A Report On The

SEISMICITY OF THE WIPP SITE

For The Period

January 1 2023 Through March 31 2023

for

Nuclear Waste Partnership LLC
P.O. No. DOE13-PO507726

by

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Executive Summary

During the period January 1 – March 31, 2023, data from the upgraded WIPP Seismic Network operated by the New Mexico Institute of Mining and Technology (NMTSO), along with additional data from the USGS/NEIC national network and the TexNet regional network, were used to locate 841 events within approximately 300 km of the WIPP site. 83 events were located in New Mexico by the NMTSO and 758 additional events were located in Texas by TexNet. Of these events, the largest magnitude recorded was 4.2 ML, 95.0 km SW of the WIPP facility. A 1.1 ML event, located 9.1 km to the SE of the WIPP facility was the closest event recorded during the reporting period. A total of 46 events between 1.1 ML and 3.3 ML were located within 50 km of the WIPP facility.

Overall, there was a slight decrease in both the total amount of seismicity within 300 km of the WIPP site and the amount of seismicity within 50 km of the WIPP site compared to the previous quarter. The pattern of seismicity has also remained relatively steady, with the large majority of the events occurring in several clusters in Texas. There has been a slight increase in the number of events occurring close to the city of Carlsbad, NM, to the west of the WIPP site, and a slight decrease in the number of events occurring in the cluster of events near the Texas-New Mexico border to the south of the WIPP site.

Highlights

- Locations seismic stations used in this report are given in Appendix A1.
- List of all events is attached to this report as an excel file.

Station Outages

Station JAL was repaired during fieldwork on Jan 4, 2023. No other significant outages occurred this quarter.

Quarterly Seismicity

For the WIPP Seismic Network data recorded January 1 – March 31, 2023, detections were obtained for events within New Mexico using the computer code easyQuake (Walter, J. I., P. Ogwari, A. Thiel, F. Ferrer, and I. Woelfel (2021), easyQuake: Putting machine learning to work for your regional seismic network or local earthquake study, Seismological Research Letters, 92(1): 555–563). Event locations were calculated using Seiscomp (Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences and gempa GmbH (2008)) and manually reviewed by an analyst. Events in Texas were obtained from the TexNet event catalog (/www.beg.utexas.edu/texnet-cisr/texnet). Origin times (UTC), epicenter coordinates, local magnitudes (ML), number of stations used by Seiscomp and epicentral distance (kms) and azimuth (degrees) to the WIPP facility are listed. A map of the epicenters with location symbols scaled to the magnitude of the events is shown in Figure 1. Events within 50 km of the WIPP site are presented in Table 1 (146 events total), and events larger than magnitude 2.5 are presented in Table 2 (106 events total).

Seismicity within 50 km of the WIPP site:

Date	UTC Time	Lat	Lon	Depth	Magni-tude	RMS	STD	Used Station Count	Net-work	dis-tance to WIPP(km)	azi-muth from WIPP(deg)
2023-01-19	01:17:54	32.3026	-103.7411	9	1.1	0.4	2.2	10	NMTSO	9.1	147.05
2023-03-24	11:34:25	32.2916	-103.7503	7.9	1.4	0.4	1.75	16	NMTSO	9.8	155.18
2023-02-18	03:47:13	32.3044	-103.721	6.1	1.2	0.5	1.67	17	NMTSO	10.1	137.41
2023-02-14	04:26:28	32.2467	-103.775	3.5	1.7	0.4	1.35	18	NMTSO	14	172.64
2023-03-31	15:06:46	32.1579	-103.8144	13.9	1.3	0.3	2.26	9	NMTSO	23.8	184.6
2023-02-05	01:40:00	32.5058	-103.4628	12.3	1.7	0.3	3.82	12	NMTSO	34.5	64.34
2023-01-18	00:50:20	32.4948	-103.4482	3.9	1.4	0.4	2.03	13	NMTSO	35.2	67.11
2023-03-22	22:54:09	32.0535	-103.7283	13.1	2.2	0.3	1.06	32	NMTSO	35.9	170.06
2023-02-25	09:51:08	32.0627	-103.6807	4.9	1.1	0.3	3.27	10	NMTSO	36	162.72
2023-02-27	04:25:59	32.0764	-103.9709	6.6	1.9	0.4	1.34	21	NMTSO	36.8	206.91
2023-02-17	09:19:47	32.0444	-103.7137	6	1.6	0.6	1.54	29	NMTSO	37.2	168.23
2023-01-09	17:10:30	32.037	-103.7558	10.1	1.3	0.4	4.01	9	NMTSO	37.4	174.46
2023-01-12	19:27:09	32.0407	-103.721	17.8	1.2	0.3	3.39	10	NMTSO	37.4	169.39
2023-02-25	08:13:45	32.0297	-103.8327	4.3	1.4	0.2	1.79	11	NMTSO	38.2	185.47
2023-03-04	07:56:03	32.601	-103.4903	4.4	1.8	0.5	2.02	18	NMTSO	38.2	48.13
2023-01-15	17:54:02	32.0233	-103.819	10.3	2.1	0.5	1.5	27	NMTSO	38.8	183.46

