

DOE Oversight Bureau, New Mexico Environment Department

**Groundwater Monitoring at
Sandia National Laboratories/New Mexico
Chemical Waste Landfill**

**Conducted by the
New Mexico Environment Department DOE Oversight Bureau
for FFY 2017 Q-2**

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Final Report

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The purpose of this communication is to transmit groundwater quality data collected by the New Mexico Environment Department DOE Oversight Bureau from Chemical Waste Landfill groundwater monitoring wells during second quarter of Federal Fiscal Year 2017.

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Introduction

The New Mexico Environment Department (NMED) DOE Oversight Bureau (DOE-OB or Bureau) has compiled and assessed groundwater data collected during January 2017. The Bureau collected groundwater samples from Chemical Waste Landfill (CWL) groundwater monitoring wells CWL-BW5, CWL-MW9 (plus duplicate), CWL-MW10 and CWL-MW11. Split samples were collected using standard Sandia National Laboratories/New Mexico (SNL/NM) sampling procedures and equipment in accordance with the CWL Post-Closure Care Permit (PCCP), Permit Attachment 2, Groundwater Sampling and Analysis Plan (NMED October 2009). Samples were analyzed for total target analyte list (TAL) metals and volatile organic compounds (VOCs). The Bureau used ALS Environmental Laboratory located in Fort Collins, Colorado to analyze and report data results from samples collected at CWL. ALS Environmental is 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 concentration limits for the hazardous constituents of concern at the CWL listed in the PCCP.

Data Assessment

All groundwater samples were collected and analyzed in accordance with U.S. EPA protocols. The Bureau's 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, and to the Groundwater Concentration Limits for Hazardous Constituents of Concern (COC) in Table 1-2 of the CWL Post-Closure Care Permit, Permit Attachment 1, Post-Closure Plan for the CWL (NMED October 2009).

For this monitoring event, the split samples collected by SNL/NM were analyzed for metals (chromium and nickel), trichloroethene (TCE), and the enhanced list of VOCs, including 1,1 dichloroethene; 1,1,2-trichloro-1,2,2-trifluoroethane (commonly known as Freon 113); chloroform; tetrachloroethylene (PCE); and trichlorofluoromethane (commonly known as Freon 11).

Results

Analytical results for total TAL metals are presented in Table-1. Metals concentrations for chromium and nickel were below established MCLs and PCCP concentration limits; all other metals concentrations were below established MCLs. In accordance with the CWL PCCP, SNL/NM only analyzes groundwater samples for the metals chromium and nickel. The CWL PCCP concentration limits for chromium and nickel are 0.050 mg/L and 0.028 mg/L, respectively.

Volatile organic compounds detected at concentrations above the method detection limits (MDLs) are presented in Table-2. Trichloroethene (TCE) was

detected above the MDL at monitoring well CWL-MW10 at a concentration of 0.88 µg/L. The result was “J” flagged, indicating that the result was an estimated value. The TCE concentration was below the EPA MCL and CWL PCCP limit of 5 µg/L. Table-3 summarizes laboratory MDLs for the remaining VOCs analyzed from the samples collected at CWL monitoring wells.

Conclusion

Groundwater samples were collected from four (4) monitoring wells during this semi-annual sampling event at the CWL. Samples collected by the Bureau and analyzed by ALS Environmental reported concentrations of metals and VOCs below established EPA MCLs and SNL/NM COC concentration limits listed in the PCCP. Groundwater results from CWL are comparable to historical results.

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

References

New Mexico Environment Department (NMED), October 2009. "Resource Conservation and Recovery Act, Post-Closure Care Permit, EPA ID No. NM5890110518, to the U.S. Department of Energy/Sandia Corporation, for the Sandia National Laboratories Chemical Waste Landfill," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico.

U.S. EPA National Primary Drinking Water Regulations (40 CFR 141), National Primary Drinking Water Standards, EPA, July 2002.

