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-1

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Final Report

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The purpose of this communication is to transmit groundwater quality data collected by NMED DOE Oversight Bureau from Mixed Waste Landfill groundwater monitoring wells during first quarter FFY 2016.

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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 2015. The Bureau collected groundwater samples from Mixed Waste Landfill (MWL) groundwater monitoring wells MWL-BW2, MWL-MW7, MWL-MW8 and MWL-MW9 (plus duplicate). Split samples were collected using standard Sandia National Laboratories/New Mexico (SNL/NM) sampling procedures and equipment. The samples were submitted for analysis to an independent analytical laboratory for target analyte list (TAL) metals plus uranium, volatile organic compounds (VOCs), gamma emitting isotopes, gross alpha/beta, radon, and tritium. No samples collected from MWL monitoring wells exceeded established U.S. Environmental Protection Agency (EPA) Maximum Contaminant Levels (MCLs) or trigger levels listed in the MWL Long-Term Monitoring and Maintenance Plan (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 MWL 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, tritium, and radon. See table below for LTMMP-listed analytes and trigger levels.

Results

Analytical results for total recoverable TAL metals plus uranium are presented in Table-1. All metal concentrations were below established MCLs and LTMMP trigger levels.

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. The concentration was detected at 0.32 µg/L. The value was “J” flagged, indicating that the result was an estimated value. The PCE result at MWL-MW8 was detected below the EPA MCL (5 µg/L) and LTMMP trigger level (2.5 µg/L). Table-3 summarizes the laboratory MDLs for the remaining VOCs analyzed from the samples collected at MWL monitoring wells.

Analytical results for radionuclides are listed in Table-4. Samples were analyzed for gross alpha and beta, gamma emitting isotopes, radon and tritium. Radon activity ranged from 41 pCi/L at MWL-MW8 to 650 pCi/L at MWL-BW2. These results are below the LTMMP trigger level of 1000 pCi/L. All other isotopes were detected below established EPA MCLs and LTMMP trigger levels.

Conclusion

Groundwater samples were collected from four (4) monitoring wells during this sampling event at the Mixed Waste Landfill. Samples collected by the Oversight Bureau and analyzed by an independent laboratory show concentrations of metals, VOCs and radionuclides below established EPA MCLs and SNL/NM trigger levels based on the LTMMP.

References

Sandia National Laboratories, New Mexico. Annual Groundwater Monitoring Report, Calendar Year 2104.

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-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)	LTMMP Trigger (mg/L)	Reporting Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 12-Oct-15	Aluminum	0.038	NE	NE	0.05	0.019	J	SW-846:6020
	Antimony	0.00023	0.006	NE	0.0003	0.00023	U	SW-846:6020
	Arsenic	0.00077	0.01	NE	0.002	0.00036	J	SW-846:6020
	Barium	0.097	2	NE	0.001	0.00094		SW-846:6020
	Beryllium	0.00014	0.004	NE	0.0005	0.00014	U	SW-846:6020
	Cadmium	0.00013	0.005	0.0025	0.0003	0.00013	U	SW-846:6020
	Calcium	72	NE	NE	1	0.094		SW-846:6020
	Chromium	0.00074	0.1	0.043	0.01	0.00074	U	SW-846:6020
	Cobalt	0.00021	NE	NE	0.001	0.00021	U	SW-846:6020
	Copper	0.002	NE	NE	0.01	0.002	U	SW-846:6020
	Iron	0.051	NE	NE	0.1	0.013	J	SW-846:6020
	Lead	0.0002	NE	NE	0.0005	0.0002	U	SW-846:6020
	Magnesium	22	NE	NE	0.1	0.039		SW-846:6020
	Manganese	0.00088	NE	NE	0.002	0.00074	J	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U H	SW-846:7470A
	Nickel	0.0023	NE	NE	0.005	0.0023	U	SW-846:6020
	Potassium	3.4	NE	NE	1	0.2		SW-846:6020
	Selenium	0.0021	0.05	NE	0.001	0.00042		SW-846:6020
	Silver	0.000041	NE	NE	0.0001	0.000041	U	SW-846:6020
	Sodium	57	NE	NE	1	0.84		SW-846:6020
	Thallium	0.000034	0.002	NE	0.0002	0.000034	U	SW-846:6020
	Uranium	0.0069	0.03	0.015	0.0001	0.000046		SW-846:6020
	Vanadium	0.006	NE	NE	0.001	0.00027	B	SW-846:6020
	Zinc	0.0071	NE	NE	0.02	0.0071	U	SW-846:6020

