SUSANA MARTINEZ
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NEW MEXICO
ENVIRONMENT DEPARTMENT

DOE Oversight Bureau

121 Tijeras Ave., NE Suite 1000
Albuquerque, NM
Phone (505) 383-2073 Fax (505) 222-9510
www.env.nm.gov

BUTCH TONGATE
Cabinet Secretary

J. C. BORREGO
Deputy Secretary

August 15, 2018

Steven Black
Point of Contact
Water Quality Program Manager
U.S. Department of Energy
Sandia Field Office
P.O Box 5400 MS 0184
Albuquerque, New Mexico 87185-5400

Subject: **Data Submittal for Groundwater Monitoring at Sandia National Laboratories/New Mexico Mixed Waste Landfill Conducted by the New Mexico Environment Department DOE Oversight Bureau for FFY 2018 Q-3**

Mr. Black:

This letter transmits the subject report as final. The report shows groundwater data results from Sandia National Laboratories Mixed Waste Landfill, collected by the New Mexico Environment Department DOE Oversight Bureau during the third quarter of FFY 2018.

The enclosed monitoring results were provided to the U.S Department of Energy in draft form on July 11, 2018 for 30-day review and comment. The final monitoring results are provided to DOE, the State of New Mexico and other federal agencies, the NMED website and interested members of the public. If you have any questions, or if you would like copies of the complete data set, please contact me by phone at (505) 383-2070, by email at chris.armijo1@state.nm.us, or by mail to the address in the above letterhead.

Sincerely,

Chris Armijo
Environmental Scientist
Sandia Oversight Section

Enclosure: (1) Groundwater Monitoring at Sandia National Laboratories/New Mexico Mixed Waste Landfill Conducted by the New Mexico Environment Department DOE Oversight Bureau for FFY 2018 Q-3
(2) Table-A Mixed Waste Landfill Groundwater Monitoring Trigger Levels
(3) Table-1 Total Target Analyte List Metals plus Uranium Results
(4) Table-2 Method Detection Limits for Volatile Organic Compounds
(5) Table-3 Gross Alpha, Gross Beta, Gamma Spectroscopy, Radon and Tritium Results

Distribution: David Rast, DOE/SFO
Michael Skelly, SNL/NM Groundwater
Tim Jackson, SNL/NM Groundwater
Susan Lucas Kamat, Bureau Chief, DOE OB

File: SGE42. Groundwater Monitoring. MWL. FFY 2018 Q-3

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 2018 Q-3

Prepared by Chris Armijo, Environmental Scientist
Sandia Oversight Section
121 Tijeras Ave., NE Suite 1000
Albuquerque, NM 87102
(505) 383-2070
chris.armijo1@state.nm.us

Final Report

8/15/2018

The purpose of this communication is to transmit groundwater quality data collected by the New Mexico Environment Department DOE Oversight Bureau from Sandia National Laboratories Mixed Waste Landfill during the third quarter of Federal Fiscal Year 2018.

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 and May 2018. The Bureau collected groundwater samples from Mixed Waste Landfill (MWL) groundwater monitoring wells MWL-BW2, MWL-MW7 (plus duplicate), MWL-MW8 and MWL-MW9. Groundwater samples were collected using standard Sandia National Laboratories/New Mexico (SNL/NM) sampling procedures and equipment in accordance with the MWL Long-Term Monitoring and Maintenance Plan (LTMMP), Appendix F (Groundwater Sampling and Analysis Plan). Samples were analyzed for total metals plus uranium, volatile organic compounds (VOCs), gamma emitting isotopes, gross alpha and gross beta, radon, and tritium. The Bureau submitted samples for analysis to 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.

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.

Table-2 summarizes the laboratory method detection limits (MDLs) for the LTMMP listed VOCs. No compounds were detected above their method detection limits (MDLs).

Analytical results for radionuclides are listed in Table-3 and used to screen for potential radiological contamination. Gross alpha activity ranged from 5.7 pico Curies per liter (pCi/L) at MWL-MW7 to 8.2 pCi/L at MWL-MW9. Radon-222 activity ranged from 110 pCi/L at MWL-MW8 to 580 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 collected from MWL. 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 the MWL. Samples collected by the Bureau and analyzed by an independent laboratory 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 2017.