2023-03-04	08:32:50	32.027	-103.7274	8.9	1.4	0.5	3.89	11	NMTSO	38.8	170.68
2023-02-05	22:32:31	32.5021	-103.4097	1.2	2.1	0.6	1.38	23	NMTSO	38.9	68.07
2023-01-15	20:20:52	32.0151	-103.8162	7.7	1.9	0.4	1.48	22	NMTSO	39.7	183.01
2023-03-29	15:02:09	32.016	-103.83	11.3	1.4	0.5	2.67	17	NMTSO	39.7	184.89
2023-02-06	07:07:50	32.4939	-103.3923	0.7	1.3	0.4	1.68	16	NMTSO	40.1	70.16
2023-03-27	01:55:01	32.0105	-103.8025	11.4	3.1	0.2	1.24	29	NMTSO	40.2	181.13
2023-01-15	20:12:53	32.0096	-103.8052	8.3	3.2	0.3	1.17	32	NMTSO	40.3	181.49
2023-01-16	00:13:27	32.0086	-103.812	7.2	2	0.1	0.5	16	TexNet	40.4	182.39
2023-03-31	02:17:04	32.0078	-103.8034	12.8	2	0.3	1.3	30	NMTSO	40.5	181.24
2023-01-06	16:11:20	32.0078	-103.8254	8.9	1.4	0.5	1.93	17	NMTSO	40.6	184.17
2023-01-15	23:01:16	32.0072	-103.8163	7.7	3.3	0.2	0.57	18	TexNet	40.6	182.96
2023-02-28	01:44:54	32.0068	-103.8135	11.4	2.8	0.3	1.34	31	NMTSO	40.6	182.58
2023-02-22	02:37:40	32.0078	-103.8382	8.2	1.2	0.5	2.39	14	NMTSO	40.7	185.87
2023-02-28	06:31:45	32.0078	-103.8364	6.7	1.5	0.5	1.69	21	NMTSO	40.7	185.63
2023-02-11	03:26:07	32.0059	-103.8309	7.1	1.3	0.4	2.45	11	NMTSO	40.8	184.87
2023-03-23	06:08:21	32.0041	-103.8181	10.4	1.5	0.3	1.58	28	NMTSO	40.9	183.16
2023-01-17	08:31:07	32.0032	-103.8318	10.9	1.1	0.3	2.71	10	NMTSO	41.1	184.96
2023-02-12	03:45:23	32.0023	-103.8162	8.7	1.6	0.4	1.67	24	NMTSO	41.1	182.91
2023-03-29	23:54:20	32.0023	-103.8162	8.9	1.6	0.3	1.29	20	NMTSO	41.1	182.91
2023-02-12	01:40:24	32.0004	-103.8034	8.7	1.9	0.4	1.7	27	NMTSO	41.3	181.22
2023-03-15	12:53:06	32.0013	-103.8226	9.1	2	0.3	1.05	29	NMTSO	41.3	183.74
2023-01-03	21:27:27	31.9998	-103.8195	8.3	2.4	0.1	0.71	15	TexNet	41.4	183.32
2023-02-12	05:51:57	32.2952	-103.3603	8.5	2.5	0.4	1.14	35	NMTSO	41.6	101.76
2023-02-12	03:52:51	32.0013	-103.8702	4	1.4	0.3	1.45	14	NMTSO	41.8	189.89
2023-01-17	17:14:00	32.0059	-103.9151	8.4	1.6	0.4	3.42	13	NMTSO	42.2	195.67
2023-02-12	00:56:16	32.3117	-103.3493	2.8	1.5	0.4	1.48	17	NMTSO	42.3	99.05
2023-02-12	16:33:32	31.9933	-103.8827	7	2.6	0.2	0.71	27	TexNet	42.9	191.23
2023-02-03	03:42:25	32.0297	-104.0506	4.4	1.5	0.4	1.19	22	NMTSO	45	212.46
2023-02-03	17:25:36	32.005	-104.0021	8	1.2	0.4	2.88	8	NMTSO	45.2	205.69
2023-03-27	00:49:23	32.1066	-103.4171	10.8	1.3	0.5	2.21	13	NMTSO	46.1	129.68

Table 1: Seismic events within 50 km of the WIPP site, January 1 – March 31, 2023, as located by the upgraded WIPP Seismic Network.

