



SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lt. Governor

NEW MEXICO ENVIRONMENT DEPARTMENT

DOE Oversight Bureau

121 Tijeras Ave., NE Suite 1000
Albuquerque, NM
Phone (505) 383-2073 Fax (505) 222-9510
www.env.nm.gov



BUTCH TONGATE
Acting Cabinet Secretary
J. C. BORREGO
Acting Deputy Secretary

Groundwater Monitoring at Sandia National Laboratories/New Mexico Solid Waste Management Unit 68 Old Burn Site Conducted by NMED DOE OB for FFY 2012 Q-3

The New Mexico Environment Department (NMED) DOE Oversight Bureau (Bureau) has compiled and assessed groundwater data collected during April 2012. The Bureau collected groundwater samples from Solid Waste Management Unit (SWMU) 68 Old Burn Site (OBS) monitoring well OBS-MW2. Split samples were collected using standard Sandia National Laboratories/New Mexico (SNL/NM or Sandia) sampling procedures and equipment. The samples were submitted for analysis to an independent analytical laboratory for total metals, inorganics, organics and radiochemistry. No anomalies were observed from groundwater samples collected at monitoring well OBS-MW2.

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

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. The COOC screening level for perchlorate is 4 micrograms per liter ($\mu\text{g/L}$).

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), dissolved major cations (as calcium, lithium, magnesium, potassium, silicon, sodium, and strontium), nitrate-nitrite, perchlorate and total cyanide are listed in Table-2. All analytes were below established MCLs and 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 samples were detected above their associated MDL.

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

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 Results
(2) Table-2 Anions, Cations, Nitrate-Nitrite, Perchlorate and Total Cyanide Results
(3) Table-3 High Explosive Compounds Results
(4) Table-4 Volatile Organic Compounds Results
(5) Table-5 Semi-Volatile Organic Compounds Results
(6) Table-6 Gross Alpha, Gross Beta, Gamma Spectroscopy, and Isotopic Uranium Results

Distribution: Karen Agogino, POC, DOE/SSO
David Rast, DOE/SSO
Karen Oden, DOE/SSO
Michael Skelly, SNL/NM Groundwater
Tim Jackson, SNL/NM Groundwater
Susan Lucas Kamat, Bureau Chief, DOE OB

File: SGE42.Groundwater Monitoring. SWMU 68. FFY 2012 Q-3

Acknowledgment:

This material is based upon work supported by the Department of Energy Office of Environmental Management under Award Number *DE-EM0002420*.

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Table-1 NMED DOE OB FFY 2012 Q-3 Solid Waste Management Unit 68 Old Burn Site 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
OBS-MW2 19-Apr-12	Aluminum	0.048	NE	0.2	0.048	U	SW-846:6010B
	Antimony	0.0098	0.006	0.02	0.0098	U	SW-846:6010B
	Arsenic	0.012	0.01	0.02	0.012	U	SW-846:6010B
	Barium	0.021	2	0.005	0.0025		SW-846:6010B
	Beryllium	0.0003	0.004	0.002	0.0003	U	SW-846:6010B
	Cadmium	0.0005	0.005	0.002	0.0005	U	SW-846:6010B
	Calcium	85.3	NE	0.5	0.05		SW-846:6010B
	Chromium	0.0012	0.1	0.008	0.0012	U	SW-846:6010B
	Cobalt	0.003	NE	0.005	0.003	U	SW-846:6010B
	Copper	0.0021	1.3	0.01	0.0021	U	SW-846:6010B
	Iron	0.02	NE	0.1	0.02	U	SW-846:6010B
	Lead	0.0025	0.015	0.005	0.0025	U	SW-846:6010B
	Magnesium	17	NE	0.5	0.04		SW-846:6010B
	Manganese	0.0025	NE	0.005	0.0025	U	SW-846:6010B
	Mercury	0.0001	0.002	0.0002	0.0001	U	SW-846:7470A
	Nickel	0.0024	NE	0.005	0.0024	U	SW-846:6010B
	Potassium	1.7	NE	1	0.093		SW-846:6010B
	Selenium	0.013	0.05	0.02	0.013	U	SW-846:6010B
	Silver	0.00084	NE	0.005	0.00084	U	SW-846:6010B
	Sodium	24.7	NE	1	0.25		SW-846:6010B
	Thallium	0.009	0.002	0.02	0.009	U	SW-846:6010B
Uranium	0.013	0.03	0.001	0.0002		SW-846:6020	
Vanadium	0.0019	NE	0.005	0.0019	U	SW-846:6010B	
Zinc	0.003	NE	0.01	0.003	U	SW-846:6010B	

