

DOE Oversight Bureau, New Mexico Environment Department

**Groundwater Monitoring at
Sandia National Laboratories/New Mexico
Mixed Waste Landfill**

**Conducted by the
New Mexico Environment Department DOE Oversight Bureau
for FFY 2017 Q-1**

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Final Report

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The purpose of this communication is to transmit groundwater quality data collected by the New Mexico Environment Department DOE Oversight Bureau from Mixed Waste Landfill groundwater monitoring wells during first quarter FFY 2017.

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Introduction

The New Mexico Environment Department (NMED) DOE Oversight Bureau (DOE-OB or Bureau) has compiled and assessed groundwater data collected during October 2016. The Bureau collected groundwater samples from Mixed Waste Landfill (MWL) groundwater monitoring wells MWL-BW2 (plus duplicate), MWL-MW7, MWL-MW8 and MWL-MW9. Split samples were collected using standard Sandia National Laboratories/New Mexico (SNL/NM) sampling procedures and equipment in accordance with the MWL Long-Term Monitoring and Maintenance Plan (LTMMP), Appendix F (Groundwater Sampling and Analysis Plan). Samples were analyzed for total metals plus uranium, volatile organic compounds (VOCs), gamma emitting isotopes, gross alpha and gross beta, radon, and tritium. The Bureau used ALS Environmental Laboratory located in Fort Collins, Colorado to analyze and report data results from samples collected at MWL. ALS Environmental is an independent analytical laboratory under contract with the NMED. No sample concentrations exceeded established U.S. Environmental Protection Agency (EPA) Maximum Contaminant Levels (MCLs) or trigger levels listed in the LTMMP.

Data Assessment

All groundwater samples were collected and analyzed in accordance with U.S. EPA protocols. Data results are compared to applicable MCLs established by the U.S. EPA National Primary Drinking Water Regulations (40 CFR 141), National Primary Drinking Water Standards, EPA, July 2002. Sample results are also compared to Mixed Waste Landfill Groundwater Monitoring Trigger Levels in Table 5.2.4-1 of the SNL/NM Environmental Restoration Operations LTMMP for the MWL, March 2012.

Under the current LTMMP, SNL/NM is required to collect samples from MWL monitoring wells MWL-BW2, MWL-MW7, MWL-MW8 and MWL-MW9. Samples are analyzed for LTMMP list VOCs, metals (Cd, Cr, Ni, and U), gamma emitting isotopes, gross alpha and beta, radon and tritium. See Table-A below for LTMMP listed analytes and trigger levels.

Results

Analytical results for total target analyte list (TAL) metals plus uranium are presented in Table-1. Metals concentrations for total uranium, cadmium, chromium, and nickel were below established MCLs and LTMMP trigger levels; all other metals concentrations were below established MCLs. In accordance with the MWL LTMMP, SNL/NM only analyzes groundwater samples for the metals uranium (total), cadmium, chromium, and nickel.

Volatile organic compounds detected at concentrations above the method detection limits (MDLs) are presented in Table 2. Tetrachloroethene (PCE) was

detected above the MDL at monitoring well MWL-MW8 at a concentration of 0.23 µg/L. The result was “J” flagged, indicating that the result was an estimated value. The PCE result was below the EPA MCL (5 µg/L) and LTMMP trigger level (2.5 µg/L). Table-3 summarizes laboratory MDLs for the remaining VOCs analyzed from the samples collected at MWL monitoring wells.

Analytical results for radionuclides are listed in Table-4 and used to screen for potential radiological contamination. Gross alpha activity ranged from 5.3 pCi/L at MWL-MW7 to 7.8 pCi/L at MWL-BW2. Radon-222 activity ranged from 120 pCi/L at MWL-MW7 to 570 pCi/L at MWL-BW2 duplicate. These results were below the LTMMP trigger level of 15 pCi/L for gross alpha and 1000 pCi/L for radon, respectively. Tritium was not detected in any samples. All radionuclide results were below established EPA MCLs and MWL LTMMP trigger levels, and consistent with previous monitoring results.

Conclusion

Groundwater samples were collected from four (4) monitoring wells during this semi-annual sampling event at MWL. Samples collected by the Bureau and analyzed by ALS Environmental reported concentrations of metals, VOCs and radionuclides below established EPA MCLs and SNL/NM trigger levels listed in the LTMMP.

The DOE-OB will continue to monitor groundwater quality at MWL semi-annually and make the data reports available to the public.

References

Sandia National Laboratories, New Mexico. Annual Groundwater Monitoring Report, Calendar Year 2015.

