Microseismic Monitoring Report
Sulphur Mines Salt Dome – Louisiana (US)
Borehole and Surface Seismic Arrays

Michael Reese 8/15/2025

Report Period: July 2025

Reference: 2634299-SUL-MR-250701

Report Review: Michael Reese – Baker Hughes LBPG #1428

LBPG review using results from Baker Hughes and Nanometrics Inc.

This review is based solely on microseismic monitoring results provided in the Baker Hughes June 2025 monthly report from the Baker Hughes microseismic team. The report results were passed through the Baker Hughes QA/QC microseismic processing workflows for accuracy and repeatability. No other information, data or observations from the Sulfur Mines Salt Dome operations were provided to support Baker Hughes report results for this PG review. Interpretation of the events is performed by Sulphur Mines Salt Dome. Details of processing and events are provided in the Baker Hughes July 2025 report (appended to this cover letter).

Seismic monitoring and data processing at Sulphur Mines Salt Dome combines the borehole and surface seismic arrays data for microseismic event processing. This includes the follow:

- Nanometrics operates and performs seismic processing for the surface seismic array using broadband network stations.
- Baker Hughes accesses the real time surface array waveform data and integrates it into the borehole waveform data for processing the microseismic location and magnitude.
- Baker Hughes provides event locations and magnitudes for all seismic events at Sulphur Mines Salt Dome using the combined borehole arrays and surface array waveform data.

Alert Level Status: Low (Green)

There was no seismic event with a magnitude >0.5 in the AOI and less than 30 MEQ per day in AOI with magnitudes > -1, thus maintaining the defined alert level status at Low (green).

With the borehole arrays, an increase to 105 detections / 35 located events were observed in July 2025 from 69 detections / 27 located events observed in June 2025. There were 16 events reported in the AOI. With 4 events (AOI Cap Rock), 11 events (AOI caverns) and 1 event (AOI Flank). The cavern with the largest number of associated events (7) was LGS-02, same as in June 2025. There were no events associated with cavern PPG-07. There were 19 events outside the AOI (3-caprock and 16-flank). The maximum magnitude of -0.56 was reported off the flank in two events (3165 and 5550 ft.). The depths of all observed events from 950 ft to 5550 ft.

MICROSEISMIC MONITORING MONTHLY REPORT: July 2025

Sulphur Mines Salt Dome – Louisiana (US)

2634299-SUL-MR-250701

Client / Site		Sulphur Mines Salt Dome
Recipient		Joshua Bradley (Westlake)
Reference		2634299-SUL-MR-250701
Period	***from***	2025/07/01
	to	2025/07/31

Revision history

Version	Date	Issued by	Verified by	Approved by	Description
1.0	2025/08/15	E. Barbieri	E. Fortier	G. Regis	Monthly report

Acronyms

Acronym	Signification
N/A	Not Applicable
PGV	Peak Ground Velocity
AOI	Area Of Interest

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Summary

Network & IT status	**System Uptime**	100 % - Borehole arrays 100 % - Surface Network
	Digitizers connectivity	Continuous, with no acquisition stops
	Sensors / Noise level	Borehole arrays: ○ PPG-6 (6 levels)→ 5 to 20 nm (RMS) ○ PPG-2 (6 levels) → 8 to 20 nm (RMS) except sensors PPG-2.3 and PPG-2.6 (20-100 nm/s) Surface receivers: ○ 6 sensors (3-axis) →6.2 cumulative days of stop for SUL02 digitizer: from 1st to 09th of July
Seismic activity	**BOREHOLE ARRAY**	
	Detections	105
	(of which) Located	35
	Max magnitude	-0.6
	Max PGV	0.0683 mm/s
	Min depth	950 (ft)
	Max depth	5,550 (ft)
	Number of alerts in the month	**0 – No alert triggered in July 2025**

PGV = Peak Ground Velocity – Maximum vibration measured on the sensors (mm/s)

Introduction

I. Alert Level Status

During July 2025, the alert level status was: Low (Green). Alert level criteria are listed in Appendix 1.

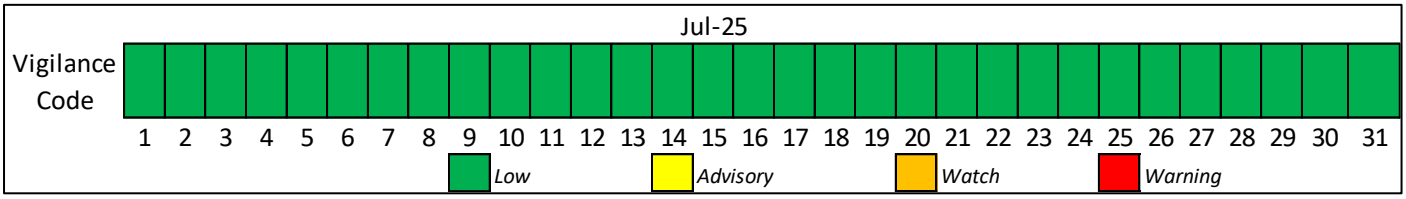

Figure 1: Alert status level during July 2025.

II. Seismic Network

Microseismic monitoring in Sulphur Mine Salt Dome is executed by:

- **Two borehole arrays**
  - Baker Hughes Microseismic Services group operates and processes data for the borehole seismic arrays located in PPG Well No. 006-X and PPG Well No. 020. The seismic array locations are shown in Figure 2, and the coordinates are listed in the Appendix 2. The borehole arrays were fully functional in July 2025.
- **A surface network, composed by 6 Broadband Trillium**
  - Data recorded by the surface broadband array operated by Nanometrics are merged with the borehole stations. The broadband station locations are shown in Figure 2 and listed in Appendix 2.

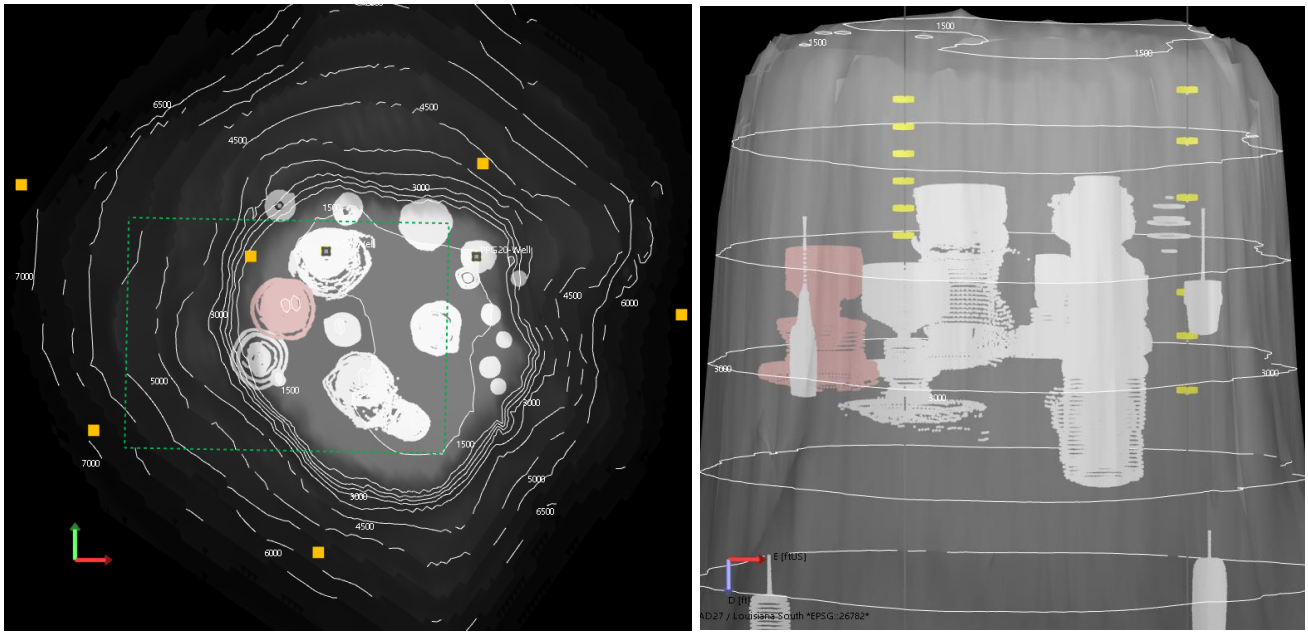

Figure 2: Map (left) and West-East cross section (looking from the South) of the Sulphur Mines Salt Dome. The salt boundary is indicated by gray contour lines. The wellbores with the borehole array sensors are marked by yellow dots for PPG No. 006X and PPG No. 020. Cavern 7 is represented with a red sonar survey. The proposed AOI is indicated on the map view by the green square. The surface network is indicated by the orange squares.

Microseismic activity during reporting period

In July 2025, 105 seismic events have been detected by the borehole arrays, 35 events had waveform with sufficient signal to noise ratio to compute their location and magnitude.

- Amongst the 35 located events 16 are inside the AOI (Area Of Interest):
  - 4 events in the AOI Cap-Rock.
  - 1 event in the AOI Flank.
  - 11 events are associated with caverns inside the AOI - the cavern with the largest number of associated events was LGS-02 (7 events).
  - There were no events associated with cavern PPG-07 during the reporting period.

