A Report On The

SEISMICITY OF THE WIPP SITE

For The Period

April 1 2023 Through June 30 2023

for

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

by

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Executive Summary

During the period April 1 – June 30, 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 836 events within approximately 300 km of the WIPP site. 129 events were located in New Mexico by the NMTSO and 707 additional events were located in Texas by TexNet. Of these events, the largest magnitude recorded was 3.9 ML, 86.4 km S of the WIPP facility. A 1.9 ML event, located 7.2 km to the SW of the WIPP facility was the closest event recorded during the reporting period. A total of 65 events between 1.0 ML and 2.4 ML were located within 50 km of the WIPP facility.

Overall, the total amount of seismicity within 300 km of the WIPP site remained approximately constant, but the amount of seismicity within 50 km of the WIPP site increased compared to the previous quarter. The number of events to the west of Carlsbad continued to increase, and there was also an increase in the number of events in the vicinity of the WIPP site, although most of the them were smaller than magnitude 2.0. Although the majority of the events, especially most of the larger events, still took place in Texas, the moderate increase of activity in New Mexico will need to be continued to be observed.

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 CBET went down on May 12, 2023 and station JAL went down on June 6, 2023. Both stations will be repaired during planned fieldwork in the upcoming weeks.

Quarterly Seismicity

For the WIPP Seismic Network data recorded April 1 – June 30, 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	UsedStationCount	Org	dis-tance to WIPP(km)	azimuth from WIPP(deg)
2023-04-10	00:44:54	32.3483	-103.8657	4	1.9	0.3	1.39	15	NMTSO	7.2	248.95
2023-06-13	03:25:49	32.3135	-103.7357	15	1.2	0.4	2.52	10	NMTSO	8.5	139.61
2023-06-24	00:22:21	32.3062	-103.7466	14	2	0.4	1.59	20	NMTSO	8.5	148.47
2023-06-23	00:37:52	32.3053	-103.7457	10	2	0.4	1.32	20	NMTSO	8.7	148.34
2023-06-23	20:24:55	32.3044	-103.7466	12	2	0.3	1.28	17	NMTSO	8.7	149.17
2023-04-22	23:16:19	32.308	-103.7375	14	1.7	0.4	3.06	12	NMTSO	8.8	143.03
2023-05-17	21:04:12	32.2842	-103.7595	8	1.2	0.2	2.77	9	NMTSO	10.2	161.47
2023-04-05	01:05:20	32.2787	-103.765	1	1.2	0.3	2.07	9	NMTSO	10.7	165.14
2023-06-18	22:35:29	32.2888	-103.7292	7	1.3	0.2	2.03	10	NMTSO	11	146.48
2023-05-20	19:35:25	32.3007	-103.71	9	1.1	0.4	2.46	9	NMTSO	11.2	134.92
2023-04-17	03:29:15	32.2769	-103.7466	5	1.5	0.4	2.56	11	NMTSO	11.4	157.03
2023-05-30	11:22:56	32.2769	-103.7137	5	1.1	0.3	1.78	10	NMTSO	13	144.32
2023-05-06	07:25:50	32.4115	-103.6578	4	1.2	0.4	3.27	8	NMTSO	13.5	70.87
2023-06-01	16:29:05	32.3703	-103.9572	0	1.2	0.2	1.95	8	NMTSO	15.3	269.46
2023-05-15	10:01:35	32.4088	-103.6203	8	1.1	0.2	1.87	7	NMTSO	16.8	75.79
2023-04-19	10:48:39	32.2083	-103.8611	8	1.2	0.4	4.54	9	NMTSO	19.2	199.14
2023-04-29	20:18:58	32.2128	-103.71	9	1.4	0.4	1.95	15	NMTSO	19.3	155.87
2023-04-13	03:35:09	32.298	-103.5699	0	1.3	0.4	1.54	14	NMTSO	22.6	111.24

