbicides: emphasize to Sequoia that any post-emergent must NOT harm grasses. Last month Sequoia originally suggested using Glyphosate for post-emergent weed control at the CWL, but Glyphosate is a non-selective herbicide and it will kill the grasses.

Prodiamine 4L is a broad-leaf selective post-emergent that should not harm the grasses and does not have a bee precaution, according to the University of California Integrated Pest Management bee precaution pesticide ratings. Sequoia should have this herbicide available.

Only a selective broadleaf post-emergent should be used anywhere near the covers due to possible wind drift carrying the herbicide to the covers.

Pre-emergent herbicides: the pre-emergent herbicide Surflan seems to have worked well so far and does not have a bee precaution, according to the University of California Integrated Pest Management bee precaution pesticide ratings.

ET Covers Observations and Recommendations

CAMU

- The two 4 inch holes on the north slope are as you describe. I will need to check the possibly active burrow with our downhole camera. Although the entrance is in good shape, today it didn't show any sign of recent activity.
- I also saw two approximately 4-inch burrow entrances on the west slope. They both appear to be abandoned. I will check them again when I return with the camera. I will fill in all inactive burrows.
- For your maintenance scope: the entire south slope up to the southernmost part of the top of the ET Cover has a moderately dense amount of small Russian thistle plants. They should either be pulled or sprayed with a broad-leaf post-emergent. Spraying might be a better choice to avoid excessive foot traffic on the steep graveled slope. The post-emergent would need to be very safe for grasses. A pre-emergent in this area would help to prevent more Russian thistle.

CWL

- The grasses are generally not robust. Supplemental water will give them a boost as soon it's available.
- Very few weeds on the ET Cover.
- I like the strategy of two rounds of vehicle-mounted water sprayed across the cover after the preemergent herbicide. Although we wouldn't want the cover driven over regularly, the two rounds of water spray will be helpful until either we can use the Big Sprinkler or the monsoons arrive.
- Two rounds of sprayed water after the pre-emergent should be enough water to settle the herbicide down through the litter (dead vegetation) that is across the cover and down through the gravel. Something to consider based on time availability: if Sequoia is limited on time for this maintenance event, we could postpone the litter raking until a later maintenance event.
- Surflan is a good pre-emergent herbicide for the CWL. There are many weedy grasses that need to be controlled, so a non-selective pre-emergent is currently preferable.
- My herbicide recommendation is the same as last month that we should only use the preemergent in this herbicide application on the CWL ET Cover.

This due to:

- 1. The grasses are generally not robust.
- o 2.there is a relatively low weed presence at the moment.

If we had supplemental water or guaranteed rain in the near future to bolster the health of the grasses, then I would like to use the pre/post combination. Without a guaranteed boost, I am more concerned with anything that might unintentionally weaken the native grasses on the CWL. I think the trade-off of allowing the current weeds to grow without a post-emergent is okay. I think the native grasses will most benefit from decreased future weed competition.

When the native grasses are more robust I will feel more comfortable using the pre-/postemergent herbicide combination.

- Off the cover (outside the fence line) a pre-/post-emergent combination is fine. I think the small amount of post-emergent broadleaf-selective herbicide drift that reaches the cover should be okay. I would just like to be extra-cautious inside the fence line.

MWL

- Very few weeds on the ET Cover. Overall things look very good.
- South of the previous dirt pile area there is quite a bit of silverleaf nightshade (Solanum



elaeagnifolium) scattered throughout the grass.

Although it's not a terrible weed, it should be removed due to its tendency to spread more widely. This is the primary weed that I think should currently be removed.

- All of the Russian thistle (large and small) should be removed from the 10 perimeter monitoring well locations.
- Other observations: two large ant colonies at the toe of the north slope, one toward the eastern corner and the other toward the western corner. Evidence of small mammal seed eating activity on the top of the ET Cover.

