

DOE Oversight Bureau, New Mexico Environment Department

**Direct Penetrating Radiation Monitoring at
the Waste Isolation Pilot Plant**

**Conducted by the
New Mexico Environment Department DOE Oversight Bureau
for Calendar Year 2012 Q-3**

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Final Report

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The purpose of this communication is to transmit direct penetrating radiation (DPR) dose levels collected at the Waste Isolation Pilot Plant during the third quarter of calendar year 2012. The data measurements were obtained using the E-PERM® electret ionization chamber system from Rad Elec Inc.

Introduction

The purpose of this communication is to transmit direct penetrating radiation (DPR) dose levels, recorded at New Mexico Environment Department (NMED) Department of Energy (DOE) Oversight Bureau monitoring sites, collected during the third quarter of calendar year 2012 (July to September, 2012). The Bureau maintains fourteen (14) sites located in the Exclusive Use Area at the Waste Isolation Pilot Plant (WIPP), and six (6) sites at other locations in the WIPP region (Table 1, Figure 2 and Figure 3).

Table 1. Location and operational details of direct penetrating radiation monitoring stations located inside the WIPP Exclusive Use Area and in the WIPP vicinity.

Location	Location Description	Operational History
WIPP 1	Exclusive Use Area, Parking lot	Active
WIPP 2	Exclusive Use Area, Railroad entrance	Active
WIPP 3 to 11	Exclusive Use Area, Fence line	Active
WIPP 12 to 14	Exclusive Use Area, Loading dock	Active
WIPP 15	Carlsbad, NM - Canal St.	Discontinued CY2012 Q-2
WIPP 16	Loving Weigh Station	Active
WIPP 17	Malaga Volunteer Fire Department	Active
WIPP 18	Hobbs Highway	Active
WIPP 19	Southeast Control Tower	Active
WIPP 20	Carlsbad, NM - Guadalupe St. (interior)	Active
WIPP 21	Carlsbad, NM - Guadalupe St. (exterior)	Active

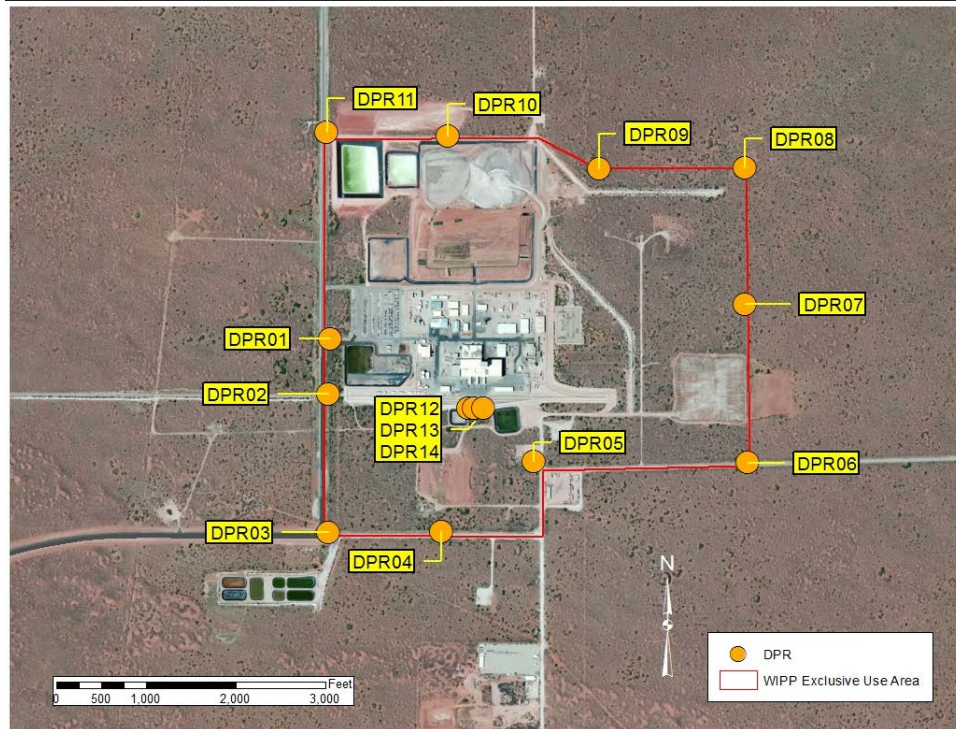


Figure 1. Location of DPR monitors maintained by the DOE Oversight Bureau at the WIPP.

