

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 2015 Q-3**

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Final Report

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The purpose of this communication is to transmit groundwater data collected by the New Mexico Environment Department DOE Oversight Bureau from the Mixed Waste Landfill groundwater monitoring wells during the third quarter of FFY 2015.

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Introductory remarks

The New Mexico Environment Department (NMED) DOE Oversight Bureau (Bureau) has compiled and assessed groundwater data collected during April 2015. The Bureau collected groundwater samples from Mixed Waste Landfill (MWL) groundwater monitoring wells MWL-BW2, MWL-MW7, MWL-MW8 (plus duplicate), 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 and beta, radon, and tritium. No samples taken from the 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 found 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 that follows 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, and also in the duplicate sample. The concentration in both samples was 0.31 µg/L. Both results were “J” flagged, indicating that the results were an estimated value. The results are below the EPA MCL and LTMMP trigger levels. 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 190 pCi/L at MWL-MW8 to 700 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 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	— ^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.

Table-1 NMED DOE OB FFY 2015 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)	Reporting Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 6-Apr-15	Aluminum	0.15	NE	0.05	0.019		SW-846:6020
	Antimony	0.00023	0.006	0.0003	0.00023	U	SW-846:6020
	Arsenic	0.00036	0.01	0.002	0.00036	U	SW-846:6020
	Barium	0.097	2	0.001	0.00094		SW-846:6020
	Beryllium	0.00014	0.004	0.0005	0.00014	U	SW-846:6020
	Cadmium	0.00013	0.005	0.0003	0.00013	U	SW-846:6020
	Calcium	70	NE	1	0.094		SW-846:6020
	Chromium	0.00074	0.1	0.01	0.00074	J	SW-846:6020
	Cobalt	0.00021	NE	0.001	0.00021	U	SW-846:6020
	Copper	0.002	NE	0.01	0.002	U	SW-846:6020
	Iron	0.16	NE	0.1	0.013		SW-846:6020
	Lead	0.0002	NE	0.0005	0.0002	U	SW-846:6020
	Magnesium	22	NE	0.1	0.039		SW-846:6020
	Manganese	0.00074	NE	0.002	0.00074	U	SW-846:6020
	Mercury	0.00006	0.002	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0023	NE	0.005	0.0023	U	SW-846:6020
	Potassium	3.6	NE	1	0.2		SW-846:6020
	Selenium	0.0034	0.05	0.001	0.00042	B	SW-846:6020
	Silver	0.000041	NE	0.0001	0.000041	U	SW-846:6020
	Sodium	56	NE	1	0.84		SW-846:6020
	Thallium	0.000034	0.002	0.0002	0.000034	U	SW-846:6020
	Uranium	0.0067	0.03	0.0001	0.000046		SW-846:6020
	Vanadium	0.0059	NE	0.001	0.00027	B	SW-846:6020
	Zinc	0.18	NE	0.02	0.0071		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 Reporting Limit but greater than or equal to the Method Detection Limit (MDL).

NE = Not Established

U = the analyte was analyzed for but not detected

Table-1 NMED DOE OB FFY 2015 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)	Reporting Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 7-Apr-15	Aluminum	0.019	NE	0.05	0.019	U	SW-846:6020
	Antimony	0.00029	0.006	0.0003	0.00023	JB	SW-846:6020
	Arsenic	0.00036	0.01	0.002	0.00036	U	SW-846:6020
	Barium	0.1	2	0.001	0.00094		SW-846:6020
	Beryllium	0.00014	0.004	0.0005	0.00014	U	SW-846:6020
	Cadmium	0.00013	0.005	0.0003	0.00013	U	SW-846:6020
	Calcium	56	NE	1	0.094		SW-846:6020
	Chromium	0.00074	0.1	0.01	0.00074	U	SW-846:6020
	Cobalt	0.00021	NE	0.001	0.00021	U	SW-846:6020
	Copper	0.002	NE	0.01	0.002	U	SW-846:6020
	Iron	0.013	NE	0.1	0.013	U	SW-846:6020
	Lead	0.0002	NE	0.0005	0.0002	U	SW-846:6020
	Magnesium	19	NE	0.1	0.039		SW-846:6020
	Manganese	0.00074	NE	0.002	0.00074	U	SW-846:6020
	Mercury	0.00006	0.002	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0023	NE	0.005	0.0023	U	SW-846:6020
	Potassium	4.5	NE	1	0.2		SW-846:6020
	Selenium	0.00053	0.05	0.001	0.00042	JB	SW-846:6020
	Silver	0.000041	NE	0.0001	0.000041	U	SW-846:6020
	Sodium	46	NE	1	0.84		SW-846:6020
	Thallium	0.000034	0.002	0.0002	0.000034	U	SW-846:6020
	Uranium	0.0073	0.03	0.0001	0.000046		SW-846:6020
	Vanadium	0.0067	NE	0.001	0.00027	B	SW-846:6020
	Zinc	0.0071	NE	0.02	0.0071	U	SW-846:6020

