DOE Oversight Bureau, New Mexico Environment Department

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

Conducted by the
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for FFY 2014 Q-3

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The purpose of this communication is to transmit groundwater data collected by NMED DOE Oversight Bureau from Mixed Waste Landfill groundwater monitoring wells during third quarter FFY 2014.

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The New Mexico Environment Department (NMED) DOE Oversight Bureau (Bureau) compiled and assessed groundwater data collected during April 2014. The Bureau collected groundwater samples from Mixed Waste Landfill (MWL) groundwater monitoring wells MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9. Split samples were collected using standard Sandia National Laboratories/New Mexico (SNL/NM or Sandia) 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. Confirmation sampling was conducted in June 2014 at monitoring well MWL-MW8 for VOCs only.

Data Assessment

All groundwater samples were collected and analyzed in accordance with U.S. Environmental Protection Agency (EPA) protocols. Data results are compared to applicable maximum contaminant levels (MCLs) established by the 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 Table 5.2.4-1 of the SNL/NM Environmental Restoration Operations Long-Term Monitoring and Maintenance Plan (LTMMP) for the Mixed Waste Landfill, March 2012.

Under the current LTMMP, SNL/NM is only required to collect sample from Mixed Waste Landfill Monitoring wells MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9. Samples are only analyzed for LTMMP-list VOCs, metals (Cd, Cr, Ni, and U), gamma-emitting isotopes, gross alpha/beta, tritium, and radon. Seeteh table that follows for listed analytes and trigger levels.

No samples taken from MWL monitoring wells exceeded established EPA MCLs or trigger levels listed in the MWL LTMMP.

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.

Results

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

Analytical results for radionuclides are listed in Table 2. Samples were analyzed for gross alpha/beta, gamma-emitting isotopes, radon and tritium. No isotopes were detected above EPA MCLs or LTMMP trigger levels.

Table-3 summarizes volatile organic compounds (VOCs) detected above their method detection limit (MDL) results for groundwater samples collected during the initial April and confirmation sampling event in June 2014. No VOCs were detected at concentrations above established MCLs or trigger levels. Tetrachloroethene (PCE) and trichloroethene (TCE) were the only VOCs detected above the laboratory MDL, but both measurements were below the reporting limits. As a result, the concentration values reported by the laboratory were qualified with “J” as estimated concentrations. In April, tetrachloroethene and trichloroethene were detected in the samples taken from MWL-MW8 and

MWL-MW8-duplicate at concentrations of 0.35 µg/L and 0.36 µg/L, respectively. During the confirmation sampling in June 2014, only tetrachloroethene was detected in both the environmental sample and duplicate. Tetrachloroethene results were 0.27 µg/L and 0.25 µg/L. The results were again "J" flagged indicating an estimated concentration. The laboratory method detection limits for the remaining VOCs analyzed from the MWL monitoring wells are presented in Table 4.

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, radionuclides and VOCs below established EPA MCLs and SNL/NM trigger levels based on LTMMP.

References

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

Table-1 NMED DOE OB FFY 2014 Q-3 Mixed Waste Landfill Groundwater Quality Results: Total TAL Metals + U

