SAFETY& SUSTAINABLE DEVELOPMENT	

# LEARNING FROM INCIDENTS

# **INVESTIGATION REPORT**

# MORANBAH NORTH MINE

**Metallurgical Coal** 

Incident Number: IN.00205770 Classification: *DNRME HPI* Incident Title: Methane exceedance in TG of LW604 Incident Date: 20.07.2019 Report Date: 20.07.2019



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#### EXECUTIVE SUMMARY 1

Power to LW604 face tripped back to the DCB at 11:50am on the 20th of July while completing the 2<sup>nd</sup> run into the TG. During the initial investigation the face ERZ Controller identified methane (CH<sub>4</sub>) blowers in the floor between #105 and #110 PRS and a GB CH<sub>4</sub> concentration up to 2.3%. Further investigation found the TG drive CH4 sensor had failed and there was >2.5% CH4 in the TG roadway.

Leading up to the time of the event CH4 level in the TG roadway was between 1.6% and 2%. At 12:12pm the TG outbye sensor passed 2.5% CH<sub>4</sub>, peaking at 12:22pm at a GB concentration of 3.36% CH4 and did not drop below 2.5% until 1:25pm. SO670A was the closest goaf drainage well but was in standby mode due to low methane and high oxygen (O2).

The face ERZ Controller used cool tubes and brattice sails along the face to direct ventilation into the rear walkway and dilute CH4 make from #105 PRS to the TG. The TG drive, TG CMU, and the shearer were checked internally for gas, and the incident site was then cleared by the Undermanager in consultation with the Underground Mine Manager. Production then recommenced at 5:30pm.

#### INVESTIGATION TEAM MEMBERS 2

List of team member	S		
Name	Position Title	Designation	Qualifications
Kelvin Sloan	LW coordinator	Investigation Lead	S123, G2, Trade Cert
Tim Johnson	HSE coordinator	Facilitator	S123, G2, Dip
Scott Fraser	ERZ controller	ERZ Controller	S123, G2, Cert 4 U/G operations
Sam Watson	Geologist	Team member	S123, G2, Geology Batch
Hamish Rowland	Drilling supervisor	Team member	S123, G2
Ben Roberts	Mine Technician	Team member	
Tim Miller	Mine Technician	Team member	
Jamle Gibson	Shift Undermanager	Team member	S123, G2, Cert 4 U/G operations
James Grebert	Ventilation officer	Team member	S123, G2, VO
Colin Standley	Mine Technician	Team member	



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#### **KEY WITNESSES** 3

List of Key Witnesses			
Name	Position Title	Statement	
Tim Miller	Mine Technician	Yes	
Scott Fraser	ERZ Controller	Yes	
Grant Dixon	Mine Technician	Yes	
Jamie Huff	Mine Technician	Yes	

#### METHODOLOGY AND TOOLS USED 4

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

The analysis tools used for this investigation are:

Analysis Tool	Tools completed within this report - Yes/No
Time Series Events Chart	Yes - mandatory tool
Control Analysis	No
Human Behaviour Analysis	No
Change Analysis Yes	
Why Analysis	Yes

Supporting evidence	Attached as Appendix if applicable - Yes/No
Initial Incident Report	Yes - mandatory evidence
Relevant SHMS Documents	Yes
Photographs	No
Statements	Yes
Diagrams / Maps / Physical Evidence	Yes

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# 5 INCIDENT REPORT SUMMARY

Summary of Incident						
Incident Number	er IN.00205770 Department		Department	Longwall		
Area / location		LW604 TG roadway Compa (Anglo/C		Company (Anglo/Contractor)	Anglo	
Summary of find	ings from Incid	ent Investigatio	on			
Incident Category	Agent	Actual ISR Rating	Potential ISR Rating	Date of Incident	Time of Incident	Number of hours worked
Legal	CH <sub>4</sub> exceedance	Minor	Moderate	20/7/19	11:50am	3hrs
Task being performed at	Production				Planned or Unplanned task?	
time of incident					Unplanned	Planned
Summary of Incident Shearer cutting back into TG to complete second run of the shuffle cut. Once shearer reached #141 PRS face power tripped back to DCB.						
Immediate actions taken	Removed operators back to the MG and investigation power trip. Upon investigation found CH <sub>4</sub> blowers in the rear of PRS between #105 and #110 with GB CH <sub>4</sub> up to 2.3% in rear walkway at #110 PRS and PGD was reading >2.5%. Further investigation found >2.5% CH <sub>4</sub> in TG roadway.					