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Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	Reporting Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 13-Apr-15	Aluminum	0.079	NE	0.05	0.019		SW-846:6020
	Antimony	0.00023	0.006	0.0003	0.00023	U	SW-846:6020
	Arsenic	0.00036	0.01	0.002	0.00036	U	SW-846:6020
	Barium	0.14	2	0.001	0.00094		SW-846:6020
	Beryllium	0.00014	0.004	0.0005	0.00014	U	SW-846:6020
	Cadmium	0.00013	0.005	0.0003	0.00013	U	SW-846:6020
	Calcium	62	NE	1	0.094		SW-846:6020
	Chromium	0.00074	0.1	0.01	0.00074	U	SW-846:6020
	Cobalt	0.00021	NE	0.001	0.00021	U	SW-846:6020
	Copper	0.002	NE	0.01	0.002	U	SW-846:6020
	Iron	0.013	NE	0.1	0.013	U	SW-846:6020
	Lead	0.0002	NE	0.0005	0.0002	U	SW-846:6020
	Magnesium	21	NE	0.1	0.039		SW-846:6020
	Manganese	0.0016	NE	0.002	0.00074	J	SW-846:6020
	Mercury	0.00006	0.002	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0023	NE	0.005	0.0023	U	SW-846:6020
	Potassium	5	NE	1	0.2		SW-846:6020
	Selenium	0.00088	0.05	0.001	0.00042	JB	SW-846:6020
	Silver	0.000041	NE	0.0001	0.000041	U	SW-846:6020
	Sodium	48	NE	1	0.84		SW-846:6020
	Thallium	0.00007	0.002	0.0002	0.000034	J	SW-846:6020
	Uranium	0.0073	0.03	0.0001	0.000046		SW-846:6020
	Vanadium	0.0023	NE	0.001	0.00027	B	SW-846:6020
	Zinc	0.0071	NE	0.02	0.0071	U	SW-846:6020

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NE = Not Established

U = the analyte was analyzed for but not detected

Table-1 NMED DOE OB FFY 2015 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)	Reporting Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 8-Apr-15	Aluminum	0.047	NE	0.05	0.019	J	SW-846:6020
	Antimony	0.00023	0.006	0.0003	0.00023	U	SW-846:6020
	Arsenic	0.0034	0.01	0.002	0.00036		SW-846:6020
	Barium	0.1	2	0.001	0.00094		SW-846:6020
	Beryllium	0.00014	0.004	0.0005	0.00014	U	SW-846:6020
	Cadmium	0.00013	0.005	0.0003	0.00013	U	SW-846:6020
	Calcium	63	NE	1	0.094		SW-846:6020
	Chromium	0.00085	0.1	0.01	0.00074	J	SW-846:6020
	Cobalt	0.00021	NE	0.001	0.00021	U	SW-846:6020
	Copper	0.002	NE	0.01	0.002	U	SW-846:6020
	Iron	0.054	NE	0.1	0.013	J	SW-846:6020
	Lead	0.0002	NE	0.0005	0.0002	U	SW-846:6020
	Magnesium	21	NE	0.1	0.039		SW-846:6020
	Manganese	0.00095	NE	0.002	0.00074	J	SW-846:6020
	Mercury	0.00006	0.002	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0023	NE	0.005	0.0023	U	SW-846:6020
	Potassium	5.1	NE	1	0.2		SW-846:6020
	Selenium	0.00069	0.05	0.001	0.00042	JB	SW-846:6020
	Silver	0.000041	NE	0.0001	0.000041	U	SW-846:6020
	Sodium	53	NE	1	0.84		SW-846:6020
	Thallium	0.000034	0.002	0.0002	0.000034	U	SW-846:6020
	Uranium	0.0087	0.03	0.0001	0.000046		SW-846:6020
	Vanadium	0.0094	NE	0.001	0.00027		SW-846:6020
	Zinc	0.0071	NE	0.02	0.0071	U	SW-846:6020