- The other events (19) are outside the AOI and located:
  - 16 located on the dome flank.
  - 3 within the dome Cap Rock.

- There are two Mw -0.6 events (see event 3 & 34). "Maximum Magnitude during this period was -0.6 on 07/06/2025 08:37:50 (CST) and 07/28/2025 18:33:00 (CST). Both events were associated with the flank area.

The catalog of the located events is presented in Appendix 3.

I. Distribution of the microseismic event

The histogram below shows the number of the locatable and non-locatable events during July 2025.

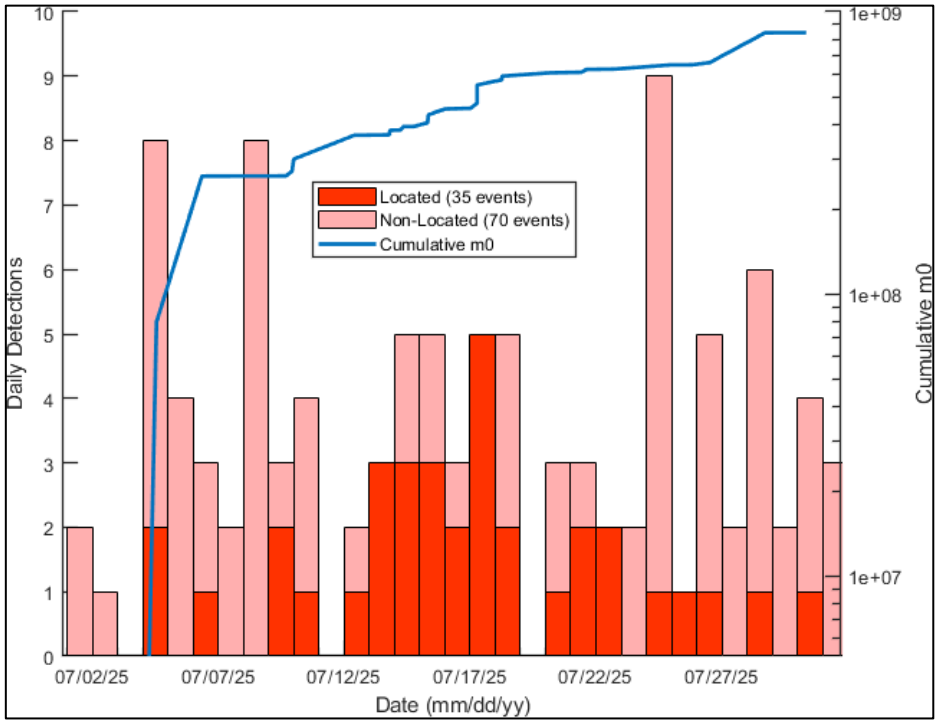

Figure 3: Daily distribution of all events during July 2025. Dark color represents the located events while light one shows the not located ones. Blue line represents the cumulative seismic moment Mo (energy) for the located events.

Figure 4 shows the distribution of the events by area. In July 2025 the seismicity occurred mainly in the flank area (16 events) and around cavern LGS-02 (7 events).

According with Figure 5, which shows the cumulated seismic energy with respect to the areas, the main release of seismic energy occurred on cavern LGS-02 and on the flank area.

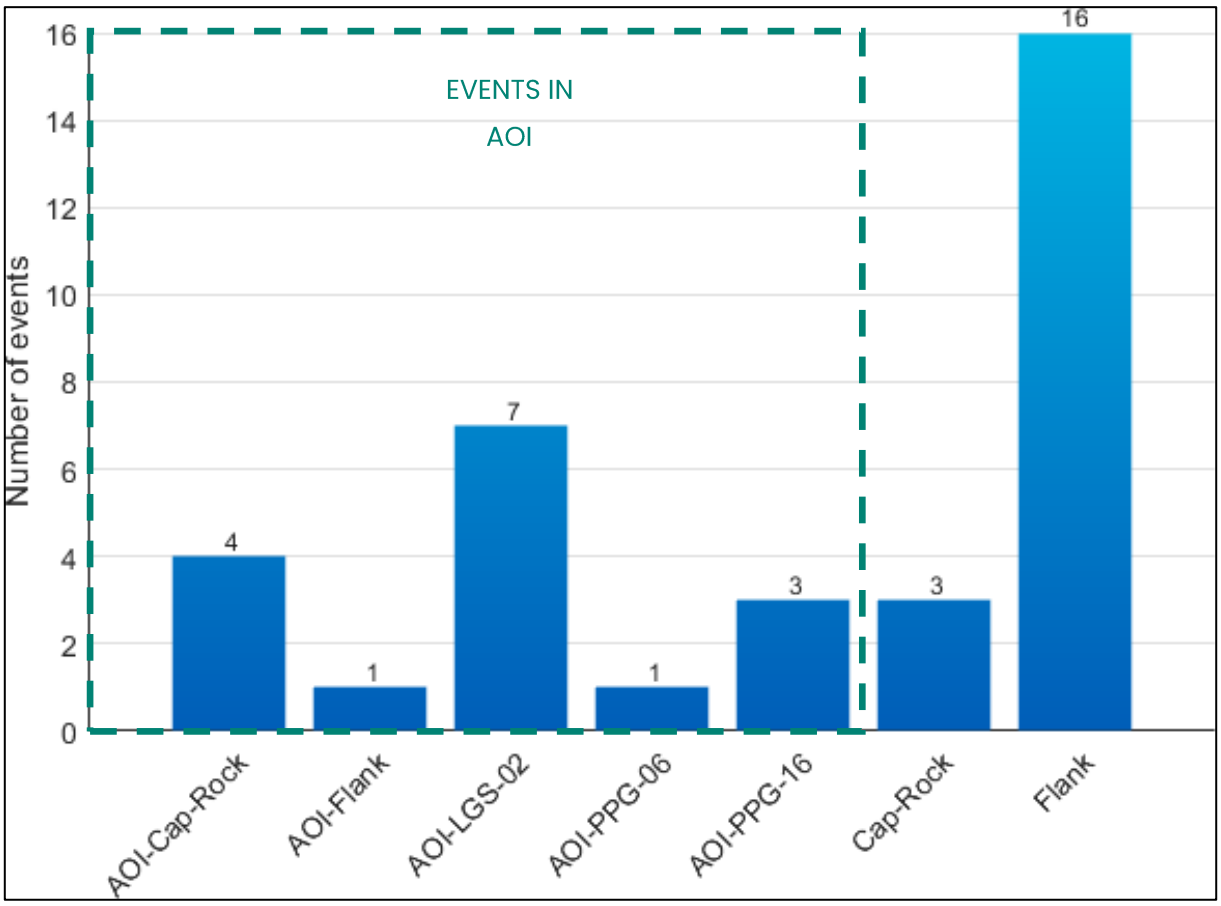

Figure 4: Events distribution by associated cavern. The green rectangle indicates the events in the AOI.

