DOE Oversight Bureau, New Mexico Environment Department

Wastewater Monitoring at Sandia National Laboratories/New Mexico

Conducted by the
New Mexico Environment Department DOE Oversight Bureau
for FFY 2016 Q-3

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Final Report

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Presentation of wastewater data results collected as a component of NMED/DOE Oversight Bureau Monitoring at Sandia National Laboratories/New Mexico. Sample collection conducted by bureau staff in parallel with Sandia National Laboratories/New Mexico, Albuquerque Bernalillo County Water Utility Authority, and NMED/DOE Oversight Bureau on April 26, 2016.

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Disclaimer:

Introduction

The New Mexico Environment Department (NMED) DOE Oversight Bureau (DOE-OB or the Bureau) has compiled and assessed wastewater data from samples during the third quarter of Federal Fiscal Year (FFY) 2016. Samples were collected on April 26, 2016. Bureau staff collected split wastewater samples with Sandia National Laboratories/New Mexico (SNL/NM) and Albuquerque Bernalillo County Water Utility Authority (ABCWUA) using standard SNL/NM sampling procedures and equipment. Samples were obtained as a 24-hour composite using an ISCO automated sampler. The ISCO sampler is programmed to collect 100ml every 15 minutes during the 24-hour sampling period.

Samples were collected from wastewater monitoring stations WW001 (ABCWUA permit number 2069A), WW006 (ABCWUA permit number 2069F), WW008 (ABCWUA permit number 2069I), and WW0011 (ABCWUA permit number 2069K). Samples were submitted for analysis to ALS Laboratory Group in Fort Collins, CO for total metals, fluoride, total cyanide, volatile organic compounds (VOCs), gross alpha, gross beta, gamma-emitting isotopes, and tritium. A set of trip blanks were also analyzed for VOCs.

Data Assessment

Results are compared to applicable New Mexico Administrative Code (NMAC) Sewer Release Limits (SRL), and the ABCWUA Sewer Use and Wastewater Control Ordinance (SUWCO) requirements, Limitations on Pollutant Concentration.

Results

Analytical results for total (unfiltered) target analyte list (TAL) metals are listed in Table 1. All results were well below the ABCWUA Daily Maximum Composite Sample Concentration Limits.

Analytical results for inorganic compounds are listed in Table 2. All samples were analyzed for fluoride. Samples for total cyanide were collected from monitoring stations WW006 and WW008. Fluoride concentrations from all samples collected were below the pollutant concentration limit of 22.7 mg/L. Total cyanide concentrations were below the pollution concentration limit of 0.45 mg/L.

VOCs detected at concentrations above the method detection limit (MDL) are presented in Table 3. Compounds detected above the MDL include acetone, bromodichloromethane, bromoform, and chlorodibromomethane. No wastewater regulatory standards exist for VOCs. Table 4 summarizes the laboratory MDLs for the remaining VOCs, not listed in Table 3.

Analytical results for radionuclides are listed in Tables 5. Samples were analyzed for gamma-emitting isotopes, gross alpha, gross beta, and tritium. It is important to note that the NMAC limit is a monthly average and the samples were obtained as a 24-hour composite. As such, it is not possible to directly correlate the values to the limits. However, it is possible to use the limit as a potential indicator for compliance. The data collected does not suggest any of the isotopes would exceed the effluent limit.

Conclusions

Evaluation of the analytical results demonstrates that TAL metals plus uranium, total cyanide and fluoride, gamma-emitting isotopes, gross alpha, gross beta, tritium, and VOCs from samples collected at SNL wastewater stations were below the NMAC Sewer Release Limits and the ABCWUA Daily Maximum Composite Sample Concentration Limits.

