



SUSANA MARTINEZ  
Governor

JOHN A. SANCHEZ  
Lieutenant Governor

## NEW MEXICO ENVIRONMENT DEPARTMENT

### *DOE Oversight Bureau*

406 North Guadalupe Street  
Carlsbad, New Mexico 88220  
Phone (575) 885-9023 Fax (575) 887-9283  
[www.nmenv.state.nm.us](http://www.nmenv.state.nm.us)



DAVE MARTIN  
Secretary

BUTCH TONGATE  
Deputy Secretary

JAMES H. DAVIS, Ph.D.  
Director  
Resource Protection Division

### **Direct Penetrating Radiation Monitoring at the Waste Isolation Pilot Plant Conducted by NMED/DOE OB for the CY 2011 Q-2**

The New Mexico Environment Department (NMED) DOE Oversight Bureau has compiled and assessed direct penetrating radiation (DPR) data collected during CY 2011 Q-2. The accompanying table shows DPR dose levels at various locations surrounding the Waste Isolation Pilot Plant, at the Oversight Bureau Office in Carlsbad, at the Malaga Volunteer Fire Department, and at the weigh station between Carlsbad and Loving. The data were obtained using Rad Elec gamma radiation monitoring electrets. The electrets are housed in aluminum canisters designed to minimize gamma radiation effects from radon gas. The quarterly dose rates have been normalized to reflect an actual quarter of 91.25 days.

#### Results

DPR results ranged from a minimum average quarterly dose of 21.9 mRad at WIPP 2 (on the North Access Road, south of the main parking lot) to a maximum average quarterly dose of 29.4 mRad at WIPP 16 (the weigh station on US 285 between Carlsbad and Loving). Currently, WIPP 15 serves as a control for quality assurance and is located at the Bureau's Canal St. office in Carlsbad. The average quarterly dose for WIPP 15 was 27.7 mRad.

Table 1 shows the individual results from each electret and the average quarterly dose in mRad at each location.

Graph 1 shows the average dose calculations of electrets located in the WIPP Exclusive Use Area by quarter.

#### Conclusion

These calculated doses from DPR are comparable with past results and do not show a trend of increased gamma radiation exposure at the WIPP. It is interesting to note that the slight rise in quarterly dose from CY 2009 Q-3 through the end of CY 2010 Q-4 correlating with the construction of the new salt pile evaporation pond and the rebuilding of the South Access Road, has continued in a small downward trend upon completion of these projects. Unfortunately, historical gamma background levels at WIPP were either determined through the use of TLDs by the Environmental Evaluation Group, or through the use of a High Pressure Ionization Chamber (HPIC) designed to monitor low levels of gamma radiation in the environment, reported in

*Statistical Summary of the Radiological Baseline Program for the Waste Isolation Pilot Plant* (DOE/WIPP-92-037). Neither is directly comparable to data obtained by the Bureau using electrets. Comparison studies by the Bureau have shown that electrets produce higher readings than TLDs.

Response

Questions and/or comments may be addressed to Julia Marple by phone at (575) 885-9023 or by email at [julia.marple@state.nm.us](mailto:julia.marple@state.nm.us)

Enclosures:    1. Table 1: Direct Penetrating Radiation as Measured by Electrets CY 2011 Q-2  
                    2. Graph 1: Average DPR Results in the WIPP Exclusive Use Area by Quarter  
                    3. Map 1: Location of DPR Monitors Maintained by the Bureau

Distribution: George Basabilvazo, DOE/CBFO  
                  Dan Ferguson, DOE/CBFO  
                  Thomas Skibitski, Chief, DOE OB  
                  Julia Marple, Environmental Scientist, DOE OB/WOS

