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March 13, 2019

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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 2019 Q-1**

Ms. Branson:

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 first quarter of Federal Fiscal Year 2019.

The enclosed monitoring results were provided to the U.S Department of Energy in draft form on January 30, 2019 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 2019 Q-1
(2) Table-1 Total Target Analyte List Metals plus Uranium Results
(3) Table-2 Detected Volatile Organic Compounds Results
(4) Table-3 Method Detection Limits for Volatile Organic Compounds
(5) Table-4 Gross Alpha, Gross Beta, Gamma Emitting Isotopes, Radon and Tritium Results

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File: SGE42. Groundwater Monitoring. MWL. FFY 2019 Q-1

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 2019 Q-1

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Final Report

3/13/2019

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 first quarter of Federal Fiscal Year (FFY) 2019.

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 October 2018. The Bureau collected groundwater samples from Mixed Waste Landfill (MWL) groundwater monitoring wells MWL-BW2, MWL-MW7, MWL-MW8 and MWL-MW9 (plus duplicate). 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 MWL 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 VOCs detected above the method detection limits (MDLs) for the LTMMP listed VOCs. Acetone, tetrachloroethene (PCE) and trichloroethene (TCE) were detected at or above the MDL. Concentrations of acetone ranged from 2.1 micrograms per liter (µg/L) at MWL-MW8 to 3.5 µg/L at monitoring well MWL-MW7. All acetone values were well below the LTMMP

trigger level of 3000 µg/L. PCE and TCE were both detected in samples collected from monitoring well MWL-MW8 at concentrations of 0.21 µg/L and 0.19 µg/L, respectively. All VOCs detected above their MDLs were "J" qualified, indicating the result was an estimated value between the MDL and Laboratory Detection Limit (LDL). The LTMMP trigger levels and EPA MCLs for PCE and TCE are 2.5 µg/L and 5.0 µg/L, respectively. The MDLs for the remaining LTMMP List VOCs are presented in Table-3.

Analytical results for radionuclides are listed in Table-4 and used to screen for potential radiological contamination. Gross alpha activity ranged from 7.5 pico Curies per liter (pCi/L) at MWL-MW7 to 10.0 pCi/L at MWL-BW2. Radon-222 activity ranged from 160 pCi/L at MWL-MW7 to 520 pCi/L at MWL-MW9. 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.

PCE and TCE were detected in samples collected from monitoring well MWL-MW8 at concentrations of 0.21 µg/L and 0.19 µg/L, respectively. PCE was last detected at MWL-MW8 from samples collected in October 2016 at a concentration of 0.23 µg/L. TCE had not been detected in any samples collected from MWL-MW8 since April 2014. The last time TCE was detected at a concentration of 0.36 µg/L.

Acetone was detected in each sample collected from the MWL. In addition to the environmental samples, acetone was also detected in all associated quality control (QC) samples, including the equipment blank and field blank samples with concentrations ranging from 2.6 µg/L to 6.0 µg/L. Acetone was not detected in any associated laboratory QC samples.

The DOE-OB will continue to monitor groundwater quality at MWL semi-annually and make the data reports available to the public.

References

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 2014 Q-3

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 2016 Q-1

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

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

New Mexico Environment Department DOE Oversight Bureau

October 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 23-Oct-18	Aluminum	0.16	NE	NE	0.1	0.01		SW-846:6020
	Antimony	0.00012	0.006	NE	0.001	0.00012	U	SW-846:6020
	Arsenic	0.00073	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	72	NE	NE	1	0.085		SW-846:6020
	Chromium	0.001	0.1	0.043	0.01	0.00046	J	SW-846:6020
	Cobalt	0.00012	NE	NE	0.005	0.00011	J	SW-846:6020
	Copper	0.0013	NE	NE	0.02	0.00032	J	SW-846:6020
	Iron	0.27	NE	NE	0.1	0.0098		SW-846:6020
	Lead	0.00019	NE	NE	0.002	0.000079	J	SW-846:6020
	Magnesium	22	NE	NE	0.1	0.016		SW-846:6020
	Manganese	0.01	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	4.3	NE	NE	1	0.039		SW-846:6020
	Selenium	0.0024	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	54	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	0.0034	NE	NE	0.005	0.00012	J	SW-846:6020
	Zinc	0.0052	NE	NE	0.1	0.0014	J	SW-846:6020

J = the reported value was obtained from a reading that was less than the Laboratory Detection 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