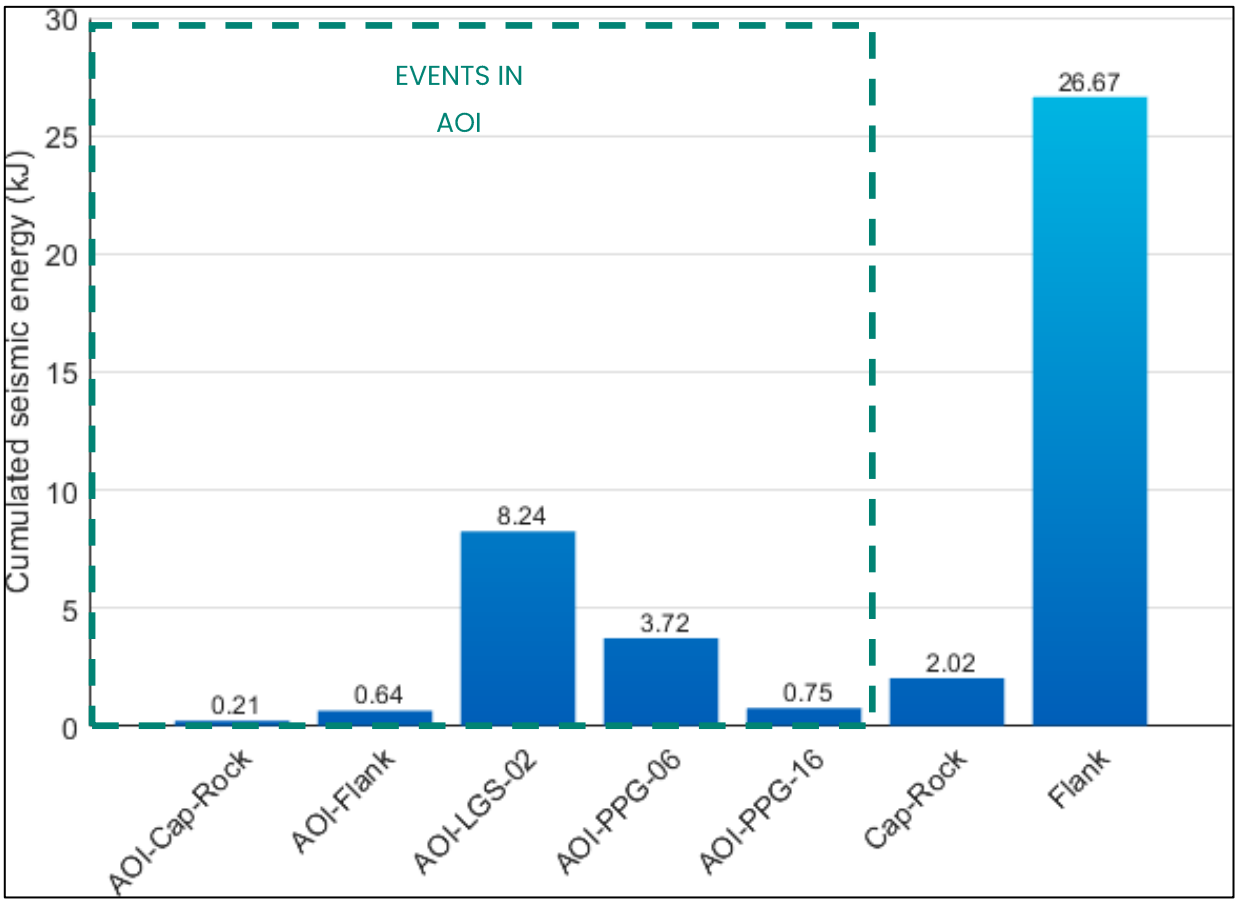

Figure 5: Events energy distribution by cavern. The green rectangle indicates the events in the AOI.

Event Location

The location maps are presented in the report as:

- All events location: inside and outside the AOI (Figure 6 and Figure 7).
- Events located in the AOI (Figure 8, Figure 9, Figure 10).

I. All event locations (inside and outside AOI)

The figures below show the event locations using the borehole arrays.

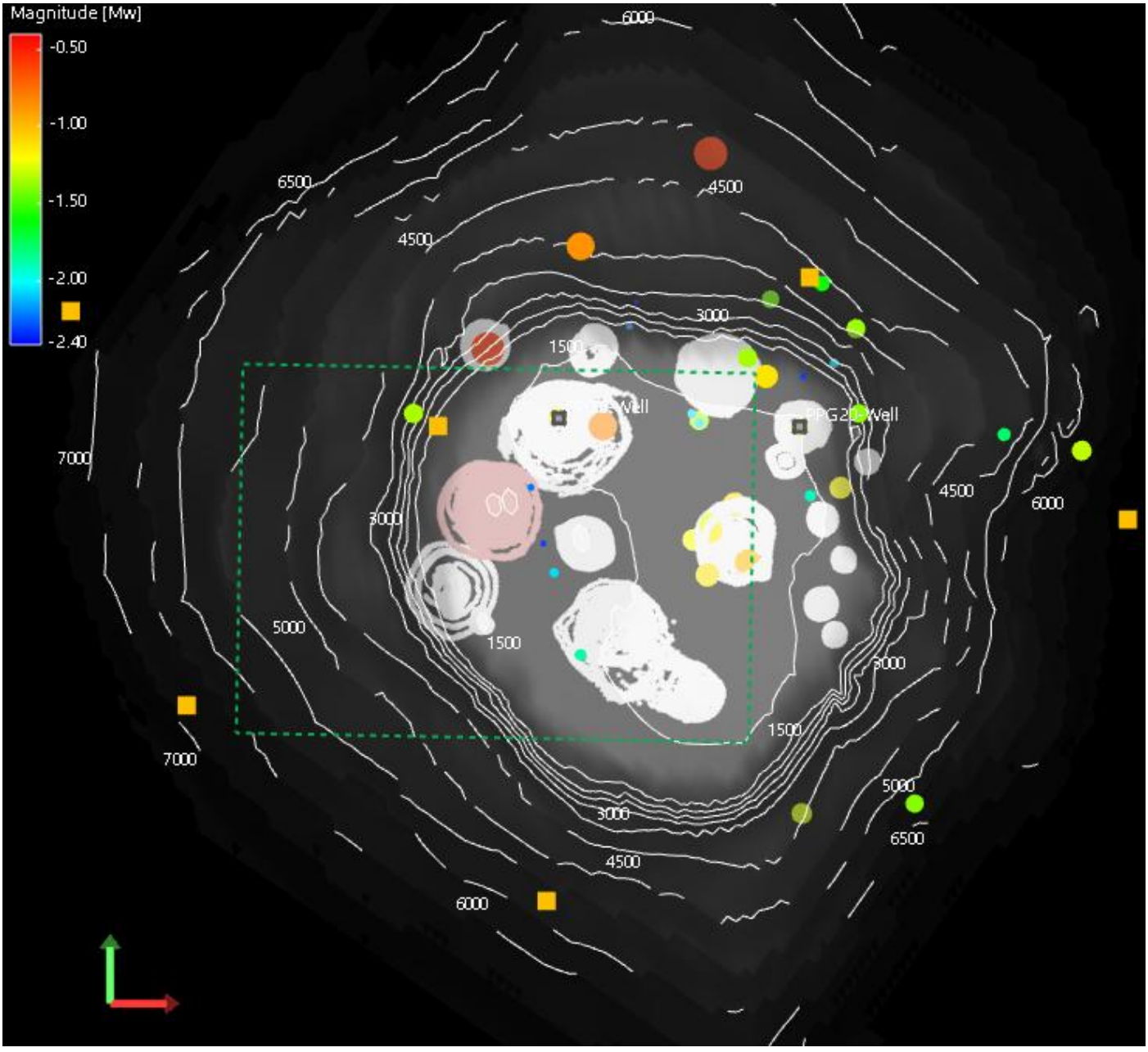

Figure 6: Map of the located events inside the AOI, in July 2025. The events are colored, from blue to red, and sized by magnitude; the green rectangle represents the AOI, the orange squares represent the surface stations.

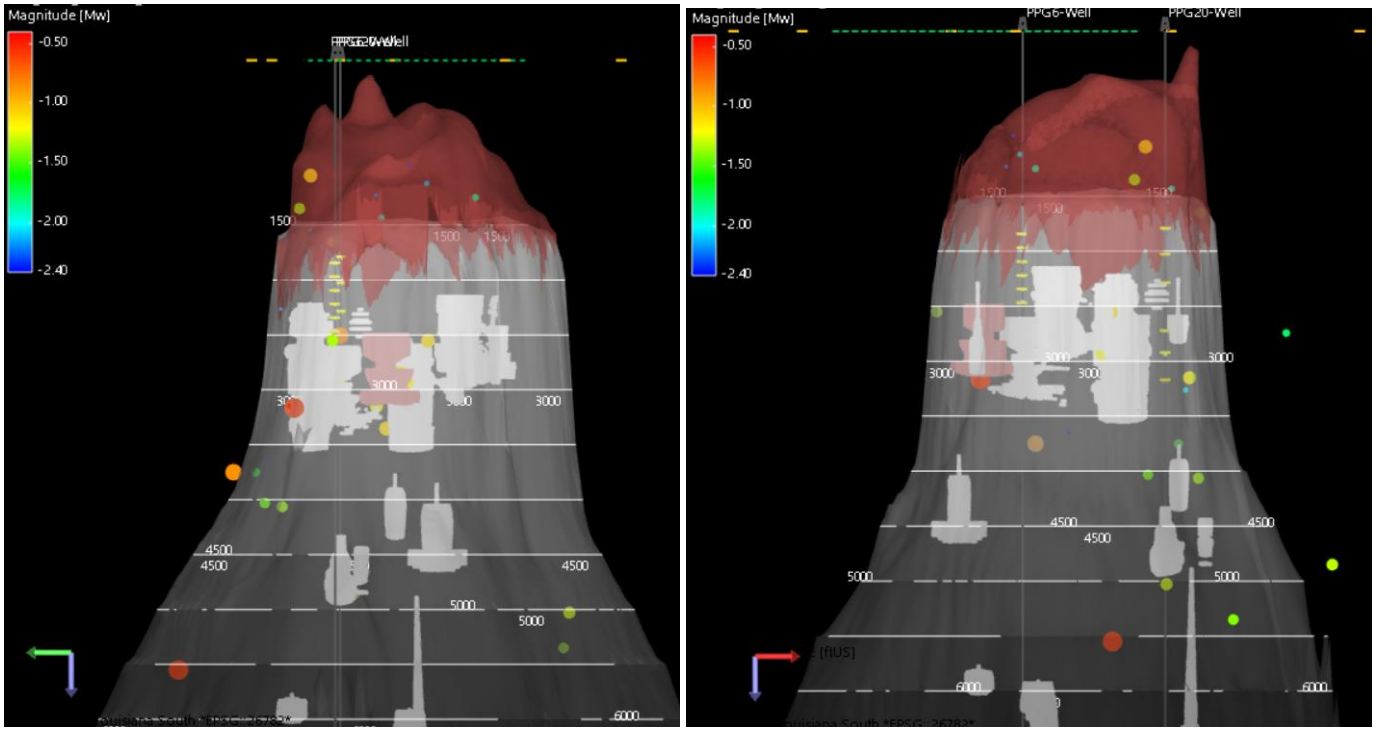

Figure 7: Cross sections W-E (right) looking from the South, and N-S (left), looking from the West. The events are colored, from blue to red, and sized by magnitude.