2023-04-13	08:59:09	32.5589	-103.9554	6	1.4	0.5	2.38	14	NMTSO	25.7	324.03
2023-06-22	21:40:25	32.1194	-103.8821	7	1.1	0.2	1.65	11	NMTSO	29.2	196.47
2023-05-20	23:42:41	32.1011	-103.7247	10	1.3	0.4	1.99	14	NMTSO	30.8	167.73
2023-05-24	04:29:54	32.6065	-103.6203	18	1.1	0.2	2.24	10	NMTSO	30.8	31.93
2023-05-28	06:02:56	32.1872	-103.5489	3	1.7	0.5	1.4	20	NMTSO	30.9	131.62
2023-06-09	19:59:28	32.0966	-103.7201	11	1.4	0.4	2.29	9	NMTSO	31.4	167.16
2023-05-26	15:34:23	32.0929	-103.7054	14	1.8	0.3	1.62	15	NMTSO	32.1	164.92
2023-04-19	10:20:56	32.2769	-103.4647	0	1.1	0.4	2.42	11	NMTSO	32.7	108.77
2023-04-29	14:30:43	32.0856	-103.8849	11	1.2	0.3	5.02	5	NMTSO	32.9	195.05
2023-06-19	04:44:51	32.5525	-103.5095	5	1.1	0.4	2.86	12	NMTSO	33.4	52.98
2023-05-25	11:13:50	32.254	-103.4601	11	1.2	0.4	3.81	9	NMTSO	34	112.6
2023-06-15	18:15:33	32.2394	-103.4674	7	1.3	0.5	2.93	11	NMTSO	34	115.57
2023-05-21	01:07:37	32.0673	-103.7347	9	1	0.5	4.18	8	NMTSO	34.3	170.61
2023-05-17	14:31:31	32.0599	-103.8007	7	1.1	0.4	2.72	9	NMTSO	34.7	181.02
2023-06-12	13:19:37	32.0645	-103.721	14	1.7	0.4	1.54	16	NMTSO	34.8	168.6
2023-04-02	07:13:46	32.0517	-103.7686	11	1.3	0.4	1.99	13	NMTSO	35.7	176.14
2023-05-17	14:23:58	32.0343	-103.7677	12	2	0.5	1.54	25	NMTSO	37.6	176.2
2023-06-22	22:38:57	32.0224	-103.8254	11	2.2	0.5	1.84	19	NMTSO	38.9	184.34
2023-05-13	07:22:35	32.0187	-103.7759	13	1.4	0.3	1.75	15	NMTSO	39.3	177.5
2023-04-18	18:11:18	32.0169	-103.7943	8	1.5	0.4	1.66	14	NMTSO	39.4	180.02
2023-04-08	13:41:05	32.0132	-103.7961	9	1.3	0.6	2.1	21	NMTSO	39.8	180.27
2023-04-12	05:19:49	32.016	-103.8373	9	2.4	0.4	1.59	26	NMTSO	39.8	185.88
2023-04-28	23:42:43	32.0132	-103.8016	8	2.3	0.4	1.51	25	NMTSO	39.9	181.01
2023-04-24	08:00:20	32.3502	-104.2227	11	1.6	0.5	1.75	17	NMTSO	40.3	266.61
2023-04-28	23:41:43	32.0087	-103.8226	12	2	0.4	2.17	16	NMTSO	40.4	183.81
2023-04-10	03:40:13	32.0096	-103.8437	7	1.5	0.4	1.62	17	NMTSO	40.5	186.63
2023-04-16	05:34:15	32.0059	-103.7979	8	2.1	0.3	1.16	21	NMTSO	40.7	180.51
2023-06-14	00:02:18	32.005	-103.8336	9	1.4	0.3	1.69	13	NMTSO	40.9	185.22
2023-06-30	14:25:34	32.0041	-103.8162	13	1.3	0.3	2.97	9	NMTSO	40.9	182.92
2023-05-30	08:28:58	32.0023	-103.8199	16	1.6	0.3	1.69	19	NMTSO	41.1	183.39
2023-05-18	05:43:10	32.0013	-103.775	11	1.4	0.4	1.96	14	NMTSO	41.2	177.5
2023-06-07	09:47:24	32.0013	-103.8226	14	1.9	0.3	1.07	24	NMTSO	41.3	183.74
2023-04-12	05:31:50	32.0004	-103.8235	10	1.1	0.3	1.77	11	NMTSO	41.4	183.85
2023-04-12	05:29:29	32.0004	-103.8455	9	1.1	0.4	3.42	10	NMTSO	41.6	186.7
2023-06-28	08:11:42	32.0151	-103.9334	11	1.9	0.4	2.73	12	NMTSO	41.8	198.33
2023-04-01	10:33:03	31.9933	-103.8714	6	2	0.1	0.72	17	TexNet	42.7	189.83
2023-04-05	19:16:05	31.9896	-103.8746	7	1.9	0.1	0.5	20	TexNet	43.1	190.13

