

LEARNING INCIDENTS

FROM

INVESTIGATION REPORT

GRASSTREE MINE

Metallurgical Coal

Incident Number: IN.00219432

Classification: High Potential Incident

Incident Title: >2.5% CH4 LW808 #197

Incident Date: 22/02/20

Report Date: 22/02/20



Version Date

Learning from Incidents Investigation Report

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1 EXECUTIVE SUMMARY

During a routine production shift, a methane concentration of >2.5% was detected at the "0m TG Sensor" on chock #197 (Note: Power was removed from the face at 2% as designed). The ERZ Controller attended the area and erected brattice sails on chocks to purge the methane from the sensor area.

The investigation found the following:

- The monitor was a new installation designed to comply with Section 243A of the Coal Mine Safety and Health Regulation Amendment 2019. This sensor was installed on 06/03/20.
- A trip of >2% had previously been recorded on this sensor on 07/02/2020, a day after its commissioning.
- A routine ventilation change (VC20015) was affected in the Longwall tailgate during a planned maintenance window on 20/02/2020, earlier than normal due to the production sequence. This may have contributed to a lower pressure on the goaf, potentially allowing the fringe to encroach on the face.
- On two occasions CH4 concentrations >2% methane concentrations had been detected at '0m TG Sensor' between the 20/02/2020 and the time of the incident.
- The position of the sensor is such that it has a high likelihood of detecting localised methane and layering (high on canopy and at Tailgate of longwall).
- A short production stoppage occurred prior to the event (for picking) that may have resulted in gas accumulation in the goaf.
- This accumulation was disturbed by the reduction in cross sectional area in the Tailgate caused by the presence of the shearer during cutting. This forced the accumulation into the area of the '0m TG Sensor'. NOTE: The panline and chocks had not commenced their advance cycle at the time of the event.
- The goaf drainage plant was operating normally at the time of the incident
- Trending indicates that other sensors (including the tailgate drive sensors) did not trend in a similar manner to the '0m TG Sensor', indicating the methane concentration was localised.
- Chock #197 was reported as being ~200-300mm higher than the adjacent chock owing to the tailgate roadway height, which further increased the likelihood of detection of methane at the '0m TG Sensor'.
- The ERZ Controller effectively dispersed the methane from the area with a brattice sail.

2 INVESTIGATION TEAM MEMBERS

S Stingle- ERZ Controller LW808 M Sellings - Shearer Driver (CMW) Braedon Smith - Ventilation Officer

3 KEY WITNESSES

Line in the second	st of Key Witnesses
Name	Designation
S Stingle	ERZ Controller – LW808
M Sellings	Shearer Driver (CMW)

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4 METHODOLOGY AND TOOLS USED

An investigation has been conducted in accordance with the Anglo American investigation methodology known as the Learning from Incidents model, supported by various investigative and analytical tools.

The analysis tools used for this investigation are:

Attached as Appendix if applicable - Yes/No
Yes – mandatory tool
No
No
Yes
Yes



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5 EXECUTIVE SUMMARY OF INCIDENT

	···			1		
			lummary of Incid	ient		
Incident	Number	IN.00219432		Depa	rtment	Longwall
Area / location		LW808		Contracting Company (if applicable)		
		Summary of fire	dings from Inci	dent Investigat	ion	
Incident Category e.g. Safety, Health, Env, Legal, Reputation, Community.	Agent EG – Fall of Ground	Actual ISR Rating	Potential ISR Rating	Date of Incident	Time of Incident	Number of hours worked
Legal and Regulatory	Non compliance	Minor	Moderate	22/02/2020	05:31AM	9
Task being performed		Longwall F	roduction		Planned or Unplanned task?	
at time of incident						Planned
Summary of Incident	During routine production, following cutting into the tailgate, a methane concentration of >2% was detected at the '0m TG Sensor' removing power from the face.					
	Elevated methane levels continued to be detected at the '0m TG Sensor' for approximately 14 minutes. During this time methane exceeded 2.5% on 4x instances with a peak measurement of 3.01%					
Immediate actions	ERZ Controlle area.	er inspect area, an	d erected brattice	e sail on #194 c	hock to purge me	ethane from #19
taken	Notify MSO/U	MM.				





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6 DESCRIPTION OF INCIDENT

On the 06/02/2020 a new methane sensor was installed and commissioned positioned on the canopy of #197 chock. The intention of this new sensor was to comply with Section 243A of the Coal Mine Safety and Health Regulation Amendments 2019. This sensor is known as the '0m TG Sensor'.