If you should have any questions, don't hesitate to contact me at my office 845-9849, cell 218-1815, or email at jjpayne@sandia.gov.

cc: Customer Funded Records Center Ecology Library Steve Cox Robert Ziock Don Schofield Rick Dotson

Mixed Waste Landfill Cover Inspection Checklist/Form

 Date of Inspection <u>9/13/17</u>
 Time of Inspection <u>0939 -1002</u> 3. Name of Inspector Robert Zick Bruce Leavis

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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]				
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number	
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 o 100 square feet.	f 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]				
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number	
A. Channel or sidewall erosion in excess of 6 inches deep.	yes	No		

B. Channel sediment accumulation in excess of 6 inches deep.

C. Debris that blocks more than 1/3 of the channel width.

No

No

yes

yes

III. SECURITY FENCE [Quarterly]			
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
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			
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
Uncorrected/undocumented previous deficiencies.	NA	NA	

Mixed Waste Landfill Cover Inspection Checklist/Form (continued)

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Mixed Waste Landfill Cover Inspection Checklist/Form (continued)

Note Number	Description
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Inspector's Signature	thurs	Bruce kas	ne la	

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

Mixed Waste Landfill Cover Inspection Checklist/Form

1.	Date of Inspection	12/1/17
2.	Time of Inspection	0959-10:26
3.	Name of Inspector	Robert Ziock,

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] Parameter Action Note **Inspection Parameter** Inspected Required Number (Yes or No) (Yes or No) A. Visible settlement of the soil cover in excess of 6 inches. B. Erosion of the soil cover in excess of 6 inches deep. C. Evidence of water ponding on the MWL cover surface in excess of 100 square feet. D. Animal intrusion burrows in excess of 4 inches in diameter. Note: During period when the Biology Inspection is occurring No quarterly, this inspection requirement will be covered on the 42.5 Biology Inspection Checklist/Form. E. Contiguous areas of no vegetation greater than 200 ft². Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the No Biology Inspection Checklist/Form. F. Potentially deep-rooted plants present. Note: During period when the Biology Inspection is occurring yes quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form. **II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]** Parameter Action Note **Inspection Parameter** Inspected Required Number (Yes or No) (Yes or No) A. Channel or sidewall erosion in excess of 6 inches deep. B. Channel sediment accumulation in excess of 6 inches deep. C. Debris that blocks more than 1/3 of the channel width.

III. SECURITY FENCE [Quarterly]									
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number						
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.	72.5	No							
F. Survey monuments in vicinity of MWL visible.	yes	No							
IV. PREVIOUS DEFICIENCIES									
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number						
Uncorrected/undocumented previous deficiencies.	NA	NA							

Note Number	Description

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<u>NOTES</u>

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Action (Note Number)	assigned to	_Date action completed
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Additional Comments:		
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Inspector's Signature What Church Bruce kavio

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



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

Albuquerque, New Mexico 87185-0104

date: December 21, 2017

to: Mike Mitchell (08854)

from: Jennifer Payne (00643) jjpayne@sandia.gov

subject: December 2017 Quarterly Inspections - Biology Follow-Up

Biological Requirement:

Biological Surveys are required prior to driving across any area of native vegetation, spraying herbicides or initiating other work activities that disturb wildlife. Please submit request three weeks to prior work at: <u>https://info.sandia.gov/esh/ecoticket/request.php</u>

Should personnel find a bird's nest during any of the work associated with these sites, they will need to halt work, and contact the Ecology Program at <u>https://info.sandia.gov/esh/ecoticket/request.php</u> If other wildlife is encountered that may cause a health and safety issue, contact the Ecology Program.

All proposed project activities will be conducted in keeping with Corporate Procedure ESH100.2.ENV.2, "Comply with Environmental Requirements for Migratory Birds, Protected Species, and Other Biota".

ET Covers Observations and Recommendations

<u>CAMU</u>

Observations:

- The December 18th inspection found the CAMU Cover to be in excellent condition. The native clump grasses have good spacing with a diverse age and species community structure. In the upcoming year the CAMU does not need additional native grass recruitment from on-site seed.
- No animal holes of concern.
- A low amount of snakeweed shrubs are present on the side slopes.
- A low amount of dried annual weedy plant species are present as litter on the cover; these are mostly tumbleweed.
- Very few tumbleweeds observed in the fenceline.
- The area in between the toe of the cover and the fenceline is clear of weeds with few native clump grasses.
- Two four-wing saltbush shrubs were observed on the cover, both at the top of the slope at the north end. The one located at the NE corner of the cover is flagged. The other shrub is located just to the SW of the uppermost sampling/monitoring tube and is not flagged.

