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July 20, 2018

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**Subject: Data Submittal for Groundwater Monitoring at Sandia National Laboratories/New Mexico Chemical Waste Landfill Conducted by the New Mexico Environment Department DOE Oversight Bureau for FFY 2018 Q-2**

Mr. Black:

This letter transmits the subject report as final. The report shows groundwater data results from Chemical Waste Landfill collected by the New Mexico Environment Department DOE Oversight Bureau during the second quarter of FFY 2018.

The enclosed monitoring results were provided to the U.S Department of Energy in draft form on June 21, 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](mailto: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 Chemical Waste Landfill Conducted by the New Mexico Environment Department DOE Oversight Bureau for FFY 2018 Q-2  
(2) Table-1 Total Target Analyte List Metals Results  
(3) Table-2 Detected Volatile Organic Compounds Results  
(4) Table-3 Method Detection Limits for Volatile Organic Compounds

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File: SGE42. Groundwater Monitoring. CWL. FFY 2018 Q-2

**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 2018 Q-2**

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**Final Report**

**7/20/2018**

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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 during the second quarter of Federal Fiscal Year 2018.

Acknowledgment:

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Disclaimer:

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

## **Introduction**

The New Mexico Environment Department (NMED) DOE Oversight Bureau (DOE-OB or Bureau) has compiled and assessed groundwater data collected during January 2018. 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) Groundwater Sampling and Analysis Plan (SAP). Samples were analyzed for total target analyte list (TAL) metals and volatile organic compounds (VOCs). 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 concentration limits for the hazardous constituents of concern listed in the CWL PCCP.

## **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 Chemical Waste Landfill Groundwater Concentration Limits for Hazardous Constituents of Concern (COC) in Table 1-2 of the SNL/NM Post-Closure Care Plan for the CWL, Permit Attachment 1, October 2009.

Under the current PCCP, SNL/NM is required to collect samples from CWL monitoring wells CWL-BW5, CWL-MW9, CWL-MW10 and CWL-MW11. Samples are analyzed for trichloroethene (TCE) and metals (chromium and nickel).

## **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 0.59 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 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**

Sandia National Laboratories/New Mexico (SNL/NM). "Annual Groundwater Monitoring Report Calendar Year 2016." Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), October 2009. "Chemical Waste Landfill Post-Closure Care Plan," Permit Attachment 1, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), October 2009. "Chemical Waste Landfill Post-Closure Care Plan," Permit Attachment 2, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), March 2017. "Chemical Waste Landfill Annual Post-Closure Care Report Calendar Year 2016," Sandia National Laboratories, Albuquerque, New Mexico.

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 Monitoring Results: Total Target Analyte List Metals plus Uranium**

**New Mexico Environment Department DOE Oversight Bureau**

**Sandia National Laboratories/New Mexico: Chemical Waste Landfill**

**January 2018**

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
<b>CWL-BW5</b> 15-Jan-18	Aluminum	0.011	NE	NE	0.1	0.0087	J	SW846:6020
	Antimony	0.000049	0.006	NE	0.001	0.000049	U	SW846:6020
	Arsenic	0.0016	0.01	NE	0.002	0.0016	U	SW846:6020
	Barium	0.056	2	NE	0.005	0.0016		SW846:6020
	Beryllium	0.000081	0.004	NE	0.0005	0.000081	U	SW846:6020
	Cadmium	0.000062	0.005	NE	0.002	0.000062	U	SW846:6020
	Calcium	120	NE	NE	1	0.077		SW846:6020
	Chromium	0.0014	0.10	0.050	0.01	0.00082	J	SW846:6020
	Cobalt	0.00028	NE	NE	0.005	0.00016	J	SW846:6020
	Copper	0.0016	NE	NE	0.02	0.0016	U	SW846:6020
	Iron	0.041	NE	NE	0.1	0.0047	J	SW846:6020
	Lead	0.000096	NE	NE	0.002	0.000096	U	SW846:6020
	Magnesium	28	NE	NE	0.1	0.012		SW846:6020
	Manganese	0.0067	NE	NE	0.005	0.00032		SW846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW846:7470A
	Nickel	0.0066	NE	0.028	0.02	0.00081	J	SW846:6020
	Potassium	6.6	NE	NE	1	0.11		SW846:6020
	Selenium	0.0021	0.05	NE	0.01	0.00018	J	SW846:6020
	Silver	0.00004	NE	NE	0.0005	0.000023	J	SW846:6020
	Sodium	90	NE	NE	1	0.18		SW846:6020
Thallium	0.000015	0.002	NE	0.0001	0.000015	U	SW846:6020	
Vanadium	0.002	NE	NE	0.005	0.00023	J	SW846:6020	
Zinc	0.074	NE	NE	0.1	0.0035	J	SW846:6020	

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).

