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

Michael Reese 10/15/2025

Report Period: September 2025

Reference: 2634299-SUL-MR-250901

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 September 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 September 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, a slight increase to 70 detections / 26 located events were observed in September 2025 compared to 60 detections / 30 located events observed in August 2025. There were 12 events reported in the AOI. With 4 events (AOI Cap Rock), 8 events (AOI caverns) and no events (AOI Flank). Within AOI cavern: PPG-06 (3 events), PPG-16 (1 event), LGS-02 (2 events) and PPG-07 (2 events). There were 14 events outside the AOI with 13 events in the Flank and 1 event in the caprock. The maximum magnitude of -0.99 was reported in the AOI Cavern PPG-07 (2925 ft.) along with several outside of AOI in the Flank (-0.99/5050 ft), (-1.03/4074 ft) and (-1.02/4750 ft). The depths of all observed events from 1016 ft to 5950 ft.

MICROSEISMIC MONITORING MONTHLY REPORT: September 2025

Sulphur Mines Salt Dome – Louisiana (US)

2634299-SUL-MR-250901

Client / Site		Sulphur Mines Salt Dome
Recipient		Joshua Bradley (Westlake)
Reference		2634299-SUL-MR-250901
Period	***from***	2025/09/01
	to	2025/09/30

Revision history

Version	Date	Issued by	Verified by	Approved by	Description
1.0	2025/10/17	E. Fortier	G. Regis	JM. Embry	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: 100 % **PPG-6** (6 levels)→ noise level: 5 to 20 nm/s (RMS) except sensors PPG-6.1Z with 100 nm/s **PPG-2** (6 levels) → noise level: 8 to 20 nm/s (RMS) except sensors PPG-2.3X-Z and PPG-2.6X-Y with 20-150 nm/s **Surface receivers**: 97.2 % 6 sensors (3-axis) → acquisition stop from 09/06/2025 to 09/11/2025 on sensor SU.03
Seismic activity	**BOREHOLE ARRAY**	
	Detection(s)	70
	(of which) Located	26
	Max magnitude	-1.0
	Max PGV	0.0037 mm/s
	Min depth	1,016 (ft)
	Max depth	5,950 (ft)
	Number of alerts in the month	**0 – No alert triggered in September 2025**

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

Introduction

I. Alert Level Status

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

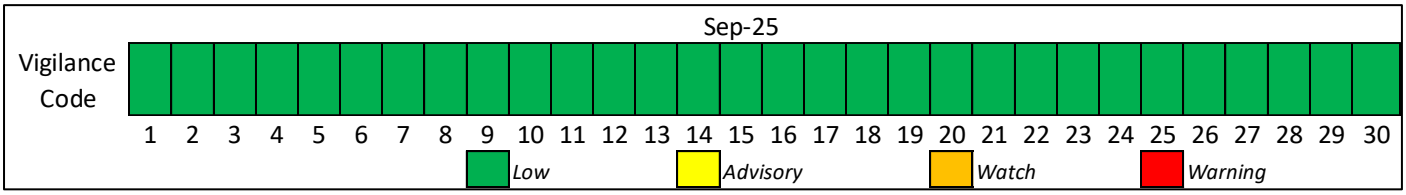

Figure 1: Alert status level during September 2025.

II. Seismic Network

Microseismic monitoring in Sulphur Mine Salt Dome is executed by:

- **Two borehole arrays**
  - The Baker Hughes Microseismic Services team 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 - Network Coordinates. The borehole arrays were fully functional in September 2025.
- **A surface network, composed by 6 Broadband Trillium**
  - Nanometrics operates the surface broadband array and provide Baker Hughes the data that are incorporated in the final files. The broadband station locations are shown in Figure 2 and listed in Appendix 2

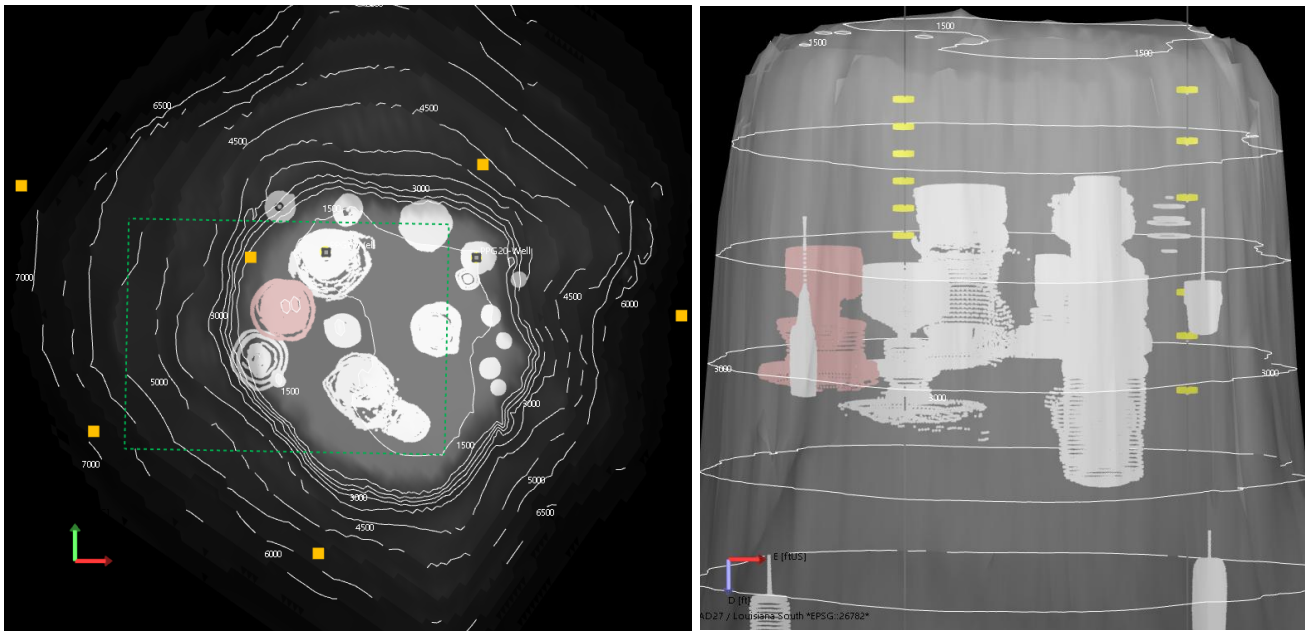

Figure 2: Map (left) and West-East cross section (looking from the South) of the Sulphur Mines Salt Dome. The salt boundary is indicated by gray contour lines. The wellbores with the borehole array sensors are marked by yellow dots for PPG No. 006X and PPG No. 020. Cavern 7 is represented with a red 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 September 2025, 70 seismic events have been detected by the borehole arrays, **26** events had waveform with sufficient signal to noise ratio to compute their location and magnitude.
- Amongst the 26 located events, 12 are inside the AOI (Area of Interest):
  - 4 events in the AOI Cap-Rock.
  - 8 events are associated with caverns inside the AOI - the main caverns with the largest number of associated events were:
    - Cavern PPG-06 (3 events).
    - Cavern PPG-16 (1 event).
    - Cavern LGS-02 (2 events).
    - **Cavern PPG-07 (2 events).**
- The other events (14) are outside the AOI, and all located mainly on the dome flank (13 events) and on the cap-rock (1 event).
- There is four main moment magnitude events equal to -1.0 associated to:
  - AOI-PPG-07 cavern: on 09/11/2025 03:57:09 (CST).
  - The flank: 3 events.

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 September 2025.

