
**Muswellbrook Coal Company Limited**

# Spontaneous Combustion Report

**For: Environmental Protection Licence 656**

| | |
|---|---|
| **Reporting Period:** | **Quarter 2 2024** |
| **Authority Holder:** | **Muswellbrook Coal Company Limited** |
| **Report Date:** | **27 August 2024** |
| **Approved by:** | **Julie Thomas**<br>**Environmental Superintendent** |

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## 1.0 INTRODUCTION

The coal seams mined by the Muswellbrook Coal Company (MCC) were the Greta Coal Measures. These measures had a history of spontaneous combustion. Spontaneous combustion was 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.

The SCMP has been updated to reflect changes to development consent conditions that were approved in February 2024. 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. Open Cut 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** | | | | |
| April 2024 | 0 | 0 | 0 | 726 |
| May 2024 | 0 | 0 | 0 | 2,106 |
| June 2024 | 0 | 0 | 0 | 1,274 |
| **Open Cut 2** | | | | |
| April 2024 | 0 | 0 | 0 | 0 |
| May 2024 | 0 | 0 | 0 | 0 |
| June 2024 | 0 | 0 | 0 | 0 |

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

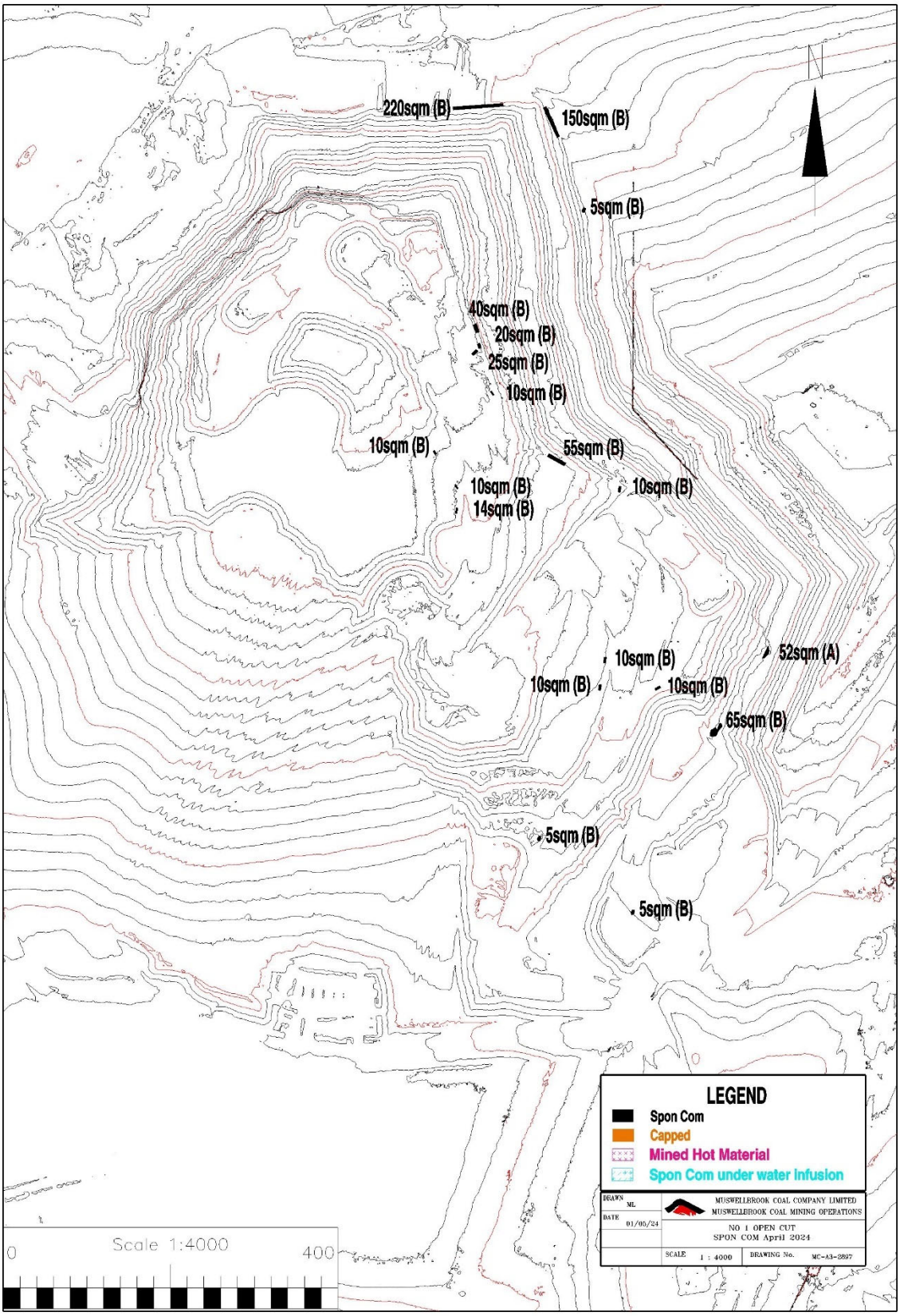



**Figure 1: Location of Spontaneous Combustion Outbreaks in Open Cut 1 – April 2024**

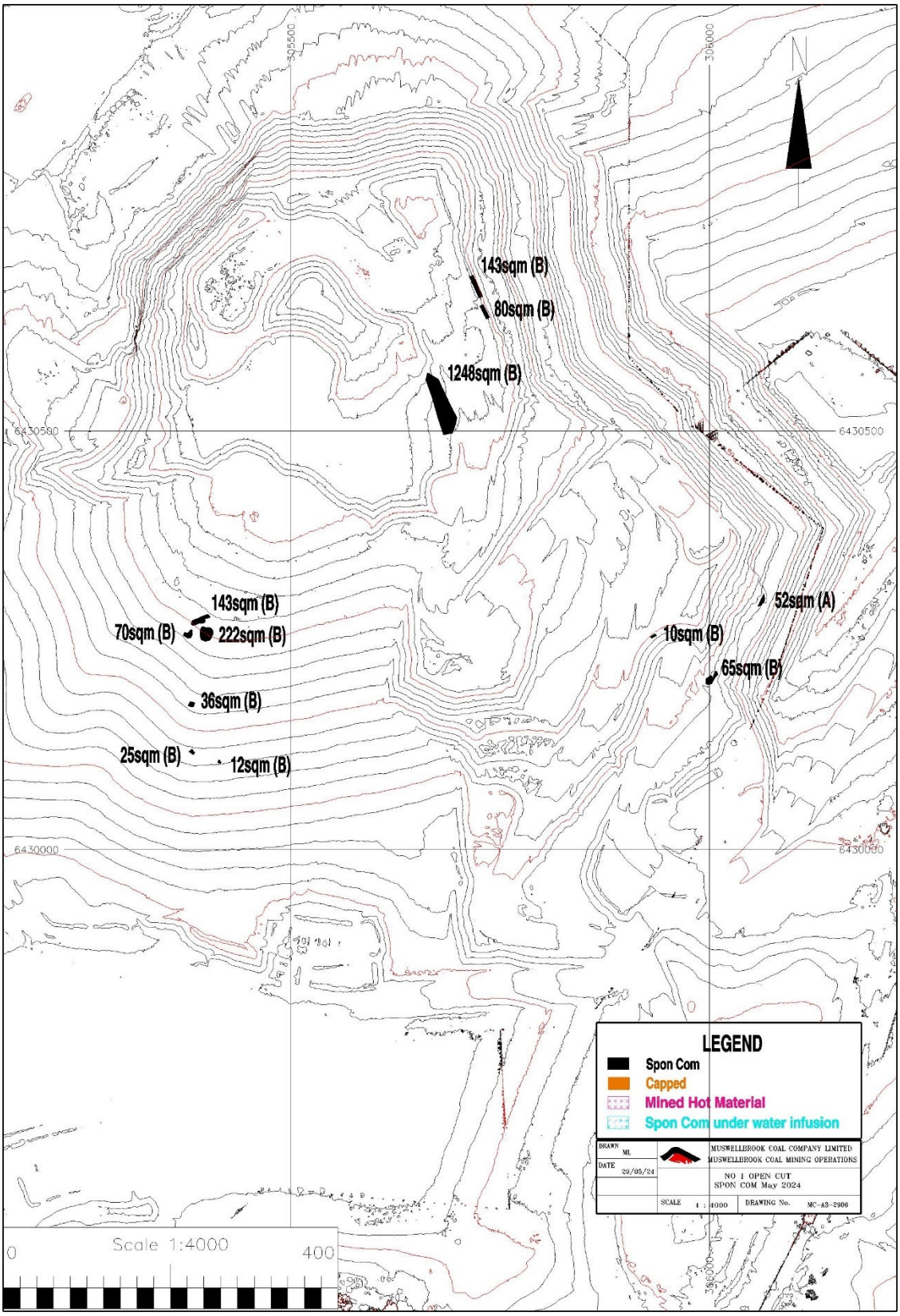



**Figure 2: Location of Spontaneous Combustion Outbreaks in Open Cut 1 – May 2024**

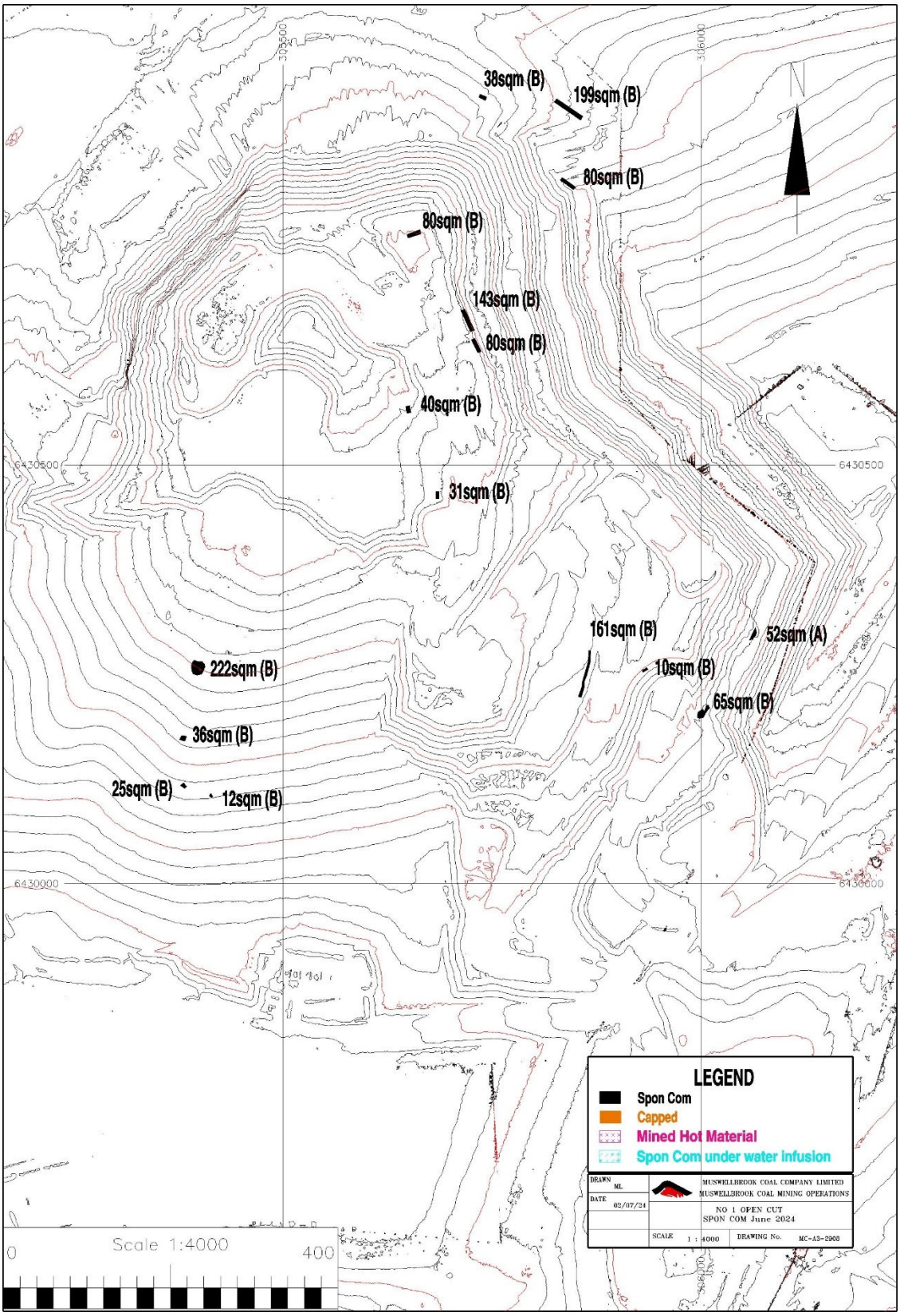



**Figure 3: Location of Spontaneous Combustion Outbreaks in Open Cut 1 – June 2024**

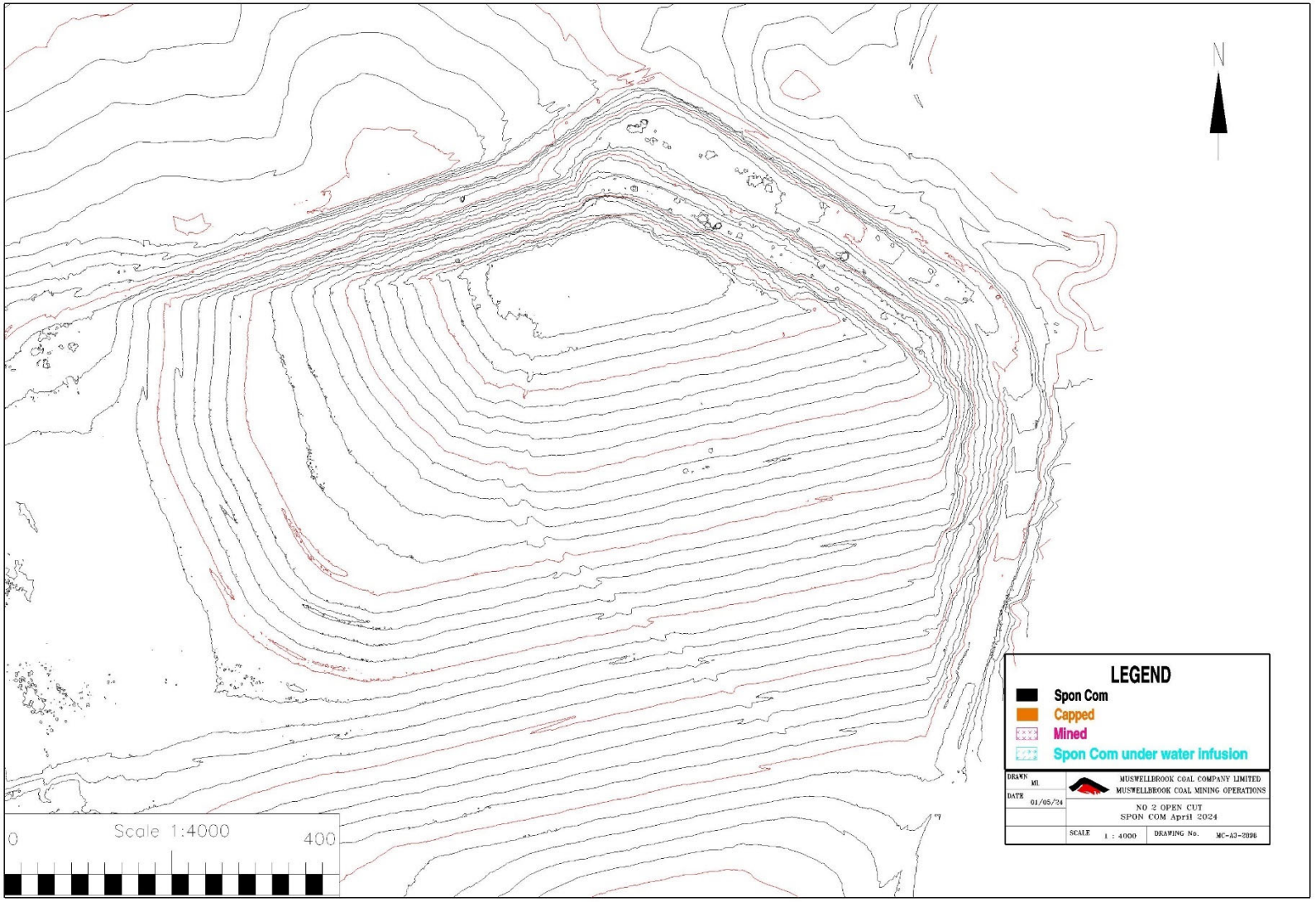



**Figure 4: Location of Spontaneous Combustion Outbreaks in Open Cut 2 – April 2024**

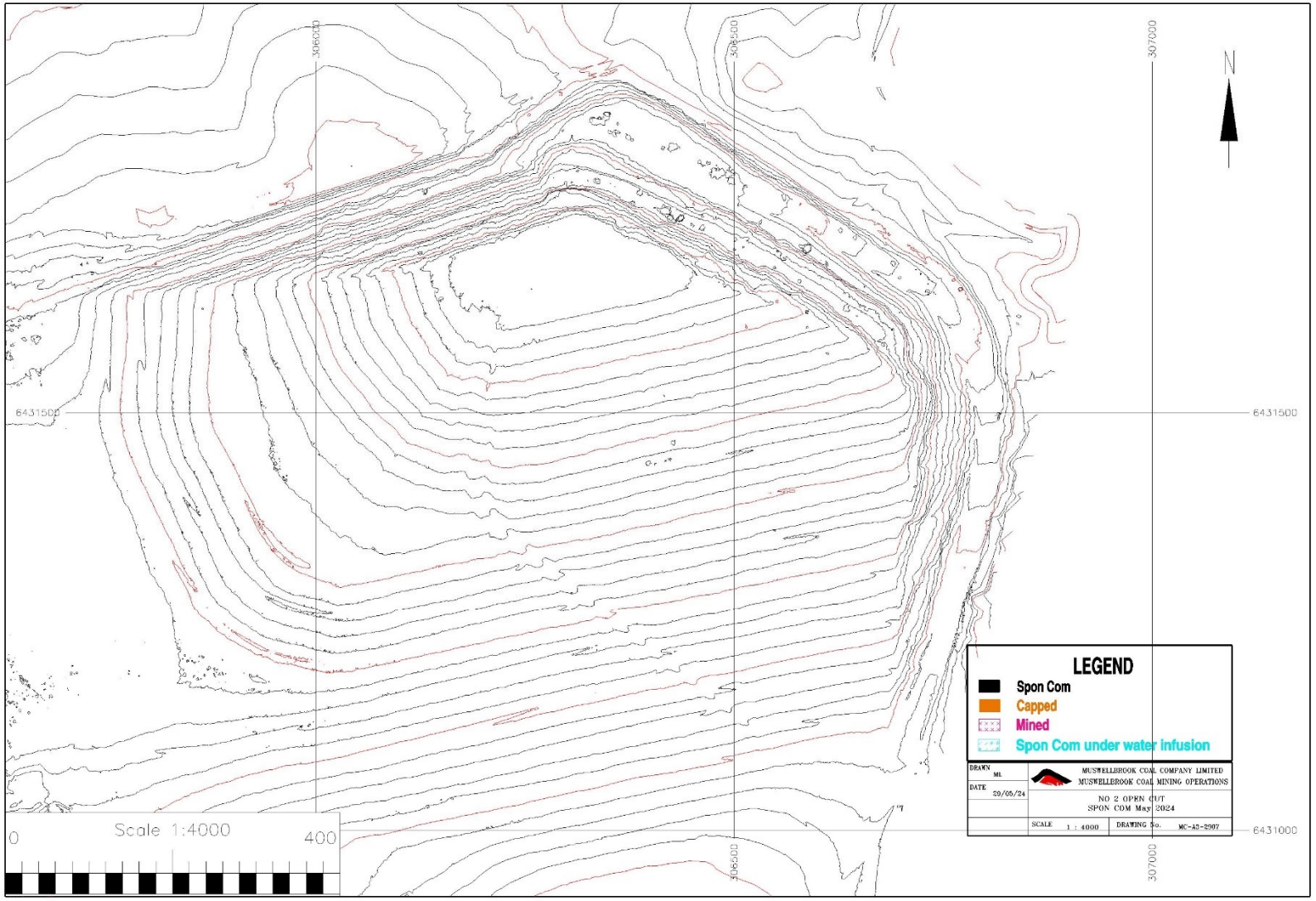



