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 2016 Q-3

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Final Report

12/20/2016

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 third quarter FFY 2016.

Acknowledgment:

This material is based upon work supported by the Department of Energy Office of Environmental Management under Award Number *DE-EM0002420*.

Introduction

The New Mexico Environment Department (NMED) DOE Oversight Bureau (DOE-OB or Bureau) has compiled and assessed groundwater data collected during April 2016. The Bureau collected groundwater samples from Mixed Waste Landfill (MWL) groundwater monitoring wells MWL-BW2, MWL-MW7 (plus duplicate), 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 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 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.

No VOC concentrations were detected above the laboratory method detection limits (MDLs). Table-2 summarizes the laboratory MDLs for VOCs analyzed from samples collected at MWL.

Analytical results for radionuclides are listed in Table-3 and used to screen for potential radiological contamination. Gross alpha activity ranged from 5.8 pCi/L at MWL-MW9 to 8.3 pCi/L at MWL-BW2. Radon-222 activity ranged from 210 pCi/L at MWL-MW7 and MWL-MW8 to 570 pCi/L at MWL-BW2. 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 Oversight 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.

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

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	—[b]	—[b]
Radon	1,000 pCi/L	No Regulatory Standard	—[b]	—[b]
Gross Alpha Activity	15 pCi/L[e]	EPA MCL	—[b]	—[b]
Gross Beta Activity	4 mrem/yr	EPA MCL	—[b]	—[b]

[a]All 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).
[b]Common laboratory contaminants specified in EPA (November 1992) technical guidance.
[c]Methylene chloride trigger level is adjusted to 60% of the EPA (May 2009) MCL, which is the analytical laboratory method detection limit.
[d]Critical level and minimum detectable activity for all radiological analyses vary greatly but are below the associated trigger level.
[e]Gross 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.

Table-1 NMED DOE Oversight Bureau FFY 2016 Q-3 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)	LTMMP Trigger Level (mg/L)	Quantitation Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 20-Apr-16	Aluminum	0.036	NE	NE	0.1	0.014	JB	SW-846:6020
	Antimony	0.00021	0.006	NE	0.001	0.000084	J	SW-846:6020
	Arsenic	0.001	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	77	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	0.045	NE	NE	0.1	0.0053	JB	SW-846:6020
	Lead	0.00016	NE	NE	0.002	0.00016	U	SW-846:6020
	Magnesium	23	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.0003	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	NE	0.02	0.0042	U	SW-846:6020
	Potassium	4.2	NE	NE	1	0.32		SW-846:6020
	Selenium	0.0024	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	61	NE	NE	1	0.19		SW-846:6020
	Thallium	0.000014	0.002	NE	0.0001	0.000014	U	SW-846:6020
	Uranium	0.0072	0.03	0.015	0.0001	0.000027		SW-846:6020
	Vanadium	0.0066	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).

LTMMP = Long-Term Monitoring and Maintanence Plan

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U = the analyte was analyzed for but not detected

