SAFETY & SUSTAINABLE DEVELOPMENT

LEARNING FROM INCIDENTS

INVESTIGATION REPORT

GRASSTREE MINE

Metallurgical Coal

Incident Number: IN.0211887
Classification: High Potential Incident
Incident Title: CH_4 concentration >2.5% in TG808
Incident Date: 25/10/2019
Report Date: 05/12/2019

Learning from Incidents Investigation Report

1 EXECUTIVE SUMMARY

While in production the 808TG roadway sensor detected > 1.9% CH_4 and latched the shearer. The ERZ Controller decided to do a tailgate inspection while the longwall was down and detected 2.56% CH_4 in the tailgate roadway between the face and 19ct.

It appears that this was the result of the tailgate ventilation not being set up in the way the system was designed.

2 INVESTIGATION TEAM MEMBERS

Graeme Read - ERZC

Danny Brouwer – Technical Services Superintendent

3 KEY WITNESSES

List of Key Witnesses	
Name	Designation
Andrew Firle	Mining Senior Official
Graeme Read	ERZ Controller

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:

Analysis Tool	Attached as Appendix if applicable - Yes/No
Time Series Events Chart	Yes – mandatory tool
Control Analysis	Yes / No
Behaviour Analysis	Yes / No
Change Analysis	Yes / No
Why Analysis	Yes / No

5 EXECUTIVE SUMMARY OF INCIDENT

Summary of Incident						
Incident Number		211887		Department		Technical Services
Area / location		LW808 195 chock to tailgate		Contracting Company (if applicable)		
Summary of findings from Incident Investigation						
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	Minor	25/10/19	18:35	8
Task being performed at time of incident	LW808 Tailgate inspection				Planned or Unplanned task?	
					Unplanned	Planned
Summary of Incident	Whilst cutting out the Maingate the LW808 tailgate gas exceeded 1.9% in the roadway and therefore latched the shearer. The ERZ Controller decided to do a tailgate inspection and found > 2.5% CH4. A maximum of 2.56% CH4 was detected in the tailgate roadway between 195 chock and 19ct.					
Immediate actions taken	Reported to MSO and waited for gas to reside.					

6 DESCRIPTION OF INCIDENT

The Longwall tailgate ventilation set up is designed in such a way that a small portion (3-5 m3/s) of the air from the longwall face flows inbye the tailgate to the next pillar and crosses at the next cut through into C hdg.

This allows for the additional air dilution that comes into A hdg at the last open cut through to be utilized to fully dilute the TG gas levels and run the last section of the TG to the most inbye open cut through on LW face return air quantity with lower gas levels.

This system was effectively utilized in previous three heading gate roads but had not been utilized in the last two longwall blocks. It has been reintroduced for LW808 due to the two-heading tailgate layout without an adjacent block.

The system relies on the limited resistance applied by brattice stoppings and therefore allowing low air quantities to flow through these areas (see attached schematic).

Because the majority of the gas would report to C hdg in this system, the CH_4 sensor to monitor the longwall return is placed in C hdg to accurately monitor the return gas levels as the A hdg roadway in the last open cut through would contain lower gas levels.

On the start-up of the longwall block the 20ct stopping was left in place, which became the stopping just inbye the longwall as soon as the longwall went past it. This means that the resistance in this cut through was much higher compared to a brattice stopping and therefore did not allow for sufficient air to migrate through the inbye cut through.

The stopping at 21-22ct A hdg was replaced by brattice, but being further inbye must have been too far away to provide for sufficient airflow.

Since the system on startup did not provide for sufficient airflow through goaf inbye the tailgate, all gas reported to the A hdg roadway inbye the last open cut through. This air is diluted at the last open cut through and therefore the roadway sensor would have been reading a lower CH_4 value than the concentrations in the A hdg roadway.

At the time of the incident the roadway sensor was reading just over 1.9% but 2.56% CH_4 was recorded in the TG return.

The problem was immediately solved by running a brattice wing inbye the last open cut through from the A hdg roadway to the longwall tailgate. This allow for additional air to be pushed up the tailgate roadway to provide adequate dilution.

Since then brattice stoppings have been installed in the cut throughs and the problem has no longer occurred.