**Figure 5: Location of Spontaneous Combustion Outbreaks in Open Cut 2 – May 2024**

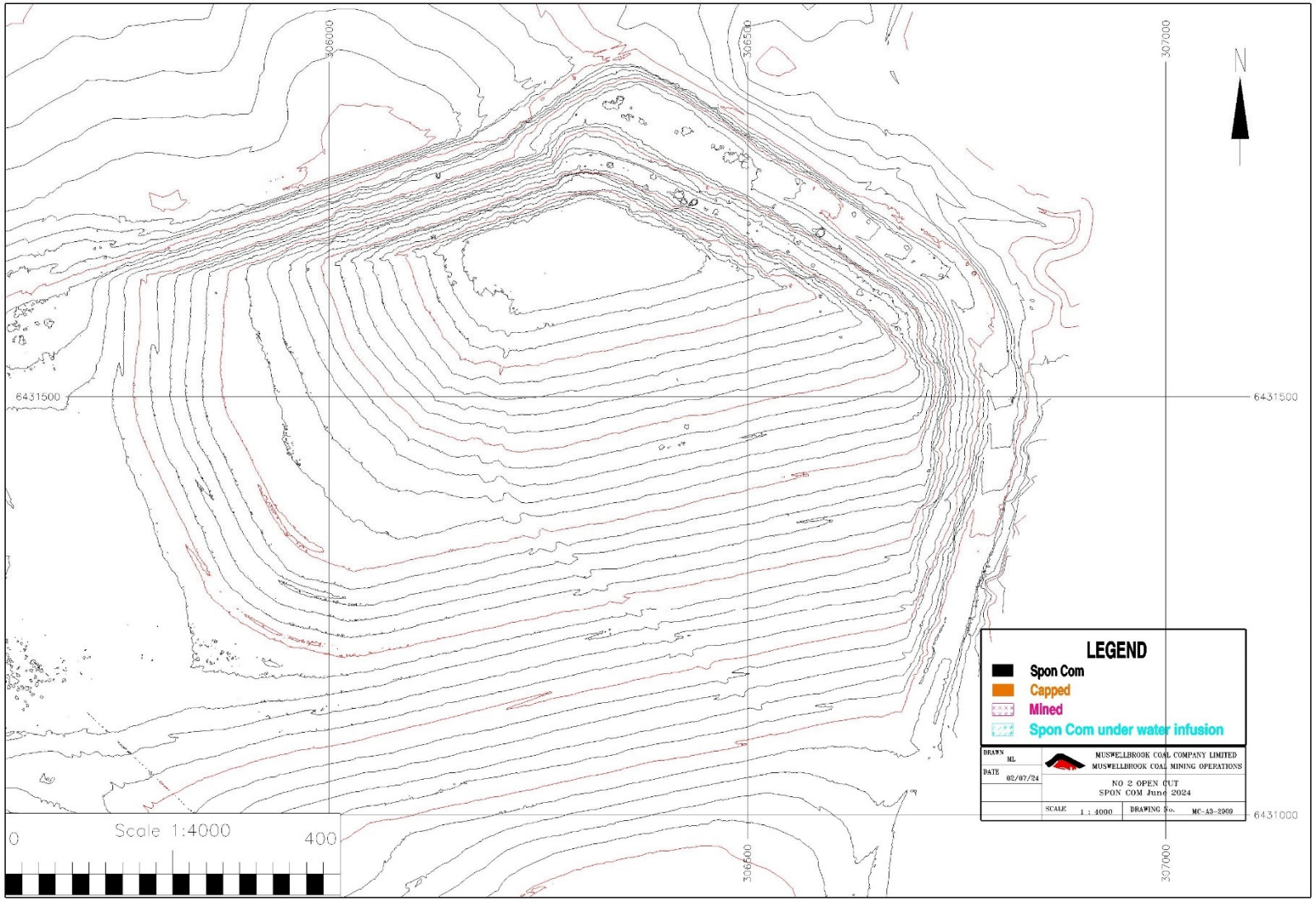



**Figure 6: Location of Spontaneous Combustion Outbreaks in Open Cut 2 – June 2024**

## 3.0 GAS MONITORING RESULTS

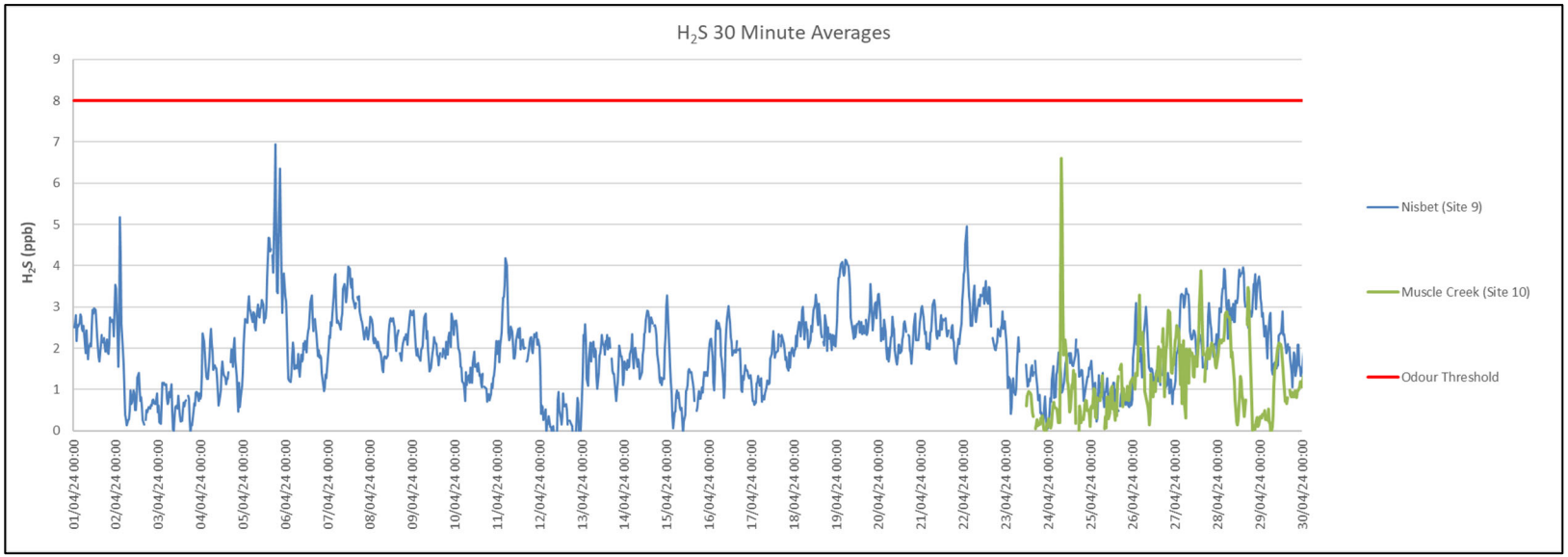
The gas monitoring results are displayed graphically in **Figure 7** to **Figure 11.** As noted in these graphs, there were no results above the health impact assessment criteria for the reporting period. In February 2024, MCC received a modification to the consent and as part of this modification the 1-hour and 24-hour sulphur dioxide criteria were changed. The updated criteria are now 100ppb for 1-hour and 20ppb for 24-hour. These changes are reflected in the figures below. The criteria for hydrogen sulphide have not changed.