NE = Not Established

U = the analyte was analyzed for but not detected

**Table-1**

**Groundwater Quality Monitoring Results: Total Target Analyte List Metals plus Uranium**

**New Mexico Environment Department DOE Oversight Bureau**

**Sandia National Laboratories/New Mexico: Chemical Waste Landfill**

**January 2018**

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
<b>CWL-MW9</b> 17-Jan-18	Aluminum	0.014	NE	NE	0.1	0.0087	J	SW846:6020
	Antimony	0.000049	0.006	NE	0.001	0.000049	U	SW846:6020
	Arsenic	0.0016	0.01	NE	0.002	0.0016	U	SW846:6020
	Barium	0.082	2	NE	0.005	0.0016		SW846:6020
	Beryllium	0.000081	0.004	NE	0.0005	0.000081	U	SW846:6020
	Cadmium	0.000062	0.005	NE	0.002	0.000062	U	SW846:6020
	Calcium	100	NE	NE	1	0.077		SW846:6020
	Chromium	0.0022	0.10	0.050	0.01	0.00082	J	SW846:6020
	Cobalt	0.00016	NE	NE	0.005	0.00016	U	SW846:6020
	Copper	0.0016	NE	NE	0.02	0.0016	U	SW846:6020
	Iron	0.038	NE	NE	0.1	0.0047	J	SW846:6020
	Lead	0.000096	NE	NE	0.002	0.000096	U	SW846:6020
	Magnesium	27	NE	NE	0.1	0.012		SW846:6020
	Manganese	0.039	NE	NE	0.005	0.00032		SW846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW846:7470A
	Nickel	0.0055	NE	0.028	0.02	0.00081	J	SW846:6020
	Potassium	8	NE	NE	1	0.11		SW846:6020
	Selenium	0.0023	0.05	NE	0.01	0.00018	J	SW846:6020
	Silver	0.00004	NE	NE	0.0005	0.000023	J	SW846:6020
	Sodium	74	NE	NE	1	0.18		SW846:6020
Thallium	0.00004	0.002	NE	0.0001	0.000015	J	SW846:6020	
Vanadium	0.0023	NE	NE	0.005	0.00023	J	SW846:6020	
Zinc	0.0076	NE	NE	0.1	0.0035	J	SW846:6020	

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**Table-1**

**Groundwater Quality Monitoring Results: Total Target Analyte List Metals plus Uranium**

**New Mexico Environment Department DOE Oversight Bureau**

**Sandia National Laboratories/New Mexico: Chemical Waste Landfill**

**January 2018**

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
<b>CWL-MW9</b> 17-Jan-18 (Duplicate)	Aluminum	0.017	NE	NE	0.1	0.0087	J	SW846:6020
	Antimony	0.00005	0.006	NE	0.001	0.000049	J	SW846:6020
	Arsenic	0.0016	0.01	NE	0.002	0.0016	U	SW846:6020
	Barium	0.08	2	NE	0.005	0.0016		SW846:6020
	Beryllium	0.000081	0.004	NE	0.0005	0.000081	U	SW846:6020
	Cadmium	0.000062	0.005	NE	0.002	0.000062	U	SW846:6020
	Calcium	100	NE	NE	1	0.077		SW846:6020
	Chromium	0.0016	0.10	0.050	0.01	0.00082	J	SW846:6020
	Cobalt	0.00016	NE	NE	0.005	0.00016	U	SW846:6020
	Copper	0.0016	NE	NE	0.02	0.0016	U	SW846:6020
	Iron	0.041	NE	NE	0.1	0.0047	J	SW846:6020
	Lead	0.000096	NE	NE	0.002	0.000096	U	SW846:6020
	Magnesium	27	NE	NE	0.1	0.012		SW846:6020
	Manganese	0.054	NE	NE	0.005	0.00032		SW846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW846:7470A
	Nickel	0.00081	NE	0.028	0.02	0.00081	U	SW846:6020
	Potassium	7.9	NE	NE	1	0.11		SW846:6020
	Selenium	0.002	0.05	NE	0.01	0.00018	J	SW846:6020
	Silver	0.00003	NE	NE	0.0005	0.000023	J	SW846:6020
	Sodium	73	NE	NE	1	0.18		SW846:6020
Thallium	0.00003	0.002	NE	0.0001	0.000015	J	SW846:6020	
Vanadium	0.0023	NE	NE	0.005	0.00023	J	SW846:6020	
Zinc	0.0069	NE	NE	0.1	0.0035	J	SW846:6020	