Table-1 NMED DOE Oversight Bureau FFY 2017 Q-2 Chemical Waste Landfill Groundwater Quality Results: Total Target Analyte List Metals

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	CWL PCCP Limits (mg/L)	Laboratory Detection Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
CWL-BW5 11-Jan-17	Aluminum	0.014	NE	NE	0.1	0.014	U	SW-846:6020
	Antimony	0.00012	0.006	NE	0.001	0.000084	J	SW-846:6020
	Arsenic	0.00044	0.01	NE	0.002	0.00018	J	SW-846:6020
	Barium	0.061	2	NE	0.005	0.00023		SW-846:6020
	Beryllium	0.00042	0.004	NE	0.0005	0.00027	J	SW-846:6020
	Cadmium	0.000099	0.005	NE	0.002	0.000099	U	SW-846:6020
	Calcium	120	NE	NE	1	0.061		SW-846:6020
	Chromium	0.0011	0.10	0.050	0.01	0.0011	J	SW-846:6020
	Cobalt	0.00012	NE	NE	0.005	0.00007	J	SW-846:6020
	Copper	0.0011	NE	NE	0.02	0.0011	U	SW-846:6020
	Iron	0.013	NE	NE	0.1	0.0053	JB	SW-846:6020
	Lead	0.00016	NE	NE	0.002	0.00016	U	SW-846:6020
	Magnesium	27	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.0013	NE	NE	0.005	0.0003	J	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0042	NE	0.028	0.02	0.0042	U	SW-846:6020
	Potassium	6.5	NE	NE	1	0.32		SW-846:6020
	Selenium	0.0018	0.05	NE	0.01	0.00066	J	SW-846:6020
	Silver	0.000039	NE	NE	0.0005	0.000039	U	SW-846:6020
	Sodium	92	NE	NE	1	0.19		SW-846:6020
Thallium	0.000014	0.002	NE	0.0001	0.000014	U	SW-846:6020	
Vanadium	0.0016	NE	NE	0.005	0.00058	JB	SW-846:6020	
Zinc	0.0091	NE	NE	0.1	0.0091	U	SW-846:6020	

B = Compound was found in the blank and sample.

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

NE = Not Established

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Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	CWL PCCP Limits (mg/L)	Laboratory Detection Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
CWL-MW9 12-Jan-17	Aluminum	0.014	NE	NE	0.1	0.014	U	SW-846:6020
	Antimony	0.00012	0.006	NE	0.001	0.000084	J	SW-846:6020
	Arsenic	0.00043	0.01	NE	0.002	0.00018	J	SW-846:6020
	Barium	0.09	2	NE	0.005	0.00023		SW-846:6020
	Beryllium	0.00027	0.004	NE	0.0005	0.00027	U	SW-846:6020
	Cadmium	0.000099	0.005	NE	0.002	0.000099	U	SW-846:6020
	Calcium	100	NE	NE	1	0.061		SW-846:6020
	Chromium	0.0011	0.10	0.050	0.01	0.0011	U	SW-846:6020
	Cobalt	0.00007	NE	NE	0.005	0.00007	U	SW-846:6020
	Copper	0.0011	NE	NE	0.02	0.0011	U	SW-846:6020
	Iron	0.0078	NE	NE	0.1	0.0053	JB	SW-846:6020
	Lead	0.00016	NE	NE	0.002	0.00016	U	SW-846:6020
	Magnesium	27	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.0057	NE	NE	0.005	0.0003		SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0042	NE	0.028	0.02	0.0042	U	SW-846:6020
	Potassium	8.1	NE	NE	1	0.32		SW-846:6020
	Selenium	0.002	0.05	NE	0.01	0.00066	J	SW-846:6020
	Silver	0.000039	NE	NE	0.0005	0.000039	U	SW-846:6020
	Sodium	78	NE	NE	1	0.19		SW-846:6020
Thallium	0.00004	0.002	NE	0.0001	0.000014	JB	SW-846:6020	
Vanadium	0.0017	NE	NE	0.005	0.00058	JB	SW-846:6020	
Zinc	0.0091	NE	NE	0.1	0.0091	U	SW-846:6020	