The data capture rates for the last 12 months to the end of June 2024 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 | 76.5 |
| | | 1 hour | 74.7 |
| | | 24 hours | 77.5 |
| Point 10, Muscle Creek | Hydrogen Sulphide | 30 minutes | 87.7 |
| | | 1 hour | 85.7 |
| | | 24 hours | 88.8 |
| Point 15, Nisbet | Sulphur Dioxide | 1 hour | 76.1 |
| | | 24 hours | 77.5 |
| Point 16, Muscle Creek | Sulphur Dioxide | 1 hour | 87.1 |
| | | 24 hours | 90.1 |

Data was lost from Point 9 and Point 15 between December 2023 and February 2024 due to faulty equipment. This resulted in the 12-month rolling average dropping below 90%. This faulty equipment has been replaced.


H2S 30 Minute Averages
H2S (ppb)
0
1
2
3
4
5
6
7
8
9
01/04/24 00:00
02/04/24 00:00
03/04/24 00:00
04/04/24 00:00
05/04/24 00:00
06/04/24 00:00
07/04/24 00:00
08/04/24 00:00
09/04/24 00:00
10/04/24 00:00
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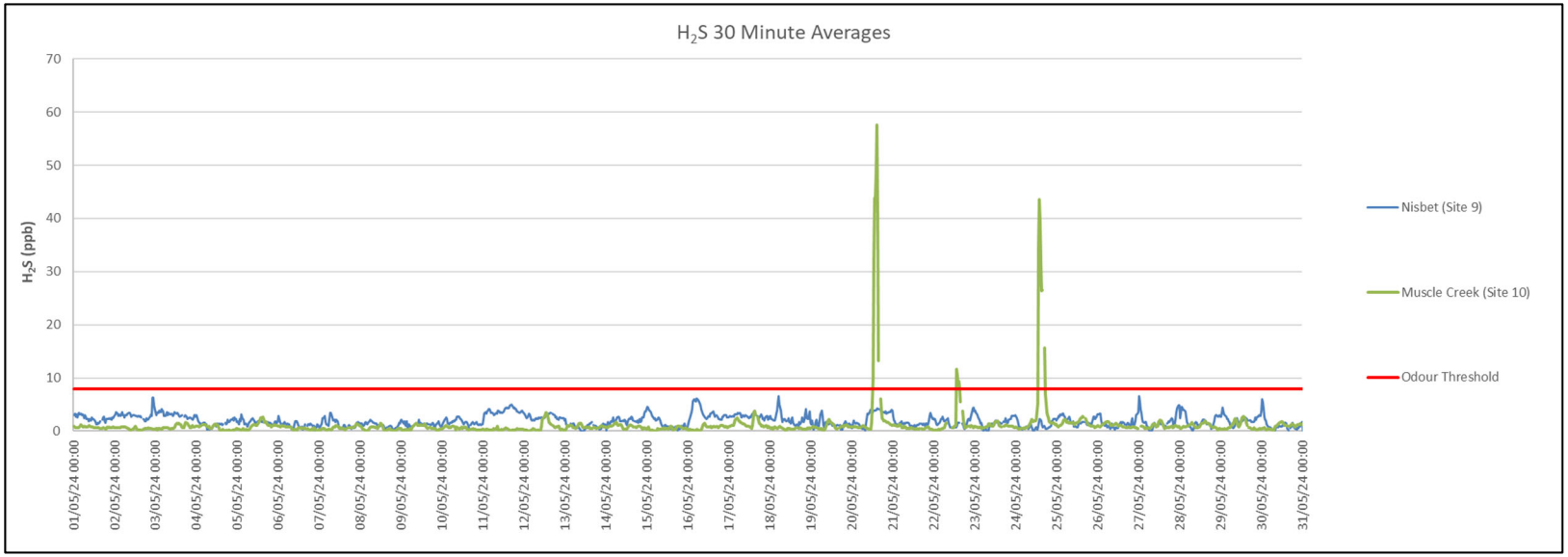
14/04/24 00:00
15/04/24 00:00
16/04/24 00:00
17/04/24 00:00
18/04/24 00:00
19/04/24 00:00
20/04/24 00:00
21/04/24 00:00
22/04/24 00:00
23/04/24 00:00
24/04/24 00:00
25/04/24 00:00
26/04/24 00:00
27/04/24 00:00
28/04/24 00:00
29/04/24 00:00
30/04/24 00:00
Nisbet (Site 9)
Muscle Creek (Site 10)
Odour Threshold


H2S 30 Minute Averages
H2S (ppb)
0
10
20
30
40
50
60
70
01/05/24 00:00
02/05/24 00:00
03/05/24 00:00
04/05/24 00:00
05/05/24 00:00
06/05/24 00:00
07/05/24 00:00
08/05/24 00:00
09/05/24 00:00
10/05/24 00:00
11/05/24 00:00
12/05/24 00:00
13/05/24 00:00
14/05/24 00:00
15/05/24 00:00
16/05/24 00:00
17/05/24 00:00
18/05/24 00:00
19/05/24 00:00
20/05/24 00:00
21/05/24 00:00
22/05/24 00:00
23/05/24 00:00
24/05/24 00:00
25/05/24 00:00
26/05/24 00:00
27/05/24 00:00
28/05/24 00:00
29/05/24 00:00
30/05/24 00:00
31/05/24 00:00
Nisbet (Site 9)
Muscle Creek (Site 10)
Odour Threshold

