Simtars
Engineering, Testing and Certification Centre

2 Smith Street, REDBANK, QLD 4301, Australia
Postal Address: PO Box 467, GOODNA, QLD, 4300 Australia

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Test Report

Operation of AC Overpressure Switch

Report No:	**NE14/0017**
Date(s) Tested:	07 May 2014
Job No.:	OG172932
Applicant/Customer Name:	Moorvale Mine Peabody Energy Australia PCI (C&M Management) Pty Ltd Peak Downs Highway via Nebo PO Box 193 NEBO QLD 4742
Equipment Details:	**AC Overpressure Switch**
Scope:	**Test the pressures at which the AC Pressure Switch operates and identify possible faults in the AC Pressure Switch**

RTI DL RELEASE - DNRM

Compiled By: sch4p3(3) Prejudice the protecti
G Ross **Date: 21/5/2014**

Approved Signatory: B. Parmar **Date: 21/5/2014**

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1.0 Scope

Simtars was requested by Peabody Energy Australia to test the operation of a Pressure Switch and to identify faults in the Pressure Switch attached to the AC Compressor.

2.0 Description of Apparatus

The Pressure Switch fitted to the compressor displayed no legible markings which identified the brand, part number or operating pressure. The pressure switch is approximately 60 mm long x 22 mm in diameter and utilises two wires for the electrical connection. Refer to the identifying photos on page 3.

3.0 Test Specification

The Pressure Switch was initialled tested as supplied by Peabody Energy Australia and as removed from the compressor unit in the Calibration Laboratory, firstly on a Druck DPI605 Pressure Calibrator and then on the high pressure test unit with a calibrated 0 to 2500 kPa test gauge fitted in order to observe and record the pressure applied. A digital multimeter was attached to the two wires and the meter set to continuity test in order to observe the electrical operation of the pressure switch. The pressure was raised gradually and the observations recorded. The Pressure Switch when fitted to the high pressure test unit was cycled through the test pressures three times to confirm the observations.

After completion of the initial tests the Pressure Switch conductors were examined and it was found that both conductors were damaged and broken inside the protective shroud of the switch. Electrical connections were then made directly onto the internal electrical connections and the pressure switch was retested on the high pressure test unit as per the initial test and the observations recorded.

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4.0 Observations

Tables 1 and 2 detail the observations on the operation of the Pressure Switch when tested as supplied by the client. Table 3 details the observations on the operation of the Pressure Switch when tested with the meter connections made inside the connector housing directly onto the internal electrical connections.

Table 1: Druck Calibrator

Pressure Applied kPa	Electrical Circuit Closed/Open	Audible Operation
0	Open	No
150.48	Open	No
511.52	Open	No
853.32	Open	No
1010.65	Open	No
1216.9	Open	No
0	Open	No

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Table 2: High Pressure Test Unit

Pressure Applied kPa	Electrical Circuit Closed/Open	Audible Operation
0	Open	No
2200 - ascending	Open	Yes
1400 - descending	Open	Yes

Table 3: High Pressure Test Unit

Pressure Applied kPa	Electrical Circuit Closed/Open	Audible Operation
0	Closed	No
2200 - ascending	Open	Yes
1400 - descending	Closed	Yes

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5.0 Summary of Observations

The Pressure Switch as supplied by Peabody Energy Australia operated mechanically and an audible click could be heard when the pressure reached 2200 kPa and again at 1400 kPa when the pressure was gradually reduced. There was no change in the electrical continuity of the Pressure Switch regardless of the pressure applied with the switch remaining open circuited.

After initial testing was completed the Pressure Switch wires were examined for damage and it was found that both the electrical conductors had been damaged by either vibration and or corrosion to the point that no electrical circuit was present. This damage was located in an area inside the terminal housing and accordingly protected by the terminal housing. When electrical connections were made directly to the internal terminals of the Pressure Switch, the Pressure Switch operated at the pressures indicated in Table 3.



Damaged Conductors



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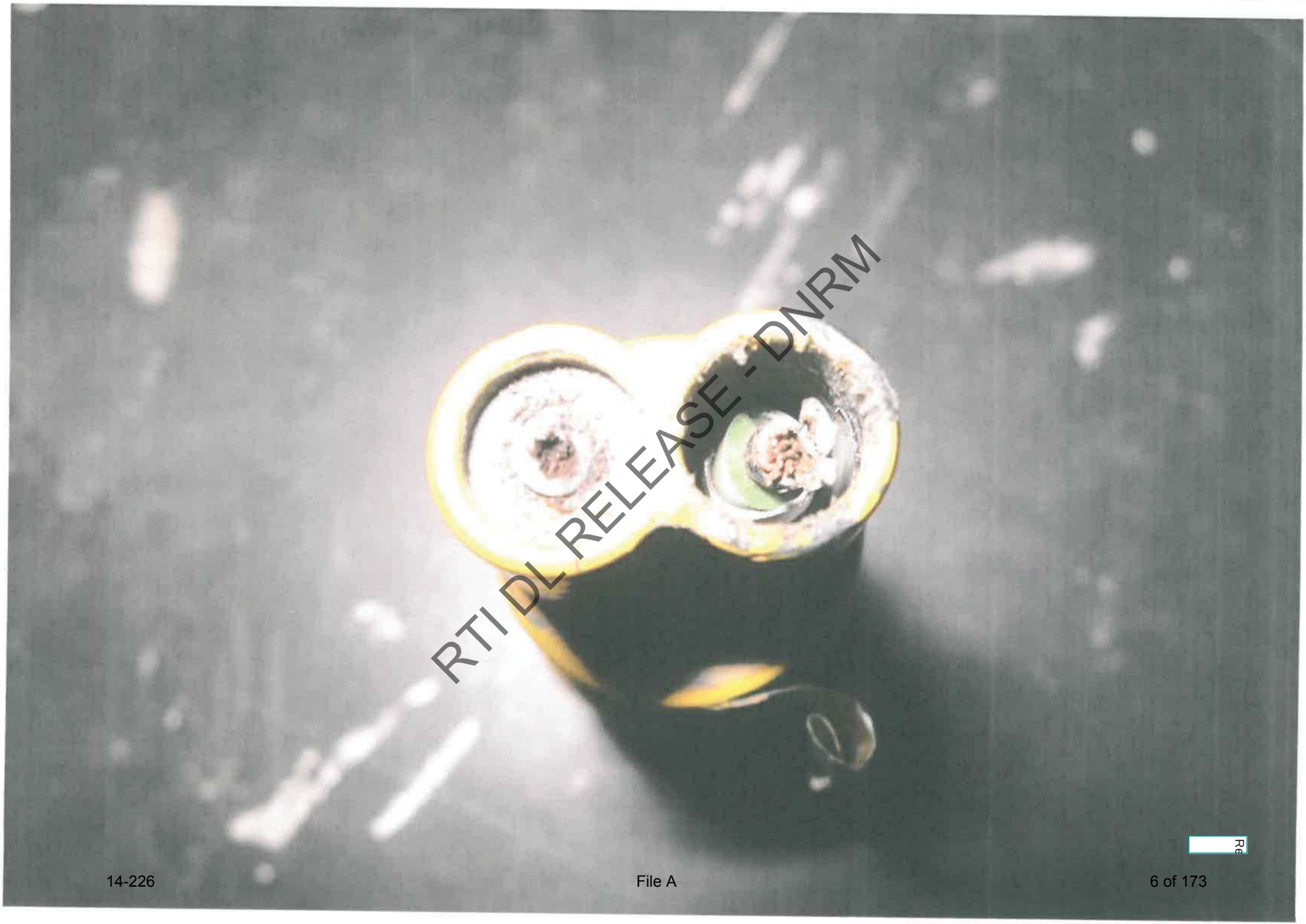


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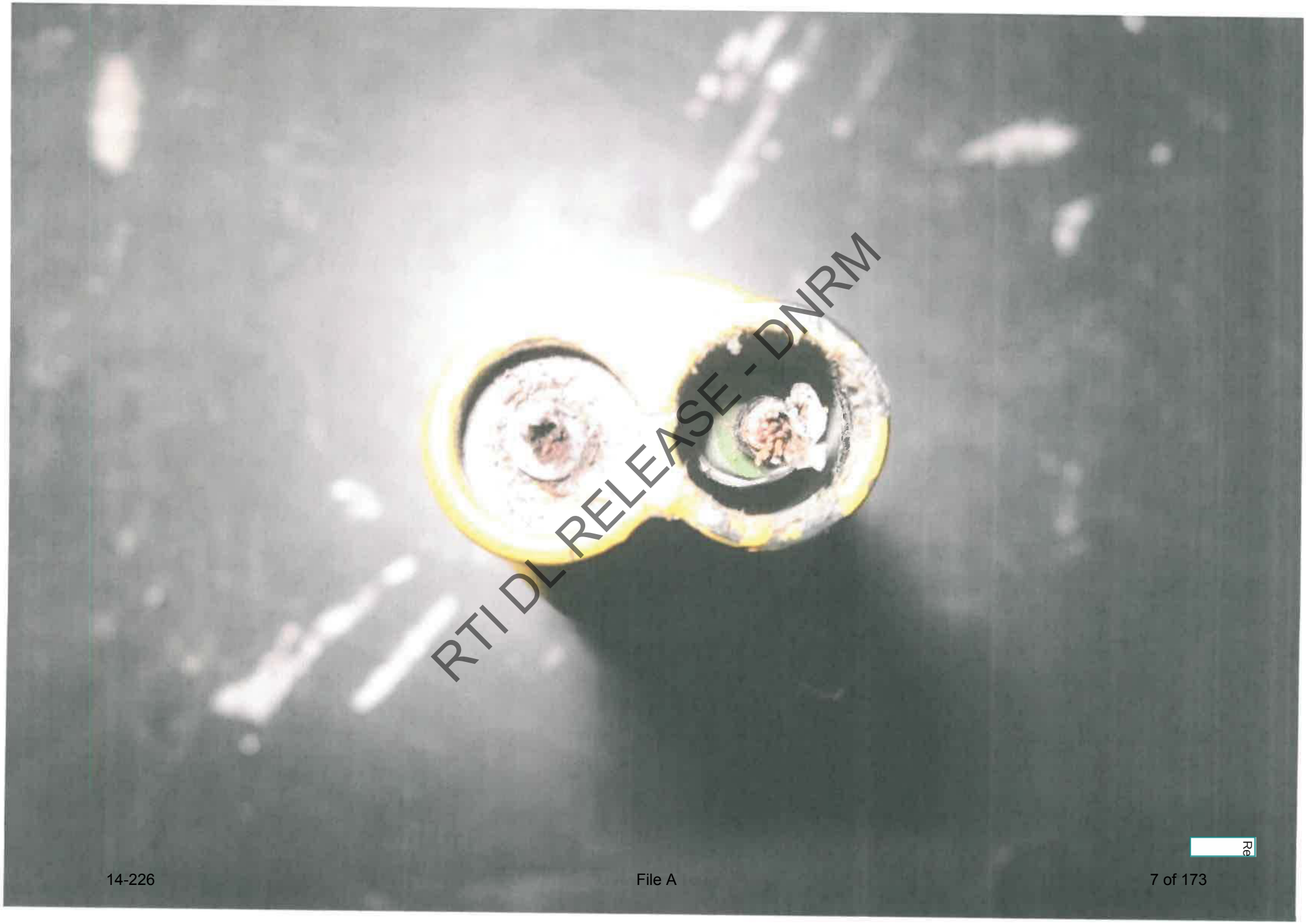


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Moorvale Coal

Identification of Receiver Drier

The label on the receiver drier was cleaned with distilled water to expose the printed writing. The label was old and damaged and as such could not be fully deciphered. What was discernible is as below.

- RD6159 (Receiver/drier part number)
- Southern Cro.....to Electric.

The photos below were taken after cleaning.







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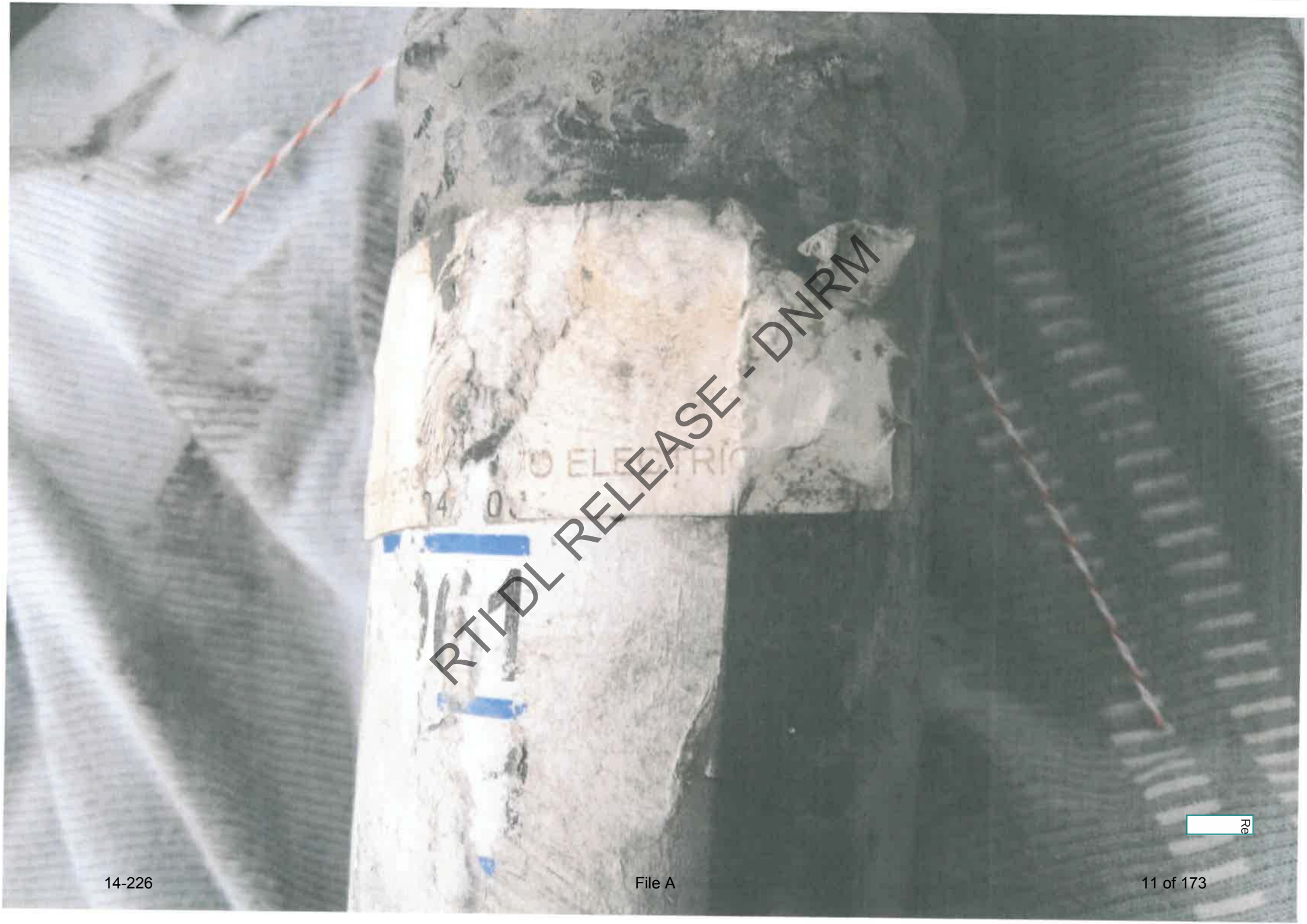
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MOORVALE MINE

PEABODY ENERGY AUSTRALIA PCI (C&M MANAGEMENT) PTY LTD

ABN: 65 077 890 932

Peak Downs Highway via Nebo
PO Box 193
Nebo, Queensland 4742
Australia

Greg Manthey
Principle Occupational Health & Hygiene Specialist
SIMTARS
2 Smith Street
Redbank QLD 4301

Moorvale Mine- Testing of Air-Conditioning Components

We refer to your discussions with myself Lamont.

1. Background

1.1 As discussed, Peabody Energy Australia PCI (C&M Management) Pty Ltd (**Peabody**) has arranged for components of an air-conditioning system (**Components**) to be delivered to SIMTARS. The collection and packaging of the Components was witnessed by Whanau White from SIMTARS (Mackay office) on 8 April 2014.

1.2 Peabody requests that SIMTARS conduct a forensic examination of the Components and the oil and gases trapped within them as outlined in this letter.

2. Objective

2.1 The objective of the forensic examination of the Components is to:

(a) obtain residues of gas (1) and oil (2) in conjunction with the process of recovering residue from within the Components;

(b) such recovered residues to be subject to testing:

(i) gas testing

- to identify any residue of gas within the Components
- to identify same and report

(ii) oil testing

- to identify any residue of oil within the Components
- to identify same and report

(c) identify faults in the pressure switch included in the Components; and

(d) attempt if possible to recover identification markings on remnant white label on receiver dryer included within the Components and report on same.

3. Testing and reporting

3.1 Disconnect pressure switch included in the Components to test considerations of faults/ failure and report.

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Release

3.2 Should oil or gas residues be identified in the Components, consider and report on:

(a) physical parameters of same;

(b) ignition points/ temperature, open flame and piloted;

(c) vapour pressure;

(d) flammability criteria;

(e) physical characteristics of combustion;

(f) likelihood of residues remaining in ambient / atmosphere; and

(g) any other points of considered pertinent to combustion of same.

4. Additional testing

Peabody would appreciate it if SIMTARS would advise whether it has the capacity to conduct tests of samples to consider presence of coal particulates.

5. Timeframes

We would also appreciate it if you could provide us with an indication on the likely timeframe for completion of the above steps.

Yours sincerely

sch4p3(3) Prejudice the protec

Brett Lamont

Mine Services Superintendent

Moorvale Mine

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1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name HYCHILL MINUS 10

Synonym(s) HR12 - MANUFACTURER'S CODE • HR12 REFRIGERANT GAS (FORMERLY) • HYDROCARBON BLEND • MINUS 30 • MINUS 30 (HR12) REFRIGERANT GAS (FORMERLY) • MINUS 30 REFRIGERANT GAS (FORMERLY) • MINUS 30EC • MINUS 40 • MINUS 50

1.2 Uses and uses advised against

Use(s) REFRIGERANT

1.3 Details of the supplier of the safety data sheet

Supplier name HYCHILL AUSTRALIA PTY LTD
Address 85A Canterbury Road, Kilsyth, Victoria, Australia, 3137
Telephone (03) 9728 5055
Fax (03) 9761 8799
Email info@hychill.com.au
Website http://www.hychill.com.au

1.4 Emergency telephone number(s)

Emergency (03) 9728 5055

2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS (GHS ONLY) ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

Risk phrases None allocated
Safety phrases None allocated

Refer to section 11: Toxicological Information

Other Hazards

No information provided.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS number	EC number	Content
ETHANE	74-84-0	200-814-8	>5%
ISOBUTANE	75-28-5	200-857-2	>35%
PROPANE	74-98-6	200-827-9	<60%
BUTANE	106-97-8	203-448-7	<1%
ETHYL MERCAPTAN	75-08-1	200-837-3	0.0025%

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4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye Cold burns: Immediately flush with tepid water or with sterile saline solution. Hold eyelids apart and irrigate for 15 minutes. Seek medical attention.

Inhalation If inhaled, remove from contaminated area. To protect rescuer, use an Air-line respirator or Self Contained Breathing Apparatus (SCBA). Be aware of possible explosive atmospheres. Apply artificial respiration if not breathing. Give oxygen if available.

Skin Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30°C) for 15 minutes. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in warm water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.

Ingestion Ingestion is not considered a potential route of exposure.

First aid facilities No information provided.

4.2 Most important symptoms and effects, both acute and delayed

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility / consciousness. Victim may not be aware of asphyxiation. In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination.

Release

4.3 Immediate medical attention and special treatment needed

Treat for asphyxia and cold burns.

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Stop flow of gas if safe to do so, such as by slowly closing the cylinder valve. If the gas source cannot be isolated, do not extinguish the flame, since re-ignition and explosion could occur. Await arrival of emergency services or manufacturer's advisor. Drench and cool cylinders with water spray from protected area at a safe distance. If it is absolutely necessary to extinguish the flame, use only a dry chemical powder extinguisher. Do not move cylinders for at least 24 hours. Avoid shock and bumps to cylinders.

5.2 Special hazards arising from the substance or mixture

Highly flammable. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, mobile phones etc. when handling. May evolve carbon oxides when heated to decomposition.

5.3 Advice for firefighters

Temperatures in a fire may cause cylinders to rupture and internal pressure relief devices to be activated. Cool cylinders or containers exposed to fire by applying water from a protected location. Do not approach cylinders or containers suspected of being hot. This material is capable of forming explosive mixtures in air.

5.4 Hazchem code

2YE

2	Water Fog (or fine water spray if fog unavailable)
Y	Self Contained Breathing apparatus and protective gloves.
E	Evacuation of people in the vicinity of the incident should be considered.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation. Eliminate ignition sources. Consider the risk of potentially explosive
atmospheres.

6.2 Environmental precautions

Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3 Methods of cleaning up

Carefully move material to a well ventilated remote area, then allow to discharge if safe to do so. Do not attempt to repair leaking valve or cylinder safety devices.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

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7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Do not drag, drop, slide or roll cylinders. The uncontrolled release of a gas under pressure may cause physical harm. Use a suitable hand truck for cylinder movement.

7.2 Conditions for safe storage, including any incompatibilities

Do not store near sources of ignition or incompatible materials. Cylinders should be stored below 45°C in a secure area, upright and restrained to prevent cylinders from falling. Cylinders should also be stored in a dry, well ventilated area constructed of non-combustible material with firm level floor (preferably concrete), away from areas of heavy traffic and emergency exits.

7.3 Specific end use(s)

No information provided.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

Release

Product name HYCHILL MINUS 10

Substance	Reference	TWA		STEL	
		ppm	mg/m³	ppm	mg/m³
Butane	SWA (AUS)	800	1900	–	–
Ethane	SWA (AUS)	Asphyxiant			
Ethyl mercaptan	SWA (AUS)	0.5	1.3	–	–
Isobutane	SWA (AUS)	1000	–	–	–
Propane	SWA (AUS)	Asphyxiant			

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls

Engineering Controls Provide suitable ventilation to minimise or eliminate exposure. Confined areas (eg. tanks) should be adequately ventilated or gas tested. Maintain vapour levels below the recommended exposure standard.

PPE

Eye/Face Wear safety glasses.

Hand Wear leather or insulated gloves.

Body Wear safety boots.

Respiratory Where an inhalation risk exists, wear Self Contained Breathing Apparatus (SCBA) or an Air-line respirator.



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9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	GAS (STORED UNDER PRESSURE IN LIQUID FORM)
Odour	ROTTEN CABBAGE-LIKE ODOUR
Odour Threshold	NOT AVAILABLE
pH	NOT AVAILABLE
Melting Point	NOT AVAILABLE
Boiling Point	-30 to 0°C
Flash Point	-104°C to 60°C
Evaporation Rate	NOT AVAILABLE
Flammability	HIGHLY FLAMMABLE
Upper Explosion Limit	9.5 %
Lower Explosion Limit	1.9 %
Vapour Pressure	490 kPa @ 20°C
Vapour Density	1.5 - 2.0 (Air = 1)
Solubility (water)	SLIGHTLY SOLUBLE
Partition Coefficient	NOT AVAILABLE
Autoignition Temperature	460°C to 470°C (Approximately)
Decomposition Temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive Properties	NOT AVAILABLE
Oxidising Properties	NOT AVAILABLE
Specific Gravity	0.53 (Approximately)

9.2 Other information

% Volatiles	100 %

Release

10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information in sections 10.2 to 10.6.

10.2 Chemical stability

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization will not occur.

10.4 Conditions to avoid

Avoid shock, friction, heavy impact, heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

Incompatible with oxidising agents (eg. hypochlorites), acids (eg. nitric acid), heat and ignition sources. Do not use natural rubber flexible hoses. Also incompatible (potentially violently) with oxygen, halogens and metal halides.

10.6 Hazardous decomposition products

This material will not decompose to form hazardous products other than that already present.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Health hazard summary	Asphyxiant. Symptoms of exposure are directly related to displacement of oxygen. As the amount of oxygen inhaled is reduced from 21-14% volume, the pulse rate may accelerate and the rate and volume of breathing may increase. The ability to maintain attention and think clearly is diminished, muscular co-ordination is somewhat disturbed. As oxygen decreases from 14-10% volume, judgement becomes faulty, severe injuries may result in no pain. Muscular effort may lead to rapid fatigue. Further reduction to 6% may result in nausea and vomiting. Ability to move may be lost. Permanent brain damage may result even after resuscitation from exposure to this low level of oxygen. Below 6% breathing is in gasps and convulsions may occur. Inhalation of a mixture containing no oxygen may result in unconsciousness from the first breath and death may follow in minutes.
Eye	Direct contact with evaporating liquid may result in cold burns, similar to frostbite injury, with possible permanent damage.
Inhalation	Asphyxiant. Effects are proportional to oxygen displacement. Acts as a simple asphyxiant by displacing oxygen in the lungs thereby diminishing the supply of oxygen to the blood and tissues.
Skin	Direct contact with the liquefied material or escaping compressed gas may cause cold burns similar to frostbite injury.
Ingestion	Ingestion is considered unlikely due to product form.
Toxicity data	PROPANE (74-98-6) LC50 (Inhalation): > 800000 ppm/15M (rat) BUTANE (106-97-8) LC50 (Inhalation): 658000 mg/m3/4H (rat) ETHYL MERCAPTAN (75-08-1) LC50 (Inhalation): 2770 ppm/4 hours (mouse) LD50 (Ingestion): 682 mg/kg (rat) LD50 (Intraperitoneal): 226 mg/kg (rat)

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12. ECOLOGICAL INFORMATION

12.1 Toxicity
No information provided.

12.2 Persistence and degradability
No information provided.

12.3 Bioaccumulative potential
No information provided.

12.4 Mobility in soil
No information provided.

12.5 Results of PBT and vPvB assessment
No information provided.

12.6 Other adverse effects
No information provided.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal	Cylinders should be returned to the manufacturer or supplier for disposal of contents.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE



	Land Transport (ADG)	Sea Transport (IMDG/IMO)	Air Transport (IATA/ICAO)
14.1 UN number	1075	1075	1075
14.2 UN proper shipping name		PETROLEUM GASES, LIQUEFIED	
14.3 Transport hazard classes			
DG division	2.1	2.1	2.1
Subsidiary risk(s)	None Allocated	-	-
14.4 Packing group	None Allocated	-	-
14.5 Environmental hazards		None Allocated	
14.6 Special precautions for user			
Hazchem Code	2YE		
EMS		F-D, S-U	

Other information Ensure cylinder is separated from driver and that outlet of relief device is not obstructed.

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Poison schedule	A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).
Classifications	None allocated

Inventory listing(s)

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Product name HYCHILL MINUS 10

AUSTRALIA: AICS (Australian Inventory of Chemical Substances)
All components are listed on AICS, or are exempt.

15.2 Chemical safety assessment

No information provided.

16. OTHER INFORMATION

Additional information

APPLICATION METHOD: Gas regulator of suitable pressure and flow rating fitted to cylinder or manifold with low pressure gas distribution to equipment.

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a ChemAlert report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

COLOUR RATING SYSTEM: RMT has assigned all ChemAlert reports a colour rating of Green, Amber or Red for the sole purpose of providing users with a quick and easy means of determining the hazardous nature of a product. Safe handling recommendations are provided in all ChemAlert reports so as to clearly identify how users can control the hazards and thereby reduce the risk (or likelihood) of adverse effects. As a general guideline, a Green colour rating indicates a low hazard, an Amber colour rating indicates a moderate hazard and a Red colour rating indicates a high hazard.

While all due care has been taken by RMT in the preparation of the Colour Rating System, it is intended as a guide only and RMT does not provide any warranty in relation to the accuracy of the Colour Rating System. As far as is lawfully possible, RMT accepts no liability or responsibility whatsoever for the actions or omissions of any person in reliance on the Colour Rating System.

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Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
GHS	Globally Harmonized System
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
PEL	Permissible Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
REACH	Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Report Status

This ChemAlert report has been independently compiled by RMT's scientific department utilising the original Safety Data Sheet ('SDS') for the product provided to RMT by the manufacturer. The information is based on the latest chemical and toxicological research and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. It is an independent

Releas

Product name **HYCHILL MINUS 10**

collation by RMT of information obtained from the original SDS for this product. Its content has not been authorised or verified by the manufacturer / distributor of the chemical to which it relates.

This ChemAlert report does not constitute the manufacturer's original SDS and is not intended to be a replacement for same. It is provided to subscribers of ChemAlert as a reference tool only, is not all-inclusive and does not represent any guarantee as to the properties of the product. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer.

While RMT has taken all due care to include accurate and up-to-date information in this ChemAlert report, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this ChemAlert report.