The first recorded event where >2% methane was detected at the '0m TG Sensor' occurred on 07/02/20 tripping face power. Anecdotal evidence indicated that at the time of this trip the canopy of #197 chock was ~200-300mm higher due to a disparity between the cutting face and the TG roadway height.

On the 20/02/2020 a routine TG retreat ventilation change (VC20015) was completed. This change was undertaken slightly earlier in the retreat cycle than normal to coincide with a maintenance shift so as not to impact the production schedule.

Between the 20/02/2020 and the time of this incident, two further >2% methane concentrations were detected at '0m TG Sensor' tripping face power.

On NS 22/02/20, the shearer stopped in the maingate to replace picks at approximately 0430HRs, the shearer driver described the maingate brattice as 'tight' at this point in time.

At approximately 0500HRs, the shearer resumed production towards the TG, reaching the tailgate at approximately 0530HRs and begins cutting to the maingate when >2% methane is detected at the '0m TG Sensor' tripping face power. At the time of the power trip the face had not yet been pushed and chocks had not commenced advancing. Methane concentrations subsequently fluctuated at the '0m TG Sensor' and exceeded 2.5% on four occasions over approximately 14 minutes, reaching a peak value of 3.01%.

The CMWs contacted the ERZ Controller (S Stingle) who inspected the area and reported 2.4% methane on his PGD. The ERZ Controller noted that the canopy of #197 chock was ~200-300mm higher than the adjacent chock and erected a brattice sail on chock #194 to direct face ventilation air around the '0m TG Sensor' to purge the methane.

The ERZ Controller subsequently notified the MSO, who notified the UMM.

7 CRITICAL CONTROL FAILURE

What / which critical controls failed?	Nil
(List CT number)	
Why did the critical control fail?'	N/A
How did the critical control fail?'	N/A
What additional or revised critical controls and/or monitoring activities need to be established/change to mitigate risk of recurrences, or to improve risk control?'	N/A





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8 FINDINGS / CONCLUSIONS

This incident occurred due to localized elevated methane in the vicinity of the '0m TG Sensor' during normal production.

Key factors contributing to the incident were:

- Location of a new sensor on TG chock canopy, being a position where methane is more
 likely to be detected being both at the tailgate end of the face (where goaf gasses are most
 likely to be drawn into the airstream) and high (where methane is most likely to layer due to
 a low relative density).
- The canopy of #197 being ~200-300mm higher than the adjacent chock due to a disparity between the cut face and the TG roadway height, again making the '0m TG Sensor' in position of higher sensitivity to methane.
- Implementation of the routine longwall retreat ventilation change earlier than usual (reducing pressure on the goaf which in turn increased the potential for goaf gases to migrate into the roadway)
- A brief production cessation to replace picks may have allowed for an accumulation of methane to occur in the tailgate goaf area, which was subsequently disturbed by the increased air velocity in the tailgate caused by the reduction in cross-sectional area as the shearer cut into the tailgate.

9 PREVENTATIVE ACTIONS / RECOMMENDATIONS

The following key actions were identified to prevent recurrence and have been assigned as detailed below in Enablon.

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Task Description	Hierarchy of Control	Task Assignee	Due Date	Task ID
Review monitoring of "0m CH4 sensor" for LW808 with respect to production rate, other airstream sensor trends, and trip events. Determine if sensor is representative of general body atmosphere in TG.	Administrative	Braedon Smith	30/4/20	75 01306660
Adjust standard Ventilation Change process for LW Tailgate retreat to include statement that "Ventilation Change is only permitted to occur when longwall face position is between 80-25m of next outbye cutthrough."	Administrative	Braedon Smith		75.0136662
Review the following SWPs with a cross section of the workforce for improvements to prevent further 0m sensor trip incidents: SWP.GTM.614 Constructing and Maintaining the Sherwood Curtain, and, SWP.GTM.614 Constructing and Maintaining the Sherwood Curtain	Administrative	Braedon Smith	3 0/03/2 0 30/4/20	TS:01306736



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10 TEST FOR EFFECTIVENESS

Post Implementation Action Plan

Test of effectiveness is to be done to ensure that the above actions to prevent recurrence have worked as intended. (Nominally scheduled 3,6 or 12 months after completion of preventative action plan)

Enablon Task No.	Action Description	Responsible Person	Due Date	Completed Date
	Audit '0m TG Sensor' trip event frequency post implementation of controls from LFI IN00219432 (closure 30/03/20) to determine effectiveness of controls in mitigating events.	Dennis Black	10/05/2020	75.01301670

11 INVESTIGATION REPORT SIGN -OFF

The Incident Investigation Team submits this report as a true reflection of the information gathered. To maximize the preventive potential of the investigation report, the findings, conclusions and learning's of the report should be distributed as appropriate.

