ESTABLISHED 1907

Muswellbrook Coal Company Limited

Spontaneous Combustion Report

For: Environmental Protection Licence 656

Reporting Period:	**Quarter 4 2023**
Authority Holder:	**Muswellbrook Coal Company Limited**
Report Date:	**29 January 2024**
Approved by:	**Julie Thomas** **Environmental Superintendent**

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1.0 INTRODUCTION

The coal seams mined by the Muswellbrook Coal Company (MCC) operations are the Greta Coal Measures. These measures have a history of spontaneous combustion. Spontaneous combustion has been a long-term issue at MCC since the first operation commenced in 1907.

A Spontaneous Combustion Management Plan (SCMP) has been prepared according to the specific requirements of the Development Consent. The main objective of the SCMP is to minimise the occurrence of spontaneous combustion and manage the effect by identification, control, removal, mitigation and prevention in the following areas:

- Existing open cut and underground workings,
- Drilling and blasting,
- Mining of overburden,
- Mining of coal,
- Emplacement of overburden,
- Emplacement of washery reject, and
- Coal stockpiles.

Following the completion of mining at the end of 2022, the SCMP was updated in April 2023 to reflect this change of activity on site. MCC are still waiting on Muswellbrook Shire Council (MSC) to approve these changes.

The Environment Protection Authority (EPA) require MCC to provide reports on spontaneous combustion management and monitoring quarterly. This report identifies:

- Spontaneous combustion management during the reporting period,
- Gas monitoring results,
- Number of complaints relating to spontaneous combustion,
- Response to hydrogen sulphide levels above the odour threshold, and
- Correlation between spontaneous combustion on site with gas results and complaints received.

2.0 SPONTANEOUS COMBUSTION MANAGEMENT MEASURES

Spontaneous combustion management measures for the reporting period included water carts assisting with cooling down hot spots and capping of spontaneous combustion outbreaks. Mining operations ceased at MCC in November 2022, so the reporting of spontaneous combustion management measures has changed and there is no longer a daily report prepared.

The classification system for spontaneous combustion outbreaks is provided in **Table 1**. A summary of the areas affected by spontaneous combustion and the areas controlled and treated during the reporting period is provided in **Table 2.** The locations of these areas can be seen in **Figure 1** to **Figure 6**. As part of the final rehabilitation at MCC, bulk shaping activities have commenced in Open Cut 1 and these activities have included the dozer push of carbonaceous materials. As a result of this work the area affected by spontaneous

combustion has increased. As the bulk shaping activities continue and inert material is placed over this carbonaceous material, this area will decrease.

Table 1: Classification of Spontaneous Combustion Outbreaks

Classification	Description
A	Open flame
B	Visible steam or smoke
C	Other physical evidence of spontaneous combustion (e.g. cracks, coal tars, sulphur crusting, etc)

* - classification revised in November 2019

Table 2: Summary of Spontaneous Combustion

Month	Areas Capped (m^2)*	Areas Mined (m^2)*	Area Under Water Infusion (m^2)*	Area Without Active Control (m^2)**
Open Cut 1				
October 23	0	0	8,360	9,583
November 23	0	0	13,390	19,760
December 23	0	0	0	645
Open Cut 2				
October 23	0	0	0	0
November 23	0	0	0	0
December 23	0	0	0	0

* - during reporting period
** - at end of reporting period

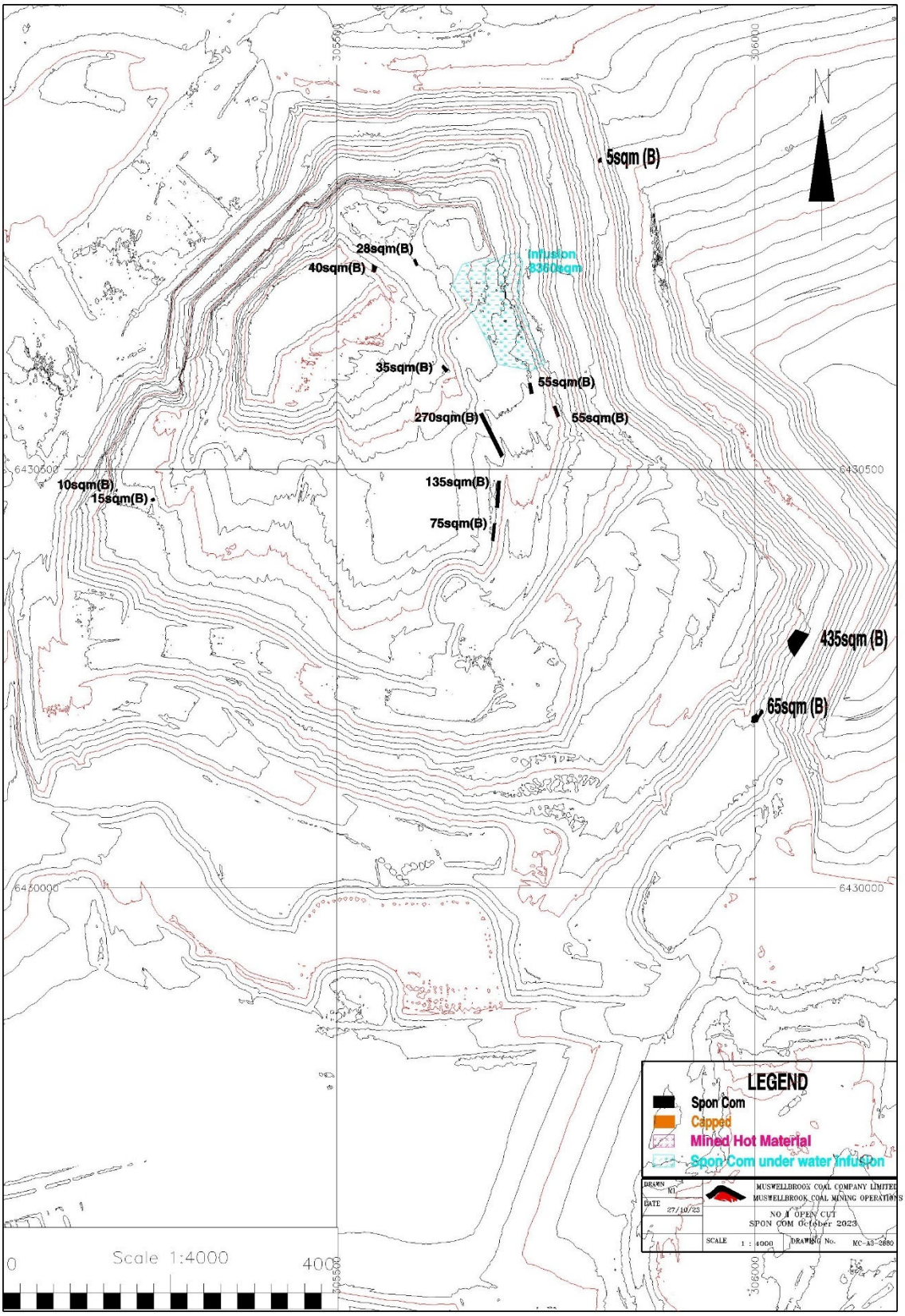


Figure 1: Location of Spontaneous Combustion Outbreaks in Open Cut 1 – October 2023