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 21-Apr-14	Aluminum	0.036	NE	0.1	0.018	JB	SW-846:6010B
	Antimony	0.00017	0.006	0.0003	0.00017	U	SW-846:6020B
	Arsenic	0.00089	0.01	0.002	0.00025	J	SW-846:6020B
	Barium	0.1	2	0.002	0.00022	B	SW-846:6010B
	Beryllium	0.00018	0.004	0.001	0.00018	U	SW-846:6010B
	Cadmium	0.00012	0.005	0.0003	0.00012	U	SW-846:6020B
	Calcium	70	NE	0.5	0.014	B	SW-846:6010B
	Chromium	0.00062	0.1	0.005	0.00062	U	SW-846:6010B
	Cobalt	0.00057	NE	0.002	0.00057	U	SW-846:6010B
	Copper	0.0011	NE	0.002	0.0011	U	SW-846:6010B
	Iron	0.0057	NE	0.06	0.0057	U	SW-846:6010B
	Lead	0.00025	NE	0.0005	0.00025	U	SW-846:6020B
	Magnesium	23	NE	0.5	0.015	B	SW-846:6010B
	Manganese	0.00042	NE	0.002	0.00017	JB	SW-846:6010B
	Mercury	0.00006	0.002	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0012	NE	0.005	0.0012	U	SW-846:6010B
	Potassium	4.4	NE	0.5	0.12		SW-846:6010B
	Selenium	0.0019	0.05	0.001	0.00054		SW-846:6020B
	Silver	0.00004	NE	0.0001	0.00004	U	SW-846:6020B
	Sodium	51	NE	0.5	0.012	B	SW-846:6010B
	Thallium	0.000042	0.002	0.0002	0.000042	U	SW-846:6020B
	Uranium-238	0.0069	0.03	0.0001	0.000088		SW-846:6020B
	Vanadium	0.0061	NE	0.005	0.00062		SW-846:6010B
	Zinc	0.0053	NE	0.006	0.0011	JB	SW-846:6010B

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 2014 Q-3 Mixed Waste Landfill Groundwater Quality Results: Total TAL Metals + U

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 22-Apr-14	Aluminum	0.018	NE	0.1	0.018	U	SW-846:6010B
	Antimony	0.001	0.006	0.0003	0.00017		SW-846:6020B
	Arsenic	0.0018	0.01	0.002	0.00025	J	SW-846:6020B
	Barium	0.11	2	0.002	0.00022	B	SW-846:6010B
	Beryllium	0.0002	0.004	0.001	0.00018	J	SW-846:6010B
	Cadmium	0.00012	0.005	0.0003	0.00012	U	SW-846:6020B
	Calcium	57	NE	0.5	0.014		SW-846:6010B
	Chromium	0.00062	0.1	0.005	0.00062	U	SW-846:6010B
	Cobalt	0.00057	NE	0.002	0.00057	U	SW-846:6010B
	Copper	0.0012	NE	0.002	0.0011	JB	SW-846:6010B
	Iron	0.0057	NE	0.06	0.0057	U	SW-846:6010B
	Lead	0.00025	NE	0.0005	0.00025	U	SW-846:6020B
	Magnesium	20	NE	0.5	0.015		SW-846:6010B
	Manganese	0.00017	NE	0.002	0.00017	U	SW-846:6010B
	Mercury	0.00006	0.002	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0012	NE	0.005	0.0012	U	SW-846:6010B
	Potassium	5.5	NE	0.5	0.12		SW-846:6010B
	Selenium	0.00054	0.05	0.001	0.00054	U	SW-846:6020B
	Silver	0.00004	NE	0.0001	0.00004	U	SW-846:6020B
	Sodium	46	NE	0.5	0.012	B	SW-846:6010B
	Thallium	0.000042	0.002	0.0002	0.000042	U	SW-846:6020B
	Uranium-238	0.0078	0.03	0.0001	0.000088		SW-846:6020B
	Vanadium	0.0073	NE	0.005	0.00062	B	SW-846:6010B
	Zinc	0.0011	NE	0.006	0.0011	U	SW-846:6010B

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U = the analyte was analyzed for but not detected

Table-1 NMED DOE OB FFY 2014 Q-3 Mixed Waste Landfill Groundwater Quality Results: Total TAL Metals + U