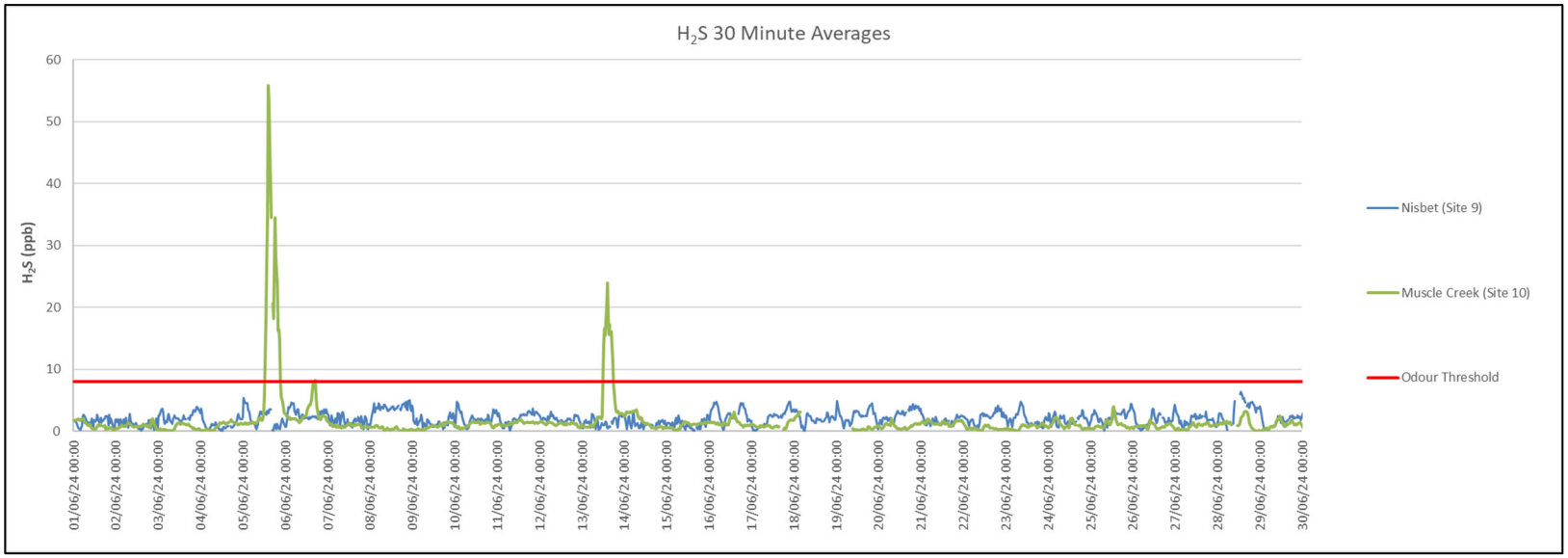
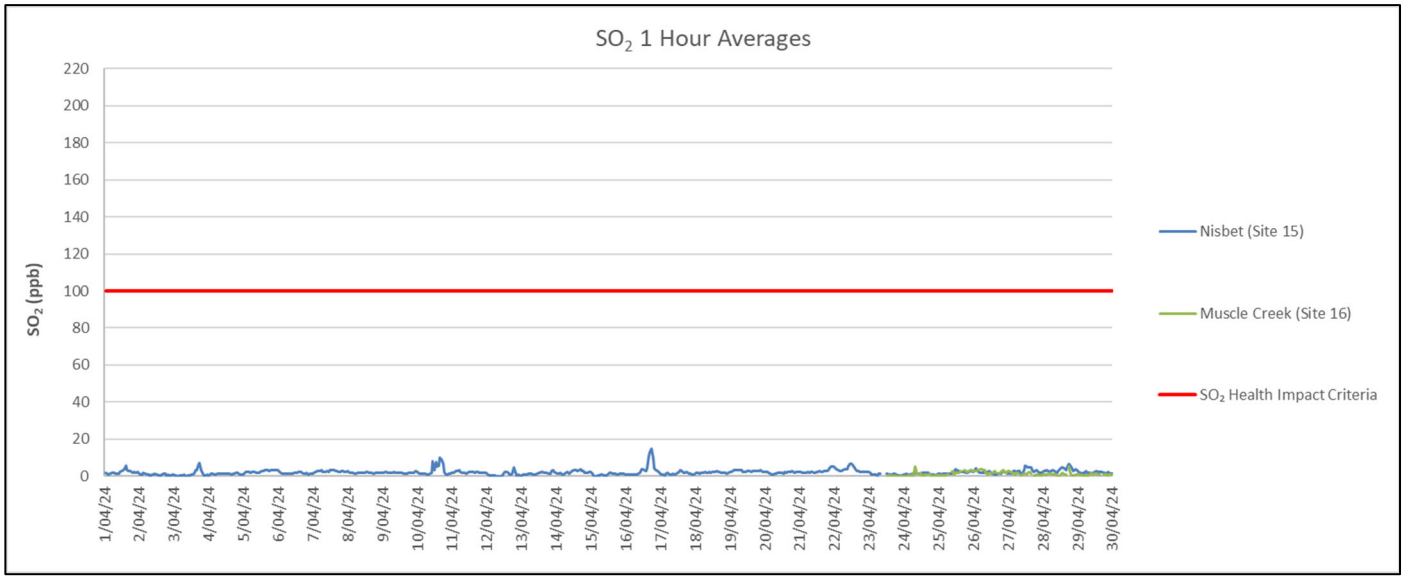
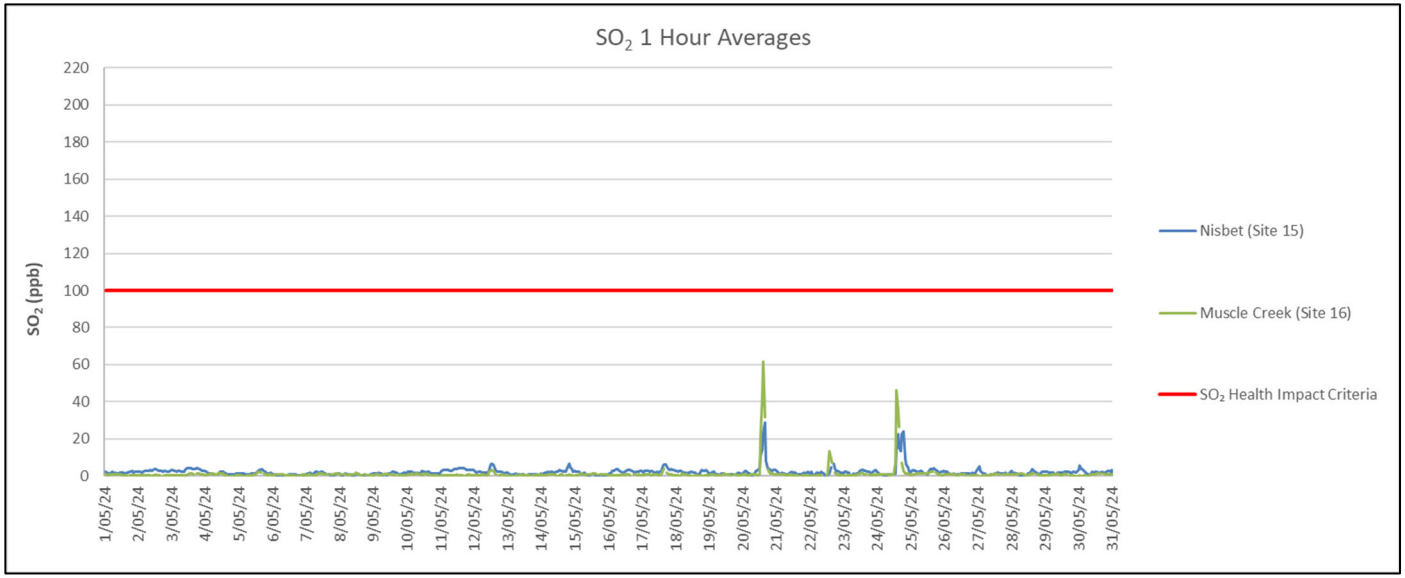



**Figure 7: Hydrogen Sulphide 30 Minute Results**


SO2 1 Hour Averages
SO2 (ppb)
220
200
180
160
140
120
100
80
60
40
20
0
1/04/24
2/04/24
3/04/24
4/04/24
5/04/24
6/04/24
7/04/24
8/04/24
9/04/24
10/04/24
11/04/24
12/04/24
13/04/24
14/04/24
15/04/24
16/04/24
17/04/24
18/04/24
19/04/24
20/04/24
21/04/24
22/04/24
23/04/24
24/04/24
25/04/24
26/04/24
27/04/24
28/04/24
29/04/24
30/04/24
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
1/05/24
2/05/24
3/05/24
4/05/24
5/05/24
6/05/24
7/05/24
8/05/24
9/05/24
10/05/24
11/05/24
12/05/24
13/05/24
14/05/24
15/05/24
16/05/24
17/05/24
18/05/24
19/05/24
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21/05/24
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23/05/24
24/05/24
25/05/24
26/05/24
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30/05/24
31/05/24
Nisbet (Site 15)
Muscle Creek (Site 16)
SO2 Health Impact Criteria