7 CRITICAL CONTROL FAILURE

(List any identified critical control failures that contributed to this event)

What / which critical controls failed? (List CT number)	
Why did the critical control fail?'	
How did the critical control fail?'	
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?'	

8 FINDINGS / CONCLUSIONS

The start up of Longwall 808 did not have the tailgate ventilation set up adequately to allow for 3-5 m3/s to migrate inbye the longwall face to go across the inbye cut through and therefore keep the majority of the tailgate gas away from the A hdg Tailgate return between the LW face and the most inbye open cut through.

The Tailgate CH_4 sensor is located in C hdg. Because of the above inadequacy, the majority of the gas was coming out of the A hdg return and being diluted in the last open cut through, the CH_4 sensor did not adequately measure the tailgate gas concentration. This allowed for Tailgate gas levels to be higher than the levels recorded in C hdg.

9 PREVENTATIVE ACTIONS / RECOMMENDATIONS

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

Task Description	Hierarchy of Control	Task Assignee	Due Date	Task ID
N/A – This situation cannot occur at Grasstree anymore as there will be no more three heading tailgates or new blocks in fresh areas with two headings in the tailgate.				

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
	N/A – This situation cannot occur at Grasstree anymore as there will be no more three heading tailgates or new blocks in fresh areas with two headings in the tailgate.			