NE = Not Established

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

Table-2 NMED DOE OB FFY 2012 Q-3 Solid Waste Management Unit 68 Old Burn Site Groundwater Quality Results: Anions, Cations, Nitrate-Nitrite, Perchlorate and Total Cyanide

Monitoring Well/ Sample Date	Analyte	Result	EPA MCL	Quantitation Limit	MDL	Units	Laboratory Qualifier	Analytical Method
OBS-MW2 19-Apr-12	Bromide	0.38	NE	0.5	0.088	mg/L	B	EPA:300.0
	Chloride	23.1	NE	5	0.18	mg/L	Q	EPA:300.0
	Fluoride	2.1	4	0.5	0.059	mg/L		EPA:300.0
	Sulfate	87.9	NE	5	0.24	mg/L	Q	EPA:300.0
	Perchlorate	0.34	NE	4	0.34	ug/L	U	EPA:314.0
	Nitrate-Nitrite	1.4	10	0.05	0.0053	mg/L		EPA:353.2
	Cyanide, Total	1.5	200	10	1.5	ug/L	U	SW-846:9012A
	Calcium	76	NE	0.5	0.05	mg/L		SW846-6010B
	Magnesium	16.4	NE	0.5	0.04	mg/L		SW846-6010B
	Potassium	1.7	NE	1	0.093	mg/L		SW846-6010B
	Silicon	14.5	NE	0.5	0.05	mg/L		SW846-6010B
	Sodium	22.5	NE	1	0.25	mg/L		SW846-6010B
	Strontium	0.57	NE		0.05	0.005	mg/L	SW846-6010B

B = Estimated result. Result is less than RL and greater than or equal to the IDL.

NE = Not Established

Q = Elevated reporting limit. The reporting limit is elevated due to high analyte levels.

U = Undetected at the Limit of Detection.

Table-3 NMED DOE OB FFY 2012 Q-3 Solid Waste Management Unit 68 Old Burn Site Groundwater Quality Results: High Explosive Compounds

Monitoring Well/ Sample Date	Analyte	Result (µg/L)	Quantitation Limit (µg/L)	MDL (µg/L)	Laboratory Qualifier	Analytical Method
OBS-MW2 19-Apr-12	1,3,5-trinitrobenzene	0.018	0.22	0.018	U	SW846-SW8321A
	1,3-Dinitrobenzene	0.019	0.22	0.019	U	SW846-SW8321A
	2,4,6-Trinitrotoluene	0.012	0.22	0.012	U	SW846-SW8321A
	2,4-Dinitrotoluene	0.021	0.22	0.021	U	SW846-SW8321A
	2,6-Dinitrotoluene	0.016	0.22	0.016	U	SW846-SW8321A
	2-Amino-4,6-dinitrotoluene	0.029	0.22	0.029	U	SW846-SW8321A
	2-nitrotoluene	0.019	0.22	0.019	U	SW846-SW8321A
	3-Nitrotoluene	0.026	0.22	0.026	U	SW846-SW8321A
	4-Amino-2,6-dinitrotoluene	0.017	0.22	0.017	U	SW846-SW8321A
	4-Methylnitrobenzene	0.026	0.22	0.026	U	SW846-SW8321A
	HMX	0.053	0.22	0.053	U	SW846-SW8321A
	Nitrobenzene	0.014	0.22	0.014	U	SW846-SW8321A
	RDX	0.022	0.22	0.022	U	SW846-SW8321A
	Tetryl	0.02	0.22	0.02	U	SW846-SW8321A