B = Compound was found in the blank and sample.

H = The sample was analyzed after hold time had already expired.

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).

NE = Not Established

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Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMMP Trigger (mg/L)	Reporting Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 13-Oct-15	Aluminum	0.019	NE	NE	0.05	0.019	U	SW-846:6020
	Antimony	0.00023	0.006	NE	0.0003	0.00023	U	SW-846:6020
	Arsenic	0.0016	0.01	NE	0.002	0.00036	J	SW-846:6020
	Barium	0.11	2	NE	0.001	0.00094		SW-846:6020
	Beryllium	0.00014	0.004	NE	0.0005	0.00014	U	SW-846:6020
	Cadmium	0.00013	0.005	0.0025	0.0003	0.00013	U	SW-846:6020
	Calcium	59	NE	NE	1	0.094		SW-846:6020
	Chromium	0.0014	0.1	0.043	0.01	0.00074	J	SW-846:6020
	Cobalt	0.00021	NE	NE	0.001	0.00021	U	SW-846:6020
	Copper	0.002	NE	NE	0.01	0.002	U	SW-846:6020
	Iron	0.013	NE	NE	0.1	0.013	U	SW-846:6020
	Lead	0.0002	NE	NE	0.0005	0.0002	U	SW-846:6020
	Magnesium	20	NE	NE	0.1	0.039		SW-846:6020
	Manganese	0.00074	NE	NE	0.002	0.00074	U	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0023	NE	NE	0.005	0.0023	U	SW-846:6020
	Potassium	4.5	NE	NE	1	0.2		SW-846:6020
	Selenium	0.00042	0.05	NE	0.001	0.00042	U	SW-846:6020
	Silver	0.000041	NE	NE	0.0001	0.000041	U	SW-846:6020
	Sodium	48	NE	NE	1	0.84		SW-846:6020
	Thallium	0.000034	0.002	NE	0.0002	0.000034	U	SW-846:6020
	Uranium	0.008	0.03	0.015	0.0001	0.000046		SW-846:6020
	Vanadium	0.0069	NE	NE	0.001	0.00027	B	SW-846:6020
	Zinc	0.0071	NE	NE	0.02	0.0071	U	SW-846:6020