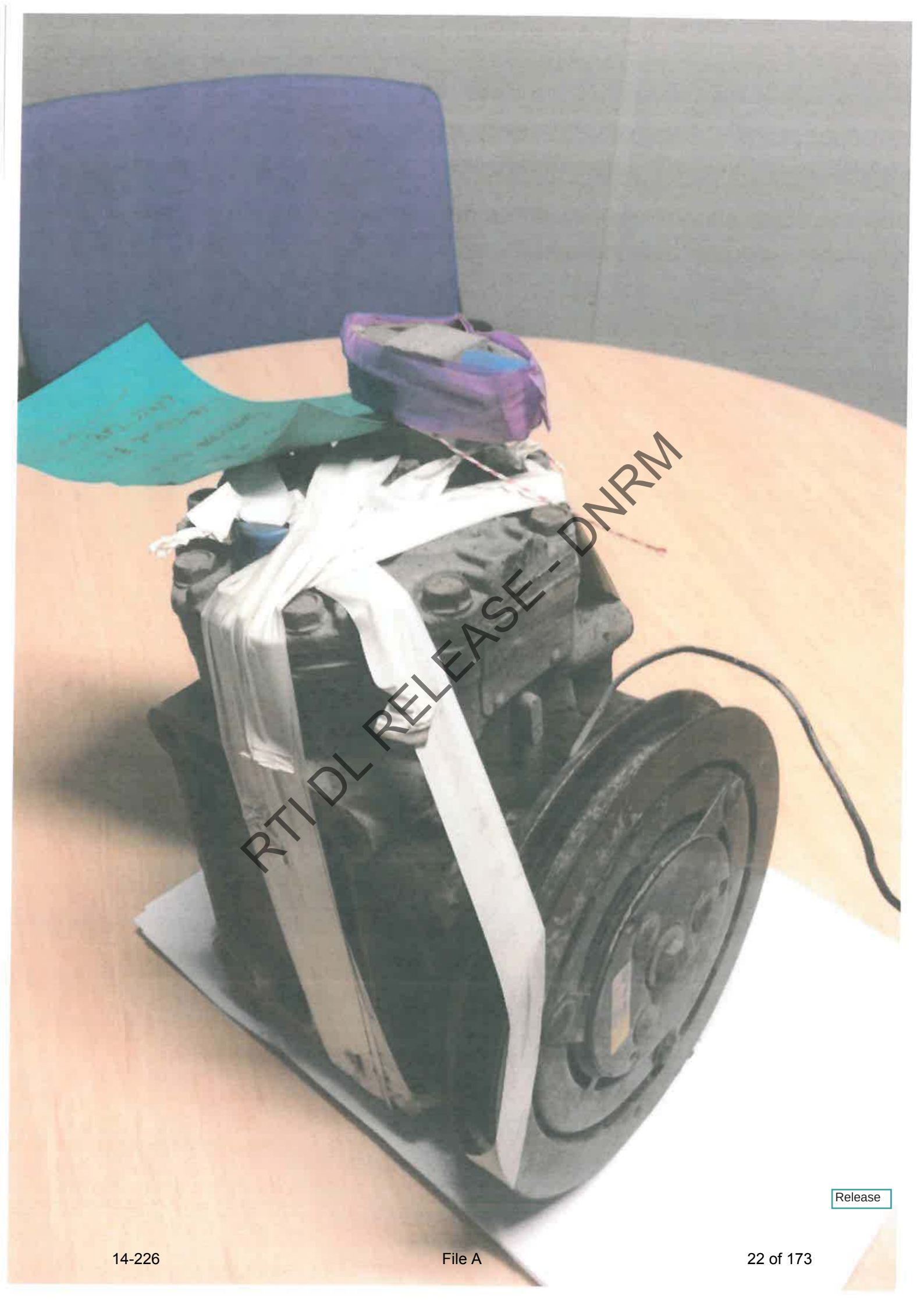
Prepared By

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Last Reviewed: 21 Jun 2013
Date Printed: 15 Apr 2014
Based on SDS dated: 03 Oct 2012

End of Report

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LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Friday, 6 June 2014 5:37 PM
To: 'Lamont, Brett W'
Cc: 'david.pass@health.qld.gov.au'; MULLER Sean; FORRESTER Lauren
Subject: FW: Compressor Oil Testing

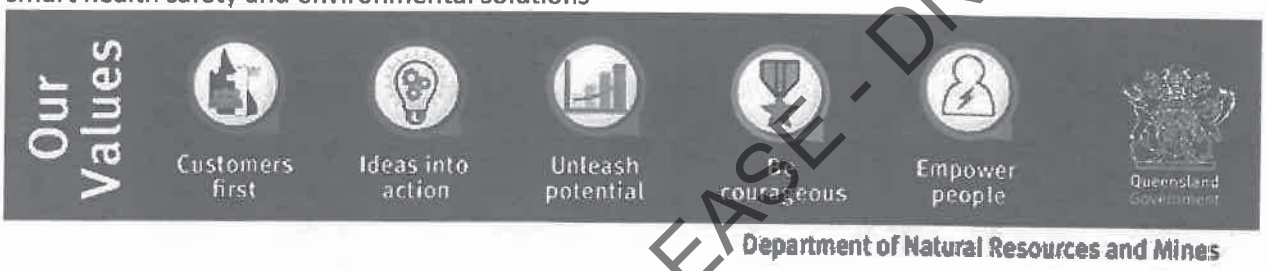
Brett,

Just following up on the e-mail below. Do you want me to proceed with the oil testing?

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388 | M +61 sch4p3(3) Preju | greg.manthey@simtars.com.au | www.simtars.com.au

smart health safety and environmental solutions



RTI DL RELEASE - DNRM

From: MANTHEY Greg
Sent: Monday, 2 June 2014 11:00 AM
To: 'Lamont, Brett W'
Cc: 'david.pass@health.qld.gov.au'; MULLER Sean; FORRESTER Lauren; HOLLYER Jeremy
Subject: Compressor Oil Testing

Brett,

I have contacted Queensland Health Forensic and Scientific Services and David Pass from that laboratory has had a look at the compressor. David thinks that a sample of oil could be recovered and tested for LPG-type gases. David was cautious however as to the likelihood of recovery as there is uncertainty over the solubility of the propane / butane gases in the oil.

I have also spoken to Wayne from NB Industries. The compressor has been sealed since recovery by NB Industries from site and the 'head-space' in the compressor may hold residual gas that was dissolved in the oil and has subsequently evaporated. Wayne indicated that there should also be around 100mL of oil in the compressor reservoir.

The testing that Qld Health would do will include analysis for butane and iso-butane, the presence of which would suggest a flammable gas in the refrigerant. It will also include tetrafluroethane which is the component in the R134a non-flammable refrigerant. The presence of this would suggest a non-flammable refrigerant.

There are two options that we could follow:

- Extraction and analysis of the gas from the head-space in the compressor,
- Drain oil from the compressor and test.

Costs

- Qld Health have indicated cost for their analysis of around $900 + GST,
- Simtars costs would be in the order of $600 + GST which includes delivery of samples to and coordination of Qld Health analysis.

With regard to the fan motor, David's opinion was that there was no likelihood of successful recovery of oil from the fan blades.

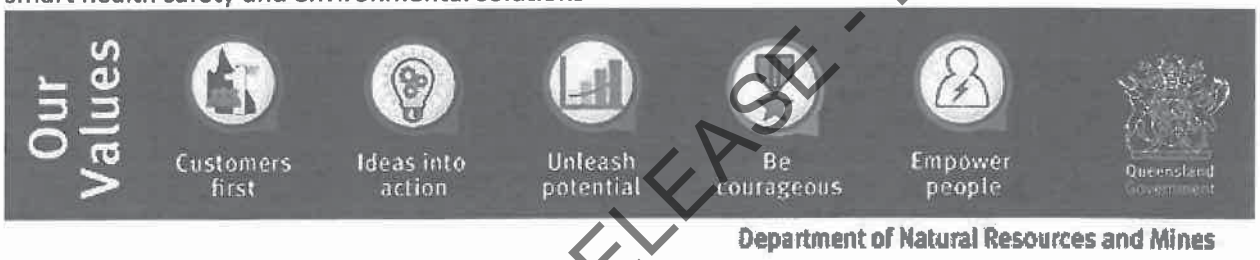
Brett - With your approval, I will arrange for:

1. Extraction of head-space gas sample - analysis by Simtars for natural gases and analysis by Qld Health which will include butane / iso-butane and tetrafluroethane.
2. Extraction of oil sample from compressor – analysis by Qld Health for dissolved gases, which I believe would include butane / iso-butane and tetrafluroethane.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388 | M +61 sch4p3(3) Preju greg.manthey@simtars.com.au | www.simtars.com.au

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RTI DL RELEASE - DNRM

LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Thursday, 1 May 2014 10:03 AM
To: BRENNAN Tabitha (Tabitha.Brennan@simtars.com.au)
Subject: FW: Moorvale Coal - Collection of Gas Cylinders

Tab,

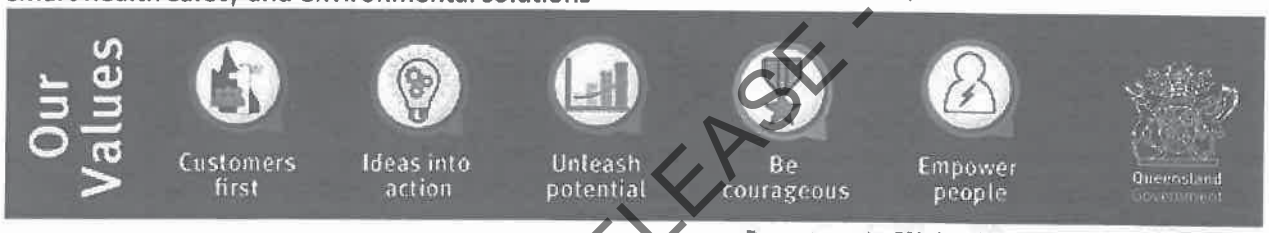
Good for collection when ever it suits you. I spoke to Wayne. There is no oil sample to collect, just the two cylinders.

Thanks

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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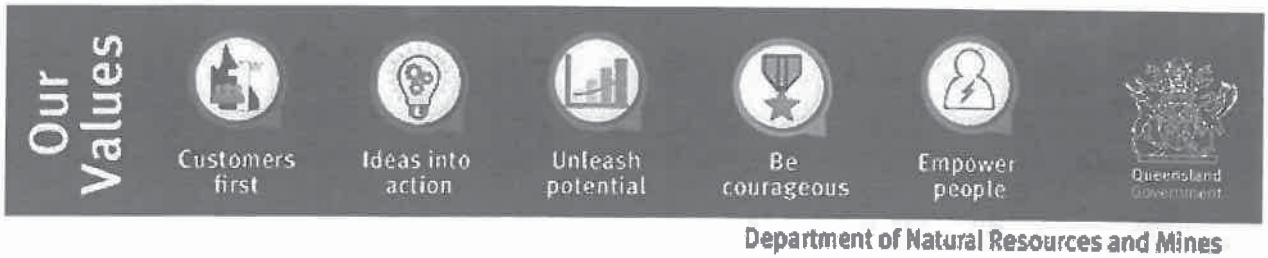
From: CONNOR Leanne
Sent: Thursday, 1 May 2014 10:01 AM
To: MANTHEY Greg
Subject: RE: Moorvale Coal - Collection of Gas Cylinders

Thanks

Leanne Connor
Administration Officer | Simtars

Department of Natural Resources and Mines
169 Sydney Street Mackay Qld 4740 | PO Box 453 Mackay Qld 4740 Australia
T +61 7 4999 5300 | F +61 7 4999 5301 | leanne.connor@simtars.com.au | www.simtars.com.au

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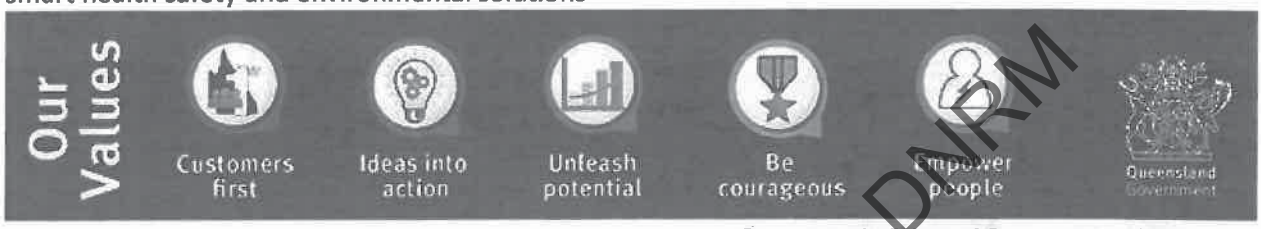
From: MANTHEY Greg
Sent: Thursday, 1 May 2014 9:49 AM
To: CONNOR Leanne
Subject: RE: Moorvale Coal - Collection of Gas Cylinders

8101533 (MST Gas Group)

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
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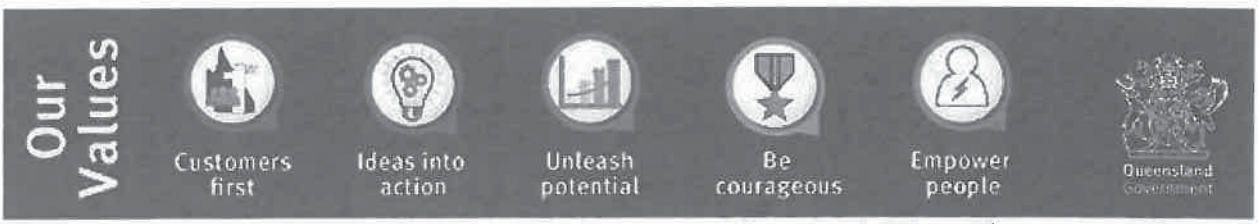
From: CONNOR Leanne
Sent: Thursday, 1 May 2014 9:28 AM
To: MANTHEY Greg
Subject: RE: Moorvale Coal - Collection of Gas Cylinders

Ok thanks. Do you know what cost centre I need to charge these to?

Leanne Connor
Administration Officer | Simtars

Department of Natural Resources and Mines
169 Sydney Street Mackay Qld 4740 | PO Box 453 Mackay Qld 4740 Australia
T +61 7 4999 5300 | F +61 7 4999 5301 | leanne.connor@simtars.com.au | www.simtars.com.au

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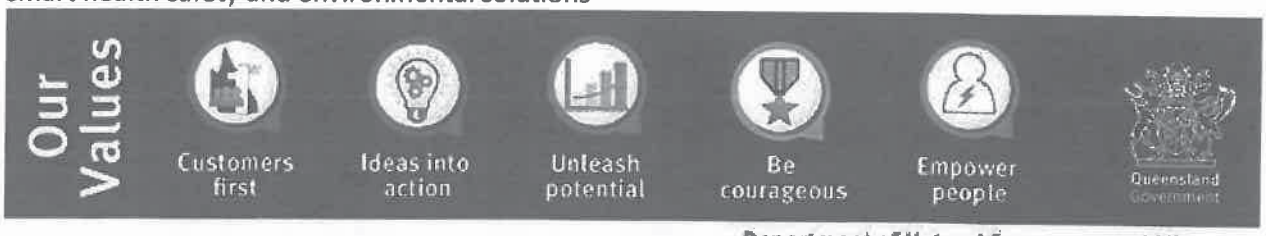
From: MANTHEY Greg
Sent: Thursday, 1 May 2014 9:24 AM
To: CONNOR Leanne
Subject: RE: Moorvale Coal - Collection of Gas Cylinders

Not as far as I am aware. The cylinders are empty (under vacuum) so no toxic or flammable contents.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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From: CONNOR Leanne
Sent: Thursday, 1 May 2014 9:23 AM
To: MANTHEY Greg
Subject: RE: Moorvale Coal - Collection of Gas Cylinders

Hello Greg

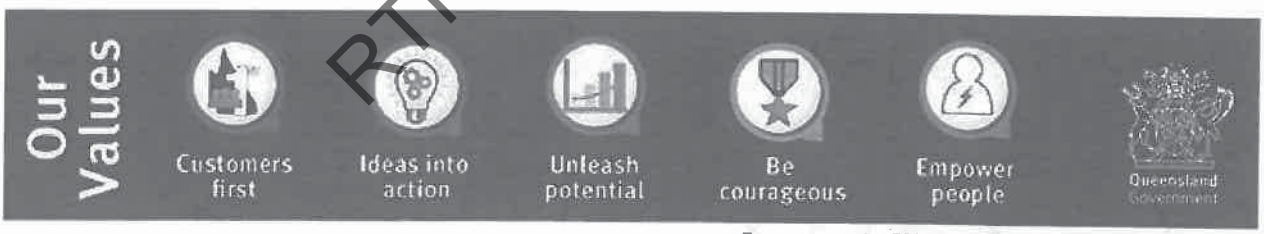
Do you know if there are any special requirements to freight these cylinders?

Thanks

Leanne Connor
Administration Officer | Simtars

Department of Natural Resources and Mines
169 Sydney Street Mackay Qld 4740 | PO Box 453 Mackay Qld 4740 Australia
T +61 7 4999 5300 | F +61 7 4999 5301 | leanne.connor@simtars.com.au | www.simtars.com.au

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RTI DL RELEASE - DNRM

From: MANTHEY Greg
Sent: Wednesday, 30 April 2014 5:15 PM
To: SimtarsMackay
Subject: Moorvale Coal - Collection of Gas Cylinders

Dear Mackay,

There is an Air Conditioning Contractor providing me with a couple of gas cylinders for an investigation job. They are based in Mackay and I need someone to collect the cylinders from them and then freight them to me at Redbank.

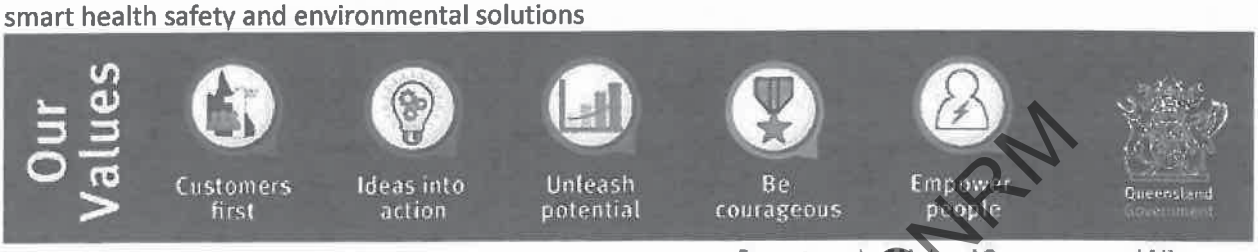
The contractors are NB Industries – Steve on sch4p3(3) Prejudice Can you please assist me.

Thanks,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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Department of Natural Resources and Mines

RTI DL RELEASE - DNRM

LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Monday, 14 April 2014 10:05 AM
To: TURNER David (DNRM); LYNCH Patrick; FORRESTER Lauren; MULLER Sean; Darren Brady (darren@minesafetyinstitute.com.au)
Cc: Tayler, Craig (craig.tayler@deedi.qld.gov.au)
Subject: FW: Moorvale Coal - Refrigerant Testing
Attachments: 20140409 Instructions to Simtars.pdf

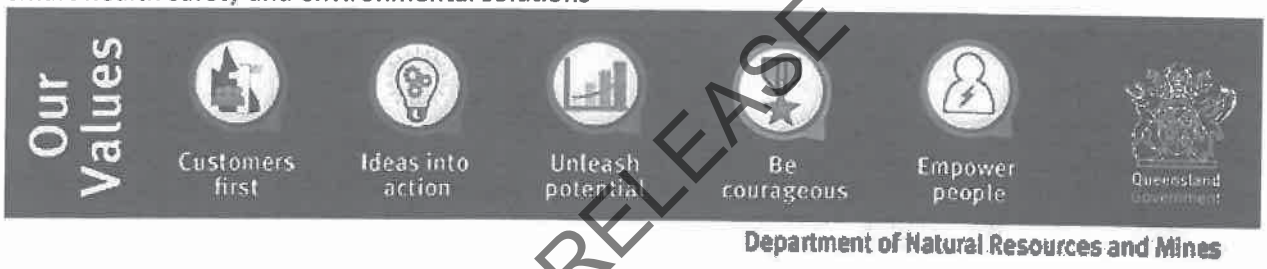
All – if you are available, can we please get together some time today to discuss these items. They are currently sitting in the Occ Hygiene equipment room.

Craig – Yes, that's my stuff on your bench. (sorry....Matt's bench) The two cylinders are mine also.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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RTI DL RELEASE - DNRM

From: MANTHEY Greg
Sent: Monday, 14 April 2014 9:52 AM
To: 'Lamont, Brett W'
Cc: WINTER Matthew
Subject: RE: Moorvale Coal - Refrigerant Testing

Brett,

Items arrived here Friday and I am arranging a meeting of the different analytical sections later today to evaluate the sampling strategy.

Your Letter of Instruction included some unexpected analysis requests, namely the switch and label aspects which we had not previously discussed. I am looking into these with our Electrical Testing branch and will advise our capacity to undertake this part as soon as they have had opportunity to look at the equipment.

With regard to the fan, this can be forwarded in a similar manner to the compressor and receiver / dryer. Ensure that the target surfaces that may be contaminated such as the fan blades are handled as little as possible.

Can you please provide a contact number for the air conditioning technicians / contractor that you used for the removal of the components. I will get in touch with them to assist us to access the internals of the parts you have sent.

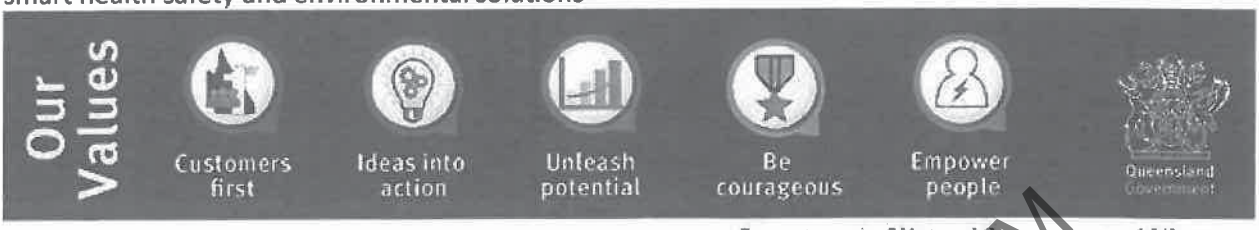
I will also get in touch with the inspectorate and advise them of timing here in order to alleviate pressure on you from that source.

Regards,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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From: Lamont, Brett W [mailto:BLamont@peabodyenergy.com]
Sent: Monday, 14 April 2014 7:41 AM
To: MANTHEY Greg
Subject: FW: Moorvale Coal - Refrigerant Testing

Good Morning Greg,

As per my email and Letter of Instructions of Wednesday 9 April, could you please advise as to the date we could expect some dates for results. This is to allow us to indicate to the Inspectorate how long we need to complete the investigation, not hold SIMTARS to a date. I would also rather err on the side of caution as I would rather not have to re-apply for an extension to the investigation.

In addition to the samples already provided, we are also considering sending a fan that was down-line from the identified failure point. This fan may have some oil residue on the blades and in involved in pushing the air into the drill rig cabin. Could you please advise as to the best methodology for us to send the fan to SIMTARS.

Thanking you in advance,

Brett Lamont.

From: Lamont, Brett W
Sent: Wednesday, 9 April 2014 10:58 AM
To: 'MANTHEY Greg'
Subject: RE: Moorvale Coal - Refrigerant Testing

Good Morning Greg,

Please find attached our letter of instructions around the testing of the samples obtained yesterday as part of our drill investigation. Could you please assist by providing an outline of when we could expect to see the testing results?

Please do not hesitate to contact me if you have any questions.

Thanking you in advance,

RTI DL RELEASE - DNRM

Brett W Lamont.

From: MANTHEY Greg [mailto:Greg.Manthey@simtars.com.au]
Sent: Monday, 7 April 2014 8:40 AM
To: Lamont, Brett W
Cc: BRENNAN Tabitha; LYNCH Patrick; FORRESTER Lauren; TAYLER Craig; WINTER Matthew
Subject: Moorvale Coal - Refrigerant Testing

Brett,

Good morning. Below is a summary of the project and discussions here regarding the sampling / testing process.

- A field technician from Simtars Mackay is planned to arrive at Moorvale prior to 10:00 a.m. today to liaise with Atlas Copco during the removal of sections of a drill rig air conditioning plant which may have contributed to an incident in the rig. The incident is believed to have involved the ignition of flammable gas within the cabin of the rig. There is the possibility that the gas may have originated from the refrigerant section of the air conditioning plant. The incident occurred on or around 28th March.
- Sections of the air conditioning plant will be freighted to Simtars Redbank where we will evaluate the potential for sampling and analysis of residual refrigerant, either as a gas or as a dissolved fraction in condenser / compressor oils.
- We will seek to sample and analyse for:
  - LPG analytes,
  - Natural gases,
  - Halogens,
  - Mercaptans

As was discussed on Friday last week, at this point it is not clear what testing will be possible and so the project is proceeding on an hourly-rate basis plus incurred costs. Peabody Moorvale hold an account with Simtars so all I would ask is your confirmation of the ex-GST rates below. If you would like to reference a particular purchase order number, please advise.

Principal Hygienist / Principal Scientist – project management / sample evaluation	$209 / hr
Senior Chemist / Senior Hygienist – sample analysis evaluation and oversight	$180 / hr
Hygiene Technician – collection of sample, travel, freighting activities	$167 / hr
Incurred costs – vehicle costs, freight charges etc	

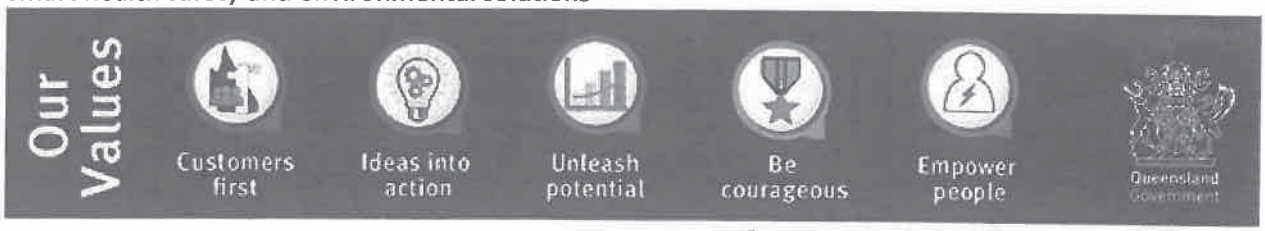
Once the unit is received at Simtars, we will provide a formal quote for any sampling and analysis that is proposed.

Regards,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388 | M +6 sch4p3(3) Prejudi | greg.manthey@simtars.com.au | www.simtars.com.au

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MOORVALE MINE

PEABODY ENERGY AUSTRALIA PCI (C&M MANAGEMENT) PTY LTD

ABN: 65 077 890 932

Peak Downs Highway via Nebo
PO Box 193
Nebo, Queensland 4742
Australia

Greg Manthey
Principle Occupational Health & Hygiene Specialist
SIMTARS
2 Smith Street
Redbank QLD 4301

Moorvale Mine- Testing of Air-Conditioning Components

We refer to your discussions with myself Lamont.

1. Background

1.1 As discussed, Peabody Energy Australia PCI (C&M Management) Pty Ltd (**Peabody**) has arranged for components of an air-conditioning system (**Components**) to be delivered to SIMTARS. The collection and packaging of the Components was witnessed by Whanau White from SIMTARS (Mackay office) on 8 April 2014.

1.2 Peabody requests that SIMTARS conduct a forensic examination of the Components and the oil and gases trapped within them as outlined in this letter.

2. Objective

2.1 The objective of the forensic examination of the Components is to:

(a) obtain residues of gas (1) and oil (2) in conjunction with the process of recovering residue from within the Components;

(b) such recovered residues to be subject to testing:

(i) gas testing

- to identify any residue of gas within the Components
- to identify same and report

(ii) oil testing

- to identify any residue of oil within the Components
- to identify same and report

(c) identify faults in the pressure switch included in the Components; and

(d) attempt if possible to recover identification markings on remnant white label on receiver dryer included within the Components and report on same.

3. Testing and reporting

3.1 Disconnect pressure switch included in the Components to test considerations of faults/ failure and report.

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Release

3.2 Should oil or gas residues be identified in the Components, consider and report on:

(a) physical parameters of same;

(b) ignition points/ temperature, open flame and piloted;

(c) vapour pressure;

(d) flammability criteria;

(e) physical characteristics of combustion;

(f) likelihood of residues remaining in ambient / atmosphere; and

(g) any other points of considered pertinent to combustion of same.

4. Additional testing

Peabody would appreciate it if SIMTARS would advise whether it has the capacity to conduct tests of samples to consider presence of coal particulates.

5. Timeframes

We would also appreciate it if you could provide us with an indication on the likely timeframe for completion of the above steps.

Yours sincerely

sch4p3(3) Prejudice the prot

Brett Lamont

Mine Services Superintendent

Moorvale Mine

RTI DL RELEASE - DNRM

LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Thursday, 10 April 2014 9:07 AM
To: WINTER Matthew
Subject: FW: Moorvale Coal - Refrigerant Testing
Attachments: 20140409 Instructions to Simtars.pdf

Matt. Refer attached. This is an interesting development. The Peabody Letter of Instruction includes some testing that had not been mentioned by the client contacts in any of my discussions with them. This includes:

- Testing a pressure switch and identifying faults and failures,
- Recovering identification markings on a damaged label.