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.

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Table-1

Groundwater Quality Results: Total Target Analyte List Metals plus Uranium

SNL/NM Mixed Waste Landfill Groundwater Monitoring

New Mexico Environment Department DOE Oversight Bureau

April/May 2018

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMMP Trigger Level (mg/L)	Laboratory Detection Limit (mg/L)	Method Detection Limit (mg/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 30-Apr-18	Aluminum	0.13	NE	NE	0.1	0.01		SW-846:6020
	Antimony	0.00028	0.006	NE	0.001	0.00012	J	SW-846:6020
	Arsenic	0.00083	0.01	NE	0.002	0.00039	J	SW-846:6020
	Barium	0.091	2	NE	0.005	0.00056		SW-846:6020
	Beryllium	0.000054	0.004	NE	0.0005	0.000054	U	SW-846:6020
	Cadmium	0.000083	0.005	0.0025	0.002	0.000083	U	SW-846:6020
	Calcium	66	NE	NE	1	0.085		SW-846:6020
	Chromium	0.00046	0.1	0.043	0.01	0.00046	U	SW-846:6020
	Cobalt	0.00011	NE	NE	0.005	0.00011	U	SW-846:6020
	Copper	0.00032	NE	NE	0.02	0.00032	U	SW-846:6020
	Iron	0.14	NE	NE	0.1	0.0098		SW-846:6020
	Lead	0.000079	NE	NE	0.002	0.000079	U	SW-846:6020
	Magnesium	23	NE	NE	0.1	0.016		SW-846:6020
	Manganese	0.0019	NE	NE	0.005	0.00036	J	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.00092	NE	0.05	0.02	0.00092	U	SW-846:6020
	Potassium	3.9	NE	NE	1	0.039		SW-846:6020
	Selenium	0.0017	0.05	NE	0.01	0.00065	J	SW-846:6020
	Silver	0.000029	NE	NE	0.0005	0.000029	U	SW-846:6020
	Sodium	58	NE	NE	1	0.022		SW-846:6020
	Thallium	0.0000041	0.002	NE	0.0001	0.0000041	U	SW-846:6020
	Uranium	0.0064	0.03	0.015	0.0001	0.0000049		SW-846:6020
	Vanadium	0.006	NE	NE	0.005	0.00012		SW-846:6020
	Zinc	0.018	NE	NE	0.1	0.0014	J	SW-846:6020

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 = Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan

NE = Not Established

U = the analyte was analyzed for but not detected

Table-1

Groundwater Quality Results: Total Target Analyte List Metals plus Uranium

SNL/NM Mixed Waste Landfill Groundwater Monitoring

New Mexico Environment Department DOE Oversight Bureau

April/May 2018

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMMP Trigger Level (mg/L)	Laboratory Detection Limit (mg/L)	Method Detection Limit (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 2-May-18	Aluminum	0.2	NE	NE	0.1	0.01		SW-846:6020
	Antimony	0.00044	0.006	NE	0.001	0.00012	J	SW-846:6020
	Arsenic	0.0016	0.01	NE	0.002	0.00039	J	SW-846:6020
	Barium	0.095	2	NE	0.005	0.00056		SW-846:6020
	Beryllium	0.000054	0.004	NE	0.0005	0.000054	U	SW-846:6020
	Cadmium	0.000083	0.005	0.0025	0.002	0.000083	U	SW-846:6020
	Calcium	54	NE	NE	1	0.085		SW-846:6020
	Chromium	0.00046	0.1	0.043	0.01	0.00046	U	SW-846:6020
	Cobalt	0.00011	NE	NE	0.005	0.00011	U	SW-846:6020
	Copper	0.00032	NE	NE	0.02	0.00032	U	SW-846:6020
	Iron	0.087	NE	NE	0.1	0.0098	J	SW-846:6020
	Lead	0.000079	NE	NE	0.002	0.000079	U	SW-846:6020
	Magnesium	19	NE	NE	0.1	0.016		SW-846:6020
	Manganese	0.0017	NE	NE	0.005	0.00036	J	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.00092	NE	0.05	0.02	0.00092	U	SW-846:6020
	Potassium	4.9	NE	NE	1	0.039		SW-846:6020
	Selenium	0.00065	0.05	NE	0.01	0.00065	U	SW-846:6020
	Silver	0.000029	NE	NE	0.0005	0.000029	U	SW-846:6020
	Sodium	49	NE	NE	1	0.022		SW-846:6020
	Thallium	0.0000041	0.002	NE	0.0001	0.0000041	U	SW-846:6020
	Uranium	0.0071	0.03	0.015	0.0001	0.0000049		SW-846:6020
	Vanadium	0.0071	NE	NE	0.005	0.00012		SW-846:6020
	Zinc	0.085	NE	NE	0.1	0.0014	J	SW-846:6020