Seismicity larger than M2.5 within 300 km of the WIPP site:

Date	UTC Time	Lat	Lon	Depth	Magni-tude	RMS	STD	UsedStation Count	Net-work	dis-tance to WIPP (km)	azi-muth from WIPP(deg)
2023-02-22	08:39:34	31.6735	-104.3747	6.6	4.2	0.2	0.64	50	TexNet	95	215.29
2023-02-28	23:57:36	31.6135	-103.9891	8.5	4.1	0.1	0.28	45	TexNet	86.3	192.36
2023-02-22	10:46:26	31.6722	-104.3682	7.2	4	0.2	0.64	45	TexNet	94.7	214.94
2023-02-05	23:57:23	31.6197	-103.98	7	3.7	0.1	0.45	22	TexNet	85.4	191.89
2023-03-08	06:24:20	31.6633	-104.3534	6.3	3.7	0.2	0.58	42	TexNet	94.8	213.9
2023-03-08	08:14:14	31.6663	-104.3585	6.1	3.6	0.3	0.58	49	TexNet	94.8	214.26
2023-01-24	20:28:07	31.6716	-104.3898	6.1	3.5	0.2	0.78	19	TexNet	96	215.91
2023-01-06	23:30:36	31.6584	-104.2938	6.1	3.4	0.2	0.64	28	TexNet	92.2	210.81
2023-03-14	01:15:01	31.7254	-104.3003	6.1	3.4	0.1	0.58	25	TexNet	86.3	213.68
2023-01-01	21:23:47	31.6843	-104.4211	6.1	3.3	0.2	0.5	35	TexNet	96.6	217.82
2023-01-15	23:01:16	32.0072	-103.8163	7.7	3.3	0.2	0.57	18	TexNet	40.6	182.96
2023-03-18	06:01:29	32.4884	-101.6723	10.9	3.3	0.1	0.64	27	TexNet	199.6	86.27
2023-03-26	22:41:00	31.6585	-104.3498	6.7	3.3	0.2	0.81	23	TexNet	95	213.56
2023-01-02	09:06:44	31.6871	-104.4131	6.1	3.2	0.2	0.64	30	TexNet	95.9	217.58
2023-01-04	11:07:37	31.6916	-104.489	6.6	3.2	0.2	0.64	54	TexNet	100	221.01
2023-01-09	06:07:07	31.0064	-103.6458	10.7	3.2	0.2	0.64	27	TexNet	152.5	174.68
2023-01-15	20:12:53	32.0096	-103.8052	8.3	3.2	0.3	1.17	32	NMTSO	40.3	181.49
2023-02-22	11:49:48	31.674	-104.3656	6.1	3.2	0.2	0.57	37	TexNet	94.4	214.88
2023-03-02	05:35:05	31.6912	-104.4093	5.7	3.2	0.3	0.64	33	TexNet	95.3	217.57
2023-03-11	02:31:06	31.6854	-104.5202	5.4	3.2	0.2	0.64	19	TexNet	102.5	222
2023-03-15	06:48:22	32.4637	-102.0314	9.6	3.2	0.1	1.22	9	TexNet	165.8	86.46
2023-03-23	05:02:49	31.5645	-104.1356	5.9	3.2	0.1	0.71	19	TexNet	95.4	199.83
2023-01-10	13:09:45	31.678	-104.3957	6.4	3.1	0.2	0.72	30	TexNet	95.7	216.43
2023-01-22	06:55:19	31.6093	-103.9637	8.5	3.1	0.1	0.28	46	TexNet	86.3	190.73
2023-02-04	14:35:12	32.2714	-101.9285	7.8	3.1	0.1	0.36	15	TexNet	175.7	93.63
2023-02-21	15:12:34	31.6383	-104.4201	6.1	3.1	0.2	0.86	23	TexNet	100.7	216.01
2023-02-22	07:44:10	31.6708	-104.3715	6.1	3.1	0.2	0.64	35	TexNet	95.1	215.04
2023-02-22	13:40:52	31.6692	-104.3658	6.6	3.1	0.2	0.64	40	TexNet	94.9	214.71
2023-02-27	13:57:53	31.6241	-104.264	6.1	3.1	0.2	0.5	41	TexNet	94.2	208.16
2023-03-13	14:13:51	31.6083	-103.9723	8.5	3.1	0.1	0.5	19	TexNet	86.5	191.25
2023-03-14	06:17:38	31.6634	-104.3415	6.7	3.1	0.2	1	17	TexNet	94.2	213.34