2023-04-01	07:49:10	31.9889	-103.8722	7	1.9	0.2	0.64	32	TexNet	43.2	189.82
2023-05-02	05:47:36	32.0975	-103.4665	4	1.6	0.5	2.04	16	NMTSO	43.3	134.65
2023-04-14	05:20:30	32.2366	-103.353	1	1.9	0.6	1.85	21	NMTSO	44.1	109.89
2023-05-11	20:09:22	32.0279	-104.0305	7	1.5	0.3	1.76	10	NMTSO	44.2	210.24
2023-05-21	09:18:39	32.6102	-103.4116	17	1.2	0.2	1.78	8	NMTSO	44.6	53.49
2023-06-14	08:11:02	32.0132	-104.0121	6	1.2	0.2	1.93	11	NMTSO	44.8	207.29
2023-05-22	22:39:48	32.6065	-103.3841	13	1.8	0.4	2.19	12	NMTSO	46.5	55.78
2023-05-16	23:30:16	32.2101	-104.2731	0	1.2	0.4	7.7	7	NMTSO	48.5	248.27
2023-05-17	03:11:55	32.1735	-104.2657	5	1.2	0.3	2.35	7	NMTSO	49.5	243.6

Table 1: Seismic events within 50 km of the WIPP site, April 1 – June 30, 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	Mag-ni-tude	RMS	STD	Used Station Count	Org	dis-tance to WIPP(km)	azi-muth from WIPP(deg)
2023-05-22	22:59:55	31.6106	-103.9766	8	3.9	0.2	0.71	16	TexNet	86.4	191.54
2023-04-10	06:14:48	32.2604	-101.9306	6	3.8	0.1	0.5	20	TexNet	175.6	94.04
2023-05-10	23:20:50	31.5298	-104.1643	7	3.8	0.1	0.42	43	TexNet	99.9	200.55
2023-05-19	18:37:30	31.6089	-103.9905	9	3.8	0.1	0.36	19	TexNet	86.8	192.37
2023-04-17	18:03:41	31.6648	-104.2901	9	3.7	0.3	0.81	30	TexNet	91.5	210.85
2023-04-18	20:31:36	32.3666	-104.4754	1	3.7	0.4	1.58	31	NMTSO	64	269.51
2023-05-11	07:31:20	31.5364	-104.1531	7	3.6	0.2	0.64	45	TexNet	98.9	200.12
2023-04-10	15:25:51	31.6937	-104.4513	5	3.5	0.2	0.78	31	TexNet	97.6	219.52
2023-04-17	20:55:01	31.6571	-104.3606	7	3.5	0.3	0.94	23	TexNet	95.7	214.01
2023-05-22	22:59:08	31.6129	-103.9696	8	3.5	0.1	0.57	14	TexNet	86	191.14
2023-05-25	09:29:51	31.7061	-104.5465	6	3.5	0.3	1.27	25	TexNet	102.5	223.89
2023-04-01	19:33:38	31.6214	-104.428	8	3.4	0.2	0.64	42	TexNet	102.6	215.74
2023-04-20	04:25:39	31.6069	-103.9777	9	3.4	0.1	0.57	17	TexNet	86.8	191.56
2023-06-02	21:51:49	31.6742	-104.4086	7	3.4	0.2	0.64	25	TexNet	96.8	216.87
2023-06-05	22:38:48	32.5223	-104.4516	4	3.3	0.3	1.29	28	NMTSO	63.9	285.21