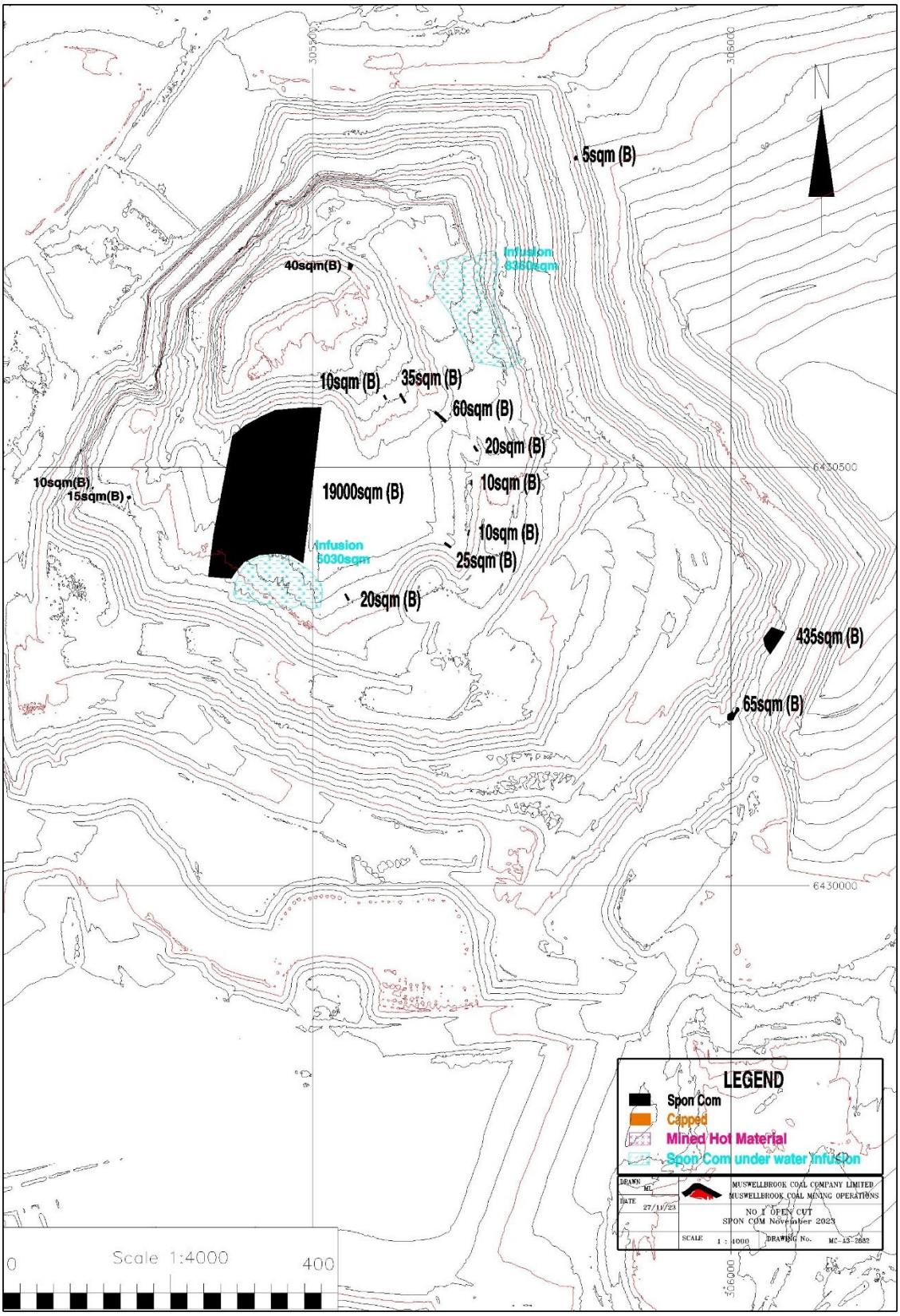


Figure 2: Location of Spontaneous Combustion Outbreaks in Open Cut 1 – November 2023

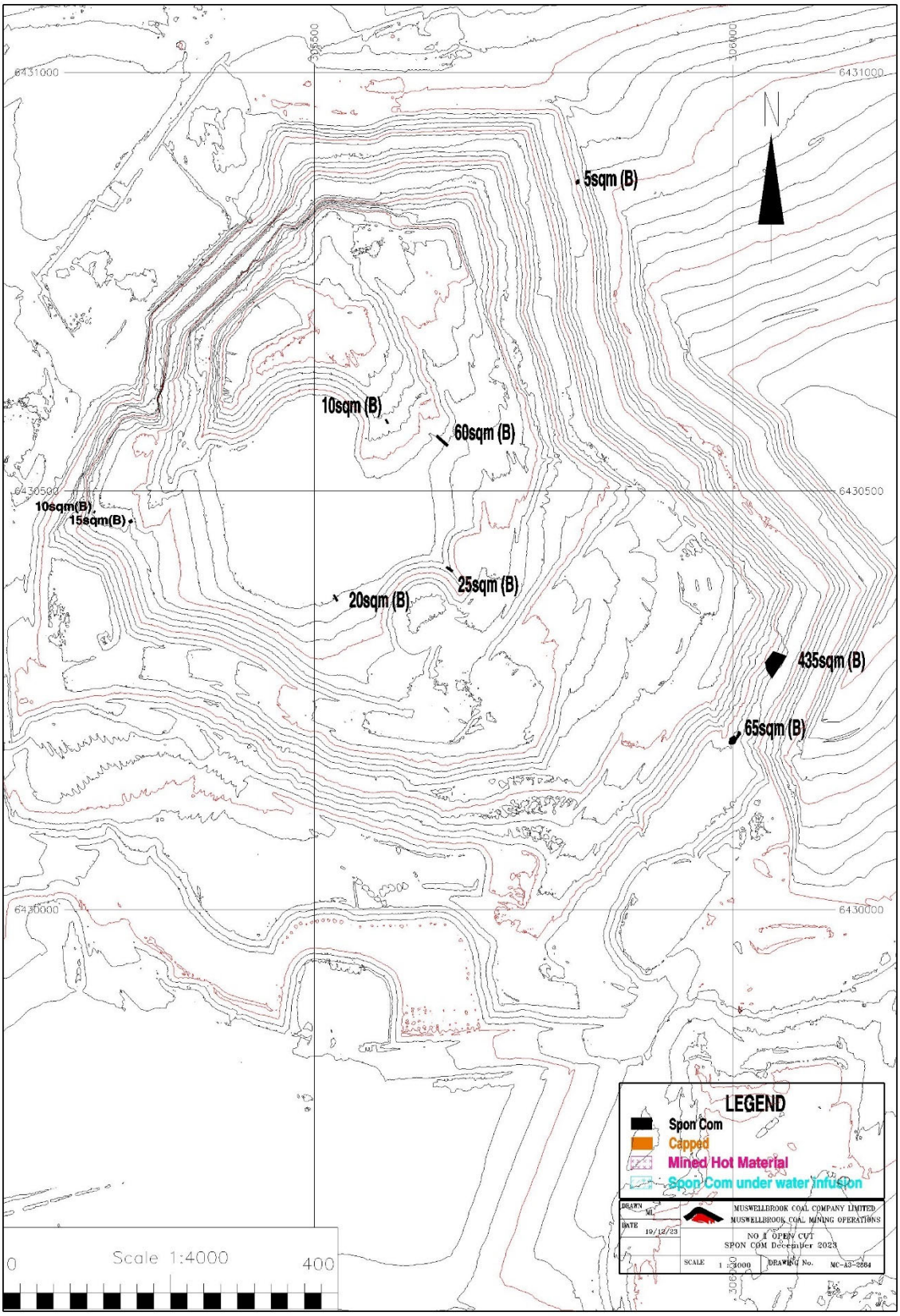


Figure 3: Location of Spontaneous Combustion Outbreaks in Open Cut 1 – December 2023

