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Groundwater Monitoring at Sandia National Laboratories/New Mexico SWMU-49 and SWMU-116 Conducted by NMED DOE OB for FFY 2011 Q-2

The New Mexico Environment Department (NMED) DOE Oversight Bureau (Bureau) has compiled and assessed groundwater data collected during March 2011. The Bureau collected groundwater samples from monitoring well CYN-MW5 located approximately 1,350 feet to the north and downslope of Solid Waste Management Unit (SWMU) 49 (Figure 1). The Bureau also collected groundwater samples from monitoring well CTF-MW1 located approximately 500 feet to the south and downslope of SWMU-116 (Figure 2). Split samples were collected using standard Sandia National Laboratories/New Mexico (SNL/NM) sampling procedures and equipment. The samples were submitted for analysis to an independent analytical laboratory for Target Analyte List (TAL) metals plus uranium, anions, nitrate plus nitrite as nitrogen (NPN), perchlorate, cyanide, volatile organic compounds (VOCs), high explosives (HE), gamma emitting isotopes, gross alpha and beta, radium 226 and 228, and isotopic uranium. No anomalies were observed in the data reported by the laboratory.

Data Assessment

All groundwater samples were collected and analyzed in accordance with U.S. Environmental Protection Agency (EPA) protocols. Data results are compared to applicable Maximum Contaminant Levels (MCLs) from the EPA National Primary Drinking Water Regulations (40 CFR 141).

Currently there is no U.S. EPA National Primary Drinking Water MCL or State of New Mexico drinking water standard for perchlorate. However, perchlorate results are compared to the *Compliance Order on Consent (COOC) Pursuant to the New Mexico Hazardous Waste Act 74-4-10: Sandia National Laboratories Consent Order*, New Mexico Environment Department, April 19, 2004.

Results

Analytical results for Target Analyte List Metals (TAL) metals are presented in Table-1. Samples were analyzed for total metals plus uranium and total mercury. No metal parameters were detected above established regulatory standards.

Analytical results for inorganic compounds are listed in Table-2. Samples were analyzed for anions (bromide, chloride, fluoride and sulfate), nitrate plus nitrite as nitrogen, perchlorate and total cyanide. No samples exceeded their associated MCL or exceeded the NMED COOC perchlorate screening level of 4 µg/L.

Analytical results for high explosives (HE) are listed in Table-3. No HE compounds were detected above the method detection limits (MDLs).

Analytical results for radionuclide are listed in Table-4. Samples were analyzed for gross alpha and beta, gamma emitting isotopes, radium 226 and 228, and isotopic uranium. No isotopes were detected above EPA MCLs.

Analytical results for VOCs detected above the MDLs are listed in Table-5. No VOCs were detected above the established drinking water standards.

Response

Questions or comments should be addressed to Chris Armijo by phone at (505) 383-2070, by e-mail at chris.armijo1@state.nm.us, or to the address in the letterhead.

Enclosure:
(1) Table-1 Total TAL Metals plus Uranium Results
(2) Table-2 Anions, Nitrate-Nitrite as Nitrogen, Perchlorate and Total Cyanide Results
(3) Table-3 High Explosives Compounds Results
(4) Table-4 Radionuclides Results
(5) Table-5 Detected Volatile Organic Compounds
(6) Figure 1 Location of Groundwater Monitoring Well CYN-MW5
(7) Figure 2 Location of Groundwater Monitoring Well CTF-MW1

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Table-1 NMED DOE OB FFY 2011 Q-2 SWMU 49 and SWMU 116 Groundwater Quality Results: Total TAL Metals plus Uranium