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Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	CWL PCCP Limits (mg/L)	Laboratory Detection Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
CWL-MW9 12-Jan-17 DUP	Aluminum	0.014	NE	NE	0.1	0.014	U	SW-846:6020
	Antimony	0.00013	0.006	NE	0.001	0.000084	J	SW-846:6020
	Arsenic	0.00044	0.01	NE	0.002	0.00018	J	SW-846:6020
	Barium	0.094	2	NE	0.005	0.00023		SW-846:6020
	Beryllium	0.00046	0.004	NE	0.0005	0.00027	J	SW-846:6020
	Cadmium	0.000099	0.005	NE	0.002	0.000099	U	SW-846:6020
	Calcium	100	NE	NE	1	0.061		SW-846:6020
	Chromium	0.0012	0.10	0.050	0.01	0.0011	J	SW-846:6020
	Cobalt	0.00008	NE	NE	0.005	0.00007	J	SW-846:6020
	Copper	0.0011	NE	NE	0.02	0.0011	U	SW-846:6020
	Iron	0.011	NE	NE	0.1	0.0053	JB	SW-846:6020
	Lead	0.00016	NE	NE	0.002	0.00016	U	SW-846:6020
	Magnesium	27	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.0046	NE	NE	0.005	0.0003	J	SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0042	NE	0.028	0.02	0.0042	U	SW-846:6020
	Potassium	8.2	NE	NE	1	0.32		SW-846:6020
	Selenium	0.0017	0.05	NE	0.01	0.00066	J	SW-846:6020
	Silver	0.000039	NE	NE	0.0005	0.000039	U	SW-846:6020
	Sodium	77	NE	NE	1	0.19		SW-846:6020
Thallium	0.00003	0.002	NE	0.0001	0.000014	JB	SW-846:6020	
Vanadium	0.0016	NE	NE	0.005	0.00058	JB	SW-846:6020	
Zinc	0.0091	NE	NE	0.1	0.0091	U	SW-846:6020	

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Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	CWL PCCP Limits (mg/L)	Laboratory Detection Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
CWL-MW10 17-Jan-17	Aluminum	0.014	NE	NE	0.1	0.014	U	SW-846:6020
	Antimony	0.0001	0.006	NE	0.001	0.000084	J	SW-846:6020
	Arsenic	0.00018	0.01	NE	0.002	0.00018	U	SW-846:6020
	Barium	0.41	2	NE	0.005	0.00023		SW-846:6020
	Beryllium	0.00027	0.004	NE	0.0005	0.00027	U	SW-846:6020
	Cadmium	0.000099	0.005	NE	0.002	0.000099	U	SW-846:6020
	Calcium	100	NE	NE	1	0.061		SW-846:6020
	Chromium	0.0011	0.10	0.050	0.01	0.0011	U	SW-846:6020
	Cobalt	0.00008	NE	NE	0.005	0.00007	J	SW-846:6020
	Copper	0.0011	NE	NE	0.02	0.0011	U	SW-846:6020
	Iron	0.98	NE	NE	0.1	0.0053	B	SW-846:6020
	Lead	0.00016	NE	NE	0.002	0.00016	U	SW-846:6020
	Magnesium	27	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.66	NE	NE	0.005	0.0003		SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0042	NE	0.028	0.02	0.0042	U	SW-846:6020
	Potassium	7.6	NE	NE	1	0.32		SW-846:6020
	Selenium	0.00066	0.05	NE	0.01	0.00066	U	SW-846:6020
	Silver	0.000039	NE	NE	0.0005	0.000039	U	SW-846:6020
	Sodium	77	NE	NE	1	0.19		SW-846:6020
Thallium	0.000014	0.002	NE	0.0001	0.000014	U	SW-846:6020	
Vanadium	0.00058	NE	NE	0.005	0.00058	U	SW-846:6020	
Zinc	0.01	NE	NE	0.1	0.0091	J	SW-846:6020	