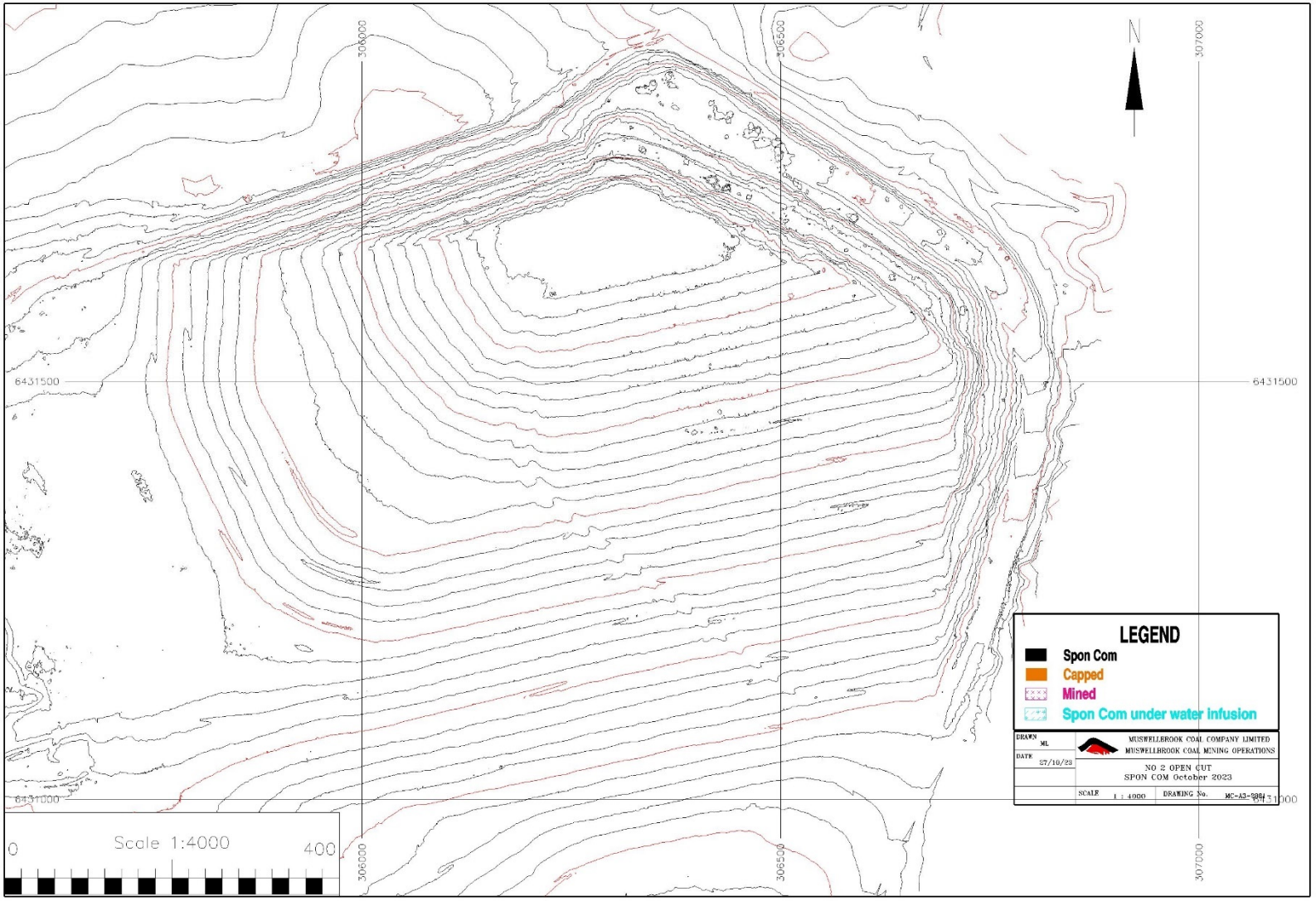


Figure 4: Location of Spontaneous Combustion Outbreaks in Open Cut 2 – October 2023

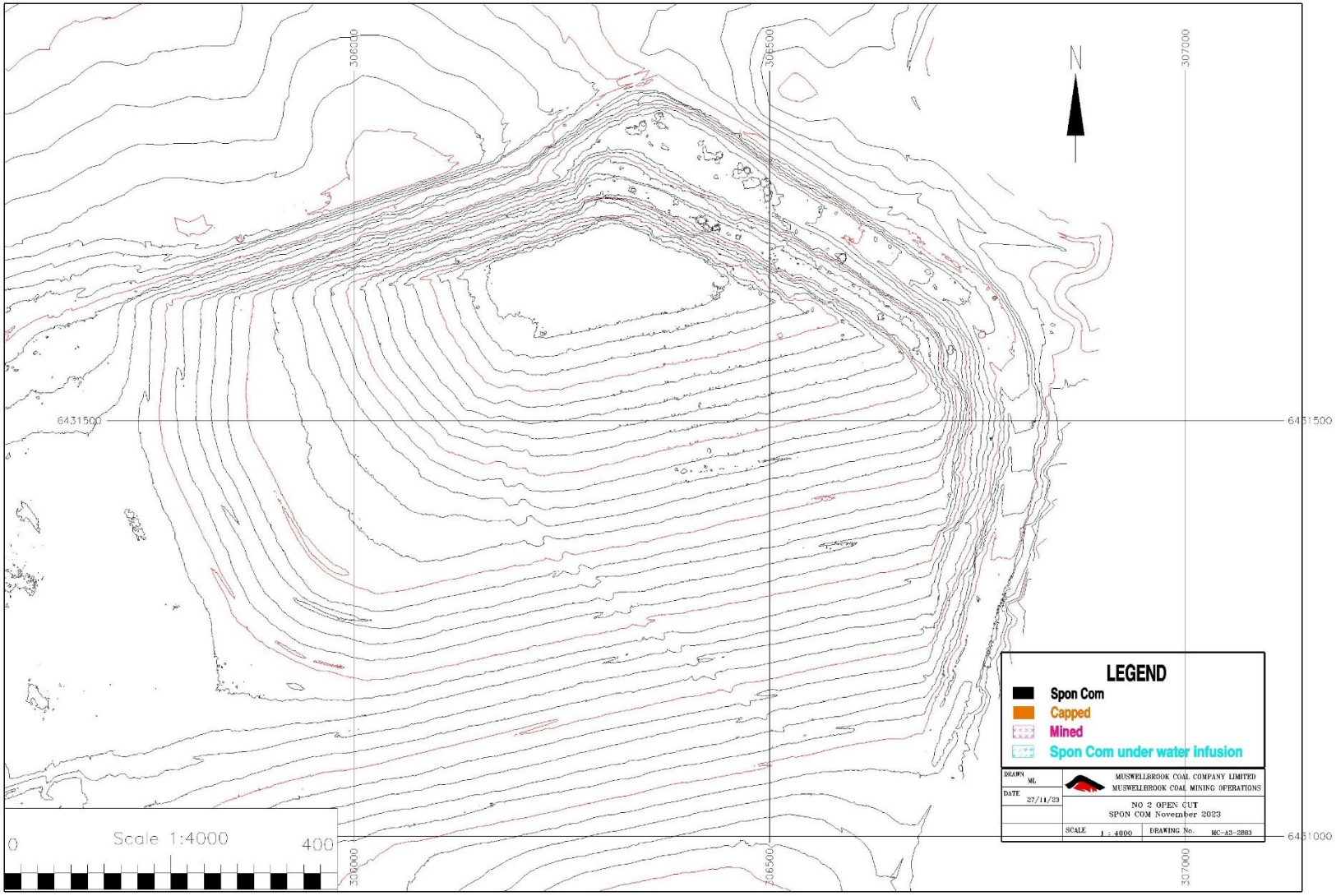


Figure 5: Location of Spontaneous Combustion Outbreaks in Open Cut 2 – November 2023

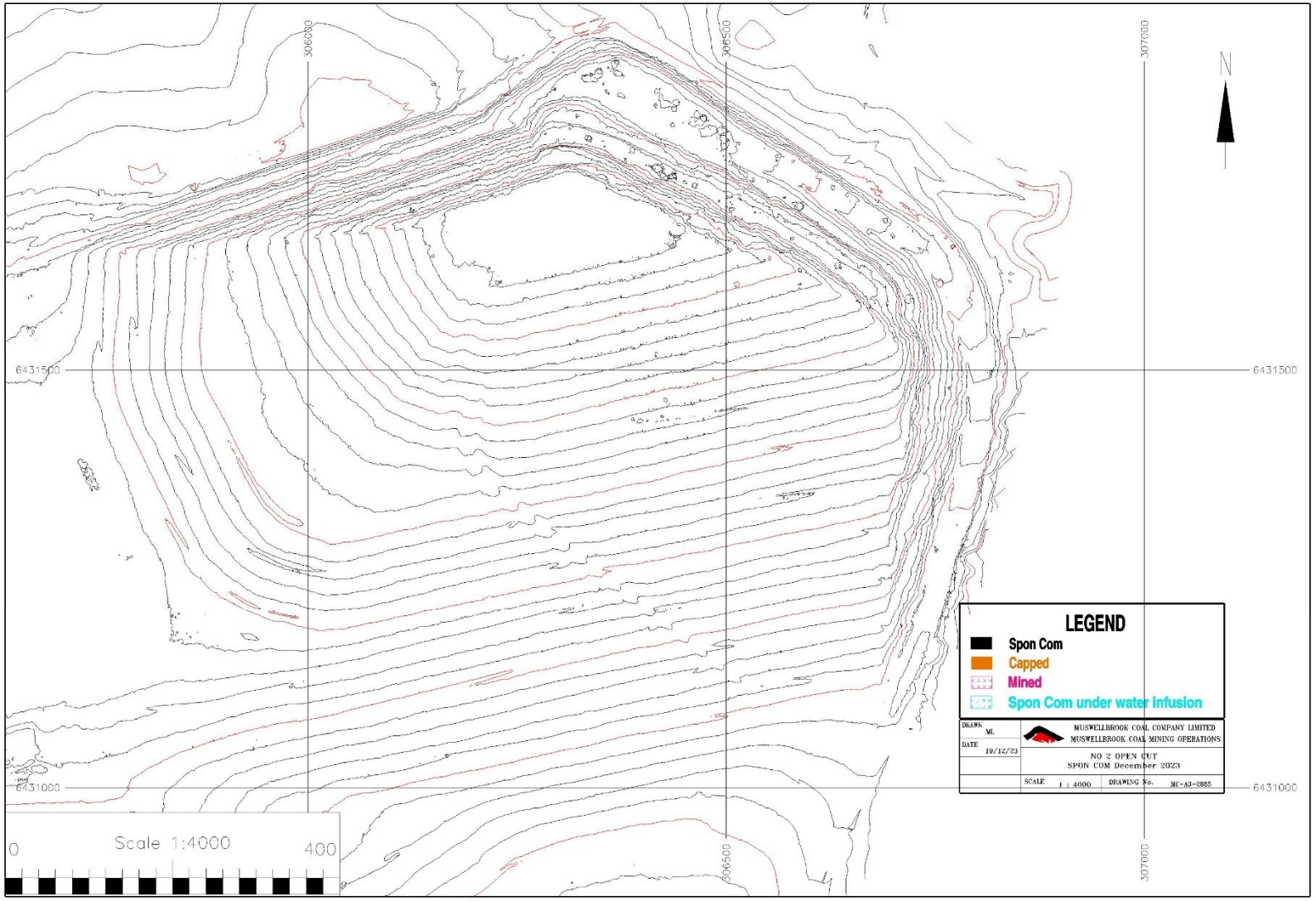


Figure 6: Location of Spontaneous Combustion Outbreaks in Open Cut 2 – December 2023