2023-03-20	10:38:34	31.6654	-104.344	5.3	3.1	0.2	0.72	21	TexNet	94.1	213.53
2023-03-27	01:55:01	32.0105	-103.8025	11.4	3.1	0.2	1.24	29	NMTSO	40.2	181.13
2023-01-23	05:18:16	31.613	-103.9803	8.3	3	0.1	0.42	41	TexNet	86.2	191.81
2023-02-13	00:05:45	31.6521	-104.3899	4.5	3	0.2	0.86	25	TexNet	97.8	215.18
2023-02-16	09:51:35	31.6481	-104.4041	7.2	3	0.3	0.78	39	TexNet	98.9	215.67
2023-02-27	09:53:05	31.6443	-104.1769	6.1	3	0.3	0.5	46	TexNet	88.6	204.14
2023-02-27	10:53:03	31.6401	-104.178	6.1	3	0.2	0.57	34	TexNet	89	204.08
2023-01-04	11:40:58	31.6092	-103.9697	8.6	2.9	0.1	0.36	19	TexNet	86.4	191.1
2023-01-13	04:17:49	31.5809	-104.0609	6.6	2.9	0.2	0.57	24	TexNet	91.5	196.04
2023-01-25	02:57:55	31.6698	-104.3774	7	2.9	0.2	0.64	43	TexNet	95.5	215.27
2023-01-27	16:00:52	31.7369	-104.1109	6.9	2.9	0.2	0.28	52	TexNet	76.6	203
2023-01-30	09:59:53	31.6462	-104.4041	4.5	2.9	0.2	0.71	26	TexNet	99.1	215.6
2023-02-02	17:12:10	31.6697	-104.4043	7.3	2.9	0.2	0.72	19	TexNet	97	216.5
2023-02-14	07:16:38	32.1075	-102.1353	7.9	2.9	0.2	0.57	17	TexNet	158.8	100.65
2023-02-22	10:58:48	31.6736	-104.3693	6.4	2.9	0.2	0.64	40	TexNet	94.7	215.04
2023-02-22	11:31:00	31.6736	-104.365	6.1	2.9	0.2	0.64	39	TexNet	94.4	214.84
2023-03-01	01:31:09	31.6169	-103.9816	7.2	2.9	0.1	0.28	38	TexNet	85.8	191.95
2023-03-08	08:13:02	32.3264	-102.1364	9.8	2.9	0.1	0.42	28	TexNet	155.8	91.85
2023-01-02	08:59:01	31.6774	-104.4135	7	2.8	0.2	0.72	28	TexNet	96.8	217.21
2023-01-05	04:05:47	31.6065	-103.9696	8.5	2.8	0.1	0.36	20	TexNet	86.7	191.05
2023-01-06	05:37:04	31.6927	-104.3633	7.5	2.8	0.2	0.58	36	TexNet	92.6	215.5
2023-01-09	09:16:26	31.6096	-104.003	9.9	2.8	0.2	0.64	20	TexNet	87	193.14
2023-01-22	08:31:09	31.6156	-103.9971	8.9	2.8	0.1	0.42	26	TexNet	86.2	192.88
2023-02-01	14:58:07	31.6056	-103.9707	10	2.8	0.1	0.57	26	TexNet	86.8	191.11
2023-02-15	07:44:48	31.6743	-104.4006	6.1	2.8	0.3	0.92	17	TexNet	96.3	216.51
2023-02-21	16:33:45	31.7177	-104.2911	7.6	2.8	0.3	0.58	23	TexNet	86.5	212.88
2023-02-28	01:44:54	32.0068	-103.8135	11.4	2.8	0.3	1.34	31	NMTSO	40.6	182.58
2023-03-01	05:09:37	31.1603	-103.7289	0.9	2.8	0.2	0.78	22	TexNet	134.8	177.36
2023-03-08	07:48:48	32.33	-102.1364	9.5	2.8	0.1	0.57	20	TexNet	155.8	91.7
2023-01-03	21:33:40	31.6243	-104.1198	6.1	2.7	0.2	0.5	27	TexNet	88.6	200.36
2023-01-09	07:11:45	31.6075	-103.9703	8.3	2.7	0.1	0.42	22	TexNet	86.6	191.11
2023-01-14	22:09:50	31.6152	-103.9686	6.6	2.7	0.1	0.5	19	TexNet	85.7	191.11
2023-01-15	02:03:06	31.7388	-104.1119	7.7	2.7	0.2	0.42	35	TexNet	76.5	203.13
2023-01-15	15:51:32	31.6906	-104.2871	7	2.7	0.3	0.64	28	TexNet	88.8	211.63
2023-01-22	10:22:17	32.2403	-103.0911	14.6	2.7	0.4	1.81	34	NMTSO	67.7	102.45
2023-01-22	16:19:10	32.2311	-103.0882	14.7	2.7	0.2	0.72	31	TexNet	68.2	103.24