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Table-1 NMED DOE Oversight Bureau FFY 2016 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)	LTMMP Trigger (mg/L)	Reporting Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 15-Oct-15	Aluminum	0.024	NE	NE	0.05	0.019	J	SW-846:6020
	Antimony	0.00023	0.006	NE	0.0003	0.00023	U	SW-846:6020
	Arsenic	0.00067	0.01	NE	0.002	0.00036	J	SW-846:6020
	Barium	0.14	2	NE	0.001	0.00094		SW-846:6020
	Beryllium	0.00014	0.004	NE	0.0005	0.00014	U	SW-846:6020
	Cadmium	0.00013	0.005	0.0025	0.0003	0.00013	U	SW-846:6020
	Calcium	62	NE	NE	1	0.094		SW-846:6020
	Chromium	0.001	0.1	0.043	0.01	0.00074	J	SW-846:6020
	Cobalt	0.00021	NE	NE	0.001	0.00021	U	SW-846:6020
	Copper	0.002	NE	NE	0.01	0.002	U	SW-846:6020
	Iron	0.013	NE	NE	0.1	0.013	J	SW-846:6020
	Lead	0.0002	NE	NE	0.0005	0.0002	U	SW-846:6020
	Magnesium	20	NE	NE	0.1	0.039		SW-846:6020
	Manganese	0.0017	NE	NE	0.002	0.00074	J	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0023	NE	NE	0.005	0.0023	U	SW-846:6020
	Potassium	4.9	NE	NE	1	0.2		SW-846:6020
	Selenium	0.00063	0.05	NE	0.001	0.00042	J	SW-846:6020
	Silver	0.000041	NE	NE	0.0001	0.000041	U	SW-846:6020
	Sodium	49	NE	NE	1	0.84		SW-846:6020
	Thallium	0.000034	0.002	NE	0.0002	0.000034	U	SW-846:6020
	Uranium	0.0082	0.03	0.015	0.0001	0.000046		SW-846:6020
	Vanadium	0.0023	NE	NE	0.001	0.00027	B	SW-846:6020
	Zinc	0.0071	NE	NE	0.02	0.0071	U	SW-846:6020

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Table-1 NMED DOE Oversight Bureau FFY 2016 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)	LTMMP Trigger (mg/L)	Reporting Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 14-Oct-15	Aluminum	0.022	NE	NE	0.05	0.019	J	SW-846:6020
	Antimony	0.00023	0.006	NE	0.0003	0.00023	U	SW-846:6020
	Arsenic	0.0042	0.01	NE	0.002	0.00036		SW-846:6020
	Barium	0.1	2	NE	0.001	0.00094		SW-846:6020
	Beryllium	0.00014	0.004	NE	0.0005	0.00014	U	SW-846:6020
	Cadmium	0.00013	0.005	0.0025	0.0003	0.00013	U	SW-846:6020
	Calcium	64	NE	NE	1	0.094		SW-846:6020
	Chromium	0.0012	0.1	0.043	0.01	0.00074	J	SW-846:6020
	Cobalt	0.00021	NE	NE	0.001	0.00021	U	SW-846:6020
	Copper	0.002	NE	NE	0.01	0.002	U	SW-846:6020
	Iron	0.018	NE	NE	0.1	0.013	J	SW-846:6020
	Lead	0.0002	NE	NE	0.0005	0.0002	U	SW-846:6020
	Magnesium	21	NE	NE	0.1	0.039		SW-846:6020
	Manganese	0.0016	NE	NE	0.002	0.00074	J	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0023	NE	NE	0.005	0.0023	U	SW-846:6020
	Potassium	4.8	NE	NE	1	0.2		SW-846:6020
	Selenium	0.00062	0.05	NE	0.001	0.00042	J	SW-846:6020
	Silver	0.000041	NE	NE	0.0001	0.000041	U	SW-846:6020
	Sodium	48	NE	NE	1	0.84		SW-846:6020
	Thallium	0.000034	0.002	NE	0.0002	0.000034	U	SW-846:6020
	Uranium	0.0095	0.03	0.015	0.0001	0.000046		SW-846:6020
	Vanadium	0.0094	NE	NE	0.001	0.00027	B	SW-846:6020
	Zinc	0.0071	NE	NE	0.02	0.0071	U	SW-846:6020