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 = Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan

NE = Not Established

U = the analyte was analyzed for but not detected

Table-1

Groundwater Quality Results: Total Target Analyte List Metals plus Uranium

SNL/NM Mixed Waste Landfill Groundwater Monitoring

New Mexico Environment Department DOE Oversight Bureau

April/May 2018

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMMP Trigger Level (mg/L)	Laboratory Detection Limit (mg/L)	Method Detection Limit (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 2-May-18 (Duplicate)	Aluminum	0.019	NE	NE	0.1	0.01	J	SW-846:6020
	Antimony	0.00012	0.006	NE	0.001	0.00012	U	SW-846:6020
	Arsenic	0.0017	0.01	NE	0.002	0.00039	J	SW-846:6020
	Barium	0.094	2	NE	0.005	0.00056		SW-846:6020
	Beryllium	0.000054	0.004	NE	0.0005	0.000054	U	SW-846:6020
	Cadmium	0.000083	0.005	0.0025	0.002	0.000083	U	SW-846:6020
	Calcium	54	NE	NE	1	0.085		SW-846:6020
	Chromium	0.00046	0.1	0.043	0.01	0.00046	J	SW-846:6020
	Cobalt	0.00011	NE	NE	0.005	0.00011	U	SW-846:6020
	Copper	0.00032	NE	NE	0.02	0.00032	U	SW-846:6020
	Iron	0.017	NE	NE	0.1	0.0098	J	SW-846:6020
	Lead	0.000079	NE	NE	0.002	0.000079	U	SW-846:6020
	Magnesium	20	NE	NE	0.1	0.016		SW-846:6020
	Manganese	0.0006	NE	NE	0.005	0.00036	J	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.00092	NE	0.05	0.02	0.00092	U	SW-846:6020
	Potassium	4.9	NE	NE	1	0.039		SW-846:6020
	Selenium	0.00065	0.05	NE	0.01	0.00065	U	SW-846:6020
	Silver	0.000029	NE	NE	0.0005	0.000029	U	SW-846:6020
	Sodium	48	NE	NE	1	0.022		SW-846:6020
	Thallium	0.0000041	0.002	NE	0.0001	0.0000041	U	SW-846:6020
	Uranium	0.007	0.03	0.015	0.0001	0.0000049		SW-846:6020
	Vanadium	0.0068	NE	NE	0.005	0.00012		SW-846:6020
	Zinc	0.0044	NE	NE	0.1	0.0014	J	SW-846:6020

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 = Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan

NE = Not Established

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Table-1

Groundwater Quality Results: Total Target Analyte List Metals plus Uranium

SNL/NM Mixed Waste Landfill Groundwater Monitoring

New Mexico Environment Department DOE Oversight Bureau

April/May 2018

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMMP Trigger Level (mg/L)	Laboratory Detection Limit (mg/L)	Method Detection Limit (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 3-May-18	Aluminum	0.028	NE	NE	0.1	0.01	J	SW-846:6020
	Antimony	0.00012	0.006	NE	0.001	0.00012	U	SW-846:6020
	Arsenic	0.00057	0.01	NE	0.002	0.00039	J	SW-846:6020
	Barium	0.11	2	NE	0.005	0.00056		SW-846:6020
	Beryllium	0.000054	0.004	NE	0.0005	0.000054	U	SW-846:6020
	Cadmium	0.000083	0.005	0.0025	0.002	0.000083	U	SW-846:6020
	Calcium	54	NE	NE	1	0.085		SW-846:6020
	Chromium	0.00092	0.1	0.043	0.01	0.00046	J	SW-846:6020
	Cobalt	0.00011	NE	NE	0.005	0.00011	U	SW-846:6020
	Copper	0.00032	NE	NE	0.02	0.00032	U	SW-846:6020
	Iron	0.0098	NE	NE	0.1	0.0098	U	SW-846:6020
	Lead	0.000079	NE	NE	0.002	0.000079	U	SW-846:6020
	Magnesium	20	NE	NE	0.1	0.016		SW-846:6020
	Manganese	0.00097	NE	NE	0.005	0.00036	J	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.00092	NE	0.05	0.02	0.00092	U	SW-846:6020
	Potassium	5.1	NE	NE	1	0.039		SW-846:6020
	Selenium	0.00098	0.05	NE	0.01	0.00065	J	SW-846:6020
	Silver	0.000029	NE	NE	0.0005	0.000029	U	SW-846:6020
	Sodium	48	NE	NE	1	0.022		SW-846:6020
	Thallium	0.0000041	0.002	NE	0.0001	0.0000041	U	SW-846:6020
	Uranium	0.0072	0.03	0.015	0.0001	0.0000049		SW-846:6020
	Vanadium	0.002	NE	NE	0.005	0.00012	J	SW-846:6020
	Zinc	0.0045	NE	NE	0.1	0.0014	J	SW-846:6020

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 = Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan

NE = Not Established

U = the analyte was analyzed for but not detected

Table-1

Groundwater Quality Results: Total Target Analyte List Metals plus Uranium

SNL/NM Mixed Waste Landfill Groundwater Monitoring

New Mexico Environment Department DOE Oversight Bureau

April/May 2018

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	LTMMP Trigger Level (mg/L)	Laboratory Detection Limit (mg/L)	Method Detection Limit (mg/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 1-May-18	Aluminum	0.032	NE	NE	0.1	0.01	J	SW-846:6020
	Antimony	0.00012	0.006	NE	0.001	0.00012	U	SW-846:6020
	Arsenic	0.0034	0.01	NE	0.002	0.00039		SW-846:6020
	Barium	0.088	2	NE	0.005	0.00056		SW-846:6020
	Beryllium	0.000054	0.004	NE	0.0005	0.000054	U	SW-846:6020
	Cadmium	0.000083	0.005	0.0025	0.002	0.000083	U	SW-846:6020
	Calcium	53	NE	NE	1	0.085		SW-846:6020
	Chromium	0.00046	0.1	0.043	0.01	0.00046	U	SW-846:6020
	Cobalt	0.00011	NE	NE	0.005	0.00011	U	SW-846:6020
	Copper	0.00032	NE	NE	0.02	0.00032	U	SW-846:6020
	Iron	0.027	NE	NE	0.1	0.0098	J	SW-846:6020
	Lead	0.000079	NE	NE	0.002	0.000079	U	SW-846:6020
	Magnesium	20	NE	NE	0.1	0.016		SW-846:6020
	Manganese	0.0055	NE	NE	0.005	0.00036		SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.00092	NE	0.05	0.02	0.00092	U	SW-846:6020
	Potassium	4.8	NE	NE	1	0.039		SW-846:6020
	Selenium	0.00065	0.05	NE	0.01	0.00065	U	SW-846:6020
	Silver	0.000029	NE	NE	0.0005	0.000029	U	SW-846:6020
	Sodium	47	NE	NE	1	0.022		SW-846:6020
	Thallium	0.0000041	0.002	NE	0.0001	0.0000041	U	SW-846:6020
	Uranium	0.0085	0.03	0.015	0.0001	0.0000049		SW-846:6020
	Vanadium	0.0086	NE	NE	0.005	0.00012		SW-846:6020
	Zinc	0.0061	NE	NE	0.1	0.0014	J	SW-846:6020

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 = Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan

NE = Not Established

U = the analyte was analyzed for but not detected

Table-2

Groundwater Quality Results: Method Detection Limits for VOCs (EPA Method 8260B)