References

Albuquerque Bernalillo County Water Utility Authority, Sewer Use and Wastewater Control Ordinance, Adopted 12/21/05 (O-05-6), Amended 12/16/2009 (O-09-8), Amended 1/29/2014 (O-13-3);

20 NMAC 3.1 § 4, Appendix B, Table III, April 15, 2004 “Annual Limits on Intake (Ali) and Derived Air Concentrations (DAC) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sanitary Sewerage.”

Table-1 NMED DOE Oversight Bureau FFY 2016 Q-3 Semi-Annual Wastewater Quality Results: Total TAL Metals plus Uranium

SNL/NM Wastewater Station	Analyte	Result (mg/L)	ABCWUA Daily Maximum Composite Sample (mg/L)	Quantitation Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
WW001 4/26/16	Aluminum	0.095	900	0.1	0.014	JB	SW-846:6020
	Antimony	0.0006	NE	0.001	0.000084	J	SW-846:6020
	Arsenic	0.0036	0.051	0.002	0.00018		SW-846:6020
	Barium	0.12	NE	0.005	0.00023	B	SW-846:6020
	Beryllium	0.00027	NE	0.0005	0.00027	U	SW-846:6020
	Cadmium	0.00011	0.5	0.002	0.000099	J	SW-846:6020
	Calcium	59	NE	1	0.061	B	SW-846:6020
	Chromium	0.0036	4.1	0.01	0.0011	J	SW-846:6020
	Cobalt	0.00033	NE	0.005	0.00007	J	SW-846:6020
	Copper	0.049	3.2	0.02	0.0011		SW-846:6020
	Iron	0.23	NE	0.1	0.0053	B	SW-846:6020
	Lead	0.0045	1	0.002	0.00016		SW-846:6020
	Magnesium	9.7	NE	0.1	0.02		SW-846:6020
	Manganese	0.011	NE	0.005	0.0003	B	SW-846:6020
	Mercury	0.00006	0.004	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0042	2	0.02	0.0042	U	SW-846:6020
	Potassium	16	NE	1	0.32		SW-846:6020
	Selenium	0.0034	0.25	0.01	0.00066	J	SW-846:6020
	Silver	0.0001	5	0.0005	0.000039	J	SW-846:6020
	Sodium	180	NE	1	0.19		SW-846:6020
	Thallium	0.00005	NE	0.0001	0.000014	J	SW-846:6020
	Uranium	0.0025	NE	0.0001	0.000027		SW-846:6020
	Vanadium	0.012	NE	0.005	0.00058		SW-846:6020
	Zinc	0.067	2.2	0.1	0.0091	J	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 Oversight Bureau FFY 2016 Q-3 Semi-Annual Wastewater Quality Results: Total TAL Metals plus Uranium

SNL/NM Wastewater Station	Analyte	Result (mg/L)	ABCWUA Daily Maximum Composite Sample (mg/L)	Quantitation Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
WW006 4/26/16	Aluminum	0.093	900	0.1	0.014	JB	SW-846:6020
	Antimony	0.0004	NE	0.001	0.000084	J	SW-846:6020
	Arsenic	0.0021	0.051	0.002	0.00018		SW-846:6020
	Barium	0.096	NE	0.005	0.00023	B	SW-846:6020
	Beryllium	0.00027	NE	0.0005	0.00027	U	SW-846:6020
	Cadmium	0.000099	0.5	0.002	0.000099	U	SW-846:6020
	Calcium	43	NE	1	0.061	B	SW-846:6020
	Chromium	0.0018	4.1	0.01	0.0011	J	SW-846:6020
	Cobalt	0.00011	NE	0.005	0.00007	J	SW-846:6020
	Copper	0.022	3.2	0.02	0.0011		SW-846:6020
	Iron	0.3	NE	0.1	0.0053	B	SW-846:6020
	Lead	0.0014	1	0.002	0.00016	J	SW-846:6020
	Magnesium	7.6	NE	0.1	0.02		SW-846:6020
	Manganese	0.017	NE	0.005	0.0003	B	SW-846:6020
	Mercury	0.00006	0.004	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0042	2	0.02	0.0042	U	SW-846:6020
	Potassium	17	NE	1	0.32		SW-846:6020
	Selenium	0.0018	0.25	0.01	0.00066	J	SW-846:6020
	Silver	0.00015	5	0.0005	0.000039	J	SW-846:6020
	Sodium	140	NE	1	0.19		SW-846:6020
	Thallium	0.000014	NE	0.0001	0.000014	U	SW-846:6020
	Uranium	0.0016	NE	0.0001	0.000027		SW-846:6020
	Vanadium	0.0045	NE	0.005	0.00058	J	SW-846:6020
	Zinc	0.12	2.2	0.1	0.0091		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 Oversight Bureau FFY 2016 Q-3 Semi-Annual Wastewater Quality Results: Total TAL Metals plus Uranium