II. Event Locations in AOI

The figures below show the location of the events inside the AOI.

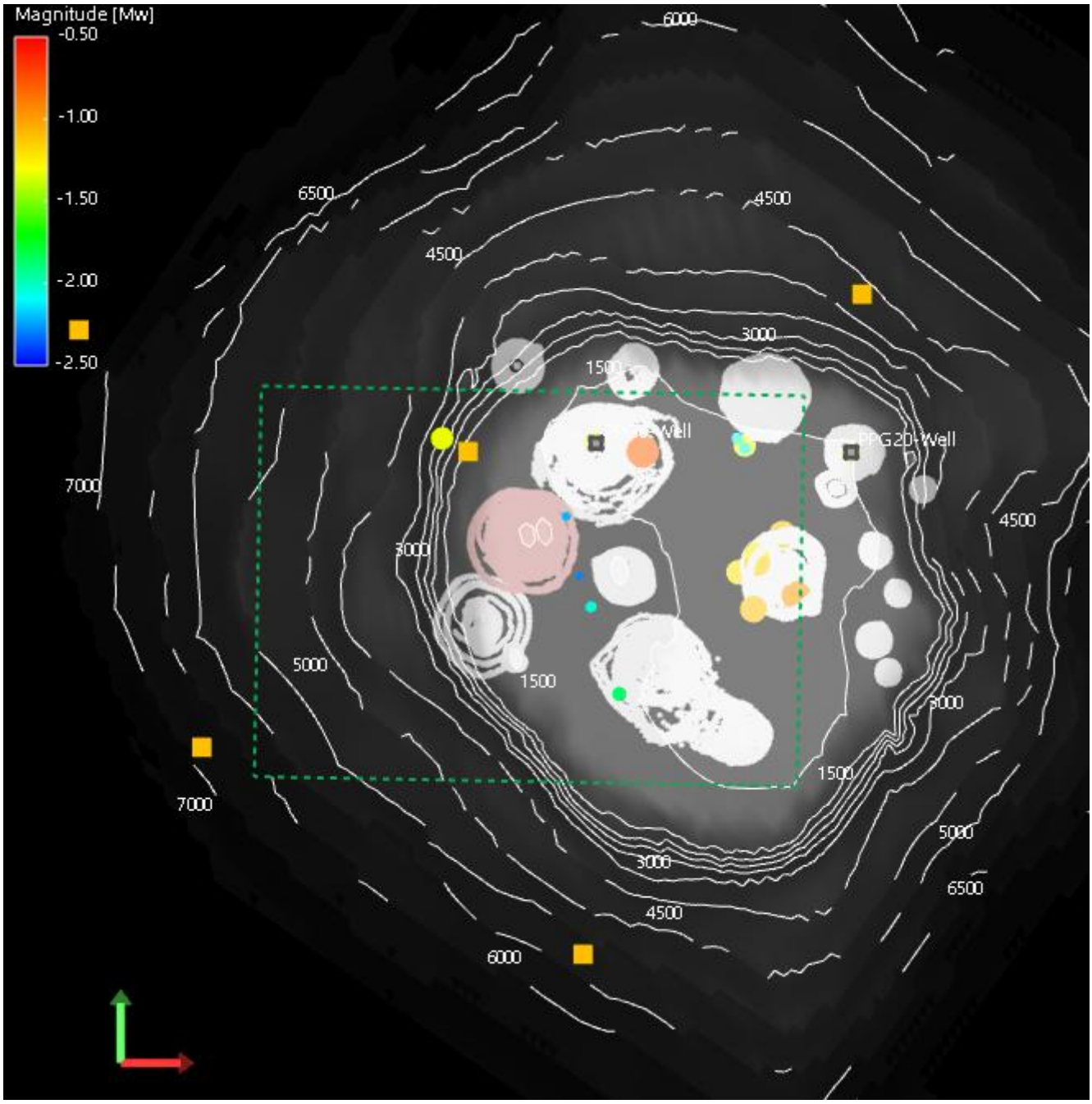

Figure 8: Map of the located events inside the AOI in July 2025. The events are colored, from blue to red, and sized by magnitude; the green rectangle represents the AOI, the orange squares represent the surface stations.

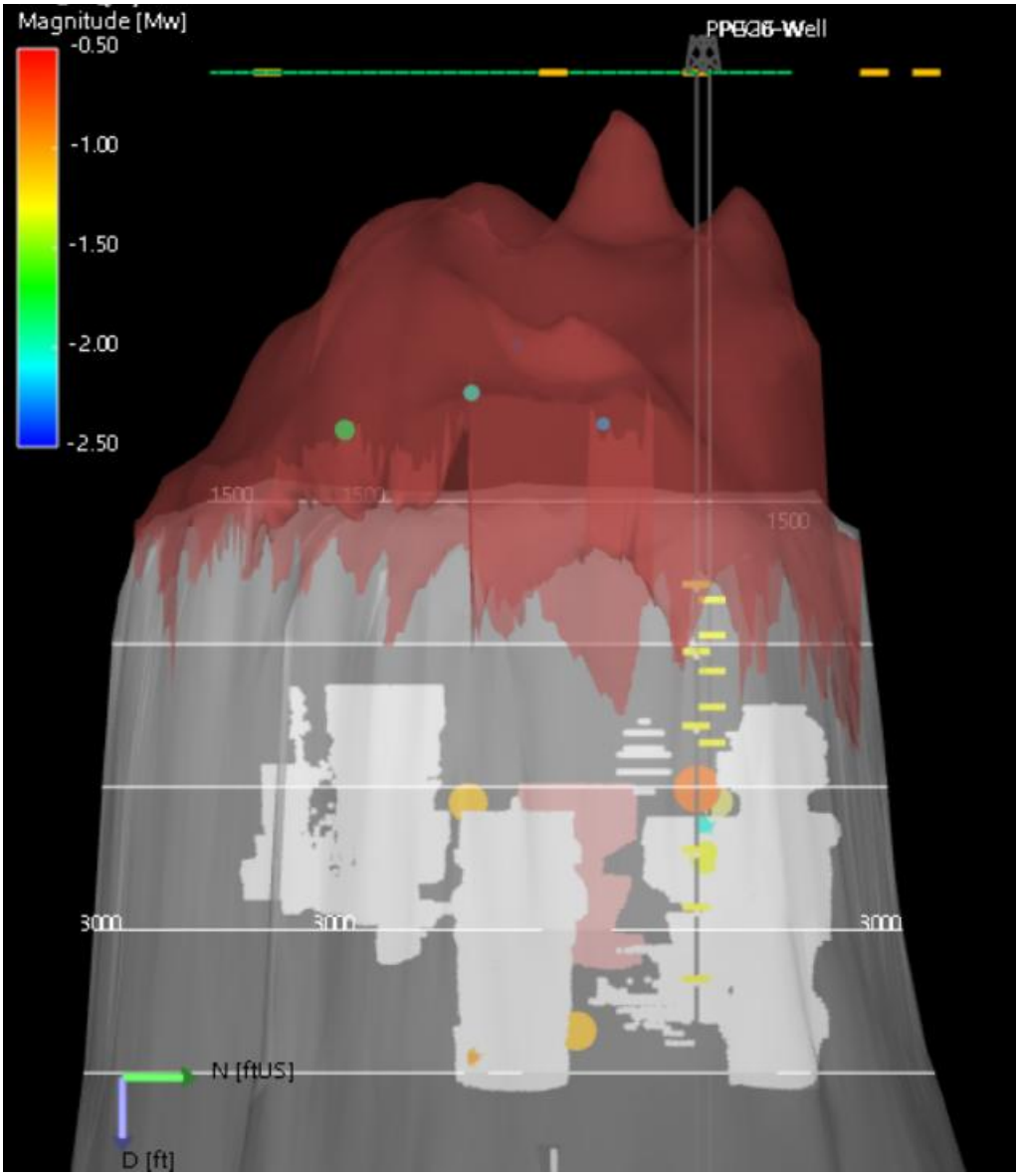

Figure 9: Cross sections S-N (looking from East) of the located events. The events are colored, from blue to red, and sized by magnitude.