Sandia National Laboratories, New Mexico Environmental Restoration Operations. Long-Term Monitoring and Maintenance Plan for the Mixed Waste Landfill, March 2012.

U.S. EPA National Primary Drinking Water Regulations (40 CFR 141), National Primary Drinking Water Standards, EPA, July 2002.

Table-A
Mixed Waste Landfill Groundwater Monitoring Trigger Levels

Groundwater Monitoring Parameters	Final Trigger Levels (µg/L) ^a	Trigger Level Source ^a	2011 Laboratory Reporting Limits	
			Method Detection Limit (µg/L)	Practical Quantitation Limit (µg/L)
EPA Method 8260 Volatile Organic Compounds				
1,1,1-Trichloroethane (1,1,1-TCA)	15	25% NMED WQCC MAC	0.325	1
1,1,2,2-Tetrachloroethane	5	50% NMED WQCC MAC	0.25	1
1,1,2-Trichloroethane ^b	2.5	50% EPA MCL	0.25	1
1,1-Dichloroethane	12.5	50% NMED WQCC MAC	0.3	1
1,1-Dichloroethene	2.5	50% NMED WQCC MAC	0.3	1
1,2-Dichloroethane	2.5	50% EPA MCL	0.25	1
1,2-Dichloropropane	2.5	50% EPA MCL	0.25	1
2-Butanone (methyl ethyl ketone) ^b	1,225	25% EPA RSL	1.25	5
2-Hexanone	17	50% EPA RSL	1.25	5
4-methyl-, 2-Pentanone (Methyl isobutyl ketone) ^b	250	25% EPA RSL	1.25	5
Acetone ^b	3,000	25% EPA RSL	1.25 – 5.0	5.0 – 15.0
Benzene	2.5	50% EPA MCL	0.30 – 1.0	1.0 – 3.0
Bromodichloromethane	0.6	50% NMED SL	0.25	1
Bromoform	4.0	50% EPA RSL	0.25	1
Bromomethane	3.5	50% EPA RSL	0.3	1
Carbon disulfide	180	25% EPA RSL	1.25	5
Carbon tetrachloride	2.5	50% EPA MCL	0.3	1
Chlorobenzene	25	25% EPA MCL	0.25	1
Chloroethane (ethyl chloride)	5,250	25% EPA RSL	0.3	1
Chloroform	25	25% NMED WQCC MAC	0.25	1
Chloromethane	47	25% NMED SL	0.3	1
Dibromochloromethane	0.75	50% NMED SL	0.3	1
Ethyl benzene	175	25% EPA MCL	0.25	1
Methylene chloride	3 ^c	60% EPA MCL	3	10
Styrene	25	25% EPA MCL	0.25	1
Tetrachloroethene (PCE)	2.5	50% EPA MCL	0.3	1
Toluene ^b	187.5	25% NMED WQCC MAC	0.25 – 1.0	1
Trichloroethene (TCE)	2.5	50% EPA MCL	0.25	1
Vinyl acetate	103	25% EPA RSL	1.5 – 5.0	5
Vinyl chloride	0.5	50% NMED WQCC MAC	0.5	1
Xylene	155	25% NMED WQCC MAC	0.3	1
cis-1,2-Dichloroethene	17.5	25% EPA MCL	0.3	1
cis-1,3-Dichloropropene (1,3-Dichloropropene)	2.2	50% NMED SL	0.25	1
trans-1,2-Dichloroethene	25	25% EPA MCL	0.3	1
trans-1,3-Dichloropropene (1,3-Dichloropropene)	2.2	50% NMED SL	0.25	1
Dichlorodifluoromethane	47.5	25% EPA RSL	0.3	1
Metals with Trigger Levels				
Uranium (total)	15	50% EPA MCL	0.05	0.2
Chromium (total)	43	NMED-approved background concentration	2.5	10
Cadmium	2.5	50% of EPA MCL	0.11	1
Nickel	50	25% of NMED WQCC standard of 0.2 mg/L	0.5	2

Table-A (Concluded)
Mixed Waste Landfill Groundwater Monitoring Trigger Levels

Groundwater Monitoring Parameters	Final Trigger Levels ^a	Trigger Level Source ^a	2011 Laboratory Reporting Limits	
			Method Detection Limit (µg/L)	Practical Quantitation Limit (µg/L)
Radiological Constituents with Trigger Levels				
Tritium	4 mrem/yr	EPA MCL	— ^d	— ^d
Radon	1,000 pCi/L	No Regulatory Standard	— ^d	— ^d
Gross Alpha Activity	15 pCi/L ^e	EPA MCL	— ^d	— ^d
Gross Beta Activity	4 mrem/yr	EPA MCL	— ^d	— ^d

^aAll trigger levels reviewed and updated in February 2012 and are based upon current EPA (November 2011) RSLs for Tap Water, EPA (May 2009) MCLs, NMED WQCC (2002) MACs for Tap Water, and NMED (February 2012) SLs for Tap Water. Percentage of standard/screening level based upon NMED guidance (Bearzi October 2008a).