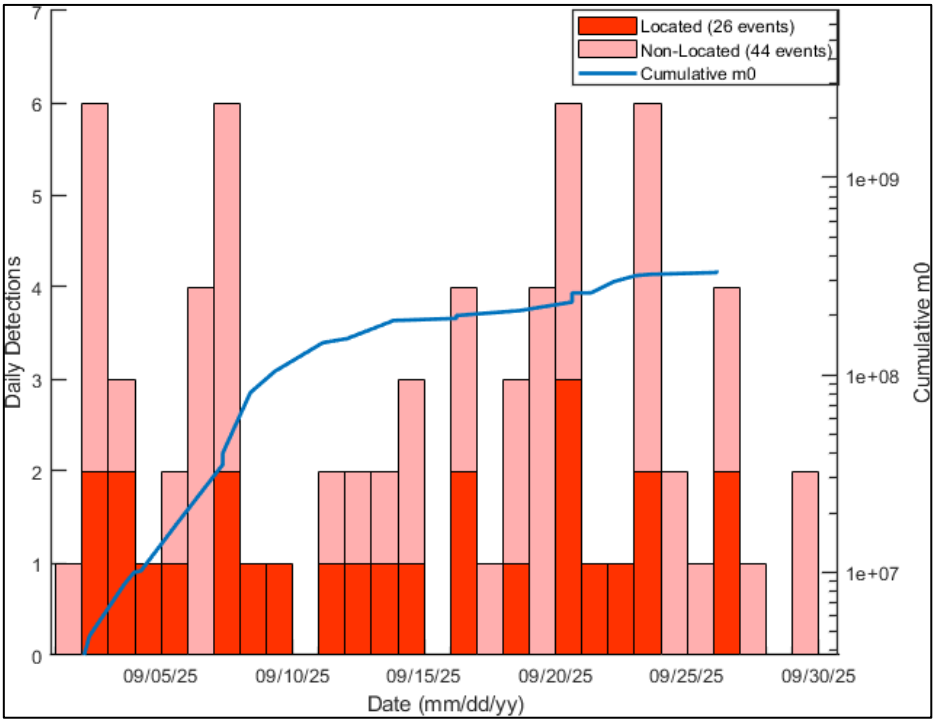

Figure 3: Daily distribution of all events during September 2025. Dark color represents the located events while light color shows the none-located events. Blue line represents the cumulative seismic moment Mo for the located events.

Figure 4 shows the distribution of the events by area. In September 2025 the seismicity occurred mainly in the flank (13 events) and around cavern AOI-PPG-06 (3 events) and on the AOI Cap-Rock (4 events)

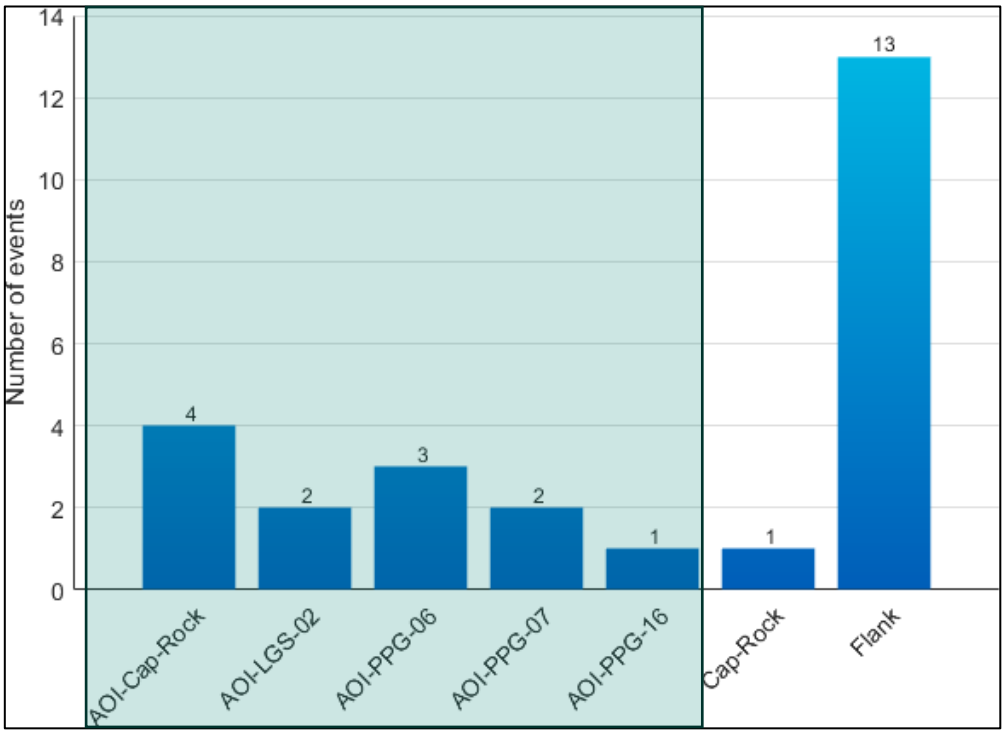

Figure 4: Events distribution by associated cavern. The green rectangle indicates the events in the AOI.

According with Figure 5, which shows the cumulated seismic energy with respect to the areas, the main release of seismic energy occurred on the flank and on AOI-PPG-07 cavern.

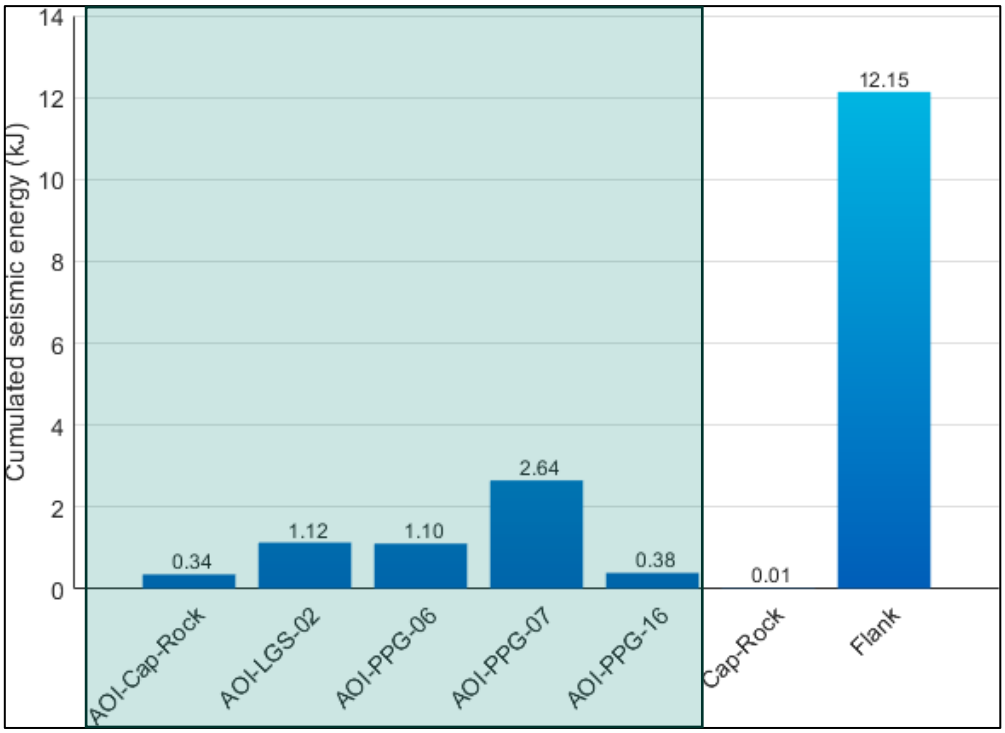

Figure 5: Events energy distribution by cavern. The green rectangle indicates the events in the AOI.