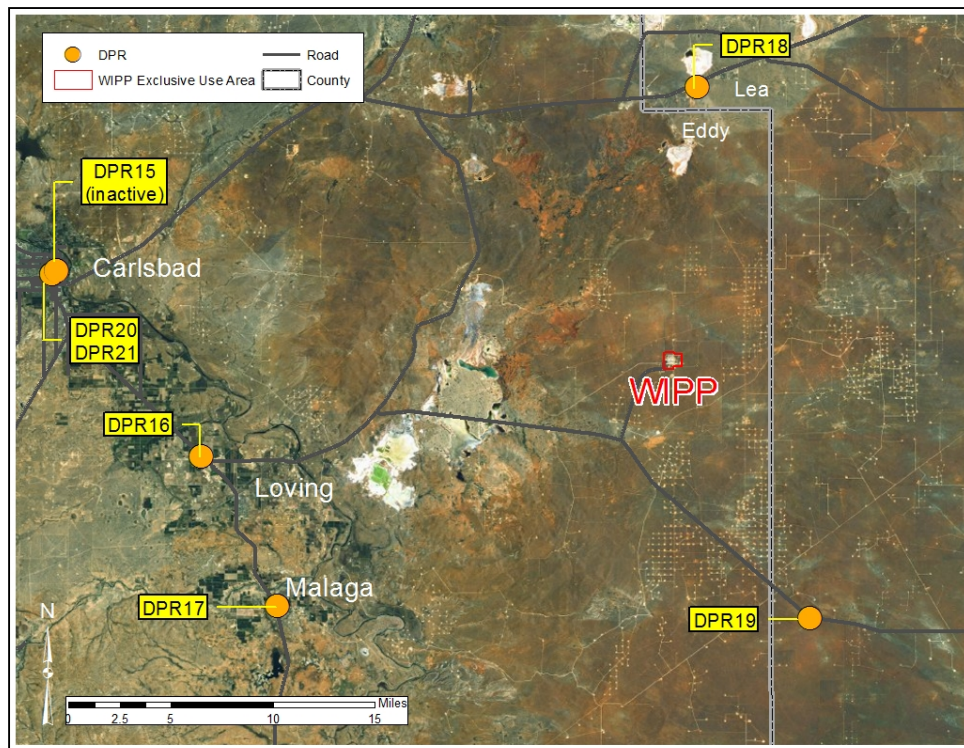


Figure 2. Location of DPR monitors maintained by the DOE Oversight Bureau in the area surrounding WIPP.

The quarterly dose rates have been normalized to reflect an actual quarter of 91.25 days.

Results

DPR results at the WIPP ranged from a minimum average quarterly dose of 22.0 mrad at WIPP Railroad Track Entrance (WIPP 2), to a maximum average quarterly dose of 30.7 mrad at WIPP North Fence Salt Pile (WIPP 10). The highest average quarterly dose at any location was 32.9 mrad, measured at the NMED Guadalupe Office –Interior (WIPP 21 or DPR21).

Table 2 shows the individual results from each electret and the normalized average quarterly dose in mrad at each location.

Figure 3 shows the average dose calculations from monitors located in the WIPP Exclusive Use Area by quarter.

Table 2. Direct Penetrating Radiation Quarterly Dose Rates for CY2012 Q-3

WIPP Parking Lot Entrance WIPP 1				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFC 139	6/29/12 5:55 AM	10/1/12 12:12 PM	38	21.6
SFC 145	6/29/12 5:55 AM	10/1/12 12:12 PM	41	24.0
SFC 207	6/29/12 5:55 AM	10/1/12 12:12 PM	43	25.2
Average Quarterly Dose in mRad:				23.6
WIPP Railroad Track Entrance WIPP 2				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFC 057	6/29/12 6:00 AM	10/1/12 12:40 PM	40	23.6
SFC 065	6/29/12 6:00 AM	10/1/12 12:40 PM	35	20.5
SFC 082	6/29/12 6:00 AM	10/1/12 12:40 PM	37	22.0
Average Quarterly Dose in mRad:				22.0
WIPP Southwest Corner Fence WIPP 3				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFB 988	6/29/12 11:58 AM	10/1/12 12:22 PM	39	23.7
SFB 983	6/29/12 11:58 AM	10/1/12 12:22 PM	38	23.2
SFC 025	6/29/12 11:58 AM	10/1/12 12:22 PM	37	22.5
Average Quarterly Dose in mRad:				23.1
WIPP South Fence Center WIPP 4				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFK 487	6/28/12 12:08 PM	10/3/12 12:19 PM	49	26.8
SFK 527	6/28/12 12:08 PM	10/3/12 12:19 PM	47	25.5
SFK 569	6/28/12 12:08 PM	10/3/12 12:19 PM	46	25.1
Average Quarterly Dose in mRad:				25.8
WIPP Near SE Corner of Fence WIPP 5				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFC 087	6/28/12 12:27 PM	9/28/12 10:20 AM	39	23.3
SFC 114	6/28/12 12:27 PM	9/28/12 10:20 AM	38	22.9
SFC 159	6/28/12 12:27 PM	9/28/12 10:20 AM	41	24.7
Average Quarterly Dose in mRad:				23.6
WIPP Far SE Corner of Fence WIPP 6				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFK 477	6/29/12 11:38 AM	9/28/12 10:15 AM	54	31.1
SFK 478	6/29/12 11:38 AM	9/28/12 10:15 AM	34	19.2
SFK 512	6/29/12 11:38 AM	9/28/12 10:15 AM	36	20.4
Average Quarterly Dose in mRad:				23.6