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**Table-1**

**Groundwater Quality Monitoring Results: Total Target Analyte List Metals plus Uranium**

**New Mexico Environment Department DOE Oversight Bureau**

**Sandia National Laboratories/New Mexico: Chemical Waste Landfill**

**January 2018**

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
<b>CWL-MW10</b> 22-Jan-18	Aluminum	0.016	NE	NE	0.1	0.0087	J	SW846:6020
	Antimony	0.000049	0.006	NE	0.001	0.000049	U	SW846:6020
	Arsenic	0.0016	0.01	NE	0.002	0.0016	U	SW846:6020
	Barium	0.54	2	NE	0.005	0.0016		SW846:6020
	Beryllium	0.000081	0.004	NE	0.0005	0.000081	U	SW846:6020
	Cadmium	0.000062	0.005	NE	0.002	0.000062	U	SW846:6020
	Calcium	100	NE	NE	1	0.077		SW846:6020
	Chromium	0.00082	0.10	0.050	0.01	0.00082	U	SW846:6020
	Cobalt	0.0002	NE	NE	0.005	0.00016	J	SW846:6020
	Copper	0.0016	NE	NE	0.02	0.0016	U	SW846:6020
	Iron	0.78	NE	NE	0.1	0.0047		SW846:6020
	Lead	0.000096	NE	NE	0.002	0.000096	U	SW846:6020
	Magnesium	28	NE	NE	0.1	0.012		SW846:6020
	Manganese	0.7	NE	NE	0.005	0.00032		SW846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW846:7470A
	Nickel	0.00081	NE	0.028	0.02	0.00081	U	SW846:6020
	Potassium	8	NE	NE	1	0.11		SW846:6020
	Selenium	0.0004	0.05	NE	0.01	0.00018	J	SW846:6020
	Silver	0.00004	NE	NE	0.0005	0.000023	J	SW846:6020
	Sodium	75	NE	NE	1	0.18		SW846:6020
Thallium	0.000015	0.002	NE	0.0001	0.000015	U	SW846:6020	
Vanadium	0.00027	NE	NE	0.005	0.00023	J	SW846:6020	
Zinc	0.012	NE	NE	0.1	0.0035	J	SW846:6020	

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).

NE = Not Established

U = the analyte was analyzed for but not detected

**Table-1**

**Groundwater Quality Monitoring Results: Total Target Analyte List Metals plus Uranium**

**New Mexico Environment Department DOE Oversight Bureau**

**Sandia National Laboratories/New Mexico: Chemical Waste Landfill**

**January 2018**

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
<b>CWL-MW11</b> 15-Jan-18	Aluminum	0.0096	NE	NE	0.1	0.0087	J	SW846:6020
	Antimony	0.000049	0.006	NE	0.001	0.000049	U	SW846:6020
	Arsenic	0.0016	0.01	NE	0.002	0.0016	U	SW846:6020
	Barium	0.065	2	NE	0.005	0.0016		SW846:6020
	Beryllium	0.000081	0.004	NE	0.0005	0.000081	U	SW846:6020
	Cadmium	0.000062	0.005	NE	0.002	0.000062	U	SW846:6020
	Calcium	110	NE	NE	1	0.077		SW846:6020
	Chromium	0.0019	0.10	0.050	0.01	0.00082	J	SW846:6020
	Cobalt	0.00016	NE	NE	0.005	0.00016	U	SW846:6020
	Copper	0.0016	NE	NE	0.02	0.0016	U	SW846:6020
	Iron	0.0064	NE	NE	0.1	0.0047	J	SW846:6020
	Lead	0.000096	NE	NE	0.002	0.000096	U	SW846:6020
	Magnesium	29	NE	NE	0.1	0.012		SW846:6020
	Manganese	0.0028	NE	NE	0.005	0.00032	J	SW846:6020
	Mercury	0.00006	0.002	NE	0.0001	0.00006	U	SW846:7470A
	Nickel	0.00081	NE	0.028	0.02	0.00081	U	SW846:6020
	Potassium	9.3	NE	NE	1	0.11		SW846:6020
	Selenium	0.0018	0.05	NE	0.01	0.00018	J	SW846:6020
	Silver	0.00004	NE	NE	0.0005	0.000023	J	SW846:6020
	Sodium	78	NE	NE	1	0.18		SW846:6020
Thallium	0.000015	0.002	NE	0.0001	0.000015	U	SW846:6020	
Vanadium	0.0022	NE	NE	0.005	0.00023	J	SW846:6020	
Zinc	0.004	NE	NE	0.1	0.0035	J	SW846:6020	