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# 6 INCIDENT DATA COLLECTION

PEEPO	Facts/Observations
People	<ul> <li>Five CMW on the face at the time of the event</li> <li>ERZC present</li> </ul>
Equipment	<ul> <li>Shearer</li> <li>TG drive</li> <li>Personal gas detector</li> <li>Static gas monitors</li> <li>Goaf wells</li> </ul>
Environment	<ul> <li>Goaf</li> <li>TG roadway</li> <li>Shearer at #141 chock</li> <li>Adjacent goaf present</li> <li>Close proximity of the GML seam (0.2 to 0.3 meters)</li> <li>GP1, PTUFF, GP0 within six meters of the GM seam roof (7.5 meters from the cut roof)</li> <li>Floor heave</li> <li>Goaf well SO670A on standby due to low methane content until after the goaf event</li> </ul>
Procedures	<ul> <li>Goaf drainage TARP</li> <li>Gas Management TARP</li> <li>Operational TARP</li> <li>Goaf Drainage Management Plan</li> <li>Longwall portion of degassing and purging procedure</li> </ul>
Organisation	Rates of retreat vs gas drainage capabilities

# 7 CONTRIBUTING FACTORS / CAUSES

Possible Causational Factors				
Factor Describe Cause Applicable				
Organisational	Rates of retreat vs gas drainage capabilities	Yes		
Task/environment Conditions	<ul> <li>Goaf</li> <li>Adjacent goaf present</li> <li>Close proximity of the GML seam (0.2 to 0.3 meters)</li> <li>GP1, PTUFF, GP0 within 6m of the GM seam roof (7.5m from the cut roof)</li> <li>Floor heave</li> </ul>	Yes		
Individual/team actions		No		
Absent/failed defences	<ul> <li>Goaf well SO670A on standby due to low methane content until after the goaf event</li> </ul>	Yes		

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#### **CRITICAL CONTROL FAILURE** 8

(List any identified critical control failures that contributed to the event. Liaise with the relevant department superintendent or critical control owner to establish if this section is applicable.)

	CC Failure Identification
Did any critical controls fail?	No
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?'	

#### **FINDINGS / CONCLUSIONS** 9

- Prior to the incident the TG roadway CH<sub>4</sub> had been sitting between 1.6 and 2% GB. .
- Prior to the incident a total of 5 goaf drainage holes online. .
- SO670A was in standby mode due to low CH<sub>4</sub> and high O<sub>2</sub>. .
- Close proximity of the GML seam (0.2 0.3m) •
- At 12:12pm the TG outbye sensor passed 2.5% CH4 peaking at 12:22pm at a GB concentration . of 3.36% CH<sub>4</sub> and did not drop below 2.5% until 1:25pm.
- 72m<sup>3</sup> ventilation across face at time of incident. .



# 10 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
Revise the UIS strategy in similar areas to ensure adequate drainage of the GML	Admin	Kevin Doyle	15/9/2019	TS.01096536
Revise the degassing and purging procedure to ensure specific to longwall operations	Admin	Luke Hamilton	15/9/2019	TS.01096537
Review geotechnical goaf caving around TG 604 with adjacent goaf	Admin	Charles Sweeney	15/9/2019	TS.01096538
Review GML gas content to ensure drainage strategy is effective	Admin	Ken Blades	30/10/2020	TS.01096539

# 11 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
TS.01096540	Review actions from completed LFI to ensure all actions have been completed and are effective.	Wesley Noble	30/11/2020	



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# 12 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.

Wesley Noble	Signature	Date
	Confidential	30-8-19
SHE Manager		
Chris Moger	Signature	Date 30 8/19.
General Manager		
Scott Dobbie	Signature Confidential	Date
Head of Operations		30/8/14
Paul Stephan	Signature	Date
Additional EXCO me	ember signoff – if applicable	
Michael Lerch	Signature	Date
	Confidential	30/8/19
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# 13 ANALYSIS TOOL APPENDICES

# 14 TIME SERIES EVENT CHART

Time	Event or Condition
20/7/19	
9:00am- 10:00am	Completed start of shift briefing and travelled into LW604.
10:00am- 11:50am	Production as planned.
11:50am	Lost face power due to CH4 trip.
1:00pm- 5:00pm	Setup brattice wings and sails onface to manage CH <sub>4</sub> . Degassed Shearer, TG CMU and TG drive motors.
5:00pm- 5.30pm	Crew waiting for approval to start production.
5:30pm	Commenced production.

