

DOE Oversight Bureau, New Mexico Environment Department

**Groundwater Monitoring at
Sandia National Laboratories/New Mexico**

**Conducted by the
New Mexico Environment Department DOE Oversight Bureau
for FFY 2013 Q-4**

**Prepared by Chris Armijo, Geoscientist
Sandia Oversight Section
P.O. Box 5400 MS 1396
Albuquerque, NM 87185-5400
(505) 845-5823
chris.armijo1@state.nm.us**

Final Report

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The purpose of this communication is to transmit groundwater data collected by the New Mexico Environment Department DOE Oversight Bureau from Solid Waste Management Unit (SWMU) 68 groundwater monitoring well OBS-MW1 during fourth quarter FFY 2013.

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Introductory remarks

The New Mexico Environment Department (NMED) DOE Oversight Bureau (Bureau) has compiled and assessed groundwater data collected during July 2013. The Bureau collected groundwater samples from Solid Waste Management Unit (SWMU) 68 Old Burn Site (OBS) groundwater monitoring well OBS-MW1. Split samples were collected using standard Sandia sampling procedures and equipment. Bureau samples were submitted to an independent analytical laboratory where they were analyzed for total metals, anions, perchlorate, nitrate-nitrite, total cyanide, high explosive compounds, volatile and semi-volatile organic compounds, gross alpha and beta, gamma-emitting isotopes, and isotopic uranium. No samples exceeded associated U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) during this sampling event.

Data Assessment

All groundwater samples were collected and analyzed in accordance with 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. 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 total target analyte list (TAL) metals plus uranium are listed in Table-1. All metal concentrations were below established MCLs.

Analytical results for major anions (as bromide, chloride, fluoride, and sulfate), nitrate-nitrite, perchlorate and total cyanide are listed in Table-2. All analytes were below established MCLs. Perchlorate was not detected above the laboratory method detection limit (MDL).

Analytical results for high explosives (HE) compounds are listed in Table-3. No HE compounds were detected above their associated MDLs.

Analytical results for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) are presented in Table-4 and Table-5, respectively. No compounds were detected above the laboratory MDL.

Analytical results for radiochemistry samples are listed in Table-6. Samples were analyzed for gross alpha, gross beta, gamma emitting isotopes and isotopic uranium. No isotopes were detected above EPA MCLs.

Conclusion

Groundwater samples were collected from monitoring well OBS-MW1 during this sampling event at SWMU-68. Analytical parameters included TAL metals plus uranium, major anions, nitrate-nitrite as nitrogen, perchlorate, total cyanide, HE compounds, VOCs, SVOCs, gross alpha and beta activity, radionuclides by gamma spectroscopy, and isotopic uranium. All concentrations were either non-detects or below established MCLs.

References

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

New Mexico Environment Department, Compliance Order on Consent (COOC) Pursuant to the New Mexico Hazardous Waste Act 74-4-10: Sandia National Laboratories Consent Order, April 19, 2004.

Table-1 NMED DOE OB FFY 2013 Q-4 SWMU 68 Groundwater Quality Results: Total TAL Metals + U