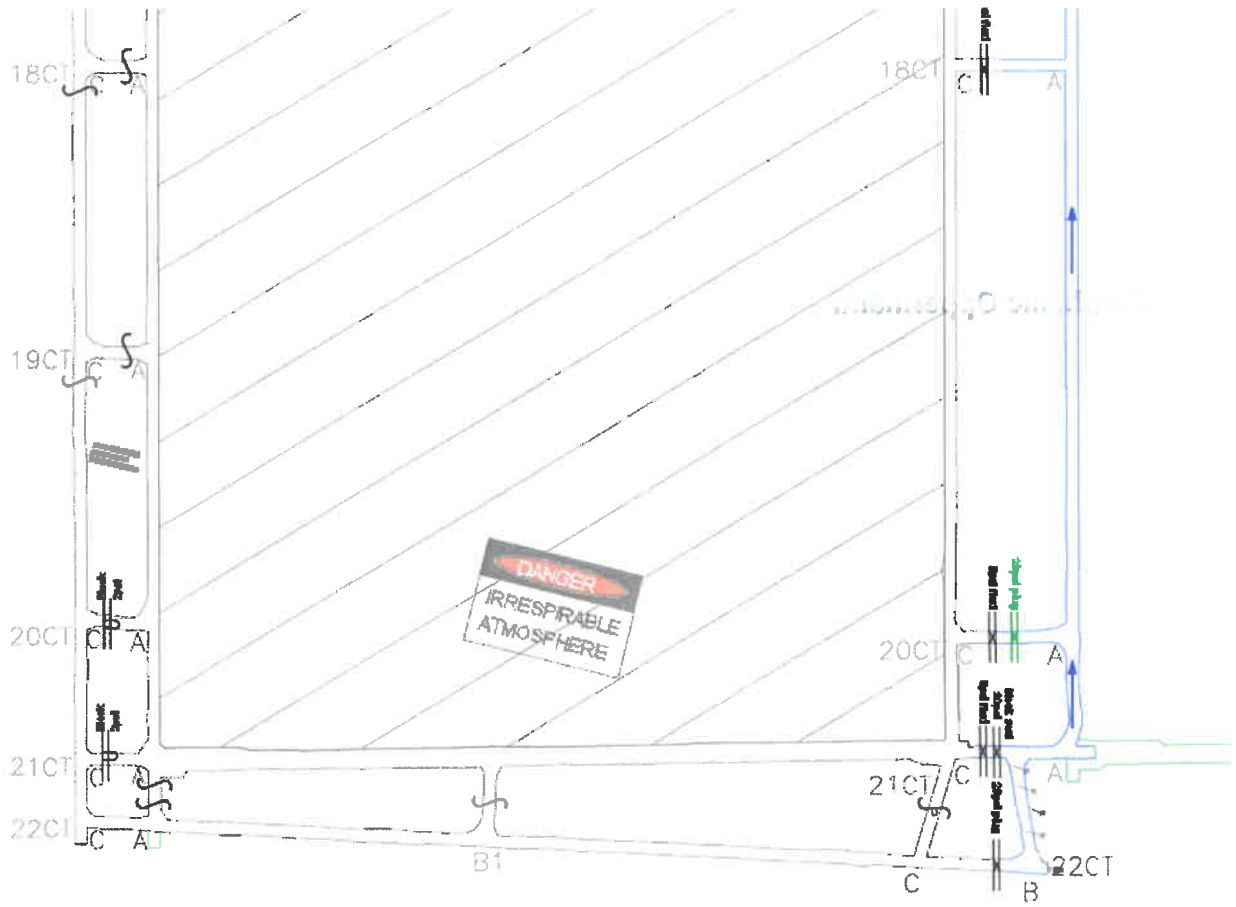
11 INVESTIGATION REPORT SIGN –OFF

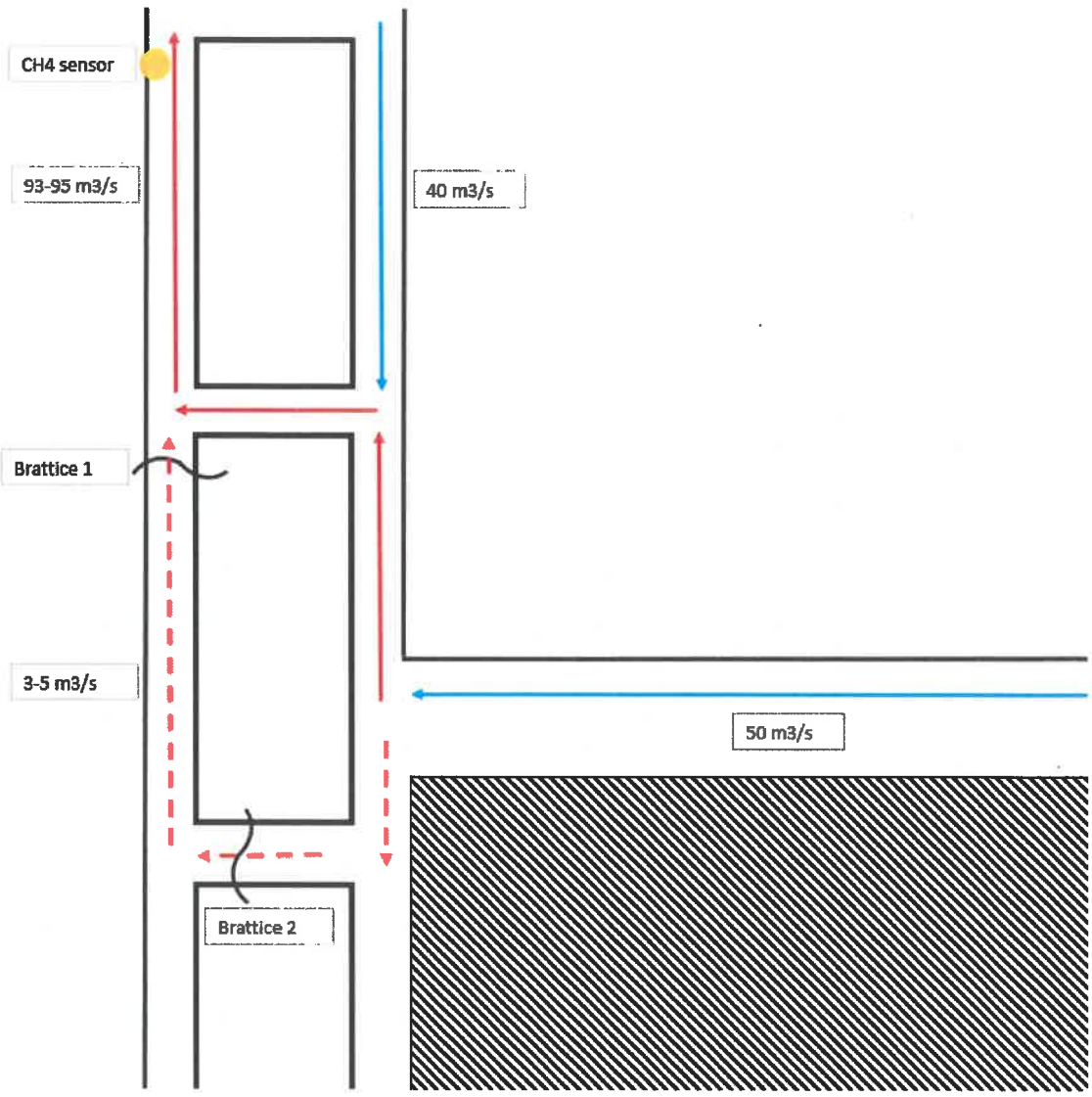
The Incident Investigation Team submits this report as a true reflection of the information gathered. To maximize the preventive potential of the investigation report, the findings, conclusions and learning's of the report should be distributed as appropriate.