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 28-Apr-14	Aluminum	0.018	NE	0.1	0.018	U	SW-846:6010B
	Antimony	0.00017	0.006	0.0003	0.00017	U	SW-846:6020B
	Arsenic	0.00097	0.01	0.002	0.00025	J	SW-846:6020B
	Barium	0.13	2	0.002	0.00022	B	SW-846:6010B
	Beryllium	0.00051	0.004	0.001	0.00018	JB	SW-846:6010B
	Cadmium	0.00012	0.005	0.0003	0.00012	U	SW-846:6020B
	Calcium	57	NE	0.5	0.014	B	SW-846:6010B
	Chromium	0.00062	0.1	0.005	0.00062	U	SW-846:6010B
	Cobalt	0.00057	NE	0.002	0.00057	U	SW-846:6010B
	Copper	0.0011	NE	0.002	0.0011	U	SW-846:6010B
	Iron	0.0057	NE	0.06	0.0057	U	SW-846:6010B
	Lead	0.00025	NE	0.0005	0.00025	U	SW-846:6020B
	Magnesium	19	NE	0.5	0.015	B	SW-846:6010B
	Manganese	0.0023	NE	0.002	0.00017	B	SW-846:6010B
	Mercury	0.00006	0.002	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0012	NE	0.005	0.0012	U	SW-846:6010B
	Potassium	5.7	NE	0.5	0.12		SW-846:6010B
	Selenium	0.00057	0.05	0.001	0.00054	J	SW-846:6020B
	Silver	0.00004	NE	0.0001	0.00004	U	SW-846:6020B
	Sodium	45	NE	0.5	0.012	B	SW-846:6010B
	Thallium	0.000042	0.002	0.0002	0.000042	U	SW-846:6020B
	Uranium-238	0.0074	0.03	0.0001	0.000088		SW-846:6020B
	Vanadium	0.0014	NE	0.005	0.00062	JB	SW-846:6010B
	Zinc	0.0042	NE	0.006	0.0011	JB	SW-846:6010B

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Table-1 NMED DOE OB FFY 2014 Q-3 Mixed Waste Landfill Groundwater Quality Results: Total TAL Metals + U

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 28-Apr-14 DUP	Aluminum	0.018	NE	0.1	0.018	U	SW-846:6010B
	Antimony	0.00024	0.006	0.0003	0.00017	J	SW-846:6020B
	Arsenic	0.00085	0.01	0.002	0.00025	J	SW-846:6020B
	Barium	0.13	2	0.002	0.00022	B	SW-846:6010B
	Beryllium	0.00044	0.004	0.001	0.00018	JB	SW-846:6010B
	Cadmium	0.00012	0.005	0.0003	0.00012	U	SW-846:6020B
	Calcium	58	NE	0.5	0.014	B	SW-846:6010B
	Chromium	0.00062	0.1	0.005	0.00062	U	SW-846:6010B
	Cobalt	0.00057	NE	0.002	0.00057	U	SW-846:6010B
	Copper	0.0011	NE	0.002	0.0011	U	SW-846:6010B
	Iron	0.0057	NE	0.06	0.0057	U	SW-846:6010B
	Lead	0.00025	NE	0.0005	0.00025	U	SW-846:6020B
	Magnesium	20	NE	0.5	0.015	B	SW-846:6010B
	Manganese	0.0015	NE	0.002	0.00017	JB	SW-846:6010B
	Mercury	0.00006	0.002	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0012	NE	0.005	0.0012	U	SW-846:6010B
	Potassium	5.7	NE	0.5	0.12		SW-846:6010B
	Selenium	0.00075	0.05	0.001	0.00054	J	SW-846:6020B
	Silver	0.00004	NE	0.0001	0.00004	U	SW-846:6020B
	Sodium	44	NE	0.5	0.012	B	SW-846:6010B
	Thallium	0.00005	0.002	0.0002	0.000042	J	SW-846:6020B
	Uranium-238	0.0072	0.03	0.0001	0.000088		SW-846:6020B
	Vanadium	0.0018	NE	0.005	0.00062	JB	SW-846:6010B
	Zinc	0.0032	NE	0.006	0.0011	JB	SW-846:6010B

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NE = Not Established

U = the analyte was analyzed for but not detected

Table-1 NMED DOE OB FFY 2014 Q-3 Mixed Waste Landfill Groundwater Quality Results: Total TAL Metals + U