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NE = Not Established

U = the analyte was analyzed for but not detected

**Table-2**

**Groundwater Quality Monitoring Results: Detected Volatile Organic Compounds**

**New Mexico Environment Department DOE Oversight Bureau**

**Sandia National Laboratories/New Mexico: Chemical Waste Landfill**

**January 2018**

<b>Monitoring Well/ Sample Date</b>	<b>Analyte</b>	<b>Result (µg/L)</b>	<b>EPA MCL (µg/L)</b>	<b>CWL PCCP Limit (µg/L)</b>	<b>Laboratory Detection Limit (µg/L)</b>	<b>MDL (µg/L)</b>	<b>Laboratory Qualifier</b>	<b>Analytical Method</b>
<b>CWL-MW10</b> 22-Jan-18	Trichloroethene	0.59	5	5	1	0.31	J	SW846:8260B-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**

**Groundwater Quality Monitoring Results: Method Detection Limits for Volatile Organic Compounds by Method SW846:8260B**

**New Mexico Environment Department DOE Oversight Bureau**

**Sandia National Laboratories/New Mexico: Chemical Waste Landfill**

**January 2018**

Analyte	MDL (µg/L)
Acetone	3
Benzene	0.32
Bromobenzene	0.3
Bromochloromethane	0.32
Bromodichloromethane	0.35
Bromoform	0.34
Bromomethane	0.3
Butanone[2-]	3
Butylbenzene[n-]	0.3
Butylbenzene[sec-]	0.3
Butylbenzene[tert-]	0.3
Carbon Disulfide	0.3
Carbon Tetrachloride	0.32
Chlorobenzene	0.3
Chlorodibromomethane	0.35
Chloroethane	0.32
Chloroform	0.3
Chlorohexane[1-]	0.3
Chloromethane	0.3
Chlorotoluene[2-]	0.3
Chlorotoluene[4-]	0.3
Dibromo-3-Chloropropane[1,2-]	0.66
Dibromoethane[1,2-]	0.3
Dibromomethane	0.31
Dichlorobenzene[1,2-]	0.3
Dichlorobenzene[1,3-]	0.3
Dichlorobenzene[1,4-]	0.3
Dichlorodifluoromethane	0.32
Dichloroethane[1,1-]	0.3
Dichloroethane[1,2-]	0.3
Dichloroethene[1,1-]	0.3
Dichloroethene[cis-1,2-]	0.33
Dichloroethene[trans-1,2-]	0.33
Dichloropropane[1,2-]	0.3
Dichloropropane[1,3-]	0.3

Analyte	MDL (µg/L)
Dichloropropane[2,2-]	0.33
Dichloropropene[1,1-]	0.3
Dichloropropene[cis-1,3-]	0.33
Dichloropropene[trans-1,3-]	0.33
Ethylbenzene	0.31
Hexachlorobutadiene	0.3
Hexanone[2-]	3
Iodomethane	0.3
Isopropylbenzene	0.3
Isopropyltoluene[4-]	0.3
Methyl tert-Butyl Ether	0.31
Methyl-2-pentanone[4-]	3
Methylene Chloride	0.3
Naphthalene	0.3
Propylbenzene[1-]	0.3
Styrene	0.32
Tetrachloroethane[1,1,1,2-]	0.3
Tetrachloroethane[1,1,2,2-]	0.3
Tetrachloroethene	0.3
Toluene	0.31
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	0.31
Trichlorofluoromethane	0.31
Trichloropropane[1,2,3-]	0.3
Trimethylbenzene[1,2,4-]	0.3
Trimethylbenzene[1,3,5-]	0.3
Vinyl acetate	0.78
Vinyl Chloride	0.31
Xylene[1,2-]	0.31
Xylene[1,3-]+Xylene[1,4-]	0.31