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	Quantitation Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
CTF-MW1 7-Mar-11 Total	Aluminum	0.04	NE	0.2	0.04	U	SW-846:6010B
	Antimony	0.00049	0.006	0.003	0.00023	J	SW-846:6020
	Arsenic	0.0027	0.01	0.001	0.00034		SW-846:6020
	Barium	0.051	2	0.001	0.00026		SW-846:6020
	Beryllium	0.0004	0.004	0.001	0.0004	U	SW-846:6010B
	Cadmium	0.000091	0.005	0.001	0.00009	J	SW-846:6020
	Calcium	87	NE	2	0.012		SW-846:6010B
	Chromium	0.0005	0.1	0.001	0.00023	J	SW-846:6020
	Cobalt	0.00037	NE	0.001	0.00005	J	SW-846:6020
	Copper	0.0016	1.3	0.001	0.00007		SW-846:6020
	Iron	0.036	NE	0.05	0.036	U	SW-846:6010B
	Lead	0.00011	0.015	0.001	0.00006	J	SW-846:6020
	Magnesium	18	NE	2	0.04		SW-846:6010B
	Manganese	0.002	NE	0.005	0.00007	J	SW-846:6020
	Mercury	0.000089	0.002	0.0005	0.000089	U	SW-846:7040
	Nickel	0.0031	NE	0.001	0.00017		SW-846:6020
	Potassium	1.8	NE	2	0.12	J	SW-846:6010B
	Selenium	0.0031	0.05	0.002	0.0012		SW-846:6020
	Silver	0.000097	NE	0.001	0.00009	J	SW-846:6020
	Sodium	29	NE	2	0.65		SW-846:6010B
	Thallium	0.00012	0.002	0.001	0.00012	U	SW-846:6020
	Uranium	0.011	0.03	0.001	0.00005		SW-846:6020
	Vanadium	0.0014	NE	0.001	0.00019		SW-846:6020
	Zinc	0.0048	NE	0.01	0.0033	J	SW-846:6020

J = Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL).

NE = Not Established

U = Analyte NOT DETECTED at or above the reporting limit or MDL, if MDL is specified

Table-1 NMED DOE OB FFY 2011 Q-2 SWMU 49 and SWMU 116 Groundwater Quality Results: Total TAL Metals plus Uranium

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	Quantitation Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
CYN-MW5 10-Mar-11 Total	Aluminum	0.072	NE	0.2	0.04	J	SW-846:6010B
	Antimony	0.00023	0.006	0.003	0.00023	U	SW-846:6020
	Arsenic	0.0056	0.01	0.001	0.00034		SW-846:6020
	Barium	0.2	2	0.001	0.00026		SW-846:6020
	Beryllium	0.0004	0.004	0.001	0.0004	U	SW-846:6010B
	Cadmium	0.00009	0.005	0.001	0.00009	U	SW-846:6020
	Calcium	54	NE	2	0.012		SW-846:6010B
	Chromium	0.00042	0.1	0.001	0.00023	J	SW-846:6020
	Cobalt	0.000084	NE	0.001	0.00005	J	SW-846:6020
	Copper	0.0005	1.3	0.001	0.00007	J	SW-846:6020
	Iron	0.036	NE	0.05	0.036	U	SW-846:6010B
	Lead	0.00006	0.015	0.001	0.00006	U	SW-846:6020
	Magnesium	10	NE	2	0.04		SW-846:6010B
	Manganese	0.001	NE	0.005	0.00007	J	SW-846:6020
	Mercury	0.000089	0.002	0.0005	0.000089	U	SW-846:7040
	Nickel	0.0029	NE	0.001	0.00017		SW-846:6020
	Potassium	2.4	NE	2	0.12		SW-846:6010B
	Selenium	0.0012	0.05	0.002	0.0012	U	SW-846:6020
	Silver	0.00009	NE	0.001	0.00009	U	SW-846:6020
	Sodium	16	NE	2	0.65		SW-846:6010B
	Thallium	0.00012	0.002	0.001	0.00012	U	SW-846:6020
	Uranium	0.00086	0.03	0.001	0.00005	J	SW-846:6020
	Vanadium	0.0012	NE	0.001	0.00019		SW-846:6020
	Zinc	0.0033	NE	0.01	0.0033	U	SW-846:6020

J = Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL).