Department Manager

Name	Signature	Date
[illegible]	Confidential	17-03-20
SHE Manager		
Name	Signature	Date
Stephanie Oppermann	Confidential	20/4/2020.
General Manager		
Name	Signature	Date
DAMIEN MYNN	Confidential	20/4/20
Head of Operations		
Name	Signature	Date
Glen Britton	Confidential	21/04/2020
Additional EXCO member signoff – if applicable		
Name	Signature	Date

12 EVIDENCE & ANALYSIS TOOL APPENDICE





Met Coal_11-9 Incident Investigation Report

Version
Date

AngloAmerican	Anglo Coal (Capcoal Management) Pty Ltd Capcoal Underground Grasstree Operations	Initial Incident Report FRM.GTM.054

Map / diagram (if required):

Anglo American Plc Risk Matrix

[illegible]

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AngloAmerican	Anglo Coal (Capcoal Management) Pty Ltd Capcoal Underground Grasstree Operations	Initial Incident Report FRM.GTM.054

To be completed by reporting person with assistance from Supervisor (Surface incidents) or ERZ Controller (UG incidents)

ALL Sections of this form are mandatory unless marked. Incident Number: [illegible]

Title of Hazard / Incident:	[illegible] CH4 [illegible]		
Date occurred:	25-10-19	Time:	[illegible] Hrs
Date Reported:	25-10-19	Time:	1850 Hrs

Classification: Safety ☑ Material Losses / Damage / Business Interruption ☐ Legal / Regulatory ☑ Environment ☐ Social / Community ☐ Impact on Reputation ☐ Workplace Exposure ☐ Health Illness ☐

Department: Longwall ☑ Development ☐ Outbye ☐ Compliance ☐ Tech Services ☑ Seamgas ☐ SHE ☐ Human Resources ☐ Commercial / Supply Chain ☐ Maintenance / Engineering ☐ Business Improvement ☐ Other

Reportable to external bodies? Yes ☐ No ☐	[illegible]		
Specific Location:	[illegible] (Longwall)		
Reported by:	[illegible]	ID # [illegible]	Contracting Name / Staff:
Key Person involved:	[illegible]	ID #	Contracting Name / Staff:
Key Person involved:		ID #	Contracting Name / Staff:
Key Person involved:		ID #	Contracting Name / Staff:
Injured Person:		ID #	Contracting Name / Staff:
Others involved:		ID #	Contracting Name / Staff:
Initial Investigation Team e.g. ERZC / Crew Supervisor / CMW:	[illegible]		
Equipment involved:	[illegible]	ERZC/ Supervisor: include ID #	[illegible]
Crew:	C	Process Area & Department	Longwall
Shift Length: 12	Hours into Shift: 8	Consecutive days worked:	1
Activity:	[illegible]	Drug and Alcohol	☐ Yes ☐ No
Incident Description:	[illegible]		
Immediate Direct Cause:	[illegible]	Mechanism:	Exposure to [illegible]
Immediate Corrective Actions Taken:	[illegible]		

Refer to AAMC Risk Matrix to determine the appropriate Consequence Type (matrix on back page)

Consequence Type: Safety Injury ☐ Material Losses / Equipment Damage / Business Interruption ☐ Legal / Regulatory ☑ Environment ☐ Hazard POTENTIAL Consequence [illegible] ☐

Actual Consequence: Not Applicable for Hazards	Insignificant ☐	Minor ☐	Moderate ☐	High ☐	Major ☐
Potential Consequence:	Insignificant ☐	Minor ☑	Moderate ☐	High ☑	Major ☐