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Table-1 NMED DOE Oversight Bureau FFY 2016 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)	LTMMP Trigger (mg/L)	Reporting Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 14-Oct-15 DUP	Aluminum	0.019	NE	NE	0.05	0.019	J	SW-846:6020
	Antimony	0.00023	0.006	NE	0.0003	0.00023	U	SW-846:6020
	Arsenic	0.0032	0.01	NE	0.002	0.00036		SW-846:6020
	Barium	0.098	2	NE	0.001	0.00094		SW-846:6020
	Beryllium	0.00014	0.004	NE	0.0005	0.00014	U	SW-846:6020
	Cadmium	0.00013	0.005	0.0025	0.0003	0.00013	U	SW-846:6020
	Calcium	59	NE	NE	1	0.094		SW-846:6020
	Chromium	0.00074	0.1	0.043	0.01	0.00074	U	SW-846:6020
	Cobalt	0.00021	NE	NE	0.001	0.00021	U	SW-846:6020
	Copper	0.002	NE	NE	0.01	0.002	U	SW-846:6020
	Iron	0.019	NE	NE	0.1	0.013	J	SW-846:6020
	Lead	0.0002	NE	NE	0.0005	0.0002	U	SW-846:6020
	Magnesium	20	NE	NE	0.1	0.039		SW-846:6020
	Manganese	0.002	NE	NE	0.002	0.00074		SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0023	NE	NE	0.005	0.0023	U	SW-846:6020
	Potassium	4.8	NE	NE	1	0.2		SW-846:6020
	Selenium	0.0006	0.05	NE	0.001	0.00042	J	SW-846:6020
	Silver	0.000041	NE	NE	0.0001	0.000041	U	SW-846:6020
	Sodium	47	NE	NE	1	0.84		SW-846:6020
	Thallium	0.000034	0.002	NE	0.0002	0.000034	U	SW-846:6020
	Uranium	0.0095	0.03	0.015	0.0001	0.000046		SW-846:6020
	Vanadium	0.009	NE	NE	0.001	0.00027	B	SW-846:6020
	Zinc	0.0071	NE	NE	0.02	0.0071	U	SW-846:6020

B = Compound was found in the blank and sample.

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U = the analyte was analyzed for but not detected

Table-2 NMED DOE Oversight Bureau FFY 2016 Q-1 Mixed Waste Landfill Groundwater Quality Results: Detected Volatile Organic Compounds

Monitoring Well/ Sample Date	Analyte	Result (µg/L)	EPA MCL (µg/L)	LTMMP Trigger (µg/L)	Reporting Limit (µg/L)	MDL (µg/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 15-Oct-15	Tetrachloroethene	0.32	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 2016 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-]	0.3
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
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

Analyte	MDL (µg/L)
Hexanone[2-]	3
Iodomethane	0.3
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	0.52
Vinyl Chloride	0.3
Xylene[1,2-]	0.3
Xylene[1,3-]+Xylene[1,4-]	0.3

Table-4 NMED DOE Oversight Bureau FFY 2016 Q-1 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Emitting Isotopes, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)			LTMMP Trigger Level (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 12-Oct-15	Actinium-228	9.4	±	5.3	NE	20	U	EPA:901.1
	Americium-241	1.3	±	1.5	NE	5	U	EPA:901.1
	Beryllium-7	17	±	12	NE	40	U	EPA:901.1
	Bismuth-212	16	±	19	NE	65	U	EPA:901.1
	Bismuth-214	10	±	2.8	NE	8.5		EPA:901.1
	Cesium-134	-0.27	±	1.2	NE	4.2	U	EPA:901.1
	Cesium-137	-1.7	±	1.2	NE	4.4	U	EPA:901.1
	Cobalt-60	1.8	±	1.4	NE	4.7	U	EPA:901.1
	Gross alpha	7.4	±	0.75	15	0.91		EPA:900
	Gross beta	5.4	±	0.65	4 mrem/yr	1.5		EPA:900
	Iodine-131	4.8	±	13	NE	45	U	EPA:901.1
	Lead-212	-0.85	±	3.8	NE	13	U	EPA:901.1
	Lead-214	-3.1	±	4.6	NE	15	U	EPA:901.1
	Potassium-40	-49	±	36	NE	120	U	EPA:901.1
	Protactinium-234m	300	±	230	NE	760	U	EPA:901.1
	Radon-222	650	±	93	1000	62		Rn222
	Radon-222	410	±	69	1000	63		Rn222
	Sodium-22	1.3	±	1.5	NE	5	U	EPA:901.1
	Thallium-208	2.1	±	2.6	NE	8.8	U	EPA:901.1
	Thorium-234	9.9	±	21	NE	69	U	EPA:901.1
	Tritium	56	±	93	4 mrem/yr	310	U	EPA:906.0

NE = Not Established

U = Result is less than the sample specific MDC or less than the associated TPU.

