



NEW MEXICO
ENVIRONMENT DEPARTMENT



DOE Oversight Bureau

SUSANNA MARTINEZ
Governor

604B N Canal Street
Carlsbad, NM 88220

DAVE MARTIN
Secretary

JOHN A. SANCHEZ
Lieutenant Governor

Phone (575) 887-6851 Fax (575) 887-6862
www.nmenv.state.nm.us

BUTCH TONGATE
Acting Deputy Secretary

September 14, 2011

George Basabilvazo
Department of Energy
Carlsbad Field Office
Carlsbad, NM 88220

Subject: Soil Sampling in the Vicinity of the Waste Isolation Pilot Plant Conducted by NMED DOE/OB, 2011

Mr. Basabilvazo:

This letter transmits the subject report as final.

The monitoring results are provided to DOE. If you have any questions, or would like copies of the complete data set, please contact me at 575-887-6851.

Sincerely,


Thomas Kesterson

Environmental Specialist –O
WIPP Oversight Section

Enclosure: Draft data submittal entitled: “Soil Sampling in the Vicinity of the Waste Isolation Pilot Plant Conducted by NMED/DOE OB, 2011” with the following enclosures:

- (1) Table 1 – Analytical Laboratory Results for Soils from Mills Ranch, 2011.
- (2) Table 2 – Analytical Laboratory Results for Soils from WIPP North, 2011.
- (3) Table 3 – Analytical Laboratory Results for Soils from WIPP North Duplicate, 2011.
- (4) Table 4 – Analytical Laboratory Results for Soils from WIPP Northeast, 2011.
- (5) Table 5 – Analytical Laboratory Results for Soils from WIPP South, 2011.
- (6) Definitions
- (7) WIPP DOE OB Soil Sample Locations 2011

Distribution: Dan Ferguson, Site Regulatory Specialist, DOE/CBFO
Thomas Skibitski, Chief, NMED/DOE OB



SUSANA MARTINEZ
Governor

JOHN SANCHEZ
Lieutenant Governor

**NEW MEXICO
ENVIRONMENT DEPARTMENT**

DOE Oversight Bureau

604B N Canal Street

Carlsbad, New Mexico 88220

Phone (575) 887-5681 Fax (575) 887-6862

www.nmenv.state.nm.us



DAVE MARTIN
Secretary

BUTCH TONGATE
Acting Deputy Secretary

Subject: Soil Sampling in the Vicinity of the Waste Isolation Pilot Plant Conducted by NMED/DOE OB, 2011.

The New Mexico Environment Department (NMED) DOE Oversight Bureau has compiled and assessed laboratory data for soils collected during 2011. The accompanying data report includes results for soils collected from four sites and a field duplicate in the vicinity of the Waste Isolation Pilot plant (WIPP).

These four sites are identified as Mills Ranch, WIPP North, WIPP North East, and WIPP South, with a field duplicate collected from WIPP North. At each location, independent samples were collected from three depths: 0-2 cm, 2- 5 cm, and 5-10 cm. Upon collection, these samples were shipped to an independent contract laboratory for analysis of Am-241, Cs-137, Pu-238, Pu-239/240, Sr-90, U-234, U-235 and U-238.

Pu-238 was detected in concentrations above the sample MDC in soils collected at Mills Ranch (2- 5 cm and 5-10 cm), WIPP North (0-2 cm), but not the corresponding field duplicate, and WIPP South (2-5 cm). Pu-238 was also detected above the MDC in the laboratory Method Blank. It should also be noted that Pu-238 has not been previously detected by the Oversight Bureau at any of these locations.

Pu-239/240 was found in concentrations above the sample MDC in soils from WIPP North (5-10 cm), but not in the corresponding field duplicate, and WIPP North East (0-2 cm). Previously, this analyte was found in soils collected by the Oversight Bureau from WIPP North East (0-2 cm) during its 2009 soils sampling project.

All results for plutonium were either below or within the average range of plutonium from fallout found in surface soils.

Am-241 was found in concentrations above the sample MDC in soils collected from Mills Ranch (all three sampling depths), WIPP North (2-5 cm and 5-10 cm), as well as in the corresponding field duplicates, WIPP North East (0-2 cm and 2-5 cm), WIPP South (0-2 cm and 5-10 cm). Am-241 was also detected above the MDC in the laboratory Method Blank. This analyte was previously found in the 2010 soil sampling project by the Oversight Bureau at Mills Ranch (2-5 cm) and at WIPP South (2-5 cm).