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

New Mexico Environment Department DOE Oversight Bureau

October 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 25-Oct-18	Aluminum	0.015	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	0.099	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	58	NE	NE	1	0.085		SW-846:6020
	Chromium	0.00084	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	0.00077	NE	NE	0.02	0.00032	J	SW-846:6020
	Iron	0.014	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	0.0012	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	4.6	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	45	NE	NE	1	0.022		SW-846:6020
	Thallium	0.0000041	0.002	NE	0.0001	0.0000041	U	SW-846:6020
	Uranium	0.0074	0.03	0.015	0.0001	0.0000049		SW-846:6020
	Vanadium	0.0069	NE	NE	0.005	0.00012		SW-846:6020
	Zinc	0.0015	NE	NE	0.1	0.0014	J	SW-846:6020

J = the reported value was obtained from a reading that was less than the Laboratory Detection Limit but greater than or equal to the Method Detection Limit (MDL).

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NE = Not Established

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Table-1

Groundwater Quality Results: Total Target Analyte List Metals plus Uranium

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

New Mexico Environment Department DOE Oversight Bureau

October 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 29-Oct-18	Aluminum	0.012	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	0.00092	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	59	NE	NE	1	0.085		SW-846:6020
	Chromium	0.0013	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	0.00098	NE	NE	0.02	0.00032	J	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	19	NE	NE	0.1	0.016		SW-846:6020
	Manganese	0.00093	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	NE	NE	1	0.039		SW-846:6020
	Selenium	0.00067	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	0.0074	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	0.0014	NE	NE	0.1	0.0014	J	SW-846:6020

J = the reported value was obtained from a reading that was less than the Laboratory Detection Limit but greater than or equal to the Method Detection Limit (MDL).

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NE = Not Established

U = the analyte was analyzed for but not detected

Table-1

Groundwater Quality Results: Total Target Analyte List Metals plus Uranium

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

New Mexico Environment Department DOE Oversight Bureau

October 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 24-Oct-18	Aluminum	0.038	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	0.0035	0.01	NE	0.002	0.00039		SW-846:6020
	Barium	0.098	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	59	NE	NE	1	0.085		SW-846:6020
	Chromium	0.001	0.1	0.043	0.01	0.00046	J	SW-846:6020
	Cobalt	0.00011	NE	NE	0.005	0.00011	J	SW-846:6020
	Copper	0.001	NE	NE	0.02	0.00032	J	SW-846:6020
	Iron	0.16	NE	NE	0.1	0.0098		SW-846:6020
	Lead	0.00008	NE	NE	0.002	0.000079	J	SW-846:6020
	Magnesium	20	NE	NE	0.1	0.016		SW-846:6020
	Manganese	0.0099	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	5	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	0.0092	0.03	0.015	0.0001	0.0000049		SW-846:6020
	Vanadium	0.009	NE	NE	0.005	0.00012		SW-846:6020
	Zinc	0.002	NE	NE	0.1	0.0014	J	SW-846:6020

J = the reported value was obtained from a reading that was less than the Laboratory Detection Limit but greater than or equal to the Method Detection Limit (MDL).

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U = the analyte was analyzed for but not detected

Table-1

Groundwater Quality Results: Total Target Analyte List Metals plus Uranium

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

New Mexico Environment Department DOE Oversight Bureau

October 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 24-Oct-18 (Duplicate)	Aluminum	0.075	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	0.0039	0.01	NE	0.002	0.00039		SW-846:6020
	Barium	0.098	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	60	NE	NE	1	0.085		SW-846:6020
	Chromium	0.001	0.1	0.043	0.01	0.00046	J	SW-846:6020
	Cobalt	0.00011	NE	NE	0.005	0.00011	J	SW-846:6020
	Copper	0.00094	NE	NE	0.02	0.00032	J	SW-846:6020
	Iron	0.084	NE	NE	0.1	0.0098	J	SW-846:6020
	Lead	0.0001	NE	NE	0.002	0.000079	J	SW-846:6020
	Magnesium	20	NE	NE	0.1	0.016		SW-846:6020
	Manganese	0.01	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	4.9	NE	NE	1	0.039		SW-846:6020
	Selenium	0.00089	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	45	NE	NE	1	0.022		SW-846:6020
	Thallium	0.0000041	0.002	NE	0.0001	0.0000041	U	SW-846:6020
	Uranium	0.0092	0.03	0.015	0.0001	0.0000049		SW-846:6020
	Vanadium	0.0093	NE	NE	0.005	0.00012		SW-846:6020
	Zinc	0.0019	NE	NE	0.1	0.0014	J	SW-846:6020

J = the reported value was obtained from a reading that was less than the Laboratory Detection 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: Detected Volatile Organic Compounds