**Table 1: Direct Penetrating Radiation as Measured by Electrets CY 2011 Q-2**

New Mexico Environment Department, DOE Oversight Bureau, WIPP Section

**WIPP 1**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFC 139	3/31/11 3:16 PM	6/30/11 7:15 AM	90.67	51	25.3
SFB 973	3/31/11 3:16 PM	6/30/11 7:15 AM	90.67	52	27.1
SFC 207	3/31/11 3:16 PM	6/30/11 7:15 AM	90.67	60	30.2
Average Quarterly Dose in mRad:					<b>27.6</b>

**WIPP 2**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFC 065	4/1/11 8:03 AM	6/30/11 7:08 AM	89.96	40	20.7
SFC 082	4/1/11 8:03 AM	6/30/11 7:08 AM	89.96	45	23.3
SFC 057	4/1/11 8:03 AM	6/30/11 7:08 AM	89.96	42	21.6
Average Quarterly Dose in mRad:					<b>21.9</b>

**WIPP 3**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFB 974	3/31/11 2:17 PM	6/30/11 6:59 AM	90.70	50	26.2
SFB 983	3/31/11 2:17 PM	6/30/11 6:59 AM	90.70	51	26.5
SFC 025	3/31/11 2:17 PM	6/30/11 6:59 AM	90.70	51	26.3
Average Quarterly Dose in mRad:					<b>26.3</b>

**WIPP 4**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFB 969	4/1/11 8:16 AM	6/30/11 6:48 AM	89.94	49	26.5
SFB 999	4/1/11 8:16 AM	6/30/11 6:48 AM	89.94	44	23.5
SFC 131	4/1/11 8:16 AM	6/30/11 6:48 AM	89.94	45	24.9
Average Quarterly Dose in mRad:					<b>25.0</b>

**WIPP 5**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFC 061	4/1/11 8:31 AM	6/30/11 8:41 AM	90.01	45	24.2
SFC 159	4/1/11 8:31 AM	6/30/11 8:41 AM	90.01	51	26.0
SFC 087	4/1/11 8:31 AM	6/30/11 8:41 AM	90.01	47	23.7
Average Quarterly Dose in mRad:					<b>24.6</b>

**Table 1: Direct Penetrating Radiation as Measured by Electrets CY 2011 Q-2**

New Mexico Environment Department, DOE Oversight Bureau, WIPP Section

**WIPP 6**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFC 099	3/31/11 9:10 AM	7/1/11 6:56 AM	91.91	46	23.8
SFC 126	3/31/11 9:10 AM	7/1/11 6:56 AM	91.91	47	24.2
SFC 171	3/31/11 9:10 AM	7/1/11 6:56 AM	91.91	48	25.0
Average Quarterly Dose in mRad:					<b>24.3</b>

**WIPP 7**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFC 210	3/31/11 9:00 AM	7/1/11 6:31 AM	91.90	53	26.1
SFB 985	3/31/11 9:00 AM	7/1/11 6:31 AM	91.90	46	23.0
SFB 987	3/31/11 9:00 AM	7/1/11 6:31 AM	91.90	49	25.0
Average Quarterly Dose in mRad:					<b>24.7</b>

**WIPP 8**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFB 966	3/31/11 8:32 AM	7/11/11 7:39 AM	101.96	52	22.4
SFB 988	3/31/11 8:32 AM	7/11/11 7:39 AM	101.96	53	22.5
SFC 095	3/31/11 8:32 AM	7/11/11 7:39 AM	101.96	52	22.7
Average Quarterly Dose in mRad:					<b>22.5</b>

**WIPP 9**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFB 995	3/31/11 8:35 AM	7/11/11 7:31 AM	101.96	53	22.3
SFC 018	3/31/11 8:35 AM	7/11/11 7:31 AM	101.96	53	22.2
SFB 961	3/31/11 8:35 AM	7/11/11 7:31 AM	101.96	54	22.7
Average Quarterly Dose in mRad:					<b>22.4</b>