AN INCOME.	Department Manager	
Dennis Black	Confidential	12.03.2020.
	SHE Manager	
Name	Confidential	Date
Stephanie Oppermann		20/4/2020
	General Manager	
Name	Signature	Date
Damien Wynn	Confidential	2 1 APR 2020
	Head of Operations	
Name	Confidential	Date
Glen Britton		21/04/2020
Ad	dditional EXCO member signoff – if applicable	
Name	Signature	Date



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12 EVIDENCE & ANALYSIS TOOL APPENDICES

Table 1. IN.00217142 Event Timeline

		Event Timeline
06/02/20		CH4 Sensor fitted to LW808 #197 chock as part of implementation plan to comply with 243A of the Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019. Sensor termed "0m CH4 Sensor"
07/02/20		First recorded trip event on "0m CH4 Sensor" where methane of >2% is detected.
16/02/20 ~18:11		Trip event on "0m CH4 Sensor" where methane of >2% is detected.
20/02/20	Before the	Ventilation Change VC20015 is undertaken in the LW808 TG. This change occurred earlier in the retreat cycle than usual.
21/02/20 ~11:12	Incident	Trip event on "0m CH4 Sensor" where methane of >2% is detected.
21/02/20 ~16:57		Trip event on "0m CH4 Sensor" where methane of >2% is detected.
22/02/20 4:30		LW808 Shearer stops in MG to repick drums. Witnesses report MG Brattice condition as being 'tight'.
22/02/20 5:00		LW808 Shearer resumes production towards TG.
22/02/20 5:31	Incident	LW808 Shearer cuts into TG and starts to cut back towards MG. Face trip event occurs when "0m CH4 Sensor" >2%.
28/01/20 08:30- 09:30		"0m CH4 Sensor" CH4 concentrations fluctuate exceeding 2.5% a total of 3x further times over a period of x minutes, with a maximum peak of 3.1%. NB: Other CH4 monitors in airstream (2x TG drive sensors, TG Roadway sensor, and LW808 Dogleg Sensor) do not replicate similar trend profiles at this time.
28/01/20 09:30	After the	Face operators (CMWs) contact ERZ C (S Stingle) and notifies him of the face trip.
28/01/20 10:05	Incident	ERZ C attends TG, notes 2.3% on handheld PGD. Erects brattice curtain on shields to purge gas from sensor. Operators and ERZ C observe chock #197 canopy height is approximately 300mm higher than adjacent chocks due to roadway height. Erects brattice to disperse gas from sensor area. TG chock hard into chain pillar rib.
28/01/20 11:00		ERZ C Notifies MSO of event. Incident subsequently reported to UMM.



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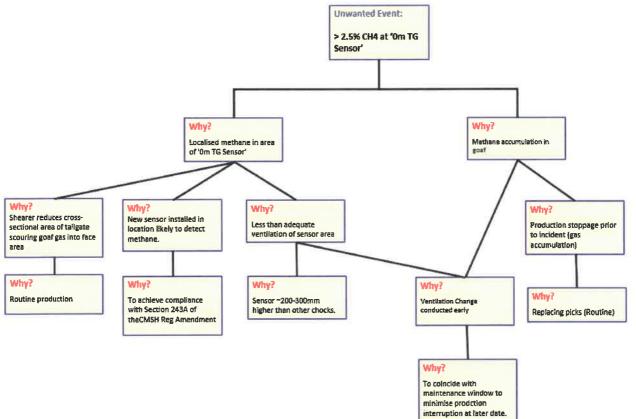


Figure 1. IN.00219432 Anglo LFI Tool Why Analysis

Table 2. IN.00219432 Anglo LFI Tool - Change Analysis

Normal Practice	Situation or practice at the time of the incident	Gap (Difference)	Impact of Difference
No CH4 sensor fitted to canopy of #197 chock	CH4 sensor fitted to canopy of #197 chock	CH4 sensor positioned high on roof where methane is most likely to layer	Overrepresentation of methane at the monitoring location (compared to General Body concentration) Higher sensitivity to goaf gas air wash during shearer cut to TG

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Chock canopy heights nominally level with one another	#197 chock ~300mm higher than adjacent chocks.		Potential for less than adequate ventilation in elevate chock canopy area.
TG Ventilation change typically undertaken when face is 70-25m from next outbye CT	TG Ventilation change undertaken when face is ~125m from next outbye CT	Small change in pressure distribution on tailgate	Slightly increased potential for gas accumulation at TG area.