^bCommon laboratory contaminants specified in EPA (November 1992) technical guidance.

^cMethylene chloride trigger level is adjusted to 60% of the EPA (May 2009) MCL, which is the analytical laboratory method detection limit.

^dCritical level and minimum detectable activity for all radiological analyses vary greatly but are below the associated trigger level.

^eGross alpha activity data corrected for naturally occurring uranium in accordance with 40 CFR Parts 9, 141, and 142, Table I-4.

— = Not applicable.

µg/L = Micrograms per liter.

CFR = Code of Federal Regulations.

EPA = U.S. Environmental Protection Agency.

MAC = Maximum Allowable Concentration.

MCL = Maximum Contaminant Level.

mg/L = Milligram(s) per liter.

mrem/yr = Millirem per year.

NMED = New Mexico Environment Department.

pCi/L = Picocurie(s) per liter.

RSL = Regional Screening Level.

SL = Tap Water Screening Level.

WQCC = Water Quality Control Commission.

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**Table-1 NMED DOE Oversight Bureau FFY 2017 Q-1 Mixed Waste Landfill Groundwater Quality Results:
Total Target Analyte List Metals plus Uranium**

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMP Trigger Level (mg/L)	Laboratory Detection Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 25-Oct-16	Aluminum	0.11	NE	NE	0.1	0.014	B	SW-846:6020
	Antimony	0.000084	0.006	NE	0.001	0.000084	U	SW-846:6020
	Arsenic	0.00097	0.01	NE	0.002	0.00018	J	SW-846:6020
	Barium	0.098	2	NE	0.005	0.00023	B	SW-846:6020
	Beryllium	0.00027	0.004	NE	0.0005	0.00027	U	SW-846:6020
	Cadmium	0.000099	0.005	0.0025	0.002	0.000099	U	SW-846:6020
	Calcium	68	NE	NE	1	0.061	B	SW-846:6020
	Chromium	0.0011	0.1	0.043	0.01	0.0011	U	SW-846:6020
	Cobalt	0.00012	NE	NE	0.005	0.00007	JB	SW-846:6020
	Copper	0.002	NE	NE	0.02	0.0011	JB	SW-846:6020
	Iron	1.7	NE	NE	0.1	0.0053	B	SW-846:6020
	Lead	0.00058	NE	NE	0.002	0.00016	JB	SW-846:6020
	Magnesium	22	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.0068	NE	NE	0.005	0.0003	B	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0042	NE	0.05	0.02	0.0042	U	SW-846:6020
	Potassium	4	NE	NE	1	0.32		SW-846:6020
	Selenium	0.0022	0.05	NE	0.01	0.00066	J	SW-846:6020
	Silver	0.000039	NE	NE	0.0005	0.000039	U	SW-846:6020
	Sodium	59	NE	NE	1	0.19		SW-846:6020
	Thallium	0.000014	0.002	NE	0.0001	0.000014	U	SW-846:6020
	Uranium	0.0067	0.03	0.015	0.0001	0.000027		SW-846:6020
	Vanadium	0.0062	NE	NE	0.005	0.00058		SW-846:6020
	Zinc	0.0091	NE	NE	0.1	0.0091	U	SW-846:6020

B = Compound was found in the blank and sample.

J = the reported value was obtained from a reading that was less than the Quantitation Limit but greater than or equal to the Method Detection Limit (MDL).

LTMP = Long-Term Monitoring and Maintenance Plan

NE = Not Established

U = the analyte was analyzed for but not detected

**Table-1 NMED DOE Oversight Bureau FFY 2017 Q-1 Mixed Waste Landfill Groundwater Quality Results:
Total Target Analyte List Metals plus Uranium**

