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Waste Isolation Division

Box 2078

Carlsbad New Mexico 88221

July 23, 1998

Westinghouse
Electric Corporation

Government and Environmental
Services Company

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DOE OVERSIGHT BUREAU

Mr. Tim Michael
Program Manager
New Mexico Environment Department
2044 A Galisteo Street
P.O. Box 26110
Santa Fe, NM 87502

MISC
WIPP

Subject: TRANSMITTAL OF THE REPORT ON THE SEISMICITY OF THE WIPP SITE

Dear Mr. Michael:

We are providing a copy of *A Report on the Seismicity of the WIPP Site for the Period of April 1, 1998 Through June 30, 1998*, for your information and use. This report was prepared by the Geophysical Research Center of the New Mexico Institute of Mining and Technology.

If you have any questions or require any assistance, please contact Mr. T. J. Ferguson at (505) 234-8275.

Sincerely,

M. W. Lipscomb, Manager
Quality and Regulatory Assurance

MAM

Attachment

cc: (without attachment)
E. K. Hunter, CAO
W. A. Walker, CAO

980719



**A Report On The
SEISMICITY OF THE WIPP SITE
For the Period
April 1, 1998 through June 30, 1998
for**

**WESTINGHOUSE ELECTRIC CORPORATION
(Contract No. 78335)**

by

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July 13, 1998

Instrumentation

The seismicity within 300 km of the WIPP site is being monitored at New Mexico Institute of Mining and Technology. We use data primarily from a seven station network approximately centered on the WIPP site (Figure 1). Designations and coordinates for the seven stations in the network are given in Table 1. Signals from the network are telemetered to the New Mexico Tech Seismological Observatory in Socorro. When appropriate, readings from the WIPP network stations are combined with readings from another New Mexico Tech network which is centered on Socorro in the central Rio Grande rift. The stations and coordinates for this network are listed in Table 2. (Note ANMO in Table 2 is a USGS station in Albuquerque.) From time to time, we exchange data with the University of Texas at El Paso (stations EPT and MOT in Table 2) and Texas Tech who operate stations in West Texas.

Table 3 lists periods of time from April 1, 1998 through June 30, 1998 when one or more of the stations were not operating. During the second quarter of 1998, the individual stations CBET, CL2B, CL7, CPRX, GDL2, HTMS and SSS were in operation the following percentages of the time: 99.9, 99.9, 99.9, 99.9, 99.9, 99.9 and 99.8. All stations did not record 0.05 percent of the time because of troubles with the microwave transmission system operated by the State of New Mexico.

The maximum magnifications at 1.0 Hz for the network stations during the second quarter of 1998 are given below. Also listed are the maximum peak magnifications and the frequencies at which they occur. Because of high-frequency background noise, four stations have peak responses set at ~ 6 Hz. Conditions at the other three stations are quieter and peak response is set at ~ 20 Hz. Because of highly variable weather, primarily wind and thunderstorms, we diminish the gains at all stations from time to time by up to a factor of four.