I think I will talk to David Turner.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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RTI DL RELEASE - DNRM

From: Lamont, Brett W [mailto:BLamont@peabodyenergy.com]
Sent: Wednesday, 9 April 2014 10:58 AM
To: MANTHEY Greg
Subject: RE: Moorvale Coal - Refrigerant Testing

Good Morning Greg,

Please find attached our letter of instructions around the testing of the samples obtained yesterday as part of our drill investigation. Could you please assist by providing an outline of when we could expect to see the testing results?

Please do not hesitate to contact me if you have any questions.

Thanking you in advance,

Brett W Lamont.

From: MANTHEY Greg [mailto:Greg.Manthey@simtars.com.au]
Sent: Monday, 7 April 2014 8:40 AM
To: Lamont, Brett W
Cc: BRENNAN Tabitha; LYNCH Patrick; FORRESTER Lauren; TAYLER Craig; WINTER Matthew
Subject: Moorvale Coal - Refrigerant Testing

Brett,

Good morning. Below is a summary of the project and discussions here regarding the sampling / testing process.

- A field technician from Simtars Mackay is planned to arrive at Moorvale prior to 10:00 a.m. today to liaise with Atlas Copco during the removal of sections of a drill rig air conditioning plant which may have contributed to an incident in the rig. The incident is believed to have involved the ignition of flammable gas within the cabin of the rig. There is the possibility that the gas may have originated from the refrigerant section of the air conditioning plant. The incident occurred on or around 28th March.
- Sections of the air conditioning plant will be freighted to Simtars Redbank where we will evaluate the potential for sampling and analysis of residual refrigerant, either as a gas or as a dissolved fraction in condenser / compressor oils.
- We will seek to sample and analyse for:
  - LPG analytes,
  - Natural gases,
  - Halogens,
  - Mercaptans

As was discussed on Friday last week, at this point it is not clear what testing will be possible and so the project is proceeding on an hourly-rate basis plus incurred costs. Peabody Moorvale hold an account with Simtars so all I would ask is your confirmation of the ex-GST rates below. If you would like to reference a particular purchase order number, please advise.

Principal Hygienist / Principal Scientist – project management / sample evaluation	$209 / hr
Senior Chemist / Senior Hygienist – sample analysis evaluation and oversight	$180 / hr
Hygiene Technician – collection of sample, travel, freighting activities	$167 / hr
Incurred costs – vehicle costs, freight charges etc	

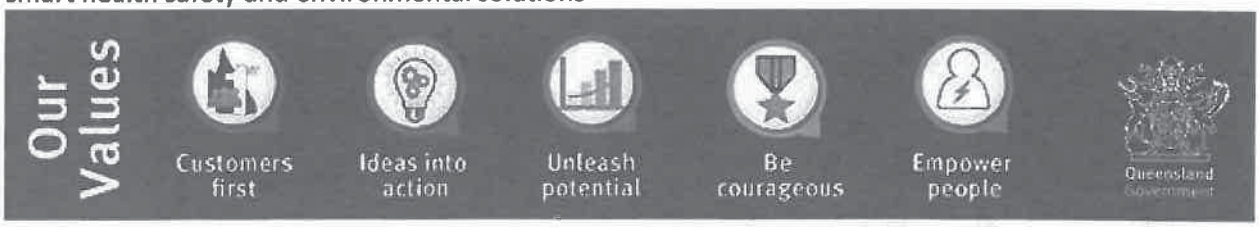
Once the unit is received at Simtars, we will provide a formal quote for any sampling and analysis that is proposed.

Regards,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Thursday, 10 April 2014 9:06 AM
To: TURNER David (DNRM)
Cc: WINTER Matthew; FORRESTER Lauren; MULLER Sean; LYNCH Patrick
Subject: FW: Moorvale Coal - Refrigerant Testing
Attachments: 20140409 Instructions to Simtars.pdf; Morevale Coal - Air Conditioning Plant Investigation

David,

See e-mails below and the attached letter from Peabody. This is one that you have not previously been involved in as it was expected to be just a Gas Group and OHECC Lab analysis. However the client has unexpectedly asked for additional testing that we do not do over this side of the compound. I thought I would get your input before talking to the client.

Background is in the attached e-mail.

Over and above the testing we do, client has asked for:

- Testing a pressure switch and identifying faults and failures,
- Recovering identification markings on a damaged label.

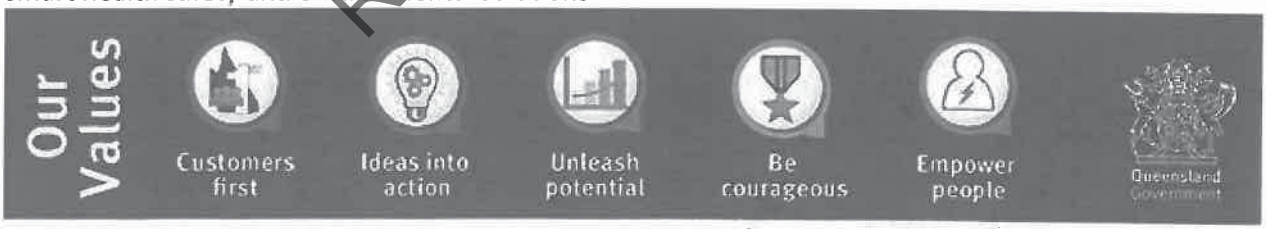
Can your guys do this?

Pat / Lauren / Sean – For info on the testing that client has specifically detailed.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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Department of Natural Resources and Mines

From: Lamont, Brett W [mailto:BLamont@peabodyenergy.com]
Sent: Wednesday, 9 April 2014 10:58 AM
To: MANTHEY Greg
Subject: RE: Moorvale Coal - Refrigerant Testing

Good Morning Greg,

Please find attached our letter of instructions around the testing of the samples obtained yesterday as part of our drill investigation. Could you please assist by providing an outline of when we could expect to see the testing results?

RTI DL RELEASE - DNRM

Please do not hesitate to contact me if you have any questions.

Thanking you in advance,

Brett W Lamont.

From: MANTHEY Greg [mailto:Greg.Manthey@simtars.com.au]
Sent: Monday, 7 April 2014 8:40 AM
To: Lamont, Brett W
Cc: BRENNAN Tabitha; LYNCH Patrick; FORRESTER Lauren; TAYLER Craig; WINTER Matthew
Subject: Moorvale Coal - Refrigerant Testing

Brett,

Good morning. Below is a summary of the project and discussions here regarding the sampling / testing process.

- A field technician from Simtars Mackay is planned to arrive at Moorvale prior to 10:00 a.m. today to liaise with Atlas Copco during the removal of sections of a drill rig air conditioning plant which may have contributed to an incident in the rig. The incident is believed to have involved the ignition of flammable gas within the cabin of the rig. There is the possibility that the gas may have originated from the refrigerant section of the air conditioning plant. The incident occurred on or around 28th March.
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  - Natural gases,
  - Halogens,
  - Mercaptans

As was discussed on Friday last week, at this point it is not clear what testing will be possible and so the project is proceeding on an hourly-rate basis plus incurred costs. Peabody Moorvale hold an account with Simtars so all I would ask is your confirmation of the ex-GST rates below. If you would like to reference a particular purchase order number, please advise.

Principal Hygienist / Principal Scientist – project management / sample evaluation	$209 / hr
Senior Chemist / Senior Hygienist – sample analysis evaluation and oversight	$180 / hr
Hygiene Technician – collection of sample, travel, freighting activities	$167 / hr
Incurred costs – vehicle costs, freight charges etc	

Once the unit is received at Simtars, we will provide a formal quote for any sampling and analysis that is proposed.

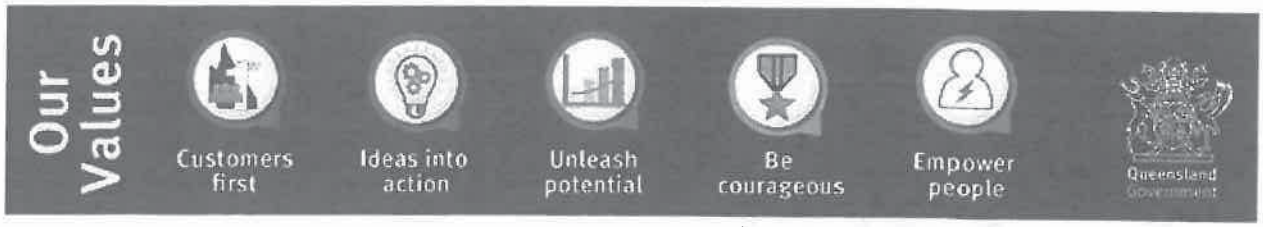
Regards,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388 | M +61 sch4p3(3) Preju greg.manthey@simtars.com.au | www.simtars.com.au

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Release

LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Thursday, 3 April 2014 2:27 PM
To: LYNCH Patrick; FORRESTER Lauren; Darren Brady
Cc: WINTER Matthew; TAYLER Craig; BRENNAN Tabitha; VANZANTEN Deborah
Subject: Morevale Coal - Air Conditioning Plant Investigation

All,

I have just spoken to Brett Lamont from Peabody who is the lead investigator at Morevale in this matter. Seems there was a fire in a blasting drill rig and they suspect that a contributing factor was a flammable refrigerant gas in the rig's air con system. Refrigerant gases are supposed to be non-flammable. Senior Gas Inspector Graham Rasmussen has indicated to Morevale that they should get Simtars to analyse the air conditioning unit to identify what was in the refrigerant. Relevant issues are:
- the refrigerant may have contained propane, iso-butane or similar
- the company that last re-gassed the unit seems to have lost their records on what gas was used (surprise!)
- the air con unit appears to have been damaged during the incident and the bulk of the refrigerant has vented to atmosphere,
- there may be some residual refrigerant (as a gas) in the dryer unit or other piping or the residual may be dissolved in the air con compressor oil,
- I don't know much about these systems but it would seem to me that the refrigerant is not likely to have contaminated the compressor oil reservoir but more likely there could be residual compressor oil in the refrigerant circuit. That could be the contaminated oil they are talking about,
- Atlas Copco (the original supplier of the unit) and a fire investigator are going to be on site Monday and Tuesday next week to inspect the damaged unit and as part of this exercise, Peabody are asking Copco to remove the unit, bag it and send to us for examination.
- Peabody want to ensure a very tight Chain of Custody and so they want someone from Simtars there to observe the removal, packing and freighting process,
- we will be able to get guidance from Atlas Copco on where in the unit the residual refrigerant may be hiding. Our task will be extraction and analysis, but it may be present as a gas or an oil-based contaminant
- the gas inspectors who attended site specifically recommended that Peabody use Simtars, so we should not lightly turn this job down.
- Brett Lamont would like someone from Simtars there for the whole of Monday and Tuesday even though the packing is probably only taking place Tuesday.
- both sch4p3(3 and [redacted] are away until next week so I can't really discuss this with them, given that [redacted] not there either.

Pat - the critical factor in this is the analysis. I am confident we can sample appropriately provided we know how the analysis is to be done. Can you please consider the best sampling approach and advise.

Darren - any thoughts on the gas capture and analysis aspect in the absence of [redacted] and [redacted]? Gas bag and analysis for natural gases seems obvious, but I would need to check the MSDS of the suspected refrigerant.

Matt / Craig / Deb - I may need a hand organising his one. Chances are [redacted] not be there tomorrow either.

Greg Manthey
Principal Occupational Hygienist
Simtars
Phone: (07)38106364
Mobile: [redacted]

RTI DL RELEASE - DNRM

Sent from my iPhone

RTI DL RELEASE - DNRM

Release

LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Friday, 2 May 2014 7:37 AM
To: TURNER David (DNRM)
Subject: FW: Moorvale Coal - Refrigerant Testing
Attachments: 20140409 Instructions to Simtars.pdf

David,

I think I might have sent you this earlier on, but here is the instruction from the client regarding the testing.

The parts that relate to ETCC testing are Items 2.1 (c) & (d).

I have the condenser in my office and will bring it over when you get in. ***NOTE:*** the condenser contains some residual oil which we may need to test at a later time. Please avoid any loss of oil from the unit during your testing.

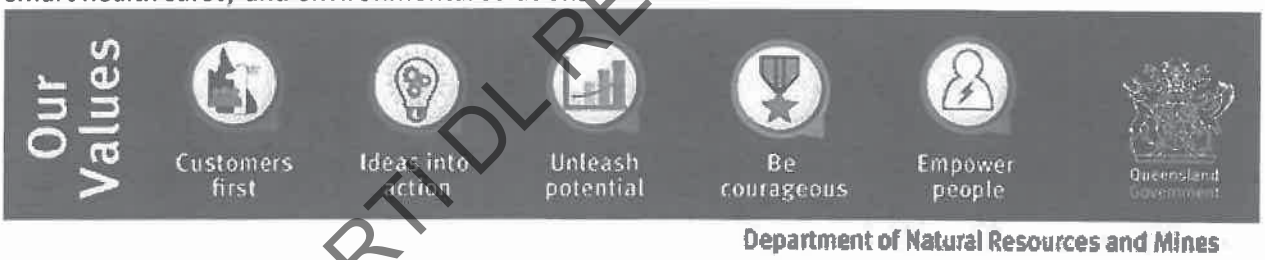
Please call me when you get in.

Thanks,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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| M +61 sch4p3(3) Preju | greg.manthey@simtars.com.au | www.simtars.com.au

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From: Lamont, Brett W [mailto:BLamont@peabodyenergy.com]
Sent: Wednesday, 9 April 2014 10:58 AM
To: MANTHEY Greg
Subject: RE: Moorvale Coal - Refrigerant Testing

Good Morning Greg,

Please find attached our letter of instructions around the testing of the samples obtained yesterday as part of our drill investigation. Could you please assist by providing an outline of when we could expect to see the testing results?

Please do not hesitate to contact me if you have any questions.

Thanking you in advance,

Brett W Lamont.

From: MANTHEY Greg [mailto:Greg.Manthey@simtars.com.au]
Sent: Monday, 7 April 2014 8:40 AM
To: Lamont, Brett W
Cc: BRENNAN Tabitha; LYNCH Patrick; FORRESTER Lauren; TAYLER Craig; WINTER Matthew
Subject: Moorvale Coal - Refrigerant Testing

Brett,

Good morning. Below is a summary of the project and discussions here regarding the sampling / testing process.

- A field technician from Simtars Mackay is planned to arrive at Moorvale prior to 10:00 a.m. today to liaise with Atlas Copco during the removal of sections of a drill rig air conditioning plant which may have contributed to an incident in the rig. The incident is believed to have involved the ignition of flammable gas within the cabin of the rig. There is the possibility that the gas may have originated from the refrigerant section of the air conditioning plant. The incident occurred on or around 28th March.
- Sections of the air conditioning plant will be freighted to Simtars Redbank where we will evaluate the potential for sampling and analysis of residual refrigerant, either as a gas or as a dissolved fraction in condenser / compressor oils.
- We will seek to sample and analyse for:
    - LPG analytes,
    - Natural gases,
    - Halogens,
    - Mercaptans

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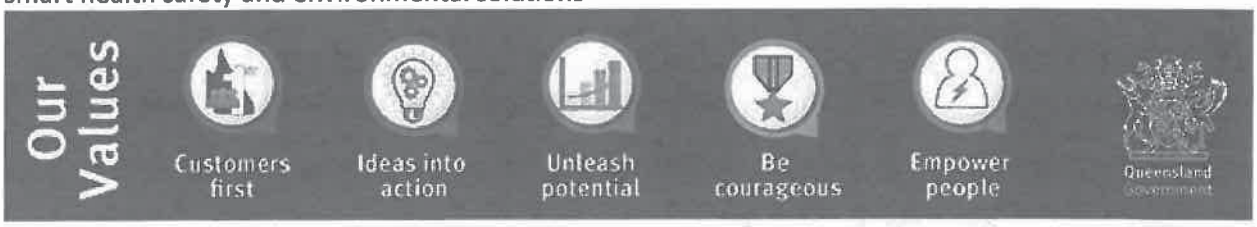
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Regards,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388 | M +61 sch4p3(3) Prejud greg.manthey@simtars.com.au | www.simtars.com.au

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Release

LANG Jennifer (Admin Review)

From: FORRESTER Lauren
Sent: Friday, 22 August 2014 3:01 PM
To: MULLER Sean
Cc: MANTHEY Greg
Subject: FW: Moorvale Coal Report

Sean,

As below, you sent the report email to Brett so will need to save it in the electronic file.

Regards,

Lauren Forrester
Analytical Chemist | Simtars

Department of Natural Resources and Mines
2 Robert Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia
T +61 7 3810 6389 | F +61 7 3810 6388 | M +61 sch4p3(3) Prejudic
lauren.forrester@simtars.com.au | www.simtars.com.au

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From: MANTHEY Greg
Sent: Friday, 22 August 2014 2:58 PM
To: FORRESTER Lauren
Subject: Moorvale Coal Report

Lauren,

Can you please put a copy of the report e-mail you sent to Brett Lamont into the electronic file.

Thanks,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388
| M +61 | greg.manthey@simtars.com.au | www.simtars.com.au

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Release

LANG Jennifer (Admin Review)

From: TAYLER Craig
Sent: Wednesday, 2 April 2014 12:32 PM
To: MANTHEY Greg
Cc: VANZANTEN Deborah
Subject: FW: Morevale coal sampling

Importance: High

Greg
Will discuss this with you when you are in next.

After discussion with Darren Brady in regards to Moranbah sampling late last year I thought that gas issues were to be handled by MST. Sampling can be done by hygiene staff if required but determination of what is to be sampled, how and analysed to would fall into the realm of gas group as they are the experts in this.

At this stage there has been no real input from gas group on this issue

Cheers

Craig Tayler
Senior Occupational Hygienist| Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia
T +61 7 3810 6349 | F +61 7 3810 6366 | M +61 sch4p3(3) Prej | craig.tayler@simtars.com.au | www.simtars.com.au

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From: BRENNAN Tabitha
Sent: Wednesday, 2 April 2014 11:47 AM
To: FORRESTER Lauren
Cc: CHAND Venita; MANTHEY Greg; TAYLER Craig; VANZANTEN Deborah
Subject: RE: Morevale coal sampling
Importance: High

Hi Lauren,
Unfortunately I am unavailable to respond to this request as I will not be in the office. Could you please contact Brett Lamont and determine the requirements of the request.

I have not supplied any quotes with the limited information received, nor do I have the resources to be able to conduct the suggested sampling within the allotted time.

In my absence, please liaise with Deb or Craig as there will not be any staff in the Mackay office as of 12:00.

Thanks, Tab.

Tabitha Brennan
Health Safety & Environmental Scientist | Simtars

Department of Natural Resources and Mines
169 Sydney Street Mackay Qld 4740 | PO Box 453 Mackay Qld 4740 Australia
T +61 7 4999 5300 | F +61 7 4999 5301 | tabitha.brennan@simtars.com.au | www.simtars.com.au

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From: FORRESTER Lauren
Sent: Wednesday, 2 April 2014 11:08 AM
To: MANTHEY Greg; BRENNAN Tabitha
Subject: Morevale coal sampling

Hi Guys,

I have had a call from Brett Lamont at Morevale. They have tried to track down the composition of the refrigerant but this is a dead end, apparently their contractor doesn't have very good maintenance records. So they want and need to go ahead with the sampling, they will have the inspectorate on site tomorrow so they are keen to show that they are investigating this thing properly.

Greg – FYI only at this stage, sch4p3(3) Prejudice the protection of an individuals right to privacy and I don't know when I will see you next.

Tabitha – are you able to give Brett a call and start the ball rolling on this, I don't know what has been communicated to him in way of a quote or anything like that. They will want to know when you can get out there to do the sampling. Let me know if I can help with anything else.

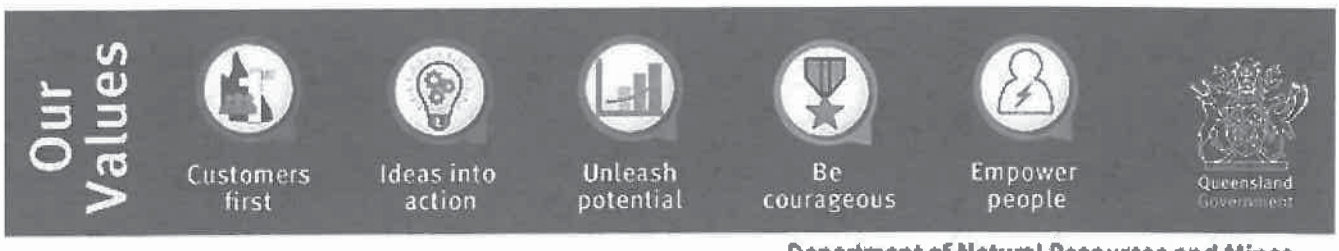
Brett Lamont
[redacted]
blamont@peabodyenergy.com

Regards,

Lauren Forrester
Analytical Chemist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia
T +61 7 3810 6389 | F +61 7 3810 6388 | M +61 [redacted]
| lauren.forrester@simtars.com.au| www.simtars.com.au

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LANG Jennifer (Admin Review)

From: Lamont, Brett W <BLamont@peabodyenergy.com>
Sent: Tuesday, 27 May 2014 6:10 PM
To: MANTHEY Greg
Subject: FW: Simtars PO 451421991 - Drill Pro Gas testing

Good Afternoon Greg,

The PO for the lab testing is 451421991.

Regards,

Brett W Lamont
Mine Production Superintendent

Phone: 61 7 4847 1451
Mobile: 61 (0 sch4p3(3) Prejudice

From: Belani, Katharina
Sent: Tuesday, 27 May 2014 5:09 PM
To: Lamont, Brett W
Subject: Simtars PO 451421991 - Drill Pro Gas testing

Kind Regards

Katharina Belani
Production Administrator
Moorvale Mine
Peabody Energy Australia

Peak Downs Highway
Via Nebo QLD 4742

Phone: 61 7 4847 1453
Fax: 61 7 4847 1499

PO Box 193
Nebo QLD 4742

KBelani@peabodyenergy.com
www.peabodyenergy.com

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Release

LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Tuesday, 8 April 2014 5:48 PM
To: WINTER Matthew
Subject: Fwd: Moorvale Coal - Refrigerant Testing
Attachments: image001.jpg

FYI

Greg Manthey
Principal Occupational Hygienist
Simtars
Phone: (07)38106364
Mobile: sch4p3(3) Prejudice

Sent from my iPhone

Begin forwarded message:

From: "Lamont, Brett W" <BLamont@peabodyenergy.com>
Date: 8 April 2014 11:27:46 AM AEST
To: MANTHEY Greg <Greg.Manthey@simtars.com.au>
Subject: RE: Moorvale Coal - Refrigerant Testing

Thanks Greg,

We are happy with the process that you are undertaking and thank you and the team for putting together a solution so quickly for us.

Regards,

Brett.

From: MANTHEY Greg [mailto:Greg.Manthey@simtars.com.au]
Sent: Monday, 7 April 2014 8:40 AM
To: Lamont, Brett W
Cc: BRENNAN Tabitha; LYNCH Patrick; FORRESTER Lauren; TAYLER Craig; WINTER Matthew
Subject: Moorvale Coal - Refrigerant Testing

Brett,

Good morning. Below is a summary of the project and discussions here regarding the sampling / testing process.

- A field technician from Simtars Mackay is planned to arrive at Moorvale prior to 10:00 a.m. today to liaise with Atlas Copco during the removal of sections of a drill rig air conditioning plant which may have contributed to an incident in the rig. The incident is believed to have involved the ignition of flammable gas within the cabin of the rig. There is the possibility that the gas may have originated from the refrigerant section of the air conditioning plant. The incident occurred on or around 28th March.
- Sections of the air conditioning plant will be freighted to Simtars Redbank where we will evaluate the potential for sampling and analysis of residual refrigerant, either as a gas or as a dissolved fraction in condenser / compressor oils.
- We will seek to sample and analyse for:

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- LPG analytes,
- Natural gases,
- Halogens,
- Mercaptans

As was discussed on Friday last week, at this point it is not clear what testing will be possible and so the project is proceeding on an hourly-rate basis plus incurred costs. Peabody Moorvale hold an account with Simtars so all I would ask is your confirmation of the ex-GST rates below. If you would like to reference a particular purchase order number, please advise.

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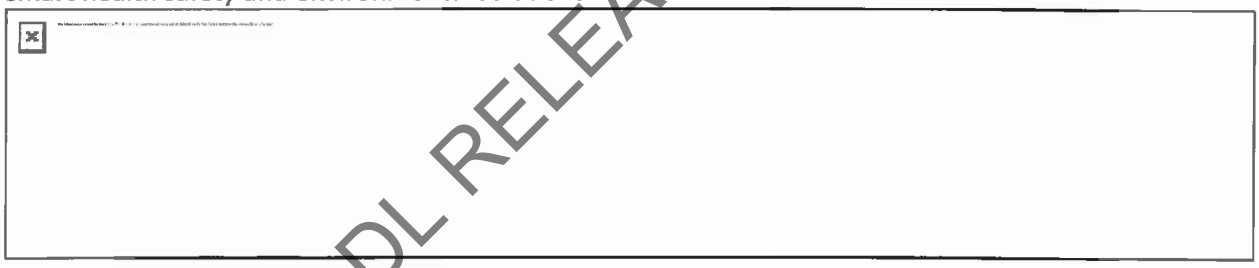
Once the unit is received at Simtars, we will provide a formal quote for any sampling and analysis that is proposed.

Regards,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
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Release

LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Wednesday, 9 April 2014 12:19 PM
To: FORRESTER Lauren; LYNCH Patrick; WINTER Matthew; MULLER Sean; MEAD Bryan
Subject: Fwd: Moorvale Coal - Refrigerant Testing
Attachments: image001.jpg; ATT00001.htm; 20140409 Instructions to Simtars.pdf; ATT00002.htm

All,

See below. Items are on their way from Moorvale.

I would like to get together with you as soon as the items are received to discuss sampling and analysis protocol.

Thanks

Greg Manthey
Principal Occupational Hygienist
Simtars
Phone: (07)38106364
Mobile: sch4p3(3) Prejudic

Sent from my iPhone

Begin forwarded message:

> **From:** "Lamont, Brett W" <BLamont@peabodyenergy.com>
> **Date:** 9 April 2014 10:57:32 AM AEST
> **To:** MANTHEY Greg <Greg.Manthey@simtars.com.au>
> **Subject: RE: Moorvale Coal - Refrigerant Testing**
>
> Good Morning Greg,
>
> Please find attached our letter of instructions around the testing of the samples obtained yesterday as part of our drill investigation. Could you please assist by providing an outline of when we could expect to see the testing results?
>
> Please do not hesitate to contact me if you have any questions.
>
> Thanking you in advance,
>
> Brett W Lamont.
>
> ---
>
> **From:** MANTHEY Greg [mailto:Greg.Manthey@simtars.com.au]
> **Sent:** Monday, 7 April 2014 8:40 AM
> **To:** Lamont, Brett W
> **Cc:** BRENNAN Tabitha; LYNCH Patrick; FORRESTER Lauren; TAYLER Craig; WINTER Matthew
> **Subject:** Moorvale Coal - Refrigerant Testing
>
> Brett,
>
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Principal Occupational Health & Hygiene Specialist | Simtars

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LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Thursday, 3 April 2014 2:47 PM
To: LYNCH Patrick; FORRESTER Lauren; WINTER Matthew; TAYLER Craig; BRENNAN Tabitha; VANZANTEN Deborah; Darren Brady
Subject: Fwd: Morevale Coal - Air Conditioning Plant Investigation

Sorry, I think that anywhere I said "compressor oil" should have said "condenser oil"

Greg Manthey
Principal Occupational Hygienist
Simtars
Phone: (07)38106364
Mobile: sch4p3(3) Prejudic

Sent from my iPhone

Begin forwarded message:

From: <Greg.Manthey@simtars.com.au>
Date: 3 April 2014 2:26:53 PM AEST
To: LYNCH Patrick <Patrick.Lynch@simtars.com.au>, FORRESTER Lauren <Lauren.Forrester@simtars.com.au>, Darren Brady <darren@minesafetyinstitute.com.au>
Cc: WINTER Matthew <Matt.Winter@simtars.com.au>, TAYLER Craig <Craig.Tayler@simtars.com.au>, Tabitha Brennan <Tabitha.Brennan@simtars.com.au>, Deborah Van Zanten <Deborah.VanZanten@simtars.com.au>
Subject: Morevale Coal - Air Conditioning Plant Investigation

All,

I have just spoken to Brett Lamont from Peabody who is the lead investigator at Morevale in this matter. Seems there was a fire in a blasting drill rig and they suspect that a contributing factor was a flammable refrigerant gas in the rig's air con system. Refrigerant gases are supposed to be non-flammable.
Senior Gas Inspector Graham Rasmussen has indicated to Morevale that they should get Simtars to analyse the air conditioning unit to identify what was in the refrigerant. Relevant issues are:
- the refrigerant may have contained propane, iso-butane or similar
- the company that last re-gassed the unit seems to have lost their records on what gas was used (surprise!)
- the air con unit appears to have been damaged during the incident and the bulk of the refrigerant has vented to atmosphere,
- there may be some residual refrigerant (as a gas) in the dryer unit or other piping or the residual may be dissolved in the air con compressor oil,
- I don't know much about these systems but it would seem to me that the refrigerant is not likely to have contaminated the compressor oil reservoir but more likely there could be residual compressor oil in the refrigerant circuit. That could be the contaminated oil they are talking about,
- Atlas Copco (the original supplier of the unit) and a fire investigator are going to be on site Monday and Tuesday next week to inspect the damaged unit and as part of this exercise, Peabody are asking Copco to remove the unit, bag it and send to us for examination.