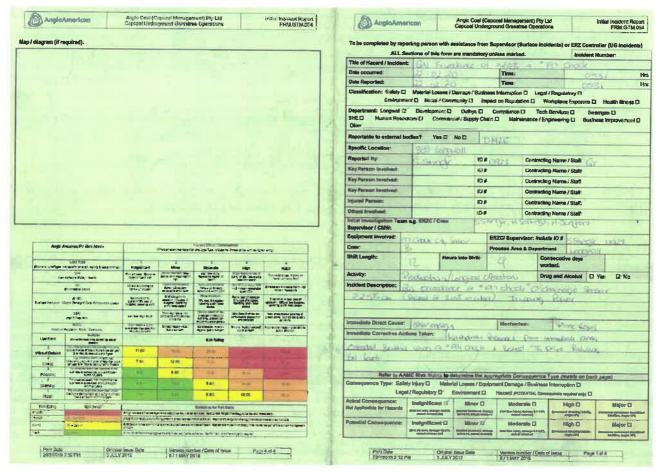


Figure 2. IN.00219432 Initial Incident Report (Front).



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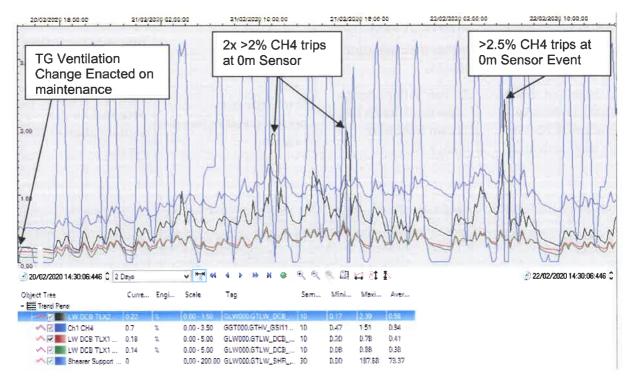


Figure 3. Shearer and CH4 monitor trending over 2 days including >2.5% CH4 trip event and two preceding >2% trip events on the day prior to the incident.

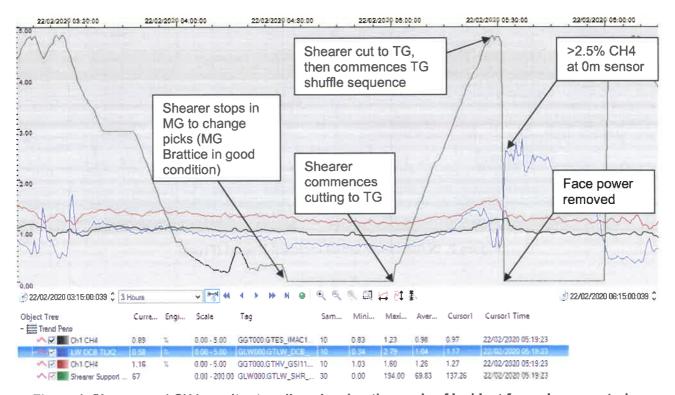


Figure 4. Shearer and CH4 monitor trending showing timescale of incident from shearer entering maingate of picks, then cutting to TG, and power trip event

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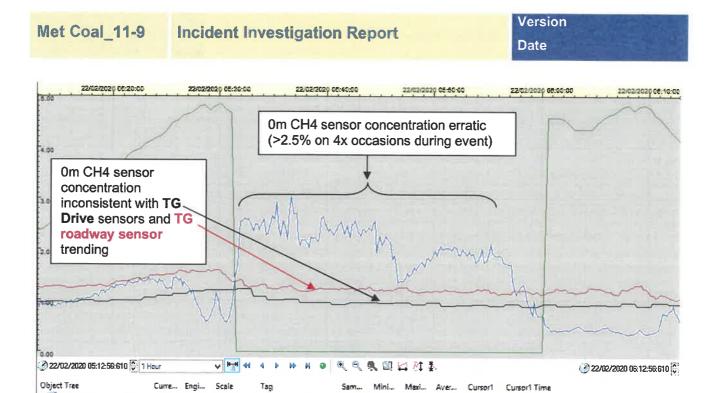


Figure 5. Shearer and CH4 monitor trending showing 0m Sensor CH4 concentrations escalating after shearer exit from maingate and erratic variation inconsistent with nearby sensors.