WIPP SEISMIC NETWORK

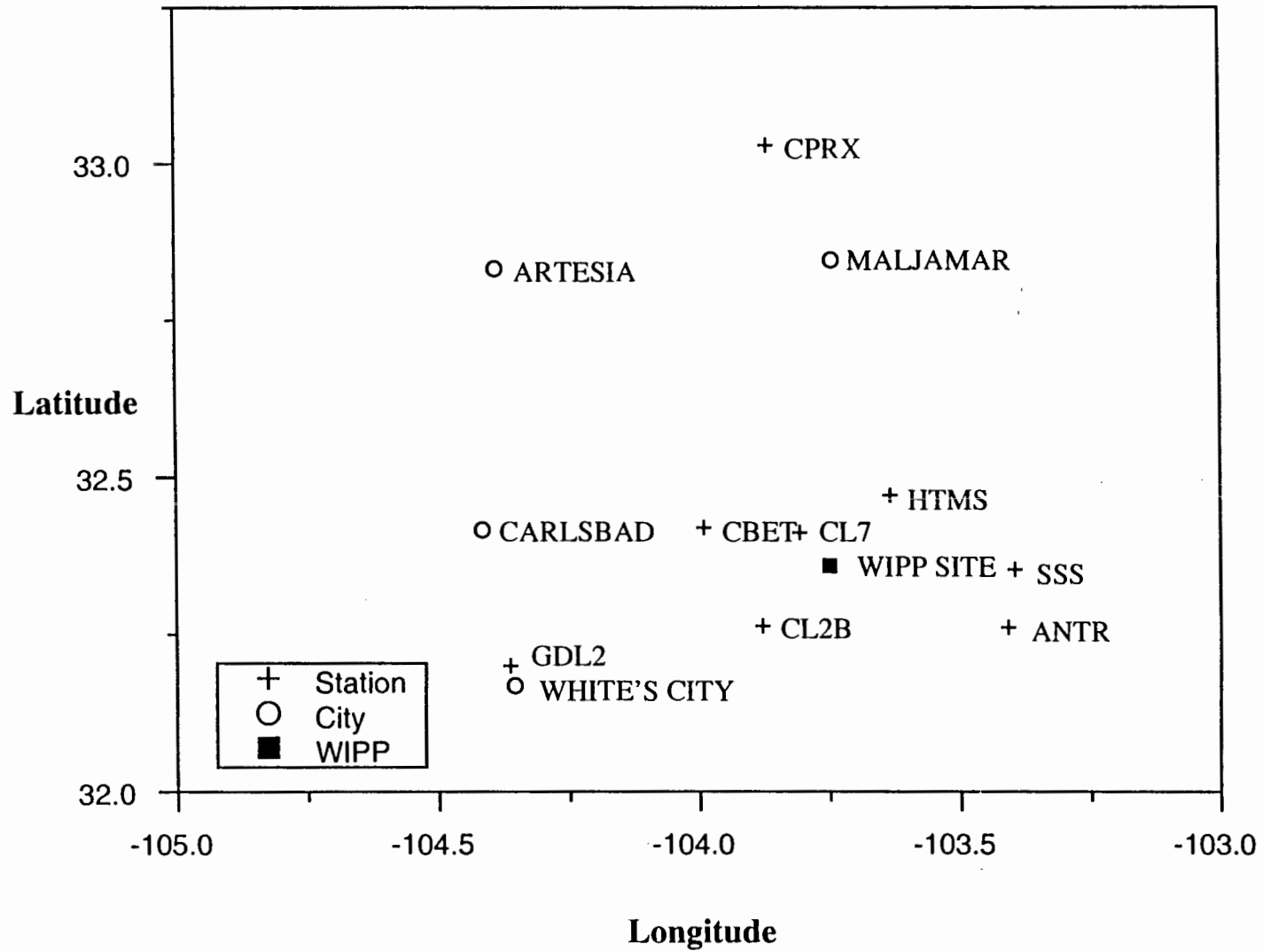


Figure 1. Location of seismograph stations in the WIPP network.

Table 1 -WIPP Network Station Locations

Station	Latitude	Longitude	Elevation
CBET	32-25.23	103-59.40	1042
CL2B	32-15.85	103-52.72	1045
CL7	32-24.77	103-48.45	1032
CPRX	33-01.82	103-52.01	1356
GDL2	32-12.03	104-21.81	1213
HTMS	32-28.35	103-38.05	1192
SSS	32-21.28	103-23.81	1073

Table 2 -Supplementary Station Locations

Station	Latitude	Longitude	Elevation
ANMO	34-56.77	106-27.40	1853
ALQ	34-56.50	106-27.50	1853
BAR	34-09.00	106-37.67	2121
BDO	34-29.76	106-54.79	1505
BMT	34-16.50	107-15.61	1987
CAR	33-57.15	106-44.07	1658
EPT	31-46.30	106-30.35	1186
LAZ	34-24.12	107-08.36	1878
LPM	34-18.70	106-37.91	1737
MOT	30-40.78	104-00.49	2020
SB	33-58.51	107-10.84	3230
SMC	33-46.72	107-01.16	1560
WTX	34-04.33	106-56.75	1555

Table 3. INTERRUPTIONS IN OPERATIONS OF SEISMOGRAPH STATIONS:
APRIL 1, 1998 THROUGH JUNE 30, 1998.