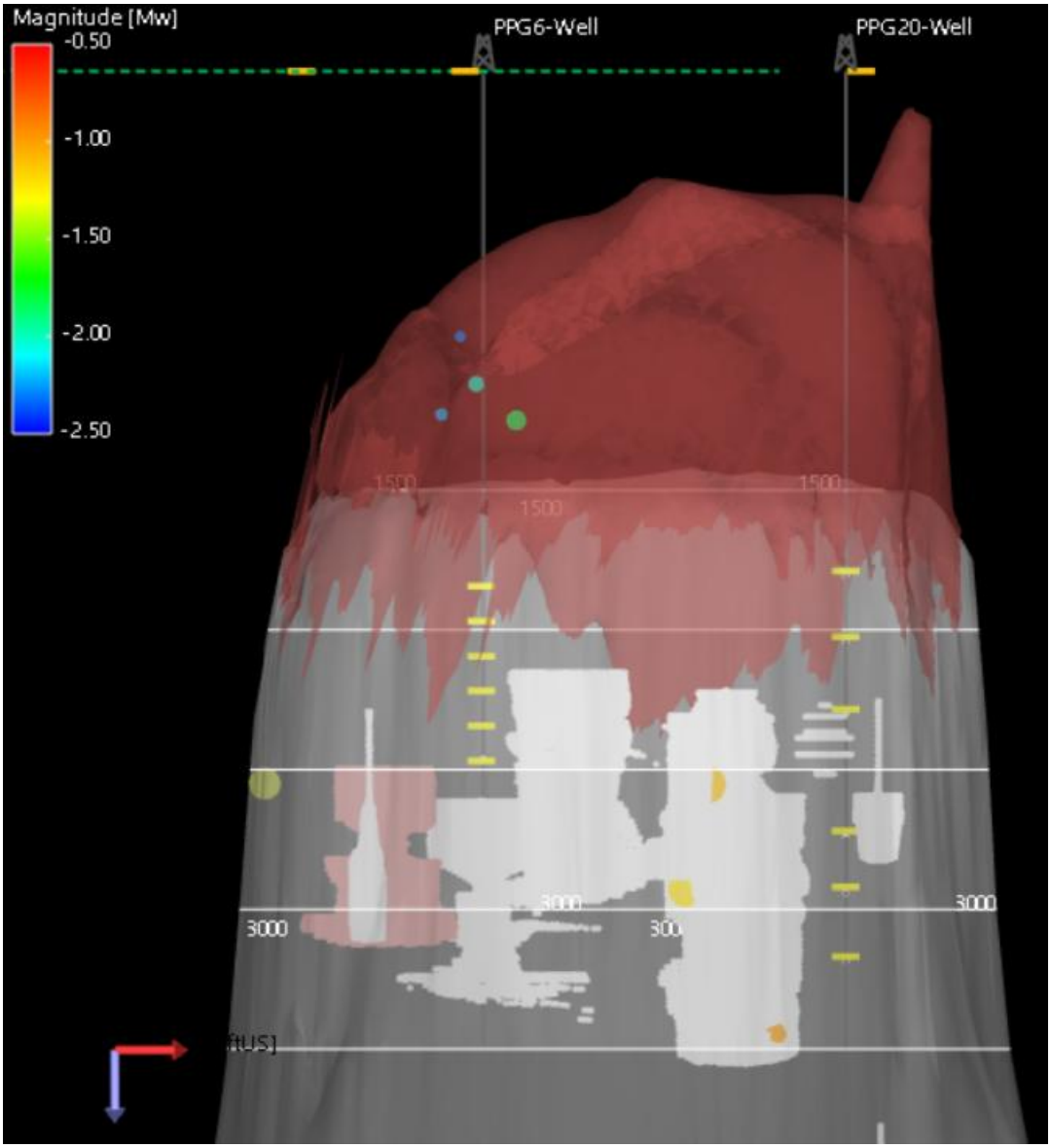

Figure 10: Cross sections W-E (looking from south) of the located events. The events are colored, from blue to red, and sized by magnitude.

Magnitude and depth distribution

The figure below shows the distribution of the moment magnitudes in July 2025. The values vary between -2.4 and -0.6, median value is -1.4.

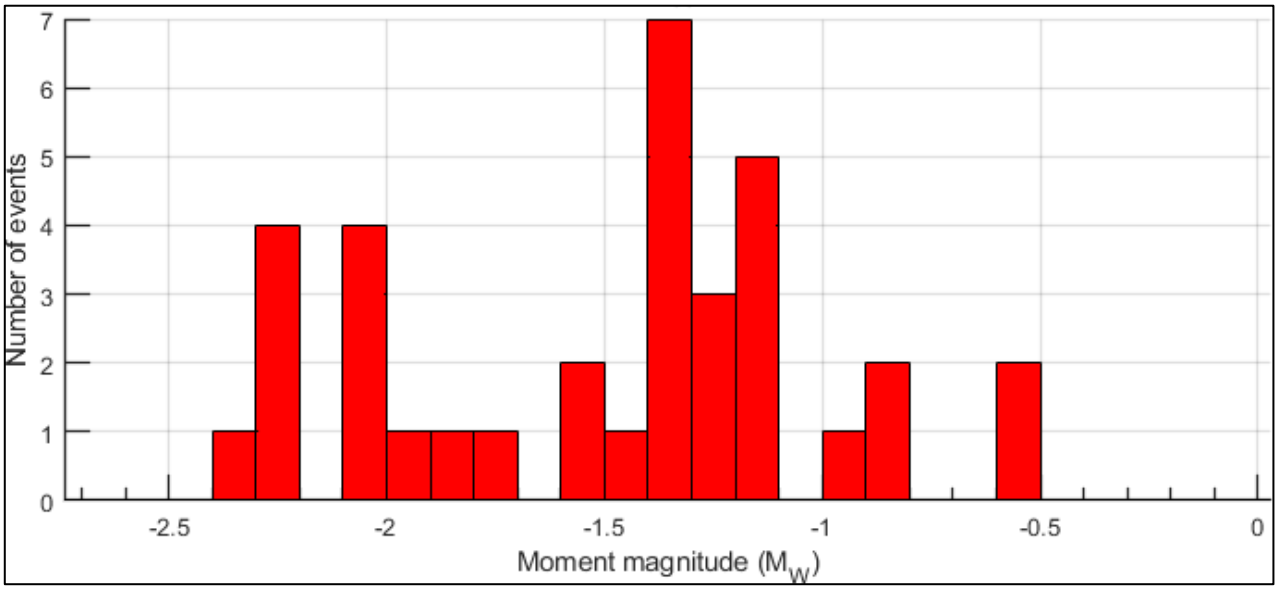

Figure 11: Distribution of magnitudes (Mw) for events located events in July 2025.

The figure below shows the depth distribution in July 2025 for all the located events.
Events are located between 950 ft and 5,550 ft. It is possible to distinguish 3 main groups:

- The first one between 950 ft and 1,650 ft (above the caverns depth and associated with events located in the Cap-Rock),
- A second one between 2,264 ft and 3,750 ft (associated with events located at depth of the caverns),
- A third composed of 6 events below 4,000 ft (flank area).

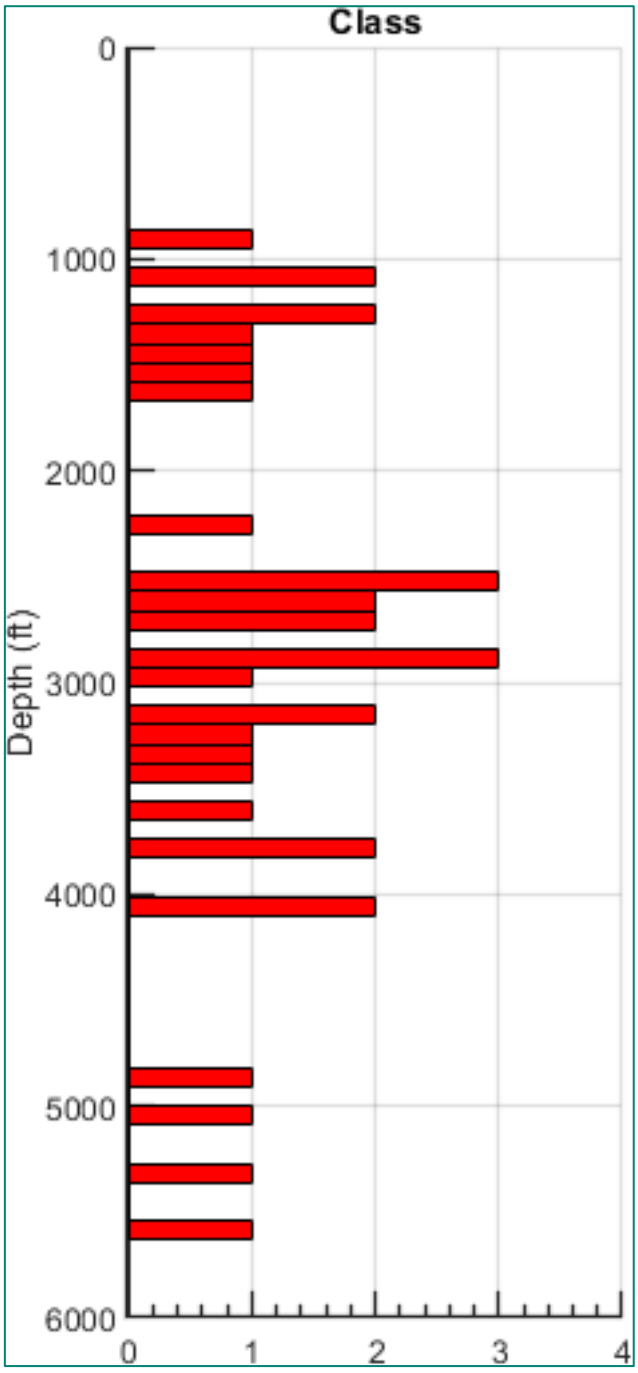

Figure 12: Distribution of the depths for all the events located events in July 2025.