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Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMMP Trigger Level (mg/L)	Quantitation Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 21-Apr-16	Aluminum	0.014	NE	NE	0.1	0.014	JB	SW-846:6020
	Antimony	0.0001	0.006	NE	0.001	0.000084	J	SW-846:6020
	Arsenic	0.0017	0.01	NE	0.002	0.00018	J	SW-846:6020
	Barium	0.1	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	0.012	NE	NE	0.1	0.0053	JB	SW-846:6020
	Lead	0.00016	NE	NE	0.002	0.00016	U	SW-846:6020
	Magnesium	18	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.0003	NE	NE	0.005	0.0003	U	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0042	NE	NE	0.02	0.0042	U	SW-846:6020
	Potassium	4.8	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	47	NE	NE	1	0.19		SW-846:6020
	Thallium	0.000014	0.002	NE	0.0001	0.000014	U	SW-846:6020
	Uranium	0.0072	0.03	0.015	0.0001	0.000027		SW-846:6020
	Vanadium	0.0074	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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Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMMP Trigger Level (mg/L)	Quantitation Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 21-Apr-16 (Duplicate)	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	0.0019	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	59	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	J	SW-846:6020
	Copper	0.0011	NE	NE	0.02	0.0011	U	SW-846:6020
	Iron	0.013	NE	NE	0.1	0.0053	JB	SW-846:6020
	Lead	0.00016	NE	NE	0.002	0.00016	U	SW-846:6020
	Magnesium	18	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.0003	NE	NE	0.005	0.0003	U	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0042	NE	NE	0.02	0.0042	U	SW-846:6020
	Potassium	4.8	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	47	NE	NE	1	0.19		SW-846:6020
	Thallium	0.000014	0.002	NE	0.0001	0.000014	U	SW-846:6020
	Uranium	0.0072	0.03	0.015	0.0001	0.000027		SW-846:6020
	Vanadium	0.0073	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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Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMMP Trigger Level (mg/L)	Quantitation Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 26-Apr-16	Aluminum	0.045	NE	NE	0.1	0.014	JB	SW-846:6020
	Antimony	0.00015	0.006	NE	0.001	0.000084	J	SW-846:6020
	Arsenic	0.00063	0.01	NE	0.002	0.00018	J	SW-846:6020
	Barium	0.13	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	59	NE	NE	1	0.061	B	SW-846:6020
	Chromium	0.0011	0.1	0.043	0.01	0.0011	J	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	0.017	NE	NE	0.1	0.0053	JB	SW-846:6020
	Lead	0.00016	NE	NE	0.002	0.00016	U	SW-846:6020
	Magnesium	19	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.00035	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	NE	0.02	0.0042	U	SW-846:6020
	Potassium	5.3	NE	NE	1	0.32		SW-846:6020
	Selenium	0.0011	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	48	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	0.0024	NE	NE	0.005	0.00058	J	SW-846:6020
	Zinc	0.0091	NE	NE	0.1	0.0091	U	SW-846:6020