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 events location (inside and outside AOI)

The figures below show the events location using the borehole arrays.

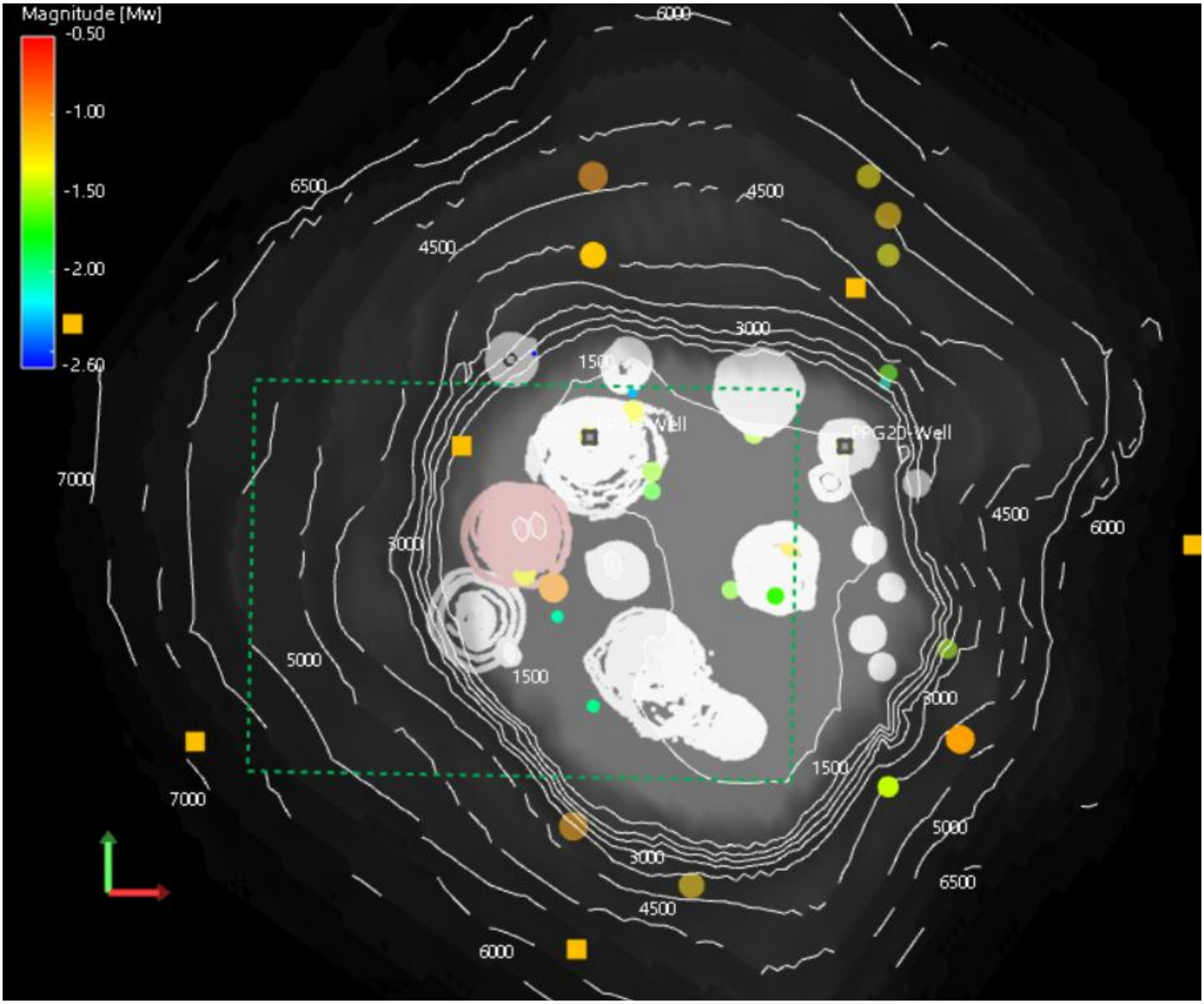

Figure 6: Map of the located events in September 2025. The events are colored, from blue to red, and sized by magnitude; the green rectangle represents the AOI.

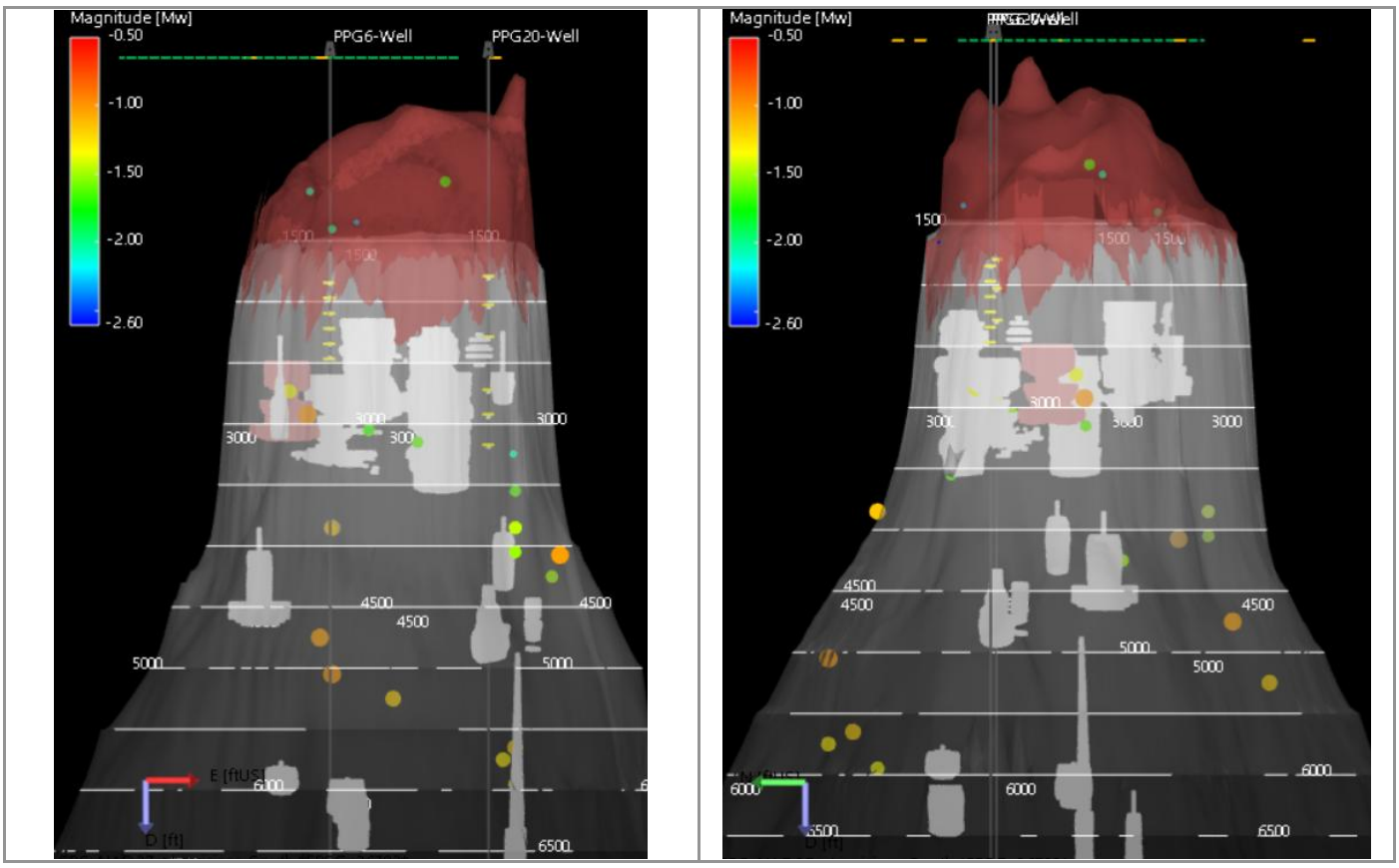

Figure 7: Cross sections W-E (left) looking from the South, and N-S (right), looking from the West. The events are colored, from blue to red, and sized by magnitude.