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

New Mexico Environment Department DOE Oversight Bureau

October 2018

Monitoring Well/ Sample Date	Analyte	Result (µg/L)	EPA MCL (µg/L)	LTMMP Trigger Level (µg/L)	Laboratory Detection Limit (µg/L)	Method Detection Limit (µg/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 23-Oct-18	Acetone	2.6	NE	3000	10	2.1	J	SW846:8260B
MWL-MW7 25-Oct-18	Acetone	3.5	NE	3000	10	2.1	J	SW846:8260B
MWL-MW8 29-Oct-18	Acetone	2.1	NE	3000	10	2.1	J	SW846:8260B
	Tetrachloroethene	0.21	5	2.5	1	0.1	J	SW846:8260B
	Trichloroethene	0.19	5	2.5	1	0.13	J	SW846:8260B
MWL-MW9 24-Oct-18	Acetone	2.9	NE	3000	10	2.1	J	SW846:8260B
MWL-MW9 24-Oct-18 (Duplicate)	Acetone	2.5	NE	3000	10	2.1	J	SW846:8260B

J = the reported value was obtained from a reading that was less than the Laboratory Detection 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

Table-3

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

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

New Mexico Environment Department DOE Oversight Bureau

October 2018

Analyte	Method Detection Limit (µg/L)
Acetone	2.1
Benzene	0.13
Bromodichloromethane	0.14
Bromoform	0.1
Bromomethane	0.29
Butanone[2-]	0.35
Carbon Disulfide	0.16
Carbon Tetrachloride	0.15
Chlorobenzene	0.12
Chlorodibromomethane	0.13
Chloroethane	0.34
Chloroform	0.12
Chloromethane	0.25
Dichlorodifluoromethane	0.16
Dichloroethane[1,1-]	0.1
Dichloroethane[1,2-]	0.22
Dichloroethene[1,1-]	0.14
Dichloroethene[cis-1,2-]	0.1
Dichloroethene[trans-1,2-]	0.11

Analyte	Method Detection Limit (µg/L)
Dichloropropane[1,2-]	0.15
Dichloropropene[cis-1,3-]	0.22
Dichloropropene[trans-1,3-]	0.08
Ethylbenzene	0.1
Hexanone[2-]	0.17
Methyl-2-pentanone[4-]	0.18
Methylene Chloride	0.35
Styrene	0.15
Tetrachloroethane[1,1,2,2-]	0.09
Tetrachloroethene	0.1
Toluene	0.25
Trichloroethane[1,1,1-]	0.19
Trichloroethane[1,1,2-]	0.31
Trichloroethene	0.13
Vinyl acetate	0.21
Vinyl Chloride	0.22
Xylene (Total)	0.18
Xylene[1,2-]	0.1
Xylene[1,3-]+Xylene[1,4-]	0.18

Table-4

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

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

New Mexico Environment Department DOE Oversight Bureau

October 2018

Monitoring Well/ Sample Date	Analyte	Activity[a] (pCi/L)			EPA MCL (pCi/L)	LTMMP Trigger Level (pCi/L)	MDA[b] (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-BW2 23-oct-18	Actinium-228	12	±	5.5	NE	NE	18	U	EPA:901.1
	Americium-241	12	±	15	NE	NE	61	U	EPA:901.1
	Beryllium-7	0.61	±	18	NE	NE	60	U	EPA:901.1
	Bismuth-212	62	±	24	NE	NE	78	U	EPA:901.1
	Bismuth-214	1.1	±	7	NE	NE	23	U	EPA:901.1
	Cesium-134	-3.6	±	1.9	NE	NE	6.6	U	EPA:901.1
	Cesium-137	-0.27	±	1.9	NE	NE	6.3	U,M	EPA:901.1
	Cobalt-60	-0.91	±	2.1	NE	NE	7.4	U	EPA:901.1
	Gross alpha	10	±	1.2	15 pCi/L	15 pCi/L	2	M3	EPA:900.0
	Gross beta	6.7	±	0.87	4 mrem/yr	4 mrem/yr	2.1	M3	EPA:900.0
	Iodine-131	-46	±	37	NE	NE	130	U	EPA:901.1
	Lead-212	5.8	±	2.5	NE	NE	8	U	EPA:901.1
	Lead-214	-5.3	±	6.5	NE	NE	22	U	EPA:901.1
	Potassium-40	14	±	54	NE	NE	180	U	EPA:901.1
	Protactinium-234m	810	±	330	NE	NE	1100	U	EPA:901.1
	Radon-222	270	±	28	NE	1000 pCi/L	45		SM7500-RnB
	Sodium-22	-1.3	±	2.2	NE	NE	7.6	U	EPA:901.1
	Thallium-208	4.1	±	1.8	NE	NE	5.7	U	EPA:901.1
	Thorium-234	-10	±	46	NE	NE	160	U	EPA:901.1
	Tritium	-2.3	±	91	NE	4 mrem/yr	310	U	EPA:906.0