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 23-Apr-14	Aluminum	0.018	NE	0.1	0.018	U	SW-846:6010B
	Antimony	0.00017	0.006	0.0003	0.00017	U	SW-846:6020B
	Arsenic	0.0032	0.01	0.002	0.00025		SW-846:6020B
	Barium	0.099	2	0.002	0.00022	B	SW-846:6010B
	Beryllium	0.00018	0.004	0.001	0.00018	U	SW-846:6010B
	Cadmium	0.00012	0.005	0.0003	0.00012	U	SW-846:6020B
	Calcium	57	NE	0.5	0.014	B	SW-846:6010B
	Chromium	0.00062	0.1	0.005	0.00062	U	SW-846:6010B
	Cobalt	0.00057	NE	0.002	0.00057	U	SW-846:6010B
	Copper	0.0011	NE	0.002	0.0011	U	SW-846:6010B
	Iron	0.01	NE	0.06	0.0057	JB	SW-846:6010B
	Lead	0.00025	NE	0.0005	0.00025	U	SW-846:6020B
	Magnesium	20	NE	0.5	0.015	B	SW-846:6010B
	Manganese	0.0019	NE	0.002	0.00017	JB	SW-846:6010B
	Mercury	0.00006	0.002	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0012	NE	0.005	0.0012	U	SW-846:6010B
	Potassium	5.4	NE	0.5	0.12		SW-846:6010B
	Selenium	0.00086	0.05	0.001	0.00054	J	SW-846:6020B
	Silver	0.00004	NE	0.0001	0.00004	U	SW-846:6020B
	Sodium	43	NE	0.5	0.012	B	SW-846:6010B
	Thallium	0.000042	0.002	0.0002	0.000042	U	SW-846:6020B
	Uranium-238	0.009	0.03	0.0001	0.000088		SW-846:6020B
	Vanadium	0.0095	NE	0.005	0.00062		SW-846:6010B
	Zinc	0.0034	NE	0.006	0.0011	JB	SW-846:6010B

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 2014 Q-3 Mixed Waste Landfill Groundwater Quality Results: Gamma Spectroscopy, Gross Alpha, Gross Beta and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)			MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 21-Apr-14	Actinium-228	11		12	40	U	EPA:901.1
	Americium-241	-19		14	49	U	EPA:901.1
	Beryllium-7	-2		12	40	U	EPA:901.1
	Bismuth-212	25		22	73	U	EPA:901.1
	Bismuth-214	63	±	7.2	23	J	EPA:901.1
	Cesium-134	-1		1.5	5.1	U	EPA:901.1
	Cesium-137	-0.74		1.4	4.9	U	EPA:901.1
	Cobalt-60	0.99		1.4	4.6	U	EPA:901.1
	Gross alpha	6.7	±	0.76	1.2		EPA:900
	Gross beta	6.7	±	0.82	1.9		EPA:900
	Iodine-131	-2.6		2	6.9	U	EPA:901.1
	Lead-212	2.1		3.4	11	U	EPA:901.1
	Lead-214	69	±	7	23	J	EPA:901.1
	Potassium-40	-51		48	160	U	EPA:901.1
	Protactinium-234m	270		260	850	U	EPA:901.1
	Rn-222	640	±	40	30		Rn222
	Rn-222	650	±	40	30		Rn222
	Sodium-22	1.6		1.3	4.5	U	EPA:901.1
	Thallium-208	4		1.6	5.1	U	EPA:901.1
	Thorium-234	70	±	22	68		EPA:901.1
	Tritium	120		87	290	U	EPA:906.0
	TRITIUM	-0.02	±	0.09	0.09		Generic:Low_Level_Tritium

J = The activity is an estimated value.