SNL/NM Wastewater Station	Analyte	Result (mg/L)	ABCWUA Daily Maximum Composite Sample (mg/L)	Quantitation Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
WW008 4/26/16	Aluminum	0.062	900	0.1	0.014	JB	SW-846:6020
	Antimony	0.0051	NE	0.001	0.000084		SW-846:6020
	Arsenic	0.0022	0.051	0.002	0.00018		SW-846:6020
	Barium	0.12	NE	0.005	0.00023	B	SW-846:6020
	Beryllium	0.00027	NE	0.0005	0.00027	U	SW-846:6020
	Cadmium	0.00014	0.5	0.002	0.000099	J	SW-846:6020
	Calcium	50	NE	1	0.061	B	SW-846:6020
	Chromium	0.0017	4.1	0.01	0.0011	J	SW-846:6020
	Cobalt	0.0047	NE	0.005	0.00007	J	SW-846:6020
	Copper	0.026	3.2	0.02	0.0011		SW-846:6020
	Iron	0.2	NE	0.1	0.0053	B	SW-846:6020
	Lead	0.0002	1	0.002	0.00016	J	SW-846:6020
	Magnesium	9.5	NE	0.1	0.02		SW-846:6020
	Manganese	0.023	NE	0.005	0.0003	B	SW-846:6020
	Mercury	0.00006	0.004	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0052	2	0.02	0.0042	J	SW-846:6020
	Potassium	24	NE	1	0.32		SW-846:6020
	Selenium	0.0023	0.25	0.01	0.00066	J	SW-846:6020
	Silver	0.00005	5	0.0005	0.000039	J	SW-846:6020
	Sodium	62	NE	1	0.19		SW-846:6020
	Thallium	0.000014	NE	0.0001	0.000014	U	SW-846:6020
	Uranium	0.0021	NE	0.0001	0.000027		SW-846:6020
	Vanadium	0.0059	NE	0.005	0.00058		SW-846:6020
	Zinc	0.046	2.2	0.1	0.0091	J	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 Oversight Bureau FFY 2016 Q-3 Semi-Annual Wastewater Quality Results: Total TAL Metals plus Uranium