**WIPP 10**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFC 010	3/31/11 8:22 AM	7/11/11 8:14 AM	101.99	57	23.9
SFB 962	3/31/11 8:22 AM	7/11/11 8:14 AM	101.99	57	24.0
SFB 963	3/31/11 8:22 AM	7/11/11 8:14 AM	101.99	54	22.8
Average Quarterly Dose in mRad:					<b>23.6</b>

**Table 1: Direct Penetrating Radiation as Measured by Electrets CY 2011 Q-2**

New Mexico Environment Department, DOE Oversight Bureau, WIPP Section

**WIPP 11**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFC 002	3/31/11 9:25 AM	6/30/11 8:01 AM	90.94	46	23.4
SFC 022	3/31/11 9:25 AM	6/30/11 8:01 AM	90.94	44	22.3
SFC 054	3/31/11 9:25 AM	6/30/11 8:01 AM	90.94	46	23.2
Average Quarterly Dose in mRad:					<b>23.0</b>

**WIPP 12**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFC 013	4/1/11 8:44 AM	6/30/11 8:27 AM	89.99	41	22.3
SFC 185	4/1/11 8:44 AM	6/30/11 8:27 AM	89.99	46	23.4
SFC 108	4/1/11 8:44 AM	6/30/11 8:27 AM	89.99	43	23.0
Average Quarterly Dose in mRad:					<b>22.9</b>

**WIPP 13**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFC 039	4/1/11 8:50 AM	6/30/11 8:37 AM	89.99	55	28.3
SFC 053	4/1/11 8:50 AM	6/30/11 8:37 AM	89.99	49	25.3
SFC 062	4/1/11 8:50 AM	6/30/11 8:37 AM	89.99	52	27.1
Average Quarterly Dose in mRad:					<b>26.9</b>

**WIPP 14**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFC 094	4/1/11 9:01 AM	6/30/11 8:43 AM	89.99	51	25.8
SFC 077	4/1/11 9:01 AM	6/30/11 8:43 AM	89.99	46	25.3
SFC 152	4/1/11 9:01 AM	6/30/11 8:43 AM	89.99	47	25.6
Average Quarterly Dose in mRad:					<b>25.6</b>

**WIPP 15 Carlsbad**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFC 114	4/5/11 1:59 PM	7/1/11 11:00 AM	86.88	50	27.2
SFC 145	4/5/11 1:59 PM	7/1/11 11:00 AM	86.88	49	26.8
SFC 063	4/5/11 1:59 PM	7/1/11 11:00 AM	86.88	53	29.2
Average Quarterly Dose in mRad:					<b>27.7</b>