3.0 GAS MONITORING RESULTS

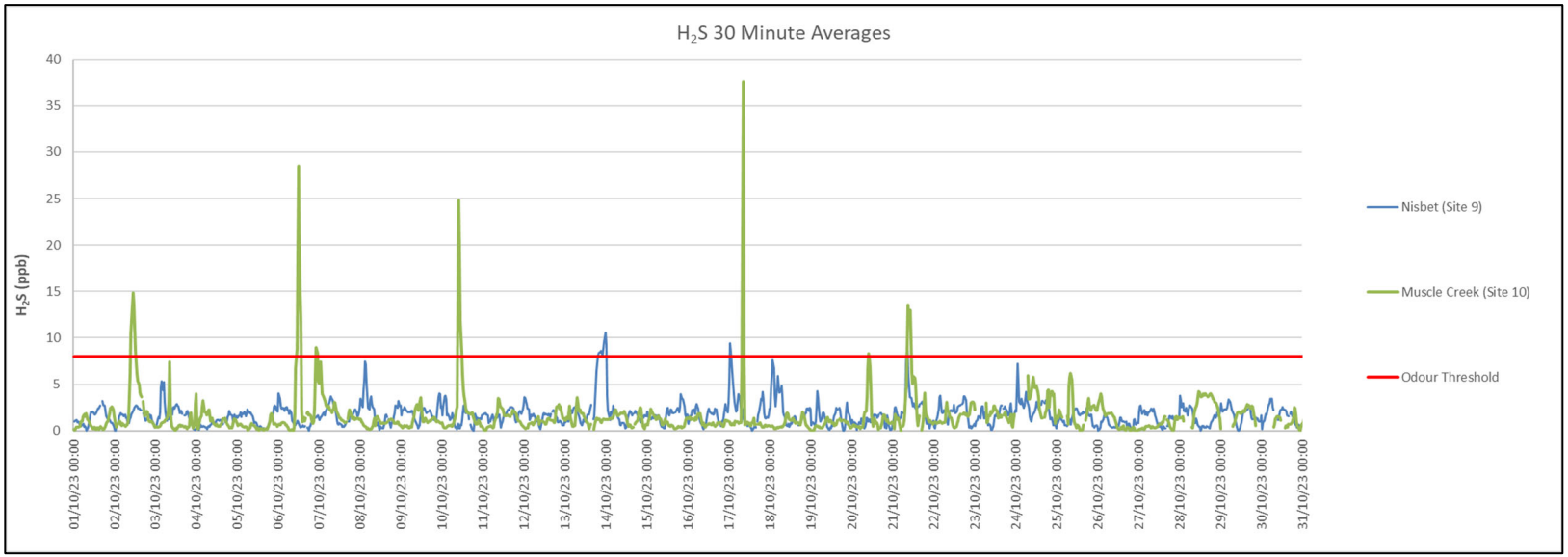
The gas monitoring results are displayed graphically in **Figure 7** to **Figure 11.** As noted in these graphs, there were no results above the health impact assessment criteria for the reporting period.

The data capture rates for the last 12 months to the end of December 2023 are shown in **Table 3**.

Table 3: Data Capture Rates

Monitoring Location	Pollutant	Averaging Period	Data Capture – 12 Month Rolling (%)
Point 9, Nisbet	Hydrogen Sulphide	30 minutes	87.3
		1 hour	85.3
		24 hours	88.5
Point 10, Muscle Creek	Hydrogen Sulphide	30 minutes	96.7
		1 hour	94.5
		24 hours	98.1
Point 15, Nisbet	Sulphur Dioxide	1 hour	86.4
		24 hours	88.8
Point 16, Muscle Creek	Sulphur Dioxide	1 hour	94.6
		24 hours	98.1

Data was lost from Point 9 and Point 15 in December 2023 due to faulty equipment. This resulted in the 12-month rolling average dropping below 90%.


H2S 30 Minute Averages
H2S (ppb)
40
35
30
25
20
15
10
5
0
01/10/23 00:00
02/10/23 00:00
03/10/23 00:00
04/10/23 00:00
05/10/23 00:00
06/10/23 00:00
07/10/23 00:00
08/10/23 00:00
09/10/23 00:00
10/10/23 00:00
11/10/23 00:00
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13/10/23 00:00
14/10/23 00:00
15/10/23 00:00
16/10/23 00:00
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27/10/23 00:00
28/10/23 00:00
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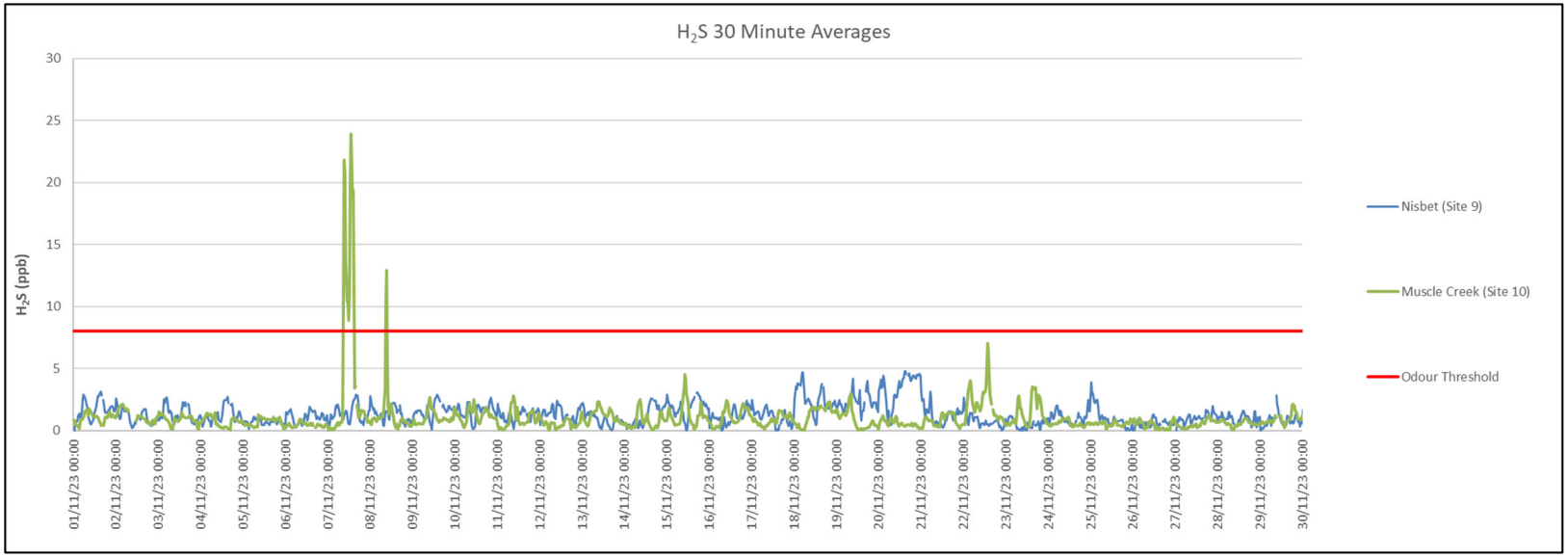
30/10/23 00:00
31/10/23 00:00
Nisbet (Site 9)
Muscle Creek (Site 10)
Odour Threshold