SNL/NM Wastewater Station	Analyte	Result (mg/L)	ABCWUA Daily Maximum Composite Sample (mg/L)	Quantitation Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
WW011 4/26/16	Aluminum	0.081	900	0.1	0.014	JB	SW-846:6020
	Antimony	0.00021	NE	0.001	0.000084	J	SW-846:6020
	Arsenic	0.0032	0.051	0.002	0.00018		SW-846:6020
	Barium	0.14	NE	0.005	0.00023	B	SW-846:6020
	Beryllium	0.00027	NE	0.0005	0.00027	U	SW-846:6020
	Cadmium	0.000099	0.5	0.002	0.000099	U	SW-846:6020
	Calcium	56	NE	1	0.061	B	SW-846:6020
	Chromium	0.0029	4.1	0.01	0.0011	J	SW-846:6020
	Cobalt	0.00023	NE	0.005	0.00007	J	SW-846:6020
	Copper	0.029	3.2	0.02	0.0011		SW-846:6020
	Iron	0.38	NE	0.1	0.0053	B	SW-846:6020
	Lead	0.00093	1	0.002	0.00016	J	SW-846:6020
	Magnesium	8.7	NE	0.1	0.02		SW-846:6020
	Manganese	0.026	NE	0.005	0.0003	B	SW-846:6020
	Mercury	0.00026	0.004	0.0001	0.00006		SW-846:7470A
	Nickel	0.0042	2	0.02	0.0042	U	SW-846:6020
	Potassium	32	NE	1	0.32		SW-846:6020
	Selenium	0.0029	0.25	0.01	0.00066	J	SW-846:6020
	Silver	0.00017	5	0.0005	0.000039	J	SW-846:6020
	Sodium	100	NE	1	0.19		SW-846:6020
	Thallium	0.000014	NE	0.0001	0.000014	U	SW-846:6020
	Uranium	0.003	NE	0.0001	0.000027		SW-846:6020
	Vanadium	0.0095	NE	0.005	0.00058		SW-846:6020
	Zinc	0.073	2.2	0.1	0.0091	J	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 Oversight Bureau FFY 2016 Q-3 Semi-Annual Wastewater Quality Results: Total Cyanide and Fluoride

SNL/NM Wastewater Station	Analyte	Result (mg/L)	ABCWUA Daily Maximum Composite Sample (mg/L)	Quantitation Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
WW001 4/26/16	Fluoride	6.5	22.7	0.2	0.06		EPA:300.0
WW006 4/26/16	Cyanide (Total)	0.0036	0.45	0.01	0.0036	U	SW-846:9014
	Fluoride	1.3	22.7	0.2	0.06		EPA:300.0
WW008 4/26/16	Cyanide (Total)	0.0036	0.45	0.01	0.0036	U	SW-846:9014
	Fluoride	0.85	22.7	0.1	0.03		EPA:300.0
WW011 4/26/16	Fluoride	1.2	22.7	0.1	0.03		EPA:300.0

H = The samples were analyzed outside of the established hold time

N = Spiked sample recovery not within control limits.

U = Analyte not detected at or above the reporting limit or MDL

Table-3 NMED DOE Oversight Bureau FFY 2016 Q-3 Semi-Annual Wastewater Quality Results: Detected Volatile Organic Compounds

SNL/NM Wastewater Station	Analyte	Result (µg/L)	Quantitation Limit (µg/L)	MDL (µg/L)	Laboratory Qualifier	Analytical Method
WW001 4/26/16	Acetone	68	10	3		SW-846:8260B_25
	Bromodichloromethane	0.33	1	0.3	J	
	Bromoform	2.9	1	0.3		
	Chlorodibromomethane	0.69	1	0.3	J	
WW006 4/26/16	Acetone	9.9	10	3	J	
WW008 4/26/16	Acetone	44	10	3		
WW011 4/26/16	Acetone	11	10	3		
	Bromoform	6.4	1	0.3		

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

Table-4 NMED DOE Oversight Bureau FFY 2016 Q-3 Semi-Annual Wastewater 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-]	0.4
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	0.38
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	0.3
Vinyl Chloride	0.3
Xylene[1,2-]	0.3
Xylene[1,3-]+Xylene[1,4-]	0.3

Table-5 NMED DOE Oversight Bureau FFY 2016 Q-3 Semi-Annual Waste Water Quality Results: Gross Alpha, Gross Beta, Gamma Spectroscopy, and Tritium