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMP Trigger Level (mg/L)	Laboratory Detection Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 25-Oct-16 DUP	Aluminum	0.11	NE	NE	0.1	0.014	B	SW-846:6020
	Antimony	0.000084	0.006	NE	0.001	0.000084	U	SW-846:6020
	Arsenic	0.00067	0.01	NE	0.002	0.00018	J	SW-846:6020
	Barium	0.099	2	NE	0.005	0.00023	B	SW-846:6020
	Beryllium	0.00027	0.004	NE	0.0005	0.00027	U	SW-846:6020
	Cadmium	0.000099	0.005	0.0025	0.002	0.000099	U	SW-846:6020
	Calcium	69	NE	NE	1	0.061	B	SW-846:6020
	Chromium	0.0011	0.1	0.043	0.01	0.0011	U	SW-846:6020
	Cobalt	0.00009	NE	NE	0.005	0.00007	JB	SW-846:6020
	Copper	0.0011	NE	NE	0.02	0.0011	U	SW-846:6020
	Iron	0.19	NE	NE	0.1	0.0053	B	SW-846:6020
	Lead	0.00074	NE	NE	0.002	0.00016	JB	SW-846:6020
	Magnesium	22	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.0043	NE	NE	0.005	0.0003	JB	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0042	NE	0.05	0.02	0.0042	U	SW-846:6020
	Potassium	4	NE	NE	1	0.32		SW-846:6020
	Selenium	0.002	0.05	NE	0.01	0.00066	J	SW-846:6020
	Silver	0.000039	NE	NE	0.0005	0.000039	U	SW-846:6020
	Sodium	58	NE	NE	1	0.19		SW-846:6020
	Thallium	0.000014	0.002	NE	0.0001	0.000014	U	SW-846:6020
	Uranium	0.0068	0.03	0.015	0.0001	0.000027		SW-846:6020
	Vanadium	0.006	NE	NE	0.005	0.00058		SW-846:6020
	Zinc	0.0091	NE	NE	0.1	0.0091	U	SW-846:6020

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**Table-1 NMED DOE Oversight Bureau FFY 2017 Q-1 Mixed Waste Landfill Groundwater Quality Results:
Total Target Analyte List Metals plus Uranium**

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMP Trigger Level (mg/L)	Laboratory Detection Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 26-Oct-16	Aluminum	0.017	NE	NE	0.1	0.014	JB	SW-846:6020
	Antimony	0.000084	0.006	NE	0.001	0.000084	U	SW-846:6020
	Arsenic	0.0018	0.01	NE	0.002	0.00018	J	SW-846:6020
	Barium	0.11	2	NE	0.005	0.00023	B	SW-846:6020
	Beryllium	0.00027	0.004	NE	0.0005	0.00027	U	SW-846:6020
	Cadmium	0.000099	0.005	0.0025	0.002	0.000099	U	SW-846:6020
	Calcium	55	NE	NE	1	0.061	B	SW-846:6020
	Chromium	0.0011	0.1	0.043	0.01	0.0011	U	SW-846:6020
	Cobalt	0.00007	NE	NE	0.005	0.00007	U	SW-846:6020
	Copper	0.0011	NE	NE	0.02	0.0011	U	SW-846:6020
	Iron	0.019	NE	NE	0.1	0.0053	JB	SW-846:6020
	Lead	0.00058	NE	NE	0.002	0.00016	JB	SW-846:6020
	Magnesium	19	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.00069	NE	NE	0.005	0.0003	JB	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0042	NE	0.05	0.02	0.0042	U	SW-846:6020
	Potassium	5	NE	NE	1	0.32		SW-846:6020
	Selenium	0.00066	0.05	NE	0.01	0.00066	U	SW-846:6020
	Silver	0.000039	NE	NE	0.0005	0.000039	U	SW-846:6020
	Sodium	50	NE	NE	1	0.19		SW-846:6020
	Thallium	0.000014	0.002	NE	0.0001	0.000014	U	SW-846:6020
	Uranium	0.0075	0.03	0.015	0.0001	0.000027		SW-846:6020
	Vanadium	0.0069	NE	NE	0.005	0.00058		SW-846:6020
	Zinc	0.0091	NE	NE	0.1	0.0091	U	SW-846:6020

B = Compound was found in the blank and sample.

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**Table-1 NMED DOE Oversight Bureau FFY 2017 Q-1 Mixed Waste Landfill Groundwater Quality Results:
Total Target Analyte List Metals plus Uranium**