Table-4 NMED DOE Oversight Bureau FFY 2016 Q-1 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Emitting Isotopes, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)			LTMMP Trigger Level (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 13-Oct-15	Actinium-228	12	±	6.2	NE	25	U	EPA:901.1
	Americium-241	-11	±	11	NE	39	U	EPA:901.1
	Beryllium-7	-18	±	32	NE	110	U	EPA:901.1
	Bismuth-212	56	±	21	NE	68	U	EPA:901.1
	Bismuth-214	3.3	±	8.8	NE	29	U	EPA:901.1
	Cesium-134	-3	±	1.4	NE	4.9	U	EPA:901.1
	Cesium-137	1.7	±	1.4	NE	4.6	U	EPA:901.1
	Cobalt-60	0.73	±	1.3	NE	4.4	U	EPA:901.1
	Gross alpha	5.3	±	0.57	15	0.88		EPA:900
	Gross beta	6.6	±	0.66	4 mrem/yr	1.2		EPA:900
	Iodine-131	-16	±	16	NE	56	U	EPA:901.1
	Lead-212	1.2	±	3.5	NE	12	U	EPA:901.1
	Lead-214	7.2	±	3	NE	9.6	U	EPA:901.1
	Potassium-40	-60	±	48	NE	160	U	EPA:901.1
	Protactinium-234m	330	±	230	NE	760	U	EPA:901.1
	Radon-222	210	±	45	1000	53		Rn222
	Radon-222	200	±	44	1000	53		Rn222
	Sodium-22	2.9	±	1.5	NE	4.8	U	EPA:901.1
	Thallium-208	2.9	±	1.5	NE	4.8	U	EPA:901.1
	Thorium-234	21	±	46	NE	150	U	EPA:901.1
	Tritium	150	±	95	4 mrem/yr	310	U	EPA:906.0

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Table-4 NMED DOE Oversight Bureau FFY 2016 Q-1 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Emitting Isotopes, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)			LTMMP Trigger Level (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 15-Oct-15	Actinium-228	8.7	±	6.7	NE	22	U	EPA:901.1
	Americium-241	-5.9	±	13	NE	43	U	EPA:901.1
	Beryllium-7	-27	±	17	NE	59	U	EPA:901.1
	Bismuth-212	16	±	25	NE	84	U	EPA:901.1
	Bismuth-214	5.6	±	8.1	NE	27	U	EPA:901.1
	Cesium-134	0.85	±	2.8	NE	9.3	U	EPA:901.1
	Cesium-137	1.7	±	1.7	NE	5.5	U	EPA:901.1
	Cobalt-60	1.6	±	2.2	NE	7.4	U	EPA:901.1
	Gross alpha	6.7	±	0.69	15	0.96		EPA:900
	Gross beta	5.6	±	0.61	4 mrem/yr	1.3		EPA:900
	Iodine-131	-4.1	±	14	NE	47	U	EPA:901.1
	Lead-212	0.92	±	4.2	NE	14	U	EPA:901.1
	Lead-214	-5.8	±	6.8	NE	23	U	EPA:901.1
	Potassium-40	16	±	53	NE	180	U	EPA:901.1
	Protactinium-234m	240	±	310	NE	1000	U	EPA:901.1
	Radon-222	41	±	25	1000	39		Rn222
	Radon-222	46	±	25	1000	39		Rn222
	Sodium-22	0.36	±	2	NE	6.9	U	EPA:901.1
	Thallium-208	3.7	±	1.9	NE	6.1	U	EPA:901.1
	Thorium-234	-1.2	±	46	NE	150	U	EPA:901.1
	Tritium	-40	±	90	4 mrem/yr	300	U	EPA:906.0