SNL/NM Wastewater Station	Analyte	Activity (pCi/L)			NMAC Sewer Release Limit (Monthly Avg) (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
WW001 4/26/16	Actinium-228	20	±	8	300,000	26	U	EPA:901.1
	Aluminum-26	2.5	±	3	60,000	10	U	EPA:901.1
	Americium-241	4.8	±	10	200	34	U	EPA:901.1
	Antimony-124	12	±	2.6	70,000	7.7		EPA:901.1
	Antimony-125	3.1	±	3.7	300,000	14	U	EPA:901.1
	Beryllium-7	58	±	18	6,000,000	56		EPA:901.1
	Bismuth-212	30	±	26	700,000	87	U	EPA:901.1
	Bismuth-214	7.2	±	7.6	3,000,000	25	U	EPA:901.1
	Cadmium-109	9.3	±	30	60,000	100	U	EPA:901.1
	Cerium-139	-1.3	±	1.3	700,000	4.3	U	EPA:901.1
	Cerium-144	1.3	±	11	30,000	36	U	EPA:901.1
	Cesium-134	-2.7	±	2	9,000	6.9	U	EPA:901.1
	Cesium-137	-2.5	±	2	10,000	6.9	U	EPA:901.1
	Chromium-51	22	±	21	5,000,000	70	U	EPA:901.1
	Cobalt-56	2	±	4.4	60,000	15	U	EPA:901.1
	Cobalt-57	-0.3	±	1	600,000	3.5	U	EPA:901.1
	Cobalt-58	-3.3	±	2.4	200,000	8.5	U	EPA:901.1
	Cobalt-60	-2.2	±	2.5	30,000	8.8	U	EPA:901.1
	Europium-152	-4.4	±	12	100,000	42	U	EPA:901.1
	Europium-154	-14	±	12	70,000	41	U	EPA:901.1
	Europium-155	1.8	±	3.9	500,000	13	U	EPA:901.1
	Gross alpha	1.8	±	0.9	NE	2.9	U	EPA:900
	Gross beta	17	±	1.7	NE	3		EPA:900
	Iodine-131	0.29	±	15	10,000	51	U	EPA:901.1
	Iron-59	8.2	±	6	100,000	20	U	EPA:901.1
	Lead-212	1.2	±	4.3	20,000	14	U	EPA:901.1
	Lead-214	-3.7	±	7.1	1,000,000	24	U	EPA:901.1
	Manganese-54	1.8	±	2	300,000	6.8	U	EPA:901.1
	Niobium-94	-2	±	2	100,000	6.7	U	EPA:901.1
	Niobium-95	-1.8	±	2.2	300,000	7.7	U	EPA:901.1
	Potassium-40	54	±	49	40,000	160	U	EPA:901.1
	Protactinium-234m	630	±	360	NE	1200	U	EPA:901.1
	Ruthenium-106	-9	±	18	30,000	61	U	EPA:901.1
	Scandium-46	0.56	±	2.5	100,000	8.3	U	EPA:901.1
	Silver-110m	3.4	±	1.8	60,000	5.9	U	EPA:901.1
	Sodium-22	0.72	±	2.3	60,000	7.9	U	EPA:901.1
	Strontium-85	6.7	±	2.7	400,000	8.3	U	EPA:901.1
	Thallium-208	6.9	±	2	NE	6.2		EPA:901.1
	Thorium-227	5.5	±	11	20,000	37	U	EPA:901.1
	Thorium-234	80	±	43	50,000	140	U	EPA:901.1
	Tritium	110	±	190	10,000,000	320	U	EPA:906.0
	Uranium-235	19	±	7.8	3,000	25	U	EPA:901.1
	Zinc-65	-1.9	±	5.1	50,000	18	U	EPA:901.1

NE = Not Established

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

Table-5 NMED DOE Oversight Bureau FFY 2016 Q-3 Semi-Annual Waste Water Quality Results: Gross Alpha, Gross Beta, Gamma Spectroscopy, and Tritium