Monitoring Well/ Sample Date	Analyte	Result (mg/L)	EPA MCL (mg/L)	Quantitation Limit (mg/L)	MDL (mg/L)	Laboratory Qualifier	Analytical Method
OBS-MW1 9-Jul-13	Aluminum	0.045	NE	0.05	0.025	J	SW-846:6020
	Antimony	0.0002	0.006	0.002	0.0002	U	SW-846:6020
	Arsenic	0.001	0.01	0.002	0.001	U	SW-846:6020
	Barium	0.019	2	0.001	0.0005		SW-846:6020
	Beryllium	0.0001	0.004	0.001	0.0001	U	SW-846:6020
	Cadmium	0.0005	0.005	0.001	0.0005	U	SW-846:6020
	Calcium	77	NE	0.05	0.03		SW-846:6020
	Chromium	0.0017	0.1	0.002	0.001	J	SW-846:6020
	Chromium, hexavalent	0.002	0.1	0.01	0.002	U,H	SW-846:7196A
	Cobalt	0.0006	NE	0.001	0.0006	U	SW-846:6020
	Copper	0.001	1.3	0.002	0.001	U	SW-846:6020
	Iron	0.025	NE	0.05	0.025	U	SW-846:6020
	Lead	0.0006	0.015	0.001	0.0006	U	SW-846:6020
	Magnesium	16	NE	0.05	0.025		SW-846:6020
	Manganese	0.0072	NE	0.001	0.0004		SW-846:6020
	Mercury	0.0001	0.002	0.0002	0.0001	U	SW-846:7470A
	Nickel	0.00012	NE	0.002	0.0001	J,B	SW-846:6020
	Potassium	1.7	NE	0.05	0.025		SW-846:6020
	Selenium	0.0037	0.05	0.002	0.001		SW-846:6020
	Silver	0.0003	NE	0.001	0.0003	U	SW-846:6020
	Sodium	22	NE	0.05	0.025		SW-846:6020
	Thallium	0.0005	0.002	0.001	0.0005	U	SW-846:6020
	Tin	0.005	NE	0.02	0.005	U	SW-846:6010B
	Uranium	0.0095	0.03	0.001	0.0002		SW-846:6020
Vanadium	0.003	NE	0.01	0.003	U	SW-846:6020	
Zinc	0.004	NE	0.005	0.004	U	SW-846:6020	

B = Compound was found in the blank and sample.

H = Sample was prepped or analyzed beyond the specified holding time

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

NE = Not Established

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

Table-2 NMED DOE OB FFY 2013 Q-4 SWMU 68 Groundwater Quality Results: Anions, Nitrate, Nitrite, Perchlorate and Total Cyanide

Monitoring Well/ Sample Date	Analyte	Result	EPA MCL	Quantitation Limit	MDL	Units	Laboratory Qualifier	Analytical Method
OBS-MW1 9-Jul-13	Bromide	0.36	NE	0.5	0.088	mg/L	J	EPA:300.0
	Chloride	26	NE	2	0.074	mg/L	D	EPA:300.0
	Cyanide, Total	2	200	10	1.5	ug/L	J	SW-846:9012A
	Fluoride	2	4	0.5	0.059	mg/L		EPA:300.0
	Nitrate	1.8	10	0.05	0.022	mg/L		EPA:300.0
	Nitrite as N	0.016	1	0.05	0.016	mg/L	U	EPA:300.0
	Perchlorate	0.34	NE	4	0.34	ug/L	U	EPA:314.0
	Sulfate	86	NE	2	0.098	mg/L	D	EPA:300.0

D = Dilution

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

NE = Not Established

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

Table-3 NMED DOE OB FFY 2013 Q-4 SWMU 68 Groundwater Quality Results: High Explosives

Monitoring Well/ Sample Date	Analyte	Result (µg/L)	Quantitation Limit (µg/L)	MDL (µg/L)	Laboratory Qualifier	Analytical Method
OBS-MW1 9-Jul-13	1,3,5-trinitrobenzene	0.018	0.23	0.018	U	SW-846:8321A
	1,3-Dinitrobenzene	0.02	0.23	0.02	U	SW-846:8321A
	2,4,6-Trinitrotoluene	0.012	0.23	0.012	U	SW-846:8321A
	2,4-Dinitrotoluene	0.021	0.23	0.021	U	SW-846:8321A
	2,6-Dinitrotoluene	0.016	0.23	0.016	U	SW-846:8321A
	2-Amino-4,6-dinitrotoluene	0.029	0.23	0.029	U	SW-846:8321A
	4-Amino-2,6-dinitrotoluene	0.018	0.23	0.018	U	SW-846:8321A
	HMX	0.054	0.23	0.054	U	SW-846:8321A
	m-Nitrotoluene	0.026	0.23	0.026	U	SW-846:8321A
	Nitrobenzene	0.014	0.23	0.014	U	SW-846:8321A
	o-Nitrotoluene	0.019	0.23	0.019	U	SW-846:8321A
	p-Nitrotoluene	0.026	0.23	0.026	U	SW-846:8321A
	RDX	0.022	0.23	0.022	U	SW-846:8321A
	Tetryl	0.02	0.23	0.02	U	SW-846:8321A