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- Peabody want to ensure a very tight Chain of Custody and so they want someone from Simtars there to observe the removal, packing and freighting process,
- we will be able to get guidance from Atlas Copco on where in the unit the residual refrigerant may be hiding. Our task will be extraction and analysis, but it may be present as a gas or an oil-based contaminant
- the gas inspectors who attended site specifically recommended that Peabody use Simtars, so we should not lightly turn this job down.
- Brett Lamont would like someone from Simtars there for the whole of Monday and Tuesday even though the packing is probably only taking place Tuesday.
- both sch4p3(3 and [redacted] are away until next week so I can't really discuss this with them, given that [redacted] not there either.

Pat - the critical factor in this is the analysis. I am confident we can sample appropriately provided we know how the analysis is to be done. Can you please consider the best sampling approach and advise.

Darren - any thoughts on the gas capture and analysis aspect in the absence of s78B(2) - and s78B(2) - Per Gas bag and analysis for natural gases seems obvious, but I would need to check the MSDS of the suspected refrigerant.

Matt / Craig / Deb - I may need a hand organising his one. Chances are [redacted] not be there tomorrow either.

Greg Manthey
Principal Occupational Hygienist
Simtars
Phone: (07)38106364
Mobile: [redacted]

Sent from my iPhone

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MATERIAL SAFETY DATA SHEET FOR HyChill HC REFRIGERANTS

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Propane/Isobutane/Ethane blends. (may also contain small amounts of n-butane)
A flammable gas used as refrigerant, normally stored under pressure in liquid form.
Most cylinders or containers are LIQUID SERVICE.
Trade Names: HyChill Minus 10, Minus 30, Minus 30EC, Minus 40 and Minus 50. Systematic Names: Propane/2-Methylpropane/Ethane

LPG Measurement Technology Pty Ltd, A.C.N. 068 745 755
85a Canterbury Rd, KILSYTH Victoria 3137, AUSTRALIA
Phone: (03) 9761 8788 FAX: (03) 9761 8799
EMERGENCY NUMBER: 0418 334 210 (24 hours)

2. HAZARDS IDENTIFICATION

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO NOHSC CRITERIA.
CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

UN No.	1075	**DG Class**	2.1	**Subsidiary Risk(s)**	None Allocated
Hazchem Code	2YE	**EPG**	2A2	**Pkg Group**	None Allocated

3. COMPOSITION / INFORMATION ON INGREDIENTS

			CAS Number
Main Components:	Propane	<60.0%	0074 – 98 – 6
	Isobutane	>35.0%	75 – 28 – 5
	Ethane	>5.0%	74 – 84 – 0
Minor Components:	Butane (normal)	<1.0%	106 – 97 – 8
Odourant:	Ethylmercaptan	Approx 25ppm	75 – 08 – 1

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4. FIRST AID MEASURES - In all cases seek medical attention.

Eye Treatment for cold burns: Immediately flush with tepid water or with sterile saline solution. Hold eyelids apart and irrigate for 15 minutes. Seek medical attention.

Inhalation Remove from area of exposure immediately. Be aware of possible explosive atmospheres. If victim is not breathing apply artificial respiration and seek urgent medical attention. Give oxygen if available. Keep warm and rested.

Skin Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30° C) for 15 minutes. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in warm water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.

Ingestion For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor. Ingestion is considered unlikely due to the product form.

Advice to Doctor Treat symptomatically. Severe inhalation over exposure may sensitise the heart to catecholamine induced arrhythmias. Do not administer catecholamines to an overexposed person.

5. FIRE FIGHTING MEASURES

Flammability Highly flammable. Heating to decomposition produces acrid smoke and irritating fumes. Product will add fuel to a fire. Eliminate all ignition sources including cigarettes, open flames, spark producing switches /tools, heaters, naked lights, pilot lights, mobile phones etc. when handling.

Fire and Explosion Highly flammable. Temperatures in a fire may cause cylinders to rupture and internal pressure relief devices to be activated. Call Fire Brigade. This product will add fuel to a fire. Cool cylinders and vessels exposed to fire by applying water from a protected location and with water spray directing spray primarily onto the upper surface. Do not approach any HyChill HC refrigerant cylinder or container suspected of being hot.

Extinguishing	Stop flow of gas if safe to do so, such as by closing valves. If the gas source cannot be isolated, do not extinguish the flame, since re-ignition and explosion could occur. Await arrival of emergency services. Drench and cool cylinders with water spray from protected area at a safe distance. If it is absolutely necessary to extinguish the flame, use only a dry chemical powder extinguisher. Do not move cylinders for at least 24 hours. Avoid shock and bumps to cylinders. Evacuate the area of persons not fighting the fire. Carbon monoxide fumes may be produced should burning occur within an enclosed space (ie causing a deficiency of oxygen). Fire fighters should wear full protective clothing and be aware of the risk of possible explosion (especially in a confined space). Flashback may occur along vapour trail. Where possible, remove cool cylinders from the path of the fire. Do not re-use a fire-exposed vessel or cylinder – seek advice of supplier.

6. ACCIDENTAL RELEASE MEASURES

Spillage	As this product has a very low flash point any spillage or leak is a fire and/or explosion hazard. If a leak has not ignited, stop gas flow, isolate sources of ignition and evacuate personnel. Note: Most cylinders/containers are LIQUID service. Ensure good ventilation. Liquid leaks generate large volumes of heavier than air flammable vapour which may travel to remote sources of ignition (eg along drainage systems). Where appropriate, use water spray to disperse the gas or vapour and to protect personnel attempting to stop leakage. Vapour may collect in any confined space.
Gas Cylinders	If the cylinder is leaking, eliminate all potential ignition sources and evacuate area of personnel. Inform manufacturer/supplier of leak. Wear appropriate PPE and carefully move to a well ventilated remote area, then allow to discharge. Do not attempt to repair leaking valve or cylinder fusible plugs.

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7. HANDLING AND STORAGE

Precautions for Safe Handling.	Avoid inhalation of vapour. Avoid contact with liquid and cold storage containers. When handling cylinders wear protective footwear and suitable gloves. Always ensure that cylinders are within test date, are fit for use and are leak checked prior to use. Do not fill excessively dented, gouged or rusty containers (refer AS2337.1). Only fill cylinders by mass on verified weighing equipment.. Avoid contact with eyes. Class 2.1 Flammable Gas products may only be loaded in the same vehicle or packed in the same freight container with the classes of products as permitted in the ADG Code (see references). Cylinders shall only be transported in an upright, secure position in accordance with the National Road Transport Commission Load Restraint Guide and shall not be dropped.
Conditions for Safe Storage	Store and use only in equipment/containers designed for use with this product. Store and dispense only in well ventilated areas away from heat and sources of ignition. Do not enter storage tanks. If entry to tanks is necessary, contact the supplier. Containers must be properly labelled. Do not remove warning labels from containers. Cylinders shall be stored in accordance with the requirements of the ADG Code, AS 4332 and AS/NZS1596. Do not store in pits and basements where vapour may collect. Store cylinders securely in an upright position. Store away from incompatible materials particularly oxidising agents. Check that vessels and cylinders are clearly labelled. Do not contaminate cylinders with other products.
Other Information	Product spilt on clothing may give rise to delayed evaporation and subsequent fire hazard. Check for leaks by sound and smell and by locating with soapy water or with approved detection devices. Use only with hoses and gauges designed and approved for refrigerants. Ensure that cylinders cannot be struck by forklift vehicles or by dropped or rolled objects, etc. Refer to Australian state and territory dangerous goods regulations.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation — Maintain adequate ventilation. Confined areas (eg tanks) should be adequately ventilated and gas tested.

Exposure		
	Isobutane	ES-TWA : 1000 ppm (NOHSC AUS)
	PROPANE	ES-TWA : 1000 ppm (NOSHC AUS)
	ETHANE	ES-TWA : 1000 ppm (NOSHC AUS)

PPE





Wear insulated or leather gloves and safety glasses.

Where an inhalation risk exists, wear an Air-line respirator or self Contained Breathing Apparatus (SCBA).

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	COLOURLESS GAS	**Solubility (water)**	0.001cm^3 / cm^3
Odour	Characteristic Odour *	**pH**	NOT AVAILABLE
Liquid Density@ 15°C	>0.50 <0.64 g/cm^3	**Volatility**	Highly Volatile
Vapour Density	NOT AVAILABLE	**Flammability**	HIGHLY FLAMMABLE
Evaporation	Rapid, temperature dependent	**Melting Point**	NOT AVAILABLE
Upper Explosion Limit	≈ 9.5 %	**Lower Explosion Limit**	≈ 1.9 %
Vapour Pressure@25°C	360 - 1006 kPa(g)	**Flash Point**	-104 to 0 °C
Boiling Point	-50 to -10°C	**Autoignition Temperature**	~480°C to ~550°C

*** HyChill has added odourant ethylmercaptan unless otherwise authorised. (recommended 25 ppm). This is detectable to 20% of its lower flammability limit.**

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10. STABILITY AND REACTIVITY

Chemical Stability	Stable under recommended conditions of storage.
Conditions to Avoid	Avoid heat, sparks, open flames and other ignition sources.
Decomposition	Heating to decomposition produces acrid smoke and irritating fumes.

11. TOXICOLOGICAL INFORMATION

Health Hazard Summary — Asphyxiant gas. Symptoms of exposure are directly related to displacement of oxygen from air.

Eye — Non irritating. However, direct contact with evaporating liquid may result in severe cold burns with possible permanent damage.

Inhalation — Non irritating – Asphyxiant. Effects are proportional to oxygen displacement. Low vapour concentrations may cause nausea, dizziness, headaches and drowsiness. May have a narcotic effect if high concentrations of vapour are inhaled. High vapour concentrations may produce symptoms of oxygen deficiency which, coupled with central nervous system depression, may lead to rapid loss of consciousness.

Abuse — Under normal conditions of use the product is non hazardous, however abuse involving deliberate inhalation of very high concentrations of vapour can produce unconsciousness and/or result in a sudden fatality or brain damage.

Skin — Non irritating. Contact with evaporating liquid or supercold vessels or pipes may result in frost-bite with severe tissue damage.

Ingestion — Due to product form, ingestion is considered highly unlikely.

Toxicity Data		
	PROPANE (74-98-6)	LC50 (Inhalation): 50,000 ppm
	ISOBUTANE (75-28-5)	LC50 (Inhalation): 57 pph/15 min (rat)
	ETHANE (74-84-0)	LD50 Rat: > 500-5000 ppm

Release

12. ECOLOGICAL INFORMATION

Environment	No known ecological damage is caused by this product.
Persistence / Degradability	Expected to be inherently biodegradable.
Mobility	No bioconcentration is expected.
Ecotoxicity	Low toxicity to aquatic organisms

13. DISPOSAL CONSIDERATIONS

Waste Disposal	Cylinders should be returned to the manufacturer or supplier for disposal of contents.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

Transport — Transport of Isobutane is controlled in accordance with the requirements of the ADG Code and the Load Restraint Guide.



UN Number	1075	Shipping Name	PROPANE/ISOBUTANE/ETHANE
DG Class	2.1	Subsidiary Risk(s)	None Allocated
Hazchem Code	2YE	Packing Group	None Allocated

15. REGULATORY INFORMATION

AICS — All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

Poison — A poison schedule number has not been allocated to this product using the criteria in Schedule the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP).

16. OTHER INFORMATION

The Australian Code for the Transport of Dangerous Goods by Road and Rail (commonly known as the ADG Code).
Australian Standards as detailed within this document.
AS/NZS 1677 Refrigerating Systems Part 1: Refrigeration classification
AS/NZS 1677 Refrigerating Systems Part 2: Safety requirements for fixed applications
Petroleum and Gas Legislation / Queensland: 2004
The Load Restraint Guide as prepared by the National Transport Commission.
Ozone Protection and Synthetic Greenhouse Gas Management Act 1989.

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Simtars

2 Smith Street Redbank Qld. PO Box 467 Goodna Qld 4300
Ph 38106333 Fax 38106388

Simtars Analysis Request/Chain of Custody

Send Report To:	blamont@peabodyenergy.com
Results Required By:	refer to client
Job Reference:	50/004/0017/29/32
Purchase Order Number:	
Report Format:	Hard [ ] fax [ ] email [ ]
Electronic :	Excel [ ] pdf [ ]
Special Sample Requirement:	

SAMPLE ID	SAMPLE TYPE/MATRIX
Compressor	compressor oil / head-space gas
Receiver / dryer	compressor oil
Fan motor	compressor oil

Total Number of Samples:

CONSIGNMENT DETAILS

Organisation:	Petrolab PVT	Consignment Note:	
Contact:	Paul Bon / Jan Bon	Courier Details:	
Phone/Fax:	08 8364 1500	Date Consigned:	18th June 2014
Address:	45 Woodforde Road, Magill SA 5072.		

ANALYSIS REQUIRED

Please refer to Brett Lamont (Peabody Energy) for directions regarding analysis.
Email - blamont@peabodyenergy.com
Phone - [redacted]

RELINQUISHED BY

NAME:	Greg Manthey	DATE:	18/06/2014
OF:	Simtars		
NAME:		DATE:	
OF:			

RECEIVED BY

NAME:		DATE:	
OF:			
NAME:		DATE:	
OF:			

Laboratory Please fax back signed copy of this custody sheet to consigner laboratory

LE0008 Status Date: 010911 SJ

Page 1 of 1

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LANG Jennifer (Admin Review)

From: Lamont, Brett W <BLamont@peabodyenergy.com>
Sent: Sunday, 20 July 2014 10:46 AM
To: MANTHEY Greg
Subject: Method of Gas Sampling Detection by NB Industries
Attachments: Recovery Procedure Drill Investigation Morvale Mine.pdf

Greg,

Please find attached a stated methodology used to collect the sample of gasses from Drill 12 air-conditioning system. Do you also need an outline of how the trial bottles were handled?

Regards,

Brett W Lamont
Mine Production Superintendent
Moorvale Mine
Peabody Energy Australia

Peak Downs Highway
Via Nebo QLD 4742

Phone: 61 7 4847 1451
Mobile: 61 (0 sch4p3(3) Prejudice

PO Box 193
Nebo QLD 4742

blamont@peabodyenergy.com
www.peabodyenergy.com

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INDUSTRIES

Attention: Deanna McMaster

Date: 27.06.2014

From: Michael Selby

RE: Recovery Procedure of air con gas from Drill Rig Moorvale Mine site.

Machine: Drill Pro Drill Rig Morvale Mine

Hook up both reclaim bottles to vacuum pump and vac them down for 1.5 hours.
Check to find 2 x reclaim bottles are in vacuum for reclaim process.
Pre clean recovery machine and gauges, purge recovery machine and connect to gauge manifold.
Evacuate gauges and recovery machine for a period of 10 minutes on "purge Setting" and 10 minutes on "recover setting".

Connect recovery machine to reclaim cylinder one, place cylinder on scales and recalibrate to zero.
Clean area around Schroeder valves, connect gauges to ac system, open high side valve and recover high side for a period of 10 minutes.
Weight recovered high side approx. 10 grams.

Turn off all high side fittings, remove cylinder one from scales, seal cylinder for sampling and mark cylinder to ID for future reference.

Connect recovery cylinder two to reclaim machine, place cylinder on scales and recalibrate to zero.
Open low side valve and recover low side for a period of 10 minutes.
Weight recovered approx: 0 grams

Turned off all valves remove reclaim machine from system, refitted Schroeder valve caps.
Remove reclaim cylinder two from scales, seal and mark as cylinder two.

Send Cylinders away for Sampling

Michael Selby

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Release

LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Wednesday, 30 April 2014 5:15 PM
To: SimtarsMackay
Subject: Moorvale Coal - Collection of Gas Cylinders

Dear Mackay,

There is an Air Conditioning Contractor providing me with a couple of gas cylinders for an investigation job. They are based in Mackay and I need someone to collect the cylinders from them and then freight them to me at Redbank.

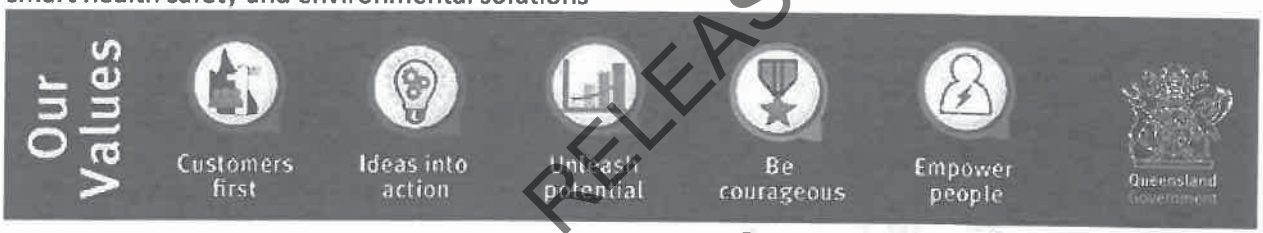
The contractors are NB Industries – Steve on sch4p3(3) Prejudic Can you please assist me.

Thanks,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388 | M + | greg.manthey@simtars.com.au | www.simtars.com.au

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LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Wednesday, 21 May 2014 3:24 PM
To: Lamont, Brett W
Cc: WINTER Matthew; MULLER Sean; FORRESTER Lauren; TURNER David (DNRM); ROSS Grant
Subject: Moorvale Coal - Gas Testing

Brett,

Further to our conversation earlier today, the status of the testing is as follows:

- Compressor pressure switch testing is completed.
- Label recovery is also complete. I believe that the details are in the compressor report, or will accompany it.
- We have introduced a known gas into one of the two 'test' cylinders provided by NB Industries, in order to validate and prove our extraction method for the two sample cylinders.
- The subsequent analysis of the gas from the test cylinder showed a higher concentration of butane than that which we had introduced into the cylinder. This was unexpected, as we were working under the impression that the cylinders used by NB Industries were clean and uncontaminated.
- I have discussed this issue with Wayne at NB Industries. Both he and Steve, the technician who attended your site, also believed that the cylinders were uncontaminated as they had been advised this by their suppliers. However, on further investigation by Wayne, it is apparent that these cylinders had been previously used. Wayne offered the opinion that based on that information and our test results, the two 'test' cylinders may have previously contained Hychill.
- It is my understanding that NB Industries are unable to offer a guarantee that the two sample cylinders were uncontaminated prior to the collection of the samples at your site.
- This compromises the gas testing we are doing. If we do recover the target LP Gases (butane or propane) from either of the two sample cylinders, there would be a question over whether the gases were from the refrigerant system of the drill rig or from residual previous contamination in the collection cylinders.

However, we will continue with the sample recovery and analysis from the two sample cylinders as you have directed.

Please advise whether you want me to source an analytical laboratory for the compressor oil testing. Wayne suggested that another source of compressor oil is the flexible hose lines in the refrigerant system.

Regards,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Tuesday, 1 April 2014 1:57 PM
To: FORRESTER Lauren; Tayler, Craig (craig.tayler@deedi.qld.gov.au); BRENNAN Tabitha (Tabitha.Brennan@simtars.com.au)
Cc: csimpson@peabodyenergy.com; WINTER Matthew
Subject: Moorvale Coal - Hydrocarbon Gas Sampling & Analysis

Matt – for info only, no action required.

All,

Rex received a call earlier today from Colin Simpson from Morevale Coal. They have had a recent incident that may be linked to a flammable gas used as a refrigerant in the air conditioning systems of mobile plant. What he is after is for us to sample possible residual gases in the dryer section of an air con unit and then analyse for hydrocarbons. Access to the residual gas should be relatively easy as they can remove a section of piping. Colin and I discussed the difficulty in analysing for unknown gases. They suspect that the refrigerant may be a type supplied by http://www.hychill.com.au/ (such as Hychill 30) that may have contained various short chain hydrocarbons (ie propane, isobutane, ethane or butane)

Colin is trying to get information from the air conditioning service contractor as to what the systems were gassed up with recently. If he obtains that information, sampling may be unnecessary.

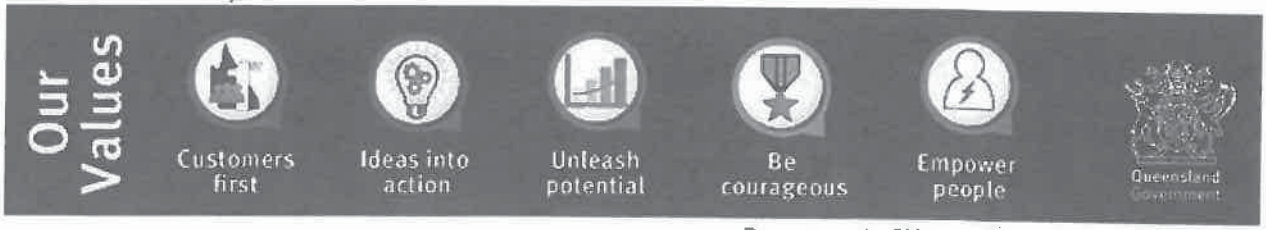
Morevale is out from Mackay, http://www.peabodyenergy.com/content/411/Australia-Mining/Queensland/Moorvale-Mine

Lauren – could you please contact Tabitha at Mackay and discuss possible sampling approaches for the target analytes. Let me know outcome so I can contact Colin.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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From: MARSHALL Rex
Sent: Tuesday, 1 April 2014 9:46 AM
To: MANTHEY Greg
Subject: HC gas

Greg
Colin Simpson of Morevale Coal Mine wants to know if we can sample and analyse hydrocarbon gas from air conditioners of mobile units.

His number is sch4p3(3) Prejudice
Thanks
Rex

RTI DL RELEASE - DNRM

LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Monday, 28 April 2014 1:00 PM
To: MANTHEY Greg
Subject: Moorvale Coal - Message to NB Industries
Attachments: photo.PNG; ATT00001.txt

RTI DL RELEASE - DNRM

Release





RTI DL RELEASE - DNRM

Steve,

Photos of cylinders as discussed.

Regards

Release

LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Tuesday, 15 April 2014 9:24 AM
To: 'Lamont, Brett W'
Cc: Darren Brady (darren@minesafetyinstitute.com.au); MULLER Sean; FORRESTER Lauren; HOLLYER Jeremy; LYNCH Patrick; MEAD Bryan; VANZANTEN Pieter
Subject: Moorvale Coal - Sampling and Analysis.

Brett,

Further to my e-mail yesterday. The sampling of the gas from the two cylinders is a bit unusual, as the cylinders we usually sample from are under pressure. We have identified a method for extraction of the gas, most probably using a water-displacement method, however as we only have the one opportunity, we would like to validate and confirm that the proposed sampling method is effective for the type of cylinder / regulator set-up you have provided. We would like to test the method on a separate pair of 'test' cylinders first.

The two cylinders you have supplied are not identical, having differing styles of regulators. We are assuming that the double-regulator cylinder has a probe to the bottom of the cylinder but want to be sure of that. Can you please advise regarding the following issues:

1. Do you have any details of the regulator design for these two cylinders?
2. Both of the sample cylinders appear to have been previously used. During one of the conversations last week with the site personnel when we were discussing the extraction of the residual gas using your cylinders, I raised a concern that the cylinders would have to be either new or cleaned sufficiently to ensure that there were no other contaminants in the cylinders from previous use. Can you please confirm that this is the case with those cylinders.
3. Can you please advise the contact details for the air conditioning technicians / contractor who assisted in the removal of the compressor and receiver / dryer.
4. Is it possible to get two additional cylinders, fitted with the two types of regulators that are on the sample cylinders, so that our Gas Group can trial and test the sample extraction method. Please note that it would be necessary for these two trial cylinders to be under vacuum so that we can fill them with a calibration gas of known concentration that we can then extract and measure.
5. One of the two sample cylinders is marked as ***"cylinder may be under slight vacuum"***. Can you please advise the circumstances of this and an estimate of what the potential extent of the residual vacuum might be.
6. Would you please provide your purchase order number for this project.

I am discussing the sampling / analysis process for the residual oil with our Principal Scientist today.

Please call me if any of this needs more clarification.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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Release

LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Tuesday, 15 April 2014 9:29 AM
To: WHITE Whanau; BRENNAN Tabitha (Tabitha.Brennan@simtars.com.au)
Subject: Moorvale Coal Sampling - Oil Sample

Whanau,

The samples and cylinders have arrived. Thanks for your help with that.

Was there a sample of the compressor oil taken from the compressor before it was packed? I was under the impression we were collecting some. If not, no problem. I just need to know whether I should be looking for a bottle or container of oil.

Thanks,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
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LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Tuesday, 6 May 2014 8:28 AM
To: MULLER Sean
Cc: FORRESTER Lauren; HOLLYER Jeremy; AMORA Vicky; KLEINHANS Mark; LENICEK Gunter; LYNCH Patrick; WINTER Matthew
Subject: Moorvale Coal Testing

Matt – for information only. No action

Sean,

Have caught up with Mark Kleinhans this morning and he has found a vessel that we can use for the water-transfer process. Clean tube in upstairs ETCC lab (Gunter's area) that has fittings at both ends.

Can you please see Mark and get hold of it. We should set up in the OHECC lab if Pat has no objections. Can you have a think about cost and time involved and let me know so I can work up a quote for the client.

Pat – We have spoken briefly about this previously. If Gas Group find LPG residue in the cylinders, there should be no need for further testing. However, if we don't find any, the client will be looking for more testing as follows. They have sent us three pieces from the air conditioning unit:

- The compressor. Unit has oil in it and client wants to know whether there is any evidence of dissolved LPG in the oil. The compressor is currently with David Turner and Grant Ross in ETCC who are assessing a pressure switch as part of a related request from Moorvale.
- The receiver / dryer unit. This also has oil in it that OHECC lab is to test similar to dot point one. The receiver / dryer is currently with David Turner and Grant Ross in ETCC who are looking at whether we can reconstruct a label as part of a related request from Moorvale.
- A fan /motor. Moorvale have asked that we try to recover oil drop residue from the fan blades and test as above.

An issue we will have to address is that the air conditioning technicians are unable to send an unused sample of the compressor oil as they did not do the previous service. There are over 30 SUPPLIERS of oils for these compressors and they have no idea which one was used by the previous service contractor. I am trying to get the client to source a sample but I am not confident that the original service contractor will supply it, as presumably they are the ones who are under investigation.

Will let you know.

Thanks.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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RTI DL RELEASE - DNRM

RTI DL RELEASE - DNRM

Release

LANG Jennifer (Admin Review)

From: MULLER Sean
Sent: Friday, 23 May 2014 4:29 PM
To: MANTHEY Greg
Subject: Moorvale gas cylinders

Hi Greg,

I have run the samples from the Moorvale cylinders.

- The High side purge cylinder contains significant amount of iso-Butane, Propane, and possibly some neo-Pentane. The rest of the sample (around 50% of the total sample) is air.
- The Low Side purge cylinder contains mostly air >95% but has small amounts of iso-Butane, Propane and possibly neo-Pentane.
- The other two test cylinders appear to contain significant amounts of n-butane and propane in addition to the gas we spiked them with.

I will be able to report the results once we have processed the data as part of our QA procedures.

Regards,

Sean Muller
Analytical Chemist | Simtars

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LANG Jennifer (Admin Review)

From: MULLER Sean
Sent: Monday, 18 August 2014 11:11 AM
To: FORRESTER Lauren
Cc: MANTHEY Greg
Subject: Moorvale info
Attachments: OG172932F1a 1-4 raw data LPG.xls; OG172932F1a 5-6 raw data LPG.xls

LP0023 - Procedure for Analysis of Natural Gas using a Micro Gas Chromatograph
LP0040 PROCEDURE FOR ANALYSIS OF LIQUEFIED PETROLEUM GASES (LPG) BY GAS CHROMATOGRAPHY

The residual contamination detected in the practice cylinders has been diluted in calibration gases or pure nitrogen. These gases were introduced to the cylinder while under vacuum before the extraction process.

Sean Muller
Analytical Chemist | Simtars

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This workbook is designed to automatically generate a LPG report. To generate a report, firstly enter the job number in A9 (purple cell) followed by a / (eg OL75796 /). Then enter each the respective sample identifications under the appropriate lab number (starting at cell E9), next **enter all normalised gas results** in to the corresponding blue cells. Finally click the Prepare Report button. A second worksheet will be opened containing the report. Please save both worksheets into the job folder.