II. Event Locations in AOI

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

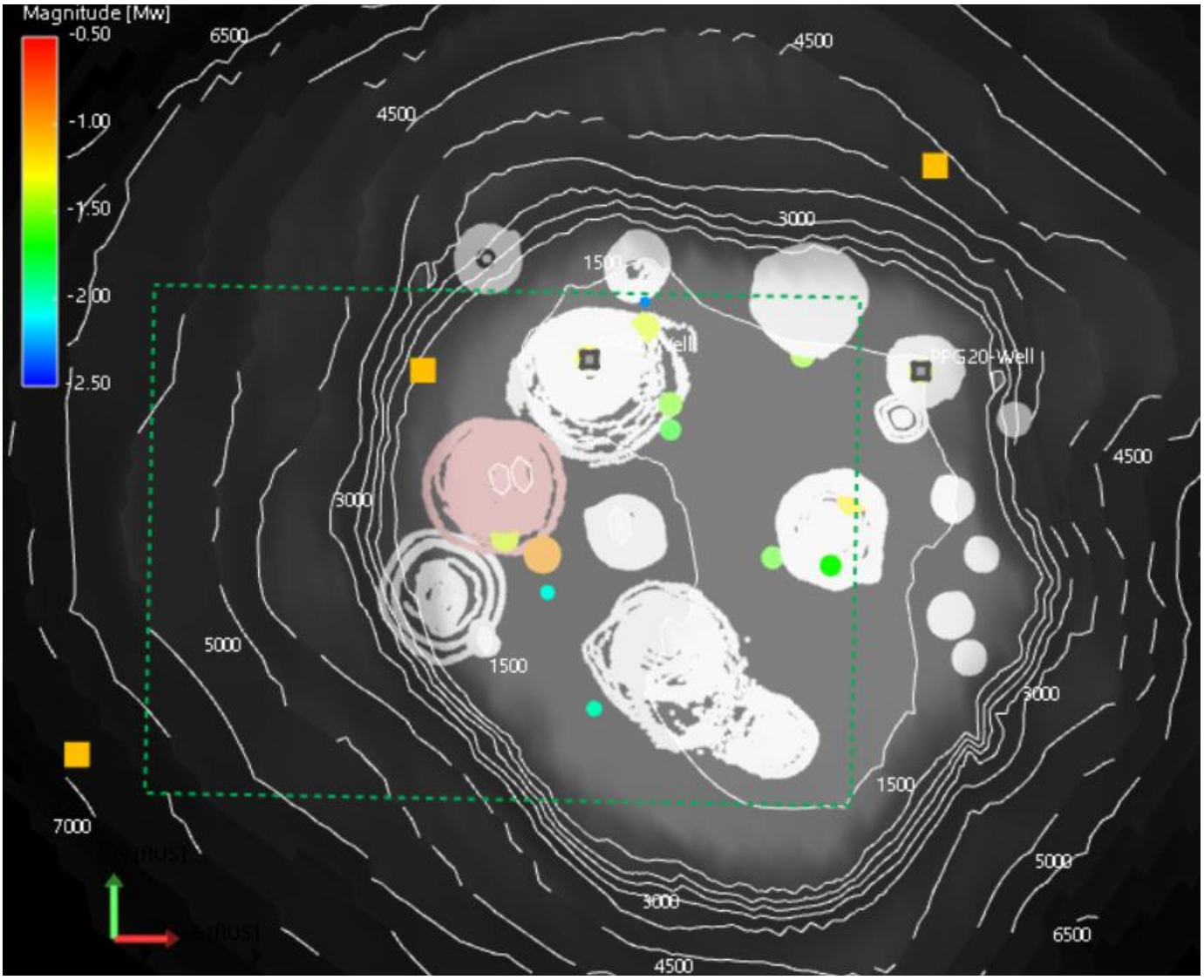

Figure 8: Map of the located events inside the AOI in September 2025. The events are colored, from blue to red, and sized by magnitude; the green rectangle represents the AOI, the orange squares represent the surface stations.

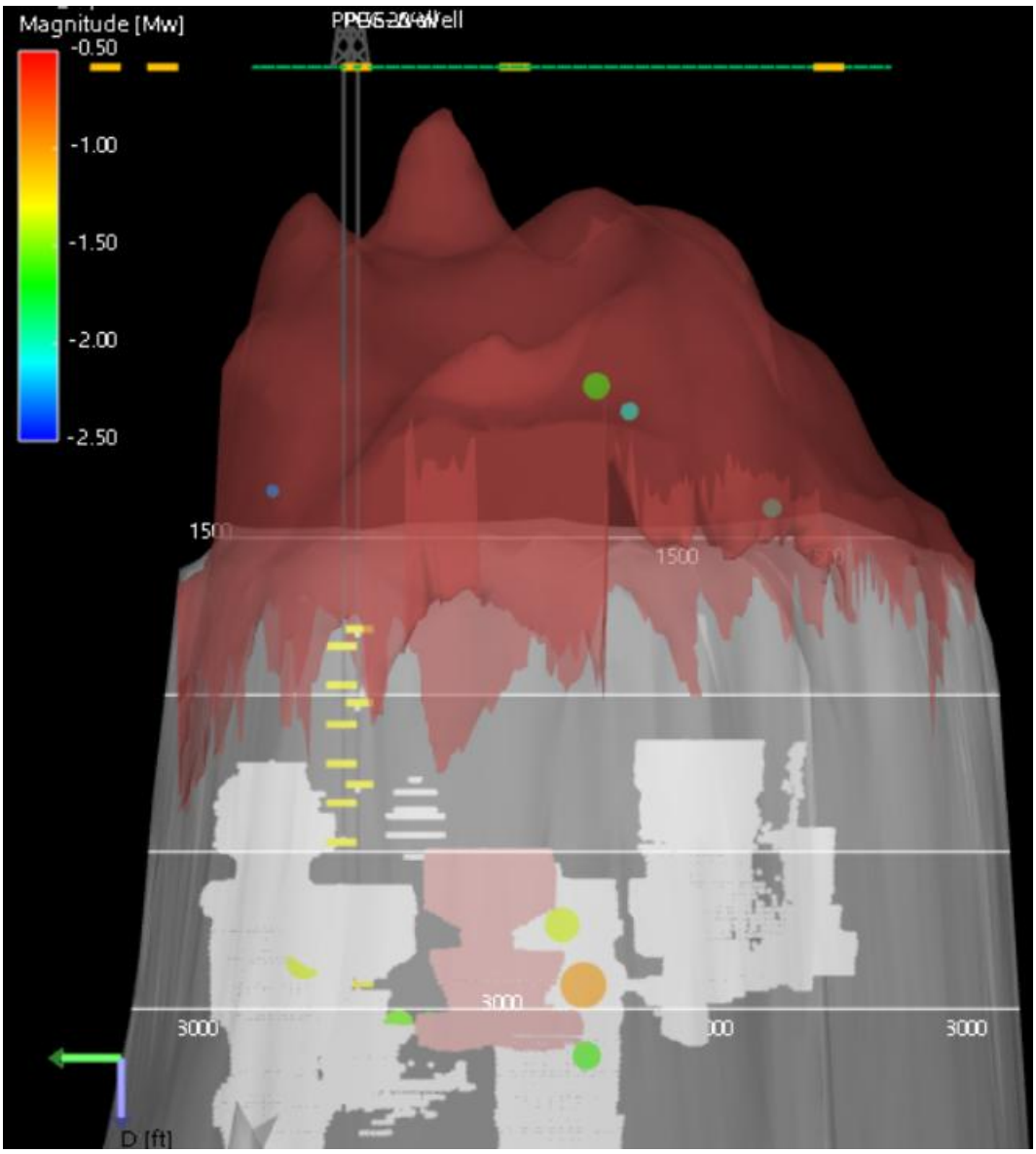

Figure 9: Cross sections N-S (looking from West) of the located events. The events are colored, from blue to red, and sized by magnitude.