	From Time UT	Date mm/dd/yy	To Time UT	Date mm/dd/yy	CBET	CL2B	CL7	CPRX	GDL2	HTMS	SSS	Cause
1.	16:07	04/18/98	16:47	04/18/98							X	Reason unknown
2.	15:02	06/01/98	18:07	06/01/98					X			Pen did not translate
3.	15:08	06/11/98	17:51	06/11/98							X	Pen did not translate
4.	07:34	06/13/98	08:50	06/13/98	X	X	X	X	X	X	X	Microwave off
5.	14:04	06/13/98	18:40	06/13/98	X	X	X	X	X	X	X	Microwave off
6.	15:02	06/15/98	21:15	06/15/98							X	Pen did not translate
7.	14:45	06/17/98	16:44	06/17/98							X	Pen did not translate

Station	Maximum Magnification at 1 Hz	Maximum Peak Magnification and Frequency
CBET	8,800	41,400 (6 Hz)
CL2B	16,600	290,500 (20 Hz)
CL7	11,300	74,600 (6 Hz)
CPRX	18,600	325,500 (20 Hz)
GDL2	20,600	638,600 (20 Hz)
HTMS	17,200	80,800 (6 Hz)
SSS	23,800	157,000 (6 Hz)

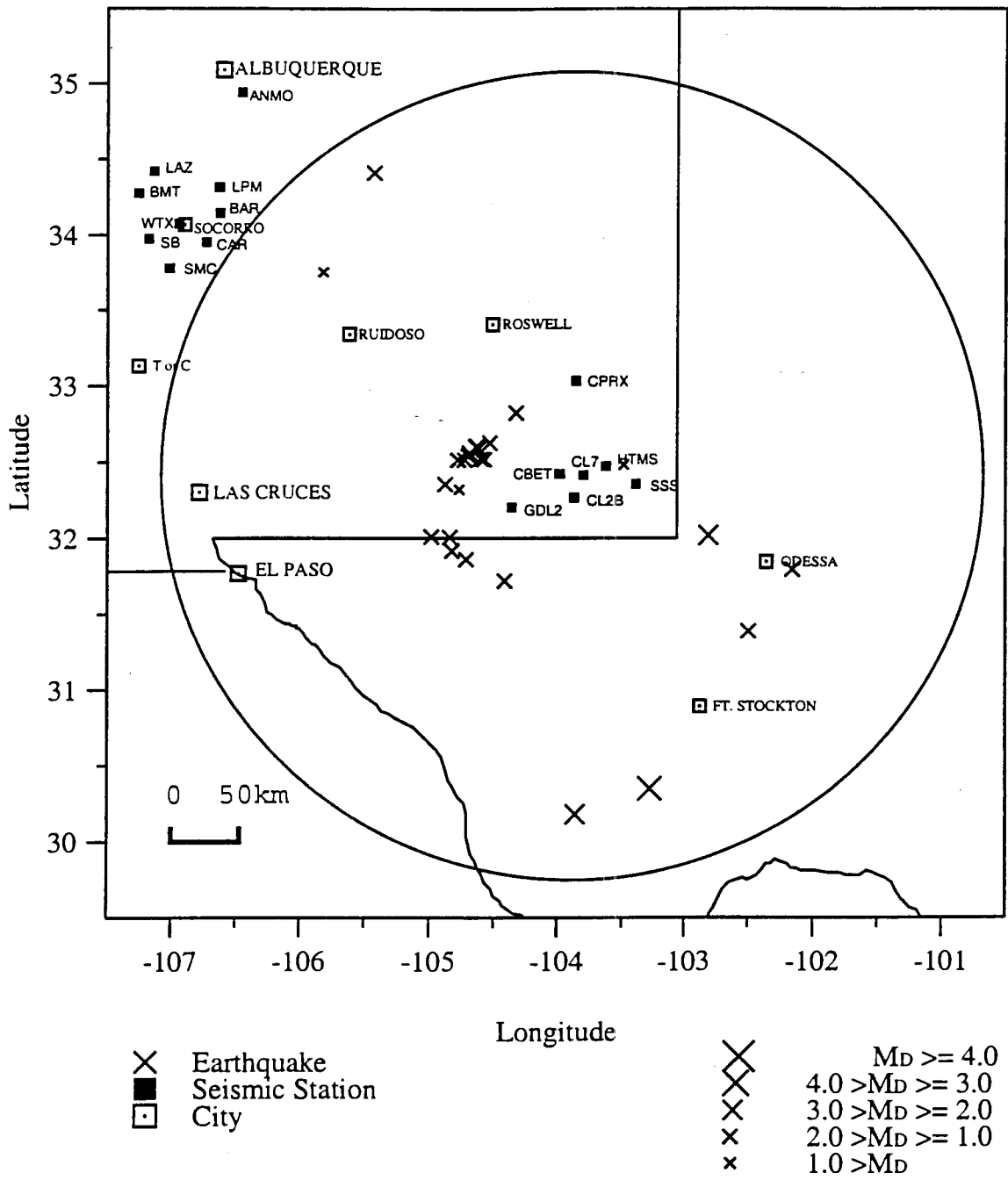
Quarterly Seismicity

From the data recorded April 1, 1998 through June 30, 1998, we obtained preliminary locations for 25 earthquakes within 300 km of the WIPP site using the computer algorithm SEISMOS. Origin times, epicenter coordinates and magnitudes from these programs are listed in Table 4. A map of the epicenters with location symbols scaled to the magnitude of the shocks is shown in Figure 2.