2023-04-17	14:52:40	31.651	-104.2975	7	3.2	0.2	0.81	16	TexNet	93.1	210.74
2023-04-25	07:40:51	31.6061	-103.9588	8	3.2	0.1	0.57	13	TexNet	86.5	190.38
2023-04-26	07:27:15	31.6822	-104.3909	6	3.2	0.3	0.72	38	TexNet	95.1	216.38
2023-04-28	03:41:18	31.6518	-104.2854	8	3.2	0.2	0.86	14	TexNet	92.5	210.16
2023-05-06	01:48:46	31.5877	-104.5205	6	3.2	0.3	1.7	19	TexNet	110.9	218.29
2023-05-08	21:58:07	31.6777	-104.4116	7	3.2	0.3	0.57	54	TexNet	96.7	217.14
2023-06-14	03:46:25	31.561	-104.0914	6	3.2	0.1	0.71	13	TexNet	94.4	197.35
2023-04-15	22:35:39	31.703	-104.1382	7	3.1	0.2	0.42	26	TexNet	81.1	203.65
2023-04-16	05:36:49	31.6816	-104.4028	6	3.1	0.3	0.78	28	TexNet	95.8	216.9
2023-05-22	14:20:30	31.6541	-104.3218	7	3.1	0.2	0.81	19	TexNet	94	212.05
2023-05-22	22:58:36	31.6129	-103.9712	8	3.1	0.1	0.42	17	TexNet	86	191.24
2023-05-26	14:51:25	31.6071	-103.9871	6	3.1	0.2	1.06	17	TexNet	86.9	192.13
2023-04-09	14:35:28	31.5612	-104.1624	8	3	0.1	0.86	20	TexNet	96.6	201.17
2023-04-15	23:44:03	31.7001	-104.1348	8	3	0.3	0.42	43	TexNet	81.3	203.35
2023-04-26	14:27:42	31.6436	-104.3841	7	3	0.2	0.78	35	TexNet	98.2	214.6
2023-05-02	02:35:36	31.7252	-104.3498	5	3	0.2	0.64	23	TexNet	88.9	216.18
2023-05-13	06:27:54	31.6804	-104.3834	7	3	0.1	0.64	37	TexNet	94.8	215.96
2023-05-13	13:18:23	31.7073	-104.1709	8	3	0.2	0.42	51	TexNet	82	205.76
2023-05-22	14:38:44	31.7024	-104.5486	5	3	0.3	2.15	21	TexNet	102.9	223.81
2023-05-28	10:08:16	31.6473	-104.2639	6	3	0.3	1.08	18	TexNet	91.9	208.91
2023-06-03	00:01:09	31.6747	-104.4059	6	3	0.1	0.78	15	TexNet	96.6	216.76
2023-06-16	18:02:05	31.6114	-103.9832	9	3	0.1	0.42	44	TexNet	86.4	191.96
2023-04-01	08:58:24	31.5612	-104.1592	8	2.9	0.1	0.78	16	TexNet	96.5	201
2023-04-01	15:15:42	31.6328	-104.4179	6	2.9	0.2	0.78	27	TexNet	101	215.71
2023-04-01	19:35:11	31.6379	-104.4126	6	2.9	0.2	0.64	29	TexNet	100.3	215.67
2023-04-10	09:43:15	32.2586	-101.9242	7	2.9	0.1	0.36	22	TexNet	176.2	94.09
2023-04-13	14:44:05	31.7517	-104.5912	7	2.9	0.3	1.3	33	TexNet	101.9	227.55
2023-04-19	22:57:29	31.6347	-104.3746	6	2.9	0.3	1	26	TexNet	98.5	213.85
2023-04-25	23:50:36	31.7086	-104.4849	6	2.9	0.2	1	29	TexNet	98.4	221.55
2023-05-02	14:03:34	31.7238	-104.3471	7	2.9	0.3	0.5	52	TexNet	88.9	215.98
2023-05-07	10:38:03	31.6357	-104.3937	6	2.9	0.2	1.03	18	TexNet	99.5	214.75
2023-05-14	16:02:12	31.5635	-104.1646	9	2.9	0.1	0.78	25	TexNet	96.4	201.34
2023-05-24	03:08:13	31.6621	-104.3719	6	2.9	0.3	1.03	20	TexNet	95.9	214.73
2023-05-27	08:24:28	31.7174	-104.2658	7	2.9	0.2	0.72	18	TexNet	85.3	211.52
2023-06-06	03:12:24	31.6079	-103.961	6	2.9	0.2	0.92	16	TexNet	86.4	190.54
2023-06-12	18:25:25	31.6956	-104.2909	8	2.9	0.2	0.57	41	TexNet	88.6	212.02
2023-06-13	02:30:07	31.6905	-104.2979	7	2.9	0.1	0.58	18	TexNet	89.4	212.19