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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

U = the analyte was analyzed for but not detected

Table-1 NMED DOE OB FFY 2015 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)	Reporting Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 8-Apr-15 Dup	Aluminum	0.022	NE	0.05	0.019	J	SW-846:6020
	Antimony	0.00023	0.006	0.0003	0.00023	U	SW-846:6020
	Arsenic	0.0034	0.01	0.002	0.00036		SW-846:6020
	Barium	0.094	2	0.001	0.00094		SW-846:6020
	Beryllium	0.00014	0.004	0.0005	0.00014	U	SW-846:6020
	Cadmium	0.00013	0.005	0.0003	0.00013	U	SW-846:6020
	Calcium	62	NE	1	0.094		SW-846:6020
	Chromium	0.00074	0.1	0.01	0.00074	U	SW-846:6020
	Cobalt	0.00021	NE	0.001	0.00021	U	SW-846:6020
	Copper	0.002	NE	0.01	0.002	U	SW-846:6020
	Iron	0.013	NE	0.1	0.013	J	SW-846:6020
	Lead	0.0002	NE	0.0005	0.0002	U	SW-846:6020
	Magnesium	20	NE	0.1	0.039		SW-846:6020
	Manganese	0.00074	NE	0.002	0.00074	U	SW-846:6020
	Mercury	0.00006	0.002	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0023	NE	0.005	0.0023	U	SW-846:6020
	Potassium	4.9	NE	1	0.2		SW-846:6020
	Selenium	0.0014	0.05	0.001	0.00042	B	SW-846:6020
	Silver	0.000041	NE	0.0001	0.000041	U	SW-846:6020
	Sodium	49	NE	1	0.84		SW-846:6020
	Thallium	0.000034	0.002	0.0002	0.000034	U	SW-846:6020
	Uranium	0.0085	0.03	0.0001	0.000046		SW-846:6020
	Vanadium	0.0089	NE	0.001	0.00027		SW-846:6020
	Zinc	0.0071	NE	0.02	0.0071	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 Reporting Limit but greater than or equal to the Method Detection Limit (MDL).

NE = Not Established

U = the analyte was analyzed for but not detected

Table-2 NMED DOE OB FFY 2015 Q-2 Mixed Waste Landfill Groundwater Quality Results: Detected Voaltile Organic Compounds