Use Normalised Data only

RTI DL RELEASE - DNRM

Sample Number			1	2	3	4	5		
OG172932/	Symbol	LOR	Sample 1 High side	sample 2 Low side	Test Cylinder 1	Test Cylinder 2			
Ethane	C_2H_6	0.01	0.07	0.00	0.44	0.00			
Propane	C_3H_8	0.01	19.42	0.25	0.17	0.00			
Propene	C_3H_6	0.01	0.00	0.00	0.09	0.00			
iso-Butane	iso-C_4	0.01	25.39	0.43	0.00	0.00			
n-Butane	n-C_4	0.01	0.02	0.01	0.00	0.00			
But-1-ene	C_4H_8	0.01	0.00	0.00	0.00	0.00			
iso-Butene	iso-C_4H_8	0.01	0.00	0.00	0.00	0.00			
2-butene (trans)	trans-C_4H_8	0.01	0.00	0.00	0.00	0.00			
2-butene (cis)	cis-C_4H_8	0.01	0.00	0.00	44.19	9.13			
1,3-Butadiene	C_4H_6	0.01	1.80	0.98	0.00	2.65			
iso-Pentane	iso-C_5	0.01	0.02	0.00	0.00	0.00			
Total				1.67	44.89	11.79	0.00		

Calculations	Relative molecular mass (MI)	Density Factor kg/m3 15deg (di)	VPF abs kPa (40deg) (pvi)	Gross Heating Value MJ/kg at 15deg, 101.325kPa	MON Factor	Wobbe Index MJ/m3 15deg, 101.325kPa
Ethane	30.0694	375.76	5611	51.98	100.7	65.13
Propane	44.0972	507.30	1352	50.39	97.1	76.83
Propene	42.0814	521.33	1661	48.96	84.9	72.86
iso-Butane	58.1230	562.98	531	49.41	97.6	87.12
n-Butane	58.1230	584.06	377	49.57	89.6	87.54
But-1-ene	56.1072	601.15	457	48.48	82.0	83.89
iso-Butene	56.1072	600.50	467	48.18	82.0	83.34
2-butene (trans)	56.1072	610.00	365	48.29	82.0	83.66
2-butene (cis)	56.1072	627.20	337	48.36	82.0	83.82
1,3-Butadiene	54.0914	627.30	436	47.02	0.0	79.85
iso-Pentane	72.1498	624.35	151	48.95	90.3	97.21
	11					
mole fraction (Xl)						
Ethane	0.0007	0.0000	0.0044	0.0000	0.0000	
Propane	0.1942	0.0025	0.0017	0.0000	0.0000	
Propene	0.0000	0.0000	0.0009	0.0000	0.0000	
iso-Butane	0.2539	0.0043	0.0000	0.0000	0.0000	
n-Butane	0.0002	0.0001	0.0000	0.0000	0.0000	
But-1-ene	0.0000	0.0000	0.0000	0.0000	0.0000	
iso-Butene	0.0000	0.0000	0.0000	0.0000	0.0000	
2-butene (trans)	0.0000	0.0000	0.0000	0.0000	0.0000	
2-butene (cis)	0.0000	0.0000	0.4419	0.0913	0.0000	
1,3-Butadiene	0.0180	0.0098	0.0000	0.0265	0.0000	
iso-Pentane	0.0002	0.0000	0.0000	0.0000	0.0000	
Sum Xi x Mi						
Ethane	0.0196	0.0002	0.1332	0.0008	0.0000	
Propane	8.5639	0.1112	0.0764	0.0014	0.0000	
Propene	0.0000	0.0000	0.0385	0.0000	0.0000	
iso-Butane	14.7594	0.2484	0.0000	0.0000	0.0000	
n-Butane	0.0117	0.0045	0.0000	0.0000	0.0000	
But-1-ene	0.0000	0.0000	0.0000	0.0000	0.0000	
iso-Butene	0.0000	0.0000	0.0000	0.0000	0.0000	
2-butene (trans)	0.0000	0.0000	0.0000	0.0000	0.0000	
2-butene (cis)	0.0000	0.0000	24.7920	5.1246	0.0000	
1,3-Butadiene	0.9759	0.5325	0.0000	1.4314	0.0000	
iso-Pentane	0.0125	0.0004	0.0000	0.0000	0.0000	
TOTAL	24.3429	0.8973	25.0402	6.5581	0.0000	
Mass Fractn (Wi)						
Ethane	0.000805723	0.000265749	0.005318873	0.000121458	#DIV/0!	
Propane	0.351800809	0.123984013	0.003051403	0.00020905	#DIV/0!	
Propene	0	0	0.001539389	0	#DIV/0!	
iso-Butane	0.606309806	0.276882001	0	0	#DIV/0!	
n-Butane	0.000479541	0.004976178	0	0	#DIV/0!	
But-1-ene	0	0	0	0	#DIV/0!	
iso-Butene	0	0	0	0	#DIV/0!	
2-butene (trans)	0	0	0	0	#DIV/0!	
2-butene (cis)	0	0	0.990090335	0.781411521	#DIV/0!	
1,3-Butadiene	0.040090361	0.593435332	0	0.218257971	#DIV/0!	
iso-Pentane	0.000513761	0.000456727	0	0	#DIV/0!	
Wi / di						
Ethane	2.14425E-06	7.0723E-07	1.4155E-05	3.23233E-07	#DIV/0!	
Propane	0.000693477	0.0002444	6.01499E-06	4.12084E-07	#DIV/0!	
Propene	0	0	2.95281E-06	0	#DIV/0!	
iso-Butane	0.001076965	0.000491815	0	0	#DIV/0!	
n-Butane	8.21047E-07	8.51998E-06	0	0	#DIV/0!	
But-1-ene	0	0	0	0	#DIV/0!	
iso-Butene	0	0	0	0	#DIV/0!	
2-butene (trans)	0	0	0	0	#DIV/0!	
2-butene (cis)	0	0	0.001578588	0.001245873	#DIV/0!	
1,3-Butadiene	6.39094E-05	0.000946015	0	0.000347932	#DIV/0!	
iso-Pentane	8.22873E-07	7.31525E-07	0	0	#DIV/0!	
TOTal	0.00183814	0.001692189	0.001601711	0.001594541	#DIV/0!	
Vapour Pressure calcs						
pvpi 40deg = xi * pvi						
Ethane	3.7	0.0	24.9	0.1	0.0	
Propane	262.6	3.4	2.3	0.0	0.0	
Propene	0.0	0.0	1.5	0.0	0.0	

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Release

iso-Butane	134.8	2.3	0.0	0.0	0.0
n-Butane	0.1	0.0	0.0	0.0	0.0
But-1-ene	0.0	0.0	0.0	0.0	0.0
iso-Butene	0.0	0.0	0.0	0.0	0.0
2-butene (trans)	0.0	0.0	0.0	0.0	0.0
2-butene (cis)	0.0	0.0	148.9	30.8	0.0
1,3-Butadiene	7.9	4.3	0.0	11.5	0.0
iso-Pentane	0.0	0.0	0.0	0.0	0.0
Total (abs vap press at 40deg)	409.0	10.0	177.6	42.5	0.0
MON calcs					
Ethane	0.065684596	0.000798551	0.446027489	0.002667543	0
Propane	18.85723365	0.244962909	0.168246141	0.003018839	0
Propene	0	0	0.0777684	0	0
iso-Butane	24.7838813	0.417179488	0	0	0
n-Butane	0.017995264	0.006883072	0	0	0
But-1-ene	0	0	0	0	0
iso-Butene	0	0	0	0	0
2-butene (trans)	0	0	0	0	0
2-butene (cis)	0	0	36.233258	7.489552	0
1,3-Butadiene	0	0	0	0	0
iso-Pentane	0.015652602	0.000512904	0	0	0
TOTAL	43.7404474	0.670336924	36.92530003	7.495238382	0
Wobbe calcs					
Ethane	0.042482996	0.000516481	0.288478355	0.001725294	0
Propane	14.9207133	0.193825956	0.133124109	0.002388645	0
Propene	0	0	0.06673976	0	0
iso-Butane	22.12266126	0.372383986	0	0	0
n-Butane	0.017581534	0.006724823	0	0	0
But-1-ene	0	0	0	0	0
iso-Butene	0	0	0	0	0
2-butene (trans)	0	0	0	0	0
2-butene (cis)	0	0	37.03745958	7.65578352	0
1,3-Butadiene	1.4406537	0.7860434	0	2.1129907	0
iso-Pentane	0.016850381	0.000552153	0	0	0
TOTAL	38.6	1.4	37.5	9.8	0.0
cal value calcs					
Ethane	0.041881494	0.013813629	0.276475011	0.006313384	#DIV/0!
Propane	17.72724276	6.247554403	0.153760204	0.010534049	#DIV/0!
Propene	0	0	0.075368479	0	#DIV/0!
iso-Butane	29.95776749	13.68073965	0	0	#DIV/0!
n-Butane	0.023770823	0.246669138	0	0	#DIV/0!
But-1-ene	0	0	0	0	#DIV/0!
iso-Butene	0	0	0	0	#DIV/0!
2-butene (trans)	0	0	0	0	#DIV/0!
2-butene (cis)	0	0	47.88076861	37.78906115	#DIV/0!
1,3-Butadiene	1.885048777	27.90332933	0	10.26248979	#DIV/0!
iso-Pentane	0.025148593	0.022356805	0	0	#DIV/0!
TOTAL	49.66085993	48.11446296	48.3863723	48.06839837	#DIV/0!
Calcs					
Vapour Pressure (guage) kPa, 40°C	308	-91	76	-59	-101
Liquid Density kg/m³ at 15°C	544.0	591.0	624.3	627.1	#DIV/0!
Volatile Residue mol % (C_4 and higher)	27.23	1.42	44.19	11.78	0.00
Volatile Residue mol % (C_5 and higher)	0.02	0.00	0.00	0.00	0.00
Gross Heating Value (MJ/kg) at 15°C & 101.325kPa	49.7	48.1	48.4	48.1	#DIV/0!
Wobbe Index (MJ/m³)	38.6	1.4	37.5	9.8	0.0
Motor Octane Number (MON)	43.7	0.7	36.9	7.5	0.0

RTI DL RELEASE - DNRM

Release

Results:

Laboratory Number	OG172932/ 1	OG172932/ 2	OG172932/ 3	OG172932/ 4	OG172932/
Sample Identification	Moorvale Sample 1 High side	Moorvale sample 2 Low side	Test Cylinder 1	Test Cylinder 2	0
Component LOR	Normalised mol %	Normalised mol %	Normalised mol %	Normalised mol %	Normalised mol %
Ethane 0.01	0.07	<0.01	0.44	<0.01	<0.01
Propane 0.01	19.42	0.25	0.17	<0.01	<0.01
Propene 0.01	<0.01	<0.01	0.09	<0.01	<0.01
iso-Butane 0.01	25.39	0.43	<0.01	<0.01	<0.01
n-Butane 0.01	0.02	<0.01	<0.01	<0.01	<0.01
But-1-ene 0.01	<0.01	<0.01	<0.01	<0.01	<0.01
iso-Butene 0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-butene (trans) 0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-butene (cis) 0.01	<0.01	<0.01	44.19	9.13	<0.01
1,3-Butadiene 0.01	1.80	0.98	<0.01	2.65	<0.01
iso-Pentane 0.01	0.02	<0.01	<0.01	<0.01	<0.01
Total	46.7	1.7	44.9	11.8	0.0
Caculations					
Vapour Pressure (guage) kPa, 40C	308	-91.28	76.30	-58.82	-101.33
Liquid Density kg/m3 at 15OC	544.0	590.95	624.33	627.14	#DIV/0!
Volatile Residue mol % (C4 and higher)	27.23	1.42	44.19	11.78	0.00
Volatile Residue mol % (C5 and higher)	0.02	0.00	0.00	0.00	0.00
Gross Heating Value (MJ/kg) at 15C & 101.325kPa	49.7	48.11	48.39	48.07	#DIV/0!
Wobbe Index (MJ/m3)	38.6	1.36	37.53	9.77	0.00
Motor Octane Number (MON)	43.7	0.67	36.93	7.50	0.00

RTIDL RELEASE - DNRM

References :

1. Simtars Laboratory Procedure LP0040 - "Procedure for analysis of Liquefied Petroleum Gases (LPG) by gas chromatography."
2. ISO 7941:1988. Commercial propane and butane - Analysis by gas chromatography.
3. ISO 8973:1997. Liquefied petroleum gases - Calculation method for density and vapour pressure.

Re



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Rel

This workbook is designed to automatically generate a LPG report. To generate a report, firstly enter the job number in A9 (purple cell) followed by a / (eg OL75796 /). Then enter each the respective sample identifications under the appropriate lab number (starting at cell E9), next **enter all normalised gas results** in to the corresponding blue cells. Finally click the Prepare Report button. A second worksheet will be opened containing the report. Please save both worksheets into the job folder.

Use Normalised Data only

RTI DL RELEASE - DNRM

Sample Number			5	6	3	4	5		
OG172932/	Symbol	LOR	Test Cylinder 3	Test Cylinder 4					
Ethane	C_2H_6	0.01	0.15	2.14					
Propane	C_3H_8	0.01	0.00	0.00					
Propene	C_3H_6	0.01	0.01	0.01					
iso-Butane	iso-C_4	0.01	0.00	0.00					
n-Butane	n-C_4	0.01	0.00	0.00					
But-1-ene	C_4H_8	0.01	0.00	0.00					
iso-Butene	iso-C_4H_8	0.01	0.00	0.00					
2-butene (trans)	trans-C_4H_8	0.01	0.00	0.00					
2-butene (cis)	cis-C_4H_8	0.01	0.32	4.37					
1,3-Butadiene	C_4H_6	0.01	0.00	2.72					
iso-Pentane	iso-C_5	0.01	0.00	0.00					
Total			0.53	9.24	0.00	0.00	0.00		

Re

Calculations	Relative molecular mass (Mi)	Density Factor kg/m3 15deg (di)	VPF abs kPa (40deg) (pvi)	Gross Heating Value MJ/kg at 15deg, 101.325kPa	MON Factor	Wobbe Index MJ/m3 15deg, 101.325kPa
Ethane	30.0694	375.76	5611	51.98	100.7	65.13
Propane	44.0972	507.30	1352	50.39	97.1	76.83
Propene	42.0814	521.33	1661	48.96	84.9	72.86
iso-Butane	58.1230	562.98	531	49.41	97.6	87.12
n-Butane	58.1230	584.06	377	49.57	89.6	87.54
But-1-ene	56.1072	601.15	457	48.48	82.0	83.89
iso-Butene	56.1072	600.50	467	48.18	82.0	83.34
2-butene (trans)	56.1072	610.00	365	48.29	82.0	83.66
2-butene (cis)	56.1072	627.20	337	48.36	82.0	83.82
1,3-Butadiene	54.0914	627.30	436	47.02	0.0	79.85
iso-Pentane	72.1498	624.35	151	48.95	90.3	97.21
	11					
mole fraction (Xi)						
Ethane	0.0015	0.0214	0.0000	0.0000	0.0000	
Propane	0.0000	0.0000	0.0000	0.0000	0.0000	
Propene	0.0001	0.0001	0.0000	0.0000	0.0000	
iso-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	
But-1-ene	0.0000	0.0000	0.0000	0.0000	0.0000	
iso-Butene	0.0000	0.0000	0.0000	0.0000	0.0000	
2-butene (trans)	0.0000	0.0000	0.0000	0.0000	0.0000	
2-butene (cis)	0.0032	0.0437	0.0000	0.0000	0.0000	
1,3-Butadiene	0.0000	0.0272	0.0000	0.0000	0.0000	
iso-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	
Sum Xi x Mi						
Ethane	0.0447	0.6429	0.0000	0.0000	0.0000	
Propane	0.0009	0.0009	0.0000	0.0000	0.0000	
Propene	0.0049	0.0047	0.0000	0.0000	0.0000	
iso-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	
But-1-ene	0.0000	0.0000	0.0000	0.0000	0.0000	
iso-Butene	0.0000	0.0000	0.0000	0.0000	0.0000	
2-butene (trans)	0.0000	0.0000	0.0000	0.0000	0.0000	
2-butene (cis)	0.1784	2.4522	0.0000	0.0000	0.0000	
1,3-Butadiene	0.0000	1.4690	0.0000	0.0000	0.0000	
iso-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	
TOTAL	0.2289	4.5697	0.0000	0.0000	0.0000	
Mass Fractn (Wi)						
Ethane	0.195457143	0.140690339	#DIV/0!	#DIV/0!	#DIV/0!	
Propane	0.003852749	0.000192999	#DIV/0!	#DIV/0!	#DIV/0!	
Propene	0.021508282	0.001031388	#DIV/0!	#DIV/0!	#DIV/0!	
iso-Butane	0	0	#DIV/0!	#DIV/0!	#DIV/0!	
n-Butane	0	0	#DIV/0!	#DIV/0!	#DIV/0!	
But-1-ene	0	0	#DIV/0!	#DIV/0!	#DIV/0!	
iso-Butene	0	0	#DIV/0!	#DIV/0!	#DIV/0!	
2-butene (trans)	0	0	#DIV/0!	#DIV/0!	#DIV/0!	
2-butene (cis)	0.779181826	0.536615799	#DIV/0!	#DIV/0!	#DIV/0!	
1,3-Butadiene	0	0.321469475	#DIV/0!	#DIV/0!	#DIV/0!	
iso-Pentane	0	0	#DIV/0!	#DIV/0!	#DIV/0!	
Wi / di						
Ethane	0.000520165	0.000374415	#DIV/0!	#DIV/0!	#DIV/0!	
Propane	7.59462E-06	3.80443E-07	#DIV/0!	#DIV/0!	#DIV/0!	
Propene	4.12566E-05	1.97838E-06	#DIV/0!	#DIV/0!	#DIV/0!	
iso-Butane	0	0	#DIV/0!	#DIV/0!	#DIV/0!	
n-Butane	0	0	#DIV/0!	#DIV/0!	#DIV/0!	
But-1-ene	0	0	#DIV/0!	#DIV/0!	#DIV/0!	
iso-Butene	0	0	#DIV/0!	#DIV/0!	#DIV/0!	
2-butene (trans)	0	0	#DIV/0!	#DIV/0!	#DIV/0!	
2-butene (cis)	0.001242318	0.000855574	#DIV/0!	#DIV/0!	#DIV/0!	
1,3-Butadiene	0	0.000512465	#DIV/0!	#DIV/0!	#DIV/0!	
iso-Pentane	0	0	#DIV/0!	#DIV/0!	#DIV/0!	
TOTal	0.001811334	0.001744813	#DIV/0!	#DIV/0!	#DIV/0!	
Vapour Pressure calcs						
pvpi 40deg = xi * pvi						
Ethane	8.3	120.0	0.0	0.0	0.0	
Propane	0.0	0.0	0.0	0.0	0.0	
Propene	0.2	0.2	0.0	0.0	0.0	

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iso-Butane	0.0	0.0	0.0	0.0	0.0
n-Butane	0.0	0.0	0.0	0.0	0.0
But-1-ene	0.0	0.0	0.0	0.0	0.0
iso-Butene	0.0	0.0	0.0	0.0	0.0
2-butene (trans)	0.0	0.0	0.0	0.0	0.0
2-butene (cis)	1.1	14.7	0.0	0.0	0.0
1,3-Butadiene	0.0	11.8	0.0	0.0	0.0
iso-Pentane	0.0	0.0	0.0	0.0	0.0
Total (abs vap press at 40deg)	9.6	146.8	0.0	0.0	0.0
MON calcs					
Ethane	0.149839586	2.153055623	0	0	0
Propane	0.001942	0.001942	0	0	0
Propene	0.0099333	0.0095088	0	0	0
iso-Butane	0	0	0	0	0
n-Butane	0	0	0	0	0
But-1-ene	0	0	0	0	0
iso-Butene	0	0	0	0	0
2-butene (trans)	0	0	0	0	0
2-butene (cis)	0.260678	3.58381	0	0	0
1,3-Butadiene	0	0	0	0	0
iso-Pentane	0	0	0	0	0
TOTAL	0.422392886	5.748316423	0	0	0
Wobbe calcs					
Ethane	0.096912137	1.392537366	0	0	0
Propane	0.0015366	0.0015366	0	0	0
Propene	0.00852462	0.00816032	0	0	0
iso-Butane	0	0	0	0	0
n-Butane	0	0	0	0	0
But-1-ene	0	0	0	0	0
iso-Butene	0	0	0	0	0
2-butene (trans)	0	0	0	0	0
2-butene (cis)	0.26646378	3.6633531	0	0	0
1,3-Butadiene	0	2.1685663	0	0	0
iso-Pentane	0	0	0	0	0
TOTAL	0.4	7.2	0.0	0.0	0.0
cal value calcs					
Ethane	10.15986229	7.313083825	#DIV/0!	#DIV/0!	#DIV/0!
Propane	0.194140015	0.009725213	#DIV/0!	#DIV/0!	#DIV/0!
Propene	1.053045511	0.050496741	#DIV/0!	#DIV/0!	#DIV/0!
iso-Butane	0	0	#DIV/0!	#DIV/0!	#DIV/0!
n-Butane	0	0	#DIV/0!	#DIV/0!	#DIV/0!
But-1-ene	0	0	#DIV/0!	#DIV/0!	#DIV/0!
iso-Butene	0	0	#DIV/0!	#DIV/0!	#DIV/0!
2-butene (trans)	0	0	#DIV/0!	#DIV/0!	#DIV/0!
2-butene (cis)	37.68123309	25.95074006	#DIV/0!	#DIV/0!	#DIV/0!
1,3-Butadiene	0	15.11549471	#DIV/0!	#DIV/0!	#DIV/0!
iso-Pentane	0	0	#DIV/0!	#DIV/0!	#DIV/0!
TOTAL	49.08828091	48.43954055	#DIV/0!	#DIV/0!	#DIV/0!
Calcs					
Vapour Pressure (guage) kPa, 40°C	-92	45	-101	-101	-101
Liquid Density kg/m^3 at 15°C	552.1	573.1	#DIV/0!	#DIV/0!	#DIV/0!
Volatile Residue mol % (C_4 and higher)	0.32	7.09	0.00	0.00	0.00
Volatile Residue mol % (C_5 and higher)	0.00	0.00	0.00	0.00	0.00
Gross Heating Value (MJ/kg) at 15°C & 101.325kPa	49.1	48.4	#DIV/0!	#DIV/0!	#DIV/0!
Wobbe Index (MJ/m^3)	0.4	7.2	0.0	0.0	0.0
Motor Octane Number (MON)	0.4	5.7	0.0	0.0	0.0

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Results:

Laboratory Number	OG172932/ 5	OG172932/ 6	OG172932/ 3	OG172932/ 4	OG172932/
Sample Identification	Test Cylinder 3	Test Cylinder 4	0	0	0
Component / LOR	Normalised mol %	Normalised mol %	Normalised mol %	Normalised mol %	Normalised mol %
Ethane 0.01	0.15	2.14	<0.01	<0.01	<0.01
Propane 0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Propene 0.01	0.01	0.01	<0.01	<0.01	<0.01
iso-Butane 0.01	<0.01	<0.01	<0.01	<0.01	<0.01
n-Butane 0.01	<0.01	<0.01	<0.01	<0.01	<0.01
But-1-ene 0.01	<0.01	<0.01	<0.01	<0.01	<0.01
iso-Butene 0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-butene (trans) 0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-butene (cis) 0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,3-Butadiene 0.01	0.32	4.37	<0.01	<0.01	<0.01
iso-Pentane 0.01	<0.01	2.72	<0.01	<0.01	<0.01
	<0.01	<0.01	<0.01	<0.01	<0.01
Total	0.5	9.2	0.0	0.0	0.0
Caculations					
Vapour Pressure (guage) kPa, 40C	-92	45.43	-101.33	-101.33	-101.33
Liquid Density kg/m3 at 15OC	552.1	573.13	#DIV/0!	#DIV/0!	#DIV/0!
Volatile Residue mol % (C4 and higher)	0.32	7.09	0.00	0.00	0.00
Volatile Residue mol % (C5 and higher)	0.00	0.00	0.00	0.00	0.00
Gross Heating Value (MJ/kg) at 15C & 101.325kPa	49.1	48.44	#DIV/0!	#DIV/0!	#DIV/0!
Wobbe Index (MJ/m3)	0.4	7.23	0.00	0.00	0.00
Motor Octane Number (MON)	0.4	5.75	0.00	0.00	0.00

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References :

1. Simtars Laboratory Procedure LP0040 - "Procedure for analysis of Liquefied Petroleum Gases (LPG) by gas chromatography."
2. ISO 7941:1988. Commercial propane and butane - Analysis by gas chromatography.
3. ISO 8973:1997. Liquefied petroleum gases - Calculation method for density and vapour pressure.

Rel



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Rel

LANG Jennifer (Admin Review)

From: WHITE Whanau
Sent: Wednesday, 9 April 2014 2:22 PM
To: MANTHEY Greg
Cc: WINTER Matthew; BRENNAN Tabitha; TAYLER Craig
Subject: Moorvale Notes
Attachments: Notes for Moorvale Mine Re.doc

Good afternoon Greg,

Have attached notes from Moorvale job.

The first meeting was layout of process and the start of identifying were samples could best be sourced for our analysis.

Subsequent meetings further explored the source of samples and how these would be extracted. My part in these meetings on behalf of Simtars was somewhat limited other than to express the importance of maintaining the integrity of the samples to be analysed.

I have documented timeframes of events as they happened. I was able to observe and oversee as best I could the extraction of all samples collected.

Please let me know if further clarification is needed from my notes. A fair amount of time onsite was meetings but once the extraction process began it was over quite quickly.

All samples were marked and signed by me with the date and times of extraction on tape applied to the samples.

It would be good to have a debrief at some point to discuss this job.

I wasn't sure who else to forward this onto Greg so please forward onto those who'll want to refer to the notes.

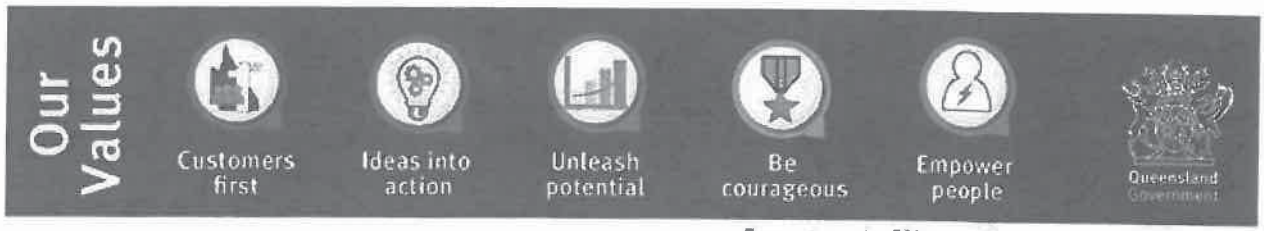
One final thing, I have indicated in the notes (blue writing) that the source of a leak was discovered. I not sure wether/if these need to be there. Your guidance please.

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Whanau White
Occupational Health & Safety Officer - Mackay | Simtars

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Notes for Moorvale Mine Re: Drill-Pro 12 Cabin Explosion

Monday 7 April 2014.

09:10 – 09:30 Arrive onsite complete visitor induction.

09:30 approximately 10:45 Meet company representatives. Some idle time due to arrival time of forensic investigator.

10:45 – 12:25 Meeting and Drill Rig inspection held to discus process to be followed for investigation and extraction of air-con components for Simtars analysis. Present were:

- Alan Miskin – Peabody Senior Health & Safety officer and main point of onsite contact.
- Stuart Richie – Forensic Consultant
- Ben ? – Peabody Lawyer
- Steven ? – NB Industries. Contractor hired to check, extract atmosphere from air-con lines, and oversee extraction of components for Simtars testing.
- Other site maintenance personal

Following a brief initial meeting there was an inspection of the Drill Rig – Drill-pro 12, following a spontaneous combustion within the operator's cabin which occurred under normal operational conditions. Stuart Richie was invited to start his initial investigation of the site scene.

Once Stuart had completed his initial inspection Steven of NB industries and I were invited to inspect the scene.

The inspection was followed a meeting which excluded Simtars due to legal privilege.

12:25 – 13:00 Further discussion on what process would be used to extract atmosphere and components for Simtars analysis.

13:00 17:00 Stuart Richie completes his scene examination. Another "in confidence" meeting is convened. There is an "all up" meeting to finalise the process to be used in extraction of atmosphere and removal of the compressor and receiver/dryer. Greg Manthey involved in part of this process via phone conference.

Left site approximately 17:15

Tuesday 8 April 2014-04-09

09:20 – Arrive at site.

10:00 – 10:20 Meeting to confirm day's proceedings.

10:20 – 10:45 Assembled at drill rig. Steven (NB Industries) set up equipment to draw atmosphere in the air conditioning system into gas bottles. This included the extraction of atmosphere from the high pressure and low pressure side.

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High pressure side atmosphere would have included atmosphere from the compressor passing through the condenser and the receiver/dryer before being deposited in one of the gas bottles.

Low pressure atmosphere would have been captured from the evaporator inside the cab up to the compressor.

Steven attached gauges to the air con system and established that if contained no pressure.

The pump and equipment used to extract atmosphere included running of equipment for ten minutes on the purge side and recovery side to minimise any chance of contamination.

The extraction of atmosphere into a gas cylinder on the high pressure side started at 11:10 and ended at 11:15.

The pump was purged before the process was repeated on the low pressure side which started at 11:24 and ended at 11:29.

Gas bottles marked with respective high/low side samples and time of extraction.

11:38 Valves shut off in compressor and receiver/dryer replaced.

Note: Compressor valves shut off and new receiver/dryer put in place to allow the system to be charged with pressurised nitro. This was done to try to establish if there was a leak in the air conditioning system. A leak was subsequently discovered in the area around the high pressure inlet inside the operator's cabin.

11:43 Receiver/dryer removed and immediately capped. Receiver/dryer then wrapped in bubble wrap in preparation for transport to Redbank. New receiver/dryer put in place.

12:00 Nitro put into system to assist in establishing if a leak is present in the air con system.

12:18 Site fitter commences dismantling of the compressor.