Microseismic history from the beginning of the acquisition

I. History of detections.

In July 2025, the total number of detections (located and no-located events) increased slightly with respect to the previous month (105 detected events in July 2025 compared with 69 detected in June). The number of located events is slightly higher in July 2025 (35 located events) with respect to June (27 located events).

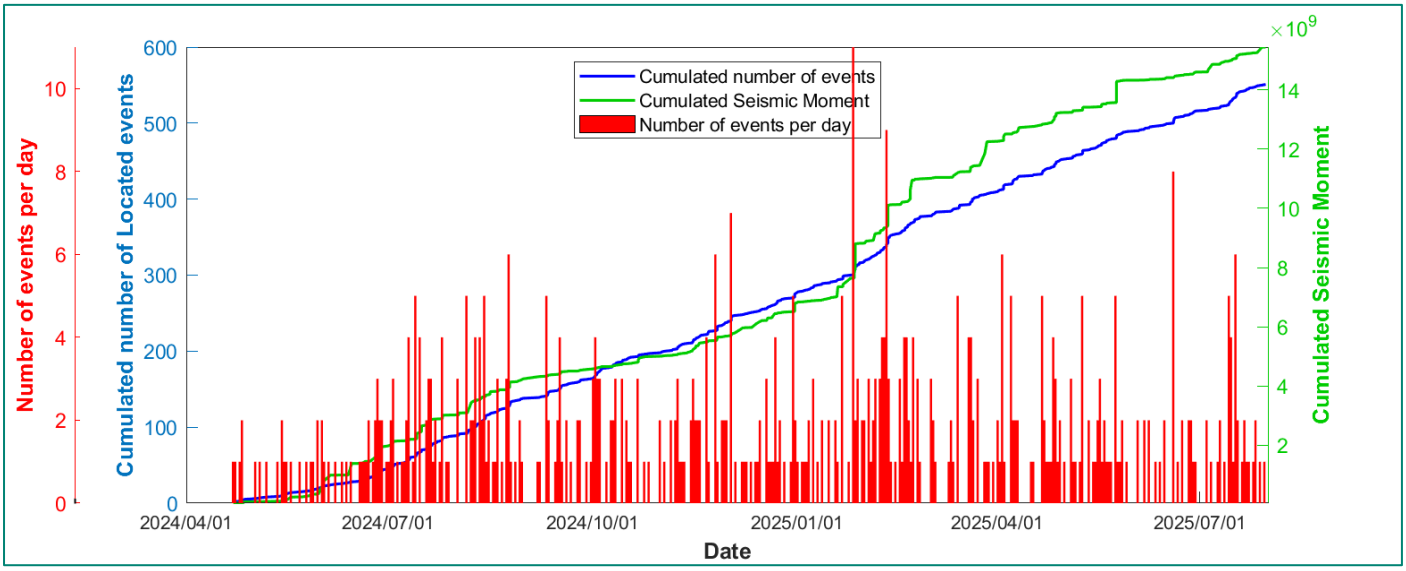

Figure 13: Distribution of the located microseismic events since the beginning of the acquisition on 04/21/2024. Blue line represents the cumulated number of located events. Green line represents the cumulated seismic moment Mo.

II. Historical magnitude distribution.

Figure 14 shows the moment magnitude distribution since the beginning of the acquisition. Dark color bars present the current monthly period and light red color bars present the distribution since the beginning of the acquisition (April 21, 2024).
Since the beginning of the acquisition, events magnitude is between -2.5 and -0.2 (for 551 located events). The median value of the magnitude since the beginning of the acquisition is -1.5.

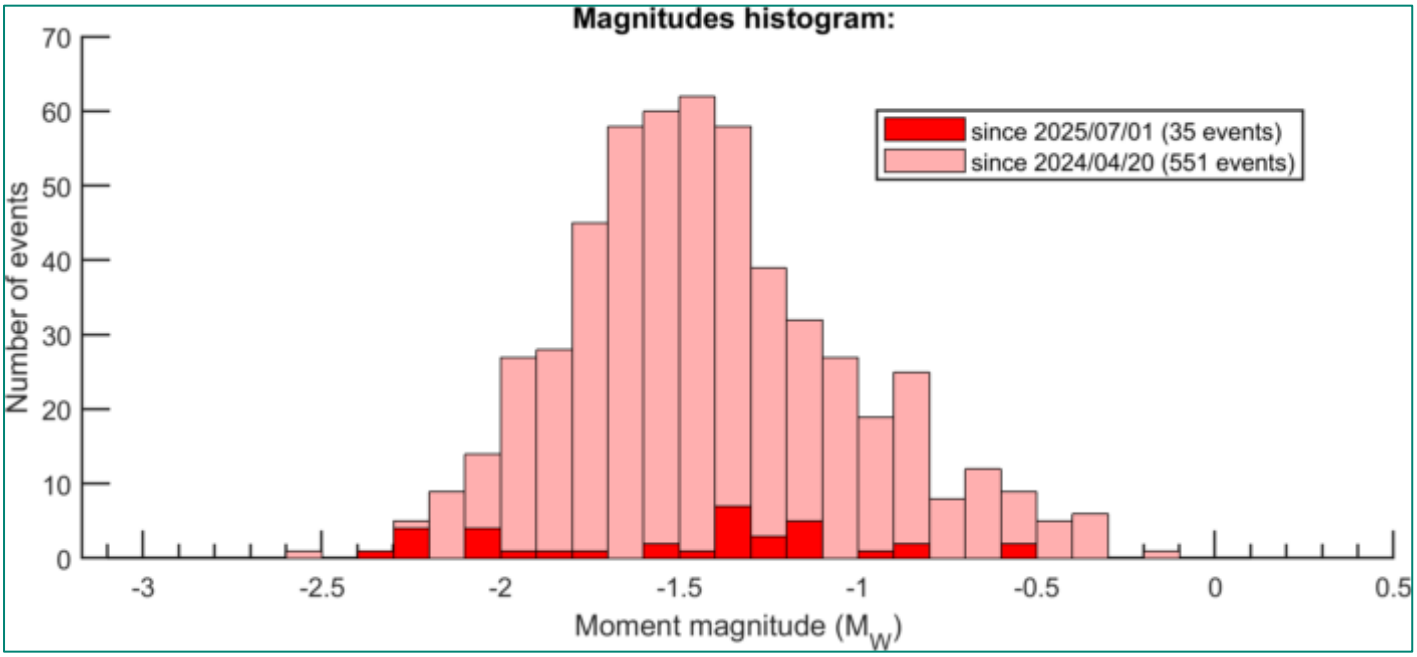

Figure 14: Distribution of magnitude (Mw) for located events. Dark color bars present the current monthly period (July 2025) and light color bars present the distribution since the beginning of the acquisition (since April 21, 2024).

III. History of the event locations.

History in Cap-Rock and on the Flank

The figure below shows the map and cross section of all the events located in the cap-rock and in the salt flank since April 21, 2024.

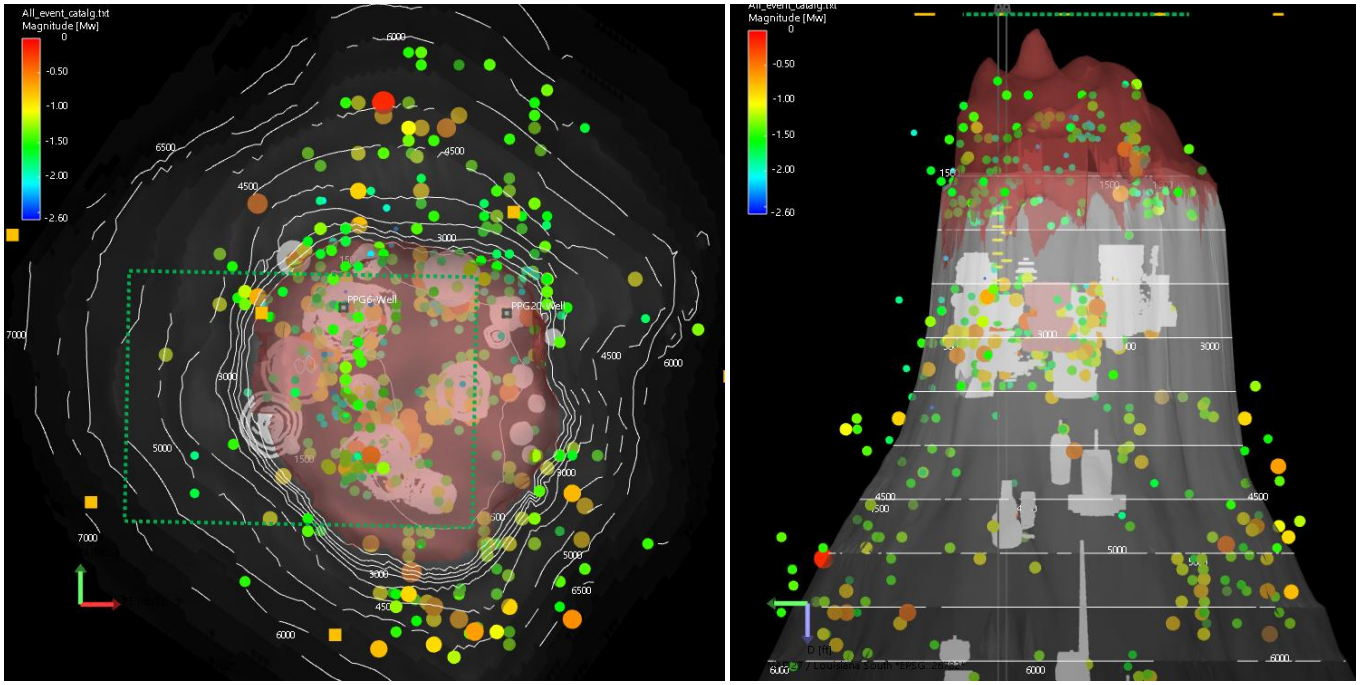

Figure 15: Map view (left) and N-S side view (right) of the cumulative seismicity recorded since the beginning of the acquisition, located in the Cap Rock (red formation) and on the Flank. Green rectangle represents the AOI area. The events are colored, from blue to red, and sized by magnitude.