2023-06-14	19:01:00	31.957	-103.3505	7	2.9	0.2	1.06	27	TexNet	62.2	137.77
2023-06-19	04:18:34	31.6524	-104.3024	8	2.9	0.3	0.98	16	TexNet	93.2	211.03
2023-06-19	22:10:39	31.5179	-104.0232	8	2.9	0.2	0.71	17	TexNet	97.4	192.89
2023-06-24	20:26:49	31.6862	-104.1605	6	2.9	0.2	0.36	35	TexNet	83.7	204.46
2023-04-06	04:35:33	31.6295	-104.4238	6	2.8	0.2	0.78	25	TexNet	101.7	215.85
2023-04-07	05:24:42	32.0096	-101.7077	9	2.8	0.1	0.64	13	TexNet	200.4	101.56
2023-04-09	14:33:51	31.5621	-104.1587	9	2.8	0.1	0.64	25	TexNet	96.4	201
2023-04-16	05:50:27	31.6795	-104.403	7	2.8	0.3	0.71	38	TexNet	96	216.82
2023-04-17	09:18:33	31.8983	-103.4531	8	2.8	0.2	0.85	17	TexNet	61.6	148.55
2023-04-17	14:19:13	31.6633	-104.363	7	2.8	0.2	0.5	36	TexNet	95.3	214.36
2023-04-17	20:47:22	31.6777	-104.371	6	2.8	0.2	0.58	28	TexNet	94.4	215.28
2023-04-24	08:07:33	32.3703	-104.4827	7	2.8	0.3	1.31	32	NMTSO	64.7	269.87
2023-04-25	03:28:22	31.6803	-104.3963	6	2.8	0.2	0.64	26	TexNet	95.6	216.55
2023-04-26	07:26:57	31.6759	-104.4062	6	2.8	0.2	0.86	12	TexNet	96.5	216.82
2023-05-05	06:27:50	31.6686	-104.5496	6	2.8	0.2	0.72	55	TexNet	105.8	222.45
2023-05-10	23:20:03	31.5405	-104.1634	7	2.8	0.2	0.72	34	TexNet	98.8	200.74
2023-05-12	02:54:30	31.5235	-104.1681	7	2.8	0.1	0.78	23	TexNet	100.7	200.6
2023-05-12	06:49:51	31.5283	-104.1652	9	2.8	0.2	0.85	28	TexNet	100.1	200.56
2023-06-03	01:30:59	31.063	-103.3188	3	2.8	0.2	0.71	11	TexNet	152.3	162.72
2023-06-19	17:49:26	31.6732	-104.1954	6	2.8	0.2	0.71	32	TexNet	86.4	206.06
2023-06-20	18:02:29	31.6606	-104.3907	6	2.8	0.2	0.86	24	TexNet	97	215.54
2023-04-09	01:12:00	31.7259	-104.5114	4	2.7	0.1	0.58	20	TexNet	98.6	223.38
2023-04-17	00:30:44	31.6568	-104.3662	9	2.7	0.3	0.99	40	TexNet	96.1	214.27
2023-04-17	19:26:57	31.6616	-104.2976	7	2.7	0.2	0.72	20	TexNet	92.1	211.12
2023-04-21	14:56:32	31.5637	-104.1606	9	2.7	0.2	0.72	23	TexNet	96.3	201.13
2023-04-28	08:05:07	31.6576	-104.2739	8	2.7	0.2	0.5	52	TexNet	91.4	209.77
2023-05-01	16:59:04	31.5781	-104.1727	7	2.7	0.1	0.5	28	TexNet	95.2	202.12
2023-05-04	07:56:12	32.2476	-103.0673	16	2.7	0.5	1.76	30	NMTSO	69.7	101.4
2023-05-06	13:35:06	31.6142	-104.5108	8	2.7	0.2	0.78	70	TexNet	108	218.86
2023-05-09	17:07:30	31.611	-103.996	8	2.7	0.1	0.57	16	TexNet	86.7	192.74
2023-05-12	07:40:00	31.6104	-104.1001	9	2.7	0.2	0.57	33	TexNet	89.4	198.9
2023-05-13	05:44:05	31.6167	-104.1859	3	2.7	0.1	0.72	18	TexNet	91.7	203.84
2023-05-24	01:12:14	31.6208	-103.9562	7	2.7	0.1	0.57	23	TexNet	84.9	190.42
2023-05-26	05:34:58	31.6147	-103.9695	7	2.7	0.1	0.42	15	TexNet	85.8	191.16
2023-05-28	11:46:39	31.66	-104.2573	6	2.7	0.3	0.86	23	TexNet	90.4	208.99
2023-05-29	06:57:52	31.7404	-104.2503	7	2.7	0.2	0.67	20	TexNet	82.3	211.58
2023-06-07	10:55:48	31.9507	-103.3367	7	2.7	0.1	0.78	13	TexNet	63.6	137.32