Monitoring Well/ Sample Date	Analyte	Result (µg/L)	EPA MCL (mg/L)	Reporting Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 13-Apr-15	Tetrachloroethene	0.31	5	1	0.2	J	SW-846:8260B_25
MWL-MW8 13-Apr-15 DUP	Tetrachloroethene	0.31	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 OB FFY 2015 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-]	0.3
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 OB FFY 2015 Q-3 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Spectroscopy, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 6-Apr-15	Actinium-228	15 ± 6.3	27	U	EPA:901.1
	Aluminum-26	-1.2 ± 1.3	4.5	U	EPA:901.1
	Americium-241	-7.8 ± 40	140	U	EPA:901.1
	Antimony-124	0.29 ± 1.5	5.1	U	EPA:901.1
	Beryllium-7	-14 ± 11	37	U	EPA:901.1
	Bismuth-212	32 ± 17	54	U	EPA:901.1
	Bismuth-214	-1.8 ± 8.2	27	UJ	EPA:901.1
	Cadmium-109	-48 ± 71	240	U	EPA:901.1
	Ce-139	-2 ± 1.5	5.2	U	EPA:901.1
	Cerium-144	9.4 ± 7.2	24	U	EPA:901.1
	Cesium-134	-0.38 ± 1.2	4.2	U	EPA:901.1
	Cesium-137	-1.5 ± 1.1	3.8	U	EPA:901.1
	Chromium-51	-6.7 ± 13	45	U	EPA:901.1
	Cobalt-56	2.4 ± 2.1	6.9	U	EPA:901.1
	Cobalt-57	-0.76 ± 1	3.4	U	EPA:901.1
	Cobalt-58	-2.7 ± 1.3	4.6	U	EPA:901.1
	Cobalt-60	-2.1 ± 1.1	4.1	U	EPA:901.1
	Europium-152	-1.7 ± 5.5	19	U	EPA:901.1
	Europium-154	-1.8 ± 6.2	21	U	EPA:901.1
	Europium-155	-0.39 ± 5	17	U	EPA:901.1
	Gross alpha	7.6 ± 0.77	0.93		EPA:900
	Gross beta	3.7 ± 0.58	1.5		EPA:900
	Iodine-131	-2.8 ± 5.9	20	U	EPA:901.1
	Iron-59	-2 ± 2.9	10	U	EPA:901.1
	Lead-212	0.52 ± 4.3	14	U	EPA:901.1
	Lead-214	-1.8 ± 6.3	21	UJ	EPA:901.1
	Manganese-54	2.3 ± 1.2	3.7	U	EPA:901.1
	Niobium-94	1.3 ± 1.2	4.1	U	EPA:901.1
	Niobium-95	1.7 ± 1.3	4.4	U	EPA:901.1
	Potassium-40	-13 ± 38	130	U	EPA:901.1
	Protactinium-234m	340 ± 190	630	U	EPA:901.1
	Rn-222	700 ± 91	42		Rn222
	Rn-222	620 ± 82	41		Rn222
	Ruthenium-106	5.2 ± 11	35	U	EPA:901.1
	Sb-125	0.26 ± 2.8	10	U	EPA:901.1
	Scandium-46	1.6 ± 1.3	4.3	U	EPA:901.1

J = The activity is an estimated value.

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

Table-4 NMED DOE OB FFY 2015 Q-3 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Spectroscopy, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)		MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 6-Apr-15	Silver-110m	2	± 1.1	3.4	U	EPA:901.1
	Sodium-22	0.33	± 1.2	4.1	U	EPA:901.1
	Strontium-85	5.5	± 1.7	5.3		EPA:901.1
	Thallium-208	4.1	± 1.2	3.8		EPA:901.1
	Thorium-227	-14	± 6.5	22	U	EPA:901.1
	Thorium-234	9.7	± 66	220	U	EPA:901.1
	Tritium	130	± 110	360	U	EPA:906.0
	Uranium-235	-7	± 20	67	U	EPA:901.1
	Zinc-65	-2.8	± 2.6	9.1	U	EPA:901.1
MWL-MW7 7-Apr-15	Actinium-228	16	± 4.6	14		EPA:901.1
	Aluminum-26	1.6	± 1.4	4.7	U	EPA:901.1
	Americium-241	1	± 1.2	4.1	U	EPA:901.1
	Antimony-124	-2.2	± 1.3	4.5	U	EPA:901.1
	Beryllium-7	-3.1	± 9.1	31	U	EPA:901.1
	Bismuth-212	27	± 16	53	U	EPA:901.1
	Bismuth-214	7.3	± 4.1	16	UJ	EPA:901.1
	Cadmium-109	10	± 10	34	U	EPA:901.1
	Ce-139	-0.35	± 0.64	2.2	U	EPA:901.1
	Cerium-144	6.1	± 4.2	14	U	EPA:901.1
	Cesium-134	0.88	± 1.1	3.5	U	EPA:901.1
	Cesium-137	-1.1	± 1.1	3.8	U	EPA:901.1
	Chromium-51	6.9	± 11	37	U	EPA:901.1
	Cobalt-56	1	± 2.3	7.8	U	EPA:901.1
	Cobalt-57	-1.3	± 0.52	1.8	U	EPA:901.1
	Cobalt-58	-0.17	± 1.2	4.2	U	EPA:901.1
	Cobalt-60	1.5	± 1.2	4	U	EPA:901.1
	Europium-152	-14	± 5.9	21	U	EPA:901.1
	Europium-154	-12	± 8.2	29	U	EPA:901.1
	Europium-155	0.99	± 1.6	5.5	U	EPA:901.1
	Gross alpha	6.5	± 0.67	0.9		EPA:900
	Gross beta	5.6	± 0.62	1.3		EPA:900
	Iodine-131	-3.4	± 5.6	19	U	EPA:901.1
	Iron-59	-0.34	± 2.9	9.9	U	EPA:901.1
	Lead-212	-1	± 3.3	11	U	EPA:901.1
	Lead-214	-2.9	± 4.1	14	UJ	EPA:901.1
	Manganese-54	1.2	± 1.1	3.7	U	EPA:901.1

J = The activity is an estimated value.