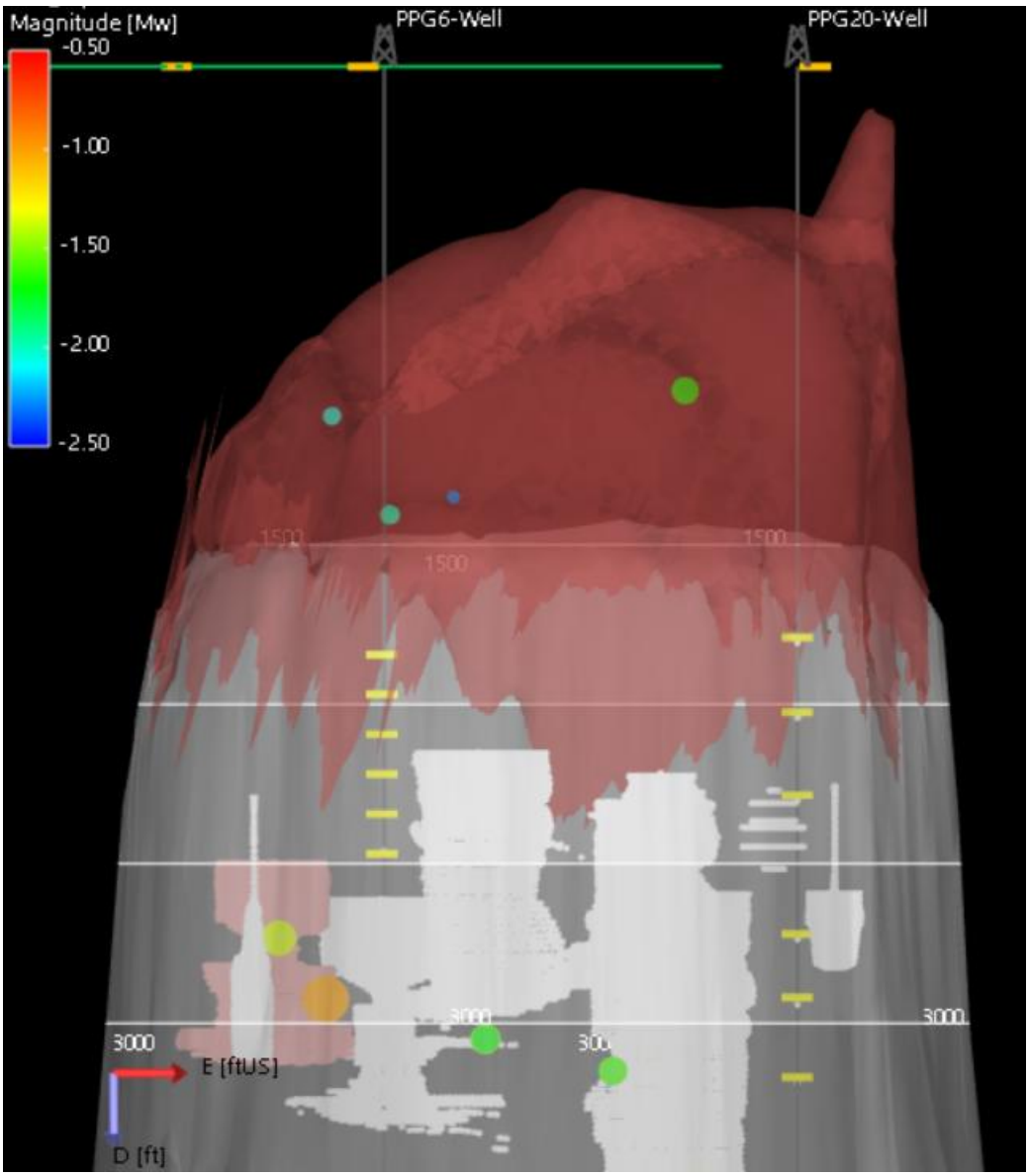

Figure 10: Cross sections W-E (looking from south) of the located events. The events are colored, from blue to red, and sized by magnitude.

Magnitude and depth distribution

The figure below shows the distribution of the moment magnitudes in September 2025. The values vary between -2.6 and -1.0 in September 2025, median value is -1.5.

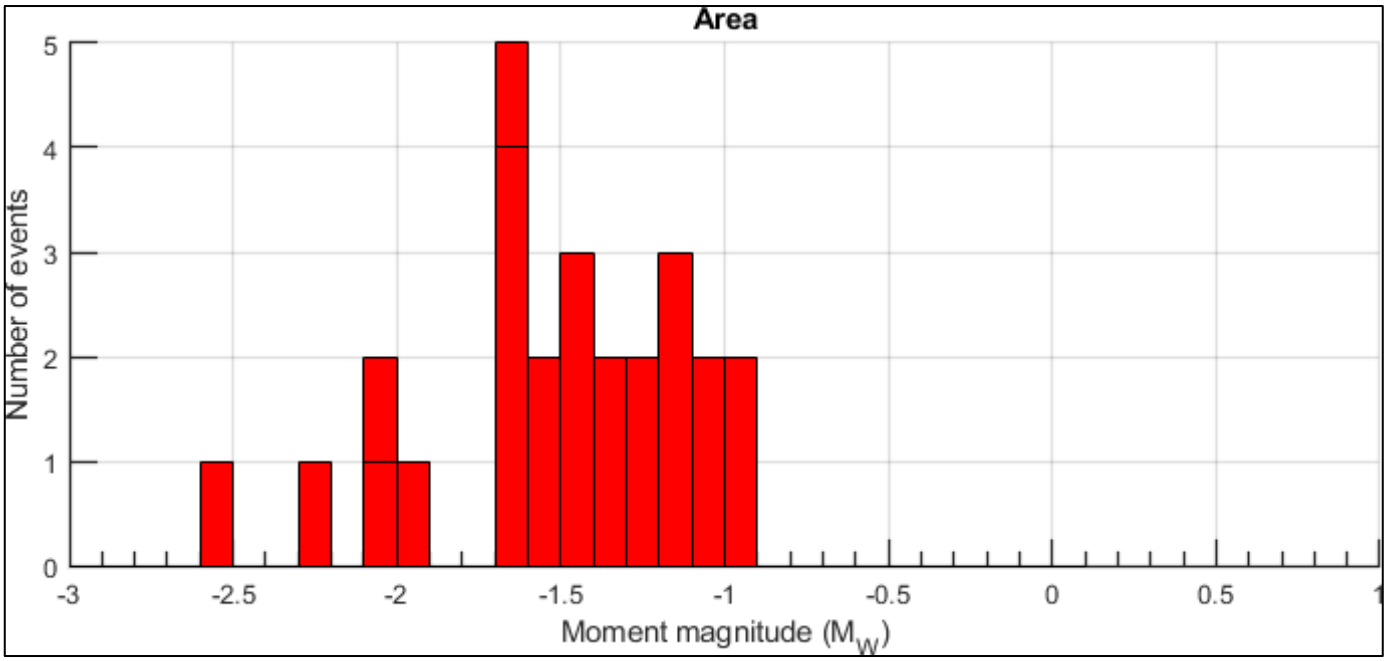

Figure 11: Distribution of magnitudes (Mw) for the located events in September 2025.