SNL/NM Mixed Waste Landfill Groundwater Monitoring

New Mexico Environment Department DOE Oversight Bureau

April/May 2018

Analyte	MDL (µg/L)
Acetone	3
Benzene	0.3
Bromodichloromethane	0.3
Bromoform	0.3
Bromomethane	0.33
Butanone[2-]	3
Carbon Disulfide	0.3
Carbon Tetrachloride	0.15
Chlorobenzene	0.3
Chlorodibromomethane	0.3
Chloroethane	0.3
Chloroform	0.3
Chloromethane	0.3
Dichlorodifluoromethane	0.3
Dichloroethane[1,1-]	0.3
Dichloroethane[1,2-]	0.15
Dichloroethene[1,1-]	0.3
Dichloroethene[cis-1,2-]	0.3
Dichloroethene[trans-1,2-]	0.3
Dichloropropane[1,2-]	0.3
Dichloropropene[cis-1,3-]	0.3
Dichloropropene[trans-1,3-]	0.3
Ethylbenzene	0.3
Hexanone[2-]	3
Methyl-2-pentanone[4-]	3
Methylene Chloride	0.34
Styrene	0.3
Tetrachloroethane[1,1,2,2-]	0.3
Tetrachloroethene	0.3
Toluene	0.3
Trichloroethane[1,1,1-]	0.3
Trichloroethane[1,1,2-]	0.3
Trichloroethene	0.3
Vinyl acetate	0.73
Vinyl Chloride	0.15
Xylene (Total)*	NA

* MDL for Total Xylene not calculated. MDL for the M-Xylene + P-Xylene isomers, and O-Xylene were both calculated at 0.31 ug/L.

Table-3

Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Emitting Isotopes, Radon and Tritium

SNL/NM Mixed Waste Landfill Groundwater Monitoring

New Mexico Environment Department DOE Oversight Bureau

April/May 2018

Monitoring Well/ Sample Date	Analyte	Activity[a] (pCi/L)			EPA MCL (pCi/L)	LTMMP Trigger Level (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 30-Apr-18	Actinium-228	14	±	4.7	NE	NE	14	U	EPA: 901.1
	Americium-241	7.8	±	14	NE	NE	47	U	EPA: 901.1
	Beryllium-7	-20	±	14	NE	NE	49	U	EPA: 901.1
	Bismuth-212	43	±	22	NE	NE	70	U	EPA: 901.1
	Bismuth-214	8.6	±	3.1	NE	NE	9.7	U	EPA: 901.1
	Cesium-134	-2.1	±	1.4	NE	NE	5	U	EPA: 901.1
	Cesium-137	-0.74	±	1.6	NE	NE	5.3	U	EPA: 901.1
	Cobalt-60	1	±	1.6	NE	NE	5.3	U	EPA: 901.1
	Gross alpha	6.7	±	0.78	15 pCi/L	15 pCi/L	1.4		EPA: 900.0
	Gross beta	4	±	0.55	4 mrem/yr	4 mrem/yr	1.4		EPA: 900.0
	Iodine-131	-31	±	16	NE	NE	55	U	EPA: 901.1
	Lead-212	1.9	±	4	NE	NE	13	U	EPA: 901.1
	Lead-214	5.6	±	2.2	NE	NE	8.2	U	EPA: 901.1
	Potassium-40	8.1	±	50	NE	NE	170	U	EPA: 901.1
	Protactinium-234m	-170	±	230	NE	NE	820	U	EPA: 901.1
	Radon-222	580	±	38	NE	1000 pCi/L	35		SM7500-RnB
	Sodium-22	-1	±	1.6	NE	NE	5.5	U	EPA: 901.1
	Thallium-208	4	±	1.5	NE	NE	4.8	U	EPA: 901.1
	Thorium-234	5.6	±	42	NE	NE	140	U	EPA: 901.1
	Tritium	-54	±	99	NE	4 mrem/yr	330	U	EPA: 906.0

LTMMP = Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan

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

Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Emitting Isotopes, Radon and Tritium