NE = Not Established

U = Analyte NOT DETECTED at or above the reporting limit or MDL, if MDL is specified

Table-2 NMED DOE OB FFY 2011 Q-2 SWMU 49 and SWMU 116 Groundwater Quality Results: Anions, Nitrate-Nirtite as Nitrogen, Perchlorate and Total Cyanide

Monitoring Well/ Sample Date	Analyte	Result	EPA MCL	Quantitation Limit	MDL	Units	Laboratory Qualifier	Analytical Method
CTF-MW1 7-Mar-11	Bromide	0.63	NE	0.5	0.077	mg/L		EPA:300
	Chloride	46	NE	2	0.056	mg/L		EPA:300
	Cyanide, Total	0.0025	0.2	0.01	0.002	mg/L	Ja	SW-846:9012B
	Fluoride	1.3	4	0.4	0.026	mg/L		EPA:300
	Nitrate-Nitrite as N	7.6	10	2	0.27	mg/L		EPA:300.0
	Perchlorate	0.47	NE	2	0.47	ug/L	U	EPA:314.0
	Sulfate	86	NE	2	0.091	mg/L		EPA:300
CYN-MW5 10-Mar-11	Bromide	0.18	NE	0.5	0.077	mg/L	J	EPA:300
	Chloride	18	NE	2	0.056	mg/L		EPA:300
	Cyanide, Total	0.0031	0.2	0.01	0.002	mg/L	Ja, B	SW-846:9012B
	Fluoride	0.32	4	0.4	0.026	mg/L	J	EPA:300
	Nitrate-Nitrite as N	1.8	10	2	0.27	mg/L	RL1, J	EPA:300.0
	Perchlorate	0.47	NE	2	0.47	ug/L	U	EPA:314.0
	Sulfate	25	NE	2	0.091	mg/L		EPA:300

B = Compound was found in the blank and sample.

J = Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL).

Ja = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

NE = Not Established

RL1 = Reporting limit raised due to sample matrix effects.

U = Analyte NOT DETECTED at or above the reporting limit or MDL, if MDL is specified

Table-3 NMED DOE OB FFY 2011 Q-2 SWMU 49 and SWMU 116 Groundwater Quality Results: High Explosives

Monitoring Well/ Sample Date	Analyte	Result (µg/L)	Quantitation Limit (µg/L)	MDL (µg/L)	Laboratory Qualifier	Analytical Method
CTF-MW1 7-Mar-11	1,3,5-trinitrobenzene	0.02	0.12	0.02	U	SW-846:8321A(M)
	1,3-dichlorobenzene	0.016	0.12	0.016	U	SW-846:8321A(M)
	2,4,6-Trinitrotoluene	0.026	0.12	0.026	U	SW-846:8321A(M)
	2,4-Dinitrotoluene	0.022	0.12	0.022	U	SW-846:8321A(M)
	2,6-Dinitrotoluene	0.026	0.12	0.026	U	SW-846:8321A(M)
	2-Amino-4,6-dinitrotoluene	0.025	0.12	0.025	U	SW-846:8321A(M)
	2-nitrotoluene	0.026	0.12	0.026	U	SW-846:8321A(M)
	3-Nitrotoluene	0.029	0.12	0.029	U	SW-846:8321A(M)
	4-Amino-2,6-dinitrotoluene	0.022	0.12	0.022	^,U	SW-846:8321A(M)
	4-Methylnitrobenzene	0.03	0.12	0.03	U	SW-846:8321A(M)
	HMX	0.022	0.12	0.022	U	SW-846:8321A(M)
	Nitrobenzene	0.039	0.12	0.039	U	SW-846:8321A(M)
	RDX	0.025	0.12	0.025	U	SW-846:8321A(M)
	Tetryl	0.025	0.12	0.025	U	SW-846:8321A(M)
CYN-MW5 10-Mar-11	1,3,5-trinitrobenzene	0.02	0.11	0.02	U	SW-846:8321A(M)
	1,3-dichlorobenzene	0.016	0.11	0.016	U	SW-846:8321A(M)
	2,4,6-Trinitrotoluene	0.025	0.11	0.025	U	SW-846:8321A(M)
	2,4-Dinitrotoluene	0.022	0.11	0.022	U	SW-846:8321A(M)
	2,6-Dinitrotoluene	0.025	0.11	0.025	U	SW-846:8321A(M)
	2-Amino-4,6-dinitrotoluene	0.024	0.11	0.024	U	SW-846:8321A(M)
	2-nitrotoluene	0.025	0.11	0.025	U	SW-846:8321A(M)
	3-Nitrotoluene	0.029	0.11	0.029	U	SW-846:8321A(M)
	4-Amino-2,6-dinitrotoluene	0.022	0.11	0.022	U	SW-846:8321A(M)
	4-Methylnitrobenzene	0.03	0.11	0.03	U	SW-846:8321A(M)
	HMX	0.022	0.11	0.022	U	SW-846:8321A(M)
	Nitrobenzene	0.038	0.11	0.038	U	SW-846:8321A(M)
	RDX	0.024	0.11	0.024	U	SW-846:8321A(M)
	Tetryl	0.024	0.11	0.024	U	SW-846:8321A(M)

^ = ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC exceeds the control limits.

U = Analyte NOT DETECTED at or above the reporting limit or MDL, if MDL is specified

Table-4 NMED DOE OB FFY 2011 Q-2 SWMU 49 and SWMU 116 Groundwater Quality Results: Radionuclides

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)			EPA MCL (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
CYN-MW5 10-Mar-11	Actinium-228	-1	±	27	NE	49	U	EPA:901.1
	Americium-241	4	±	11	NE	19	U	EPA:901.1
	Bismuth-212	-50	±	1700	NE	200	U	EPA:901.1
	Bismuth-214	-7	±	28	NE	29	U	EPA:901.1
	Cesium-134	-1.4	±	6.1	NE	11	U	EPA:901.1
	Cesium-137	0.5	±	6.5	NE	12	U	EPA:901.1
	Cobalt-60	5.1	±	4.4	NE	5.5	U	EPA:901.1
	Gross alpha	2.6	±	1.8	15	2.5		EPA:900
	Gross beta	2.3	±	1	4 mRem/yr	1.4		EPA:900
	Lead-212	14	±	14	NE	21	U	EPA:901.1
	Lead-214	3	±	13	NE	26	U	EPA:901.1
	Potassium-40	-60	±	280	NE	220	U	EPA:901.1
	Protactinium-234M	500	±	1100	NE	2000	U	EPA:901.1
	Radium-226	0.54	±	0.18	5	0.15		EPA:903.0
	Radium-228	1.31	±	0.31	5	0.33		EPA:904.0
	Sodium-22	-1.3	±	7.2	NE	13	U	EPA:901.1
	Thallium-208	-4	±	20	NE	15	U	EPA:901.1
	Thorium-234	4	±	130	NE	240	U	EPA:901.1
	Uranium-234	1.78	±	0.45	30 µg/L	0.16		HASL-300:ISOU
	Uranium-235	-5	±	70	30 µg/L	46	U	EPA:901.1
	Uranium-235/236	0.013	±	0.065	30 µg/L	0.17	U	HASL-300:ISOU
	Uranium-238	0.47	±	0.23	30 µg/L	0.15		HASL-300:ISOU

NE = Not Established

U = Result is less than the sample detection limit.

Table 5- NMED DOE OB FFY 2011 Q-2 SWMU 49 and SWMU 116 Groundwater Quality Results: Detected Volatile Organic Compounds

Monitoring Well/ Sample Date	Analyte	Result (µg/L)	EPA MCL (µg/L)	Quantitation Limit (µg/L)	MDL (µg/L)	Laboratory Qualifier	Analytical Method
CTF-MW1 7-Mar-11	Chloromethane	0.38	NE	5	0.2	J	SW-846:8260B

J = Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL).