2023-06-09	15:36:10	31.4918	-104.0373	6	2.7	0.2	0.92	18	TexNet	100.5	193.26
2023-06-20	20:52:08	31.5248	-104.174	6	2.7	0.2	0.72	20	TexNet	100.8	200.93
2023-04-03	21:11:52	31.687	-104.4287	6	2.6	0.2	0.78	32	TexNet	96.8	218.27
2023-04-25	08:30:52	31.6101	-103.9603	9	2.6	0.2	0.42	33	TexNet	86.1	190.53
2023-04-27	02:40:40	31.6792	-104.4151	7	2.6	0.2	0.57	46	TexNet	96.7	217.35
2023-04-27	22:28:32	31.6543	-104.2798	8	2.6	0.3	0.64	35	TexNet	92	209.96
2023-05-08	03:53:41	31.6495	-104.466	6	2.6	0.1	0.99	27	TexNet	102.3	218.38
2023-05-09	16:56:54	31.6125	-103.9967	9	2.6	0.2	0.42	34	TexNet	86.5	192.81
2023-05-18	08:34:54	31.1702	-103.2609	2	2.6	0.2	0.85	15	TexNet	142.8	159.21
2023-05-18	19:00:00	31.6786	-104.4138	7	2.6	0.2	0.64	27	TexNet	96.7	217.27
2023-05-19	00:49:51	31.6816	-104.3995	7	2.6	0.2	0.64	35	TexNet	95.6	216.75
2023-05-22	23:01:06	31.6125	-103.9729	8	2.6	0.2	0.71	15	TexNet	86.1	191.34
2023-05-30	02:00:04	31.6136	-103.9839	7	2.6	0.1	0.42	14	TexNet	86.2	192.04
2023-05-30	11:49:30	31.5988	-104.2302	3	2.6	0.1	1.13	14	TexNet	95.3	205.67
2023-05-30	13:23:31	31.592	-104.2465	6	2.6	0.2	0.58	24	TexNet	96.6	206.3
2023-06-03	10:49:40	31.737	-104.1075	8	2.6	0.1	0.57	17	TexNet	76.5	202.78
2023-06-10	01:12:05	31.723	-104.4075	6	2.6	0.2	0.78	34	TexNet	92.4	218.81
2023-06-19	02:23:39	31.6551	-104.297	6	2.6	0.2	0.67	20	TexNet	92.7	210.86
2023-06-19	06:36:14	31.6111	-103.968	8	2.6	0.1	0.57	15	TexNet	86.1	191.02
2023-06-20	00:22:44	31.6987	-104.1353	7	2.6	0.1	0.5	17	TexNet	81.4	203.34
2023-06-25	12:50:29	31.6315	-104.4136	8	2.6	0.2	0.78	44	TexNet	100.9	215.48
2023-04-01	06:49:47	31.2071	-103.7659	10	2.5	0.2	0.64	48	TexNet	129.5	178.81
2023-04-05	08:15:08	31.6742	-104.4065	7	2.5	0.1	0.78	16	TexNet	96.7	216.77
2023-04-06	20:05:59	31.639	-104.421	6	2.5	0.2	1.36	22	TexNet	100.6	216.07
2023-04-12	05:58:49	31.5214	-104.0068	7	2.5	0.1	0.5	26	TexNet	96.6	192.04
2023-04-13	00:31:38	31.9457	-103.3632	10	2.5	0.2	0.78	14	TexNet	62.4	139.35
2023-04-16	00:21:58	31.6994	-104.1361	7	2.5	0.2	0.5	27	TexNet	81.4	203.41
2023-04-16	12:46:39	31.3099	-103.4109	5	2.5	0.2	0.78	14	TexNet	123.5	162.86
2023-04-17	13:07:45	31.695	-104.4691	7	2.5	0.3	0.86	43	TexNet	98.5	220.33
2023-04-18	01:52:28	31.6748	-104.3882	9	2.5	0.3	0.86	35	TexNet	95.6	215.96
2023-04-18	22:15:59	32.3666	-104.4736	0	2.5	0.5	1.61	22	NMTSO	63.8	269.5
2023-04-19	04:14:17	31.6556	-104.296	7	2.5	0.2	0.72	30	TexNet	92.6	210.82
2023-04-21	09:43:10	31.6136	-103.9996	8	2.5	0.1	0.42	13	TexNet	86.5	193
2023-04-24	04:43:24	31.5653	-104.1603	9	2.5	0.2	0.57	43	TexNet	96.1	201.16
2023-04-24	05:17:42	31.5704	-104.1609	8	2.5	0.2	0.64	37	TexNet	95.6	201.31
2023-04-24	12:27:38	32.6212	-104.4113	0	2.5	0.5	1.81	31	NMTSO	64.2	295.64
2023-04-25	04:27:22	32.3062	-104.6072	0	2.5	0.3	1.34	31	NMTSO	76.7	264.57