SNL/NM Wastewater Station	Analyte	Activity (pCi/L)			NMAC Sewer Release Limit (Monthly Avg) (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
WW006 4/26/16	Actinium-228	12	±	5.3	300,000	19	U	EPA:901.1
	Aluminum-26	1.6	±	2	60,000	6.7	U	EPA:901.1
	Americium-241	0.89	±	7.9	200	26	U	EPA:901.1
	Antimony-124	6.9	±	1.8	70,000	5.5		EPA:901.1
	Antimony-125	4	±	3.1	300,000	11	U	EPA:901.1
	Beryllium-7	11	±	14	6,000,000	46	U	EPA:901.1
	Bismuth-212	20	±	19	700,000	62	U	EPA:901.1
	Bismuth-214	1.8	±	7.8	3,000,000	26	U	EPA:901.1
	Cadmium-109	-29	±	26	60,000	89	U	EPA:901.1
	Cerium-139	-1	±	0.99	700,000	3.4	U	EPA:901.1
	Cerium-144	-1.2	±	6.6	30,000	22	U	EPA:901.1
	Cesium-134	1.8	±	1.9	9,000	6.4	U	EPA:901.1
	Cesium-137	-1	±	1.4	10,000	4.9	U	EPA:901.1
	Chromium-51	8.9	±	17	5,000,000	58	U	EPA:901.1
	Cobalt-56	4.2	±	3.1	60,000	10	U	EPA:901.1
	Cobalt-57	-1	±	0.88	600,000	3	U	EPA:901.1
	Cobalt-58	-2.2	±	1.7	200,000	6	U	EPA:901.1
	Cobalt-60	-0.31	±	1.7	30,000	5.8	U	EPA:901.1
	Europium-152	-0.76	±	8.2	100,000	28	U	EPA:901.1
	Europium-154	0.028	±	7.8	70,000	27	U	EPA:901.1
	Europium-155	4.9	±	3.7	500,000	12	U	EPA:901.1
	Gross alpha	0.99	±	0.57	NE	1.9	U	EPA:900
	Gross beta	16	±	1.4	NE	1.8		EPA:900
	Iodine-131	-14	±	13	10,000	43	U	EPA:901.1
	Iron-59	3.8	±	4.1	100,000	14	U	EPA:901.1
	Lead-212	4.4	±	3.6	20,000	12	U	EPA:901.1
	Lead-214	-0.42	±	5.5	1,000,000	18	U	EPA:901.1
	Manganese-54	-1.7	±	1.5	300,000	5.1	U	EPA:901.1
	Niobium-94	-0.44	±	1.5	100,000	5	U	EPA:901.1
	Niobium-95	-1.2	±	1.7	300,000	6	U	EPA:901.1
	Potassium-40	-32	±	40	40,000	140	U	EPA:901.1
	Protactinium-234m	150	±	230	NE	790	U	EPA:901.1
	Ruthenium-106	2.4	±	14	30,000	48	U	EPA:901.1
	Scandium-46	-2.8	±	1.7	100,000	6	U	EPA:901.1
	Silver-110m	0.51	±	1.4	60,000	4.6	U	EPA:901.1
	Sodium-22	2	±	1.6	60,000	5.2	U	EPA:901.1
	Strontium-85	3	±	2.2	400,000	7.2	U	EPA:901.1
	Thallium-208	-0.78	±	3.1	NE	10	U	EPA:901.1
	Thorium-227	8.8	±	9.1	20,000	30	U	EPA:901.1
	Thorium-234	34	±	39	50,000	130	U	EPA:901.1
	Tritium	88	±	190	10,000,000	320	U	EPA:906.0
	Uranium-235	18	±	6.3	3,000	20	U	EPA:901.1
	Zinc-65	1	±	3.4	50,000	12	U	EPA:901.1

NE = Not Established

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Table-5 NMED DOE Oversight Bureau FFY 2016 Q-3 Semi-Annual Waste Water Quality Results: Gross Alpha, Gross Beta, Gamma Spectroscopy, and Tritium