SNL/NM Mixed Waste Landfill Groundwater Monitoring

New Mexico Environment Department DOE Oversight Bureau

April/May 2018

Monitoring Well/ Sample Date	Analyte	Activity[a] (pCi/L)			EPA MCL (pCi/L)	LTMMP Trigger Level (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 2-May-18	Actinium-228	9.7	±	4.6	NE	NE	15	U	EPA: 901.1
	Americium-241	1.7	±	1.4	NE	NE	4.7	U	EPA: 901.1
	Beryllium-7	2.6	±	10	NE	NE	35	U	EPA: 901.1
	Bismuth-212	59	±	17	NE	NE	53		EPA: 901.1
	Bismuth-214	4.6	±	5.1	NE	NE	17	U	EPA: 901.1
	Cesium-134	-2.7	±	1.2	NE	NE	4	U	EPA: 901.1
	Cesium-137	-3.2	±	1.2	NE	NE	4.2	U	EPA: 901.1
	Cobalt-60	-2.6	±	1.2	NE	NE	4.4	U	EPA: 901.1
	Gross alpha	5.7	±	0.61	15 pCi/L	15 pCi/L	0.9		EPA: 900.0
	Gross beta	5.6	±	0.58	4 mrem/yr	4 mrem/yr	1.1		EPA: 900.0
	Iodine-131	-7.4	±	10	NE	NE	35	U	EPA: 901.1
	Lead-212	0.55	±	3.1	NE	NE	10	U	EPA: 901.1
	Lead-214	-5.2	±	4.4	NE	NE	15	U	EPA: 901.1
	Potassium-40	28	±	31	NE	NE	100	U	EPA: 901.1
	Protactinium-234m	270	±	210	NE	NE	680	U	EPA: 901.1
	Radon-222	210	±	21	NE	1000 pCi/L	47		SM7500-RnB
	Sodium-22	0.94	±	1.3	NE	NE	4.3	U	EPA: 901.1
	Thallium-208	-1.6	±	2.6	NE	NE	8.6	U	EPA: 901.1
	Thorium-234	23	±	18	NE	NE	70	U	EPA: 901.1
	Tritium	-100	±	99	NE	4 mrem/yr	330	U	EPA: 906.0

LTMMP = Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan

NE = Not Established

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Table-3

Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Emitting Isotopes, Radon and Tritium

SNL/NM Mixed Waste Landfill Groundwater Monitoring

New Mexico Environment Department DOE Oversight Bureau

April/May 2018

Monitoring Well/ Sample Date	Analyte	Activity[a] (pCi/L)			EPA MCL (pCi/L)	LTMMP Trigger Level (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 2-May-18 (Duplicate)	Actinium-228	20	±	4.4	NE	NE	17		EPA: 901.1
	Americium-241	1.6	±	3.2	NE	NE	11	U	EPA: 901.1
	Beryllium-7	2.4	±	11	NE	NE	38	U	EPA: 901.1
	Bismuth-212	51	±	20	NE	NE	64	U	EPA: 901.1
	Bismuth-214	2.9	±	5.9	NE	NE	19	U	EPA: 901.1
	Cesium-134	-2	±	1.3	NE	NE	4.4	U	EPA: 901.1
	Cesium-137	-0.6	±	1.3	NE	NE	4.4	U	EPA: 901.1
	Cobalt-60	1.2	±	1.4	NE	NE	4.8	U	EPA: 901.1
	Gross alpha	6.5	±	0.69	15 pCi/L	15 pCi/L	0.97		EPA: 900.0
	Gross beta	5.4	±	0.62	4 mrem/yr	4 mrem/yr	1.3		EPA: 900.0
	Iodine-131	-5.3	±	11	NE	NE	38	U	EPA: 901.1
	Lead-212	-2.1	±	3.8	NE	NE	13	U	EPA: 901.1
	Lead-214	6.6	±	2.4	NE	NE	7.6	U	EPA: 901.1
	Potassium-40	-14	±	38	NE	NE	130	U	EPA: 901.1
	Protactinium-234m	370	±	220	NE	NE	700	U	EPA: 901.1
	Radon-222	190	±	20	NE	1000 pCi/L	48		SM7500-RnB
	Sodium-22	-0.99	±	1.4	NE	NE	5.1	U	EPA: 901.1
	Thallium-208	2.8	±	3	NE	NE	9.9	U	EPA: 901.1
	Thorium-234	-0.34	±	24	NE	NE	78	U	EPA: 901.1
	Tritium	13	±	120	NE	4 mrem/yr	390	U	EPA: 906.0