**Table 1: Direct Penetrating Radiation as Measured by Electrets CY 2011 Q-2**

New Mexico Environment Department, DOE Oversight Bureau, WIPP Section

**WIPP 16 Loving**

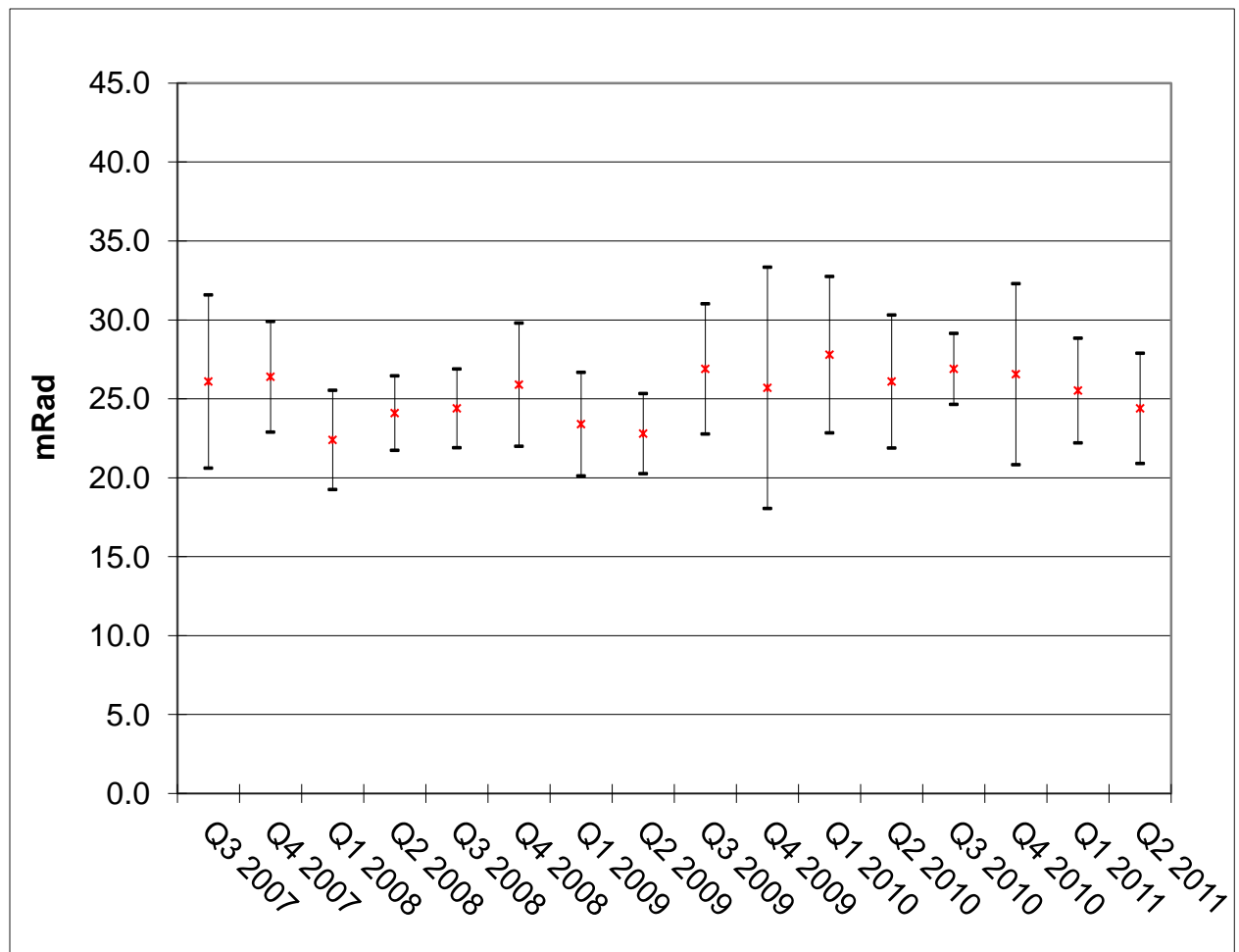
Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFC 060	3/31/11 12:27 PM	6/30/11 9:46 AM	90.89	54	30.5
SFC 132	3/31/11 12:27 PM	6/30/11 9:46 AM	90.89	53	28.9
SFC 173	3/31/11 12:27 PM	6/30/11 9:46 AM	90.89	53	28.9
Average Quarterly Dose in mRad:					<b>29.4</b>