The figure below shows the depth distribution in September 2025 for all the located events.
The events are located between 1,016 ft and 5,950 ft. It is possible to distinguish 3 main groups:

- The first one between 1,016 ft and 1,650 ft (above the caverns depth and associated with events located in the Cap-Rock),
- A second one between 2,730 ft and 3,500 ft (associated with events located at depth of the caverns),
- A third composed of 11 events below 3,500 ft (flank area).

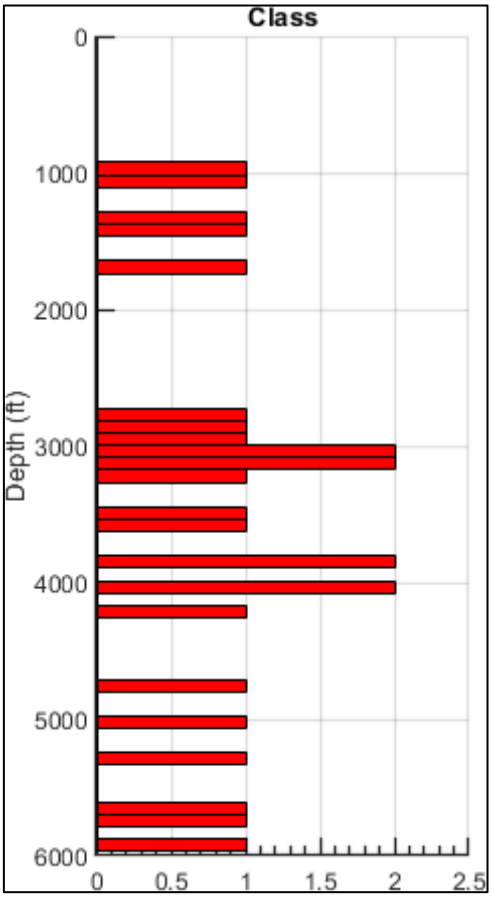

Figure 12: Distribution of the depths for all the events located events in September 2025.

Microseismic history from the beginning of the acquisition

I. History of detections.

In September 2025, the total number of detections (located and not-located events) slightly increased with respect to the previous month (70 detected events in September 2025 compared with 60 detected events in August 2025).
The number of located events is slightly decreased in September 2025 (26 located events) with respect to August (30 located events).

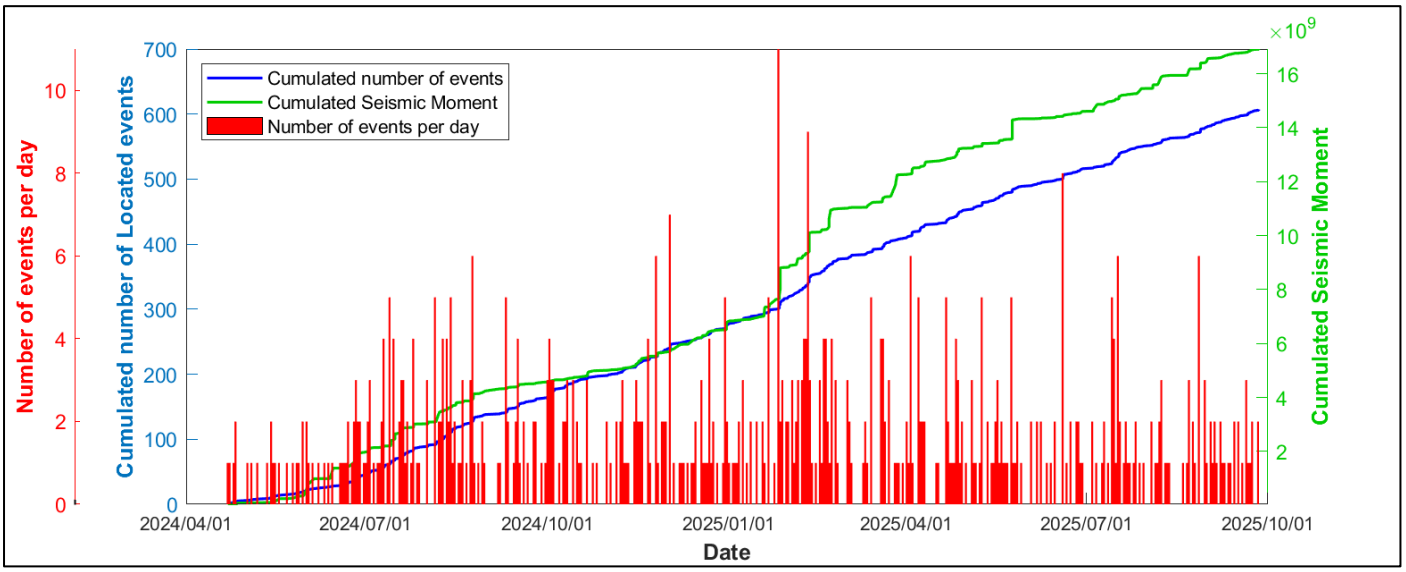

Figure 13: Distribution of the located microseismic events since the beginning of the acquisition on 04/21/2024. Blue line represents the cumulated number of located events. Green line represents the cumulated seismic moment Mo.

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 are between -2.5 and -0.2 (for 631 located events). The median value of the magnitude since the beginning of the acquisition is -1.46.