H2S 30 Minute Averages
H2S (ppb)
30
25
20
15
10
5
0
01/11/23 00:00
02/11/23 00:00
03/11/23 00:00
04/11/23 00:00
05/11/23 00:00
06/11/23 00:00
07/11/23 00:00
08/11/23 00:00
09/11/23 00:00
10/11/23 00:00
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30/11/23 00:00
Nisbet (Site 9)
Muscle Creek (Site 10)
Odour Threshold

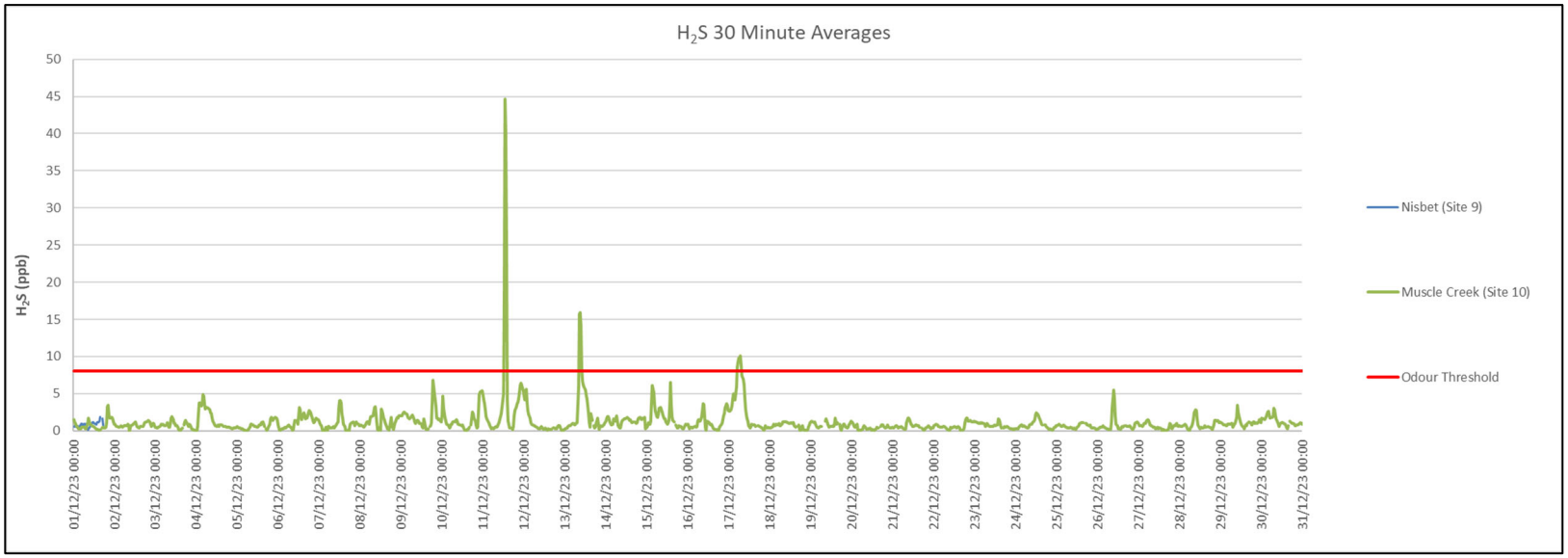
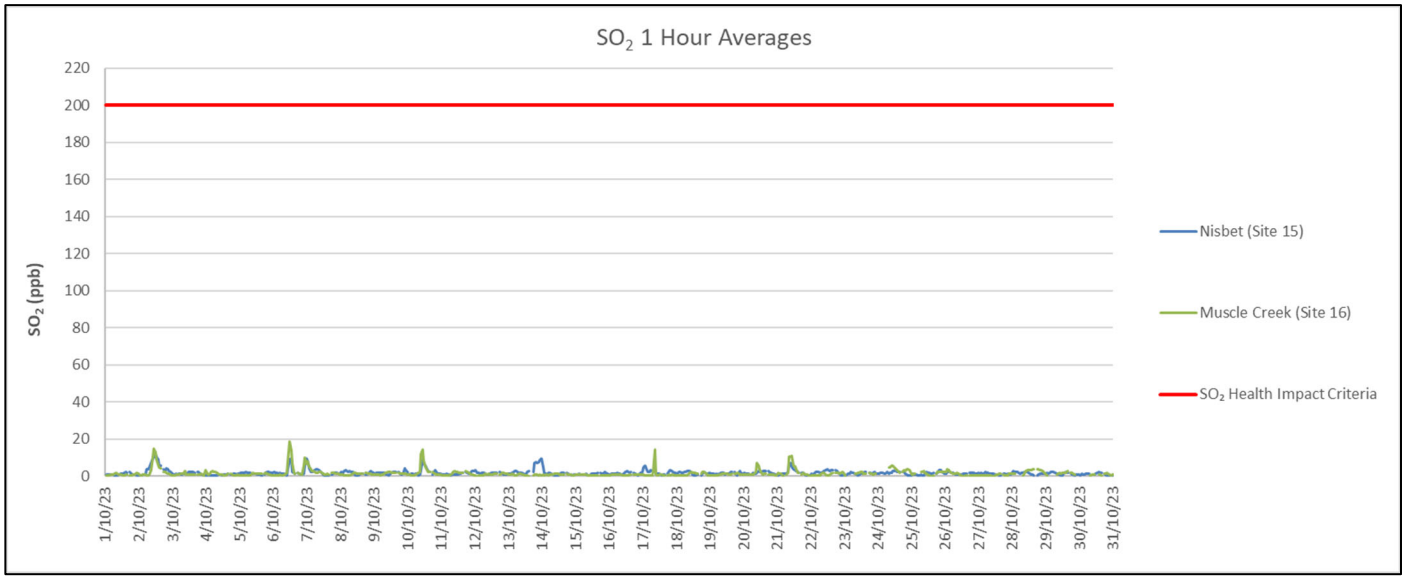


Figure 7: Hydrogen Sulphide 30 Minute Results


SO2 1 Hour Averages
SO2 (ppb)
220
200
180
160
140
120
100
80
60
40
20
0
1/10/23
2/10/23
3/10/23
4/10/23
5/10/23
6/10/23
7/10/23
8/10/23
9/10/23
10/10/23
11/10/23
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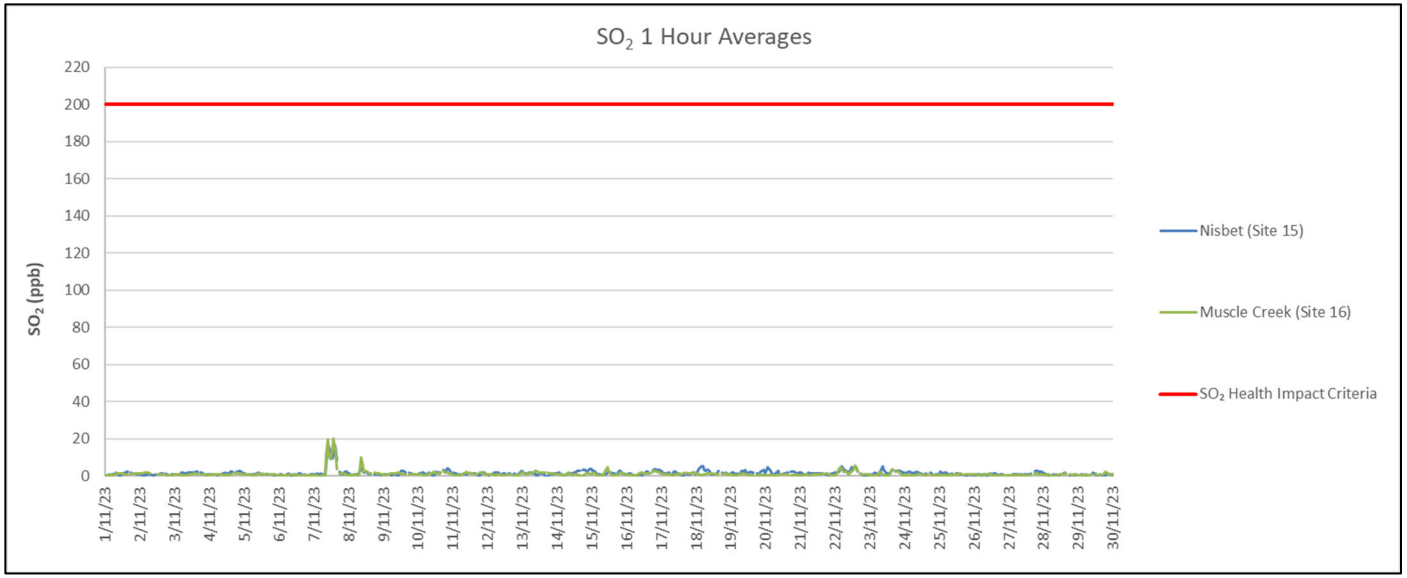
30/10/23
31/10/23
Nisbet (Site 15)
Muscle Creek (Site 16)
SO2 Health Impact Criteria