Cs-137 was found in concentrations above the sampling MDC at Mills Ranch (0-2 cm and 2-5 cm). In previous sampling programs, this analyte was detected at WIPP South (0-2 cm) in 2009, and at Mills Ranch (0-2 cm) in 2010. All results for Cs-137 were below the average concentration found in surface soil from fallout.

U-234 and U-238 were found in concentrations above the sample MDC in soils collected from all four sites and depths, including the field duplicate. In previous sampling programs by the Oversight Bureau, these two analytes have consistently been found at all locations and depths.

U-235 was found in concentrations above the sample MDC at Mills Ranch (5-10 cm), and at WIPP North East (5-10 cm). In 2009, U-235 was found at Mills ranch (5-10 cm) and at WIPP North (0-2 cm). No U-235 was found during the 2010 OB's sampling program.

All Uranium results were within the historical range of reported results around the WIPP site prior to emplacement of any waste (Waste Isolation Pilot Plant 1999 Site Environmental Report) and within the average range of Uranium found naturally in soils worldwide.

No Sr-90 was detected in any of the samples.

Response

Questions and/or comments may be addressed to Thomas Kesterson, at 575-887-6851.

- Enclosures: (1) Table 1 – Analytical Laboratory Results for Soils from Mills Ranch, 2011.
(2) Table 2 – Analytical Laboratory Results for Soils from WIPP North, 2011.
(3) Table 3 – Analytical Laboratory Results for Soils from WIPP North Duplicate, 2011.
(4) Table 4 – Analytical Laboratory Results for Soils from WIPP Northeast, 2011.
(5) Table 5 – Analytical Laboratory Results for Soils from WIPP South, 2011.
(6) Definitions
(7) WIPP DOE OB Soil Sample Locations 2011

Cc: George Basabilvazo, Director, Environmental Safety & Health, DOE CBFO
Dan Ferguson, Site Regulatory Specialist, DOE / CBFO
Thomas Skibitski Bureau Chief, NMED DOE OB

Table 1 – Analytical Laboratory Results for Soils from Mills Ranch, 2011.

<i>Mills Ranch</i> <i>2011</i>				Sample MDC	Lab Flag	<i>Data Summaries</i>	
Analyte	0-2 cm Result	2 s TPU (±)				Result	2 s TPU (±)
		pCi/g			mBq/g		
Sr-90	0.02	0.10	0.22	U	0.81	3.70	
Pu-239/240	0.025	0.026	0.035	U	0.925	0.962	
Pu-238	0.011	0.020	0.015	U	0.407	0.740	
Am-241	0.022	0.022	0.015	LT	0.814	0.814	
Cs-137	0.38	0.13	0.13	LT, G	14.06	4.81	
U-234	0.39	0.11	0.04		14.43	4.07	
U-235	0.030	0.029	0.034	U	1.110	1.073	
U-238	0.36	0.11	0.03		13.32	4.07	

<i>Mills Ranch</i> <i>2011</i>				Sample MDC	Lab Flag	<i>Data Summaries</i>	
Analyte	2-5 cm Result	2 s TPU (±)				Result	2 s TPU (±)
		pCi/g			mBq/g		
Sr-90	0.09	0.11	0.23	U	3.29	4.07	
Pu-239/240	0.013	0.022	0.044	U	0.481	0.814	
Pu-238	0.019	0.023	0.017	LT	0.703	0.851	
Am-241	0.035	0.029	0.016	LT	1.295	1.073	
Cs-137	0.13	0.06	0.08	LT, G	4.81	2.11	
U-234	0.39	0.11	0.05		14.43	4.07	
U-235	0.014	0.024	0.047	U	0.518	0.888	
U-238	0.46	0.13	0.06		17.02	4.81	

<i>Mills Ranch</i> <i>2011</i>				Sample MDC	Lab Flag	<i>Data Summaries</i>	
Analyte	5-10 cm Result	2 s TPU (±)				Result	2 s TPU (±)
		pCi/g			mBq/g		
Sr-90	0.06	0.10	0.22	U	2.257	3.70	
Pu-239/240	0.019	0.025	0.043	U	0.703	0.925	
Pu-238	0.035	0.031	0.032	LT	1.295	1.15	
Am-241	0.016	0.019	0.014	LT	0.592	0.70	
Cs-137	0.01	0.07	0.12	U, G	0.44	2.48	
U-234	0.43	0.12	0.05		15.91	4.44	
U-235	0.045	0.036	0.035	LT	1.665	1.332	
U-238	0.46	0.13	0.05		17.02	4.81	

Table 2 – Analytical Laboratory Results for Soils from WIPP North, 2011.

