



# LEARNING FROM INCIDENTS

## INVESTIGATION REPORT

### GROSVENOR MINE

#### Metallurgical Coal

**Incident Number: IN.00205342**

**Classification: DNRM HPI**

**Incident Title: LW103 CH4 Gas Exceedance**

**Incident Date: 15 July 2019**

**Report Date: 13 August 2019**

## Learning from Incidents Investigation Report

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## 1 INVESTIGATION TEAM MEMBERS

Name	Designation
Elysse Maunder	Health and Safety Coordinator
Logan Mohr	Technical Services Manager
Garth Zerner	Ventilation Officer
Brad Meldrum	ERZ Controller

## 2 KEY WITNESSES

List of Key Witnesses	
Name	Designation
Brad Meldrum	ERZ Controller
Garth Zerner	Ventilation Officer

## 3 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
Behaviour Analysis	Yes
Change Analysis	Yes
Why Analysis	No

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## 4 DESCRIPTION OF INCIDENT

In order to reduce the intake Methane to the LW face and Return a Ventilation change was completed on the 15th of July. The primary objective of the change was to reverse the ventilation direction of the perimeter roadway as this ventilation circuit was introducing methane levels of 0.3% to 0.4% into the intake of the LW. To complete the change, the ventilation quantity of the intake road (MG103 B Hdg) and the LW ventilation circuit had to be increased to allow for the additional air required to change the direction of the airflow inbye of the LW face on the perimeter road. At 1:49pm the first part of the ventilation change was completed and this change increased the quantity of air along the LW face, as well as the differential pressure across the LW face. This change resulted in the goaf fringe being increased and additional gas pulled out at the TG. The inbye TG sensor peaked at 2.5% CH<sub>4</sub>, whilst the outbye TG sensor reached a peak reading of 2.71%.

## 5 EVENT FACTORS

<b>Individual Factors</b>	Regulator at 3-4 c/t was opened over the duration of 5 minutes as the VO was concerned with his fatigue management
<b>Workplace Factors</b>	WRAC identified the hazard of pressure and gas. Existing control of real time monitoring of barometer  Ventilation change was conducted during the barometer low
<b>Organisational Factors</b>	GRO-1316-FRM-Permit to Change Ventilation does not include consideration to barometric pressure  Gas drainage system - less than adequate methane recovery / dilution  Decision by IMT to bring forward the ventilation change by one day without adequate change management

## 6 FINDINGS AND CONCLUSIONS

Through the LFI investigation the following was identified:

- Originally the ventilation change was planned to occur while the barometer was high, however it was undertaken during a low. No change management was conducted or review if the WRAC prior to implementing the change,
- GRO-1316-FRM-Permit to Change Ventilation does not include consideration the barometric pressure,
- The regulator at 3-4 c/t was opened a rate then typically allowed for.

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## 7 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
Review and update GRO-1316-FRM-Permit to Change Ventilation to include consideration to barometric pressure	Administration	Garth Zerner	18/09/2019	TS.01086433
Develop a plan to increase goaf drainage capacity for peak SGE areas of Grosvenor to reduce tailgate methane concentrations to meet business plan productivity targets.	Engineering	Casper Badenhorst	30/08/2019	TS.01029425
Liaise with VO Officer regarding the pace of which regulators are opened during a barometer low	Administration	Logan Mohr	20/08/2019	TS.01086434

## 8 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.01086436	Review effectiveness of action close out from Incident <b>IN.00205342</b>	Department Manager	18/12/2019	



## 9 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.

### Acceptance of Final Report for Management Sign Off

Department Superintendent		
Name	Signature	Date
Logan Mohr	[REDACTED]	12/8/19
Note: in signing the above, the Department Superintendent certifies that all actions have been communicated to the responsible person and due dates agreed		

### MEM / EEM Sign Off (if applicable)

Electrical Engineering Manager or Mechanical Engineering Manager (tick)		
Name	Signature	Date