# 15 CHANGE ANALYSIS

	Chang	e Analysis	
Normal Practice	Situation or practice at the time of the incident	Gap (difference)	Impact of Difference
Goaf drainage well operating	Well SO670A in standby mode due to low methane and high O <sub>2</sub>	Can't pull gas from the TG goaf area, closest to the face	With closest goaf well on standby will result in less control of the gas content in the TG roadway
Methane content in TG generally between 1.2% and 2%	Leading up to the time of the event CH <sub>4</sub> level was between 1.6% and 2%. Shearer speeds whilst coming into the TG was being halted to assist with reducing CH <sub>4</sub> levels.	Modified operation of the shearer with consideration of the methane content	Gas management to prevent exceedance





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#### SUPPORTING EVIDENCE APPENDICES 17 INITIAL INCIDENT REPORT 18

Enablos ID No.

Hazard & Incident Report Form



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



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#### STATEMENTS 19

### Statement - Tim Miller

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Incident Investigation Initial Witness Statement Form

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Statement - Scott Fraser



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### Met Coal\_11-9 Incident Investigation Report

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Statement - J Huff

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Primary information gathered during initial investigation.

#### **Primary Information**

- Precise location of the accident/Incident.
- Longwall 604 Maingate Chainage.2398m
   When the accident/incident happened
- 20/07/2019 1200 hrs
  Number of persons involved with the incident Nil HPI gas exceedance.
  TG 604 8 Heading 1 c/t > 2.5 % @ 1212 Hrs
  TG 604 8 Heading 1 c/t = 3.36 % @ 1222Hrs
  TG 604 8 Heading 1 c/t < 2.5 % @ 1325Hrs</li>
- 4.Name of person who was injured from the Incident.
- Name of any person who saw or was present when the incident happened.

Longwall C Crew Shearer Op Tim Millar " Chock Jamle Huff. ERZC Scott Fraser,

6.A brief description of the accident/incident

Shearer was docking at the tailgate drive. Goaf flushed in forcing methane over the tailgate drive Sensor which tripped power to the face. Methane levels reached outbye as above , Ventilation Dept will trend Sensors.

EEM UMM notified, Degassing as per SWG 52315

Incident Report and witness Statements being prepared.

See Attached Control Room Timeline.

#### Timeline of events gathered by CRO

Sullivan, Mick

From:	O'Hara, Gienn
Sent:	Saturday, 20 July 2019 1:46 PM
To:	Lerch, Michael; Sullivan, Mick; Gibson, Jamie; Tait, Patrick; Dobbie, Scott; Bruce, David; Grebert, James: Sloan, Kelvin: Kelv, Brendan
Subject:	Timeline LW CH4 HPI Sat 20 Jul 19

The below is the time line from control

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1144 Shearer in TG
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- 1152 K Sloan: ask Seamgas to see if they can increase CH4 suction
- 1159 CH4 on face TG drive rising
- 1159 CH4 sharply rises to over 3% and sensor falls and goes into negative reading, U/M V/O notified
- 1205 TG toby sensor rising to over 3% max reading 3.29% at 1208
- 1210 SO67BA turned up to draw 300l/s
- 1217 TG O/B sensor rises to over 3% max reading 3.40% at 1218
- 1230 S Fraser #97 >1% rear walkway, #99 > 1% walkway, #108 GB 2.3%, TG off scale
- 1231 Audible blower rear #109
- 1230 SO670A flow from 305 l/s to 1219 l/s
- 1234 Contacted M Lerch, Plan in place to brattice chocks to flush rear of chocks, called S Dobbie, P Taite, B Kelly, D

Bruce

- 1327 K Sloan booking out Brattice, Gas detectors, probe, venturi, etc.
- 1343 Time of email TG Inby 2.09% CH4 O/B 2.38% CH4

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# 20 DIAGRAMS/MAPS

1. Shearer @ #140 shield - start to rise CH4 at TG inbye sensor

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1. Max CH<sub>4</sub> - TG inbye sensor





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### 1. Max CH<sub>4</sub> - TG outbye sensor

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**Incident Investigation Report** Met Coal\_11-9

Revision Date 09/05/2024

#### INVESTIGATION REPORT ASSISTANCE 21

- 1) Anglo American Risk Matrix
- 2) Anglo American Incident Agents List
- 3) Anglo American Hierarchy of Controls
- 4) DNRM Causational Factors Examples

#### **RECORD OF AMENDMENTS** 22

Issue 7	:	Site adaptation to Moranbah North Mine requirements and guidelines.	06 January 2019, Chris Moger, Timothy Johnson				
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	:	<ul> <li>Sign off table updated to include "Additional EXCO" member signoff.</li> </ul>	15 September 2015, Allan Gordon				
		<ul> <li>Section 7 – New – Critical Control Failure (for HPI's only)</li> </ul>					
		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				

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