Maintenance Planning Recommendations:

- A minimum of two pre-emergent herbicide applications should be made across the cover in 2018. This will control all weedy annual species without harming the existing native clump grasses. The pre-emergent herbicide Surflan, applied in liquid form, has worked well so far on the covers and does not have a bee precaution, according to the University of California Integrated Pest Management bee precaution pesticide ratings.
 - The first application should be as early as possible in the Jan-March timeframe.
 - The second application should be approximately 3 months after the first application.
 - A third application should be made approximately 3 months after the second application.
- A weed-removal sweep should be made across the cover during each maintenance event to remove any weedy annuals and shrubs. Of note is that the four-wing saltbush shrub is much easier to see during the winter months because its foliage stands out against the dried grass blades, it is much harder to observe during the summer months.

<u>CWL</u>

Observations:

- The CWL Cover looked great on the December 18th inspection. The native clump grasses made good progress maturing in 2017. In the upcoming year the CWL does not need additional native grass recruitment from on-site seed.
- Blue grama grass appears extremely dominant during this inspection. This native grass species has retained many more seedheads than any of the other native grasses on the CWL and during the growing season its total foliar area covered per plant is much less than other species.
- Very few tumbleweeds observed on the ET Cover and a few along the east fenceline.
- Very few dried weedy plants observed on the ET Cover.

Maintenance Planning Recommendations:

- A minimum of two pre-emergent herbicide applications should be made across the cover in 2018. This will control all weedy annual species without harming the existing native clump grasses. The pre-emergent herbicide Surflan, applied in liquid form, has worked well so far on the covers and does not have a bee precaution, according to the University of California Integrated Pest Management bee precaution pesticide ratings.
 - The first application should be as early as possible in the Jan-March timeframe.
 - The second application should be approximately 3 months after the first application.
 - A third application should be made approximately 3 months after the second application.
- A weed-removal sweep should be made across the cover during each maintenance event to remove any weedy annuals and shrubs. Of note is that the four-wing saltbush shrub is much easier to see during the winter months because its foliage stands out against the dried grass blades, it is much harder to observe during the summer months.
- Off the cover (outside the fence line) a pre-/post-emergent combination is fine as deemed necessary. I think the small amount of post-emergent broadleaf-selective herbicide drift that reaches the cover should be okay. I would just like to be extra-cautious inside the fence line.

<u>MWL</u>

Observations:

- The Cover is really in excellent condition. The native clump grasses have good spacing with a diverse age and species community structure. In the upcoming year the MWL does not need additional native grass recruitment from on-site seed.
- The fencelines were all clear of tumbleweeds during my December 19th inspection.
- Very few tumbleweeds or other weeds present on the ET Cover.

Maintenance Planning Recommendations:

- A minimum of two pre-emergent herbicide applications should be made across the cover in 2018. This will control all weedy annual species without harming the existing native clump grasses. The pre-emergent herbicide Surflan, applied in liquid form, has worked well so far on the covers and does not have a bee precaution, according to the University of California Integrated Pest Management bee precaution pesticide ratings.
 - The first application should be as early as possible in the Jan-March timeframe.
 - The second application should be approximately 3 months after the first application.
 - A third application should be made approximately 3 months after the second application.
- A weed-removal sweep should be made across the cover during each maintenance event to remove any weedy annuals and shrubs. The MWL should require very low weed removal efforts.

If you should have any questions, don't hesitate to contact me at my office 845-9849, cell 218-1815, or email at jjpayne@sandia.gov.

cc: Customer Funded Records Center Ecology Library Steve Cox Robert Ziock Don Schofield Rick Dotson Stephanie Salinas

Mixed Waste Landfill Cover Inspection Checklist/Form

1. Date of Inspection March 9, 2018

2. Time of Inspection 0927 to 09:55

3. Name of Inspector Robert Zibek, Brue Reaviz

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]

Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
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 ft². 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 STR	UCTURES [Quarterly]	
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number
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	

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III. SECURITY FENCE [Quarterly]									
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number						
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									
Inspection Parameter	Parameter Inspected (Yes or No)	Action Required (Yes or No)	Note Number						
Uncorrected/undocumented previous deficiencies.	NA	NA							

- 1 × 1 ×

Note Number	Description
1	Wind blown plant debris needs to be removed from site security france
	8
-	

NOTES

Action (Note Number)	assigned to Mike Mitchel	Date action completed 4/27/2018
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. Wind blown plant debris was removed from the site security tence by the landscapting/maintenance contractor on 4/27/2018. Rz