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

Table-4 NMED DOE OB FFY 2012 Q-3 Solid Waste Management Unit 68 Old Burn Site 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-MW2 19-Apr-12	4-Methyl-2-pentanone (MIBK)	0.18	2	0.18	U	SW-846:8260B
	Acetone	2.1	10	2.1	U	SW-846:8260B
	Benzene	0.13	1	0.13	U	SW-846:8260B
	Bromodichloromethane	0.14	1	0.14	U	SW-846:8260B
	Bromoform	0.1	1	0.1	U	SW-846:8260B
	Bromomethane	0.29	1	0.29	U	SW-846:8260B
	Butanone[2-]	0.35	2	0.35	U	SW-846:8260B
	Carbon Disulfide	0.16	2	0.16	U	SW-846:8260B
	Carbon Tetrachloride	0.15	1	0.15	U	SW-846:8260B
	Chlorobenzene	0.12	1	0.12	U	SW-846:8260B
	Chloroethane	0.34	1	0.34	U	SW-846:8260B
	Chloroform	0.12	1	0.12	U	SW-846:8260B
	Chloromethane	0.25	1	0.25	U	SW-846:8260B
	Dibromochloromethane	0.13	1	0.13	U	SW-846:8260B
	Dichloroethane[1,1-]	0.1	1	0.1	U	SW-846:8260B
	Dichloroethane[1,2-]	0.22	1	0.22	U	SW-846:8260B
	Dichloroethene[1,1-]	0.14	1	0.14	U	SW-846:8260B
	Dichloroethene[cis-1,2-]	0.1	1	0.1	U	SW-846:8260B
	Dichloroethene[trans-1,2-]	0.11	1	0.11	U	SW-846:8260B
	Dichloropropane[1,2-]	0.15	1	0.15	U	SW-846:8260B
	Dichloropropene[cis-1,3-]	0.22	1	0.22	U	SW-846:8260B
	Dichloropropene[trans-1,3-]	0.08	1	0.08	U	SW-846:8260B
	Ethylbenzene	0.1	1	0.1	U	SW-846:8260B
	Hexanone[2-]	0.17	2	0.17	U	SW-846:8260B
	Methylene Chloride	0.35	1	0.35	U	SW-846:8260B
	Styrene	0.15	1	0.15	U	SW-846:8260B
	Tetrachloroethane[1,1,2,2-]	0.09	1	0.09	U	SW-846:8260B
	Tetrachloroethene	0.1	1	0.1	U	SW-846:8260B
	Toluene	0.25	1	0.25	U	SW-846:8260B
	Trichloroethane[1,1,1-]	0.19	1	0.19	U	SW-846:8260B
Trichloroethane[1,1,2-]	0.31	1	0.31	U	SW-846:8260B	
Trichloroethene	0.13	1	0.13	U	SW-846:8260B	
Vinyl acetate	0.21	2	0.21	U	SW-846:8260B	
Vinyl Chloride	0.22	1	0.22	U	SW-846:8260B	
Xylene (Total)	0.18	1	0.18	U	SW-846:8260B	

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

Table-5 NMED DOE OB FFY 2012 Q-3 Solid Waste Management Unit 68 Old Burn Site 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-MW2 19-Apr-12	1,2,4-Trichlorobenzene	1.6	11	1.6	U	SW-846:8270C
	1,2-Dichlorobenzene	1.7	11	1.7	U	SW-846:8270C
	1,3-Dichlorobenzene	1.7	11	1.7	U	SW-846:8270C
	1,4-Dichlorobenzene	1.6	11	1.6	U	SW-846:8270C
	2,2'-oxybis[1-chloropropane]	1.5	11	1.5	U	SW-846:8270C
	2,4,5-Trichlorophenol	2.3	11	2.3	U	SW-846:8270C
	2,4,6-Trichlorophenol	2.3	11	2.3	U	SW-846:8270C
	2,4-Dichlorophenol	2.9	11	2.9	U	SW-846:8270C
	2,4-Dimethylphenol	2.5	11	2.5	U	SW-846:8270C
	2,4-Dinitrophenol	23	56	23	U	SW-846:8270C
	2,4-Dinitrotoluene	2.3	11	2.3	U	SW-846:8270C
	2,6-Dinitrotoluene	2.3	11	2.3	U	SW-846:8270C
	2-Chloronaphthalene	1.5	11	1.5	U	SW-846:8270C
	2-Chlorophenol	1.8	11	1.8	U	SW-846:8270C
	2-Methylnaphthalene	1.7	11	1.7	U	SW-846:8270C
	2-Methylphenol	1.1	11	1.1	U	SW-846:8270C
	2-Nitroaniline	2.3	56	2.3	U	SW-846:8270C
	2-Nitrophenol	2.1	11	2.1	U	SW-846:8270C
	3,3'-Dichlorobenzidine	1.1	56	1.1	U	SW-846:8270C
	4,6-Dinitro-2-methylphenol	2.5	56	2.5	U	SW-846:8270C
	4-Bromophenyl phenyl ether	1.2	11	1.2	U	SW-846:8270C
	4-Chloro-3-methylphenol	2.3	11	2.3	U	SW-846:8270C
	4-Chloroaniline	2.3	11	2.3	U	SW-846:8270C
	4-Chlorophenyl phenyl ether	1.2	11	1.2	U	SW-846:8270C
	4-Nitroaniline	1.7	56	1.7	U	SW-846:8270C
	4-Nitrophenol	6.9	56	6.9	U	SW-846:8270C
	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
	Benz(a)anthracene	1.1	11	1.1	U	SW-846:8270C
	Benzo(a)pyrene	0.77	11	0.77	U	SW-846:8270C
	Benzo(b)fluoranthene	1.4	11	1.4	U	SW-846:8270C
Benzo(g,h,i)perylene	1.6	11	1.6	U	SW-846:8270C	
Benzo(k)fluoranthene	1.1	11	1.1	U	SW-846:8270C	
Bis(2-chloroethoxy)methane	1.1	11	1.1	U	SW-846:8270C	

B = Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J = Estimated result. Result is less than RL.