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMP Trigger Level (mg/L)	Laboratory Detection Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 28-Oct-16	Aluminum	0.017	NE	NE	0.1	0.014	J	SW-846:6020
	Antimony	0.000084	0.006	NE	0.001	0.000084	U	SW-846:6020
	Arsenic	0.0006	0.01	NE	0.002	0.00018	J	SW-846:6020
	Barium	0.14	2	NE	0.005	0.00023		SW-846:6020
	Beryllium	0.00027	0.004	NE	0.0005	0.00027	U	SW-846:6020
	Cadmium	0.000099	0.005	0.0025	0.002	0.000099	U	SW-846:6020
	Calcium	58	NE	NE	1	0.061		SW-846:6020
	Chromium	0.0011	0.1	0.043	0.01	0.0011	U	SW-846:6020
	Cobalt	0.00007	NE	NE	0.005	0.00007	U	SW-846:6020
	Copper	0.0011	NE	NE	0.02	0.0011	U	SW-846:6020
	Iron	0.019	NE	NE	0.1	0.0053	JB	SW-846:6020
	Lead	0.00061	NE	NE	0.002	0.00016	JB	SW-846:6020
	Magnesium	19	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.0053	NE	NE	0.005	0.0003		SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0042	NE	0.05	0.02	0.0042	U	SW-846:6020
	Potassium	5.1	NE	NE	1	0.32		SW-846:6020
	Selenium	0.00066	0.05	NE	0.01	0.00066	U	SW-846:6020
	Silver	0.000039	NE	NE	0.0005	0.000039	U	SW-846:6020
	Sodium	50	NE	NE	1	0.19		SW-846:6020
	Thallium	0.000014	0.002	NE	0.0001	0.000014	U	SW-846:6020
	Uranium	0.013	0.03	0.015	0.0001	0.000027		SW-846:6020
	Vanadium	0.0019	NE	NE	0.005	0.00058	J	SW-846:6020
	Zinc	0.0091	NE	NE	0.1	0.0091	U	SW-846:6020

B = Compound was found in the blank and sample.

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LTMP = Long-Term Monitoring and Maintenance Plan

NE = Not Established

U = the analyte was analyzed for but not detected

**Table-1 NMED DOE Oversight Bureau FFY 2017 Q-1 Mixed Waste Landfill Groundwater Quality Results:
Total Target Analyte List Metals plus Uranium**

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMP Trigger Level (mg/L)	Laboratory Detection Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 27-Oct-16	Aluminum	0.02	NE	NE	0.1	0.014	JB	SW-846:6020
	Antimony	0.000084	0.006	NE	0.001	0.000084	U	SW-846:6020
	Arsenic	0.0033	0.01	NE	0.002	0.00018		SW-846:6020
	Barium	0.097	2	NE	0.005	0.00023	B	SW-846:6020
	Beryllium	0.00027	0.004	NE	0.0005	0.00027	U	SW-846:6020
	Cadmium	0.000099	0.005	0.0025	0.002	0.000099	U	SW-846:6020
	Calcium	58	NE	NE	1	0.061	B	SW-846:6020
	Chromium	0.0011	0.1	0.043	0.01	0.0011	U	SW-846:6020
	Cobalt	0.00007	NE	NE	0.005	0.00007	U	SW-846:6020
	Copper	0.0011	NE	NE	0.02	0.0011	U	SW-846:6020
	Iron	0.014	NE	NE	0.1	0.0053	JB	SW-846:6020
	Lead	0.00072	NE	NE	0.002	0.00016	JB	SW-846:6020
	Magnesium	19	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.0014	NE	NE	0.005	0.0003	JB	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0042	NE	0.05	0.02	0.0042	U	SW-846:6020
	Potassium	4.9	NE	NE	1	0.32		SW-846:6020
	Selenium	0.00066	0.05	NE	0.01	0.00066	U	SW-846:6020
	Silver	0.000039	NE	NE	0.0005	0.000039	U	SW-846:6020
	Sodium	49	NE	NE	1	0.19		SW-846:6020
	Thallium	0.000014	0.002	NE	0.0001	0.000014	U	SW-846:6020
	Uranium	0.0089	0.03	0.015	0.0001	0.000027		SW-846:6020
	Vanadium	0.0087	NE	NE	0.005	0.00058		SW-846:6020
	Zinc	0.0091	NE	NE	0.1	0.0091	U	SW-846:6020

B = Compound was found in the blank and sample.

J = the reported value was obtained from a reading that was less than the Quantitation Limit but greater than or equal to the Method Detection Limit (MDL).

LTMP = Long-Term Monitoring and Maintenance Plan

NE = Not Established

U = the analyte was analyzed for but not detected

**Table-2 NMED DOE Oversight Bureau FFY 2017 Q-1 Mixed Waste Landfill Groundwater Quality Results:
Detected Volatile Organic Compounds**

Monitoring Well/ Sample Date	Analyte	Result (µg/L)	EPA MCL (µg/L)	LTMMMP Trigger Level (µg/L)	Laboratory Detection Limit (µg/L)	MDL (µg/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 26-Oct-16	Tetrachloroethene	0.23	5	2.5	1	0.2	J	SW-846:8260B_25

J = the reported value was obtained from a reading that was less than the Reporting Limit but greater than or equal to the Method Detection Limit (MDL).