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Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMMP Trigger Level (mg/L)	Quantitation Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 25-Apr-16	Aluminum	0.032	NE	NE	0.1	0.014	JB	SW-846:6020
	Antimony	0.00009	0.006	NE	0.001	0.000084	J	SW-846:6020
	Arsenic	0.0032	0.01	NE	0.002	0.00018		SW-846:6020
	Barium	0.096	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	0.039	NE	NE	0.1	0.0053	JB	SW-846:6020
	Lead	0.00016	NE	NE	0.002	0.00016	U	SW-846:6020
	Magnesium	18	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.0018	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	NE	0.02	0.0042	U	SW-846:6020
	Potassium	4.8	NE	NE	1	0.32		SW-846:6020
	Selenium	0.0011	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	46	NE	NE	1	0.19		SW-846:6020
	Thallium	0.000014	0.002	NE	0.0001	0.000014	U	SW-846:6020
	Uranium	0.0086	0.03	0.015	0.0001	0.000027		SW-846:6020
	Vanadium	0.0089	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-2 NMED DOE Oversight Bureau FFY 2016 Q-3 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-3 NMED DOE Oversight Bureau FFY 2016 Q-3 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)			LTMMP Trigger Level (pCi/L)	EPA MCL (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 20-Apr-16	Actinium-228	21	±	5.9	NE	NE	18		EPA:901.1
	Americium-241	24	±	10	NE	NE	33	U	EPA:901.1
	Beryllium-7	-4.7	±	13	NE	NE	45	U	EPA:901.1
	Bismuth-212	75	±	22	NE	NE	69		EPA:901.1
	Bismuth-214	20	±	5.2	NE	NE	22	U	EPA:901.1
	Cesium-134	3.2	±	7.6	NE	NE	25	U	EPA:901.1
	Cesium-137	-0.36	±	1.5	NE	NE	5.1	U	EPA:901.1
	Cobalt-60	0.75	±	1.6	NE	NE	5.5	U	EPA:901.1
	Gross alpha	8.3	±	0.98	15	15	1.8		EPA:900
	Gross beta	6.4	±	0.88	4 mrem/yr	4 mrem/yr	2.2		EPA:900
	Iodine-131	-3.2	±	3.9	NE	NE	13	U	EPA:901.1
	Lead-212	3.4	±	4.5	NE	NE	15	U	EPA:901.1
	Lead-214	11	±	4.8	NE	NE	16	U	EPA:901.1
	Potassium-40	3.8	±	41	NE	NE	140	U	EPA:901.1
	Protactinium-234m	490	±	250	NE	NE	820	U	EPA:901.1
	Radon-222	570	±	74	1000	NE	36		Rn222
	Sodium-22	-0.65	±	1.5	NE	NE	5.2	U	EPA:901.1
	Thallium-208	4.9	±	1.6	NE	NE	5	U	EPA:901.1
	Thorium-234	32	±	42	NE	NE	140	U	EPA:901.1
	Tritium	-72	±	94	4 mrem/yr	4 mrem/yr	320	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-3 NMED DOE Oversight Bureau FFY 2016 Q-3 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)			LTMMP Trigger Level (pCi/L)	EPA MCL (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 21-Apr-16	Actinium-228	-10	±	18	NE	NE	60	U	EPA:901.1
	Americium-241	13	±	10	NE	NE	33	U	EPA:901.1
	Beryllium-7	-8.4	±	15	NE	NE	50	U	EPA:901.1
	Bismuth-212	35	±	27	NE	NE	88	U	EPA:901.1
	Bismuth-214	4.2	±	11	NE	NE	36	U	EPA:901.1
	Cesium-134	-1.9	±	2.7	NE	NE	10	U	EPA:901.1
	Cesium-137	1.4	±	1.9	NE	NE	6.3	U	EPA:901.1
	Cobalt-60	4.6	±	2.5	NE	NE	8.1	U	EPA:901.1
	Gross alpha	6.3	±	0.78	15	15	1.4		EPA:900
	Gross beta	7.4	±	0.78	4 mrem/yr	4 mrem/yr	1.5		EPA:900
	Iodine-131	4.8	±	4.2	NE	NE	14	U	EPA:901.1
	Lead-212	0.64	±	4.1	NE	NE	14	U	EPA:901.1
	Lead-214	2.3	±	6.8	NE	NE	23	U	EPA:901.1
	Potassium-40	-16	±	60	NE	NE	200	U	EPA:901.1
	Protactinium-234m	820	±	370	NE	NE	1200	U	EPA:901.1
	Radon-222	210	±	35	1000	NE	31		Rn222
	Sodium-22	0.84	±	2.5	NE	NE	8.5	U	EPA:901.1
	Thallium-208	3.8	±	1.9	NE	NE	6.3	U	EPA:901.1
	Thorium-234	6.5	±	50	NE	NE	160	U	EPA:901.1
	Tritium	-57	±	94	4 mrem/yr	4 mrem/yr	320	U	EPA:906.0

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

Table-3 NMED DOE Oversight Bureau FFY 2016 Q-3 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)			LTMMP Trigger Level (pCi/L)	EPA MCL (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 21-Apr-16 (Duplicate)	Actinium-228	9.5	±	12	NE	NE	38	U	EPA:901.1
	Americium-241	-30	±	34	NE	NE	110	U	EPA:901.1
	Beryllium-7	13	±	12	NE	NE	38	U	EPA:901.1
	Bismuth-212	35	±	17	NE	NE	56	U	EPA:901.1
	Bismuth-214	4.8	±	10	NE	NE	33	U	EPA:901.1
	Cesium-134	-3.1	±	1.5	NE	NE	5	U	EPA:901.1
	Cesium-137	0	±	1.4	NE	NE	4.7	U	EPA:901.1
	Cobalt-60	-2.8	±	1.4	NE	NE	5	U	EPA:901.1
	Gross alpha	6.7	±	0.82	15	15	1.5		EPA:900
	Gross beta	6.7	±	0.89	4 mrem/yr	4 mrem/yr	2.2		EPA:900
	Iodine-131	1.2	±	3.8	NE	NE	13	U	EPA:901.1
	Lead-212	1.4	±	4.4	NE	NE	15	U	EPA:901.1
	Lead-214	-0.98	±	6	NE	NE	20	U	EPA:901.1
	Potassium-40	-31	±	38	NE	NE	130	U	EPA:901.1
	Protactinium-234m	470	±	220	NE	NE	720	U	EPA:901.1
	Radon-222	240	±	42	1000	NE	42		Rn222
	Sodium-22	-0.49	±	1.3	NE	NE	4.4	U	EPA:901.1
	Thallium-208	1.6	±	3.1	NE	NE	10	U	EPA:901.1
	Thorium-234	5.8	±	69	NE	NE	230	U	EPA:901.1
	Tritium	130	±	97	4 mrem/yr	4 mrem/yr	320	U	EPA:906.0