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

Table-4 NMED DOE OB FFY 2015 Q-3 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Spectroscopy, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)		MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 7-Apr-15	Niobium-94	1	± 1.2	3.9	U	EPA:901.1
	Niobium-95	-1.5	± 1.3	4.6	U	EPA:901.1
	Potassium-40	-3.8	± 29	98	U	EPA:901.1
	Protactinium-234m	240	± 120	390	U	EPA:901.1
	Rn-222	250	± 40	35		Rn222
	Rn-222	220	± 37	35		Rn222
	Ruthenium-106	-10	± 9.8	34	U	EPA:901.1
	Sb-125	2.4	± 2.4	8.8	U	EPA:901.1
	Scandium-46	-1	± 1.2	4.2	U	EPA:901.1
	Silver-110m	-0.42	± 1	3.6	U	EPA:901.1
	Sodium-22	-0.87	± 1.1	3.9	U	EPA:901.1
	Strontium-85	4.5	± 1.7	5.2	U	EPA:901.1
	Thallium-208	0.2	± 2.5	8.4	U	EPA:901.1
	Thorium-227	-4.6	± 5.1	17	U	EPA:901.1
	Thorium-234	-2.3	± 21	71	U	EPA:901.1
	Tritium	47	± 110	360	U	EPA:906.0
	Uranium-235	9.7	± 4.1	13	U	EPA:901.1
	Zinc-65	2.4	± 2.5	8.2	U	EPA:901.1
MWL-MW8 13-Apr-15	Actinium-228	17	± 5.3	16		EPA:901.1
	Aluminum-26	1.4	± 1.9	6.3	U	EPA:901.1
	Americium-241	-12	± 11	38	U	EPA:901.1
	Antimony-124	4.1	± 1.5	4.9	U	EPA:901.1
	Beryllium-7	10	± 13	45	U	EPA:901.1
	Bismuth-212	35	± 19	63	U	EPA:901.1
	Bismuth-214	5.9	± 6	20	UJ	EPA:901.1
	Cadmium-109	39	± 22	71	U	EPA:901.1
	Ce-139	-1.1	± 0.95	3.2	U	EPA:901.1
	Cerium-144	-4.2	± 6.3	21	U	EPA:901.1
	Cesium-134	-1.9	± 1.3	4.5	U	EPA:901.1
	Cesium-137	-0.44	± 1.4	4.7	U	EPA:901.1
	Chromium-51	-18	± 16	54	U	EPA:901.1
	Cobalt-56	4.3	± 2.8	9.1	U	EPA:901.1
	Cobalt-57	-0.7	± 0.88	3	U	EPA:901.1
	Cobalt-58	1.6	± 1.6	5.5	U	EPA:901.1
	Cobalt-60	-0.73	± 1.5	5.4	U	EPA:901.1
	Europium-152	-3.1	± 7.1	25	U	EPA:901.1

J = The activity is an estimated value.