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

Table-2 NMED DOE OB FFY 2014 Q-3 Mixed Waste Landfill Groundwater Quality Results: Gamma Spectroscopy, Gross Alpha, Gross Beta and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)			MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 22-Apr-14	Actinium-228	9.7		14	48	U	EPA:901.1
	Americium-241	-5.3		13	42	U	EPA:901.1
	Beryllium-7	-14		12	41	U	EPA:901.1
	Bismuth-212	18		23	76	U	EPA:901.1
	Bismuth-214	33	±	6.4	24	J	EPA:901.1
	Cesium-134	-3.6		1.7	5.9	U	EPA:901.1
	Cesium-137	-2.3		1.8	6.1	U	EPA:901.1
	Cobalt-60	-0.68		2.1	7.4	U	EPA:901.1
	Gross alpha	5.9	±	0.64	0.97		EPA:900
	Gross beta	4.9	±	0.59	1.3		EPA:900
	Iodine-131	-1.4		1.7	5.9	U	EPA:901.1
	Lead-212	6.1		3.9	13	U	EPA:901.1
	Lead-214	33	±	5.5	18	J	EPA:901.1
	Potassium-40	-31		53	180	U	EPA:901.1
	Protactinium-234m	570		300	960	U	EPA:901.1
	Rn-222	140	±	14	29		Rn222
	Rn-222	150	±	14	29		Rn222
	Sodium-22	-0.69		1.9	6.7	U	EPA:901.1
	Thallium-208	7.5	±	1.7	5.2		EPA:901.1
	Thorium-234	7.9		44	150	U	EPA:901.1
	Tritium	-22		84	290	U	EPA:906.0
	TRITIUM	-0.03	±	0.09	0.09		Generic:Low_Level_Tritium

J = The activity is an estimated value.

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

Table-2 NMED DOE OB FFY 2014 Q-3 Mixed Waste Landfill Groundwater Quality Results: Gamma Spectroscopy, Gross Alpha, Gross Beta and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)			MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 28-Apr-14	Actinium-228	23	±	4.6	13		EPA:901.1
	Americium-241	2.8		1.3	4.2	U	EPA:901.1
	Beryllium-7	-16		9.4	33	U	EPA:901.1
	Bismuth-212	26		11	37	U	EPA:901.1
	Bismuth-214	9.7		5	16	UJ	EPA:901.1
	Cesium-134	0.3		1.2	3.9	U	EPA:901.1
	Cesium-137	-1.7		1.2	4.1	U	EPA:901.1
	Cobalt-60	0.21		1.2	4.2	U	EPA:901.1
	Gross alpha	7.6	±	0.78	1		EPA:900
	Gross beta	6.5	±	0.65	1.2		EPA:900
	Iodine-131	0		1.8	6.1	U	EPA:901.1
	Lead-212	2.4		3.2	10	U	EPA:901.1
	Lead-214	14	±	3.3	12	J	EPA:901.1
	Potassium-40	-39		32	110	U	EPA:901.1
	Protactinium-234m	220		200	650	U	EPA:901.1
	Rn-222	230	±	19	33		Rn222
	Rn-222	220	±	18	33		Rn222
	Sodium-22	1.5		1.3	4.3	U	EPA:901.1
	Thallium-208	3.5		2.1	6.9	U	EPA:901.1
	Thorium-234	5.4		23	74	U	EPA:901.1
	Tritium	14		95	320	U	EPA:906.0
	TRITIUM	-0.03	±	0.09	0.09		Generic:Low_Level_Tritium

J = The activity is an estimated value.

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

Table-2 NMED DOE OB FFY 2014 Q-3 Mixed Waste Landfill Groundwater Quality Results: Gamma Spectroscopy, Gross Alpha, Gross Beta and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)			MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 28-Apr-14 DUP	Actinium-228	15		5.1	18	U	EPA:901.1
	Americium-241	21		32	110	U	EPA:901.1
	Beryllium-7	3.3		10	35	U	EPA:901.1
	Bismuth-212	40		18	56	U	EPA:901.1
	Bismuth-214	22	±	5	20	J	EPA:901.1
	Cesium-134	-0.0048		1.4	4.7	U	EPA:901.1
	Cesium-137	-0.22		1.4	4.7	U	EPA:901.1
	Cobalt-60	-0.69		1.2	4.3	U	EPA:901.1
	Gross alpha	7.1	±	0.73	0.99		EPA:900
	Gross beta	6	±	0.61	1.1		EPA:900
	Iodine-131	3.6		2.1	7	U	EPA:901.1
	Lead-212	-2.9		4.5	15	U	EPA:901.1
	Lead-214	14		4.8	19	UJ	EPA:901.1
	Potassium-40	-44		35	120	U	EPA:901.1
	Protactinium-234m	220		220	730	U	EPA:901.1
	Rn-222	220	±	18	34		Rn222
	Rn-222	240	±	20	34		Rn222
	Sodium-22	-2.1		1.3	4.6	U	EPA:901.1
	Thallium-208	2.8		2.4	7.9	U	EPA:901.1
	Thorium-234	38		21	69	U	EPA:901.1
	Tritium	-140		93	320	U	EPA:906.0
	TRITIUM	-0.01	±	0.09	0.09		Generic:Low_Level_Tritium