NE = Not Established

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

Table-3 NMED DOE Oversight Bureau FFY 2016 Q-3 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)			LTMMP Trigger Level (pCi/L)	EPA MCL (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 26-Apr-16	Actinium-228	29	±	6	NE	NE	18		EPA:901.1
	Americium-241	1.3	±	8.1	NE	NE	27	U	EPA:901.1
	Beryllium-7	20	±	11	NE	NE	37	U	EPA:901.1
	Bismuth-212	28	±	19	NE	NE	62	U	EPA:901.1
	Bismuth-214	8.2	±	5.9	NE	NE	19	U	EPA:901.1
	Cesium-134	0.67	±	1.4	NE	NE	4.6	U	EPA:901.1
	Cesium-137	-2.8	±	1.4	NE	NE	5	U	EPA:901.1
	Cobalt-60	-1.9	±	1.7	NE	NE	6	U	EPA:901.1
	Gross alpha	6.1	±	0.79	15	15	1.6		EPA:900
	Gross beta	7.9	±	0.99	4 mrem/yr	4 mrem/yr	2.3		EPA:900
	Iodine-131	3.2	±	2.3	NE	NE	7.6	U	EPA:901.1
	Lead-212	-6.5	±	4.5	NE	NE	15	U	EPA:901.1
	Lead-214	14	±	6.3	NE	NE	20	U	EPA:901.1
	Potassium-40	-14	±	43	NE	NE	140	U	EPA:901.1
	Protactinium-234m	440	±	240	NE	NE	790	U	EPA:901.1
	Radon-222	210	±	35	1000	NE	31		Rn222
	Sodium-22	-1.1	±	1.5	NE	NE	5.4	U	EPA:901.1
	Thallium-208	-0.29	±	3	NE	NE	10	U	EPA:901.1
	Thorium-234	-1.3	±	37	NE	NE	120	U	EPA:901.1
	Tritium	-30	±	94	4 mrem/yr	4 mrem/yr	320	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-3 NMED DOE Oversight Bureau FFY 2016 Q-3 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)			LTMMP Trigger Level (pCi/L)	EPA MCL (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 25-Apr-16	Actinium-228	17	±	6.6	NE	NE	21	U	EPA:901.1
	Americium-241	-9.5	±	50	NE	NE	170	U	EPA:901.1
	Beryllium-7	1.9	±	9.6	NE	NE	32	U	EPA:901.1
	Bismuth-212	33	±	17	NE	NE	56	U	EPA:901.1
	Bismuth-214	11	±	7.3	NE	NE	24	U	EPA:901.1
	Cesium-134	-3.9	±	1.3	NE	NE	4.6	U	EPA:901.1
	Cesium-137	-2	±	1.3	NE	NE	4.6	U	EPA:901.1
	Cobalt-60	-4.4	±	1.4	NE	NE	5	U	EPA:901.1
	Gross alpha	5.8	±	0.82	15	15	1.8		EPA:900
	Gross beta	7.1	±	0.95	4 mrem/yr	4 mrem/yr	2.4		EPA:900
	Iodine-131	-2.8	±	2.2	NE	NE	7.5	U	EPA:901.1
	Lead-212	0.6	±	4.1	NE	NE	14	U	EPA:901.1
	Lead-214	11	±	8.2	NE	NE	27	U	EPA:901.1
	Potassium-40	6.7	±	40	NE	NE	130	U	EPA:901.1
	Protactinium-234m	-120	±	450	NE	NE	1500	U	EPA:901.1
	Radon-222	550	±	72	1000	NE	36		Rn222
	Sodium-22	-0.34	±	1.4	NE	NE	4.7	U	EPA:901.1
	Thallium-208	-0.58	±	2.8	NE	NE	9.3	U	EPA:901.1
	Thorium-234	-46	±	56	NE	NE	190	U	EPA:901.1
	Tritium	-37	±	92	4 mrem/yr	4 mrem/yr	310	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).