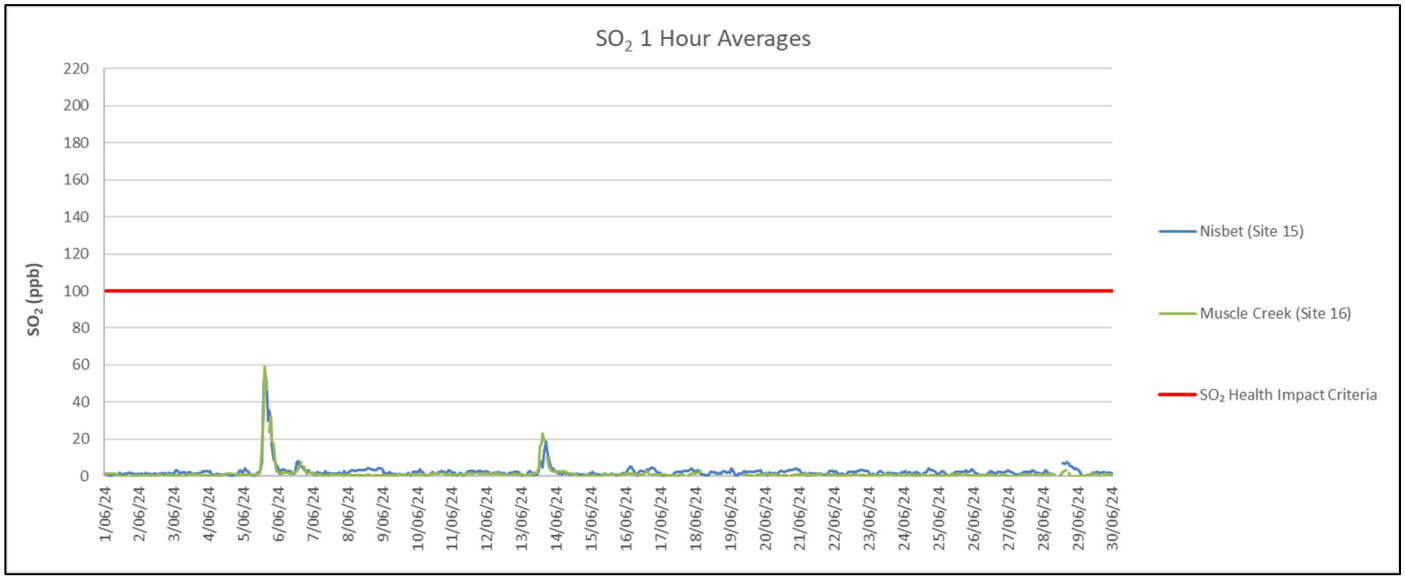
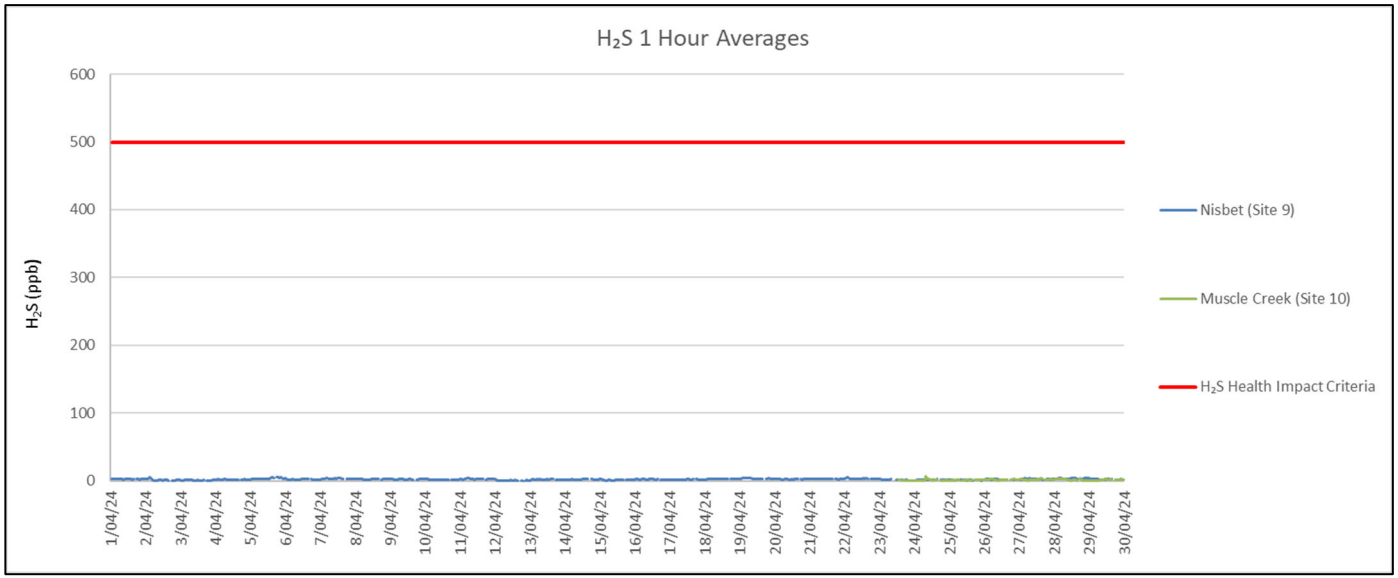
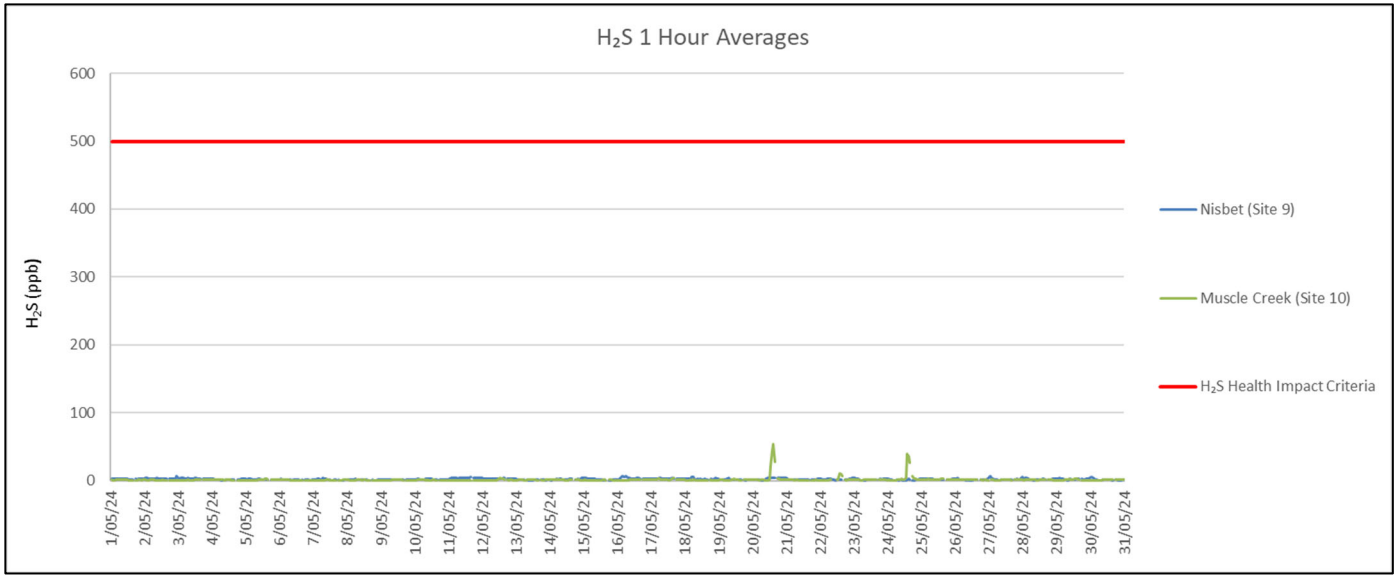



**Figure 8: Sulphur Dioxide 1 Hour Results**


H2S 1 Hour Averages
H2S (ppb)
600
500
400
300
200
100
0
1/04/24
2/04/24
3/04/24
4/04/24
5/04/24
6/04/24
7/04/24
8/04/24
9/04/24
10/04/24
11/04/24
12/04/24
13/04/24
14/04/24
15/04/24
16/04/24
17/04/24
18/04/24
19/04/24
20/04/24
21/04/24
22/04/24
23/04/24
24/04/24
25/04/24
26/04/24
27/04/24
28/04/24
29/04/24
30/04/24
Nisbet (Site 9)
Muscle Creek (Site 10)
H2S Health Impact Criteria


H2S 1 Hour Averages
H2S (ppb)
600
500
400
300
200
100
0
1/05/24
2/05/24
3/05/24
4/05/24
5/05/24
6/05/24
7/05/24
8/05/24
9/05/24
10/05/24
11/05/24
12/05/24
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22/05/24
23/05/24
24/05/24
25/05/24
26/05/24
27/05/24
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29/05/24
30/05/24
31/05/24
Nisbet (Site 9)
Muscle Creek (Site 10)
H2S Health Impact Criteria