12:35 In the process of extracting the compressor, the fitter while loosening a bolt on the suction intake of the compressor breaks off a bolt housing one of the shut of valves. This exposes the oil contained inside to the outside atmosphere. I cover the hole with my hand and Steven (NB Industries) proceeds to plug and cap the hole.

12:50 Compressor and receiver/dryer packaged up for transport to Redband. This task was performed by Elias of Peabody and me. Prior to tapping up the box I asked Alan Miskin to inspect how components were packaged and asked if he was satisfied with the way they were pack to which he replied in the affirmative.

13:40 Elias and I delivered package and gas bottles to dispatch with instruction as to how samples needed to be handled.

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Left site at approximately 14:15.

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LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Tuesday, 13 May 2014 3:22 PM
To: 'Lamont, Brett W'
Cc: MULLER Sean; TURNER David (DNRM); ROSS Grant; FORRESTER Lauren; WINTER Matthew
Subject: Moorvale Sample Analysis - Update

Brett,

I contacted Graham Rasmussen earlier this morning and gave him an update on the testing of the gas samples. Have been putting together this update to send you and my apologies for not sending it earlier today.

Gas Samples – Testing is expected to be completed before the end of next week (Friday 23rd May). I should be able to give you verbal results before Friday and the report will be available shortly after that.

Compressor Pressure Switch – Testing has been conducted and the report is being finalised

Receiver / Dryer Label – I understand that some detail has been recovered from the label and is being included in the pressure switch report. However I don't have any details immediately to hand.

The costs for the processes above are $8,910 (ex GST). This includes:

- Two days of site work out of Simtars Mackay,
- Gas testing of up to four samples,
- Pressure switch testing and label recovery.

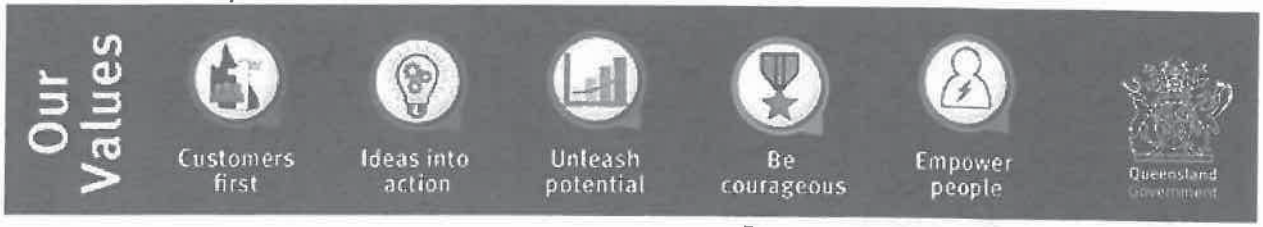
Note that if the gas samples are negative for LPG, further testing of the oil residues will be additional cost.

Can you please call me to discuss if you have any questions.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Monday, 14 July 2014 5:36 PM
To: Lamont, Brett W
Subject: Moorvale Testing

Brett,

I spoke to Josh at NB Industries late last week. From what he could find out from the couriers, it looks like the second pair of test cylinders they recently sent have been lost in transit.

He was sending a third set.

Regards,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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LANG Jennifer (Admin Review)

From: WHITE Whanau
Sent: Monday, 12 May 2014 8:38 AM
To: MANTHEY Greg
Subject: Moorvale

Good morning Greg,

Mate, I was wondering if there were any gases found in the samples collected from the Moorvale job.

Also, did the company forward onto Simtars the pictures that were taken on our behalf by the fire scene investigator? There was a fair bit of hoo haa getting permission to get the photo's so I hope they have passed them on.

Cheers,

Whanau White
Occupational Health & Safety Officer - Mackay | Simtars

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Simtars Report OG172932F1

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Gas Analysis
for Peabody Moorvale Coal

Q *Were flammable gas components present in two test cylinders collected at Moorvale Coal on 08/04/14.*

A *Yes. Simtars identified significant amounts of propane, iso-butane and 1,3-butadiene in the two test cylinders.*

This Question & Answer was supplied in good faith as a common-language review, for the convenience of our clients. It must be read in conjunction with the full report.

Client Contact	*Mr Brett Lamont* *Mine Production Superintendent* *Peabody Energy* *Moorvale Coal* *PO Box 193 Nebo, Qld. 4742.*
Client Reference	*Brett Lamont*
Investigation Period	*May – August 2014*
Simtars Investigator(s)	*Sean Muller (+61 7 3810 6338)* *Greg Manthey (+61 7 3810 6364)*
Reviewed	*Lauren Forrester*
Approved Signatory	sch4p3(3) Prejudice the protectio
	Lauren Forrester *Analytical Chemist*
Report Date	*4th September 2014*

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1 Objectives

The aim of the project was to determine whether flammable gas components were present in either of two gas samples collected from a mobile drill rig air conditioning system refrigerant line.

2 Background

A workplace incident occurred at the Peabody Moorvale Coal Mine on or around 28th March 2014. The incident involved an explosion in the cabin of a mobile drill rig.

Simtars was requested by Mr Brett Lamont of Moorvale Coal to assist in aspects of the subsequent investigation process, including sampling and analysis of residual gases from the refrigerant line in the air-conditioning unit from the drill rig. The refrigerant line was ruptured during the incident resulting in the escape of refrigerant gases. The purpose of the analysis by Simtars was to identify whether residual refrigerant gases were present and the constituents of the residual gas. The gas investigation instructions are included in Moorvale Coal document marked as ***Appendix A***.

3 Methodology

The recovery of the residual gases was conducted by Moorvale Coal personnel, under observation by Simtars Mackay field officer Whanau White on Tuesday 08th April 2014. Two separate samples were collected using vacuum extraction into negative pressure cylinders. These are referred to in this report as the 'Test' cylinders. One sample was collected from the 'high pressure' side of the refrigerant line and the second from the 'low pressure' side. The process used for the collection is described in the document entitled *'Recovery Procedure of Air Con Gas from Drill Rig Moorvale Mine Site'* provided by contractors NB Industries. A copy of this document is attached marked ***Appendix B – Gas Sample Recovery Process.***

The two test cylinders were received by Simtars for analysis to identify the presence or otherwise of 'LPG-type' components commonly found in certain air-conditioning refrigerant gases such as HyChill. The Material Safety Data Sheet for HyChill is attached marked ***Appendix C – MSDS HyChill HC Refrigerant***. The typical main constituents of HyChill are propane, iso-butane and ethane. HyChill is classified as a Dangerous Goods Class 2.1 – Flammable Gas.

The two test cylinders were under atmospheric pressure when received by Simtars. It was determined by Simtars that extraction of the contents was best achieved using a water-displacement method. This method involved forcing a saturated sodium chloride solution under pressure into the gas cylinders until the pressure became too high to physically force any more solution into the cylinder. The cylinder valve was then closed to contain the pressure. A new Tedlar sample bag, which had been purged with nitrogen and all gas removed by vacuum was then attached to the cylinder valve. The valve was released enabling the pressurised gas to flow into the sample bag. The saturated sodium chloride solution was used as opposed to water, to minimise the potential for gases in the sample to dissolve into the solution used to pressurise the cylinder.

In order to ensure that this collection methodology was effective, prior to treatment of the test cylinders, Simtars obtained a pair of 'practice' cylinders from contractors NB Industries, the air-conditioning contractors involved in the initial sample collection.

The practice cylinders received were under vacuum. Approximately five litres of Simtars Low Span Natural Calibration Gas was introduced into cylinder number one of the first set of practice cylinders. Approximately five litres of the Simtars Low Span General Calibration Gas was introduced into cylinder number two of the first set of practice cylinders. The concentration of the calibration gases introduced to the first set of practice cylinders is listed in Table 1. The contents were then extracted using the water displacement method and analysed, with the expectation that what Simtars had introduced into the cylinder would be identical to what was extracted using the water displacement method.

The same methodology was subsequently used on a second set of practice cylinders, with the exception being that pure, analytical grade nitrogen was introduced, rather than calibration gas mixes. The requirement for a second set of practice cylinders is discussed in Section 4 below.

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The contents of each of the two test cylinders were extracted using the water displacement method, with no additional gases added by Simtars. The samples were immediately analysed on a micro gas chromatograph.

Analysis was performed in accordance with Simtars in-house methods LP0023 Procedure for Analysis of Natural Gas using a Micro Gas Chromatograph and LP0040 Procedure for Analysis of Liquefied Petroleum Gases (LPG) by Gas Chromatography

4 Results

Practice Cylinder Results

Based on the understanding that the gas cylinders had been thoroughly cleaned prior to use, the expectation was that the extracted gas results would match the introduced gas mixture. Simtars Low Span Natural Calibration Gas was introduced to cylinder one of the first set of practice cylinders (OG172932/03). Simtars Low Span General Calibration Gas was introduced to cylinder two of the first set of practice cylinders (OG172932/04). The concentrations of each of the calibration gases introduced to the practice cylinders are listed in Table 1. The extracted gas contained gases not present in the mixes that were introduced to the cylinders. Results are detailed in report OG172932F1a, samples OG172932/03 and OG172932/04 in ***Appendix D***.

These results suggest that the cylinders contained residual contamination prior to receipt by Simtars. The residual contamination detected in the practice cylinders was diluted by the calibration gases introduced as part of the extraction process.

Table 1: Concentration of Simtars Calibration Gases introduced to practice cylinders

Component (%)	Simtars Low Span Natural Calibration Gas Cylinder # 457042	Component (%)	Simtars Low Span General Calibration Gas Cylinder # 421346
Nitrogen	7.83	Helium	0.0096
Methane	89.52719	Hydrogen	0.0202
Carbon Dioxide	0.49	Oxygen	18.96
Ethane	1.50	Nitrogen	78.9734
Propane	0.51	Methane	0.99
Iso-butane	0.21	Carbon Monoxide	0.0201
n-butane	0.20	Carbon Dioxide	1.00
Neo-pentane	0.05032	Ethylene	0.0111
Iso-pentane	0.05799	Ethane	0.0107
n-pentane	0.0505	Propane	0.0049
Hexane	0.0230		

Following these unexpected results, investigations through NB Industries revealed that the two initial practice cylinders were not completely clean and Simtars was advised that these two cylinders may not have been prepared and handled in a similar manner to the two test cylinders used at the Moorvale site. This was discussed via phone conference on 23rd June 2014 between Brett Lamont (Moorvale Coal), Alan Miskin (Moorvale Coal), Greg Manthey (Simtars) and Lauren Forrester (Simtars).

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Subsequently, two additional practice cylinders also under vacuum (Simtars samples OG172932/05 and OG172932/06) were obtained from NB Industries. Simtars understands that these were cleaned using an identical process to that used to prepare the two test cylinders used on site to extract the residual atmosphere from the refrigerant line. Refer to ***Appendix A***.

Simtars introduced analytical grade, pure nitrogen to the second set of practice cylinders which was then extracted using the water displacement method. Results for these cylinders are shown in report OG172932F1a, in ***Appendix C***. Ethane, cis-butene, propene and 1,3 butadiene were found in the second set of practice cylinders, with cylinder two showing higher levels to a combined total of approximately 9%. These results suggest that the cylinders contained residual contamination prior to receipt by Simtars, however at much lower levels than those contained in test cylinder one of the first practice set (OG172932/03). The residual contamination detected in the practice cylinders was diluted by the pure nitrogen introduced as part of the extraction process.

Test Cylinder Results

Results are detailed in report OG172932F1a, samples OG172932/01 and OG172932/02 in ***Appendix D***.

The 'high-pressure' side cylinder was found to contain significant amounts of iso-butane, propane, 1,3 butadiene, with lower amounts of ethane, n-butane and iso-pentane.

The 'low-pressure' side cylinder was found to contain small amounts of iso-butane, propane, 1,3 butadiene and n-butane.

The identified gases are all flammable in their own right under the correct conditions and concentrations in air.

Flammable gases were identified in the mix extracted from the drill rig air conditioning system, with some constituents in common with those detailed in the HyChill MSDS. The Lower Explosive Limit (LEL) for HyChill in normal air is given at around 1.9%. Simtars is unable to determine the LEL for the gas mix extracted from the air conditioning system.

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5 Conclusions

Based on the understanding that the pre-use cleaning process for the original test cylinders and the second set of practice cylinders was identical, Simtars concludes that:

- All cylinders received from either Moorvale Coal or NB Industries contained a level of residual contamination, despite the vacuum cleaning prior to use.
- The second set of practice cylinders (samples OG172932/05 and OG172932/06) that were subjected to the intensive pre-use cleaning held relatively lower levels of residual contamination than test cylinder one of the first practice set (OG172932/03)
- The two test cylinders were both found to contain flammable gas components which included iso-butane, propane and 1,3-butadiene. The high side cylinder contained higher concentrations of the gas components, with the low side being more diluted. This is consistent with the rupture point being close to where the low side sample was taken.
- The significant amounts of gases such as iso-butane, propane and 1,3-butadiene in the test cylinders (OG172932/01 and OG172932/02) indicate these gases came from residual atmosphere collected in the air conditioning refrigerant line.
- Some of the gases present in the test cylinders are consistent with those found in HyChill as described in the MSDS.
- Propane and iso-butane, the two primary constituents of HyChill, were identified in the high side cylinder at concentrations significantly greater than in any of the practice cylinders or the low side cylinder.

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References

1. Simtars Method LP0023 Procedure for Analysis of Natural Gas using a Micro Gas Chromatograph
2. Simtars Method LP0040 Procedure for Analysis of Liquefied Petroleum Gases (LPG) by Gas Chromatography

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Appendix A: Letter of Instruction

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MOORVALE MINE

PEABODY ENERGY AUSTRALIA PCI (C&M MANAGEMENT) PTY LTD

ABN: 66 077 890 932

Peak Downs Highway via Nebo
PO Box 193
Nebo, Queensland 4742
Australia

Greg Manthey
Principle Occupational Health & Hygiene Specialist
SIMTARS
2 Smith Street
Redbank QLD 4301

Moorvale Mine- Testing of Air-Conditioning Components

We refer to your discussions with myself Lamont.

1. Background

1.1 As discussed, Peabody Energy Australia PCI (C&M Management) Pty Ltd (**Peabody**) has arranged for components of an air-conditioning system (**Components**) to be delivered to SIMTARS. The collection and packaging of the Components was witnessed by Whanau White from SIMTARS (Mackay office) on 8 April 2014.

1.2 Peabody requests that SIMTARS conduct a forensic examination of the Components and the oil and gases trapped within them as outlined in this letter.

2. Objective

2.1 The objective of the forensic examination of the Components is to:

(a) obtain residues of gas (1) and oil (2) in conjunction with the process of recovering residue from within the Components;

(b) such recovered residues to be subject to testing:

(i) gas testing

- to identify any residue of gas within the Components
- to identify same and report

(ii) oil testing

- to identify any residue of oil within the Components
- to identify same and report

(c) identify faults in the pressure switch included in the Components; and

(d) attempt if possible to recover identification markings on remnant white label on receiver dryer included within the Components and report on same.

3. Testing and reporting

3.1 Disconnect pressure switch included in the Components to test considerations of faults/ failure and report.

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3.2 Should oil or gas residues be identified in the Components, consider and report on:

(a) physical parameters of same;

(b) ignition points/ temperature, open flame and piloted;

(c) vapour pressure;

(d) flammability criteria;

(e) physical characteristics of combustion;

(f) likelihood of residues remaining in ambient / atmosphere; and

(g) any other points of considered pertinent to combustion of same.

4. Additional testing

Peabody would appreciate it if SIMTARS would advise whether it has the capacity to conduct tests of samples to consider presence of coal particulates.

5. Timeframes

We would also appreciate it if you could provide us with an indication on the likely timeframe for completion of the above steps.

Yours sincerely

sch4p3(3) Prejudice th

Brett Lamont

Mine Services Superintendent

Moorvale Mine

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Appendix B: Gas Sample Recovery Process

NB INDUSTRIES

Attention: Deanna McMaster

Date: 27.06.2014

From: Michael Selby

RE: Recovery Procedure of air con gas from Drill Rig Moorvale Mine site.

Machine: Drill Pro Drill Rig Morvale Mine

Hook up both reclaim bottles to vacuum pump and vac them down for 1.5 hours.
Check to find 2 x reclaim bottles are in vacuum for reclaim process.
Pre clean recovery machine and gauges, purge recovery machine and connect to gauge manifold.
Evacuate gauges and recovery machine for a period of 10 minutes on "purge Setting" and 10 minutes on "recover setting".

Connect recovery machine to reclaim cylinder one, place cylinder on scales and recalibrate to zero.
Clean area around Schroeder valves, connect gauges to ac system, open high side valve and recover high side for a period of 10 minutes.
Weight recovered high side approx. 10 grams.

Turn off all high side fittings, remove cylinder one from scales, seal cylinder for sampling and mark cylinder to ID for future reference.

Connect recovery cylinder two to reclaim machine, place cylinder on scales and recalibrate to zero.
Open low side valve and recover low side for a period of 10 minutes.
Weight recovered approx: 0 grams

Turned off all valves remove reclaim machine from system, refitted Schroeder valve caps.
Remove reclaim cylinder two from scales, seal and mark as cylinder two.

Send Cylinders away for Sampling

Michael Selby

24 Iridium Drive, Paget Qld 4740 | PO BOX 7138, Mackay Mail Centre Qld 4741
Ph: 07 4952 3931 | Fax: 07 4998 5539 | www.nbindustries.com.au

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Appendix C: MSDS – HyChill HC Refrigerant

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MATERIAL SAFETY DATA SHEET FOR HyChill HC REFRIGERANTS

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Propane/Isobutane/Ethane blends. (may also contain small amounts of n-butane)
A flammable gas used as refrigerant, normally stored under pressure in liquid form.
Most cylinders or containers are LIQUID SERVICE.
Trade Names: HyChill Minus 10, Minus 30, Minus 30EC, Minus 40 and Minus 50. Systematic Names: Propane/2-Methylpropane/Ethane

LPG Measurement Technology Pty Ltd, A.C.N. 068 745 755
85a Canterbury Rd, KILSYTH Victoria 3137, AUSTRALIA
Phone: (03) 9761 8788 FAX: (03) 9761 8799
EMERGENCY NUMBER: 0418 334 210 (24 hours)

2. HAZARDS IDENTIFICATION

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO NOHSC CRITERIA.
CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

UN No.	1075	**DG Class**	2.1	**Subsidiary Risk(s)**	None Allocated
Hazchem Code	2YE	**EPG**	2A2	**Pkg Group**	None Allocated

3. COMPOSITION / INFORMATION ON INGREDIENTS

			CAS Number
Main Components:	Propane	<60.0%	0074 – 98 – 6
	Isobutane	>35.0%	75 – 28 – 5
	Ethane	>5.0%	74 – 84 – 0
Minor Components:	Butane (normal)	<1.0%	106 – 97 – 8
Odourant:	Ethylmercaptan	Approx 25ppm	75 – 08 – 1

4. FIRST AID MEASURES - In all cases seek medical attention.

Eye Treatment for cold burns: Immediately flush with tepid water or with sterile saline solution. Hold eyelids apart and irrigate for 15 minutes. Seek medical attention.

Inhalation Remove from area of exposure immediately. Be aware of possible explosive atmospheres. If victim is not breathing apply artificial respiration and seek urgent medical attention. Give oxygen if available. Keep warm and rested.

Skin Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30°C) for 15 minutes. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in warm water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.

Ingestion For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor. Ingestion is considered unlikely due to the product form.

Advice to Doctor Treat symptomatically. Severe inhalation over exposure may sensitise the heart to catecholamine induced arrhythmias. Do not administer catecholamines to an overexposed person.

5. FIRE FIGHTING MEASURES

Flammability Highly flammable. Heating to decomposition produces acrid smoke and irritating fumes. Product will add fuel to a fire. Eliminate all ignition sources including cigarettes, open flames, spark producing switches /tools, heaters, naked lights, pilot lights, mobile phones etc. when handling.

Fire and Explosion Highly flammable. Temperatures in a fire may cause cylinders to rupture and internal pressure relief devices to be activated. Call Fire Brigade. This product will add fuel to a fire. Cool cylinders and vessels exposed to fire by applying water from a protected location and with water spray directing spray primarily onto the upper surface. Do not approach any HyChill HC refrigerant cylinder or container suspected of being hot.

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Extinguishing	Stop flow of gas if safe to do so, such as by closing valves. If the gas source cannot be isolated, do not extinguish the flame, since re-ignition and explosion could occur. Await arrival of emergency services. Drench and cool cylinders with water spray from protected area at a safe distance. If it is absolutely necessary to extinguish the flame, use only a dry chemical powder extinguisher. Do not move cylinders for at least 24 hours. Avoid shock and bumps to cylinders. Evacuate the area of persons not fighting the fire. Carbon monoxide fumes may be produced should burning occur within an enclosed space (ie causing a deficiency of oxygen). Fire fighters should wear full protective clothing and be aware of the risk of possible explosion (especially in a confined space). Flashback may occur along vapour trail. Where possible, remove cool cylinders from the path of the fire. Do not re-use a fire-exposed vessel or cylinder – seek advice of supplier.

6. ACCIDENTAL RELEASE MEASURES

Spillage	As this product has a very low flash point any spillage or leak is a fire and/or explosion hazard. If a leak has not ignited, stop gas flow, isolate sources of ignition and evacuate personnel. Note: Most cylinders/containers are LIQUID service. Ensure good ventilation. Liquid leaks generate large volumes of heavier than air flammable vapour which may travel to remote sources of ignition (eg along drainage systems). Where appropriate, use water spray to disperse the gas or vapour and to protect personnel attempting to stop leakage. Vapour may collect in any confined space.
Gas Cylinders	If the cylinder is leaking, eliminate all potential ignition sources and evacuate area of personnel. Inform manufacturer/supplier of leak. Wear appropriate PPE and carefully move to a well ventilated remote area, then allow to discharge. Do not attempt to repair leaking valve or cylinder fusible plugs.

7. HANDLING AND STORAGE

Precautions for Safe Handling.	Avoid inhalation of vapour. Avoid contact with liquid and cold storage containers. When handling cylinders wear protective footwear and suitable gloves. Always ensure that cylinders are within test date, are fit for use and are leak checked prior to use. Do not fill excessively dented, gouged or rusty containers (refer AS2337.1). Only fill cylinders by mass on verified weighing equipment.. Avoid contact with eyes. Class 2.1 Flammable Gas products may only be loaded in the same vehicle or packed in the same freight container with the classes of products as permitted in the ADG Code (see references). Cylinders shall only be transported in an upright, secure position in accordance with the National Road Transport Commission Load Restraint Guide and shall not be dropped.
Conditions for Safe Storage	Store and use only in equipment/containers designed for use with this product. Store and dispense only in well ventilated areas away from heat and sources of ignition. Do not enter storage tanks. If entry to tanks is necessary, contact the supplier. Containers must be properly labelled. Do not remove warning labels from containers. Cylinders shall be stored in accordance with the requirements of the ADG Code, AS 4332 and AS/NZS1596. Do not store in pits and basements where vapour may collect. Store cylinders securely in an upright position. Store away from incompatible materials particularly oxidising agents. Check that vessels and cylinders are clearly labelled. Do not contaminate cylinders with other products.
Other Information	Product spilt on clothing may give rise to delayed evaporation and subsequent fire hazard. Check for leaks by sound and smell and by locating with soapy water or with approved detection devices. Use only with hoses and gauges designed and approved for refrigerants. Ensure that cylinders cannot be struck by forklift vehicles or by dropped or rolled objects, etc. Refer to Australian state and territory dangerous goods regulations.

ReviewedOctober 03, 2012

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation	Maintain adequate ventilation. Confined areas (eg tanks) should be adequately ventilated and gas tested.	
Exposure	Isobutane	ES-TWA : 1000 ppm (NOHSC AUS)
	PROPANE	ES-TWA : 1000 ppm (NOSHC AUS)
	ETHANE	ES-TWA : 1000 ppm (NOSHC AUS)

PPE



Wear insulated or leather gloves and safety glasses.

Where an inhalation risk exists, wear an Air-line respirator or self Contained Breathing Apparatus (SCBA).

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	COLOURLESS GAS	**Solubility (water)**	0.001cm^3 / cm^3
Odour	Characteristic Odour *	**pH**	NOT AVAILABLE
Liquid Density@ 15 °C	>0.50 <0.64 g/cm^3	**Volatility**	Highly Volatile
Vapour Density	NOT AVAILABLE	**Flammability**	HIGHLY FLAMMABLE
Evaporation	Rapid, temperature dependent	**Melting Point**	NOT AVAILABLE
Upper Explosion Limit	9.5 %	**Lower Explosion Limit**	1.9 %
Vapour Pressure@25 °C	360 - 1006 kPa(g)	**Flash Point**	-104 to 0 °C
Boiling Point	-50 to -10 °C	**Autoignition Temperature**	~480 °C to ~550 °C

* **HyChill has added odourant ethylmercaptan unless otherwise authorised. (recommended 25 ppm). This is detectable to 20% of its lower flammability limit.**

10. STABILITY AND REACTIVITY

Chemical Stability	Stable under recommended conditions of storage.
Conditions to Avoid	Avoid heat, sparks, open flames and other ignition sources.
Decomposition	Heating to decomposition produces acrid smoke and irritating fumes.

11. TOXICOLOGICAL INFORMATION

Health Hazard Summary	Asphyxiant gas. Symptoms of exposure are directly related to displacement of oxygen from air.
Eye	Non irritating. However, direct contact with evaporating liquid may result in severe cold burns with possible permanent damage.
Inhalation	Non irritating – Asphyxiant. Effects are proportional to oxygen displacement. Low vapour concentrations may cause nausea, dizziness, headaches and drowsiness. May have a narcotic effect if high concentrations of vapour are inhaled. High vapour concentrations may produce symptoms of oxygen deficiency which, coupled with central nervous system depression, may lead to rapid loss of consciousness.
Abuse	Under normal conditions of use the product is non hazardous, however abuse involving deliberate inhalation of very high concentrations of vapour can produce unconsciousness and/or result in a sudden fatality or brain damage.
Skin	Non irritating. Contact with evaporating liquid or supercold vessels or pipes may result in frost-bite with severe tissue damage.
Ingestion	Due to product form, ingestion is considered highly unlikely.

Toxicity Data	PROPANE (74-98-6)	LC50 (Inhalation): 50,000 ppm
	ISOBUTANE (75-28-5)	LC50 (Inhalation): 57 pph/15 min (rat)
	ETHANE (74-84-0)	LD50 Rat: > 500-5000 ppm

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12. ECOLOGICAL INFORMATION

Environment	No known ecological damage is caused by this product.
Persistence / Degradability	Expected to be inherently biodegradable.
Mobility	No bioconcentration is expected.
Ecotoxicity	Low toxicity to aquatic organisms

13. DISPOSAL CONSIDERATIONS

Waste Disposal	Cylinders should be returned to the manufacturer or supplier for disposal of contents.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

Transport — Transport of Isobutane is controlled in accordance with the requirements of the ADG Code and the Load Restraint Guide.



UN Number	1075	Shipping Name	PROPANE/ISOBUTANE/ETHANE
DG Class	2.1	Subsidiary Risk(s)	None Allocated
Hazchem Code	2YE	Packing Group	None Allocated

15. REGULATORY INFORMATION

AICS — All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

Poison — A poison schedule number has not been allocated to this product using the criteria in Schedule the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP).

16. OTHER INFORMATION

The Australian Code for the Transport of Dangerous Goods by Road and Rail (commonly known as the ADG Code).
Australian Standards as detailed within this document.
AS/NZS 1677 Refrigerating Systems Part 1: Refrigeration classification
AS/NZS 1677 Refrigerating Systems Part 2: Safety requirements for fixed applications
Petroleum and Gas Legislation / Queensland: 2004
The Load Restraint Guide as prepared by the National Transport Commission.
Ozone Protection and Synthetic Greenhouse Gas Management Act 1989.