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NE = Not Established

U = the analyte was analyzed for but not detected

Table-1 NMED DOE Oversight Bureau FFY 2017 Q-2 Chemical Waste Landfill Groundwater Quality Results: Total Target Analyte List Metals

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	CWL PCCP Limits (mg/L)	Laboratory Detection Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
CWL-MW11 13-Jan-17	Aluminum	0.014	NE	NE	0.1	0.014	U	SW-846:6020
	Antimony	0.00011	0.006	NE	0.001	0.000084	J	SW-846:6020
	Arsenic	0.00042	0.01	NE	0.002	0.00018	J	SW-846:6020
	Barium	0.071	2	NE	0.005	0.00023		SW-846:6020
	Beryllium	0.00027	0.004	NE	0.0005	0.00027	U	SW-846:6020
	Cadmium	0.000099	0.005	NE	0.002	0.000099	U	SW-846:6020
	Calcium	110	NE	NE	1	0.061		SW-846:6020
	Chromium	0.0015	0.10	0.050	0.01	0.0011	J	SW-846:6020
	Cobalt	0.00007	NE	NE	0.005	0.00007	U	SW-846:6020
	Copper	0.0011	NE	NE	0.02	0.0011	U	SW-846:6020
	Iron	0.0096	NE	NE	0.1	0.0053	JB	SW-846:6020
	Lead	0.00016	NE	NE	0.002	0.00016	U	SW-846:6020
	Magnesium	28	NE	NE	0.1	0.02		SW-846:6020
	Manganese	0.0056	NE	NE	0.005	0.0003		SW-846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW-846:7470A
	Nickel	0.0042	NE	0.028	0.02	0.0042	U	SW-846:6020
	Potassium	9.1	NE	NE	1	0.32		SW-846:6020
	Selenium	0.0013	0.05	NE	0.01	0.00066	J	SW-846:6020
	Silver	0.000039	NE	NE	0.0005	0.000039	U	SW-846:6020
	Sodium	81	NE	NE	1	0.19		SW-846:6020
Thallium	0.000014	0.002	NE	0.0001	0.000014	U	SW-846:6020	
Vanadium	0.0018	NE	NE	0.005	0.00058	JB	SW-846:6020	
Zinc	0.0091	NE	NE	0.1	0.0091	U	SW-846:6020	

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NE = Not Established

U = the analyte was analyzed for but not detected

Table-2 NMED DOE Oversight Bureau FFY 2017 Q-2 Chemical Waste Landfill Groundwater Quality Results: Detected Volatile Organic Compounds

Monitoring Well/ Sample Date	Analyte	Result (µg/L)	EPA MCL (µg/L)	CWL PCCP Limit (µg/L)	Laboratory Detection Limit (µg/L)	MDL (µg/L)	Laboratory Qualifier	Analytical Method
CWL-MW10 17-Jan-17	Trichloroethene	0.88	5	5	1	0.3	J	SW-846:8260B_25

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

Table-3 NMED DOE Oversight Bureau FFY 2017 Q-2 Chemical Waste Landfill Groundwater Quality Results: Method Detection Limits for Volatile Organic Compounds by Method SW-846:8260B_25

Analyte	MDL (µg/L)
Acetone	3
Benzene	0.3
Bromobenzene	0.3
Bromochloromethane	0.3
Bromodichloromethane	0.3
Bromoform	0.3
Bromomethane	0.3
Butanone[2-]	3
Butylbenzene[n-]	0.3
Butylbenzene[sec-]	0.3
Butylbenzene[tert-]	0.3
Carbon Disulfide	0.3
Carbon Tetrachloride	0.3
Chlorobenzene	0.3
Chlorodibromomethane	0.3
Chloroethane	0.3
Chloroform	0.3
Chlorohexane[1-]	0.3
Chloromethane	0.3
Chlorotoluene[2-]	0.3
Chlorotoluene[4-]	0.3
Dibromo-3-Chloropropane[1,2-]	0.4
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

Analyte	MDL (µg/L)
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
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