2023-01-24	20:33:56	31.6677	-104.3889	7.4	2.7	0.2	0.72	15	TexNet	96.3	215.72
2023-01-30	06:55:56	31.6476	-104.4046	6.1	2.7	0.2	0.64	31	TexNet	99	215.67
2023-02-01	21:29:31	31.6072	-104.2353	9.7	2.7	0.2	0.5	47	TexNet	94.6	206.18
2023-02-02	08:28:25	31.6557	-104.3665	7.5	2.7	0.2	0.58	44	TexNet	96.2	214.24
2023-02-24	23:31:12	31.6807	-104.406	5.7	2.7	0.1	0.81	17	TexNet	96.1	217
2023-02-27	09:25:31	31.6398	-104.1771	6.1	2.7	0.2	0.42	47	TexNet	89	204.02
2023-02-28	23:31:54	31.6255	-104.3431	6.1	2.7	0.1	0.58	17	TexNet	97.8	212.07
2023-02-28	23:58:39	31.6165	-103.9976	8.2	2.7	0.1	0.57	17	TexNet	86.1	192.93
2023-03-10	21:47:21	31.5644	-104.1384	6.9	2.7	0.2	0.45	36	TexNet	95.5	199.97
2023-03-10	22:21:56	31.5653	-104.1376	6.7	2.7	0.2	0.5	29	TexNet	95.3	199.95
2023-03-13	13:48:39	31.6263	-104.2796	7.5	2.7	0.2	0.5	59	TexNet	94.7	209.02
2023-03-13	23:48:13	31.6543	-104.4348	5.9	2.7	0.1	0.92	14	TexNet	100.1	217.25
2023-03-15	04:22:53	31.6138	-104.3411	6.2	2.7	0.2	1	19	TexNet	98.8	211.58
2023-03-16	20:31:59	31.5195	-104.0041	7.9	2.7	0.1	0.64	19	TexNet	96.8	191.86
2023-03-17	08:40:32	31.6573	-104.4591	7.6	2.7	0.3	0.78	51	TexNet	101.2	218.4
2023-03-18	17:37:07	31.615	-103.9951	7.8	2.7	0.2	0.36	24	TexNet	86.2	192.75
2023-01-01	16:28:26	31.7173	-104.2798	7.1	2.6	0.2	0.5	26	TexNet	86	212.27
2023-01-03	01:26:09	31.7272	-104.5185	5.1	2.6	0.2	0.71	17	TexNet	99	223.72
2023-01-06	15:18:44	31.6574	-104.3035	6.4	2.6	0.2	0.57	49	TexNet	92.8	211.26
2023-01-08	21:47:29	31.1525	-103.724	9.6	2.6	0.2	0.64	22	TexNet	135.7	177.18
2023-01-11	11:40:01	32.4765	-102.0207	9.1	2.6	0.2	0.89	26	TexNet	166.9	85.99
2023-01-12	21:46:50	31.7215	-104.3043	7.2	2.6	0.2	0.5	27	TexNet	86.8	213.73
2023-01-13	15:06:43	31.6854	-104.3931	6.1	2.6	0.3	0.72	30	TexNet	94.9	216.61
2023-01-18	20:01:32	31.6253	-104.4004	7.6	2.6	0.2	1.12	12	TexNet	100.8	214.67
2023-01-19	04:55:09	31.6348	-104.3991	6.1	2.6	0.1	0.81	16	TexNet	99.8	214.96
2023-01-25	13:09:02	31.6821	-104.3947	6.1	2.6	0.2	0.81	25	TexNet	95.3	216.55
2023-01-30	13:28:08	32.4911	-101.6798	8.9	2.6	0.2	0.57	29	TexNet	198.9	86.17
2023-02-01	14:46:59	31.6637	-104.3353	8.4	2.6	0.2	0.58	24	TexNet	93.8	213.05
2023-02-01	18:23:04	31.5957	-104.2439	6.9	2.6	0.1	0.64	21	TexNet	96.1	206.28
2023-02-06	00:36:51	31.7045	-104.1677	7.1	2.6	0.2	0.5	26	TexNet	82.1	205.48
2023-02-07	17:03:38	31.6742	-104.4076	6.1	2.6	0.1	0.67	13	TexNet	96.7	216.82
2023-02-07	17:29:44	31.6837	-104.4068	5.8	2.6	0.1	0.72	16	TexNet	95.8	217.16
2023-02-08	07:30:00	31.6092	-103.963	7.5	2.6	0.1	0.28	16	TexNet	86.3	190.68
2023-02-09	23:28:51	31.6634	-104.4484	6.1	2.6	0.2	0.64	20	TexNet	100	218.18
2023-02-10	06:56:29	31.6797	-104.4103	6.1	2.6	0.2	0.81	21	TexNet	96.4	217.16
2023-02-12	16:33:32	31.9933	-103.8827	7	2.6	0.2	0.71	27	TexNet	42.9	191.23