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Appendix D: Results

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Occupational Hygiene, Environment
and Chemistry Centre

Street Address 2 Smith Street, Redbank Q 4301
Postal Address PO Box 467, Goodna Q 4300
Phone 07 3810 6333
Fax 07 3810 6338

Analysis Report

Report Number	OG172932F1a
Report Issue Date	August 18, 2014
Report To	Peabody Energy, Mostyale Coal PO box 193 Nebo QLD, 4742
Client Reference	Drill Pro gas testing PO: 451421991
Job Description	6 Samples for LPG gas analysis
Date Received	April 11, 2014
Date Tested/Completed	August 7, 2014
Responsibility for Sampling	Client and Simtars
Approved Signatory	Sean Muller - Analytical Chemist

sch4p3(3)

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Report Number: OG172932F1a

Results:

Laboratory Number:		OG172932/ 1	OG172932/ 2	OG172932/ 3	OG172932/ 4	OG172932/ 5
Sample Identification:		Moorvale Drill-Pro 12 High side purge Tue 08 April 2014 W. White 11am-11:15am Cylinder may be under slight vacuum	Moorvale Drill-Pro 12 Low side purge Tue 08 April 2014 W. White 11:20am-11:25am	Practice set 1 Cylinder 1 M461947	Practice set 1 Cylinder 2 M500072	Practice set 2 Cylinder 1 M469856
Component	LOR	Normalised mol %	Normalised mol %	Normalised mol %	Normalised mol %	Normalised mol %
Ethane	0.01	0.07	<0.01	0.4	<0.01	0.15
Propane*	0.01	19.4	0.25	0.7	<0.01	<0.01
Propene*	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iso-Butane*	0.01	25.4	0.45	<0.01	<0.01	<0.01
n-Butane*	0.01	0.02	<0.01	<0.01	<0.01	<0.01
But-1-ene*	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iso-Butene*	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-butene (trans)*	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-butene (cis)*	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,3-Butadiene*	0.1	<0.1	<0.1	44.2	9.1	0.2
Iso-Pentane*	0.01	1.8	1.0	<0.1	2.6	<0.1
		0.02	<0.01	<0.01	<0.01	<0.01
Total		45.7	1.7	44.8	11.7	0.5

*Results are qualitative only due to results being more than 10% over highest calibration point

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Report Number: OG172932F1a

Results:

Laboratory Number		OG172932 6
Sample Identification		**Practice set 2 Cylinder 2 M460604**
Component	LOR	Normalised mol %
Ethane	0.01	2.14
Propene	0.01	<0.01
Propane	0.1	<0.1
iso-Butane	0.01	<0.01
n-Butane	0.01	<0.01
But-1-ene	0.1	<0.1
iso-Butene	0.1	<0.1
2-butene (trans)	0.1	<0.1
2-butene (cis)*	0.1	4.4
1,3-Butadiene*	0.1	2.7
iso-Pentane	0.01	<0.01
Total		9.2

*Results are qualitative only due to results being more than 15% over highest calibration point

References :

1. Simtars Laboratory Procedure LP0040 - "Procedure for analysis of Liquefied Petroleum Gases (LPG) by gas chromatography."
2. ISO 7941:1988, Commercial propane and butane - Analysis by gas chromatography.
3. Simtars Laboratory Procedure LP0023 - "Procedure for Analysis of Natural gas Using a Micro Gas Chromatograph".

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Simtars

Occupational Hygiene, Environment
and Chemistry Centre

Street Address 2 Smith Street, Redbank Q 4301
Postal Address PO Box 467, Goodna Q 4300
Phone 07 3810 6333
Fax 07 3810 6338

Analysis Report

RTI DL RELEASE - DNRM

Report Number	OG172932F1a
Report Issue Date	August 18, 2014
Report To	Peabody Energy, Moorvale Coal PO box 193 Nebo QLD, 4742
Client Reference	Drill Pro gas testing PO: 451421991
Job Description	6 Samples for LPG gas analysis
Date Received	April 11, 2014
Date Tested/Completed	August 7, 2014
Responsibility for Sampling	Client and Simtars
Approved Signatory	Sean Muller - Analytical Chemist

[redacted] sch4p3(3)

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Report Number: OG172932F1a

Results:

Laboratory Number	OG172932/ 1	OG172932/ 2	OG172932/ 3	OG172932/ 4	OG172932/ 5
Sample Identification	Moorvale Drill-Pro 12 High side purge Tue 08 April 2014 W.White 11am-11:15am Cylinder may be under slight vacuum	Moorvale Drill-Pro 12 Low side purge Tue 08 April 2014 W.White 11:24am-11:29am	Practice set 1 Cylinder 1 M461947	Practice set 1 Cylinder 2 M460072	Practice set 2 Cylinder 1 M463856
Component / LOR	Normalised mol %	Normalised mol %	Normalised mol %	Normalised mol %	Normalised mol %
Ethane 0.01	0.07	<0.01	0.44	<0.01	0.15
Propane* 0.01	19.4	0.25	0.17	<0.01	<0.01
Propene 0.1	<0.1	<0.1	<0.1	<0.1	<0.1
iso-Butane* 0.01	25.4	0.43	<0.01	<0.01	<0.01
n-Butane 0.01	0.02	<0.01	<0.01	<0.01	<0.01
But-1-ene 0.1	<0.1	<0.1	<0.1	<0.1	<0.1
iso-Butene 0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-butene (trans) 0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-butene (cis)* 0.1	<0.1	<0.1	44.2	9.1	0.3
1,3-Butadiene* 0.1	1.8	1.0	<0.1	2.6	<0.1
iso-Pentane 0.01	0.02	<0.01	<0.01	<0.01	<0.01
Total	46.7	1.7	44.8	11.7	0.5

*Results are qualitative only due to results being more than 10% over highest calibration point

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Re

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Report Number: OG172932F1a

Results:

Laboratory Number	OG172932/ 6
Sample Identification	Practice set 2 Cylinder 2 M460804
Component / LOR	Normalised mol %
Ethane 0.01	2.14
Propane 0.01	<0.01
Propene 0.1	<0.1
Iso-Butane 0.01	<0.01
n-Butane 0.01	<0.01
But-1-ene 0.1	<0.1
Iso-Butene 0.1	<0.1
2-butene (trans) 0.1	<0.1
2-butene (cis) 0.1	<0.1
1,3-Butadiene* 0.1	4.4
Iso-Pentane 0.01	2.7
	<0.01
Total	9.2

*Results are qualitative only due to results being more than 10% over highest calibration point

References :

1. Simtars Laboratory Procedure LP0040 - "Procedure for analysis of Liquefied Petroleum Gases (LPG) by gas chromatography."
2. ISO 7941:1988. Commercial propane and butane - Analysis by gas chromatography.
3. Simtars Laboratory Procedure LP0023 - "Procedure for Analysis of Natural gas Using a Micro Gas Chromatograph".

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Simtars Report OG172932P1

2 Smith Street, REDBANK, QLD 4301, Australia
Postal Address: PO Box 467, GOODNA, QLD, 4300 Australia

Phone (07) 3810 6333 Fax (07) 3810 6363 International Fax (617) 3810 6363

Gas Analysis
for Peabody Moorvale Coal

Q *Were flammable gas components present in two test cylinders collected at Moorvale Coal on 08/04/14.*

A *Yes. Simtars identified significant amounts of propane, iso-butane and 1,3-butadiene in the two test cylinders.*

This Question & Answer was supplied in good faith as a common-language review, for the convenience of our clients. It must be read in conjunction with the full report.

Client Contact	*Mr Brett Lamont* *Mine Production Superintendent* *Peabody Energy* *Moorvale Coal* *PO Box 193 Nebo, Qld. 4742.*
Client Reference	*Brett Lamont*
Investigation Period	*May – August 2014*
Simtars Investigator(s)	*Sean Muller (+61 7 3810 6338)* *Greg Manthey (+61 7 3810 6364)*
Reviewed	*Lauren Forrester*
Approved Signatory	sch4p3(3) Prejudice the protec
	Lauren Forrester *Analytical Chemist*
Report Date	*18 August 2014*

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1 Objectives

The aim of the project was to determine whether flammable gas components were present in either of two gas samples collected from a mobile drill rig air conditioning system refrigerant line.

2 Background

A workplace incident occurred at the Peabody Moorvale Coal Mine on or around 28th March 2014. The incident involved an explosion in the cabin of a mobile drill rig.

Simtars was requested by Mr Brett Lamont of Moorvale Coal to assist in aspects of the subsequent investigation process, including sampling and analysis of residual gases from the refrigerant line in the air-conditioning unit from the drill rig. The refrigerant line was ruptured during the incident resulting in the escape of refrigerant gases. The purpose of the analysis by Simtars was to identify whether residual refrigerant gases were present and the constituents of the residual gas. The gas investigation instructions are included in Moorvale Coal document marked as ***Appendix A***.

3 Methodology

The recovery of the residual gases was conducted by Moorvale Coal personnel, under observation by Simtars Mackay field officer Whanau White on Tuesday 08th April 2014. Two separate samples were collected using vacuum extraction into negative pressure cylinders. These are referred to in this report as the 'Test' cylinders. One sample was collected from the 'high pressure' side of the refrigerant line and the second from the 'low pressure' side. The process used for the collection is described in the document entitled *'Recovery Procedure of Air Con Gas from Drill Rig Moorvale Mine Site'* provided by contractors NB Industries. A copy of this document is attached marked ***Appendix B – Gas Sample Recovery Process.***

The two test cylinders were received by Simtars for analysis to identify the presence or otherwise of 'LPG-type' components commonly found in certain air-conditioning refrigerant gases such as HyChill. The Material Safety Data Sheet for HyChill is attached marked ***Appendix C – MSDS HyChill HC Refrigerant***. The typical main constituents of HyChill are propane, iso-butane and ethane. HyChill is classified as a Dangerous Goods Class 2.1 – Flammable Gas.

The two test cylinders were under atmospheric pressure when received by Simtars. It was determined by Simtars that extraction of the contents was best achieved using a water-displacement method. This method involved forcing a saturated sodium chloride solution under pressure into the gas cylinders until the pressure became too high to physically force any more solution into the cylinder. The cylinder valve was then closed to contain the pressure. A new Tedlar sample bag, which had been purged with nitrogen and all gas removed by vacuum was then attached to the cylinder valve. The valve was released enabling the pressurised gas to flow into the sample bag. The saturated sodium chloride solution was used as opposed to water, to minimise the potential for gases in the sample to dissolve into the solution used to pressurise the cylinder.

In order to ensure that this collection methodology was effective, prior to treatment of the test cylinders, Simtars obtained a pair of 'practice' cylinders from contractors NB Industries, the air-conditioning contractors involved in the initial sample collection.

The practice cylinders received were under vacuum. Approximately five litres of Simtars Low Span Natural Calibration Gas was introduced into cylinder number one of the first set of practice cylinders. Approximately five litres of the Simtars Low Span General Calibration Gas was introduced into cylinder number two of the first set of practice cylinders. The concentration of the calibration gases introduced to the first set of practice cylinders is listed in Table 1. The contents were then extracted using the water displacement method and analysed, with the expectation that what Simtars had introduced into the cylinder would be identical to what was extracted using the water displacement method.

The same methodology was subsequently used on a second set of practice cylinders, with the exception being that pure, analytical grade nitrogen was introduced, rather than calibration gas mixes. The requirement for a second set of practice cylinders is discussed in Section 4 below.

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The contents of each of the two test cylinders were extracted using the water displacement method, with no additional gases added by Simtars. The samples were immediately analysed on a micro gas chromatograph.

Analysis was performed in accordance with Simtars in-house methods LP0023 Procedure for Analysis of Natural Gas using a Micro Gas Chromatograph and LP0040 Procedure for Analysis of Liquefied Petroleum Gases (LPG) by Gas Chromatography

4 Results

Practice Cylinder Results

Based on the understanding that the gas cylinders had been thoroughly cleaned prior to use, the expectation was that the extracted gas results would match the introduced gas mixture. Simtars Low Span Natural Calibration Gas was introduced to cylinder one of the first set of practice cylinders (OG172932/03). Simtars Low Span General Calibration Gas was introduced to cylinder two of the first set of practice cylinders (OG172932/04). The concentrations of each of the calibration gases introduced to the practice cylinders are listed in Table 1. The extracted gas contained gases not present in the mixes that were introduced to the cylinders. Results are detailed in report OG172932F1a, samples OG172932/03 and OG172932/04 in ***Appendix D***.

These results suggest that the cylinders contained residual contamination prior to receipt by Simtars. The residual contamination detected in the practice cylinders was diluted by the calibration gases introduced as part of the extraction process.

Table 1: Concentration of Simtars Calibration Gases introduced to practice cylinders

Component (%)	Simtars Low Span Natural Calibration Gas Cylinder # 457042	Component (%)	Simtars Low Span General Calibration Gas Cylinder # 421346
Nitrogen	7.83	Helium	0.0096
Methane	89.52719	Hydrogen	0.0202
Carbon Dioxide	0.49	Oxygen	18.96
Ethane	1.50	Nitrogen	78.9734
Propane	0.51	Methane	0.99
Iso-butane	0.21	Carbon Monoxide	0.0201
n-butane	0.20	Carbon Dioxide	1.00
Neo-pentane	0.05032	Ethylene	0.0111
Iso-pentane	0.05799	Ethane	0.0107
n-pentane	0.0505	Propane	0.0049
Hexane	0.0230		

Following these unexpected results, investigations through NB Industries revealed that the two initial practice cylinders were not completely clean and Simtars was advised that these two cylinders may not have been prepared and handled in a similar manner to the two test cylinders used at the Moorvale site. This was discussed via phone conference on 23rd June 2014 between Brett Lamont (Moorvale Coal), Alan Miskin (Moorvale Coal), Greg Manthey (Simtars) and Lauren Forrester (Simtars).

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Subsequently, two additional practice cylinders also under vacuum (Simtars samples OG172932/05 and OG172932/06) were obtained from NB Industries. Simtars understands that these were cleaned using an identical process to that used to prepare the two test cylinders used on site to extract the residual atmosphere from the refrigerant line. Refer to ***Appendix A***.

Simtars introduced analytical grade, pure nitrogen to the second set of practice cylinders which was then extracted using the water displacement method. Results for these cylinders are shown in report OG172932F1a, in ***Appendix C***. Ethane, cis-butene, propene and 1,3 butadiene were found in the second set of practice cylinders, with cylinder two showing higher levels to a combined total of approximately 9%. These results suggest that the cylinders contained residual contamination prior to receipt by Simtars, however at much lower levels than those contained in test cylinder one of the first practice set (OG172932/03). The residual contamination detected in the practice cylinders was diluted by the pure nitrogen introduced as part of the extraction process.

Test Cylinder Results

Results are detailed in report OG172932F1a, samples OG172932/01 and OG172932/02 in ***Appendix D***.

The 'high-pressure' side cylinder was found to contain significant amounts of iso-butane, propane, 1,3 butadiene, with lower amounts of ethane, n-butane and iso-pentane.

The 'low-pressure' side cylinder was found to contain small amounts of iso-butane, propane, 1,3 butadiene and n-butane.

The identified gases are all flammable in their own right under the correct conditions and concentrations in air.

Flammable gases were identified in the mix extracted from the drill rig air conditioning system, with some constituents in common with those detailed in the HyChill MSDS. The Lower Explosive Limit (LEL) for HyChill in normal air is given at around 1.9%. Simtars is unable to determine the LEL for the gas mix extracted from the air conditioning system.

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5 Conclusions

Based on the understanding that the pre-use cleaning process for the original test cylinders and the second set of practice cylinders was identical, Simtars concludes that:

- All cylinders received from either Moorvale Coal or NB Industries contained a level of residual contamination, despite the vacuum cleaning prior to use.
- The second set of practice cylinders (samples OG172932/05 and OG172932/06) that were subjected to the intensive pre-use cleaning held relatively lower levels of residual contamination than test cylinder one of the first practice set (OG172932/03)
- The two test cylinders were both found to contain flammable gas components which included iso-butane, propane and 1,3-butadiene. The high side cylinder contained higher concentrations of the gas components, with the low side being more diluted. This is consistent with the rupture point being close to where the low side sample was taken.
- The significant amounts of gases such as iso-butane, propane and 1,3-butadiene in the test cylinders (OG172932/01 and OG172932/02) indicate these gases came from residual atmosphere collected in the air conditioning refrigerant line.
- Some of the gases present in the test cylinders are consistent with those found in HyChill as described in the MSDS.
- Propane and iso-butane, the two primary constituents of HyChill, were identified in the high side cylinder at concentrations significantly greater than in any of the practice cylinders or the low side cylinder.

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References

1. Simtars Method LP0023 Procedure for Analysis of Natural Gas using a Micro Gas Chromatograph
2. Simtars Method LP0040 Procedure for Analysis of Liquefied Petroleum Gases (LPG) by Gas Chromatography

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Appendix A: Letter of Instruction

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MOORVALE MINE

PEABODY ENERGY AUSTRALIA PCI (C&M MANAGEMENT) PTY LTD

ABN: 65 077 890 932

Peak Downs Highway via Nebo
PO Box 193
Nebo, Queensland 4742
Australia

Greg Manthey
Principle Occupational Health & Hygiene Specialist
SIMTARS
2 Smith Street
Redbank QLD 4301

Moorvale Mine- Testing of Air-Conditioning Components

We refer to your discussions with myself Lamont.

1. Background

1.1 As discussed, Peabody Energy Australia PCI (C&M Management) Pty Ltd (**Peabody**) has arranged for components of an air-conditioning system (**Components**) to be delivered to SIMTARS. The collection and packaging of the Components was witnessed by Whanau White from SIMTARS (Mackay office) on 8 April 2014.

1.2 Peabody requests that SIMTARS conduct a forensic examination of the Components and the oil and gases trapped within them as outlined in this letter.

2. Objective

2.1 The objective of the forensic examination of the Components is to:

(a) obtain residues of gas (1) and oil (2) in conjunction with the process of recovering residue from within the Components;

(b) such recovered residues to be subject to testing:

(i) gas testing

- to identify any residue of gas within the Components
- to identify same and report

(ii) oil testing

- to identify any residue of oil within the Components
- to identify same and report

(c) identify faults in the pressure switch included in the Components; and

(d) attempt if possible to recover identification markings on remnant white label on receiver dryer included within the Components and report on same.

3. Testing and reporting

3.1 Disconnect pressure switch included in the Components to test considerations of faults/ failure and report.

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3.2 Should oil or gas residues be identified in the Components, consider and report on:

(a) physical parameters of same;

(b) ignition points/ temperature, open flame and piloted;

(c) vapour pressure;

(d) flammability criteria;

(e) physical characteristics of combustion;

(f) likelihood of residues remaining in ambient / atmosphere; and

(g) any other points of considered pertinent to combustion of same.

4. Additional testing

Peabody would appreciate it if SIMTARS would advise whether it has the capacity to conduct tests of samples to consider presence of coal particulates.

5. Timeframes

We would also appreciate it if you could provide us with an indication on the likely timeframe for completion of the above steps.

Yours sincerely

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Brett Lamont

Mine Services Superintendent

Moorvale Mine

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Appendix B: Gas Sample Recovery Process

NB INDUSTRIES

Attention: Deanna McMaster

Date: 27.06.2014

From: Michael Selby

RE: Recovery Procedure of air con gas from Drill Rig Moorvale Mine site.

Machine: Drill Pro Drill Rig Morvale Mine

Hook up both reclaim bottles to vacuum pump and vac them down for 1.5 hours.
Check to find 2 x reclaim bottles are in vacuum for reclaim process.
Pre clean recovery machine and gauges, purge recovery machine and connect to gauge manifold.
Evacuate gauges and recovery machine for a period of 10 minutes on "purge Setting" and 10 minutes on "recover setting".

Connect recovery machine to reclaim cylinder one, place cylinder on scales and recalibrate to zero.
Clean area around Schroeder valves, connect gauges to ac system, open high side valve and recover high side for a period of 10 minutes.
Weight recovered high side approx. 10 grams.

Turn off all high side fittings, remove cylinder one from scales, seal cylinder for sampling and mark cylinder to ID for future reference.

Connect recovery cylinder two to reclaim machine, place cylinder on scales and recalibrate to zero.
Open low side valve and recover low side for a period of 10 minutes.
Weight recovered approx: 0 grams

Turned off all valves remove reclaim machine from system, refitted Schroeder valve caps.
Remove reclaim cylinder two from scales, seal and mark as cylinder two.

Send Cylinders away for Sampling

Michael Selby

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24 Iridium Drive, Paget Qld 4740 | PO BOX 7138, Mackay Mail Centre Qld 4741
Ph: 07 4952 3931 | Fax: 07 4998 5539 | www.nbindustries.com.au

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Appendix C: MSDS – HyChill HC Refrigerant

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MATERIAL SAFETY DATA SHEET FOR HyChill HC REFRIGERANTS

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Propane/Isobutane/Ethane blends. (may also contain small amounts of n-butane)
A flammable gas used as refrigerant, normally stored under pressure in liquid form.
Most cylinders or containers are LIQUID SERVICE.
Trade Names: HyChill Minus 10, Minus 30, Minus 30EC, Minus 40 and Minus 50. Systematic Names: Propane/2-Methylpropane/Ethane

LPG Measurement Technology Pty Ltd, A.C.N. 068 745 755
85a Canterbury Rd, KILSYTH Victoria 3137, AUSTRALIA
Phone: (03) 9761 8788 FAX: (03) 9761 8799
EMERGENCY NUMBER: 0418 334 210 (24 hours)

2. HAZARDS IDENTIFICATION

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO NOHSC CRITERIA.
CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

UN No.	1075	**DG Class**	2.1	**Subsidiary Risk(s)**	None Allocated
Hazchem Code	2YE	**EPG**	2A2	**Pkg Group**	None Allocated

3. COMPOSITION / INFORMATION ON INGREDIENTS

			CAS Number
Main Components:	Propane	<60.0%	0074 – 98 – 6
	Isobutane	>35.0%	75 – 28 – 5
	Ethane	>5.0%	74 – 84 – 0
Minor Components:	Butane (normal)	<1.0%	106 – 97 – 8
Odourant:	Ethylmercaptan	Approx 25ppm	75 – 08 – 1

4. FIRST AID MEASURES - In all cases seek medical attention.

Eye Treatment for cold burns: Immediately flush with tepid water or with sterile saline solution. Hold eyelids apart and irrigate for 15 minutes. Seek medical attention.

Inhalation Remove from area of exposure immediately. Be aware of possible explosive atmospheres. If victim is not breathing apply artificial respiration and seek urgent medical attention. Give oxygen if available. Keep warm and rested.

Skin Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30°C) for 15 minutes. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in warm water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.

Ingestion For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor. Ingestion is considered unlikely due to the product form.

Advice to Doctor Treat symptomatically. Severe inhalation over exposure may sensitise the heart to catecholamine induced arrhythmias. Do not administer catecholamines to an overexposed person.

5. FIRE FIGHTING MEASURES

Flammability Highly flammable. Heating to decomposition produces acrid smoke and irritating fumes. Product will add fuel to a fire. Eliminate all ignition sources including cigarettes, open flames, spark producing switches /tools, heaters, naked lights, pilot lights, mobile phones etc. when handling.

Fire and Explosion Highly flammable. Temperatures in a fire may cause cylinders to rupture and internal pressure relief devices to be activated. Call Fire Brigade. This product will add fuel to a fire. Cool cylinders and vessels exposed to fire by applying water from a protected location and with water spray directing spray primarily onto the upper surface. Do not approach any HyChill HC refrigerant cylinder or container suspected of being hot.

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Extinguishing	Stop flow of gas if safe to do so, such as by closing valves. If the gas source cannot be isolated, do not extinguish the flame, since re-ignition and explosion could occur. Await arrival of emergency services. Drench and cool cylinders with water spray from protected area at a safe distance. If it is absolutely necessary to extinguish the flame, use only a dry chemical powder extinguisher. Do not move cylinders for at least 24 hours. Avoid shock and bumps to cylinders. Evacuate the area of persons not fighting the fire. Carbon monoxide fumes may be produced should burning occur within an enclosed space (ie causing a deficiency of oxygen). Fire fighters should wear full protective clothing and be aware of the risk of possible explosion (especially in a confined space). Flashback may occur along vapour trail. Where possible, remove cool cylinders from the path of the fire. Do not re-use a fire-exposed vessel or cylinder – seek advice of supplier.

6. ACCIDENTAL RELEASE MEASURES

Spillage	As this product has a very low flash point any spillage or leak is a fire and/or explosion hazard. If a leak has not ignited, stop gas flow, isolate sources of ignition and evacuate personnel. Note: Most cylinders/containers are LIQUID service. Ensure good ventilation. Liquid leaks generate large volumes of heavier than air flammable vapour which may travel to remote sources of ignition (eg along drainage systems). Where appropriate, use water spray to disperse the gas or vapour and to protect personnel attempting to stop leakage. Vapour may collect in any confined space.
Gas Cylinders	If the cylinder is leaking, eliminate all potential ignition sources and evacuate area of personnel. Inform manufacturer/supplier of leak. Wear appropriate PPE and carefully move to a well ventilated remote area, then allow to discharge. Do not attempt to repair leaking valve or cylinder fusible plugs.

7. HANDLING AND STORAGE

Precautions for Safe Handling.	Avoid inhalation of vapour. Avoid contact with liquid and cold storage containers. When handling cylinders wear protective footwear and suitable gloves. Always ensure that cylinders are within test date, are fit for use and are leak checked prior to use. Do not fill excessively dented, gouged or rusty containers (refer AS2337.1). Only fill cylinders by mass on verified weighing equipment.. Avoid contact with eyes. Class 2.1 Flammable Gas products may only be loaded in the same vehicle or packed in the same freight container with the classes of products as permitted in the ADG Code (see references). Cylinders shall only be transported in an upright, secure position in accordance with the National Road Transport Commission Load Restraint Guide and shall not be dropped.
Conditions for Safe Storage	Store and use only in equipment/containers designed for use with this product. Store and dispense only in well ventilated areas away from heat and sources of ignition. Do not enter storage tanks. If entry to tanks is necessary, contact the supplier. Containers must be properly labelled. Do not remove warning labels from containers. Cylinders shall be stored in accordance with the requirements of the ADG Code, AS 4332 and AS/NZS1596. Do not store in pits and basements where vapour may collect. Store cylinders securely in an upright position. Store away from incompatible materials particularly oxidising agents. Check that vessels and cylinders are clearly labelled. Do not contaminate cylinders with other products.
Other Information	Product spilt on clothing may give rise to delayed evaporation and subsequent fire hazard. Check for leaks by sound and smell and by locating with soapy water or with approved detection devices. Use only with hoses and gauges designed and approved for refrigerants. Ensure that cylinders cannot be struck by forklift vehicles or by dropped or rolled objects, etc. Refer to Australian state and territory dangerous goods regulations.

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation	Maintain adequate ventilation. Confined areas (eg tanks) should be adequately ventilated and gas tested.	
Exposure	Isobutane	ES-TWA : 1000 ppm (NOHSC AUS)
	PROPANE	ES-TWA : 1000 ppm (NOSHC AUS)
	ETHANE	ES-TWA : 1000 ppm (NOSHC AUS)

PPE





Wear insulated or leather gloves and safety glasses.

Where an inhalation risk exists, wear an Air-line respirator or self Contained Breathing Apparatus (SCBA).

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	COLOURLESS GAS	**Solubility (water)**	0.001cm^3 / cm^3
Odour	Characteristic Odour *	**pH**	NOT AVAILABLE
Liquid Density@ 15 °C	>0.50 <0.64 g/cm^3	**Volatility**	Highly Volatile
Vapour Density	NOT AVAILABLE	**Flammability**	HIGHLY FLAMMABLE
Evaporation	Rapid, temperature dependent	**Melting Point**	NOT AVAILABLE
Upper Explosion Limit	~ 9.5 %	**Lower Explosion Limit**	~ 1.9 %
Vapour Pressure@25 °C	360 - 1006 kPa(g)	**Flash Point**	-104 to 0 °C
Boiling Point	-50 to -10 °C	**Autoignition Temperature**	~480 °C to ~550 °C

* HyChill has added odourant ethylmercaptan unless otherwise authorised. (recommended 25 ppm). This is detectable to 20% of its lower flammability limit.

10. STABILITY AND REACTIVITY

Chemical Stability	Stable under recommended conditions of storage.
Conditions to Avoid	Avoid heat, sparks, open flames and other ignition sources.
Decomposition	Heating to decomposition produces acrid smoke and irritating fumes.

11. TOXICOLOGICAL INFORMATION

Health Hazard Summary	Asphyxiant gas. Symptoms of exposure are directly related to displacement of oxygen from air.
Eye	Non irritating. However, direct contact with evaporating liquid may result in severe cold burns with possible permanent damage.
Inhalation	Non irritating – Asphyxiant. Effects are proportional to oxygen displacement. Low vapour concentrations may cause nausea, dizziness, headaches and drowsiness. May have a narcotic effect if high concentrations of vapour are inhaled. High vapour concentrations may produce symptoms of oxygen deficiency which, coupled with central nervous system depression, may lead to rapid loss of consciousness.
Abuse	Under normal conditions of use the product is non hazardous, however abuse involving deliberate inhalation of very high concentrations of vapour can produce unconsciousness and/or result in a sudden fatality or brain damage.
Skin	Non irritating. Contact with evaporating liquid or supercold vessels or pipes may result in frost-bite with severe tissue damage.
Ingestion	Due to product form, Ingestion is considered highly unlikely.

Toxicity Data	PROPANE (74-98-6)	LC50 (Inhalation): 50,000 ppm
	ISOBUTANE (75-28-5)	LC50 (Inhalation): 57 pph/15 min (rat)
	ETHANE (74-84-0)	LD50 Rat: > 500-5000 ppm

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12. ECOLOGICAL INFORMATION

Environment	No known ecological damage is caused by this product.
Persistence / Degradability	Expected to be inherently biodegradable.
Mobility	No bioconcentration is expected.
Ecotoxicity	Low toxicity to aquatic organisms

13. DISPOSAL CONSIDERATIONS

Waste Disposal	Cylinders should be returned to the manufacturer or supplier for disposal of contents.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

Transport — Transport of Isobutane is controlled in accordance with the requirements of the ADG Code and the Load Restraint Guide.



UN Number	1075	Shipping Name	PROPANE/ISOBUTANE/ETHANE
DG Class	2.1	Subsidiary Risk(s)	None Allocated
Hazchem Code	2YE	Packing Group	None Allocated

15. REGULATORY INFORMATION

AICS — All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

Poison — A poison schedule number has not been allocated to this product using the criteria in Schedule the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP).