**WIPP 17 Malaga**

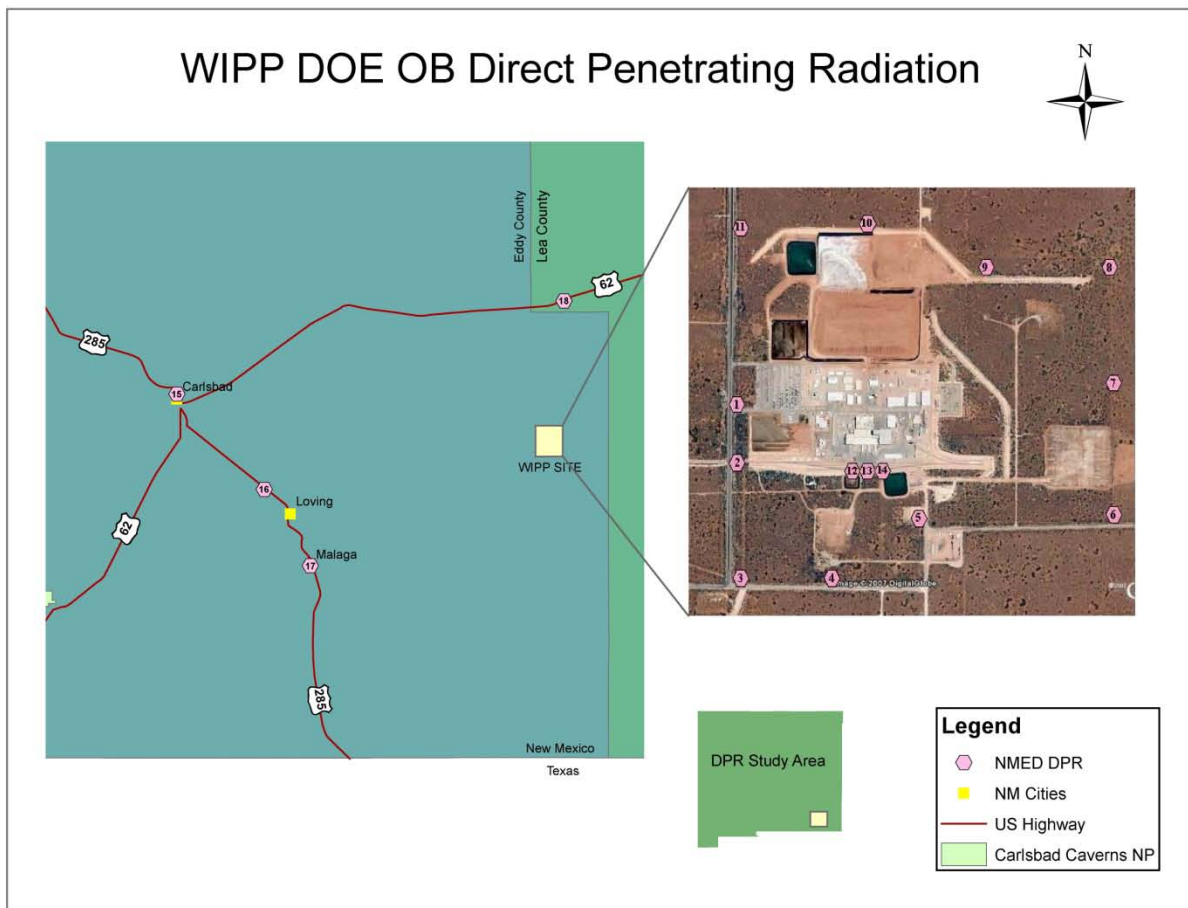
Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFC 012	3/31/11 12:44 PM	6/30/11 9:27 AM	90.86	52	27.2
SFC 021	3/31/11 12:44 PM	6/30/11 9:27 AM	90.86	54	27.8
SFC 044	3/31/11 12:44 PM	6/30/11 9:27 AM	90.86	56	29.1
Average Quarterly Dose in mRad:					<b>28.0</b>

**WIPP 18 Hobbs Hwy**

Electret Number	Start Date and Time	Finish Date and Time	# of Days:	Voltage Drop	Quarterly Dose
SFC 092	3/31/11 9:45 AM	6/30/11 6:22 AM	90.86	60	30.3
SFC 182	3/31/11 9:45 AM	6/30/11 6:22 AM	90.86	53	26.7
SFC 183	3/31/11 9:45 AM	6/30/11 6:22 AM	90.86	59	30.2
Average Quarterly Dose in mRad:					<b>29.0</b>



Graph 1: Average DPR Results in the WIPP Exclusive Use Area by Quarter ( $\pm 2sd$ )



Map 1: Location of DPR Monitors Maintained by the Bureau