2023-02-22	07:54:34	31.668	-104.3795	7.9	2.6	0.1	0.64	21	TexNet	95.7	215.3
2023-02-22	13:19:38	31.6678	-104.4145	4.9	2.6	0.2	0.92	28	TexNet	97.7	216.88
2023-02-23	05:24:27	31.6764	-104.4318	6.9	2.6	0.1	0.86	17	TexNet	97.9	217.98
2023-02-28	03:06:20	31.6791	-104.4388	6.6	2.6	0.3	0.58	46	TexNet	98.1	218.39
2023-03-01	06:58:49	31.7153	-104.3034	6.7	2.6	0.2	0.5	32	TexNet	87.3	213.43
2023-03-01	17:56:56	31.6397	-104.1775	6.1	2.6	0.2	0.5	29	TexNet	89.1	204.04
2023-03-06	02:34:10	31.6526	-104.2951	7.9	2.6	0.2	0.81	18	TexNet	92.9	210.67
2023-03-11	09:51:19	31.6075	-104.2762	7.6	2.6	0.1	0.72	16	TexNet	96.4	208.25
2023-03-14	09:59:42	31.6751	-104.3381	6.4	2.6	0.2	0.67	32	TexNet	92.9	213.61
2023-03-17	16:06:21	32.3795	-102.1064	3.2	2.6	0.2	0.57	57	TexNet	158.5	89.68
2023-03-20	15:25:53	31.6664	-104.3407	6.1	2.6	0.1	0.58	19	TexNet	93.8	213.41
2023-03-28	09:45:00	31.6188	-103.9623	6.1	2.6	0.2	0.36	26	TexNet	85.2	190.77
2023-01-08	14:07:47	31.6044	-103.959	7.8	2.5	0.1	0.36	21	TexNet	86.7	190.37
2023-01-08	19:28:17	31.6116	-103.9578	6	2.5	0	0.42	14	TexNet	85.9	190.39
2023-01-11	13:12:17	31.6796	-104.3602	5.6	2.5	0.2	0.86	18	TexNet	93.6	214.84
2023-01-13	15:52:19	31.7169	-104.2668	7	2.5	0.3	0.67	22	TexNet	85.4	211.56
2023-01-14	20:25:39	31.6803	-104.3931	7.2	2.5	0.2	0.64	29	TexNet	95.4	216.4
2023-01-15	16:05:07	31.7331	-104.2503	7	2.5	0.2	0.64	27	TexNet	83	211.29
2023-01-15	21:51:40	31.7381	-104.2487	8.1	2.5	0.3	0.5	26	TexNet	82.4	211.4
2023-01-21	14:33:44	31.6638	-104.3832	7.1	2.5	0.2	0.72	15	TexNet	96.3	215.31
2023-01-21	20:16:53	31.7235	-104.5313	6	2.5	0.2	1.03	18	TexNet	100.1	224.05
2023-01-21	23:22:46	32.4088	-102.1107	9.2	2.5	0.1	0.81	30	TexNet	158.1	88.5
2023-01-26	16:40:56	31.6929	-104.2941	7.1	2.5	0.2	0.5	39	TexNet	89	212.08
2023-01-30	11:19:58	32.4875	-101.6734	10.5	2.5	0.2	0.64	27	TexNet	199.5	86.29
2023-01-30	22:47:37	31.6276	-104.2861	7.6	2.5	0.2	0.5	35	TexNet	94.9	209.38
2023-01-31	16:57:52	31.687	-104.42	6.1	2.5	0.2	0.81	21	TexNet	96.3	217.88
2023-02-01	03:54:21	31.6864	-104.2887	7.4	2.5	0.2	0.58	22	TexNet	89.3	211.56
2023-02-01	15:23:15	31.5869	-104.2497	6.9	2.5	0.1	0.78	14	TexNet	97.3	206.32
2023-02-01	19:16:43	31.5901	-104.2497	6.1	2.5	0.1	0.58	20	TexNet	96.9	206.41
2023-02-11	14:36:11	31.6757	-104.5287	5.9	2.5	0.2	0.86	21	TexNet	103.8	221.94
2023-02-12	05:51:57	32.2952	-103.3603	8.5	2.5	0.4	1.14	35	NMTSO	41.6	101.76
2023-02-13	07:28:14	31.6642	-104.4586	8.8	2.5	0.2	0.78	34	TexNet	100.6	218.64
2023-02-22	07:01:42	31.6167	-104.2725	7.3	2.5	0.2	0.86	38	TexNet	95.3	208.35
2023-02-22	16:48:46	31.6722	-104.3704	6.2	2.5	0.1	0.5	20	TexNet	94.9	215.04
2023-02-27	13:18:46	31.6587	-104.3105	6.1	2.5	0.2	0.57	29	TexNet	93	211.66
2023-03-09	14:34:18	31.4989	-103.9912	6.7	2.5	0.1	0.64	17	TexNet	98.8	190.9

2023-03-10	03:41:36	31.6206	-104.0949	5.3	2.5	0.2	0.42	22	TexNet	88.2	198.83
2023-03-11	13:17:16	31.6434	-104.2625	7.8	2.5	0.1	0.67	15	TexNet	92.2	208.71
2023-03-11	13:33:31	31.6714	-104.4129	7.6	2.5	0.2	0.78	21	TexNet	97.3	216.95
2023-03-14	03:50:27	31.5283	-104.1641	5.8	2.5	0.2	1.14	20	TexNet	100.1	200.51
2023-03-14	05:25:17	31.6824	-104.4216	6.6	2.5	0.3	0.64	35	TexNet	96.8	217.77
2023-03-15	00:41:02	31.6472	-104.4361	5.3	2.5	0.2	1.39	14	TexNet	100.8	217.03
2023-03-16	20:25:18	31.6669	-104.3294	7.5	2.5	0.2	0.58	31	TexNet	93.2	212.88
2023-03-20	09:41:44	32.352	-104.4791	5.5	2.5	0.2	1.23	32	NMTSO	64.4	268.06
2023-03-21	01:24:22	31.6035	-104.5333	8.2	2.5	0.2	0.85	32	TexNet	110.2	219.34
2023-03-26	02:14:13	31.6059	-103.9765	8.7	2.5	0.1	0.36	21	TexNet	86.9	191.47
2023-03-28	09:44:27	32.4655	-102.0185	8.6	2.5	0.1	0.5	21	TexNet	167	86.41
2023-03-28	15:22:44	31.6168	-103.9601	5.3	2.5	0.1	0.36	16	TexNet	85.4	190.61
2023-03-30	00:10:34	31.1181	-103.6855	5.6	2.5	0.2	0.78	25	TexNet	139.8	175.76

Table 2: Seismic events within 300 km of the WIPP site and larger than magnitude 2.5, January 1 – March 31, 2023, as located by the upgraded WIPP Seismic Network.