WIPP North 2011				Sample MDC	Lab Flag	Data Summaries	
Analyte	Result	2 s TPU (±)				Result	2 s TPU (±)
		pCi/g				mBq/g	
Sr-90	0.14	0.10	0.20	U	5.18	3.70	
Pu-239/240	0.004	0.020	0.029	U	0.141	0.740	
Pu-238	0.022	0.022	0.015	LT	0.814	0.814	
Am-241	0.010	0.020	0.043	U	0.363	0.740	
Cs-137	0.03	0.06	0.11	U, G	1.04	2.26	
U-234	0.14	0.08	0.07		5.18	2.78	
U-235	0.041	0.047	0.077	U	1.517	1.739	
U-238	0.15	0.08	0.07		5.55	2.85	

WIPP North 2011				Sample MDC	Lab Flag	Data Summaries	
Analyte	Result	2 s TPU (±)				Result	2 s TPU (±)
		pCi/g				mBq/g	
Sr-90	0.05	0.10	0.22	U	1.67	3.70	
Pu-239/240	0.010	0.020	0.029	U	0.352	0.740	
Pu-238	0.015	0.020	0.029	U	0.555	0.740	
Am-241	0.039	0.031	0.015	LT	1.443	1.147	
Cs-137	0.060	0.062	0.097	U, G	2.220	2.294	
U-234	0.13	0.06	0.06		4.81	2.26	
U-235	0.008	0.025	0.049	U	0.278	0.925	
U-238	0.14	0.06	0.06		5.18	2.37	

WIPP North 2011				Sample MDC	Lab Flag	Data Summaries	
Analyte	Result	2 s TPU (±)				Result	2 s TPU (±)
		pCi/g				mBq/g	
Sr-90	0.07	0.11	0.23	U	2.55	4.07	
Pu-239/240	0.055	0.036	0.015		2.035	1.332	
Pu-238	0.019	0.023	0.035	U	0.703	0.851	
Am-241	0.043	0.031	0.015	LT	1.591	1.147	
Cs-137	0.084	0.054	0.082	LT, G, NQ	3.108	1.998	
U-234	0.22	0.08	0.04		8.14	3.07	
U-235	0.015	0.026	0.051	U	0.555	0.962	
U-238	0.19	0.08	0.04		7.03	2.81	

Table 3 – Analytical Laboratory Results for Soils from WIPP North Duplicate, 2011.

<i>WIPP North Dup 2011</i>				Sample MDC	Lab Flag	<i>Data Summaries</i>	
<i>0-2 cm</i>		2 s TPU (\pm)	pCi/g			Result	2 s TPU (\pm)
Analyte	Result					mBq/g	
Sr-90	0.12	0.11	0.21	U	4.44	4.07	
Pu-239/240	0.011	0.023	0.033	U	0.407	0.851	
Pu-238	0.023	0.026	0.033	U	0.851	0.962	
Am-241	0.038	0.037	0.042	U	1.406	1.369	
Cs-137	0.11	0.07	0.09	LT, G, NQ	4.07	2.52	
U-234	0.18	0.08	0.05		6.66	2.78	
U-235	0.027	0.029	0.038	U	0.999	1.073	
U-238	0.18	0.07	0.02		6.66	2.74	

<i>WIPP North Dup 2011</i>				Sample MDC	Lab Flag	<i>Data Summaries</i>	
<i>2-5 cm</i>		2 s TPU (\pm)	pCi/g			Result	2 s TPU (\pm)
Analyte	Result					mBq/g	
Sr-90	0.13	0.11	0.22	U	4.81	4.07	
Pu-239/240	0.008	0.019	0.034	U	0.278	0.703	
Pu-238	0.009	0.019	0.028	U	0.337	0.703	
Am-241	0.016	0.019	0.014	LT	0.592	0.703	
Cs-137	0.05	0.08	0.13	U, G	1.70	2.81	
U-234	0.14	0.07	0.05		5.18	2.48	
U-235	0.014	0.028	0.059	U	0.518	1.036	
U-238	0.14	0.07	0.05		5.18	2.41	