Thick Bruce Rearing Inspector's Signature

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



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

Albuquerque, New Mexico 87185-0104

date: March 20, 2018

to: Mike Mitchell (08854)

from: Jennifer Payne (00643) jjpayne@sandia.gov

subject: March 2018 Quarterly Inspections - Biology Follow-Up

Biological Requirement:

Biological Surveys are required prior to driving across any area of native vegetation, spraying herbicides or initiating other work activities that disturb wildlife. Please submit request three weeks to prior work at: <u>https://info.sandia.gov/esh/ecoticket/request.php</u>

Should personnel find a bird's nest during any of the work associated with these sites, they will need to halt work, and contact the Ecology Program at <u>https://info.sandia.gov/esh/ecoticket/request.php</u> If other wildlife is encountered that may cause a health and safety issue, contact the Ecology Program.

All proposed project activities will be conducted in keeping with Corporate Procedure ESH100.2.ENV.2, "Comply with Environmental Requirements for Migratory Birds, Protected Species, and Other Biota".

ET Covers Observations and Recommendations

The biology quarterly evaluation of the three ET Covers was conducted on March 19, 2018.

CAMU

- The ET Cover is in excellent condition. The mature perennial grasses still mostly dormant; some individual grass clumps and scattered other perennial native vegetation are in an early seasonal growth stage, evidenced by a limited amount of green vegetation on the cover.
- Few tumbleweeds or partial tumbleweeds observed on the ET Cover and along the fence lines.

CWL

- Overall the ET Cover is in very good condition.
- The base of most native grass clumps are beginning to green up, showing early seasonal growth.
- The native grass clumps are more mature than they were in March 2017. The ET cover is still in the process of developing into a mature native plant community. Currently the majority of grasses are in a middle to older juvenile stage of development. A limited number of grass

clumps have fully developed to full size. Due to the vegetative litter raking event in 2017, the spaces between the native grass clumps are more evident than prior to raking. The current spacing between the native grass clumps is much less than the initial "turf-like" tight proximity spacing of young juvenile grasses that originally developed and largely collapsed across the ET cover due to lack of root growth space. The current spacing is still slightly tighter than what typically occurs across a natural landscape of these grass species. Due to this, additional recruitment (seed germination and growth of new individuals) is not recommended in 2018. The CWL ET cover should be actively managed in 2018 to discourage the establishment of additional native grass clumps. This will allow the current individuals appropriate growth and development opportunities.

- 2 -

- Very few other perennial or annual plants were observed on the ET Cover.
- Few tumbleweeds or partial tumbleweeds observed on the ET Cover and along the fence lines.

MWL

- The ET Cover is in excellent condition. The mature perennial grasses still mostly dormant; some individual grass clumps and scattered other perennial native vegetation are in an early seasonal growth stage, evidenced by a limited amount of green vegetation on the cover.
- Few tumbleweeds or partial tumbleweeds observed on the ET Cover and along the fence lines.

ET Covers Recommendations

- The 2017 annual inspection recommendation of a pre-emergent herbicide application during the first quarter of 2018 to control the annual winter weeds was not implemented due to extremely dry meteorological conditions since October 2017. This recommendation was made as a best management practice in the fall of 2017 for ET Cover maintenance planning purposes, based on the expectation of normal winter moisture. When fall and winter moisture was far below normal, the biologist's maintenance recommendation changed to no early 2018 pre-emergent herbicide application. This was discussed and agreed upon with the ET Cover Project Lead. Avoiding unnecessary herbicide application benefits the environment, and supports the SNL Environment, Safety, and Health Corporate Policy of ESH100.
- An early summer pre-emergent application is anticipated to be needed to control the development of Russian thistle, particularly before the monsoon rains begin. Early in the May-June 2018 timeframe is ideal.

If you should have any questions, don't hesitate to contact me at my office 845-9849, cell 218-1815, or email at jjpayne@sandia.gov.

cc: Customer Funded Records Center Ecology Library Steve Cox Robert Ziock Don Schofield Rick Dotson

Mixed Waste Landfill Biology Inspection Checklist/Form for the MWL Cover

Approximate vegetative coverage (actively photosynthesizing*): <u>51</u>% Approximate percent native vegetation of the total vegetative cover: <u>99</u>% Listed below are the main plant species identified as growing on the MWL cover and the percentage of the cover populated by each species.