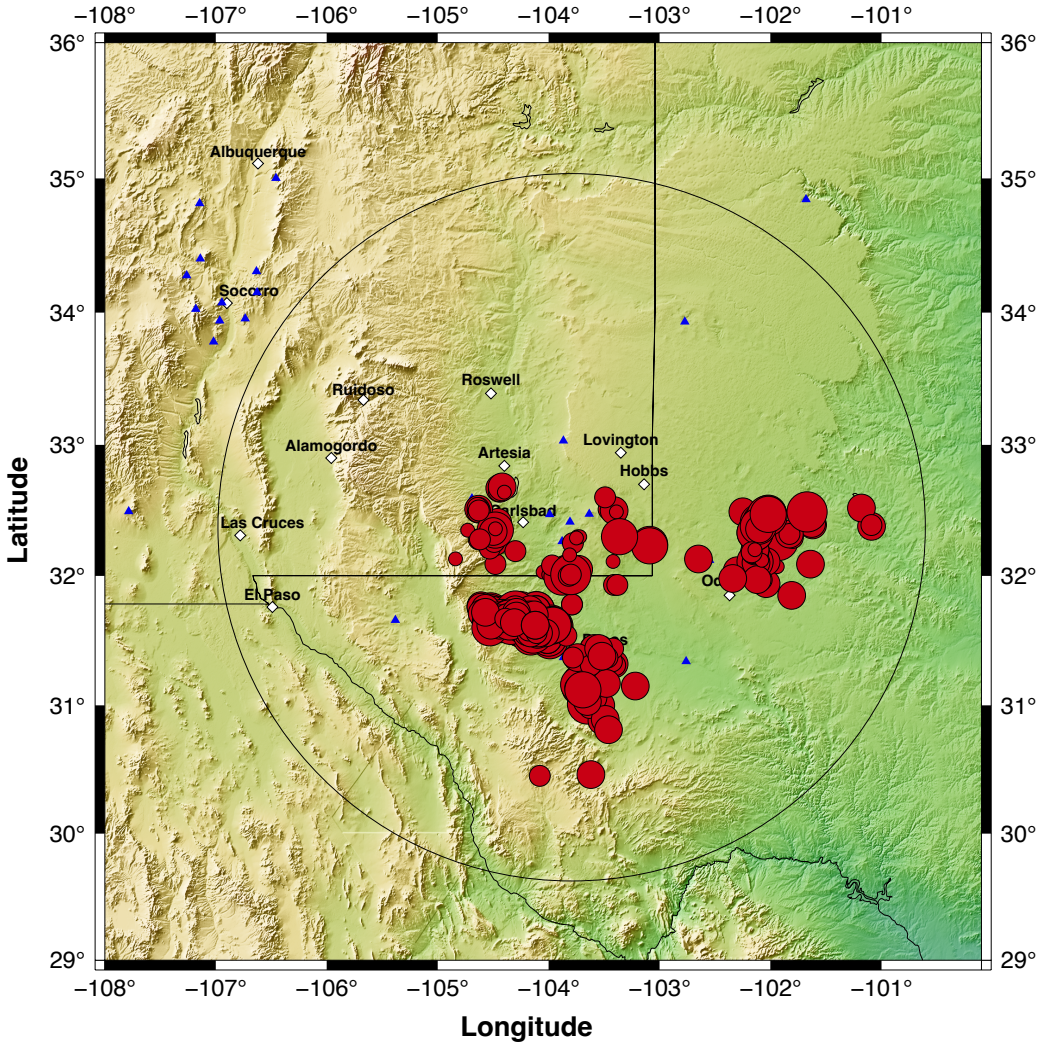

Figure 1: Seismic event activity within 300km (circled) of the WIPP site, January 1 – March 31, 2023 from Table 4 as detected by the upgraded WIPP Seismic Network. Towns are shown as white diamonds, seismic stations as blue triangles.

Appendix A1: Station Information

The seismicity within 300 km of the WIPP site is monitored at the New Mexico Institute of Mining and Technology. Data used are primarily from an 11-station network approximately centered on the WIPP site (Figure A1.1). Designations and coordinates for the stations in the network are given in Table A1.1. Digital packets from the network are transported via the Verizon cell network to the New Mexico Tech Seismological Observatory (NMTSO) in Socorro. Detections from the WIPP Seismic Network are combined with detections from TexNet, a seismic network operated by the state of Texas, to form the catalog of seismicity within 300km of the WIPP site. The stations and coordinates for the Socorro Magma Body Seismic Network are listed in Table A1.2.