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

Table-5 NMED DOE OB FFY 2012 Q-3 Solid Waste Management Unit 68 Old Burn Site 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-MW2 19-Apr-12	Bis(2-chloroethyl)ether	1.7	11	1.7	U	SW-846:8270C
	Bis(2-ethylhexyl)phthalate	1.2	11	1.1	J,B	SW-846:8270C
	Butylbenzylphthalate	1.6	11	1.6	U	SW-846:8270C
	Chrysene	0.69	11	0.69	U	SW-846:8270C
	Dibenz(a,h)anthracene	2.3	11	2.3	U	SW-846:8270C
	Dibenzofuran	1.2	11	1.2	U	SW-846:8270C
	Diethylphthalate	1.1	11	1.1	U	SW-846:8270C
	Dimethyl Phthalate	0.99	11	0.99	U	SW-846:8270C
	Di-n-butylphthalate	1.2	11	1.2	U	SW-846:8270C
	Di-n-octylphthalate	1.7	11	1.7	U	SW-846:8270C
	Fluoranthene	0.73	11	0.73	U	SW-846:8270C
	Fluorene	1.1	11	1.1	U	SW-846:8270C
	Hexachlorobenzene	1.6	11	1.6	U	SW-846:8270C
	Hexachlorobutadiene	1.5	11	1.5	U	SW-846:8270C
	Hexachlorocyclopentadiene	5.6	56	5.6	U	SW-846:8270C
	Hexachloroethane	1.6	11	1.6	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
	Methylphenol, 3-&4-	1.3	23	1.3	U	SW-846:8270C
	Naphthalene	1.5	11	1.5	U	SW-846:8270C
	Nitroaniline[3-]	1.6	56	1.6	U	SW-846:8270C
	Nitrobenzene	1.8	11	1.8	U	SW-846:8270C
	N-Nitrosodiphenylamine	0.61	11	0.61	U	SW-846:8270C
	N-nitrosodipropylamine	1.6	11	1.6	U	SW-846:8270C
	Pentachlorophenol	2.3	56	2.3	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	1.6	11	1.6	U	SW-846:8270C	

B = Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J = Estimated result. Result is less than RL.

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

Table-6 NMED DOE OB FFY 2012 Q-3 Solid Waste Management Unit 68 Old Burn Site Groundwater Quality Results: Gross Alpha, Gross Beta, Gamma Spectroscopy, and Isotopic Uranium

Monitoring Well/ Sample Date	Analyte	Activity (pCi/L)	MDA (pCi/L)	Laboratory Qualifier	Analytical Method
OBS-MW2 19-Apr-12	Actinium-228	1.48 ± 20	18.7	U	EPA:901.1M
	Beryllium-7	3.38 ± 19	33.4	U	EPA:901.1M
	Bismuth-212	70.1 ± 32	57	U	EPA:901.1M
	Bismuth-214	156 ± 46	26.3		EPA:901.1M
	Cesium-134	2.88 ± 2.3	4.21	U	EPA:901.1M
	Cesium-137	0.655 ± 2.2	3.86	U	EPA:901.1M
	Cobalt-60	0.847 ± 2.2	4.03	U	EPA:901.1M
	Gross Alpha	21 ± 5.9	2.79		EPA:900.0
	Gross Beta	6.09 ± 1.3	1.45		EPA:900.0
	Iodine-131	-1.67 ± 5.7	9.48	U	EPA:901.1M
	Lead-212	3.59 ± 7	5.38	U	EPA:901.1M
	Lead-212	124 ± 19	7.2		EPA:901.1M
	Potassium-40	-140 ± 64	91	U	EPA:901.1M
	Protactinium-234m	218 ± 260	471	U	EPA:901.1M
	Sodium-22	-0.434 ± 2.4	4.18	U	EPA:901.1M
	Tallium-208	2.91 ± 2.4	4.18	U	EPA:901.1M
	Thorium-234	218 ± 260	471	U	EPA:901.1M
	Uranium-234	22.4 ± 3.7	0.00543		HASL-300:ISOU
	Uranium-235	0.44 ± 0.084	0.00543		HASL-300:ISOU
Uranium-238	4.72 ± 0.79	0.00543		HASL-300:ISOU	

U = Result is less than the sample detection limit.