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

Table-4 NMED DOE OB FFY 2013 Q-4 SWMU 68 Groundwater Quality Results: Volatile Organic Compounds

Monitoring Well/ Sample Date	Analyte	Result (µg/L)	Quantitation Limit (µg/L)	MDL (µg/L)	Laboratory Qualifier	Analytical Method
OBS-MW1 9-Jul-13	4-Methyl-2-pentanone (MIBK)	0.18	2	0.18	U,H	SW-846:8260B
	Acetone	2.1	10	2.1	U,H	SW-846:8260B
	Benzene	0.13	1	0.13	U,H	SW-846:8260B
	Bromodichloromethane	0.14	1	0.14	U,H	SW-846:8260B
	Bromoform	0.1	1	0.1	U,H	SW-846:8260B
	Bromomethane	0.29	1	0.29	U,H	SW-846:8260B
	Butanone[2-]	0.35	2	0.35	U,H	SW-846:8260B
	Carbon Disulfide	0.16	2	0.16	U,H	SW-846:8260B
	Carbon Tetrachloride	0.15	1	0.15	U,H	SW-846:8260B
	Chlorobenzene	0.12	1	0.12	U,H	SW-846:8260B
	Chloroethane	0.34	1	0.34	U,H	SW-846:8260B
	Chloroform	0.12	1	0.12	U,H	SW-846:8260B
	Chloromethane	0.25	1	0.25	U,H	SW-846:8260B
	Dibromochloromethane	0.13	1	0.13	U,H	SW-846:8260B
	Dichloroethane[1,1,-]	0.1	1	0.1	U,H	SW-846:8260B
	Dichloroethane[1,2,-]	0.22	1	0.22	U,H	SW-846:8260B
	Dichloroethene[1,1,-]	0.14	1	0.14	U,H	SW-846:8260B
	Dichloroethene[cis-1,2,-]	0.1	1	0.1	U,H	SW-846:8260B
	Dichloroethene[trans-1,2,-]	0.11	1	0.11	U,H	SW-846:8260B
	Dichloropropane[1,2,-]	0.15	1	0.15	U,H	SW-846:8260B
	Dichloropropene[cis-1,3,-]	0.22	1	0.22	U,H	SW-846:8260B
	Dichloropropene[trans-1,3,-]	0.08	1	0.08	U,H	SW-846:8260B
	Ethylbenzene	0.1	1	0.1	U,H	SW-846:8260B
	Hexanone[2-]	0.17	2	0.17	U,H	SW-846:8260B
	Methylene Chloride	0.35	1	0.35	U,H	SW-846:8260B
	Styrene	0.15	1	0.15	U,H	SW-846:8260B
	Tetrachloroethane[1,1,2,2,-]	0.09	1	0.09	U,H	SW-846:8260B
	Tetrachloroethene	0.1	1	0.1	U,H	SW-846:8260B
	Toluene	0.25	1	0.25	U,H	SW-846:8260B
	Trichloroethane[1,1,1,-]	0.19	1	0.19	U,H	SW-846:8260B
	Trichloroethane[1,1,2,-]	0.31	1	0.31	U,H	SW-846:8260B
	Trichloroethene	0.13	1	0.13	U,H	SW-846:8260B
Vinyl acetate	0.21	2	0.21	U,H	SW-846:8260B	
Vinyl Chloride	0.22	1	0.22	U,H	SW-846:8260B	
Xylenes, Total	0.18	1	0.18	U,H	SW-846:8260B	

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

Table-5 NMED DOE OB FFY 2013 Q-4 SWMU 68 Groundwater Quality Results: Semi-Volatile Organic Compounds