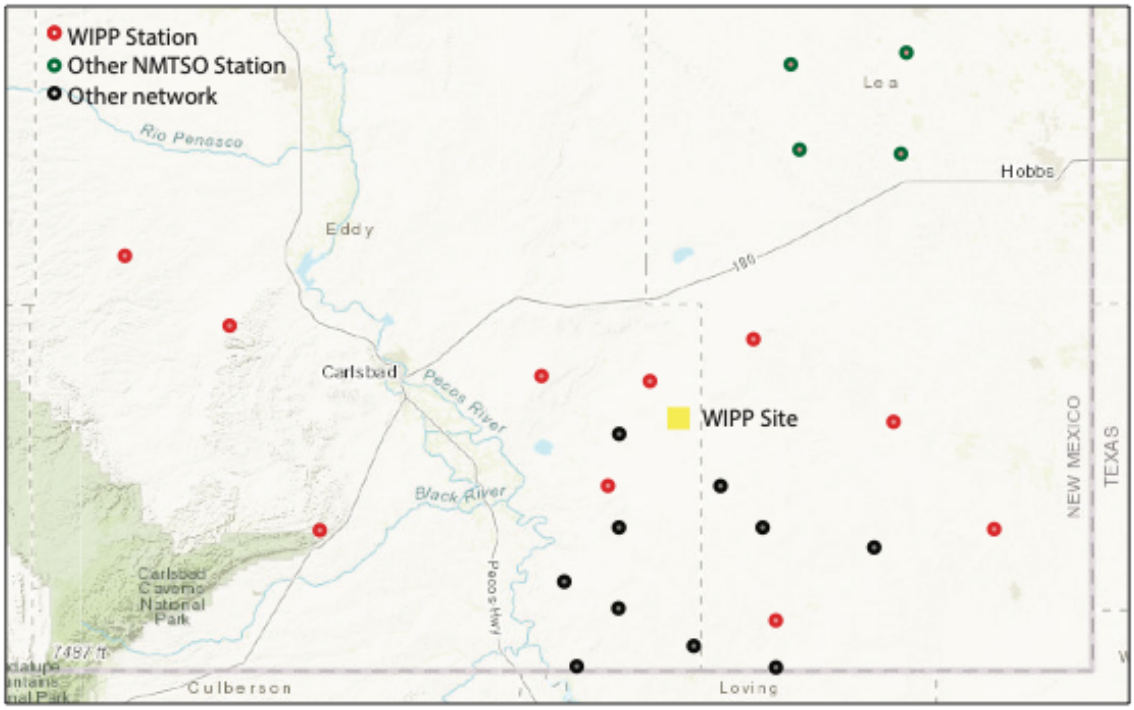

Figure A1.1: Location of seismographic stations in the WIPP Seismic Network

Station	North Latitude	West Longitude	Elevation (Meters)	Depth (Meters)	Kms to WIPP
CBET	32.4203°	103.9908°	1042	2.13	19
CL2B	32.2641°	103.8790°	1045	1.07	14
CL7	32.4130°	103.8084°	1032	1.99	5
CPRX	33.0308°	103.8673°	1356	1.07	73
DAG	32.5910°	104.6917°	1277	1.22	87
GDL2	32.2008°	104.3637°	1213	0.46	57
HTMS	32.4726°	103.6343°	1192	0.46	19
SRH	32.4918°	104.5154°	1270	0.46	69

SSS	32.3551°	103.3986°	1073	1.99	37
JAL	32.202412°	-103.22932°	1020		
PDB	32.072201°	-103.59662°	1025		

Table A1.1: WIPP Seismic Network station locations

Station	North Latitude	West Longitude	Elevation (Meters)	Kms to WIPP
ANMO	34.9417°	106.4583°	1853	377
BAR	34.1501°	106.6286°	2121	330
BMT**	34.2760°	107.2622°	1987	386
CAR	33.9529°	106.7356°	1658	326
LAZ**	34.4018°	107.1401°	1878	384
LEM	34.1658°	106.9730°	1698	357
LPM**	34.3070°	106.6342°	1737	340
MLM**	34.8143°	107.1455°	2088	412
SBY	33.9753°	107.1814°	3240	362
SMC	33.7791°	107.0196°	1560	339
WTX	34.0733°	106.9452°	1555	349
Y22A	33.9397°	106.9652°	1674	343
121A	32.5324°	107.7851°	1652	376
AMTX	34.8437°	101.6808°	1010	337
MSTX	33.9296°	102.7724°	1167	197
MNTX	31.6585°	105.3821°	405	170
SDCO	37.7456°	105.5012°	2569	616
T25A	37.1388°	104.4108°	2017	532
WUAZ	35.5169°	111.3739°	1592	782
PECS	31.3705°	103.8670°	914	111
MNHN	31.3402°	102.7614°	750	150
ODSA	32.1201°	102.5491°	943	121

Table A1.2: Supplementary station locations

** Socorro Magma Body stations down due to closure of repeater site on Socorro Mountain in 2014. Network upgrade pending funding.