SO2 1 Hour Averages
SO2 (ppb)
220
200
180
160
140
120
100
80
60
40
20
0
1/11/23
2/11/23
3/11/23
4/11/23
5/11/23
6/11/23
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30/11/23
Nisbet (Site 15)
Muscle Creek (Site 16)
SO2 Health Impact Criteria

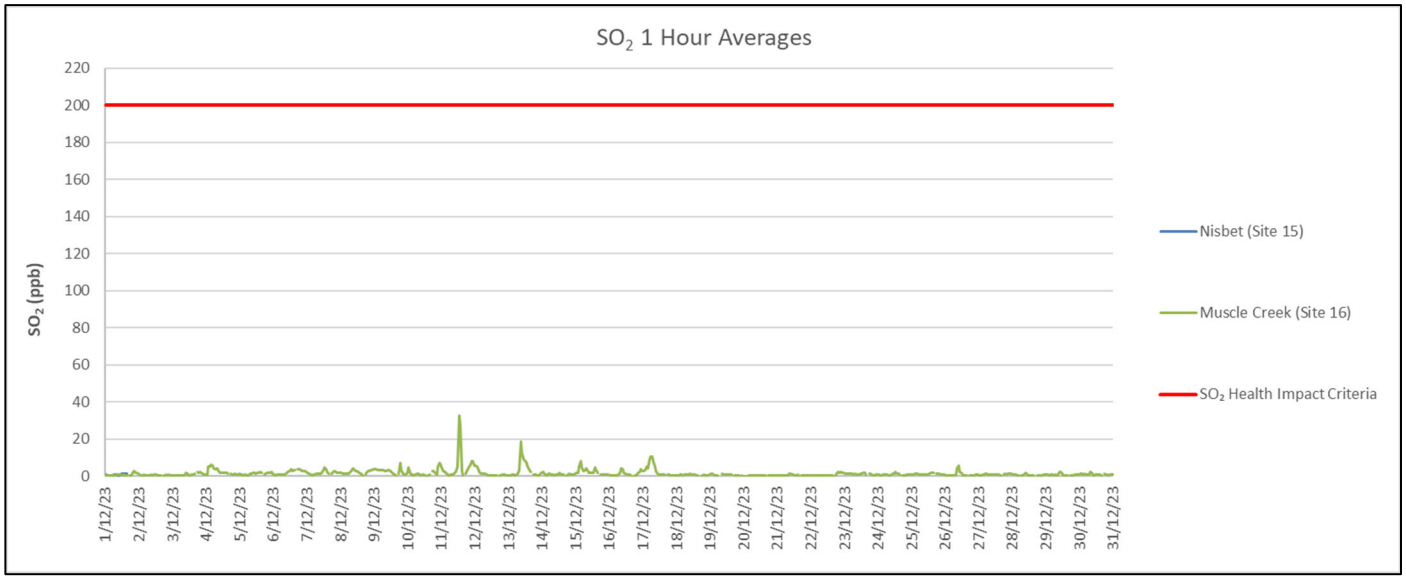
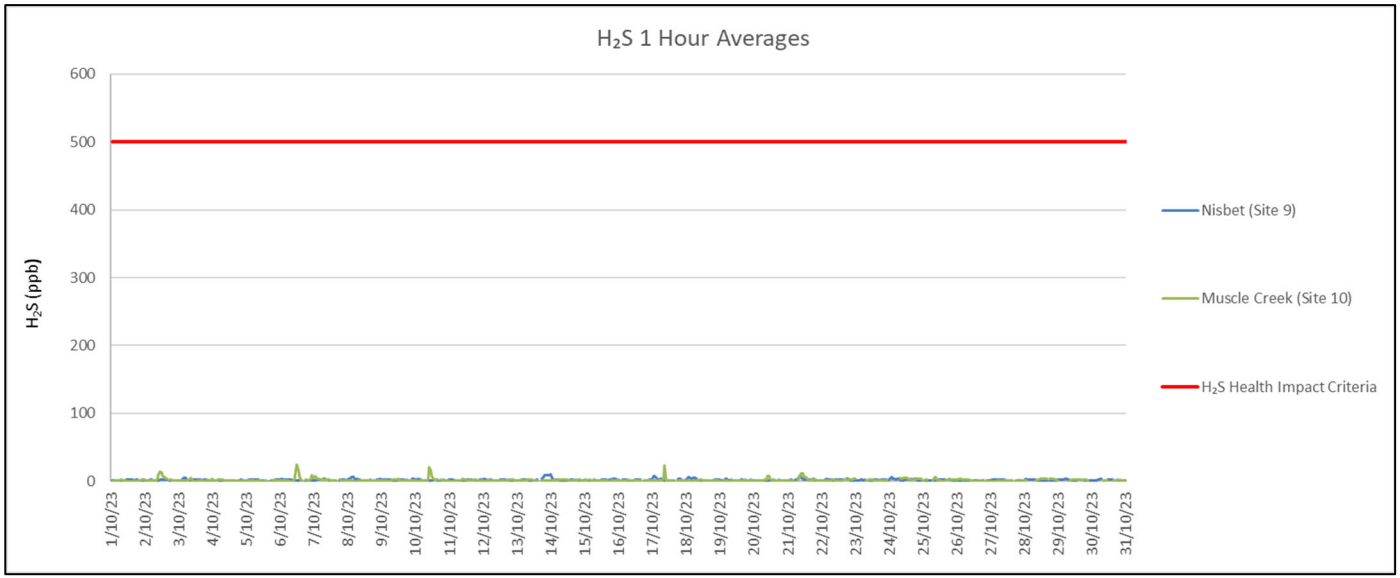


Figure 8: Sulphur Dioxide 1 Hour Results


H2S 1 Hour Averages
H2S (ppb)
600
500
400
300
200
100
0
1/10/23
2/10/23
3/10/23
4/10/23
5/10/23
6/10/23
7/10/23
8/10/23
9/10/23
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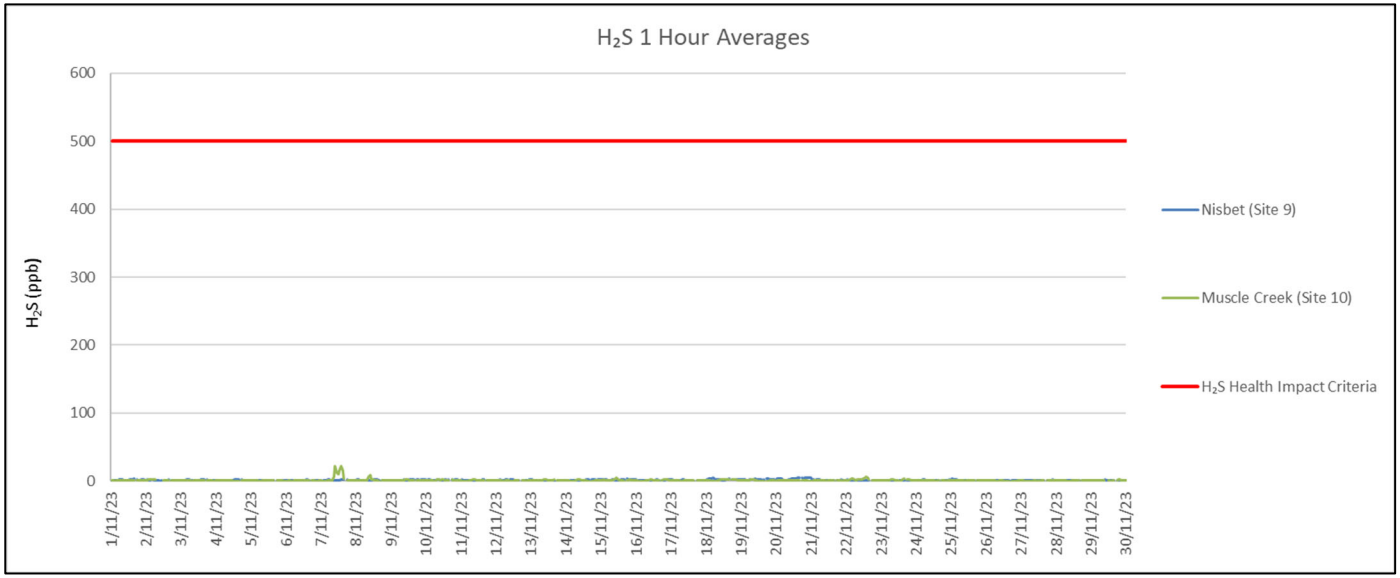
31/10/23
Nisbet (Site 9)
Muscle Creek (Site 10)
H2S Health Impact Criteria