Monitoring Well/ Sample Date	Analyte	Result (µg/L)	Quantitation Limit (µg/L)	MDL (µg/L)	Laboratory Qualifier	Analytical Method
OBS-MW1 9-Jul-13	Acenaphthene	1.2	11	1.2	U	SW-846:8270C
	Acenaphthylene	1.2	11	1.2	U	SW-846:8270C
	Anthracene	1.1	11	1.1	U	SW-846:8270C
	Benzo[a]anthracene	1.1	11	1.1	U	SW-846:8270C
	Benzo[b]fluoranthene	1.3	11	1.3	U	SW-846:8270C
	Benzo[k]fluoranthene	1.1	11	1.1	U	SW-846:8270C
	Benzo[g,h,i]perylene	1.5	11	1.5	U	SW-846:8270C
	Benzo[a]pyrene	0.75	11	0.75	U	SW-846:8270C
	Bis(2-chloroethoxy)methane	1.1	11	1.1	U	SW-846:8270C
	Bis(2-chloroethyl)ether	1.7	11	1.7	U	SW-846:8270C
	bis (2-chloroisopropyl) ether	1.4	11	1.4	U	SW-846:8270C
	Bis(2-ethylhexyl)phthalate	1.1	11	1.1	U	SW-846:8270C
	Bromophenyl-phenylether[4-]	1.2	11	1.2	U	SW-846:8270C
	Butylbenzylphthalate	1.5	11	1.5	U	SW-846:8270C
	Chloroaniline[4-]	2.2	11	2.2	U	SW-846:8270C
	Chloro-3-methylphenol[4-]	2.2	11	2.2	U	SW-846:8270C
	Chloronaphthalene[2-]	1.4	11	1.4	U	SW-846:8270C
	Chlorophenol[2-]	1.8	11	1.8	U	SW-846:8270C
	Chlorophenyl-phenyl[4-] ether	1.2	11	1.2	U	SW-846:8270C
	Chrysene	0.67	11	0.67	U	SW-846:8270C
	Dibenz(a,h)anthracene	2.2	11	2.2	U	SW-846:8270C
	Dibenzofuran	1.2	11	1.2	U	SW-846:8270C
	Di-n-butylphthalate	1.2	11	1.2	U	SW-846:8270C
	Dichlorobenzene[1,2-]	1.7	11	1.7	U	SW-846:8270C
	Dichlorobenzene[1,3-]	1.7	11	1.7	U	SW-846:8270C
	Dichlorobenzene[1,4-]	1.5	11	1.5	U	SW-846:8270C
	Dichlorobenzidine[3,3'-]	1.1	55	1.1	U	SW-846:8270C
	Dichlorophenol[2,4-]	2.9	11	2.9	U	SW-846:8270C
	Diethylphthalate	1	11	1	U	SW-846:8270C
	Dimethylphenol[2,4-]	2.4	11	2.4	U	SW-846:8270C
	Dimethyl Phthalate	0.97	11	0.97	U	SW-846:8270C
	Dinitro-2-methylphenol[4,6-]	2.4	55	2.4	U	SW-846:8270C
	Dinitrophenol[2,4-]	22	55	22	U	SW-846:8270C
	2,4-Dinitrotoluene	2.2	11	2.2	U	SW-846:8270C
2,6-Dinitrotoluene	2.2	11	2.2	U	SW-846:8270C	
Di-n-octylphthalate	1.7	11	1.7	U	SW-846:8270C	
Fluoranthene	0.72	11	0.72	U	SW-846:8270C	
Fluorene	1	11	1	U	SW-846:8270C	
Hexachlorobenzene	1.5	11	1.5	U	SW-846:8270C	
Hexachlorobutadiene	1.4	11	1.4	U	SW-846:8270C	

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

Table-5 NMED DOE OB FFY 2013 Q-4 SWMU 68 Groundwater Quality Results: Semi-Volatile Organic Compounds