WIPP East Fence Mid WIPP 7				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFB 985	6/29/12 5:50 AM	10/3/12 11:48 AM	39	22.5
SFB 987	6/29/12 5:50 AM	10/3/12 11:48 AM	39	23.5
SFB 210	6/29/12 5:50 AM	10/3/12 11:48 AM	45	25.5
Average Quarterly Dose in mRad:				23.8
WIPP NE Corner of Fence WIPP 8				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFK 431	7/2/12 4:44 PM	10/2/12 12:16 PM	51	29.2
SFK 510	7/2/12 4:44 PM	10/2/12 12:16 PM	49	27.9
SFK 533	7/2/12 4:44 PM	10/2/12 12:16 PM	41	23.1
Average Quarterly Dose in mRad:				26.7
WIPP North Fence NE WIPP 9				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFB 961	7/2/12 4:49 PM	10/2/12 12:28 PM	43	27.1
SFB 995	7/3/12 4:49 PM	10/2/12 12:28 PM	40	25.5
SFB 018	7/4/12 4:49 PM	10/2/12 12:28 PM	41	26.3
Average Quarterly Dose in mRad:				26.3
WIPP North Fence Salt Pile WIPP 10				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFK 428	7/2/12 4:52 PM	10/2/12 12:32 PM	59	34.0
SFK 437	7/2/12 4:52 PM	10/2/12 12:32 PM	124	71.8
SFK 438	7/2/12 4:52 PM	10/2/12 12:32 PM	48	27.3
Average Quarterly Dose in mRad:				30.7
WIPP NW Corner of Fence WIPP 11				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFC 002	6/29/12 11:27 AM	10/1/12 12:34 PM	40	23.9
SFC 022	6/29/12 11:27 AM	10/1/12 12:34 PM	41	24.4
SFC 054	6/29/12 11:27 AM	10/1/12 12:34 PM	41	24.4
Average Quarterly Dose in mRad:				24.3
WIPP Loading Dock WHB (West) WIPP 12				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFK 344	6/29/12 12:08 PM	10/3/12 12:12 PM	38	20.4
SFK 441	6/29/12 12:08 PM	10/3/12 12:12 PM	40	21.5
SFK 580	6/29/12 12:08 PM	10/3/12 12:12 PM	47	25.7
Average Quarterly Dose in mRad:				22.5

WIPP Loading Dock WHB (Center) WIPP 13				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFC 039	6/29/12 11:31 AM	10/3/12 12:26 PM	44	25.9
SFC 053	6/29/12 11:31 AM	10/3/12 12:26 PM	44	25.4
SFC 062	6/29/12 11:31 AM	10/3/12 12:26 PM	43	25.1
Average Quarterly Dose in mRad:				25.5
WIPP Loading Dock WHB (East) WIPP 14				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFK 473	6/29/12 12:04 PM	10/3/12 12:23 PM	46	25.0
SFK 574	6/29/12 12:04 PM	10/3/12 12:23 PM	44	24.0
SFK 578	6/29/12 12:04 PM	10/3/12 12:23 PM	44	24.0
Average Quarterly Dose in mRad:				24.3
Loving Weigh Station WIPP 16				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFC 075	7/2/12 8:44 AM	9/27/12 4:37 PM	51	32.1
SFC 195	7/2/12 8:44 AM	9/27/12 4:37 PM	44	26.7
SFC 212	7/2/12 8:44 AM	9/27/12 4:37 PM	54	33.1
Average Quarterly Dose in mRad:				30.6
Malaga VFD WIPP 17				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFC 021	7/2/12 8:38 AM	9/27/12 4:43 PM	43	28.2
SFC 044	7/2/12 8:38 AM	9/27/12 4:43 PM	41	27.2
SFC 063	7/2/12 8:38 AM	9/27/12 4:43 PM	50	31.9
Average Quarterly Dose in mRad:				29.1
Hobbs Hwy/ North Access Rd WIPP 18				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFC 092	6/29/12 11:20 AM	9/28/12 10:24 AM	44	27.0
SFC 182	6/29/12 11:20 AM	9/28/12 10:24 AM	43	26.1
SFC 183	6/29/12 11:20 AM	9/28/12 10:24 AM	43	26.6
Average Quarterly Dose in mRad:				26.6
Southeast Control WIPP 19				Quarterly Dose Normalized
Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	
SFK 410	6/28/12 12:22 PM	9/28/12 1:25 PM	57	33.0
SFK 443	6/28/12 12:22 PM	9/28/12 1:25 PM	52	30.1
SFK 562	6/28/12 12:22 PM	9/28/12 1:25 PM	39	22.2
Average Quarterly Dose in mRad:				28.4