Table-3 NMED DOE Oversight Bureau FFY 2017 Q-1 Mixed Waste Landfill Groundwater Quality Results: Method Detection Limits for Volatile Organic Compounds by Method SW-846:8260B_25

Analyte	MDL (µg/L)
Acetone	3
Benzene	0.3
Bromobenzene	0.3
Bromochloromethane	0.3
Bromodichloromethane	0.3
Bromoform	0.3
Bromomethane	0.3
Butanone[2-]	3
Butylbenzene[n-]	0.3
Butylbenzene[sec-]	0.3
Butylbenzene[tert-]	0.3
Carbon Disulfide	0.3
Carbon Tetrachloride	0.3
Chlorobenzene	0.3
Chlorodibromomethane	0.3
Chloroethane	0.3
Chloroform	0.3
Chlorohexane[1-]	0.3
Chloromethane	0.3
Chlorotoluene[2-]	0.3
Chlorotoluene[4-]	0.3
Dibromo-3-Chloropropane[1,2-]	0.4
Dibromoethane[1,2-]	0.3
Dibromomethane	0.3
Dichlorobenzene[1,2-]	0.3
Dichlorobenzene[1,3-]	0.3
Dichlorobenzene[1,4-]	0.3
Dichlorodifluoromethane	0.3
Dichloroethane[1,1-]	0.3
Dichloroethane[1,2-]	0.3
Dichloroethene[1,1-]	0.3
Dichloroethene[cis-1,2-]	0.3
Dichloroethene[trans-1,2-]	0.3
Dichloropropane[1,2-]	0.3
Dichloropropane[1,3-]	0.3

Analyte	MDL (µg/L)
Dichloropropane[2,2-]	0.3
Dichloropropene[1,1-]	0.3
Dichloropropene[cis-1,3-]	0.3
Dichloropropene[trans-1,3-]	0.3
Ethylbenzene	0.3
Hexachlorobutadiene	0.3
Hexanone[2-]	3
Iodomethane	0.38
Isopropylbenzene	0.3
Isopropyltoluene[4-]	0.3
Methyl tert-Butyl Ether	0.3
Methyl-2-pentanone[4-]	3
Methylene Chloride	0.44
Naphthalene	0.3
Propylbenzene[1-]	0.3
Styrene	0.3
Tetrachloroethane[1,1,1,2-]	0.3
Tetrachloroethane[1,1,2,2-]	0.3
Tetrachloroethene	0.2
Toluene	0.3
Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.3
Trichlorobenzene[1,2,3-]	0.3
Trichlorobenzene[1,2,4-]	0.3
Trichloroethane[1,1,1-]	0.3
Trichloroethane[1,1,2-]	0.3
Trichloroethene	0.3
Trichlorofluoromethane	0.3
Trichloropropane[1,2,3-]	0.3
Trimethylbenzene[1,2,4-]	0.3
Trimethylbenzene[1,3,5-]	0.3
Vinyl acetate	0.3
Vinyl Chloride	0.3
Xylene[1,2-]	0.3
Xylene[1,3-]+Xylene[1,4-]	0.3

Table-4 NMED DOE Oversight Bureau FFY 2017 Q-1 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Emitting Isotopes, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity ^a (pCi/L)			EPA MCL (pCi/L)	LTMMP Trigger Level (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 25-Oct-16	Actinium-228	14	±	5.2	NE	NE	21	U	EPA:901.1
	Americium-241	7.1	±	31	NE	NE	100	U	EPA:901.1
	Beryllium-7	10	±	11	NE	NE	38	U	EPA:901.1
	Bismuth-212	43	±	18	NE	NE	59	U	EPA:901.1
	Bismuth-214	0.0056	±	6.6	NE	NE	22	U	EPA:901.1
	Cesium-134	5.4	±	1.3	NE	NE	3.9		EPA:901.1
	Cesium-137	-0.71	±	1.2	NE	NE	4.2	U	EPA:901.1
	Cobalt-60	-1.3	±	1.4	NE	NE	4.8	U	EPA:901.1
	Gross alpha	7.8	±	0.84	15	15	1.3		EPA:900
	Gross beta	6	±	0.66	4 mrem/yr	4 mrem/yr	1.3		EPA:900
	Iodine-131	-0.89	±	4.7	NE	NE	16	U	EPA:901.1
	Lead-212	5.2	±	4.5	NE	NE	15	U	EPA:901.1
	Lead-214	-4.1	±	5.6	NE	NE	19	U	EPA:901.1
	Potassium-40	24	±	41	NE	NE	140	U	EPA:901.1
	Protactinium-234m	400	±	210	NE	NE	670	U	EPA:901.1
	Radon-222	530	±	74	NE	1000	49		Rn222
	Sodium-22	0.61	±	1.3	NE	NE	4.4	U	EPA:901.1
	Thallium-208	-0.32	±	2.5	NE	NE	8.4	U	EPA:901.1
	Thorium-234	-4.6	±	72	NE	NE	240	U	EPA:901.1
	Tritium	-220	±	100	4 mrem/yr	4 mrem/yr	340	U	EPA:906.0