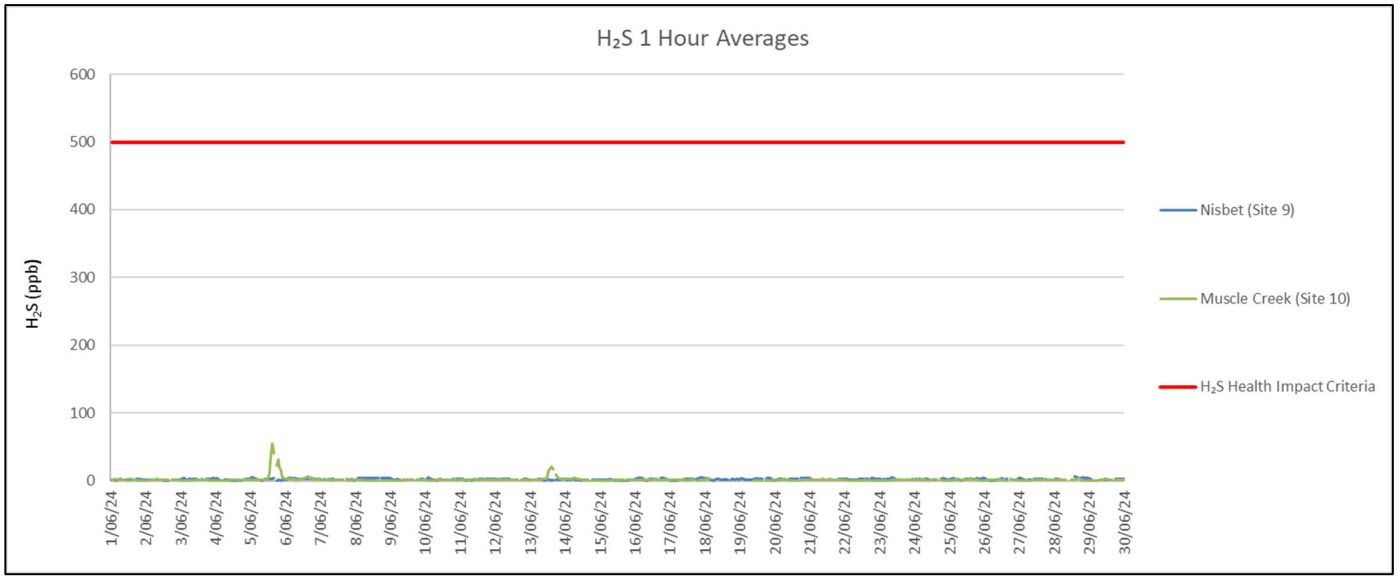
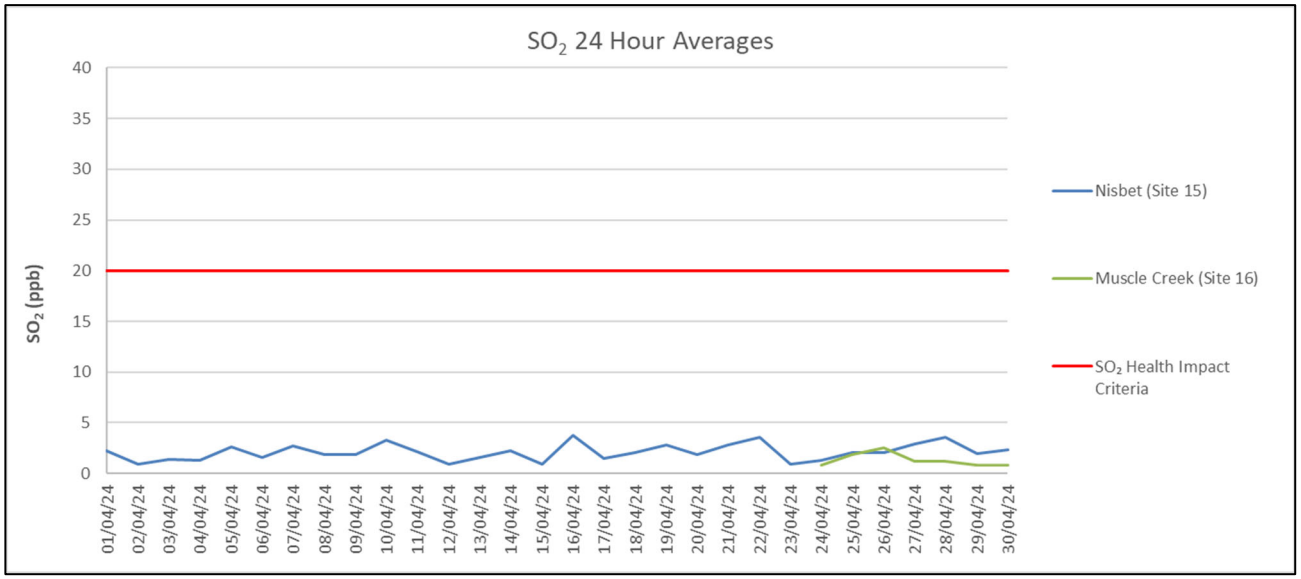



**Figure 9: Hydrogen Sulphide 1 Hour Results**


SO2 24 Hour Averages
SO2 (ppb)
40
35
30
25
20
15
10
5
0
01/04/24
02/04/24
03/04/24
04/04/24
05/04/24
06/04/24
07/04/24
08/04/24
09/04/24
10/04/24
11/04/24
12/04/24
13/04/24
14/04/24
15/04/24
16/04/24
17/04/24
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22/04/24
23/04/24
24/04/24
25/04/24
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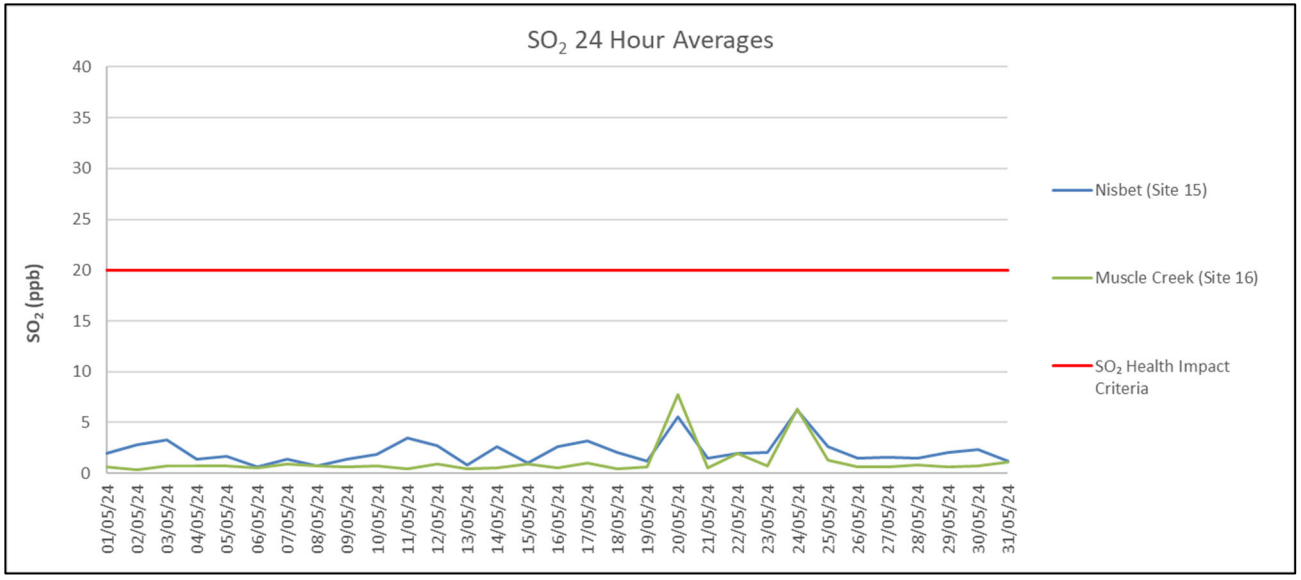
29/04/24
30/04/24
Nisbet (Site 15)
Muscle Creek (Site 16)
SO2 Health Impact Criteria


SO2 24 Hour Averages
SO2 (ppb)
40
35
30
25
20
15
10
5
0
01/05/24
02/05/24
03/05/24
04/05/24
05/05/24
06/05/24
07/05/24
08/05/24
09/05/24
10/05/24
11/05/24
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23/05/24
24/05/24
25/05/24
26/05/24
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31/05/24
Nisbet (Site 15)
Muscle Creek (Site 16)
SO2 Health Impact Criteria

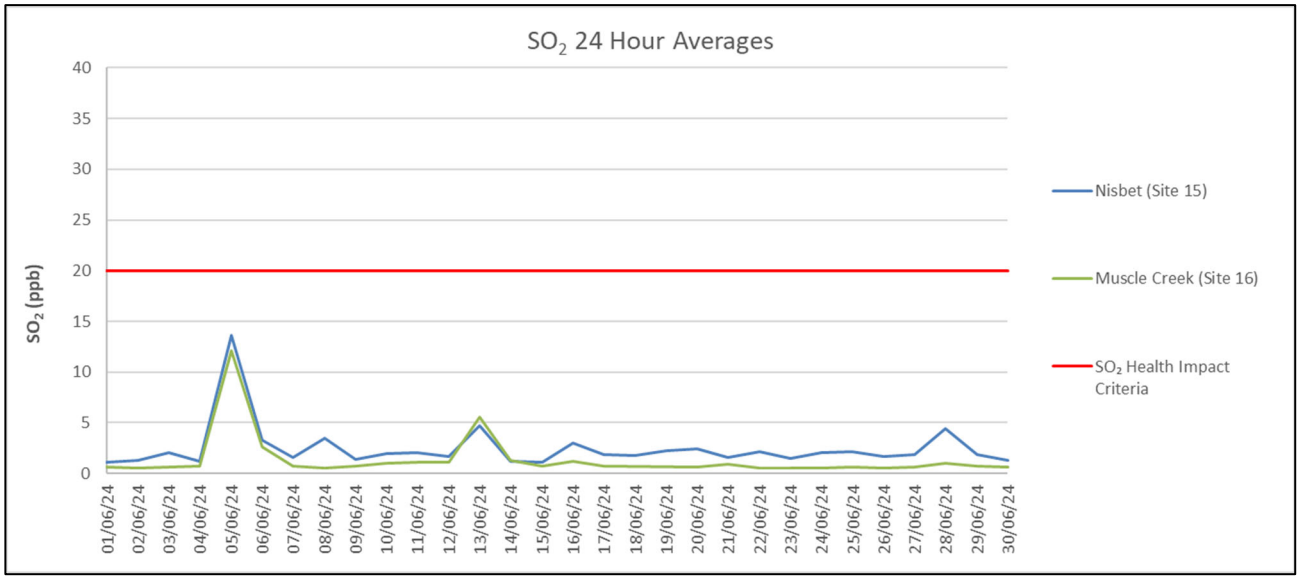
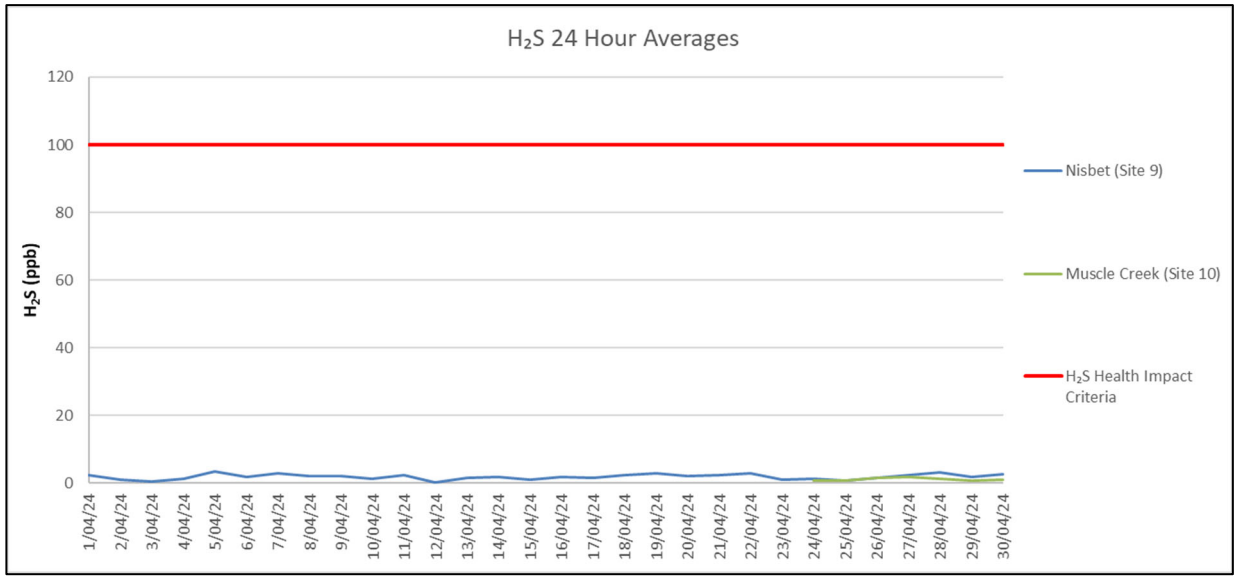