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[b] Minimun Detectable Activity

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

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

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October 2018

Monitoring Well/ Sample Date	Analyte	Activity[a] (pCi/L)			EPA MCL (pCi/L)	LTMMP Trigger Level (pCi/L)	MDA[b] (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW7 25-Oct-18	Actinium-228	12	±	6	NE	NE	20	U	EPA:901.1
	Americium-241	13	±	15	NE	NE	51	U	EPA:901.1
	Beryllium-7	1.8	±	16	NE	NE	56	U	EPA:901.1
	Bismuth-212	58	±	22	NE	NE	70	U	EPA:901.1
	Bismuth-214	17	±	3.3	NE	NE	9.6	NQ	EPA:901.1
	Cesium-134	-0.26	±	1.5	NE	NE	5.2	U	EPA:901.1
	Cesium-137	0.33	±	1.6	NE	NE	5.4	U,M	EPA:901.1
	Cobalt-60	-1.4	±	1.7	NE	NE	5.9	U	EPA:901.1
	Gross alpha	7.5	±	0.97	15 pCi/L	15 pCi/L	2	M3	EPA:900.0
	Gross beta	5.9	±	0.73	4 mrem/yr	4 mrem/yr	1.7	M3	EPA:900.0
	Iodine-131	4.3	±	24	NE	NE	82	U	EPA:901.1
	Lead-212	9.9	±	2.4	NE	NE	7.5	NQ	EPA:901.1
	Lead-214	11	±	3.3	NE	NE	10	NQ	EPA:901.1
	Potassium-40	380	±	33	NE	NE	53	NQ	EPA:901.1
	Protactinium-234m	400	±	250	NE	NE	830	U	EPA:901.1
	Radon-222	160	±	18	NE	1000 pCi/L	34		SM7500-RnB
	Sodium-22	-0.67	±	1.8	NE	NE	6.1	U	EPA:901.1
	Thallium-208	6	±	1.6	NE	NE	5	NQ	EPA:901.1
	Thorium-234	100	±	22	NE	NE	67	NQ	EPA:901.1
	Tritium	44	±	98	NE	4 mrem/yr	330	U	EPA:906.0

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

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

New Mexico Environment Department DOE Oversight Bureau

October 2018

Monitoring Well/ Sample Date	Analyte	Activity[a] (pCi/L)			EPA MCL (pCi/L)	LTMMP Trigger Level (pCi/L)	MDA[b] (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW8 29-Oct-18	Actinium-228	21	±	5.5	NE	NE	17	NQ	EPA:901.1
	Americium-241	18	±	19	NE	NE	62	U	EPA:901.1
	Beryllium-7	-24	±	14	NE	NE	48	U	EPA:901.1
	Bismuth-212	49	±	26	NE	NE	84	U	EPA:901.1
	Bismuth-214	-5	±	7.4	NE	NE	25	U	EPA:901.1
	Cesium-134	0.45	±	1.4	NE	NE	4.7	U	EPA:901.1
	Cesium-137	1.8	±	1.4	NE	NE	4.8	U	EPA:901.1
	Cobalt-60	0	±	1.5	NE	NE	5.1	U	EPA:901.1
	Gross alpha	8.1	±	0.91	15 pCi/L	15 pCi/L	1.5	M3	EPA:900.0
	Gross beta	5.9	±	0.69	4 mrem/yr	4 mrem/yr	1.5	M3	EPA:900.0
	Iodine-131	-10	±	15	NE	NE	50	U	EPA:901.1
	Lead-212	-0.87	±	4.2	NE	NE	14	U	EPA:901.1
	Lead-214	-13	±	5.8	NE	NE	19	U	EPA:901.1
	Potassium-40	18	±	38	NE	NE	130	U	EPA:901.1
	Protactinium-234m	-74	±	240	NE	NE	810	U	EPA:901.1
	Radon-222	210	±	18	NE	1000 pCi/L	35		SM7500-RnB
	Sodium-22	0.24	±	1.5	NE	NE	5.1	U	EPA:901.1
	Thallium-208	-1.8	±	3.1	NE	NE	10	U	EPA:901.1
	Thorium-234	-53	±	59	NE	NE	200	U	EPA:901.1
	Tritium	-59	±	95	NE	4 mrem/yr	320	U	EPA:906.0