J = The activity is an estimated value.

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

Table-2 NMED DOE OB FFY 2014 Q-3 Mixed Waste Landfill Groundwater Quality Results: Gamma Spectroscopy, Gross Alpha, Gross Beta and Tritium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)			MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 23-Apr-14	Actinium-228	16	±	4.5	14		EPA:901.1
	Americium-241	1.4		1.3	4.3	U	EPA:901.1
	Beryllium-7	21		8.7	28	U	EPA:901.1
	Bismuth-212	16		16	52	U	EPA:901.1
	Bismuth-214	12		4	16	UJ	EPA:901.1
	Cesium-134	-2.5		1.2	4	U	EPA:901.1
	Cesium-137	-0.046		1.1	3.8	U	EPA:901.1
	Cobalt-60	-2.3		1.2	4.4	U	EPA:901.1
	Gross alpha	6.7	±	0.73	1.1		EPA:900
	Gross beta	6	±	0.69	1.5		EPA:900
	Iodine-131	-1.7		2	6.8	U	EPA:901.1
	Lead-212	13	±	1.7	4.5		EPA:901.1
	Lead-214	15	±	3.3	12	J	EPA:901.1
	Potassium-40	120	±	17	44		EPA:901.1
	Protactinium-234m	190		200	660	U	EPA:901.1
	Rn-222	540	±	34	29		Rn222
	Rn-222	510	±	33	29		Rn222
	Sodium-22	-0.22		1.2	4.3	U	EPA:901.1
	Thallium-208	6.1	±	1.2	3.5		EPA:901.1
	Thorium-234	140	±	12	23		EPA:901.1
	Tritium	11		95	320	U	EPA:906.0
	TRITIUM	-0.03	±	0.09	0.09		Generic:Low_Level_Tritium

J = The activity is an estimated value.

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

Table-3 NMED DOE OB FFY 2014 Q-3 Mixed Waste Landfill Groundwater Quality Results: Detected Volatile Organic Compounds

Monitoring Well/ Sample Date	Analyte	Result (µg/L)	EPA MCL (µg/L)	Quantitation Limit (µg/L)	MDL (µg/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 28-Apr-14	Tetrachloroethene	0.35	5	1	0.2	J	SW-846:8260B_25
MWL-MW8 28-Apr-14 DUP	Trichloroethene	0.36	5	1	0.3	J	SW-846:8260B_25
	Tetrachloroethene	0.35	5	1	0.2	J	SW-846:8260B_25
MWL-MW8 30-Jun-14	Tetrachloroethene	0.27	5	1	0.2	J	SW-846:8260B_25
MWL-MW8 30-Jun-14 DUP	Tetrachloroethene	0.25		1	0.2	J	SW-846:8260B_25

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Table-4 NMED DOE OB FFY 2014 Q-3 Mixed Waste Landfill Groundwater Quality Results: Method Detection Limits for Volatile Organic Compounds, Method SW-846:8260B

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-]	0.6
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
Hexanone[2-]	3

Analyte	MDL (µg/L)
Iodomethane	0.3
Isopropylbenzene	0.3
Isopropyltoluene[4-]	0.3
Methyl tert-Butyl Ether	0.3
Methyl-2-pentanone[4-]	3
Methylene Chloride	0.43
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	0.68
Vinyl Chloride	0.3
Xylene[1,2-]	0.3
Xylene[1,3-]+Xylene[1,4-]	0.3