NE = Not Established

U = Result is less than the sample specific Minimum Detectable Activity (MDA).

^a Negative numbers indicate the sample count or result was less than the instrument background; result is below the Minimum Detectable Activity (MDA).

Table-4 NMED DOE Oversight Bureau FFY 2017 Q-1 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Emitting Isotopes, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity ^a (pCi/L)		EPA MCL (pCi/L)	LTMMP Trigger Level (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 25-Oct-16 DUP	Actinium-228	9.3	± 5.9	NE	NE	19	U	EPA:901.1
	Americium-241	20	± 14	NE	NE	46	U	EPA:901.1
	Beryllium-7	2.4	± 12	NE	NE	41	U	EPA:901.1
	Bismuth-212	40	± 21	NE	NE	70	U	EPA:901.1
	Bismuth-214	7.3	± 4.7	NE	NE	21	U	EPA:901.1
	Cesium-134	-3	± 1.4	NE	NE	4.9	U	EPA:901.1
	Cesium-137	-1.3	± 1.4	NE	NE	4.7	U	EPA:901.1
	Cobalt-60	-1	± 1.5	NE	NE	5.3	U	EPA:901.1
	Gross alpha	6.9	± 0.79	15	15	1.4		EPA:900
	Gross beta	5.9	± 0.61	4 mrem/yr	4 mrem/yr	1.1		EPA:900
	Iodine-131	4.1	± 5.5	NE	NE	18	U	EPA:901.1
	Lead-212	8.7	± 2.2	NE	NE	6.8		EPA:901.1
	Lead-214	-0.19	± 4.7	NE	NE	16	U	EPA:901.1
	Potassium-40	56	± 53	NE	NE	170	U	EPA:901.1
	Protactinium-234m	340	± 250	NE	NE	810	U	EPA:901.1
	Radon-222	580	± 83	NE	1000	59		Rn222
	Sodium-22	0.16	± 1.5	NE	NE	5.1	U	EPA:901.1
	Thallium-208	0.6	± 2.6	NE	NE	8.8	U	EPA:901.1
	Thorium-234	48	± 20	NE	NE	63	U	EPA:901.1
	Tritium	-340	± 99	4 mrem/yr	4 mrem/yr	340	U	EPA:906.0

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Table-4 NMED DOE Oversight Bureau FFY 2017 Q-1 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Emitting Isotopes, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity ^a (pCi/L)		EPA MCL (pCi/L)	LTMMP Trigger Level (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 26-Oct-16	Actinium-228	15	± 5.7	NE	NE	18	U	EPA:901.1
	Americium-241	0.000016	± 11	NE	NE	38	U	EPA:901.1
	Beryllium-7	-24	± 21	NE	NE	70	U	EPA:901.1
	Bismuth-212	14	± 20	NE	NE	66	U	EPA:901.1
	Bismuth-214	-9.1	± 7	NE	NE	23	U	EPA:901.1
	Cesium-134	0.81	± 1.8	NE	NE	6.6	U	EPA:901.1
	Cesium-137	-2	± 1.4	NE	NE	4.7	U	EPA:901.1
	Cobalt-60	2.5	± 1.7	NE	NE	5.4	U	EPA:901.1
	Gross alpha	5.3	± 0.63	15	15	1.2		EPA:900
	Gross beta	6.2	± 0.63	4 mrem/yr	4 mrem/yr	1.1		EPA:900
	Iodine-131	3.3	± 4	NE	NE	13	U	EPA:901.1
	Lead-212	1.6	± 4.1	NE	NE	13	U	EPA:901.1
	Lead-214	-8.6	± 5.1	NE	NE	17	U	EPA:901.1
	Potassium-40	14	± 37	NE	NE	120	U	EPA:901.1
	Protactinium-234m	460	± 240	NE	NE	780	U	EPA:901.1
	Radon-222	120	± 32	NE	1000	42		Rn222
	Sodium-22	0.12	± 1.6	NE	NE	5.4	U	EPA:901.1
	Thallium-208	4.9	± 1.5	NE	NE	4.5		EPA:901.1
	Thorium-234	37	± 41	NE	NE	140	U	EPA:901.1
	Tritium	-200	± 95	4 mrem/yr	4 mrem/yr	330	U	EPA:906.0