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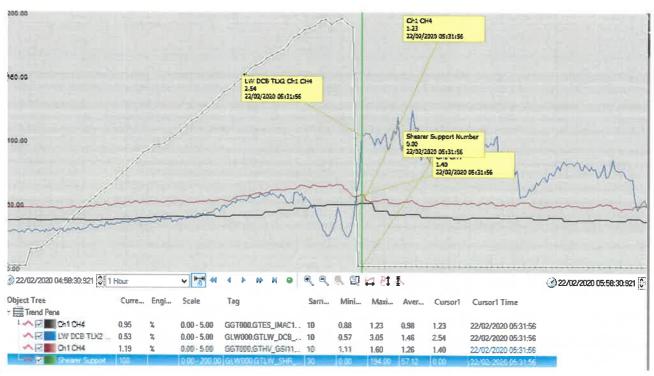


Figure 6. Shearer and CH4 monitor trending showing 0m Sensor CH4 concentrations exceeding (1st spike) 2.5% at 05:31:56

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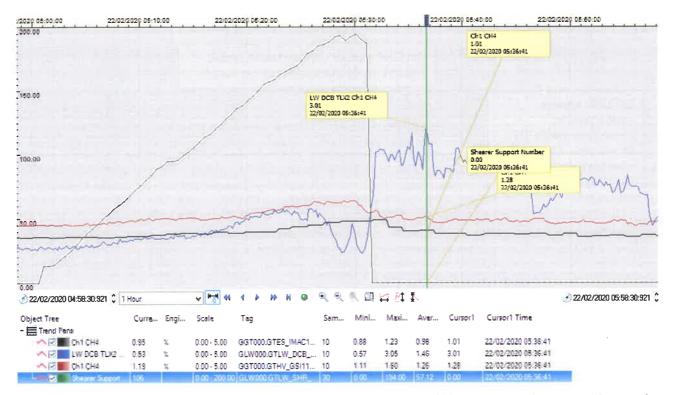


Figure 7. Shearer and CH4 monitor trending showing 0m Sensor CH4 concentrations reaching peak of 3.01% at 05:36:41

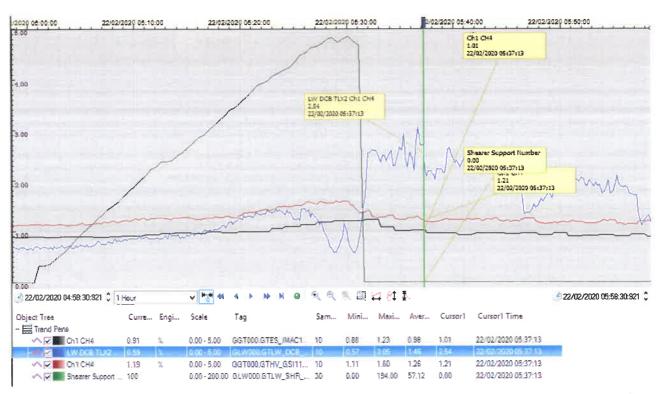


Figure 8. Shearer and CH4 monitor trending showing 0m Sensor CH4 concentrations reduce (1st spike) below 2.5% at 05:37:13

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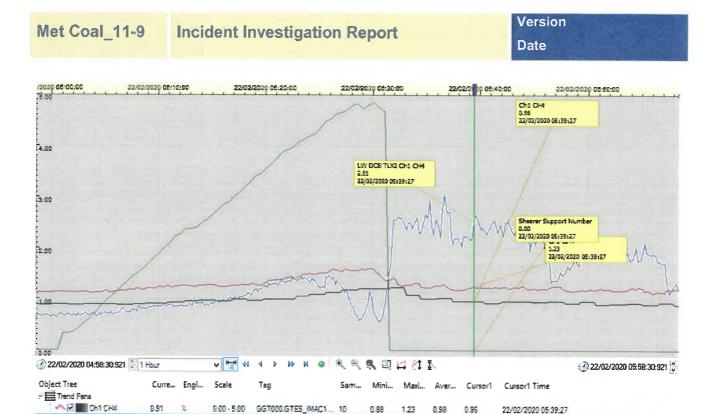