SNL/NM Wastewater Station	Analyte	Activity (pCi/L)			NMAC Sewer Release Limit (Monthly Avg) (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
WW008 4/26/16	Actinium-228	22	±	5.3	300,000	16		EPA:901.1
	Aluminum-26	1.6	±	1.7	60,000	5.7	U	EPA:901.1
	Americium-241	-6.6	±	7.8	200	26	U	EPA:901.1
	Antimony-124	-9.7	±	1.9	70,000	6.6	U	EPA:901.1
	Antimony-125	5.1	±	2.7	300,000	10	U	EPA:901.1
	Beryllium-7	14	±	13	6,000,000	43	U	EPA:901.1
	Bismuth-212	36	±	19	700,000	63	U	EPA:901.1
	Bismuth-214	0.38	±	5.7	3,000,000	19	U	EPA:901.1
	Cadmium-109	17	±	25	60,000	83	U	EPA:901.1
	Cerium-139	-0.8	±	0.9	700,000	3.1	U	EPA:901.1
	Cerium-144	1.9	±	5.3	30,000	18	U	EPA:901.1
	Cesium-134	-3.7	±	1.3	9,000	4.5	U	EPA:901.1
	Cesium-137	-1.1	±	1.3	10,000	4.6	U	EPA:901.1
	Chromium-51	19	±	17	5,000,000	56	U	EPA:901.1
	Cobalt-56	2.1	±	3	60,000	9.9	U	EPA:901.1
	Cobalt-57	-0.15	±	0.71	600,000	2.4	U	EPA:901.1
	Cobalt-58	0.9	±	1.6	200,000	5.3	U	EPA:901.1
	Cobalt-60	-2.3	±	1.6	30,000	5.5	U	EPA:901.1
	Europium-152	-8.1	±	7.7	100,000	27	U	EPA:901.1
	Europium-154	-0.26	±	7.7	70,000	26	U	EPA:901.1
	Europium-155	-1.4	±	3.1	500,000	10	U	EPA:901.1
	Gross alpha	1.2	±	0.4	NE	1.2	U	EPA:900
	Gross beta	20	±	1.7	NE	1.2		EPA:900
	Iodine-131	-6.1	±	10	10,000	34	U	EPA:901.1
	Iron-59	7.5	±	4.1	100,000	13	U	EPA:901.1
	Lead-212	-0.74	±	3.5	20,000	12	U	EPA:901.1
	Lead-214	-2.6	±	5.3	1,000,000	18	U	EPA:901.1
	Manganese-54	1.5	±	1.3	300,000	4.4	U	EPA:901.1
	Niobium-94	1.4	±	1.3	100,000	4.5	U	EPA:901.1
	Niobium-95	0.17	±	1.6	300,000	5.6	U	EPA:901.1
	Potassium-40	14	±	35	40,000	120	U	EPA:901.1
	Protactinium-234m	430	±	240	NE	770	U	EPA:901.1
	Ruthenium-106	3.6	±	18	30,000	59	U	EPA:901.1
	Scandium-46	2.4	±	1.5	100,000	5.1	U	EPA:901.1
	Silver-110m	1	±	1.3	60,000	4.3	U	EPA:901.1
	Sodium-22	-0.98	±	1.6	60,000	5.4	U	EPA:901.1
	Strontium-85	3.9	±	2.3	400,000	7.3	U	EPA:901.1
	Thallium-208	5.1	±	1.3	NE	4		EPA:901.1
	Thorium-227	-5.9	±	5.7	20,000	20	U	EPA:901.1
	Thorium-234	44	±	34	50,000	120	U	EPA:901.1
	Tritium	-32	±	190	10,000,000	320	U	EPA:906.0
	Uranium-235	5.9	±	3.6	3,000	12	U	EPA:901.1
	Zinc-65	-0.78	±	3.4	50,000	12	U	EPA:901.1

NE = Not Established

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Table-5 NMED DOE Oversight Bureau FFY 2016 Q-3 Semi-Annual Waste Water Quality Results: Gross Alpha, Gross Beta, Gamma Spectroscopy, and Tritium