H2S 1 Hour Averages
H2S (ppb)
600
500
400
300
200
100
0
1/11/23
2/11/23
3/11/23
4/11/23
5/11/23
6/11/23
7/11/23
8/11/23
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Nisbet (Site 9)
Muscle Creek (Site 10)
H2S Health Impact Criteria

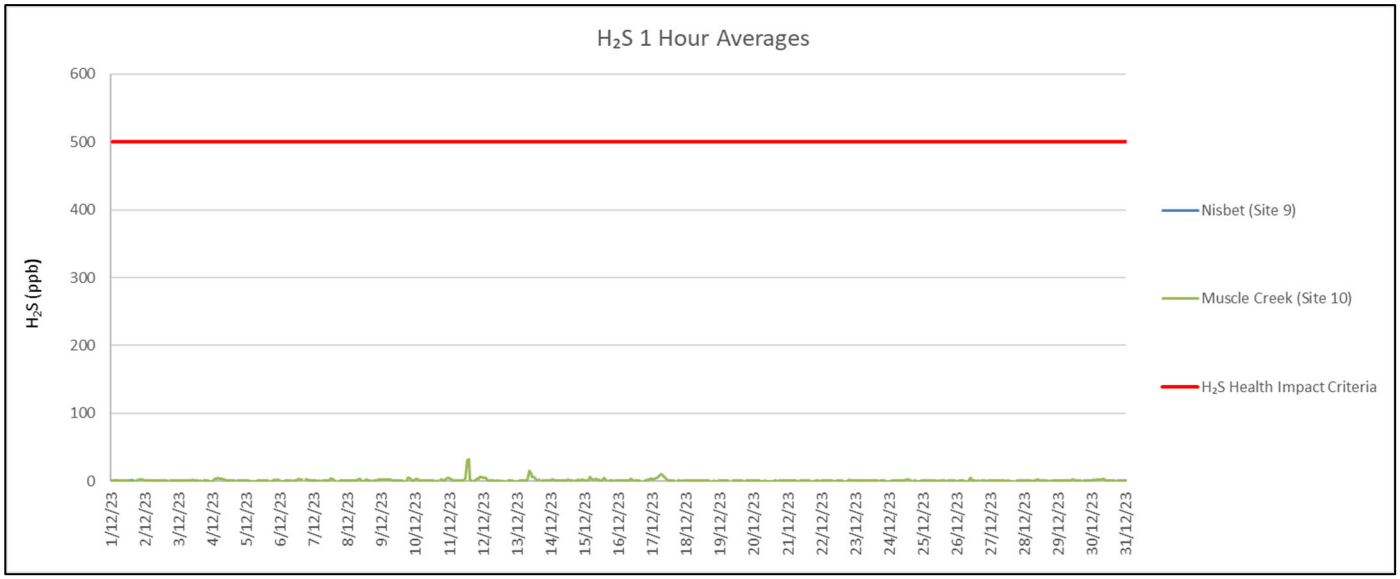

Figure 9: Hydrogen Sulphide 1 Hour Results


SO2 24 Hour Averages
SO2 (ppb)
100
80
60
40
20
0
01/10/23
02/10/23
03/10/23
04/10/23
05/10/23
06/10/23
07/10/23
08/10/23
09/10/23
10/10/23
11/10/23
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30/10/23
31/10/23
Nisbet (Site 15)
Muscle Creek (Site 16)
SO2 Health Impact Criteria
SO2 24 Hour Averages
SO2 (ppb)
100
80
60
40
20
0
01/11/23
02/11/23
03/11/23
04/11/23
05/11/23
06/11/23
07/11/23
08/11/23
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30/11/23
Nisbet (Site 15)
Muscle Creek (Site 16)
SO2 Health Impact Criteria

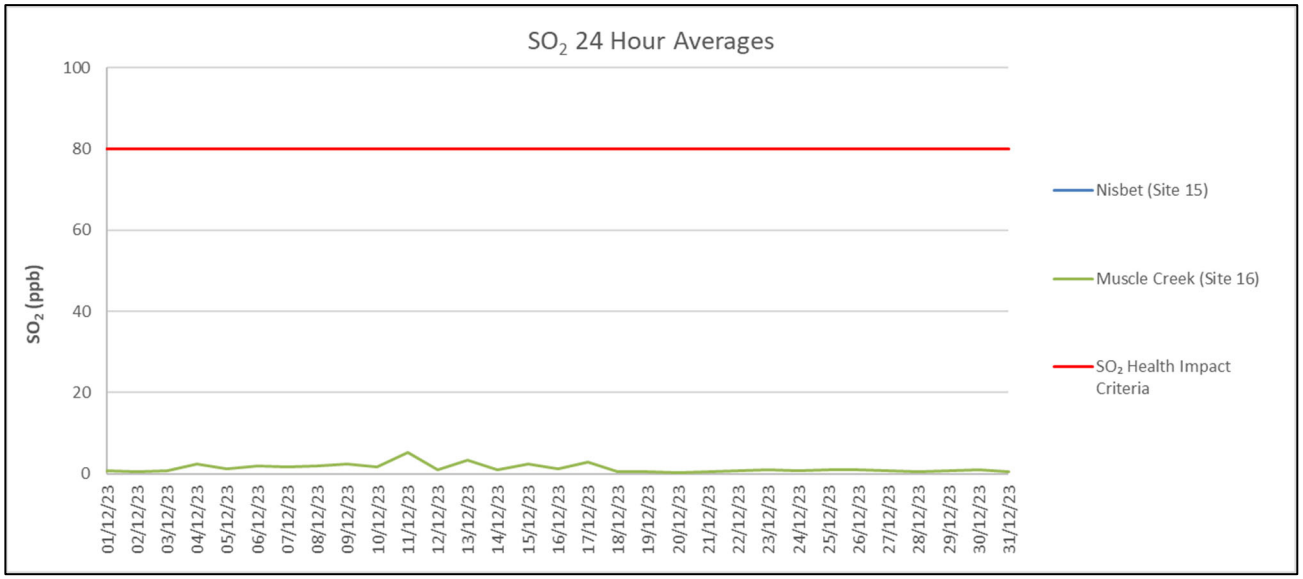
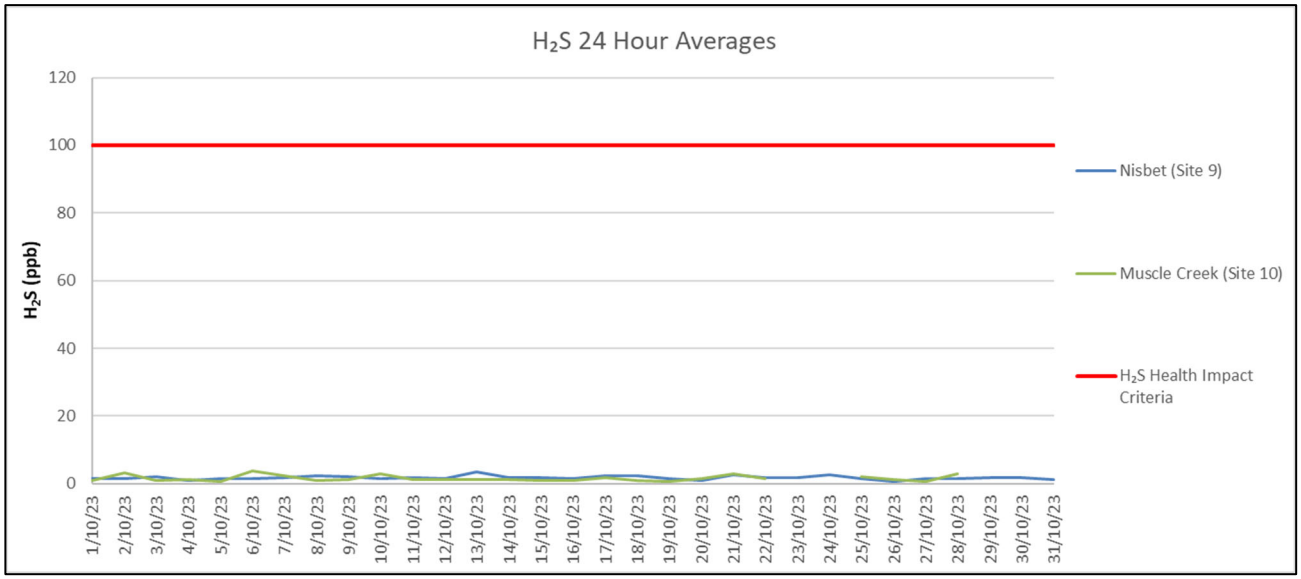