Scientific Name	Common Name (optional)	% of Cover ¹
Pleuraphis jamesii	Galleta grass	40 %
Bouteloua gracilis	Blue grama	2 %
Sporobolus flexuosus	Mesa dropseed	4 %
Bouteloua eriopoda	Black grama	2 %
Sporobolus cryptandrus	Sand dropseed	3 %
Xanthisma spinulosum	Spiny goldenweed	< 0.5%
Salsola tragus	Russian thistle	< 0.5%
Sporobolus contractus	Spike dropseed	< 0.5%
Agropyron cristatum	Crested wheatgrass	< 0.5%
Sphaeralcea hastulata	Wrinkled globemallow	< 0.5%
Kallstroemia parviflora	Warty carpetweed	< 0.5%
Solanum elaeagnifolium	Silverleaf nightshade	< 0.5%
Achnatherum hymenoides	Indian ricegrass	< 0.5%

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)? <u>No</u>

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? <u>No</u>

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? Yes

Do any of the burrows appear to be active? <u>Possibly</u>

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: Four very small diameter (less than 1.5 inch) entrance diggings were observed. None of the burrow entrances showed signs of recent activity; the burrow entrances were not wellmaintained and none had foot or tail prints near the digging. All were shallow, the deepest less than 3 inches in depth. Two burrow locations were selected, flagged for biota sampling, and surveyed using a GPS unit; sampling locations are shown in the biological inspection map. No follow-up action is recommended.

Sixteen ant hills were observed on the cover, occurring evenly on the side-slopes and top. 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:

- Overall the MWL ET Cover vegetation is in excellent condition. The species complexity. spacing, and appearance of the mature native perennial grasses is close to that of the surrounding area vegetation. Many young, healthy juvenile native grass clumps were observed throughout the Cover.

- Low weed presence on the MWL Cover. The native clump grasses have formed ideal spacing; currently no additional native plant recruitment is needed onsite from seed.

- A few whiptail lizards were observed across the cover.

- The grass seedheads are not as abundant this year as in some previous years, making the exact species identifications more challenging. Galleta has by far the most seedheads; it has also retained a high quantity of seedheads on stems from previous years. Blue grama and the dropseed species have particularly limited seedheads present. The thick green grass blades appear healthy; the annual inspection timing may be ahead of 2017 seed production.

- Recommendations for best practices designed to enhance ET Cover vegetation health and sustainability are provided in the Annual Biology Report.

Biological Aspects Map -- [note: sketch map to locate specific features described above will be attached as appropriate]

envite Payne Date: August 21, 2017_ Inspector's Signature: Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center



MWL Biological Inspection Map - August 21, 2017

ANNEX G

Mixed Waste Landfill Biology Report

April 2017-March 2018

1.0 Introduction

As required by the Mixed Waste Landfill (MWL) Long-Term Monitoring and Maintenance Plan (LTMMP) (SNL/NM March 2012, Section 4.2.1), this summary report for the annual reporting period (April 1, 2017-March 31, 2018) 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 2017 growing season and reporting period, expand on the inspection results, if appropriate, and provide recommendations for future ET Cover vegetation monitoring and maintenance. The annual Biology Inspection of the ET Cover was conducted on August 21, 2017. 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 2017, and March 2018) as a best practice.

A self-sustaining plant community is an important component of overall ET Cover performance. Vegetation minimizes erosion by stabilizing the ET Cover surface and moves soil moisture from the ET Cover Topsoil and Native Soil Layers to the atmosphere through transpiration. Vegetation species that are native to the area create the optimal, selfsustaining 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 LTMMP, Section 4.1, the MWL was seeded in August 2009 after cover construction was completed. The native seed mix was drill-seeded and hand-broadcast uniformly across the cover. To facilitate seed germination and seedling growth, supplemental watering was performed as approved by NMED (Bearzi December 2008). Specific conditions and limits for supplemental watering are addressed in Section 4.2.3 of the LTMMP (SNL/NM March 2012). All cover maintenance and supplemental watering activities from 2009 through 2011 are documented in Appendix B of the LTMMP. ET Cover maintenance and supplemental watering watering activities performed since 2011 are documented in MWL Annual LTMM Reports.

ET Cover Biology Inspections were initiated in May 2013 prior to LTMMP approval, which occurred on January 8, 2014. The ET Cover has met the LTMMP criteria for successful revegetation as documented in all quarterly inspections. In accordance with the LTMMP, the frequency of Biology Inspections transitioned to an annual frequency after the August

2014 growing season inspection, which provided confirmation that all successful revegetation criteria had been met (SNL/NM June 2015).