### Management Sign Off

Department Manager		
Name	Signature	Date
Logan Motin	[REDACTED]	12/8/19
SHE Manager		
Name	Signature	Date
KATT BACHMANN SHE MANAGER	[REDACTED]	13/08/19
Underground Mine Manager		
Name	Signature	Date
Walter Nicholas	[REDACTED]	14/08/2019
General Manager		
Name	Signature	Date
TAMM GUNZLITZ	[REDACTED]	13/8/19
Head of Operations		
Name	Signature	Date
P. SERRA	[REDACTED]	12/9/19

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## 10 APPEDIX: SEQUENCE OF EVENTS

Date	Time	Event or Condition
11/07/2019		Ventilation change planned for 16/07/2019
15/07/2019	06:00	Start of shift
	11:00	IMT conducted and ventilation change is rescheduled for as soon as possible
	12:00	Personnel withdrawn from tailgate and the parameter road. Shearer parked at shield #100
	13:35	Regulator at 3-4 c/t opened
	13:49	EVENT: Longwall dogleg sensor reaches 2.5% methane
	14:08	Longwall dogleg sensor peaks at 2.7% methane
	14:30	Longwall dogleg sensor falls below 2.5%
	18:00	Ventilation change completed

## 11 APPENDIX: CONTROL ANALYSIS

Unwanted Event: Methane in excess of 2.5%				
Hazard: Elevated Methane				
Absent or Failed control and support systems	How did they perform?	Why did they fail or were absent?	Outcome of failed or absent controls and support systems.	Site critical control Yes or No?
GRO-1316-FRM-Permit to Change Ventilation	Failed	Form does not include consideration to barometric pressure	Ventilation changed whilst the barometer was low	No
Gas Drainage System	Failed	Less than adequate methane recovery / dilution	Design capacity cannot meet current production rate	No
Adequate planning and execution of ventilation change	Failed	Ventilation change originally planned for 16/07/2019, IMT decision to pull forward due to production constraints	Ventilation change conducted later in day than planned, resulting in change happening on barometric low	No
Change management	Absent	No change management process / review of WRAC when decision was made to bring forward the ventilation change	Did not recognise and manage impact of barometric low pressure	No

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## 12 APPENDIX: BEHAVIOUR ANALYSIS

Human Behaviour Analysis			
A – Activator	B – Behaviour	C – Consequence	Circle <b>ONE</b> on each row:
<i>Goggles Scratched</i>	<i>Grinding without goggles</i>	<i>Able to see and complete task.</i>	<i>Sooner</i> <i>Uncertain</i>
<i>Time Constraints</i>		<i>Able to complete task on time.</i>	<i>Negative</i>
IMT directed Ventilation Officer to undertake ventilation change, aware of barometric low	Ventilation Officer undertook change as directed	Ventilation change conducted later in day than planned, resulting in change happening on barometric low	<del>Sooner/ Later</del> <del>Certain/ Uncertain</del> <del>Positive/ Negative</del>
Concern for exceeding 14hrs onsite	Ventilation Officer opened the 3-4ct regulator faster than what normally be allowed for.	Ventilation change conducted later in day than planned, resulting in change happening on barometric low	<del>Sooner/ Later</del> <del>Certain/ Uncertain</del> <del>Positive/ Negative</del>

## 13 APPENDIX: CHANGE ANALYSIS

Normal Practice	Situation or practice at the time of the incident	Gap (difference)	Impact of Difference
Ventilation change is scheduled during barometer high	Ventilation change was conducted during the barometer low	At the time of the ventilation change background methane was more elevated that during a barometer high	General body concentrations of CH4 exceeding 2.5
Regulator opened slowly when elevated background methane is encountered	Regulator at 3-4 c/t was opened within 5 minutes due to the VO's fatigue management	Ventilation change was conducted quickly not allowing for the gas to dilute	General body concentrations of CH4 exceeding 2.5
Mine ventilation system	Normal operation	Increased gas make	General body concentrations of CH4 exceeding 2.5%

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