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

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

New Mexico Environment Department DOE Oversight Bureau

October 2018

Monitoring Well/ Sample Date	Analyte	Activity[a] (pCi/L)			EPA MCL (pCi/L)	LTMMP Trigger Level (pCi/L)	MDA[b] (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 24-Oct-18	Actinium-228	26	±	5.9	NE	NE	18	NQ	EPA:901.1
	Americium-241	-29	±	77	NE	NE	260	U	EPA:901.1
	Beryllium-7	-26	±	16	NE	NE	54	U	EPA:901.1
	Bismuth-212	30	±	20	NE	NE	65	U	EPA:901.1
	Bismuth-214	-0.54	±	6.1	NE	NE	20	U	EPA:901.1
	Cesium-134	-1.2	±	1.6	NE	NE	5.4	U	EPA:901.1
	Cesium-137	-0.39	±	1.4	NE	NE	4.9	U	EPA:901.1
	Cobalt-60	-3	±	1.6	NE	NE	5.7	U	EPA:901.1
	Gross alpha	9	±	0.99	15 pCi/L	15 pCi/L	1.6	M3	EPA:900.0
	Gross beta	6.6	±	0.79	4 mrem/yr	4 mrem/yr	1.8	M3	EPA:900.0
	Iodine-131	-9.1	±	16	NE	NE	53	U	EPA:901.1
	Lead-212	-0.33	±	4.8	NE	NE	16	U	EPA:901.1
	Lead-214	-5.9	±	6.8	NE	NE	23	U	EPA:901.1
	Potassium-40	-8.7	±	44	NE	NE	150	U	EPA:901.1
	Protactinium-234m	660	±	230	NE	NE	730	U	EPA:901.1
	Radon-222	520	±	45	NE	1000 pCi/L	38		SM7500-RnB
	Sodium-22	0.5	±	1.6	NE	NE	5.3	U	EPA:901.1
	Thallium-208	-0.0037	±	2.9	NE	NE	9.6	U	EPA:901.1
	Thorium-234	-1.4	±	73	NE	NE	240	U	EPA:901.1
	Tritium	66	±	96	NE	4 mrem/yr	320	U	EPA:906.0

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October 2018

Monitoring Well/ Sample Date	Analyte	Activity[a] (pCi/L)			EPA MCL (pCi/L)	LTMMP Trigger Level (pCi/L)	MDA[b] (pCi/L)	Laboratory Qualifier	Analytical Method
MWL-MW9 24-Oct-18 (Duplicate)	Actinium-228	17	±	7.1	NE	NE	30	U	EPA:901.1
	Americium-241	5.7	±	19	NE	NE	63	U	EPA:901.1
	Beryllium-7	31	±	14	NE	NE	46	U	EPA:901.1
	Bismuth-212	49	±	29	NE	NE	96	U	EPA:901.1
	Bismuth-214	6	±	7.3	NE	NE	24	U	EPA:901.1
	Cesium-134	-3.6	±	1.4	NE	NE	4.8	U	EPA:901.1
	Cesium-137	-2.6	±	1.4	NE	NE	4.8	U	EPA:901.1
	Cobalt-60	0.71	±	1.4	NE	NE	4.6	U	EPA:901.1
	Gross alpha	8.1	±	0.91	15 pCi/L	15 pCi/L	1.4		EPA:900.0
	Gross beta	7.3	±	0.82	4 mrem/yr	4 mrem/yr	1.7	M3	EPA:900.0
	Iodine-131	33	±	14	NE	NE	45	U	EPA:901.1
	Lead-212	3.9	±	4.2	NE	NE	14	U	EPA:901.1
	Lead-214	-6.2	±	5.7	NE	NE	19	U	EPA:901.1
	Potassium-40	34	±	36	NE	NE	120	U	EPA:901.1
	Protactinium-234m	450	±	240	NE	NE	770	U	EPA:901.1
	Radon-222	460	±	41	NE	1000 pCi/L	38		SM7500-RnB
	Sodium-22	-0.62	±	1.4	NE	NE	4.9	U	EPA:901.1
	Thallium-208	-1.3	±	2.9	NE	NE	9.9	U	EPA:901.1
	Thorium-234	-33	±	57	NE	NE	190	U	EPA:901.1
	Tritium	67	±	98	NE	4 mrem/yr	320	U	EPA:906.0

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