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Table-4 NMED DOE Oversight Bureau FFY 2016 Q-1 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Emitting Isotopes, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)			LTMMP Trigger Level (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 14-Oct-15	Actinium-228	-3.2	±	11	NE	36	U	EPA:901.1
	Americium-241	25	±	33	NE	110	U	EPA:901.1
	Beryllium-7	-5.6	±	13	NE	45	U	EPA:901.1
	Bismuth-212	9.4	±	17	NE	59	U	EPA:901.1
	Bismuth-214	1	±	5.9	NE	19	U	EPA:901.1
	Cesium-134	-3.2	±	1.4	NE	4.7	U	EPA:901.1
	Cesium-137	-0.56	±	1.3	NE	4.5	U	EPA:901.1
	Cobalt-60	-0.14	±	1.4	NE	4.8	U	EPA:901.1
	Gross alpha	6.4	±	0.66	15	0.96		EPA:900
	Gross beta	6.2	±	0.68	4 mrem/yr	1.4		EPA:900
	Iodine-131	21	±	12	NE	40	U	EPA:901.1
	Lead-212	-0.74	±	5.1	NE	17	U	EPA:901.1
	Lead-214	-2.1	±	5.8	NE	19	U	EPA:901.1
	Potassium-40	-22	±	38	NE	130	U	EPA:901.1
	Protactinium-234m	180	±	210	NE	690	U	EPA:901.1
	Radon-222	570	±	78	1000	45		Rn222
	Radon-222	590	±	80	1000	45		Rn222
	Sodium-22	0.27	±	1.3	NE	4.5	U	EPA:901.1
	Thallium-208	0.78	±	3	NE	10	U	EPA:901.1
	Thorium-234	-48	±	70	NE	230	U	EPA:901.1
	Tritium	100	±	89	4 mrem/yr	290	U	EPA:906.0

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Table-4 NMED DOE Oversight Bureau FFY 2016 Q-1 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Emitting Isotopes, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)			LTMMP Trigger Level (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 14-Oct-15 DUP	Actinium-228	16	±	4.5	NE	18	U	EPA:901.1
	Americium-241	-8.6	±	9.8	NE	33	U	EPA:901.1
	Beryllium-7	18	±	15	NE	49	U	EPA:901.1
	Bismuth-212	3.8	±	21	NE	72	U	EPA:901.1
	Bismuth-214	2.2	±	6.6	NE	22	U	EPA:901.1
	Cesium-134	1.9	±	2.1	NE	6.8	U	EPA:901.1
	Cesium-137	-0.058	±	1.4	NE	4.9	U	EPA:901.1
	Cobalt-60	-1.2	±	1.5	NE	5.4	U	EPA:901.1
	Gross alpha	8.7	±	0.84	15	0.92		EPA:900
	Gross beta	6.3	±	0.63	4 mrem/yr	1.1		EPA:900
	Iodine-131	-0.43	±	14	NE	47	U	EPA:901.1
	Lead-212	1.5	±	4.2	NE	14	U	EPA:901.1
	Lead-214	15	±	3	NE	8.8		EPA:901.1
	Potassium-40	-16	±	42	NE	140	U	EPA:901.1
	Protactinium-234m	660	±	240	NE	750	U	EPA:901.1
	Radon-222	61	±	30	1000	45		Rn222
	Radon-222	400	±	60	1000	45		Rn222
	Sodium-22	-0.56	±	1.6	NE	5.5	U	EPA:901.1
	Thallium-208	0.12	±	2.9	NE	9.6	U	EPA:901.1
	Thorium-234	-56	±	43	NE	140	U	EPA:901.1
	Tritium	-120	±	90	4 mrem/yr	310	U	EPA:906.0

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