SNL/NM Wastewater Station	Analyte	Activity (pCi/L)			NMAC Sewer Release Limit (Monthly Avg) (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
WW011 4/26/16	Actinium-228	4	±	8.6	300,000	29	U	EPA:901.1
	Aluminum-26	-1.4	±	1.3	60,000	4.8	U	EPA:901.1
	Americium-241	0.84	±	1.2	200	4	U	EPA:901.1
	Antimony-124	0	±	1.5	70,000	5	U	EPA:901.1
	Antimony-125	1.5	±	2.3	300,000	8.8	U	EPA:901.1
	Beryllium-7	12	±	10	6,000,000	34	U	EPA:901.1
	Bismuth-212	-1	±	16	700,000	56	U	EPA:901.1
	Bismuth-214	3.1	±	4.9	3,000,000	16	U	EPA:901.1
	Cadmium-109	9.9	±	11	60,000	35	U	EPA:901.1
	Cerium-139	-0.037	±	1	700,000	3.4	U	EPA:901.1
	Cerium-144	-5.1	±	4.2	30,000	14	U	EPA:901.1
	Cesium-134	1.2	±	1.1	9,000	3.7	U	EPA:901.1
	Cesium-137	-2.4	±	1.6	10,000	5.5	U	EPA:901.1
	Chromium-51	1.2	±	13	5,000,000	45	U	EPA:901.1
	Cobalt-56	1.9	±	2.4	60,000	7.9	U	EPA:901.1
	Cobalt-57	0.65	±	0.53	600,000	1.7	U	EPA:901.1
	Cobalt-58	0.63	±	1.4	200,000	4.6	U	EPA:901.1
	Cobalt-60	0.34	±	1.3	30,000	4.4	U	EPA:901.1
	Europium-152	-0.68	±	6	100,000	21	U	EPA:901.1
	Europium-154	7.4	±	6.5	70,000	22	U	EPA:901.1
	Europium-155	-3	±	2.8	500,000	9.3	U	EPA:901.1
	Gross alpha	3.5	±	0.76	NE	2.1		EPA:900
	Gross beta	39	±	3.2	NE	1.5		EPA:900
	Iodine-131	6.7	±	8.8	10,000	29	U	EPA:901.1
	Iron-59	0.93	±	3.2	100,000	11	U	EPA:901.1
	Lead-212	-2.2	±	3	20,000	10	U	EPA:901.1
	Lead-214	-4.8	±	4.6	1,000,000	16	U	EPA:901.1
	Manganese-54	1	±	1.2	300,000	3.9	U	EPA:901.1
	Niobium-94	0.16	±	1.1	100,000	3.8	U	EPA:901.1
	Niobium-95	0.3	±	1.4	300,000	4.7	U	EPA:901.1
	Potassium-40	-10	±	33	40,000	110	U	EPA:901.1
	Protactinium-234m	-220	±	200	NE	700	U	EPA:901.1
	Ruthenium-106	-22	±	10	30,000	36	U	EPA:901.1
	Scandium-46	-0.06	±	1.3	100,000	4.4	U	EPA:901.1
	Silver-110m	-0.085	±	1.1	60,000	3.6	U	EPA:901.1
	Sodium-22	-1.2	±	1.2	60,000	4.3	U	EPA:901.1
	Strontium-85	4.9	±	1.9	400,000	5.9	U	EPA:901.1
	Thallium-208	0.62	±	2.1	NE	6.9	U	EPA:901.1
	Thorium-227	4.7	±	5	20,000	17	U	EPA:901.1
	Thorium-234	-28	±	22	50,000	74	U	EPA:901.1
	Tritium	-0.32	±	190	10,000,000	320	U	EPA:906.0
	Uranium-235	13	±	4.1	3,000	13	U	EPA:901.1
	Zinc-65	-0.76	±	2.7	50,000	9.1	U	EPA:901.1

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