2023-04-25	12:32:14	32.3044	-104.6091	0	2.5	0.4	1.44	26	NMTSO	76.9	264.43
2023-04-26	07:34:00	31.6842	-104.3977	7	2.5	0.3	0.64	45	TexNet	95.3	216.77
2023-04-28	11:57:02	31.6163	-104.2628	8	2.5	0.3	0.71	43	TexNet	94.9	207.85
2023-04-29	14:03:10	31.6733	-104.3696	6	2.5	0.3	0.5	31	TexNet	94.7	215.05
2023-04-29	17:08:48	31.6144	-103.9873	8	2.5	0.2	0.42	31	TexNet	86.1	192.26
2023-04-30	04:59:19	31.6978	-104.1375	8	2.5	0.2	0.42	54	TexNet	81.6	203.44
2023-05-02	19:12:48	31.7248	-104.3449	8	2.5	0.3	0.36	27	TexNet	88.7	215.92
2023-05-08	19:15:10	31.6552	-104.2927	9	2.5	0.3	0.81	37	TexNet	92.5	210.64
2023-05-14	06:38:24	31.6531	-104.2925	9	2.5	0.1	0.54	22	TexNet	92.7	210.56
2023-05-15	05:08:58	31.6096	-104.5455	8	2.5	0.1	1.36	35	TexNet	110.5	220.02
2023-05-16	02:41:01	31.6809	-104.2014	7	2.5	0.2	0.5	32	TexNet	85.9	206.65
2023-05-22	23:01:38	31.6138	-103.9782	7	2.5	0.1	0.5	14	TexNet	86	191.69
2023-05-22	23:13:29	31.6172	-104.5133	7	2.5	0.3	1.14	28	TexNet	107.9	219.07
2023-05-26	20:06:59	32.3026	-101.7934	7	2.5	0.3	0.92	17	TexNet	188.1	92.34
2023-05-28	10:16:10	31.653	-104.2626	6	2.5	0.2	0.58	26	TexNet	91.3	209.03
2023-06-03	18:48:13	31.6708	-104.5416	7	2.5	0.1	0.71	23	TexNet	105.1	222.23
2023-06-15	23:27:50	31.945	-103.3462	8	2.5	0.1	1.5	12	TexNet	63.5	138.3
2023-06-16	06:26:43	31.6129	-103.9782	7	2.5	0.1	0.71	15	TexNet	86.1	191.68
2023-06-19	22:11:59	31.5209	-104.0117	8	2.5	0.1	0.64	18	TexNet	96.8	192.3
2023-06-21	08:22:38	32.3154	-101.8213	6	2.5	0.1	0.42	22	TexNet	185.4	91.93
2023-06-29	15:28:24	32.4417	-102.1193	8	2.5	0.1	0.5	21	TexNet	157.4	87.16
2023-06-29	19:01:19	31.6126	-103.9893	7	2.5	0.1	0.85	11	TexNet	86.4	192.35

Table 2: Seismic events within 300 km of the WIPP site and larger than magnitude 2.5, April 1 – June 30, 2023, as located by the upgraded WIPP Seismic Network.