Monitoring Well/ Sample Date	Analyte	Result (µg/L)	Quantitation Limit (µg/L)	MDL (µg/L)	Laboratory Qualifier	Analytical Method
	Hexachloroethane	1.5	11	1.5	U	SW-846:8270C
	Indeno[1,2,3-cd]pyrene	3.8	11	3.8	U	SW-846:8270C
	Isophorone	1.1	11	1.1	U	SW-846:8270C
	Methylnaphthalene[2-]	1.7	11	1.7	U	SW-846:8270C
	Methylphenol[2-]	1	11	1	U	SW-846:8270C
	Methylphenol[4-]	1.3	22	1.3	U	SW-846:8270C
	Naphthalene	1.4	11	1.4	U	SW-846:8270C
	Nitroaniline[2-]	2.2	55	2.2	U	SW-846:8270C
	Nitroaniline[3-]	1.5	55	1.5	U	SW-846:8270C
	Nitroaniline[4-]	1.7	55	1.7	U	SW-846:8270C
	Nitrobenzene	1.8	11	1.8	U	SW-846:8270C
	Nitrophenol[2-]	2.1	11	2.1	U	SW-846:8270C
	Nitrophenol[4-]	6.7	55	6.7	U	SW-846:8270C
	Nitrosodiphenylamine[N-]	0.6	11	0.6	U	SW-846:8270C
	Nitroso-di-n-propylamine[N-]	1.5	11	1.5	U	SW-846:8270C
	Pentachlorophenol	2.2	55	2.2	U	SW-846:8270C
	Phenanthrene	1.1	11	1.1	U	SW-846:8270C
	Phenol	1.2	11	1.2	U	SW-846:8270C
	Pyrene	1.5	11	1.5	U	SW-846:8270C
	Trichlorobenzene[1,2,4-]	1.5	11	1.5	U	SW-846:8270C
	Trichlorophenol[2,4,5-]	2.2	11	2.2	U	SW-846:8270C
	Trichlorophenol[2,4,6-]	2.2	11	2.2	U	SW-846:8270C

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

Table-6 NMED DOE OB FFY 2013 Q-4 SWMU 68 Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Emitting Isotopes and Isotopic Uranium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
OBS-MW1 9-Jul-13	Actinium-228	2.18 ± 6.8	8.18	U	EPA:901.1M
	Beryllium-7	-1.27 ± 10	17.3	U	EPA:901.1M
	Bismuth-212	25.9 ± 15	27.2	U	EPA:901.1M
	Bismuth-214	-12 ± 13	17.2	U	EPA:901.1M
	Cesium-134	0.83 ± 1.1	2.02	U	EPA:901.1M
	Cesium-137	0.449 ± 1.1	1.84	U	EPA:901.1M
	Cobalt-60	-0.997 ± 1	1.66	U	EPA:901.1M
	Gross Alpha	16.9 ± 6.2	5.93		EPA:900.0
	Gross Beta	5.1 ± 3	4.93		EPA:900.0
	Iodine-131	-1.83 ± 6.3	10.6	U	EPA:901.1M
	Lead-212	-2.97 ± 2.3	2.59	U	EPA:901.1M
	Lead-212	-2.52 ± 3.8	3.74	U	EPA:901.1M
	Potassium-40	-68.1 ± 37	50.9	U	EPA:901.1M
	Protactinium-234m	27.8 ± 130	221	U	EPA:901.1M
	Sodium-22	-0.611 ± 1.1	1.83	U	EPA:901.1M
	Tallium-208	1.1 ± 1.1	1.89	U	EPA:901.1M
	Thorium-234	27.8 ± 130	221	U	EPA:901.1M
	Uranium-234	17.4 ± 2.4	0.00947		HASL-300:ISOU
Uranium-235	0.127 ± 0.034	0.00947		HASL-300:ISOU	
Uranium-238	2.97 ± 0.43	0.0115		HASL-300:ISOU	

J = Qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

U = Analyzed for but not detected above limiting criteria. Limit criteria is less than the MDA or not identified by gamma scan software.