<i>WIPP North Dup 2011</i>				Sample MDC	Lab Flag	<i>Data Summaries</i>	
<i>5-10 cm</i>		2 s TPU (\pm)	pCi/g			Result	2 s TPU (\pm)
Analyte	Result					mBq/g	
Sr-90	0.06	0.11	0.24	U	2.37	4.07	
Pu-239/240	0.001	0.024	0.046	U	0.024	0.888	
Pu-238	-0.004	0.024	0.041	U	-0.144	0.888	
Am-241	0.037	0.031	0.036	LT	1.369	1.147	
Cs-137	0.028	0.046	0.076	U, G	1.036	1.702	
U-234	0.11	0.06	0.04		4.07	2.04	
U-235	0.014	0.025	0.019	U	0.518	0.925	
U-238	0.16	0.07	0.05		5.92	2.59	

Table 4 – Analytical Laboratory Results for Soils from WIPP Northeast, 2011.

<i>WIPP North East 2011</i>				Sample MDC	Lab Flag	<i>Data Summaries</i>	
<i>0-2 cm</i>		2 s TPU (\pm)	pCi/g			Result	2 s TPU (\pm)
Analyte	Result					mBq/g	
Sr-90	0.06	0.10	0.21	U	2.11	3.7	
Pu-239/240	0.032	0.029	0.017	LT	1.184	1.073	
Pu-238	0.011	0.023	0.034	U	0.407	0.851	
Am-241	0.030	0.028	0.016	LT	1.110	1.036	
Cs-137	0.064	0.054	0.079	U, G	2.368	1.998	
U-234	0.19	0.07	0.03		7.03	2.63	
U-235	0.009	0.023	0.040	U	0.329	0.851	
U-238	0.15	0.06	0.03		5.55	2.37	

<i>WIPP North East 2011</i>				Sample MDC	Lab Flag	<i>Data Summaries</i>	
<i>2-5 cm</i>		2 s TPU (\pm)	pCi/g			Result	2 s TPU (\pm)
Analyte	Result					mBq/g	
Sr-90	0.07	0.10	0.22	U	2.55	3.70	
Pu-239/240	0.003	0.019	0.045	U	0.100	0.703	
Pu-238	0.011	0.020	0.015	U	0.407	0.740	
Am-241	0.050	0.032	0.013	LT	1.850	1.184	
Cs-137	0.10	0.07	0.09	LT, G, NQ	3.70	2.44	
U-234	0.16	0.064	0.05	Y1	5.92	2.37	
U-235	-0.002	0.021	0.031	Y1, U	-0.067	0.777	
U-238	0.16	0.06	0.04	Y1	5.92	2.37	

<i>WIPP North East 2011</i>				Sample MDC	Lab Flag	<i>Data Summaries</i>	
<i>5-10 cm</i>		2 s TPU (\pm)	pCi/g			Result	2 s TPU (\pm)
Analyte	Result					mBq/g	
Sr-90	0.10	0.11	0.22	U	3.70	4.07	
Pu-239/240	0.001	0.024	0.048	U	0.025	0.888	
Pu-238	0.011	0.024	0.035	U	0.407	0.888	
Am-241	0.010	0.019	0.014	U	0.370	0.703	
Cs-137	0	0.06	0.12	U, G	0.29	2.37	
U-234	0.12	0.06	0.06		4.44	2.26	
U-235	0.028	0.028	0.019	LT	1.036	1.036	
U-238	0.18	0.07	0.04		6.66	2.70	

Table 5 – Analytical Laboratory Results for Soils from WIPP South, 2011.

WIPP South 2011				Sample MDC	Lab Flag	Data Summaries	
Analyte	Result	2 s TPU (±)				Result	2 s TPU (±)
		pCi/g		mBq/g			
Sr-90	0.03	0.10	0.22	U	1.11	3.70	
Pu-239/240	0.004	0.020	0.030	U	0.144	0.740	
Pu-238	0.006	0.020	0.015	U	0.207	0.740	
Am-241	0.020	0.024	0.018	LT	0.740	0.888	
Cs-137	0.03	0.06	0.10	U, G	0.96	2.15	
U-234	0.19	0.07	0.05		7.03	2.74	
U-235	-0.006	0.024	0.047	U	-0.218	0.888	
U-238	0.22	0.08	0.04		8.14	2.96	

WIPP South 2011				Sample MDC	Lab Flag	Data Summaries	
Analyte	Result	2 s TPU (±)				Result	2 s TPU (±)
		pCi/g		mBq/g			
Sr-90	0.06	0.10	0.22	U	2.29	3.70	
Pu-239/240	0.024	0.027	0.041	U	0.888	0.999	
Pu-238	0.023	0.023	0.016	LT	0.851	0.851	
Am-241	0.010	0.018	0.013	Y1, U	0.359	0.666	
Cs-137	0.01	0.07	0.13	U, G	0.27	2.66	
U-234	0.17	0.07	0.04		6.29	2.55	
U-235	0.03	0.03	0.04	U	1.07	1.11	
U-238	0.17	0.07	0.03		6.29	2.55	