NE = Not Established

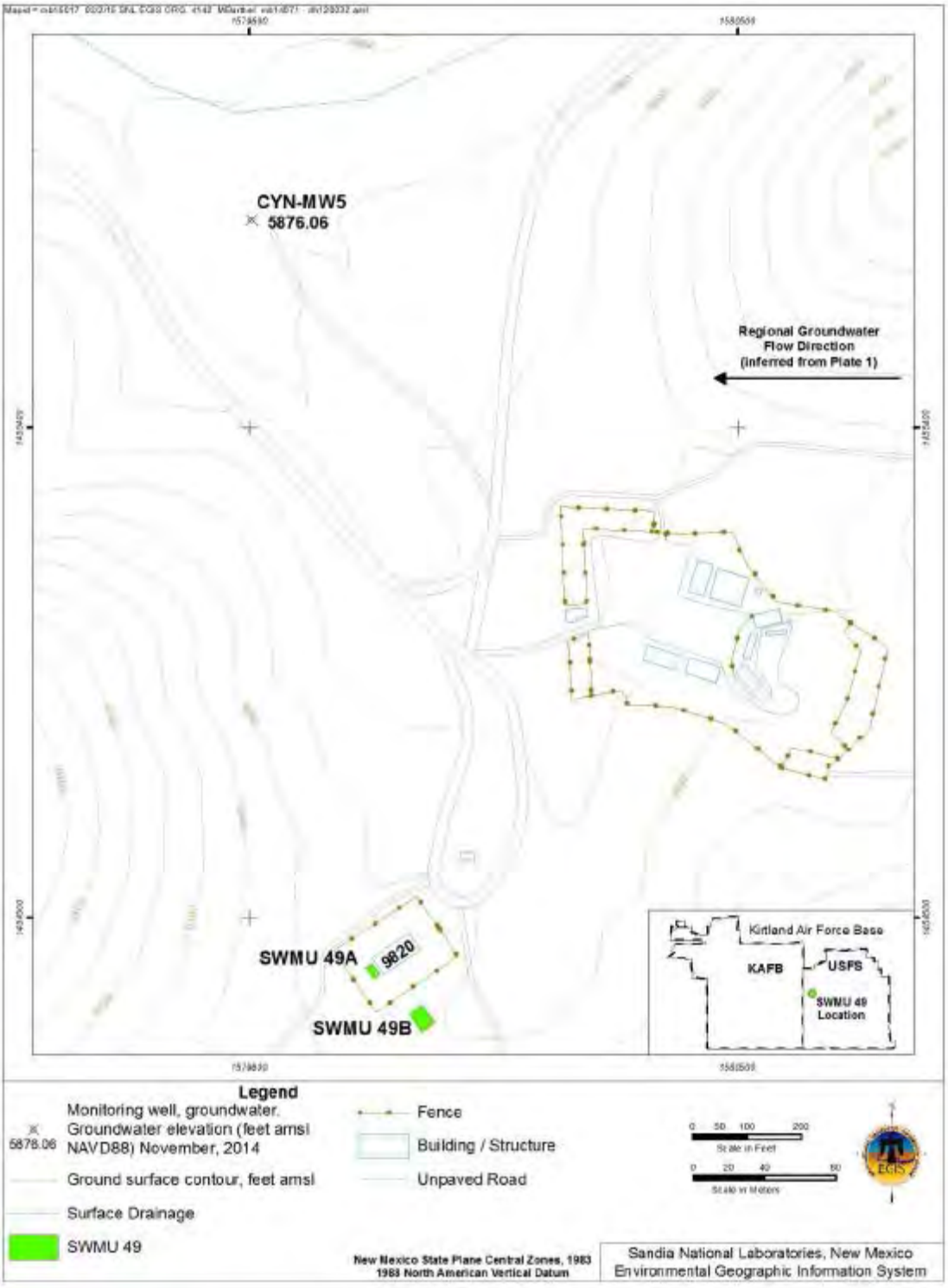

Figure 1. Location of Groundwater Monitoring Well CYN-MW5

Figure 2. Location of Groundwater Monitoring Well CTF-MW1