Figure 9. Shearer and CH4 monitor trending showing 0m Sensor CH4 concentrations again (2nd spike) exceeding 2.5% at 05:39:27

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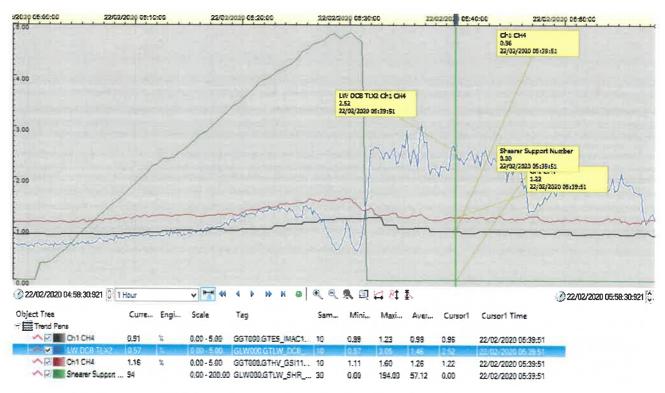


Figure 10. Shearer and CH4 monitor trending showing 0m Sensor CH4 concentrations reduce (2nd spike) to below 2.5% at 05:39:51

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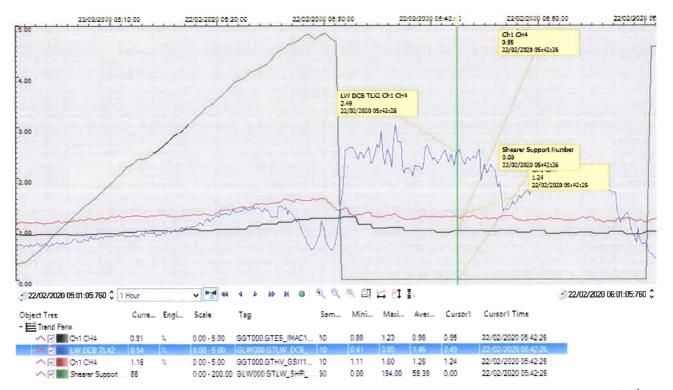


Figure 11. Shearer and CH4 monitor trending showing 0m Sensor CH4 concentrations again (3rd spike) exceeding 2.5% at 05:42:26

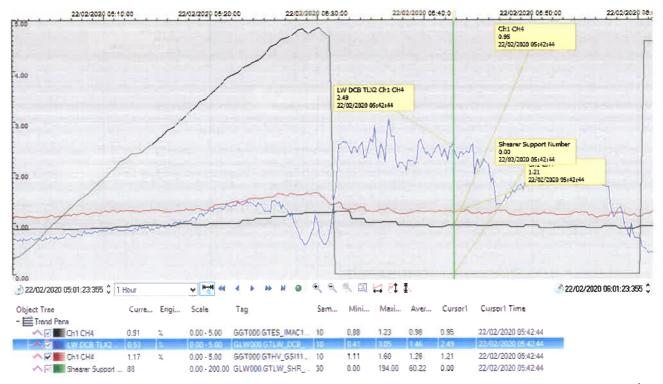


Figure 12. Shearer and CH4 monitor trending showing 0m Sensor CH4 concentrations reduce (3rd spike) below 2.5% at 05:42:44

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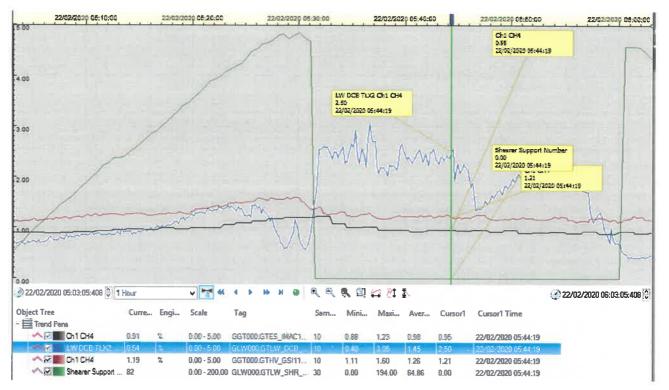