The largest earthquake of the second quarter of 1998 (event 6 in Table 4) was a magnitude 3.7 shock located ~ 235 km south of the WIPP site near Alpine, Texas. Eleven of the 25 earthquakes in Table 4 are grouped 72 km to 101 km W to WNW of station CL 7. Many of the weaker events of this group are not well located and therefore they may be more closely bunched than the map of epicenters indicates. Some if not all of these shocks are a continuation of activity which began January 8, 1997, in a

Table 4. PRELIMINARY LOCATIONS AND MAGNITUDES FOR EARTHQUAKES
 WITHIN 300 KM OF THE WIPP SITE:
 APRIL 1, 1998 THROUGH JUNE 30, 1998.

	Date	Origin Time	Location		Magnitude	No. of	Distance to
	Mo/Day/Yr	UT	Lat-N	Long-W	MD	Stations	CL7 - Km
1.	04/07/98	23:30:24	32-33.51	104-41.82	1.7	07	085
2.	04/09/98	01:24:18	32-30.72	104-47.14	1.3	04	092
3.	04/09/98	21:20:10	32-00.25	104-50.85	1.7	04	107
4.	04/10/98	02:46:19	31-54.90	104-49.88	1.4	03	110
5.	04/10/98	02:47:22	31-51.56	104-43.26	1.4	04	104
6.	04/15/98	10:33:45	30-20.85	103-16.74	3.7	14	235
7.	04/28/98	00:38:09	34-24.45	105-26.00	1.9	11	269
8.	05/02/98	02:19:43	30-10.71	103-51.90	2.0	07	248
9.	05/08/98	02:40:41	31-47.64	102-09.89	1.6	04	169
10.	05/19/98	14:19:25	32-36.13	104-38.38	1.3	07	081
11.	05/21/98	15:53:13	32-28.88	103-29.58	0.5	04	030
12.	05/22/98	17:10:18	32-19.05	104-46.56	0.9	04	091
13.	05/23/98	01:12:25	32-31.14	104-36.45	1.5	06	076
14.	05/23/98	02:40:45	32-30.96	104-34.95	1.2	06	073
15.	05/25/98	12:39:15	33-44.97	105-49.55	0.8	07	240
16.	05/27/98	06:00:33	31-23.08	102-30.02	1.8	07	169
17.	05/27/98	13:40:07	32-37.50	104-32.26	1.1	06	072
18.	05/27/98	22:03:53	32-21.08	104-53.21	1.1	04	101
19.	05/28/98	18:48:50	32-30.77	104-44.00	1.4	05	087
20.	06/12/98	06:56:47	32-00.55	104-59.37	1.2	07	119
21.	06/14/98	13:41:30	32-32.36	104-42.34	1.3	05	085
22.	06/16/98	05:52:20	32-35.10	104-37.76	2.0	09	079
23.	06/18/98	17:51:23	32-49.17	104-19.88	1.1	04	067
24.	06/22/98	06:23:04	31-43.02	104-25.23	1.6	06	096
25.	06/27/98	13:06:49	32-01.04	102-48.95	2.1	08	103



**Figure 2. Earthquake activity within 300 km of the WIPP site:
April 1, 1998 through June 30, 1998.**

if not all of these shocks are a continuation of activity which began January 8, 1997, in a very small isolated area ~ 50 km WNW of Carlsbad. The strongest earthquakes in this area (centered $32^{\circ}35'N$ and $104^{\circ}40'W$) to the end of the second quarter of 1998 were magnitude 2.0 events on March 20, 1998 and June 16, 1998 (event 22 in Table 4). However, as this report was being prepared, we recorded and located a magnitude 2.7 earthquake on July 8, 1998 with coordinates of $32^{\circ} 36.5' N$ and $104^{\circ} 37.7' W$.