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Table-4 NMED DOE Oversight Bureau FFY 2017 Q-1 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Emitting Isotopes, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity ^a (pCi/L)		EPA MCL (pCi/L)	LTMMP Trigger Level (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 28-Oct-16	Actinium-228	-0.28	± 8.5	NE	NE	29	U	EPA:901.1
	Americium-241	-41	± 48	NE	NE	160	U	EPA:901.1
	Beryllium-7	-6.3	± 9.9	NE	NE	34	U	EPA:901.1
	Bismuth-212	11	± 17	NE	NE	57	U	EPA:901.1
	Bismuth-214	-9.3	± 7.1	NE	NE	24	U	EPA:901.1
	Cesium-134	-2.2	± 1.2	NE	NE	4.3	U	EPA:901.1
	Cesium-137	-0.68	± 1.3	NE	NE	4.4	U	EPA:901.1
	Cobalt-60	0.096	± 1.3	NE	NE	4.6	U	EPA:901.1
	Gross alpha	7	± 0.72	15	15	1		EPA:900
	Gross beta	6.3	± 0.66	4 mrem/yr	4 mrem/yr	1.2		EPA:900
	Iodine-131	-0.7	± 3.1	NE	NE	11	U	EPA:901.1
	Lead-212	0.8	± 4.2	NE	NE	14	U	EPA:901.1
	Lead-214	-3.1	± 6.1	NE	NE	20	U	EPA:901.1
	Potassium-40	34	± 42	NE	NE	140	U	EPA:901.1
	Protactinium-234m	310	± 220	NE	NE	720	U	EPA:901.1
	Radon-222	240	± 43	NE	1000	44		Rn222
	Sodium-22	-2	± 1.3	NE	NE	4.5	U	EPA:901.1
	Thallium-208	3.2	± 2.7	NE	NE	9	U	EPA:901.1
	Thorium-234	-5.6	± 68	NE	NE	230	U	EPA:901.1
	Tritium	-130	± 97	4 mrem/yr	4 mrem/yr	330	U	EPA:906.0

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Table-4 NMED DOE Oversight Bureau FFY 2017 Q-1 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Emitting Isotopes, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity ^a (pCi/L)		EPA MCL (pCi/L)	LTMMP Trigger Level (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 27-Oct-16	Actinium-228	15	± 7.9	NE	NE	26	U	EPA:901.1
	Americium-241	6.7	± 10	NE	NE	34	U	EPA:901.1
	Beryllium-7	4.2	± 15	NE	NE	51	U	EPA:901.1
	Bismuth-212	17	± 26	NE	NE	86	U	EPA:901.1
	Bismuth-214	-1.2	± 9.3	NE	NE	31	U	EPA:901.1
	Cesium-134	-1.7	± 2.8	NE	NE	10	U	EPA:901.1
	Cesium-137	1.1	± 1.9	NE	NE	6.3	U	EPA:901.1
	Cobalt-60	-1.7	± 2.5	NE	NE	8.8	U	EPA:901.1
	Gross alpha	7.3	± 0.77	15	15	1.2		EPA:900
	Gross beta	6.9	± 0.67	4 mrem/yr	4 mrem/yr	1.1		EPA:900
	Iodine-131	5.8	± 5	NE	NE	16	U	EPA:901.1
	Lead-212	-3.6	± 5.1	NE	NE	17	U	EPA:901.1
	Lead-214	-11	± 8	NE	NE	27	U	EPA:901.1
	Potassium-40	54	± 61	NE	NE	200	U	EPA:901.1
	Protactinium-234m	-260	± 360	NE	NE	1300	U	EPA:901.1
	Radon-222	470	± 63	NE	1000	36		Rn222
	Sodium-22	-1.1	± 2.4	NE	NE	8.2	U	EPA:901.1
	Thallium-208	7.1	± 1.9	NE	NE	6		EPA:901.1
	Thorium-234	11	± 47	NE	NE	160	U	EPA:901.1
	Tritium	-250	± 97	4 mrem/yr	4 mrem/yr	330	U	EPA:906.0

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