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 density of less than one-half of one-percent are recorded as "< 0.5%." Due to the presence of these species in very low numbers, they are not calculated into the total vegetative coverage. Species that are present between one-half and one percent are recorded as "1%" and are calculated into the total vegetative coverage.

3.0 Local Climate Trends for 2017 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.

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 2016 meteorological conditions assisted the 2017 growing season with above average precipitation, providing good soil moisture and aiding vegetative root health. The remaining winter and spring months preceding the 2017 growing season experienced slightly above average precipitation, initiating the growing season with above normal soil moisture.

Table 1 provides meteorological data for CY 2017. Table 2 provides meteorological data for the first 3-month period of CY 2018. A 20-year data set (1995-2014) provides the reference mean monthly meteorological data and will be the reference mean data set until 2019, when a 25-year data set will be created for the 1994-2018 time period.

Precipitation, Relative Humidity and Winds

Warmer than average temperatures with below average precipitation have been the meteorological norm trend in the MWL area since 2008. Total annual precipitation for 2017 was 6.79 inches, 22% below the 20-year annual precipitation mean of 8.71 inches. As of March 22, 2018, the area was categorized as "Severe Drought" according to the U.S. Drought Monitor (U.S. Drought Monitor March 2018).

Soil moisture received during the months of October 2016 through January 2017 benefitted the vegetation during the very dry months of February and March 2017, which

	Table 1	
Summary of 2017	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	38.4	46.1	54.3	55.9	63.7	76.3	76.1	72.1	68.9	57.9	54.1	42.8	58.9
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	1.18	0.14	0.10	1.07	0.27	.06	0.94	1.39	1.57	0.07	0.00	0.00	6.79
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	57.4	45.7	28.7	33.5	28.8	24.2	41.1	47.3	38.6	40.5	35.5	35.6	38.1
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	7.5	8.3	8.6	9.6	9.8	9.6	8.8	8.1	8.9	8.2	6.6	6.3	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.

	_		
Month	January	February	March
Temperature (°F)			
Monthly Mean	40.6	45.3	50.5
20-year Temp Means	37.7	41.7	48.8
Precipitation (Inches)			
Monthly Total	0.05	0.71	0.28
20-year Precip Means	0.34	0.45	0.56
Relative Humidity (%)			
Monthly Mean	38.8	38.1	31.6
20-year RH Means	49.9	44.9	36.4
Wind (Miles/hour)			
Monthly Mean	7.5	8.3	8.6
20-year Wind Means	6.9	8.1	9.1

Table 2Summary of January-March 2018 Meteorological Data at the Mixed Waste Landfill^a

^aInformation Source: SNL/NM Meteorological Monitoring Network.

barely received any measurable precipitation. April 2017 received twice the monthly average, providing timely soil moisture before warm season active vegetative growth. June through August 2017 received 2.39 inches of precipitation, 35% below the growing season historical mean of 3.70 inches. The total annual precipitation for the 2017 growing season and preceding winter-to-spring timeframe (October 2016-September 2017) was 9.58 inches, above the 20-year mean of 8.72 inches. After the warm growing season, the final quarter of 2017 was extremely dry, receiving only 0.07 inches of precipitation. The first quarter of 2018 was 23% drier than normal, receiving a total of 1.04 inches of rain for the period.

Relative humidity was near normal for CY 2017 at 38.1%, slightly below the 20-year annual mean of 40.6%.

Winds were very close to average for CY 2017. All months recorded average wind speeds that were within 1.0 mile per hour of the respective historical monthly mean.

Temperature

In CY 2017 the MWL experienced 91 degrees of temperature variability, with a low of 11.5°F in January 2017 and a high of 102.7°F in June 2017. The annual mean temperature was 58.9°F, which is 1.6°F above the historical mean of 57.3°F. The monthly temperature means were near normal, except for February, March, November, and December 2017 which were 4.4°F, 5.5°F, 7.7°F, and 5.8°F above their respective historical mean temperatures. November 2017 was the warmest November on record since meteorological data collection began more than 100 years ago at the ABQ Sunport, followed by an abnormally warm December. Warmer than normal temperatures continued in the first quarter of 2018 with the mean temperature 3.0°F above the 20-year mean for the quarter.