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April/May 2018

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MWL-MW8 3-May-18	Actinium-228	-5.3	±	5.4	NE	NE	18	U	EPA: 901.1
	Americium-241	-2.8	±	7.9	NE	NE	26	U	EPA: 901.1
	Beryllium-7	3.7	±	6.7	NE	NE	22	U	EPA: 901.1
	Bismuth-212	13	±	17	NE	NE	58	U	EPA: 901.1
	Bismuth-214	3.5	±	4.4	NE	NE	14	U	EPA: 901.1
	Cesium-134	-0.47	±	0.74	NE	NE	2.5	U	EPA: 901.1
	Cesium-137	-1.7	±	0.65	NE	NE	2.2	U	EPA: 901.1
	Cobalt-60	-0.47	±	0.68	NE	NE	2.3	U	EPA: 901.1
	Gross alpha	6.9	±	0.98	15 pCi/L	15 pCi/L	2.1		EPA: 900.0
	Gross beta	6.4	±	0.9	4 mrem/yr	4 mrem/yr	2.6		EPA: 900.0
	Iodine-131	-12	±	5.4	NE	NE	18	U	EPA: 901.1
	Lead-212	1	±	2.4	NE	NE	8	U	EPA: 901.1
	Lead-214	2.4	±	3.7	NE	NE	12	U	EPA: 901.1
	Potassium-40	1.3	±	19	NE	NE	64	U	EPA: 901.1
	Protactinium-234m	260	±	100	NE	NE	330	U	EPA: 901.1
	Radon-222	110	±	15	NE	1000 pCi/L	41		SM7500-RnB
	Sodium-22	-0.42	±	0.62	NE	NE	2.1	U	EPA: 901.1
	Thallium-208	0.18	±	1.5	NE	NE	5	U	EPA: 901.1
	Thorium-234	11	±	28	NE	NE	96	U	EPA: 901.1
	Tritium	-51	±	99	NE	4 mrem/yr	330	U	EPA: 906.0

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Monitoring Well/ Sample Date	Analyte	Activity[a] (pCi/L)			EPA MCL (pCi/L)	LTMMP Trigger Level (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 1-May-18	Actinium-228	-3.3	±	13	NE	NE	43	U	EPA: 901.1
	Americium-241	-28	±	36	NE	NE	120	U	EPA: 901.1
	Beryllium-7	16	±	14	NE	NE	45	U	EPA: 901.1
	Bismuth-212	33	±	18	NE	NE	57	U	EPA: 901.1
	Bismuth-214	0.84	±	5.5	NE	NE	18	U	EPA: 901.1
	Cesium-134	-0.17	±	2.1	NE	NE	7.2	U	EPA: 901.1
	Cesium-137	-2	±	1.3	NE	NE	4.6	U	EPA: 901.1
	Cobalt-60	0.024	±	1.5	NE	NE	5	U	EPA: 901.1
	Gross alpha	8.2	±	0.83	15 pCi/L	15 pCi/L	1.1		EPA: 900.0
	Gross beta	5.6	±	0.62	4 mrem/yr	4 mrem/yr	1.3		EPA: 900.0
	Iodine-131	-14	±	12	NE	NE	42	U	EPA: 901.1
	Lead-212	4.9	±	4.7	NE	NE	16	U	EPA: 901.1
	Lead-214	0.27	±	5.4	NE	NE	18	U	EPA: 901.1
	Potassium-40	-13	±	38	NE	NE	130	U	EPA: 901.1
	Protactinium-234m	34	±	230	NE	NE	770	U	EPA: 901.1
	Radon-222	540	±	36	NE	1000 pCi/L	38		SM7500-RnB
	Sodium-22	-0.5	±	1.5	NE	NE	5.1	U	EPA: 901.1
	Thallium-208	2.2	±	2.9	NE	NE	9.5	U	EPA: 901.1
	Thorium-234	-33	±	67	NE	NE	220	U	EPA: 901.1
	Tritium	-33	±	110	NE	4 mrem/yr	360	U	EPA: 906.0

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