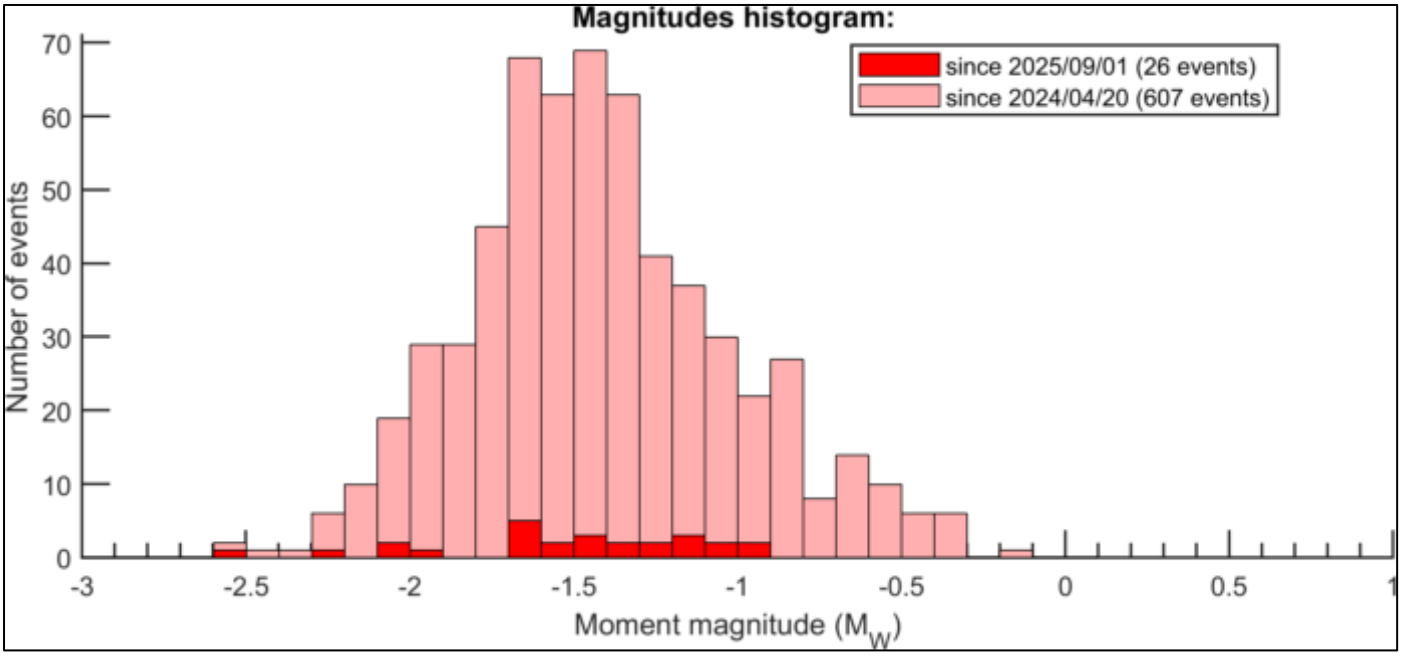

Figure 14: Distribution of magnitude (Mw) for located events. Dark color bars present the current monthly period (September 2025) and light color bars present the distribution since the beginning of the acquisition (from April 21,2024).

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.

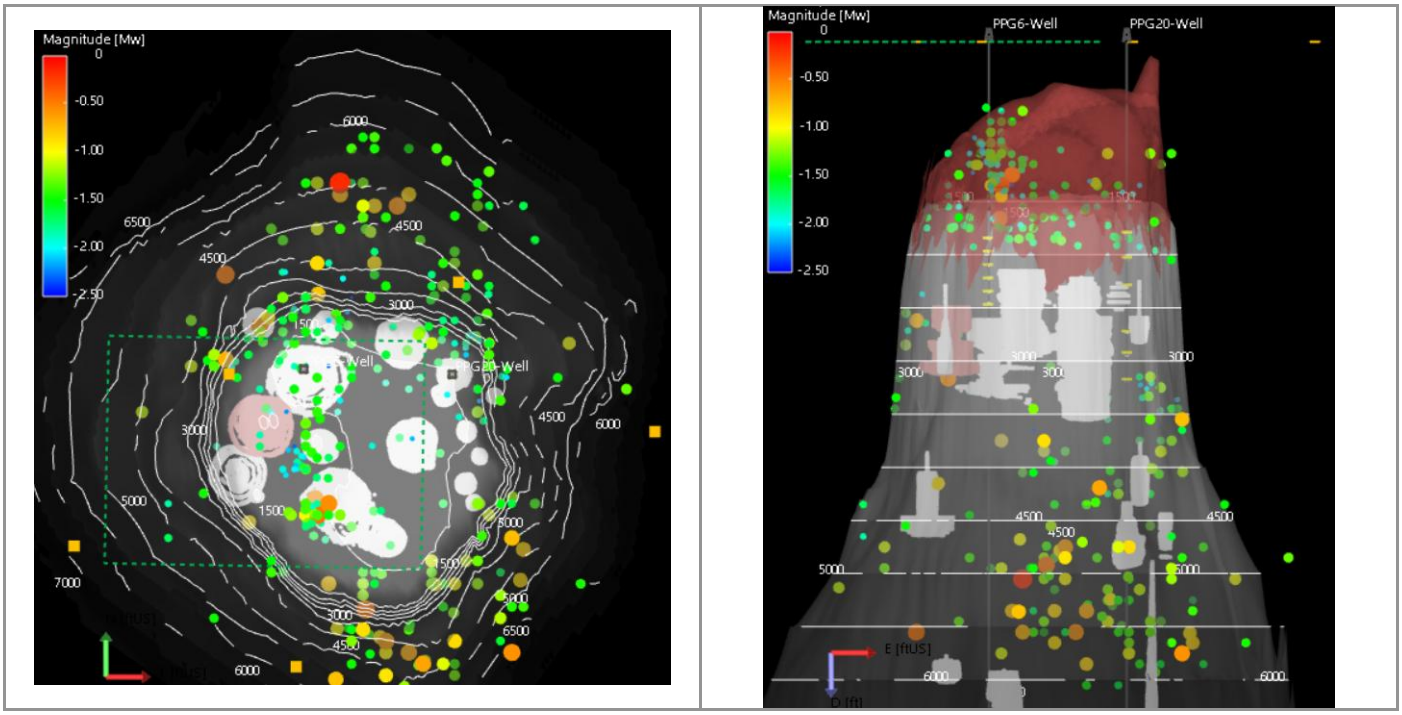

Figure 15: Map view (left) and W-E side view (right) of the cumulative seismicity recorded since the beginning of the acquisition, located in the Cap Rock (red formation) and on the Flank. Green rectangle represents the AOI area. The events are colored, from blue to red, and sized by magnitude.

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).