Figure 10: Sulphur Dioxide 24 Hour Results


H2S 24 Hour Averages
H2S (ppb)
120
100
80
60
40
20
0
1/10/23
2/10/23
3/10/23
4/10/23
5/10/23
6/10/23
7/10/23
8/10/23
9/10/23
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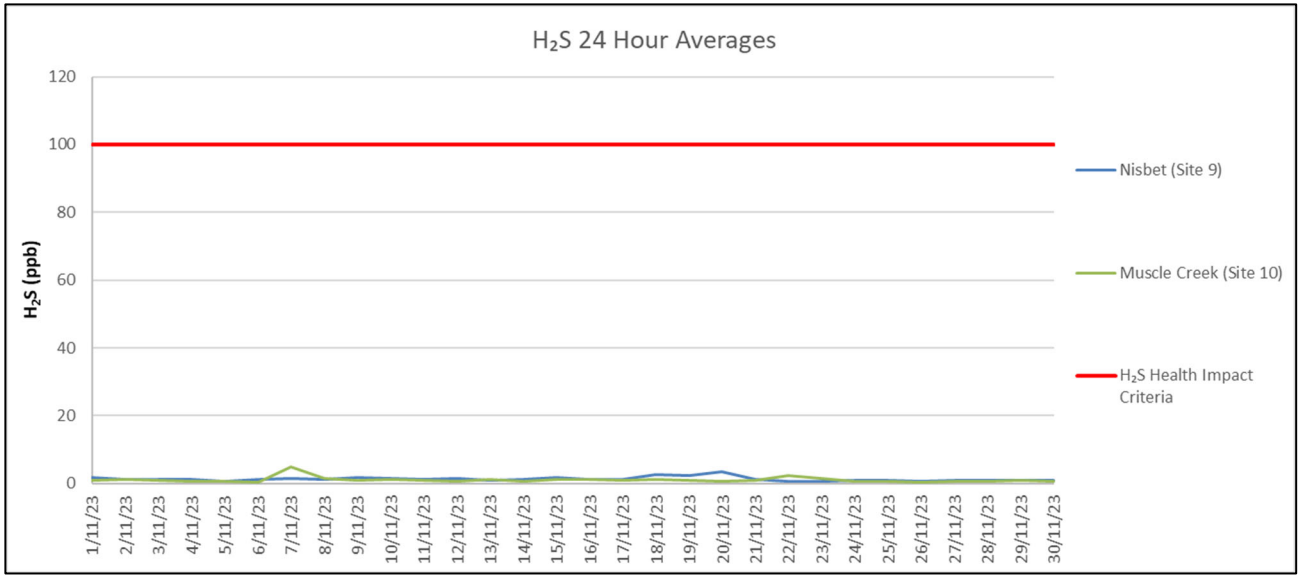
31/10/23
Nisbet (Site 9)
Muscle Creek (Site 10)
H2S Health Impact Criteria


H2S 24 Hour Averages
H2S (ppb)
120
100
80
60
40
20
0
1/11/23
2/11/23
3/11/23
4/11/23
5/11/23
6/11/23
7/11/23
8/11/23
9/11/23
10/11/23
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28/11/23
29/11/23
30/11/23
Nisbet (Site 9)
Muscle Creek (Site 10)
H2S Health Impact Criteria

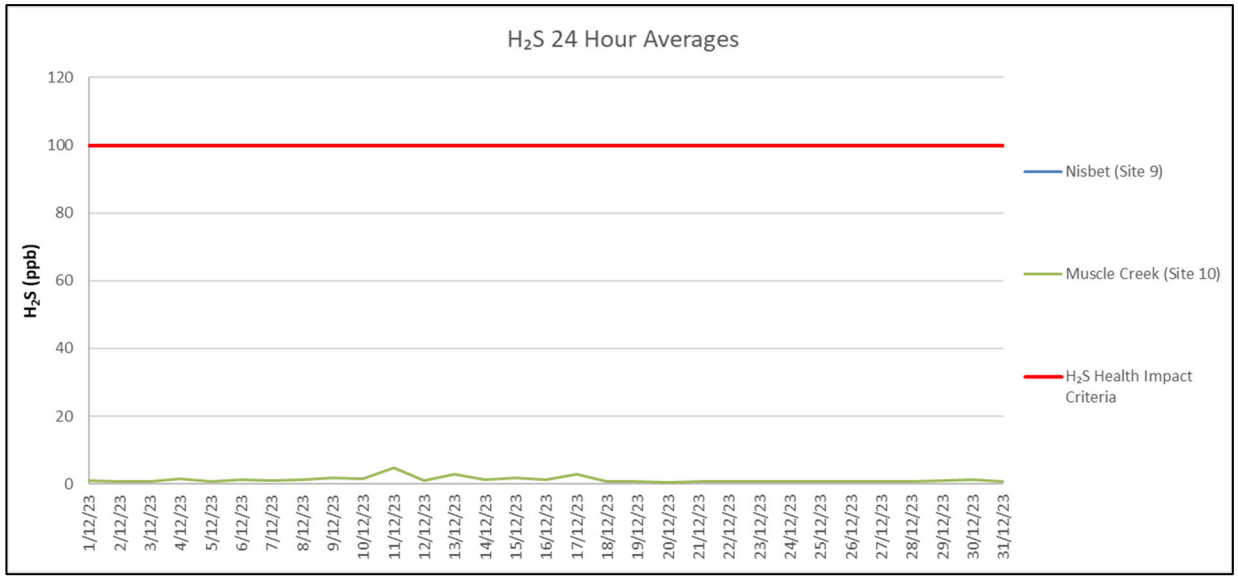

Figure 11: Hydrogen Sulphide 24 Hour Results

4.0 RESPONSE TO ELEVATED GAS LEVELS

When MCC receive an alarm that the hydrogen sulphide levels at the gas monitors are above the odour threshold of 8ppb, a review of operations and gas sources in the local area is undertaken. The responses to any alarms received during the reporting period are shown in **Table 4.** When the majority of alarms were received (~87.5%), the wind was not blowing from the mine towards the monitor, indicating that MCC were most likely not the source of the elevated gas at the monitor.

Table 4: Actions Taken in Response to Elevated Gas Levels

Date and Time of Alarm	Location of Alarm	Weather Conditions at Time of Alarm	Response to Alarm	Classification of Spontaneous Combustion
07/11/23 10:05am	Muscle Creek	Wind – 1.3m/s from the NW.	Site inspection did not detect odour between the operation and the monitor.	Combination of Class A and B
08/11/23 09:45am	Muscle Creek	Wind – 1.8m/s from the NE. Wind was not blowing from the operation to the monitor.	Infusion sprays and dozer push occurring	Class B
22/11/23 02:55pm	Muscle Creek	Wind – 3.9m/s from the E. Wind was not blowing from the operation to the monitor.	Nil odour detected during site inspection.	Class B
11/12/23 01:35pm	Muscle Creek	Wind – 2.1m/s from the W. Wind was not blowing from the operation to the monitor.	Minimal activity in carbonaceous area.	Class B
13/12/23 09:15am	Muscle Creek	Wind – 1.3m/s from the SSE. Wind was not blowing from the operation to the monitor.	No activity in carbonaceous area.	Class B
15/12/23 03:25am	Muscle Creek	Wind – 2.5m/s from the SSE. Wind was not blowing from the operation to the monitor.	No activity occurring on site due to storm activity.	Class B
15/12/23 12:55pm	Muscle Creek	Wind – 3.8m/s from the SSE. Wind was not blowing from the operation to the monitor.	No activity occurring on site due to storm activity.	Class B
17/12/23 05:55am	Muscle Creek	Wind – 4.2m/s from the SE. Wind was not blowing from the operation to the monitor.	No activity occurring on site.	Nil Classification

5.0 CORRELATION BETWEEN MANAGEMENT ACTIVITIES AND GAS LEVELS

A review of the correlation between spontaneous combustion management activities and gas levels has been undertaken. This review found that gas levels during the reporting period were generally low.

6.0 CORRELATION BETWEEN COMMUNITY COMPLAINTS AND GAS LEVELS

There have been no complaints received during the reporting period in relation to odour.