History around the caverns

The figures below show the history of the events associated with the caverns since the beginning of the acquisition (April 21, 2024).

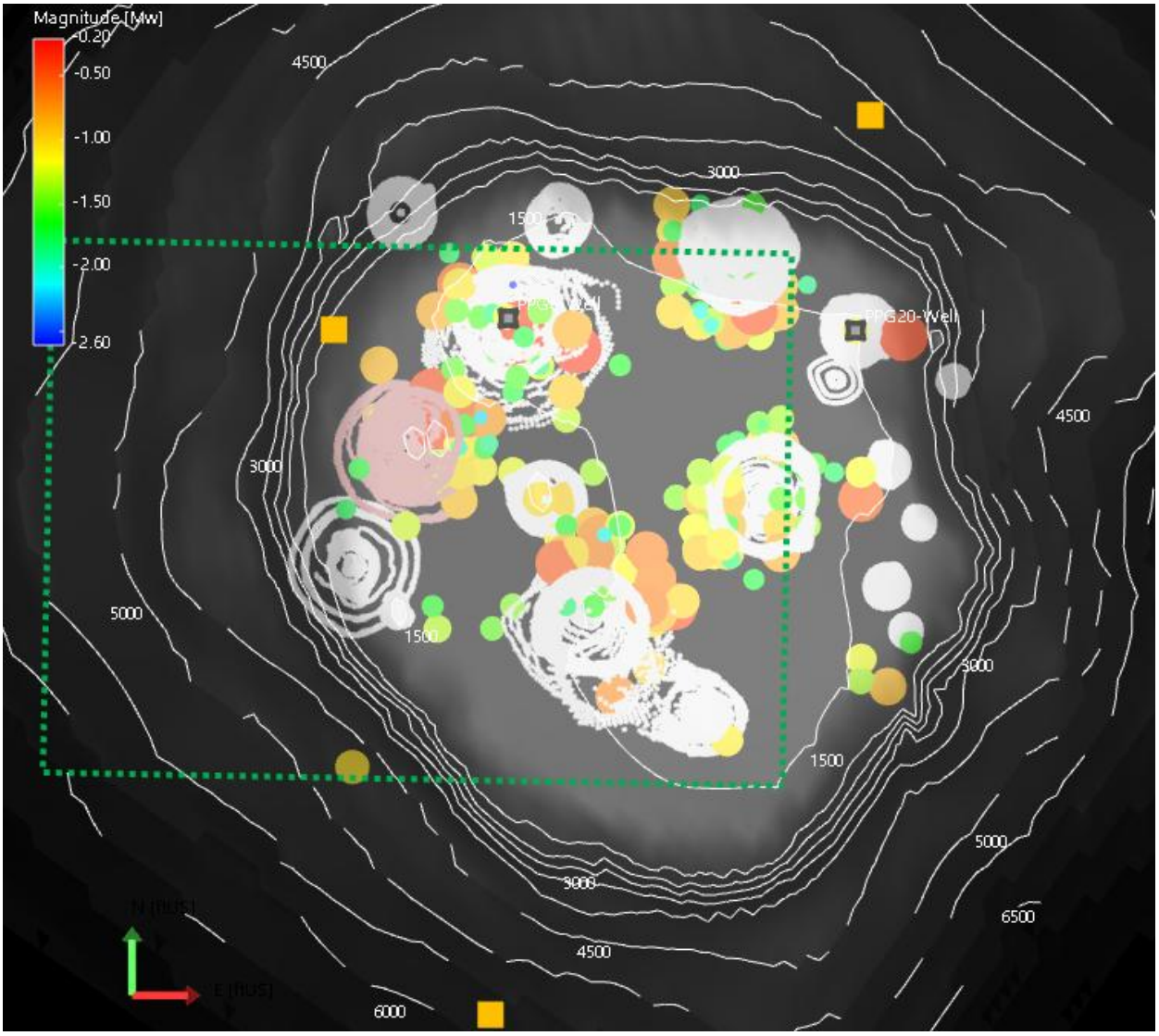

Figure 16: Map view of the events located in proximity to the caverns since the beginning of the acquisition (April 21, 2024). The events are colored, from blue to red, and sized by magnitude.

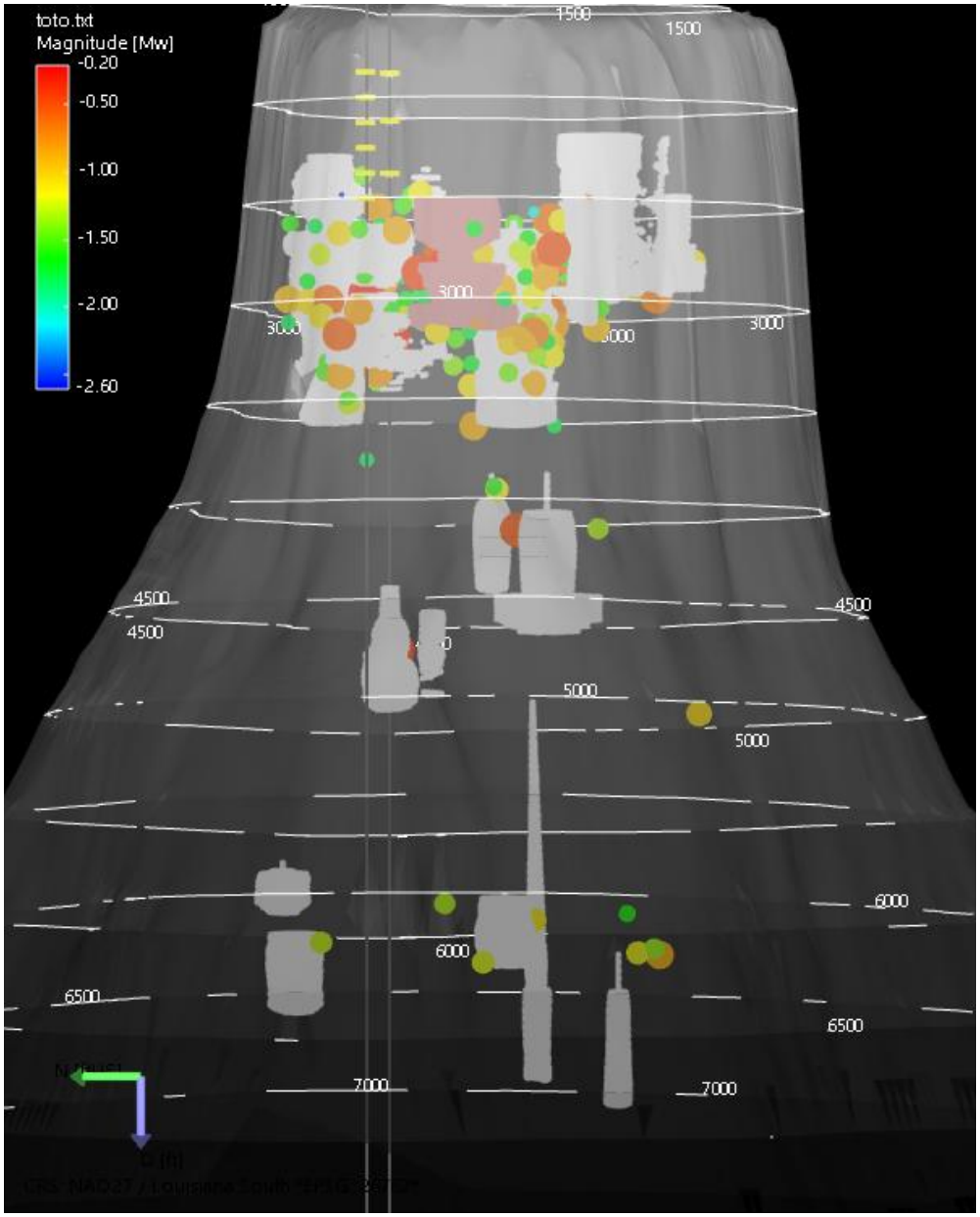

Figure 17: Cross sections N-S looking from the West of the events located close to the caverns since the beginning of the acquisition. The events are colored, from blue to red, and sized by magnitude

APPENDIX 1 – Alert level criteria

Proposed Microseismic Alert Level Criteria and Response for Sulphur Mines Dome.