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

Table-4 NMED DOE OB FFY 2015 Q-3 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Spectroscopy, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)		MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 13-Apr-15	Europium-154	-2.6	± 7.6	26	U	EPA:901.1
	Europium-155	-4.8	± 3.9	13	U	EPA:901.1
	Gross alpha	6.9	± 0.71	0.94		EPA:900
	Gross beta	5.7	± 0.68	1.5		EPA:900
	Iodine-131	-11	± 8.1	28	U	EPA:901.1
	Iron-59	3.8	± 2.5	11	U	EPA:901.1
	Lead-212	0.82	± 4	13	U	EPA:901.1
	Lead-214	2.1	± 4.9	16	UJ	EPA:901.1
	Manganese-54	-0.012	± 1.4	4.9	U	EPA:901.1
	Niobium-94	-1.9	± 1.4	4.8	U	EPA:901.1
	Niobium-95	-0.02	± 1.6	5.4	U	EPA:901.1
	Potassium-40	-14	± 39	130	U	EPA:901.1
	Protactinium-234m	210	± 230	770	U	EPA:901.1
	Rn-222	210	± 36	33		Rn222
	Rn-222	190	± 34	33		Rn222
	Ruthenium-106	16	± 13	43	U	EPA:901.1
	Sb-125	-1.2	± 3.2	11	U	EPA:901.1
	Scandium-46	-2.6	± 1.4	5.1	U	EPA:901.1
	Silver-110m	1.3	± 1.3	4.4	U	EPA:901.1
	Sodium-22	0.64	± 1.6	5.4	U	EPA:901.1
	Strontium-85	4.6	± 2.4	7.6	U	EPA:901.1
	Thallium-208	1.3	± 3.2	11	U	EPA:901.1
	Thorium-227	11	± 10	34	U	EPA:901.1
	Thorium-234	-41	± 48	160	U	EPA:901.1
	Tritium	-43	± 95	320	U	EPA:906.0
	Uranium-235	11	± 12	40	U	EPA:901.1
	Zinc-65	-3.3	± 3.4	12	U	EPA:901.1
MWL-MW9 8-Apr-15	Actinium-228	2.5	± 9.9	33	U	EPA:901.1
	Aluminum-26	-0.58	± 1.9	6.6	U	EPA:901.1
	Americium-241	-5.8	± 11	38	U	EPA:901.1
	Antimony-124	-7.3	± 1.8	6.2	U	EPA:901.1
	Beryllium-7	4.5	± 13	43	U	EPA:901.1
	Bismuth-212	24	± 19	62	U	EPA:901.1
	Bismuth-214	3.8	± 6	20	UJ	EPA:901.1
	Cadmium-109	17	± 34	110	U	EPA:901.1
	Ce-139	0.25	± 0.87	2.9	U	EPA:901.1

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Table-4 NMED DOE OB FFY 2015 Q-3 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Spectroscopy, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)		MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 8-Apr-15	Cerium-144	17	± 6.3	20	U	EPA:901.1
	Cesium-134	-1.5	± 1.3	4.5	U	EPA:901.1
	Cesium-137	0.11	± 1.3	4.5	U	EPA:901.1
	Chromium-51	-1.7	± 15	50	U	EPA:901.1
	Cobalt-56	3.9	± 2.8	9.2	U	EPA:901.1
	Cobalt-57	-1.2	± 0.84	2.9	U	EPA:901.1
	Cobalt-58	1.1	± 1.5	5	U	EPA:901.1
	Cobalt-60	1.4	± 1.1	4.6	U	EPA:901.1
	Europium-152	7.1	± 7.1	24	U	EPA:901.1
	Europium-154	1.1	± 7.2	25	U	EPA:901.1
	Europium-155	-1.9	± 3.9	13	U	EPA:901.1
	Gross alpha	7.4	± 0.8	1.2		EPA:900
	Gross beta	5.9	± 0.7	1.6		EPA:900
	Iodine-131	-0.61	± 6.3	21	U	EPA:901.1
	Iron-59	7.5	± 3.6	11	U	EPA:901.1
	Lead-212	0.81	± 3.7	12	U	EPA:901.1
	Lead-214	-3.6	± 5.7	19	UJ	EPA:901.1
	Manganese-54	0.87	± 1.4	4.7	U	EPA:901.1
	Niobium-94	0.2	± 1.3	4.5	U	EPA:901.1
	Niobium-95	-1.1	± 1.6	5.6	U	EPA:901.1
	Potassium-40	12	± 36	120	U	EPA:901.1
	Protactinium-234m	-270	± 220	790	U	EPA:901.1
	Rn-222	550	± 71	33		Rn222
	Rn-222	560	± 72	33		Rn222
	Ruthenium-106	10	± 13	43	U	EPA:901.1
	Sb-125	0.45	± 3	11	U	EPA:901.1
	Scandium-46	1	± 1.5	5.1	U	EPA:901.1
	Silver-110m	-0.1	± 1.3	4.3	U	EPA:901.1
	Sodium-22	-3.9	± 1.6	5.8	U	EPA:901.1
	Strontium-85	6.7	± 2.1	6.5		EPA:901.1
	Thallium-208	-1.2	± 2.6	8.8	U	EPA:901.1
	Thorium-227	1.7	± 10	34	U	EPA:901.1
	Thorium-234	-5.3	± 49	160	U	EPA:901.1
	Tritium	31	± 110	360	U	EPA:906.0
	Uranium-235	20	± 5	19		EPA:901.1
	Zinc-65	-5.1	± 3.2	11	U	EPA:901.1