Figure 13. Shearer and CH4 monitor trending showing 0m Sensor CH4 concentrations again (4th spike) exceeding 2.5% at 05:44:19

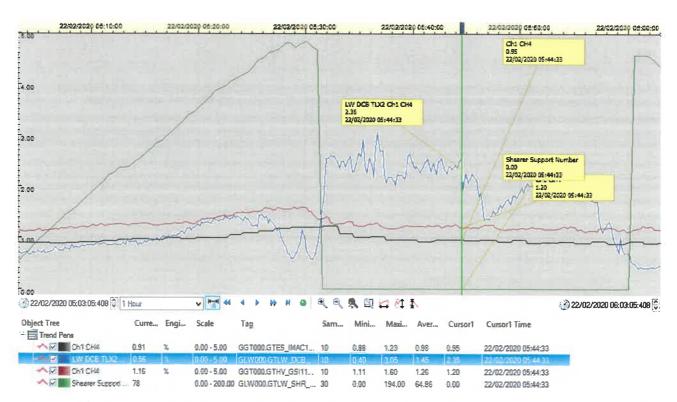


Figure 14. Shearer and CH4 monitor trending showing 0m Sensor CH4 concentrations reduce (4th spike) below 2.5% at 05:44:33

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APPENDIX	3 INVOLVED	PERSON	OR WITNES	S STATEM	ENT	
Event Description:	1 1925 EVS	ere at 10	Teach this			
Date and Time:	23-1-20				7-7	
Location of Event:	197 chick					
Witness Details					19	
Name of Witness:	Matthew Sell mis		Contact No:		1 2 3	
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Employer:	Anges 1			×	A A	
Witness Statement			and the second		10. 100	117
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Who was your supervi	sor?	MA SERVICE STATE				6 .
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Who was the ERZ Con	troller responsible	for the zone	at the time of th	e incident?		
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Figure 15. M Sellings Witness Statement for IN.00219432 (1 of 2 Pages)

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Anglo Coal (Capcoal Management) Pty Ltd Capcoal Underground Grasstree Mine Management Plan Involved Person or Witness Statement

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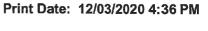
Figure 16. M Sellings Witness Statement for IN.00219432 (2 of 2 Pages)

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Anglo Coal (Capcoal Management) Pty Ltd
Capcoal Underground Grasstree Mine
Management Plan
Involved Person or Witness Statement
MP GTM 025

Event Description:	Gas Emaderice 72%	a ODL STA	197 Ehrek
Date and Time:	22-01-20 0-31		10 11 10 10 10 10 10 10 10 10 10 10 10 1
ocation of Event:	Se la recal		
Witness Details	Tare territa		
Name of Witness:	Chann Surk	Contact No:	
		Anglo No:	0923
Job Title:	Durin	Angio No.	1100
Employer: Witness Statement	May 3		
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hat processes or p	rentroller responsible for the rocedures were you following ave a permit to work / autho	ng whilst carrying o	
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Vhat was your role i			1

Figure 17. S Stingle Witness Statement for IN.00219432 (1 of 2 Pages)



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Anglo Coal (Capcoal Management) Pty Ltd Capcoal Underground Grasstree Mine Management Plan Involved Person or Witness Statement MP,GTM.025

Explain your own words what happened during incident including the lead-up, incident occurrence, and post incident -- please include what you saw, heard and did. (If you need more space, please attach another page at rear). Draw diagrams if necessary.

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Figure 18. S Stingle Witness Statement for IN.00219432 (2 of 2 Pages)



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RECORD OF AMENDMENTS 13

Issue 6	:	Full review to align the investigation report to the Learning from Incidents process being rolled out at Met Coal in 2018.	08 June 2018, Chris Gately, Lynda Butler
Issue 5	:	 Sign off table updated to include "Additional EXCO" member signoff. 	15 September 2015, Allan Gordon
		 Section 7 – New – Critical Control Failure (for HPI's only) 	
		References to Met Coal removed.	
Issue 4	:	Reviewed Sign off table updated to include sign off from Head of Operations	22 April 2014, Allan Gordon
Issue 3	:	Reviewed for currency – reformatted	8 January 2014, Bruce Gavin
Issue 2	:	Reviewed to align with Enablon Incident Database	6 March 2013, Graeme Redding
Issue 1	:	New Template	15 December 2011, Bruce Gavin