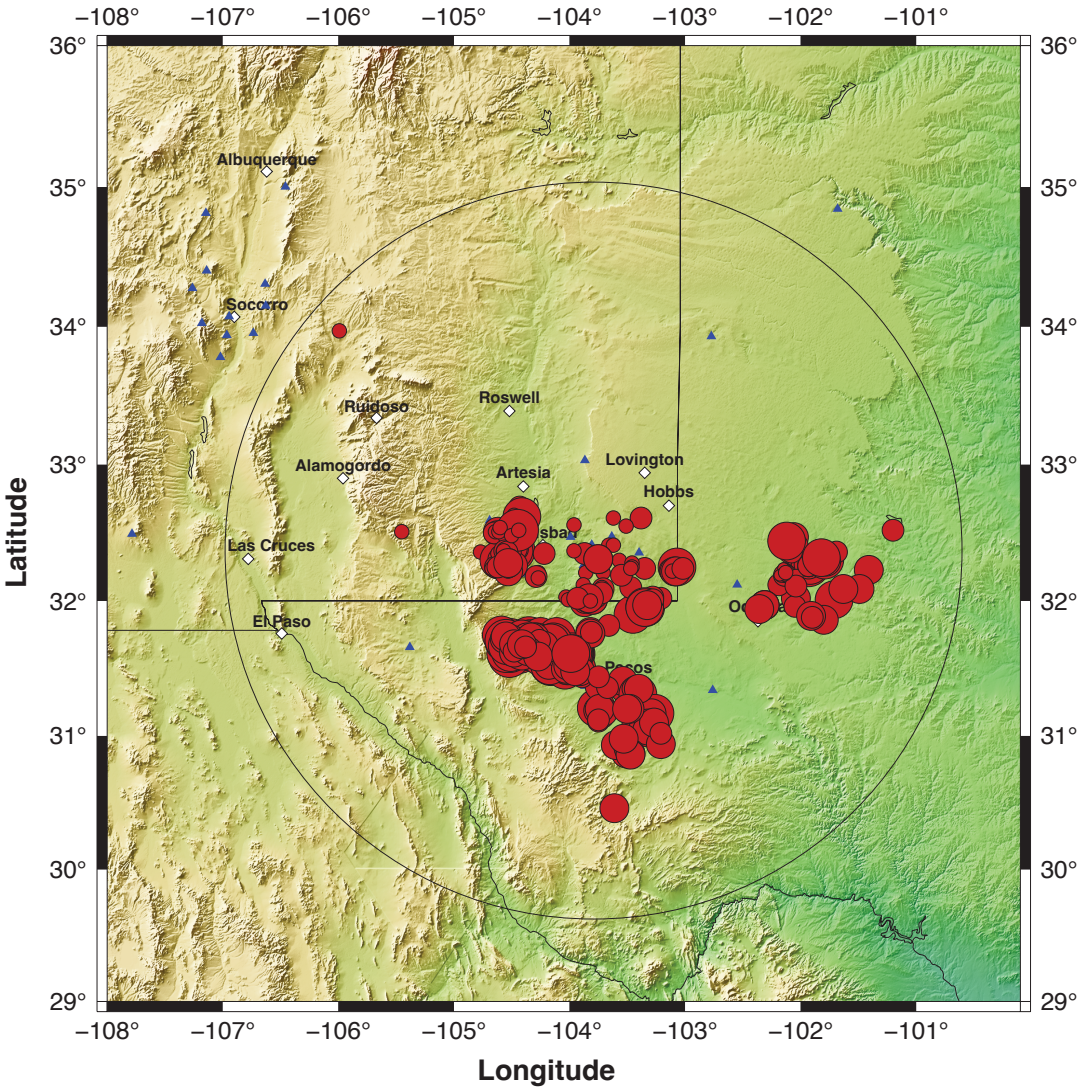

Figure 1: Seismic event activity within 300km (circled) of the WIPP site, April 1 – June 30, 2023 from Table 4 as detected by the upgraded WIPP Seismic Network. Towns are shown as white diamonds, seismic stations as blue triangles.

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.

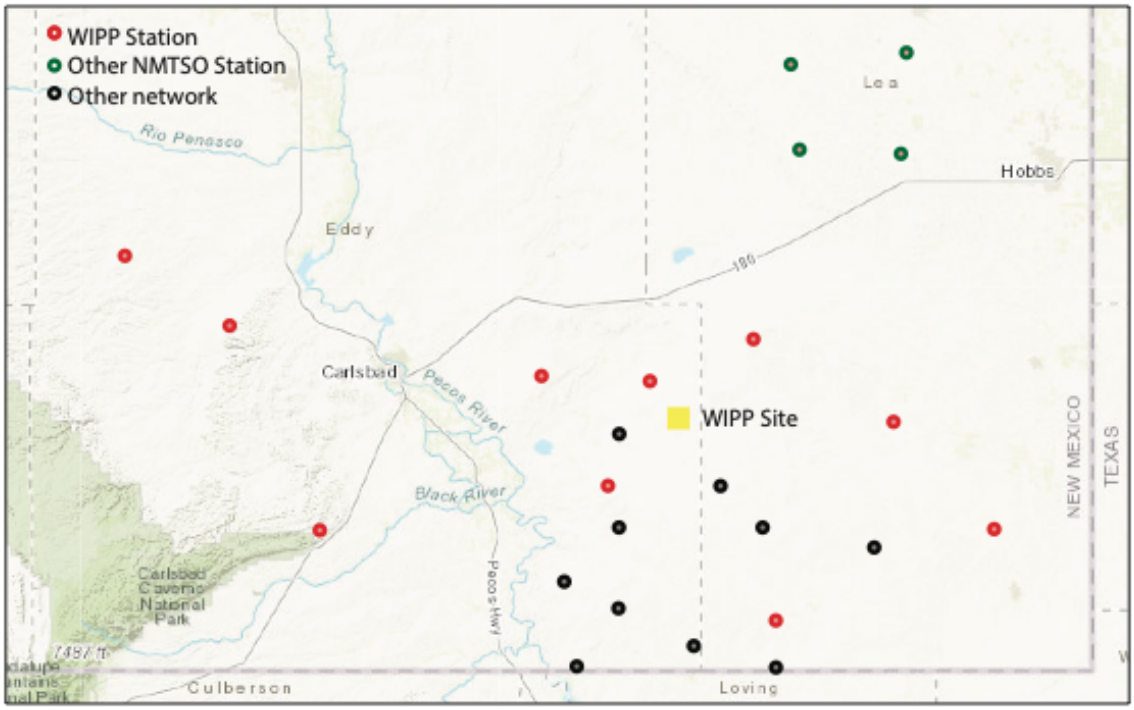

Figure A1.1: Location of seismographic stations in the WIPP Seismic Network

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.