4.0 August 2017 Inspection Results

The August 21, 2017 MWL ET Cover Biology Inspection occurred during the New Mexico growing season, which typically ends 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 August 2017 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 99% 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, with many young, juvenile native grass clumps also occurring across the ET Cover. The overall appearance of the mature native grass community was very similar to the surrounding vegetation in Technical Area III. The native bunch grasses in 2017 appeared healthy with thick green grass blades. Very few weeds were present on the MWL ET Cover.

No burrows with an entrance diameter of 4 inches or greater were observed on the MWL ET Cover during the August 2017 Biology Inspection. Four very small diameter (less than 1 inch) and shallow burrow entrance diggings were observed, where the soil was excavated approximately 1.5 inches deep, or less, by a small animal. There was no obvious sign of recent activity at any of the very small burrow entrance diggings. Sixteen ant hills were observed across the ET Cover on both the side-slopes and top.

Biota sampling locations were identified for anthills and the very small burrow entrance diggings during the August 2017 Biology Inspection. Two anthills and two animal diggings 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 potentially deep-rooted plants were observed in 2017. 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 2017 – 2018 reporting period are summarized in Section 9.7 of this MWL Annual LTMM Report. Three routine weed control events were conducted in May, July and September as a best practice during the 2017 growing season. These events included removal of dead, windblown tumbleweeds from the ET Cover surface, perimeter fence, and drainage swale, as well as removal of minimal live weeds from the ET Cover, perimeter fence line, and 10-foot perimeter around erosion control features on the western perimeter. An invasive shrub was also removed along the western perimeter area during the May maintenance work. A pre-/post-emergent herbicide mix was applied to North and South Staging Areas (May and July) and a 3-foot area outside the perimeter fence (September). 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.

6.0 Recommendations

The MWL ET Cover Biology Inspections will continue on an annual frequency and be conducted in August or September. As a best practice, the SNL staff biologist will continue to support quarterly ET Cover inspections, document observations, and provide recommendations to maintain or improve the ecological health and integrity of the ET Cover.

Routine weed removal events will likely be needed during the 2018 – 2019 reporting period to clear the perimeter fence and remove windblown tumbleweeds from the ET Cover, perimeter drainage, and perimeter area based on LTMMP inspection requirements and best practice. Pre- and/or post-emergent herbicides should be applied as needed to the graveled staging areas and along the perimeter fence, which is prone to weed growth

due to the unavoidable accumulation of windblown weeds and their seeds. Application of pre-emergent herbicides on the ET Cover will also be evaluated. If present, other annual weedy species on the MWL ET Cover should also be removed during the growing season weed removal events. If observed, four-wing saltbush and any other potentially deeprooted plants will be pulled by hand, clipped at the ground surface, or removed for biota sampling. These routine weed control activities help the desired native grasses by reducing the availability of weed seeds and competition from the future growth of invasive plants. Based on experience since initial seeding of the ET Cover in 2009, these activities have a significant, positive impact on the establishment of healthy, self-sustaining native grasses in a relatively short period of time. Successful revegetation requirements were met in 5 years after initial seeding; this is a process that could take 50 years or more without active seeding and maintenance activities.

8.0 References

Bearzi, J.P. (New Mexico Environment Department), December 2008. Letter to K. Davis (U.S. Department of Energy) and F. Nimick (Sandia Corporation), "Conditional Approval, Mixed Waste Landfill Corrective Measures Implementation Plan, November 2005, Sandia National Laboratories NM5890110518, SNL-05-025." December 22, 2008.

Sandia National Laboratories/New Mexico (SNL/NM), March 2012. "Long-Term Monitoring and Maintenance Plan for the Mixed Waste Landfill," Environmental Restoration Operations, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), June 2015. "Mixed Waste Landfill Annual Long-Term Monitoring and Maintenance Report, January – March 2015," Sandia National Laboratories, Albuquerque, New Mexico.

U. S. Drought Monitor (March 2018) Accessed March 2018. http://droughtmonitor.unl.edu/





South portion of the cover from approximate center of ET cover



West portion of the cover from approximate center of ET cover



East portion of the cover from approximate center of ET cover

Figure 1 August 21, 2017 MWL ET Cover Photographs - Main Cover Surface



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 south of the dogleg bend

Figure 2 August 21, 2017 MWL ET Cover Photographs – Cover Side Slopes