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Has the hazard, defect or incident been effectively controlled on shift?		YES ☑	NO ☐
If not, why not?			
Safety			
Parts Injured / Location: N/A	Medical Treatment:	YES ☐	NO ☐
	Hospitalised:	YES ☐	NO ☐
Environmental			
Media Impacted.	Environmental Impact:		
Hazard			
Hazard Agent:	Hazard Type:	Act ☐	Condition ☑

Timeline:		
01/01/18 08:00		Example: Attended Start of Shift
[illegible]	Before the Incident	[illegible]
[illegible]		[illegible]
[illegible]		[illegible]
		Incident Occurred
[illegible]	After the Incident	[illegible]
		[illegible]

Additional Actions to prevent reoccurrence: (ERZ Controller/ Supervisor to complete)

Initial Incident Report Checklist:

Contact relevant site personnel: Completed ☑	Have statements been collected?: Completed ☐ *e.g. Key person involved, witnesses (submit with this form)*
Collect any relevant SHE MS Documents: Completed ☐	Take photos of incident scene as required: Completed ☐

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	Task Description	By Whom	Action Due (date)	Enablon ID #
PEOPLE Tasks	Is counselling of the CMW required *(put text to be saved in box)*? Yes ☐ No ☐ CMW to be counselled in line with the Anglo Coal Consequence Model and Applicable Misconduct Policy. *Evidence to be sent to site HR for file.*			
WORKPLACE Tasks	Conduct LFI	[illegible]	25-11-19	
ORGANISATIONAL Tasks				
Conclusion	CH4 gas make increased greater than 2.5% in TG roadway			

Incident Sign Off:			
Person Reporting	Name: [illegible]	Supervisor (For surface incident) ERZ Controller (For UG incidents)	Name: [illegible]
Signature: [redacted]		Signature: [redacted]	
Date: 25-10-19		Date: 25-10-19	
Verification Sign Off:			
Undermanager/ MSO	Name: [illegible]	Signature: [redacted]	Date: 25/10/19
Superintendent/ Manager	Name [illegible]	Signature:	Date: [illegible]
Entered into Enablon By:	Name:	Date:	Staff ID #
If reported to the DNRME, is a form 5A required? Yes ☐ No ☐ If Yes, Raise relevant task for the completion of Form 5A		Is a 'Learning From Incident' Investigation Required? Yes ☑ No ☐ *If Yes, Raise relevant task for the completion of LFI report*	
LFI Task Enablon ID:		Completion Date of Task	

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Time Series Event Chart

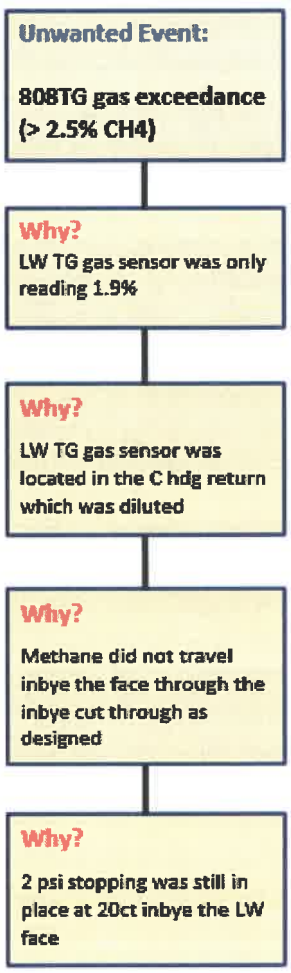
1 - TM.00028038 25/10/19 18:05:00
Shearer latched due to >1.9% CH4 at TG roadway

2 - TM.00028039 25/10/19 18:25:00
Carried out inspection at Tg while shearer was down

3 - TM.00028040 25/10/19 18:35:00
Detected >2.5% CH4 (2.56%) at Tg betweenface & 19ct

4 - TM.00028041 25/10/19 18:50:00
Reported to MSO

5 - TM.00028042 25/10/19 18:50:00
Waited for further instruction



13 RECORD OF AMENDMENTS

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. • Section 7 – New – Critical Control Failure (for HPI's only) • References to Met Coal removed.	15 September 2015, Allan Gordon
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