Guadalupe Office Inside WIPP 20

Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	Quarterly Dose Normalized
SFK 364	7/2/12 4:10 PM	9/27/12 4:54 PM	56	32.6
SFK 514	7/2/12 4:10 PM	9/27/12 4:54 PM	60	34.9
SFK 542	7/2/12 4:10 PM	9/27/12 4:54 PM	54	31.3
Average Quarterly Dose in mRad:				32.9

Guadalupe Office Outside WIPP 21

Electret ID	Start Date and Time	Finish Date and Time	Voltage Drop	Quarterly Dose Normalized
SFK 450	7/2/12 4:25 PM	9/27/12 4:27 PM	59	35.3
SFK 466	7/2/12 4:25 PM	9/27/12 4:27 PM	52	31.0
SFK 486	7/2/12 4:25 PM	9/27/12 4:27 PM	53	31.5
Average Quarterly Dose in mRad:				32.6

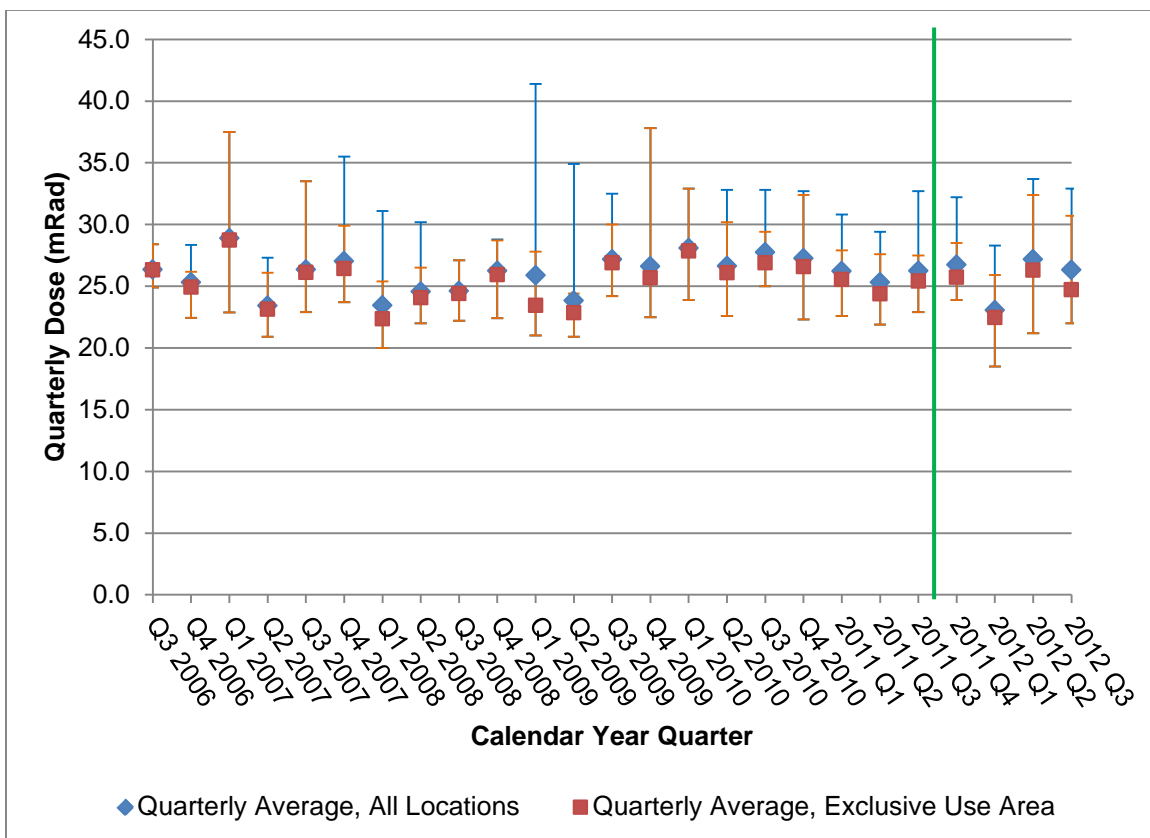


Figure 3. Average DPR Results for all locations and for the WIPP Exclusive Use Area by Quarter. The error bars represent maximum and minimum results for the quarter. The green line denotes the implementation of 2012 program changes, most significantly, the application of temperature and pressure correction factors and correcting for the inherent discharge of electrets.

Conclusions

These calculated doses from DPR are comparable with past results obtained by the Bureau and do not show a trend of increased gamma radiation exposure at the WIPP.