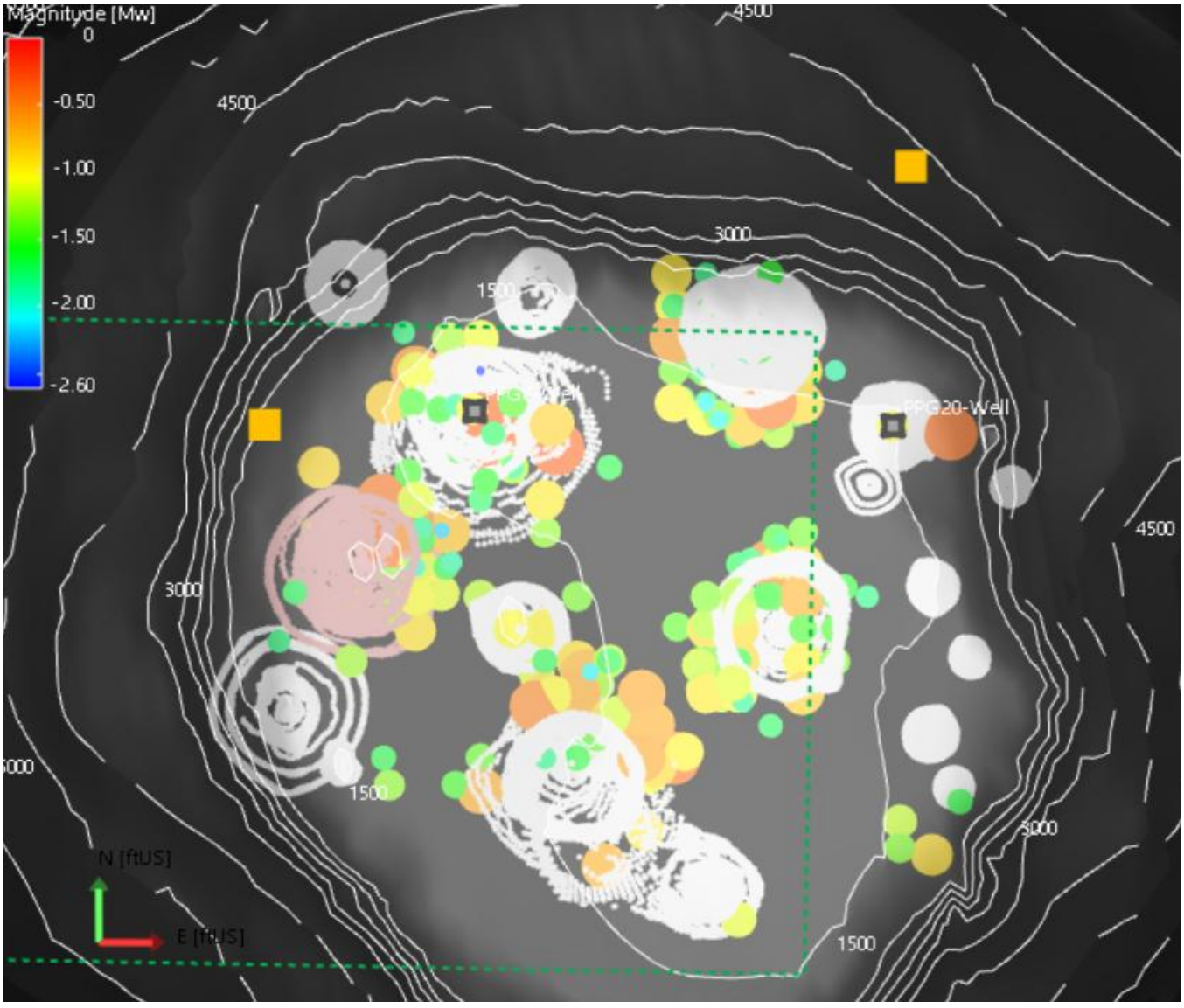

Figure 16: Map view of the events located in proximity to the caverns since the beginning of the acquisition (April 21, 2024). The events are colored, from blue to red, and sized by magnitude.

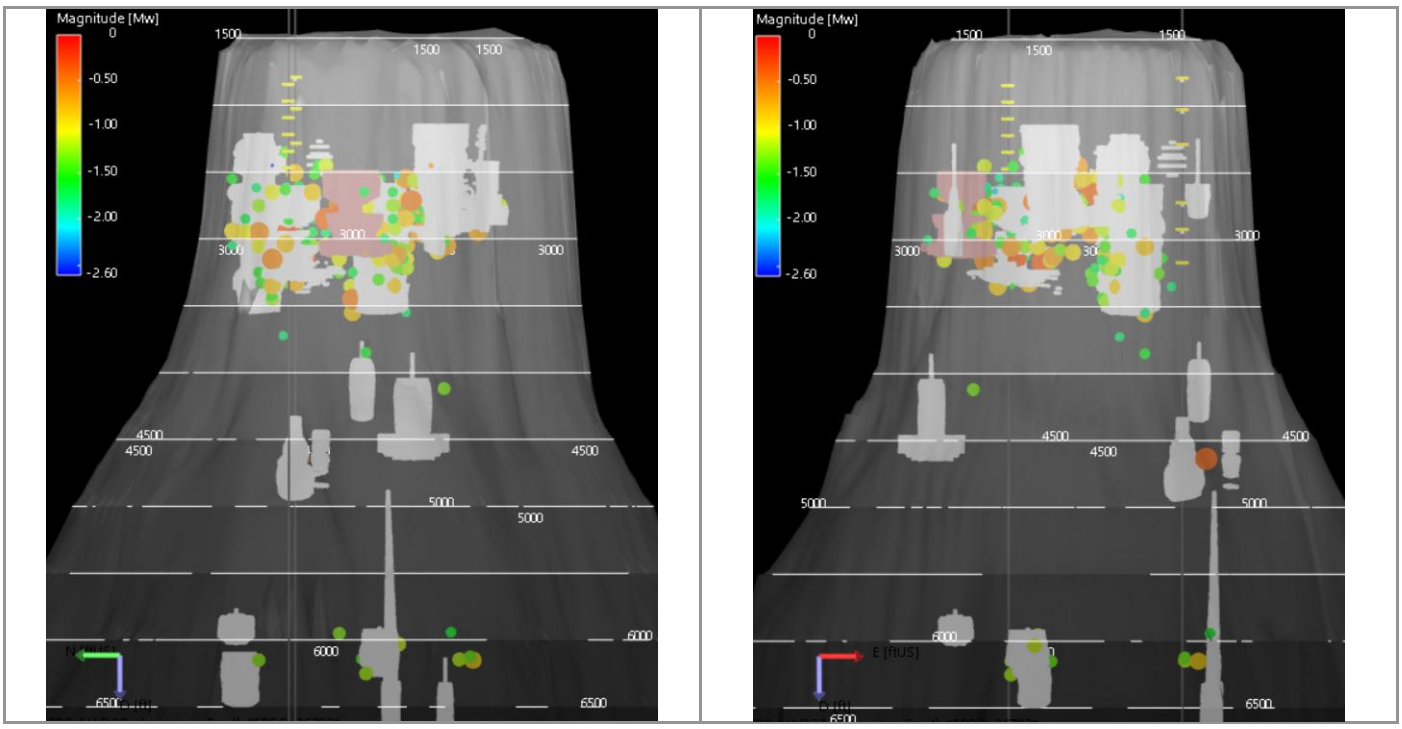

Figure 17: Cross sections W-E (right), looking from the South; and N-S (left), looking from the West of the events located close to the caverns since the beginning of the acquisition. The events are colored, from blue to red, and sized by magnitude.

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)	Mw	Detected by
1	09/02/2025 01:43:12.734	1342818	582723	2733	-1.36	AOI-PPG-07
2	09/02/2025 06:43:27.088	1344650	583691	3246	-2.08	Flank
3	09/03/2025 14:31:23.774	1344093	582613	1016	-1.67	AOI-Cap-Rock
4	09/03/2025 23:33:09.365	1343167	582054	1405	-1.99	AOI-Cap-Rock
5	09/04/2025 05:41:53.745	1342866	583844	1650	-2.59	Cap-Rock
6	09/05/2025 14:58:18.510	1343984	583438	3108	-1.48	AOI-PPG-16
7	09/07/2025 08:30:19.755	1344180	582872	3495	-1.24	AOI-LGS-02
8	09/07/2025 08:30:24.195	1343866	582644	3150	-1.60	AOI-LGS-02
9	09/08/2025 09:45:53.941	1343166	584744	5050	-0.99	Flank
10	09/09/2025 08:09:08.330	1343166	584344	3850	-1.16	Flank
11	09/11/2025 03:57:08.704	1342965	582655	2925	-0.99	AOI-PPG-07
12	09/12/2025 02:20:32.675	1344966	582344	4250	-1.49	Flank
13	09/13/2025 20:50:05.622	1345032	581885	4074	-1.03	Flank
14	09/14/2025 11:48:54.332	1342985	582508	1096	-2.05	AOI-Cap-Rock
15	09/16/2025 06:08:40.511	1343466	583144	3050	-1.69	AOI-PPG-06
16	09/16/2025 06:08:54.719	1343466	583244	3050	-1.53	AOI-PPG-06
17	09/18/2025 16:07:33.614	1343366	583544	2850	-1.35	AOI-PPG-06
18	09/20/2025 15:53:07.951	1344666	584544	5650	-1.17	Flank
19	09/20/2025 15:53:24.065	1344666	584344	5950	-1.36	Flank
20	09/20/2025 15:53:32.894	1344566	584744	5750	-1.29	Flank
21	09/21/2025 09:04:02.165	1343366	583644	1350	-2.27	AOI-Cap-Rock
22	09/22/2025 06:41:17.540	1343066	581444	4750	-1.02	Flank
23	09/23/2025 01:54:00.731	1343666	581144	5250	-1.19	Flank
24	09/23/2025 14:58:58.227	1344666	583744	3550	-1.34	Flank
25	09/26/2025 04:10:17.667	1344666	581644	4050	-1.50	Flank
26	09/26/2025 04:10:20.995	1344666	581644	3850	-1.44	Flank