Alert Status	Criteria	Response
Low (GREEN)	No events with magnitude ≥0.5 in AOI and/or Less than 30 MEQ per day in AOI with magnitudes ≥ -1	Once per week data processing, with previous monthly microseismic activity summary in the AOI is provided by the 15th of the following month to LDNR IMD.
Advisory (YELLOW)	Event with magnitude ≥0.5 and <1.0 in AOI and/or Count of MEQ per day ≥30 and <40 in AOI with magnitudes ≥ -1	Daily data processing M-F. Weekly reporting is provided LNDR IMD with activity summary from the previous week. Status remains active until seismic levels within the AOI reach "low"(green) level for 1 day.
Watch (ORANGE)	Event with magnitude ≥1 and <1.5 in AOI and/or Count of MEQ ≥40 and <50 with magnitudes ≥ -1 in AOI	Seven days per week data processing, 2x week reporting with activity for the previous days is provided via email and text message notifications to IMD. Status remains active until seismic levels within the AOI reach Advisory or Low criteria for 2 consecutive days.
Warning (RED)	Event with magnitude ≥1.5 in the AOI and/or Count of MEQ ≥50 with magnitudes ≥ -1 in the AOI	Seven days per week data processing, daily reporting with online meetings with stake holders as needed. The warning status level remains active until seismicity levels within the AOI reach a lower status level for 2 consecutive days.

APPENDIX 2 – Network Coordinates

Borehole arrays coordinates:

Wellbore	Sensor	TVD SS	Easting (ft)	Northing (ft)
PPG 6x	Tool 1	1844	1343141	583425
PPG 6x	Tool 2	1969	1343141	583425
PPG 6x	Tool 3	2094	1343141	583425
PPG 6x	Tool 4	2219	1343141	583425
PPG 6x	Tool 5	2344	1343141	583425
PPG 6x	Tool 6	2469	1343141	583425
PPG 20	Tool 1	1790	1344445	583372
PPG 20	Tool 2	2025	1344445	583372
PPG 20	Tool 3	2285	1344445	583372
PPG 20	Tool 4	2720	1344445	583372
PPG 20	Tool 5	2920	1344445	583372
PPG 20	Tool 6	3170	1344445	583372

Surface network coordinates:

Station	LAT WGS84	LON WGS84	Date start	Date end
Temp_1a	30.2575	-93.4123	1/30/2023	2/9/2023
Temp_1b	30.2534	-93.4135	2/9/2023	4/3/2023
Temp_2a	30.2570	-93.4097	1/30/2023	2/9/2023
Temp_2b	30.2555	-93.4132	2/9/2023	2/27/2023
Temp_2c	30.2547	-93.4138	2/27/2023	4/5/2023
Temp_3a	30.2533	-93.4091	1/30/2023	2/9/2023
Temp_3b	30.2563	-93.4146	2/9/2023	4/5/2023
Temp_4a	30.2486	-93.4123	1/30/2023	2/27/2023
Temp_4b	30.2507	-93.4121	2/27/2023	3/8/2023
Temp_4c	30.2506	-93.4100	3/8/2023	3/15/2023
Temp_4d	30.2503	-93.4119	3/15/2023	est 4/3/2023
Temp_5a	30.2502	-93.4156	1/30/2023	2/27/2023
Temp_5b	30.2507	-93.4153	2/27/2023	3/15/2023
Temp_5c	30.2504	-93.4140	3/15/2023	est 4/3/2023
Temp_6a	30.2532	-93.4166	1/30/2023	3/15/2023
Temp_6b	30.2529	-93.4161	3/15/2023	4/4/2023
Temp_7a	30.2547	-93.4161	1/30/2023	4/3/2023
Semi Perm S01	30.2453	-93.4073	4/4/2023	
Semi Perm S02	30.2571	-93.4098	4/6/2023	
Semi Perm S03	30.2536	-93.4091	4/6/2023	
Semi Perm S04	30.2470	-93.4213	4/5/2023	5/12/2023
Semi Perm S04_1	30.2506	-93.4204	5/12/2023	
Semi Perm S05	30.2564	-93.4224	4/5/2023	
Semi Perm S06	30.2532	-93.4167	4/5/2023	
Semi Perm S07	30.2547	-93.4162	4/5/2023	
SUL01 trillium	30.2452	-93.4071	9/20/2023	3/12/2024
	LAT NAD 83	LON NAD 83		
SUL02 trillium	30.2570	-93.4098	9/13/2023	
SUL03 trillium	30.2505	-93.4203	9/12/2023	
SUL04 trillium	30.2563	-93.4224	9/12/2023	
SUL05 trillium	30.2547	-93.4161	9/13/2023	
SUL06 trillium	30.2535	-93.4043	3/12/2024	
SUL07 trillium	30.2477	-93.4141	3/12/2024	

Seismic Station locations and operational dates at Sulphur Mines Dome (to November 1, 2024).

Temporary Station locations and start and end dates provided by Westlake.

Trillium Station locations provided by Nanometrics and Westlake (Trillium SUL 02-07).

APPENDIX 3 - Catalogue of located events

#	Event origin time CST (UTC-5)	Easting (ft)	Northing (ft)	Depth (ft)	ΔEasting (ft)	ΔNorthing (ft)	ΔDepth (ft)	Mw	Detected by
1	07/04/2025 06:18:31	1344566	584144	3750	651	1467	1126	-1.59	Flank
2	07/04/2025 13:13:07	1343386	583376	2506	245	582	355	-0.82	AOI-PPG-06
3	07/06/2025 08:37:50	1343966	584844	5550	952	3078	1567	-0.56	Flank
4	07/09/2025 17:03:17	1344466	583644	1550	289	711	661	-2.29	Flank
5	07/09/2025 22:41:04	1345066	581344	5350	1181	2862	2048	-1.39	Flank
6	07/10/2025 00:17:46	1343949	582575	2554	228	1252	597	-1.1	AOI-LGS-02
7	07/12/2025 10:13:17	1343266	584344	3750	673	1919	1021	-0.86	Flank
8	07/13/2025 19:39:20	1343906	583393	2632	265	501	398	-2.04	AOI-PPG-16
9	07/13/2025 19:39:45	1343866	583444	2650	333	636	472	-2.05	AOI-PPG-16
10	07/13/2025 20:06:01	1343905	583407	2747	408	700	566	-1.33	AOI-PPG-16
11	07/14/2025 06:19:17	1343123	582587	1120	420	1379	564	-2.06	AOI-CAP-ROCK
12	07/14/2025 09:02:55	1344766	583444	1650	305	833	774	-1.38	Flank
13	07/14/2025 19:17:14	1343066	582744	950	415	1443	649	-2.29	AOI-Cap-Rock
14	07/15/2025 08:14:10	1344166	583744	1350	266	969	707	-1.34	Cap-Rock
15	07/15/2025 08:49:17	1344266	583644	1050	314	1099	738	-1.12	Cap-Rock
16	07/15/2025 17:54:48	1342366	583444	2550	255	741	585	-1.33	AOI-Flank
17	07/16/2025 01:03:57	1344289	584059	4031	498	1563	632	-1.43	Flank
18	07/16/2025 21:34:05	1343266	582144	1250	462	1743	843	-1.86	AOI-Cap-Rock
19	07/17/2025 01:18:12	1342998	583047	1229	438	972	522	-2.21	AOI-Cap-Rock
20	07/17/2025 07:29:05	1343873	582763	2930	312	1052	498	-1.21	AOI-LGS-02
21	07/17/2025 07:29:10	1343879	582761	2940	319	1059	483	-1.53	AOI-LGS-02
22	07/17/2025 07:29:15	1344166	582644	3450	377	1252	523	-0.99	AOI-LGS-02
23	07/17/2025 07:29:22	1344097	582956	3353	321	961	403	-1.1	AOI-LGS-02
24	07/18/2025 07:07:47	1343968	582810	2843	258	1037	485	-1.15	AOI-LGS-02
25	07/18/2025 07:08:00	1343963	582852	2841	253	1007	469	-1.24	AOI-LGS-02
26	07/20/2025 04:39:29	1344458	581291	5028	901	3052	1719	-1.26	Flank
27	07/21/2025 11:09:23	1345547	583331	4350	534	1267	1235	-1.5	Flank
28	07/21/2025 15:42:55	1345966	583244	4850	563	1560	1679	-1.3	Flank
29	07/22/2025 17:05:56	1344504	583001	1432	293	855	416	-1.91	Cap-Rock
30	07/22/2025 21:37:56	1344632	583715	3262	376	700	525	-2.03	Flank

#	Event origin time CST (UTC-5)	Easting (ft)	Northing (ft)	Depth (ft)	ΔEasting (ft)	ΔNorthing (ft)	ΔDepth (ft)	Mw	Detected by
31	07/24/2025 23:40:49	1344666	583044	3150	375	677	518	-1.19	Flank
32	07/25/2025 21:06:08	1343530	583915	2264	374	935	591	-2.2	Flank
33	07/26/2025 13:36:30	1344749	583901	4063	549	1885	1075	-1.35	Flank
34	07/28/2025 18:33:00	1342766	583792	3165	472	1188	667	-0.56	Flank
35	07/30/2025 09:38:34	1343566	584044	3650	467	1626	761	-2.38	Flank