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

Table-4 NMED DOE OB FFY 2015 Q-3 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Spectroscopy, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)		MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 8-Apr-15 Dup	Actinium-228	3.6	± 7.1	24	U	EPA:901.1
	Aluminum-26	2	± 2.6	8.7	U	EPA:901.1
	Americium-241	9.1	± 9	30	U	EPA:901.1
	Antimony-124	-12	± 2.5	8.6	U	EPA:901.1
	Beryllium-7	0.55	± 16	55	U	EPA:901.1
	Bismuth-212	1	± 24	83	U	EPA:901.1
	Bismuth-214	16	± 4	12	J	EPA:901.1
	Cadmium-109	-9.6	± 55	180	U	EPA:901.1
	Ce-139	-3.4	± 1.2	4	U	EPA:901.1
	Cerium-144	18	± 9.2	30	U	EPA:901.1
	Cesium-134	-5.9	± 1.9	6.7	U	EPA:901.1
	Cesium-137	-1	± 1.7	5.9	U	EPA:901.1
	Chromium-51	-26	± 17	59	U	EPA:901.1
	Cobalt-56	6.3	± 3.8	12	U	EPA:901.1
	Cobalt-57	-0.41	± 0.91	3.1	U	EPA:901.1
	Cobalt-58	-4.8	± 2.1	7.4	U	EPA:901.1
	Cobalt-60	1.9	± 2	6.9	U	EPA:901.1
	Europium-152	-5.5	± 10	36	U	EPA:901.1
	Europium-154	5.1	± 10	35	U	EPA:901.1
	Europium-155	-5.1	± 3.9	13	U	EPA:901.1
	Gross alpha	7.6	± 0.82	1.2		EPA:900
	Gross beta	6.7	± 0.78	1.7		EPA:900
	Iodine-131	11	± 7.9	26	U	EPA:901.1
	Iron-59	5	± 5.1	17	U	EPA:901.1
	Lead-212	9.2	± 2.3	7.1		EPA:901.1
	Lead-214	4.2	± 7.1	24	UJ	EPA:901.1
	Manganese-54	1.6	± 1.8	6.1	U	EPA:901.1
	Niobium-94	0.13	± 1.8	6.1	U	EPA:901.1
	Niobium-95	-1.3	± 2	6.9	U	EPA:901.1
	Potassium-40	-16	± 53	180	U	EPA:901.1
	Protactinium-234m	-120	± 320	1100	U	EPA:901.1
	Rn-222	520	± 69	33		Rn222
	Rn-222	560	± 73	33		Rn222
	Ruthenium-106	-11	± 16	55	U	EPA:901.1
	Sb-125	-3.5	± 4.2	14	U	EPA:901.1
	Scandium-46	-2.6	± 2	7.1	U	EPA:901.1

J = The activity is an estimated value.

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

Table-4 NMED DOE OB FFY 2015 Q-3 Mixed Waste Landfill Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Spectroscopy, Radon and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)		MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 8-Apr-15 Dup	Silver-110m	-2.1	± 1.7	5.9	U	EPA:901.1
	Sodium-22	-2.2	± 2.2	7.6	U	EPA:901.1
	Strontium-85	2.9	± 2.4	7.8	U	EPA:901.1
	Thallium-208	7.3	± 1.9	5.7		EPA:901.1
	Thorium-227	-7.7	± 7.3	25	U	EPA:901.1
	Thorium-234	-39	± 47	160	U	EPA:901.1
	Tritium	210	± 110	360	U	EPA:906.0
	Uranium-235	23	± 7.5	24	U	EPA:901.1
	Zinc-65	-3.9	± 4.5	16	U	EPA:901.1

J = The activity is an estimated value.

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