WIPP South 2011				Sample MDC	Lab Flag	Data Summaries	
Analyte	Result	2 s TPU (±)				Result	2 s TPU (±)
		pCi/g		mBq/g			
Sr-90	0.01	0.10	0.21	U	0.48	3.59	
Pu-239/240	0.012	0.021	0.042	U	0.444	0.777	
Pu-238	0.006	0.021	0.016	U	0.218	0.777	
Am-241	0.028	0.025	0.026	LT	1.036	0.925	
Cs-137	0.03	0.07	0.12	U, G	1.18	2.66	
U-234	0.16	0.07	0.05		5.92	2.48	
U-235	0.02	0.02	0.04	U	0.56	0.85	
U-238	0.14	0.06	0.03		5.18	2.26	

Definitions

Qualifiers/Flags

U – Result is less than the sample specific MDC.

Y1 – Chemical yield is in control at 100-110%. Quantitative yield is assumed.

LT – Result is less than the Requested MDC, greater than sample specific MDC.

MDC – Minimum Detectable Concentration.

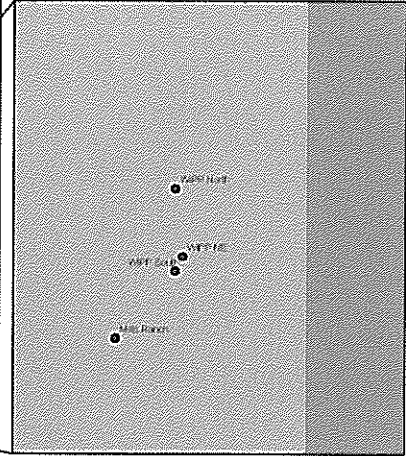
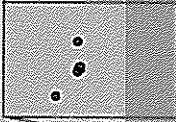
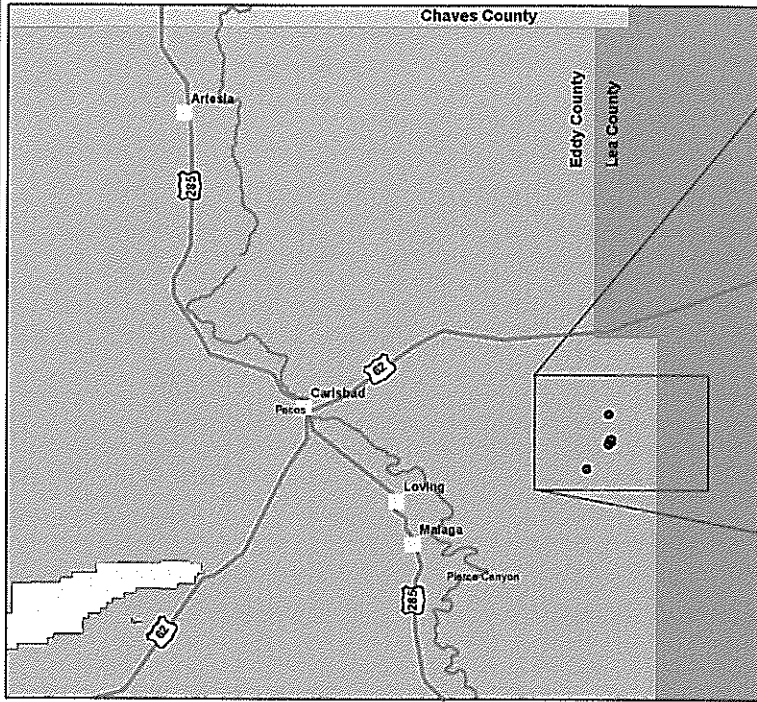
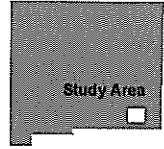
NQ - No peak, so there is no hit. The math in the software generates an “apparent” hit above the MDC, but it is not real.

TPU – Total Propagated Uncertainty.

G – Sample Density differs by more than 15% of LCS Density.



WIPP DOE OB Soil Sample Locations 2011



Legend

- Soil
- Carlsbad Caverns NP
- NM Cities
- US Highway
- Pecos River