**Figure 10: Sulphur Dioxide 24 Hour Results**


H2S 24 Hour Averages
H2S (ppb)
120
100
80
60
40
20
0
1/04/24
2/04/24
3/04/24
4/04/24
5/04/24
6/04/24
7/04/24
8/04/24
9/04/24
10/04/24
11/04/24
12/04/24
13/04/24
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16/04/24
17/04/24
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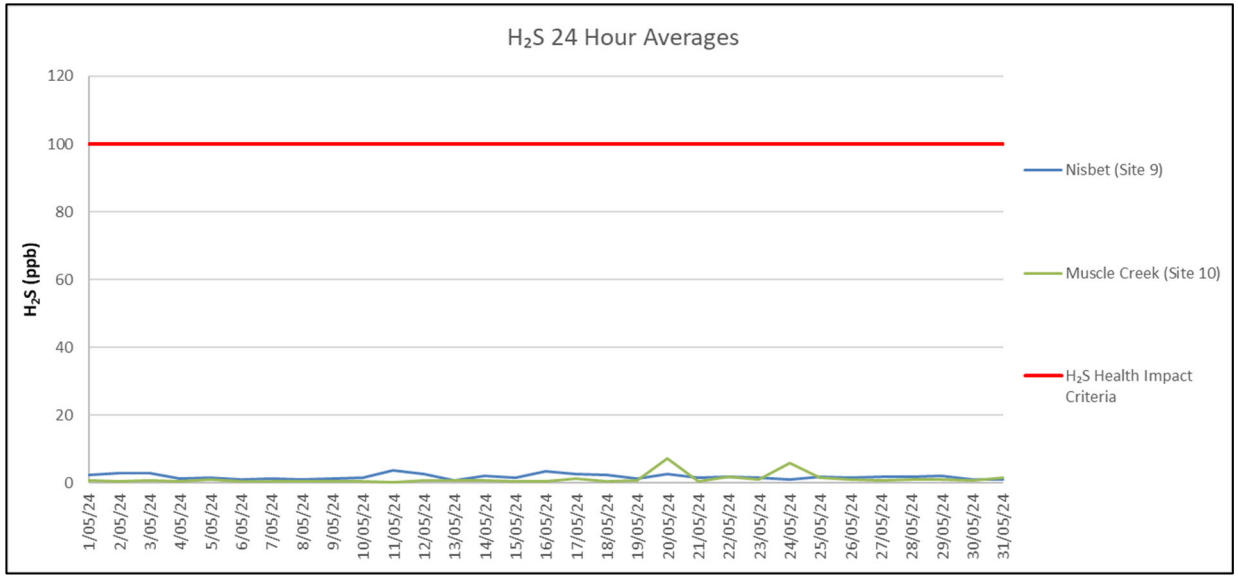
19/04/24
20/04/24
21/04/24
22/04/24
23/04/24
24/04/24
25/04/24
26/04/24
27/04/24
28/04/24
29/04/24
30/04/24
Nisbet (Site 9)
Muscle Creek (Site 10)
H2S Health Impact Criteria


H2S 24 Hour Averages
H2S (ppb)
120
100
80
60
40
20
0
1/05/24
2/05/24
3/05/24
4/05/24
5/05/24
6/05/24
7/05/24
8/05/24
9/05/24
10/05/24
11/05/24
12/05/24
13/05/24
14/05/24
15/05/24
16/05/24
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23/05/24
24/05/24
25/05/24
26/05/24
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31/05/24
Nisbet (Site 9)
Muscle Creek (Site 10)
H2S Health Impact Criteria

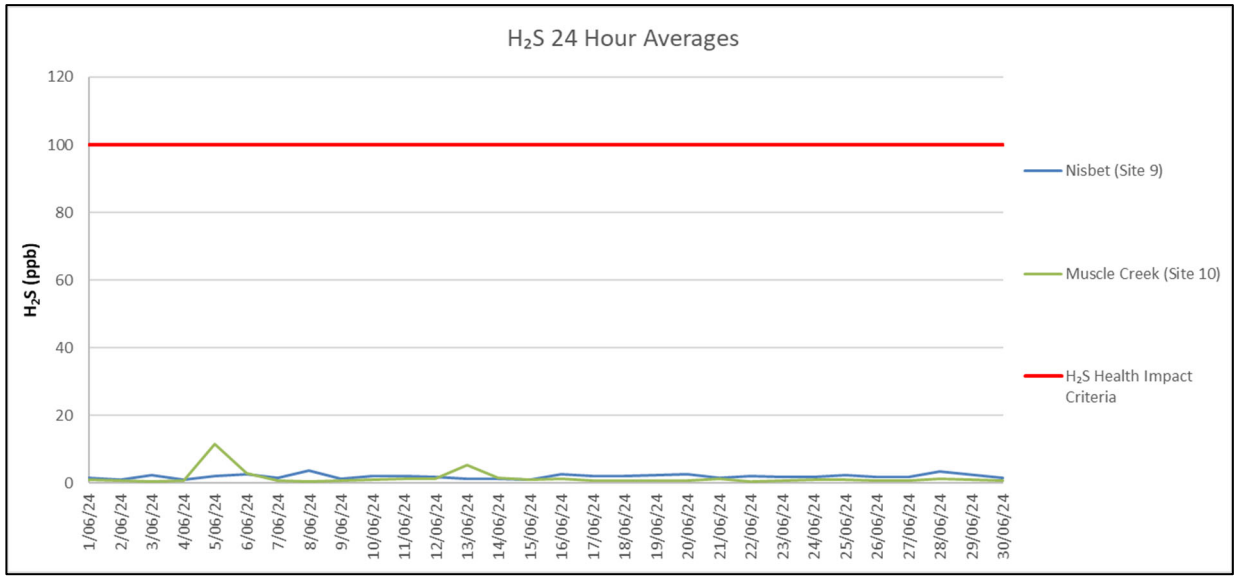


**Figure 11: Hydrogen Sulphide 24 Hour Results**

## 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 six of the seven alarms were received, 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 |
|---|---|---|---|---|
| 10/04/24 10:10am | Muscle Creek | Wind – 2.6m/s from the S. Wind was not blowing from the operation to the monitor. | Nil odour observed towards monitor | Class A and Class B |
| 20/05/24 12:35pm | Muscle Creek | Wind – 1.3m/s from the SW. Wind was not blowing from the operation to the monitor. | No smell outside of pit | Class A and Class B |
| 22/05/24 01:35Pm | Muscle Creek | Wind – 1.5m/s from the ENE. Wind was not blowing from the operation to the monitor. | No odour detected | Class A and Class B |
| 27/05/24 11:10am | Muscle Creek | Wind – 1.5m/s from the SW. Wind was not blowing from the operation to the monitor. | No odour detected at monitor | Class A |
| 05/06/24 12:35pm | Muscle Creek | Wind – 2.0m/s from the WNW. Wind was not blowing from the operation to the monitor. | No odour detected | All classes |
| 06/06/24 04:05pm | Muscle Creek | Wind – 1.1m/s from the NW. | No odour detected at monitor | Class A |
| 13/06/24 04:45pm | Muscle Creek | Wind – 0.9m/s from the SW. Wind was not blowing from the operation to the monitor. | No odour detected at monitor | Class A |

## 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.