16. OTHER INFORMATION

The Australian Code for the Transport of Dangerous Goods by Road and Rail (commonly known as the ADG Code).
Australian Standards as detailed within this document.
AS/NZS 1677 Refrigerating Systems Part 1: Refrigeration classification
AS/NZS 1677 Refrigerating Systems Part 2: Safety requirements for fixed applications
Petroleum and Gas Legislation / Queensland: 2004
The Load Restraint Guide as prepared by the National Transport Commission.
Ozone Protection and Synthetic Greenhouse Gas Management Act 1989.

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Appendix D: Results

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Occupational Hygiene, Environment
and Chemistry Centre

Street Address 2 Smith Street, Redbank Q 4301
Postal Address PO Box 467, Goodna Q 4300
Phone 07 3810 6333
Fax 07 3810 6338

Analysis Report

Report Number	OG172932F1a
Report Issue Date	August 18, 2014
Report To	Peabody Energy, Moorvale Coal PO box 193 Nebo Qld 4742
Client Reference	Drill Pro gas testing PO: 451421991
Job Description	6 Samples for LPG gas analysis
Date Received	April 11, 2014
Date Tested/Completed	August 7, 2014
Responsibility for Sampling	Client and Simtars
Approved Signatory	Sean Muller - Analytical Chemist

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Report Number: OG172932F1a

Results:

Laboratory Number		OG172932/ 1	OG172932/ 2	OG172932/ 3	OG172932/ 4	OG172932/ 5
Sample Identification		Moorvale Drill-Pro 12 High side purge Tue 08 April 2014 W. Wide 11am 11:15am Cylinder may be under slight vacuum	Moorvale Drill-Pro 12 Low side purge Tue 08 April 2014 W. Wide 11:24am-11:29am	Practice set 1 Cylinder 1 M461947	Practice set 1 Cylinder 2 M460072	Practice set 2 Cylinder 1 M460866
Component	LOR	Normalised mol %	Normalised mol %	Normalised mol %	Normalised mol %	Normalised mol %
Ethane	0.01	0.07	<0.01	0.44	<0.01	0.15
Propane*	0.01	19.4	0.25	0.12	<0.01	<0.01
Propene	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iso-Butane*	0.01	25.4	0.43	<0.01	<0.01	<0.01
n-Butane*	0.01	0.02	<0.01	<0.01	<0.01	<0.01
But-1-ene	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iso-Butene	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-butene (trans)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-butene (cis)*	0.1	<0.1	<0.1	44.2	9.1	0.3
1,3-Butadiene*	0.1	1.8	1.0	<0.1	2.5	<0.1
Iso-Pentane	0.01	0.02	<0.01	<0.01	<0.01	<0.01
Total		46.7	1.7	44.8	11.7	0.5

*Results are qualitative only due to results being more than 10% over highest calibration point

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Unless otherwise indicated responsibility for sampling rests with the client. Where test items are submitted by the client results expressed in this report relate only to test items as received. This document may not be reproduced except in full or used in any way for advertising purposes without the written approval of the laboratory.

Report Number: OG172932F1a

Results:

Laboratory Number		OG172932 6
Sample Identification		Practice set 2 Cylinder 2 M460804
Component	LOR	Normalised mol %
Ethane	0.01	2.14
Propane	0.01	<0.01
Propene	0.1	<0.1
Iso-Butane	0.01	<0.01
n-Butane	0.01	<0.01
But-1-ene	0.1	<0.1
Iso-Butene	0.1	<0.1
2-butene (trans)	0.1	<0.1
2-butene (cis)*	0.1	4.4
1,3-Butadiene*	0.1	2.7
Iso-Pentane	0.01	<0.01
Total		9.2

*Results are qualitative only due to results being more than 10% over highest calibration point

References :

1. Simtars Laboratory Procedure LP0040 - "Procedure for analysis of Liquefied Petroleum Gases (LPG) by gas chromatography."
2. ISO 7941:1988. Commercial propane and butane - Analysis by gas chromatography.
3. Simtars Laboratory Procedure LP0023 - "Procedure for Analysis of Natural gas Using a Micro Gas Chromatograph".

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LF0088 Status Date: 050514

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LANG Jennifer (Admin Review)

From:	MANTHEY Greg
Sent:	Thursday, 1 May 2014 12:30 PM
To:	MULLER Sean; FORRESTER Lauren; HOLLYER Jeremy; AMORA Vicky; KLEINHANS Mark
Cc:	WINTER Matthew
Subject:	Peabody - Moorvale Coal Sample and Analysis
Attachments:	hychill-refrig-msds-1075.pdf; Cylinder Photo.jpg; Sampling Rig.jpg; RE: Extracting sample from empty cylinder

Matt – for info only. No action.

Gas Group and Mark Kleinhans,

MST file reference is 50/004/0017/29/32

Attached are:

- Photo of two cylinders. We have these two that are at atmospheric pressure and we are required to extract a bag of the contents and then analyse for residue of refrigerant gases.
- The contents are residual atmospheric-pressure gas from an air conditioning system from a drill rig that had an explosion in the operator cabin. The client thinks there might have been a flammable gas used as the air conditioning system refrigerant.
- Hychill generic MSDS. The substances we are looking for are those listed in the MSDS. Nat gas analysis should find propane and butane if it's there, the procedure has a limit of reporting of 100 ppm but I want to analyse / report as low as we can go, which Lauren tells me is single digit ppm.
- Photo of the proposed test rig. Because the contents of the test cylinders are under atmospheric pressure we will need to displace the contents, probably using a liquid.
- Copy of e-mail to Lauren from The sample extraction method is detailed in that.

By early next week, we are going to receive a further two cylinders, hopefully identical to those in the photo. These extra cylinders (Method Validation Cylinders) are being supplied under vacuum. The intention is to introduce a contaminant of known concentration (preferably propane and butane in air) into the validation cylinders then water-extract, analyse and compare. If we get out what we put in, then the testing of the real cylinders can proceed.

Gas Group – Can you please have a look at the test rig photo and identify whether we have any of the parts (uncontaminated) that we need for the fittings and lines.

Mark – As discussed earlier, can you please let me know what you need from us in order to build the test rig. NOTE – It **does not** need to be exactly the same (ie dimensions, looks etc), it just needs to work the same way.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
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MATERIAL SAFETY DATA SHEET FOR HyChill HC REFRIGERANTS

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Propane/Isobutane/Ethane blends. (may also contain small amounts of n-butane)
A flammable gas used as refrigerant, normally stored under pressure in liquid form.
Most cylinders or containers are LIQUID SERVICE.
Trade Names: HyChill Minus 10, Minus 30, Minus 30EC, Minus 40 and Minus 50. Systematic Names: Propane/2-Methylpropane/Ethane

LPG Measurement Technology Pty Ltd, A.C.N. 068 745 755
85a Canterbury Rd, KILSYTH Victoria 3137, AUSTRALIA
Phone: (03) 9761 8788 FAX: (03) 9761 8799
EMERGENCY NUMBER: 0418 334 210 (24 hours)

2. HAZARDS IDENTIFICATION

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO NOHSC CRITERIA.
CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

UN No.	1075	**DG Class**	2.1	**Subsidiary Risk(s)**	None Allocated
Hazchem Code	2YE	**EPG**	2A2	**Pkg Group**	None Allocated

3. COMPOSITION / INFORMATION ON INGREDIENTS

			CAS Number
Main Components:	Propane	<60.0%	0074 – 98 – 6
	Isobutane	>35.0%	75 – 28 – 5
	Ethane	>5.0%	74 – 84 – 0
Minor Components:	Butane (normal)	<1.0%	106 – 97 – 8
Odourant:	Ethylmercaptan	Approx 25ppm	75 – 08 – 1

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4. FIRST AID MEASURES - In all cases seek medical attention.

Eye Treatment for cold burns: Immediately flush with tepid water or with sterile saline solution. Hold eyelids apart and irrigate for 15 minutes. Seek medical attention.

Inhalation Remove from area of exposure immediately. Be aware of possible explosive atmospheres. If victim is not breathing apply artificial respiration and seek urgent medical attention. Give oxygen if available. Keep warm and rested.

Skin Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30° C) for 15 minutes. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in warm water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.

Ingestion For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor. Ingestion is considered unlikely due to the product form.

Advice to Doctor Treat symptomatically. Severe inhalation over exposure may sensitise the heart to catecholamine induced arrhythmias. Do not administer catecholamines to an overexposed person.

5. FIRE FIGHTING MEASURES

Flammability Highly flammable. Heating to decomposition produces acrid smoke and irritating fumes. Product will add fuel to a fire. Eliminate all ignition sources including cigarettes, open flames, spark producing switches /tools, heaters, naked lights, pilot lights, mobile phones etc. when handling.

Fire and Explosion Highly flammable. Temperatures in a fire may cause cylinders to rupture and internal pressure relief devices to be activated. Call Fire Brigade. This product will add fuel to a fire. Cool cylinders and vessels exposed to fire by applying water from a protected location and with water spray directing spray primarily onto the upper surface. Do not approach any HyChill HC refrigerant cylinder or container suspected of being hot.

Extinguishing	Stop flow of gas if safe to do so, such as by closing valves. If the gas source cannot be isolated, do not extinguish the flame, since re-ignition and explosion could occur. Await arrival of emergency services. Drench and cool cylinders with water spray from protected area at a safe distance. If it is absolutely necessary to extinguish the flame, use only a dry chemical powder extinguisher. Do not move cylinders for at least 24 hours. Avoid shock and bumps to cylinders. Evacuate the area of persons not fighting the fire. Carbon monoxide fumes may be produced should burning occur within an enclosed space (ie causing a deficiency of oxygen). Fire fighters should wear full protective clothing and be aware of the risk of possible explosion (especially in a confined space). Flashback may occur along vapour trail. Where possible, remove cool cylinders from the path of the fire. Do not re-use a fire-exposed vessel or cylinder – seek advice of supplier.

6. ACCIDENTAL RELEASE MEASURES

Spillage	As this product has a very low flash point any spillage or leak is a fire and/or explosion hazard. If a leak has not ignited, stop gas flow, isolate sources of ignition and evacuate personnel. Note: Most cylinders/containers are LIQUID service. Ensure good ventilation. Liquid leaks generate large volumes of heavier than air flammable vapour which may travel to remote sources of ignition (eg along drainage systems). Where appropriate, use water spray to disperse the gas or vapour and to protect personnel attempting to stop leakage. Vapour may collect in any confined space.
Gas Cylinders	If the cylinder is leaking, eliminate all potential ignition sources and evacuate area of personnel. Inform manufacturer/supplier of leak. Wear appropriate PPE and carefully move to a well ventilated remote area, then allow to discharge. Do not attempt to repair leaking valve or cylinder fusible plugs.

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7. HANDLING AND STORAGE

Precautions for Safe Handling.	Avoid inhalation of vapour. Avoid contact with liquid and cold storage containers. When handling cylinders wear protective footwear and suitable gloves. Always ensure that cylinders are within test date, are fit for use and are leak checked prior to use. Do not fill excessively dented, gouged or rusty containers (refer AS2337.1). Only fill cylinders by mass on verified weighing equipment.. Avoid contact with eyes. Class 2.1 Flammable Gas products may only be loaded in the same vehicle or packed in the same freight container with the classes of products as permitted in the ADG Code (see references). Cylinders shall only be transported in an upright, secure position in accordance with the National Road Transport Commission Load Restraint Guide and shall not be dropped.
Conditions for Safe Storage	Store and use only in equipment/containers designed for use with this product. Store and dispense only in well ventilated areas away from heat and sources of ignition. Do not enter storage tanks. If entry to tanks is necessary, contact the supplier. Containers must be properly labelled. Do not remove warning labels from containers. Cylinders shall be stored in accordance with the requirements of the ADG Code, AS 4332 and AS/NZS1596. Do not store in pits and basements where vapour may collect. Store cylinders securely in an upright position. Store away from incompatible materials particularly oxidising agents. Check that vessels and cylinders are clearly labelled. Do not contaminate cylinders with other products.
Other Information	Product spilt on clothing may give rise to delayed evaporation and subsequent fire hazard. Check for leaks by sound and smell and by locating with soapy water or with approved detection devices. Use only with hoses and gauges designed and approved for refrigerants. Ensure that cylinders cannot be struck by forklift vehicles or by dropped or rolled objects, etc. Refer to Australian state and territory dangerous goods regulations.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation: Maintain adequate ventilation. Confined areas (eg tanks) should be adequately ventilated and gas tested.

Exposure		
	Isobutane	ES-TWA : 1000 ppm (NOHSC AUS)
	PROPANE	ES-TWA : 1000 ppm (NOSHC AUS)
	ETHANE	ES-TWA : 1000 ppm (NOSHC AUS)

PPE





Wear insulated or leather gloves and safety glasses.

Where an inhalation risk exists, wear an Air-line respirator or self Contained Breathing Apparatus (SCBA).

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	COLOURLESS GAS	**Solubility (water)**	0.001cm^3 / cm^3
Odour	Characteristic Odour *	**pH**	NOT AVAILABLE
Liquid Density@ 15℃	>0.50 <0.64 g/cm^3	**Volatility**	Highly Volatile
Vapour Density	NOT AVAILABLE	**Flammability**	HIGHLY FLAMMABLE
Evaporation	Rapid, temperature dependent	**Melting Point**	NOT AVAILABLE
Upper Explosion Limit	≈ 9.5 %	**Lower Explosion Limit**	≈ 1.9 %
Vapour Pressure@25℃	360 - 1006 kPa(g)	**Flash Point**	-104 to 0 ℃
Boiling Point	-50 to -10℃	**Autoignition Temperature**	~480℃ to ~550℃

*** HyChill has added odourant ethylmercaptan unless otherwise authorised. (recommended 25 ppm). This is detectable to 20% of its lower flammability limit.**

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10. STABILITY AND REACTIVITY

Chemical Stability	Stable under recommended conditions of storage.
Conditions to Avoid	Avoid heat, sparks, open flames and other ignition sources.
Decomposition	Heating to decomposition produces acrid smoke and irritating fumes.

11. TOXICOLOGICAL INFORMATION

Health Hazard Summary: Asphyxiant gas. Symptoms of exposure are directly related to displacement of oxygen from air.

Eye: Non irritating. However, direct contact with evaporating liquid may result in severe cold burns with possible permanent damage.

Inhalation: Non irritating – Asphyxiant. Effects are proportional to oxygen displacement. Low vapour concentrations may cause nausea, dizziness, headaches and drowsiness. May have a narcotic effect if high concentrations of vapour are inhaled. High vapour concentrations may produce symptoms of oxygen deficiency which, coupled with central nervous system depression, may lead to rapid loss of consciousness.

Abuse: Under normal conditions of use the product is non hazardous, however abuse involving deliberate inhalation of very high concentrations of vapour can produce unconsciousness and/or result in a sudden fatality or brain damage.

Skin: Non irritating. Contact with evaporating liquid or supercold vessels or pipes may result in frost-bite with severe tissue damage.

Ingestion: Due to product form, ingestion is considered highly unlikely.

Toxicity Data		
	PROPANE (74-98-6)	LC50 (Inhalation): 50,000 ppm
	ISOBUTANE (75-28-5)	LC50 (Inhalation): 57 pph/15 min (rat)
	ETHANE (74-84-0)	LD50 Rat: > 500-5000 ppm

12. ECOLOGICAL INFORMATION

Environment	No known ecological damage is caused by this product.
Persistence / Degradability	Expected to be inherently biodegradable.
Mobility	No bioconcentration is expected.
Ecotoxicity	Low toxicity to aquatic organisms

13. DISPOSAL CONSIDERATIONS

Waste Disposal	Cylinders should be returned to the manufacturer or supplier for disposal of contents.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

Transport — Transport of Isobutane is controlled in accordance with the requirements of the ADG Code and the Load Restraint Guide.



UN Number	1075	Shipping Name	PROPANE/ISOBUTANE/ETHANE
DG Class	2.1	Subsidiary Risk(s)	None Allocated
Hazchem Code	2YE	Packing Group	None Allocated

15. REGULATORY INFORMATION

AICS — All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

Poison — A poison schedule number has not been allocated to this product using the criteria in Schedule the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP).

16. OTHER INFORMATION

The Australian Code for the Transport of Dangerous Goods by Road and Rail (commonly known as the ADG Code).
Australian Standards as detailed within this document.
AS/NZS 1677 Refrigerating Systems Part 1: Refrigeration classification
AS/NZS 1677 Refrigerating Systems Part 2: Safety requirements for fixed applications
Petroleum and Gas Legislation / Queensland: 2004
The Load Restraint Guide as prepared by the National Transport Commission.
Ozone Protection and Synthetic Greenhouse Gas Management Act 1989.

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Release

LANG Jennifer (Admin Review)

From: Greg Browning <greg.browning@trade.nsw.gov.au>
Sent: Wednesday, 16 April 2014 3:32 PM
To: FORRESTER Lauren
Subject: RE: Extracting sample from empty cylinder
Attachments: IMG_20140416_150142666.jpg

Hi Lauren,

I've attached a photo of our rig.

The way we do it is:

Fill the rig with saturated sodium chloride solution. You have to use a saturated salt solution to reduce the solubility of gases in water. This will minimise dissolving components in your sample or releasing dissolved gases that could contaminate your sample. The higher the ionic strength of the solution, the lower the solubility of gases.

Turn the gas cylinder upside down so that if you get any leaks in the rig, the salt solution gets squirted out not your sample.

Use compressed air to slowly push the solution out of the rig and into the gas cylinder. You will only need 1 atm pressure at most to get a bagful of sample for a scuba tank sized cylinder. Less if the cylinder is bigger.

Turn the cylinder right way up to get sample. It's easiest to have a two way valve in line so you can fill a bag without having to disconnect anything.

There will always be a bit of water collected in the bag so take care when pushing the sample into the GC/analyser.

Hope this helps.

Regards

Greg Browning

Dr Greg Browning
Senior Scientific Officer
Mine Safety Technology Centre
NSW Trade & Investment
PO Box 343 Hunter Region Mail Centre NSW 2310
8 Hartley Drive, Thornton NSW 2322
Ph: 02 4924 4005
Fx: 02 4924 4080
Greg.Browning@trade.nsw.gov.au

From: FORRESTER Lauren [mailto:Lauren.Forrester@simtars.com.au]
Sent: Wednesday, 16 April 2014 12:08 PM
To: greg.browning@industry.nsw.gov.au
Subject: Extracting sample from empty cylinder

Hi Greg,

Release

I hope all is well on your end. I remember you telling me about how you had to get a sample out of a scuba cylinder that was empty when I was down visiting your lab. We have a similar situation with a few cylinders here, they aren't

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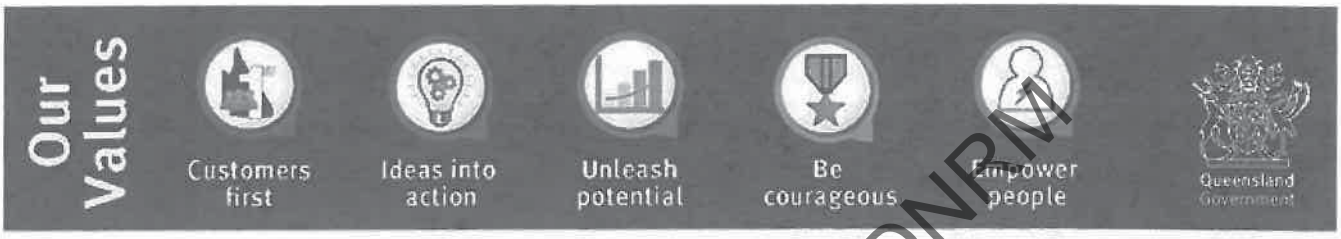
scuba cylinders but the contents are only at atmospheric. There has been discussion about using water displacement to get a sample out of them, so I thought I'd send you an email and see if you had any advice considering you've already had to go through the process yourself. From memory you even had a rig that you had made up to deliver the water in to the cylinder. Any advice or help you can give would be beneficial for us.

Regards,

Lauren Forrester
Analytical Chemist | Simtars

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LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Monday, 7 April 2014 9:11 AM
To: WHITE Whanau
Cc: BRENNAN Tabitha (Tabitha.Brennan@simtars.com.au); WINTER Matthew; FORRESTER Lauren; LYNCH Patrick
Subject: Peabody Energy - Moorvale Coal

Whanau,

As discussed earlier this morning, some points to bear in mind:

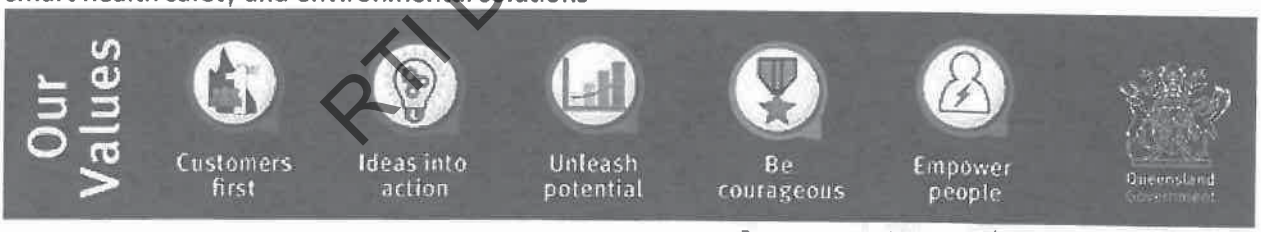
- Get as much assistance from Atlas Copco as possible on identifying where in the system that refrigerant may be lurking.
- Call me with ANY questions.
- It would be best if bag sampling is conducted at Redbank. However, if you do need to use a Tedlar bag from somewhere, try to ensure it is a brand new bag, not one that has been used previously. Try to get an aspirator bulb or hand pump with the bag because you will need some means of filling the bag.
- Discourage Atlas from using any hot methods for removal of system. Cold crimping of pipes etc.
- Get Atlas to plug and patch any holes if possible. I have spoken to Darren Brady about the issue of whether it is OK to use tape and he said if possible wrap component in an aluminium sample bag and then seal with tape. Call me if this is necessary and we can talk through it.

Good luck

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
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LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Friday, 2 May 2014 8:46 AM
To: TURNER David (DNRM); ROSS Grant
Subject: Peabody Energy - Moorvale Coal

David,

Contact details are:

Peabody Energy Moorvale Coal - Brett Lamont sch4p3(3) Prejudic

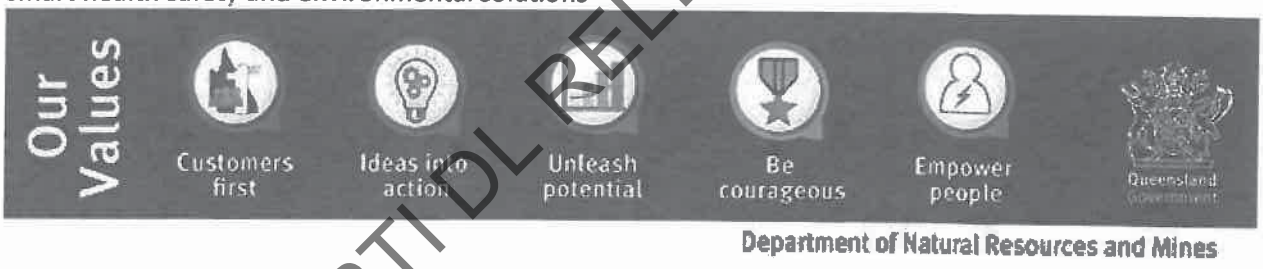
Air Conditioning Technicians
NB Industries Paget Mackay
Either Wayne 4840 2335 or Steve (the technician who removed the parts from the drill rig)
http://www.nbindustries.com.au/paget-facility.html

Thanks

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
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PURCHASE ORDER

PRINT DATE: 27.05.2014 17:07:50

ORDER DATE: 27.05.2014

INVOICE TO:	SHIP TO:	
PEABODY ENERGY AUSTRALIA PCI (C&M MANAGEMENT) P/L AS OPERATOR OF CMJV 100 Melbourne St South Brisbane, QLD 4101 ABN#: 65077890932 PCI_accountspayable@peabodyenergy.com	Moorvale Mine Peak Downs Highway, via Nebo Nebo, QLD 4742	PURCHASE ORDER NUMBER **PO: 451421991** THIS NUMBER MUST APPEAR ON ALL INVOICES, SHIPPING NOTICES, BILL OF LADINGS, PACKING SLIPS, PACKAGES AND CORRESPONDENCE .

VENDOR ADDRESS:

SIMTARS
DEPT OF NAT. RESOURCES & MINES
2 SMITH ST
REDBANK, QLD 4301
0738106363

PAYMENT TERMS: Net in 30 days

FREIGHT TERMS:

TRANSPORT NOTES:

LINE NO	QUANTITY ORDERED	UNIT	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
00010	15,000.000	EA	SERVICE 206441 206441 SERVICE OFFSITE TESTING LABORATORY Drill Pro gas testing as per Brett Lamont request Required Delivery Date:10.06.2014	1.00	15,000.00

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Page 1 of 4	TOTAL AMOUNT	15,000.00

SEND ORIGINAL INVOICE SHOWING OUR PURCHASE ORDER NUMBER
*THE TERMS AND CONDITIONS OF THIS PURCHASE ORDER ARE ATTACHED.

PLEASE DIRECT QUESTIONS TO THE PURCHASING CONTACT LISTED BELOW

NAME	SIGNATURE	TELEPHONE	FAX NUMBER	EMAIL
Do not use		0746635555	0746635549	smurphy4@peabodyenergy.com

Release

1. SUPPLY OF GOODS OR SERVICES

1.1 The Supplier must supply to the Company the Goods or perform the Services in accordance with the Purchase Order (which includes these Purchase Order Terms and Conditions).

1.2 To the extent the Supplier's terms and conditions are supplied with the Goods or Services (including as printed on consignment notes or other documents), those terms and conditions will be of no legal effect and will not constitute part of this Purchase Order.

1.3 Where this Purchase Order relates to Goods or Services the subject of an existing contract between the Supplier and the Company, the terms of that contract prevail.

1.4 The Supplier must, in supplying the Goods or performing the Services:

a) not interfere with the Company's activities at the Delivery Address or the Site;

b) be aware of and comply with and ensure that the Supplier's employees, agents and suppliers are aware of and comply with:

(i) all applicable Laws;

(ii) all Site Standards and Procedures, to the extent that they are applicable to the supply of the Goods or the performance of the Services; and

(iii) all lawful directions and orders given by the Company's representative or any person authorised by Law to give directions to the Supplier;

c) ensure that the Supplier's employees, agents and suppliers entering the Site perform their tasks in a safe manner and are properly qualified for, and skilled in, the performance of their tasks and are of such character as not to prejudice:

(i) safe working practices;

(ii) safety and care of property; or

(iii) continuity of work;

d) provide all such information and assistance as the Company reasonably requires in connection with any statutory or Health and Safety investigation in connection with the supply of the Goods or the performance of the Services;

e) on request by the Company, provide to the Company and its employees, agents and consultants any information and assistance required to identify, evaluate, implement and report on any matter required by Law, including:

(i) producing written reports;

(ii) collecting data; or

(iii) monitoring or metering;

in respect of any thing used, produced or created in connection with the performance of the Supplier#s obligations under this Purchase Order; and

f) leave the Site in a clean and tidy state to the satisfaction of the Company.

1.5 The Company may direct the Supplier to remove any person from the Site if the Company believes the person to be guilty of misconduct, incompetent or negligent.

2. TIME FOR PERFORMANCE

The Supplier must supply the Goods or perform the Services in accordance with the terms of this Purchase Order by the Delivery Date.

3. PACKAGING

3.1 The Supplier must ensure that the Goods are suitably packed to avoid damage in transit or in storage.

3.2 Packages must be marked with the Purchase Order number, item number, destination, contents, quality, date and method of dispatch and weight of each package.

4. TITLE AND RISK

4.1 Title in the Goods passes to the Company upon the earlier of payment of the Price and delivery of the Goods to the Delivery Address.

4.2 Risk in the Goods passes to the Company when the Supplier has safely removed the Goods off its transporters and deposited the Goods at the Delivery Address.

5. PRICE

5.1 The Company must pay the Supplier the Price for the Goods or Services.

5.2 The Price is inclusive of all costs incurred by the Supplier in the supply of the Goods or performance of the Services.

5.3 Payment does not constitute the Company#s acceptance ofthe Goods or Services.

5.4 The Supplier will at all times remain responsible for making, and hereby indemnifies the Company against, all necessary deductions in respect of personnel who will be performing the Services including any legislation concerning income, payroll or fringe benefits tax, superannuation, workers#compensation or leave entitlements. The Supplier acknowledges that the Company may deduct from the Price any amounts for which the Company has been indemnified under this clause.

6. GOODS AND SERVICE TAX (GST)

6.1 For the purposes of this clause 6, "Supplier" has the meaning given in this clause and the terms, **"GST"**, **"GST law"**, **"Supply"** and other capitalised terms used but not otherwise defined in this clause 6 have the meanings given to them by the A New Tax System (Goods and Services Tax) Act 1999 (as amended from time to time) or any replacement or other relevant legislation and regulations, except that **"GST law"** also includes any other legislation enacted to validate, recapture or recoup tax collected as GST.

6.2 Unless otherwise stated, all amounts payable (including non-monetary consideration) by the recipient of a Supply **(Recipient)** to the party making the Supply **(Supplier)**, howsoever described in this Purchase Order do not include GST.

6.3 If a Supply under this Purchase Order is subject to GST, the Recipient must pay to the Supplier an additional amount equal to the amount payable in relation to that Supply multiplied by the prevailing GST rate.

6.4 The additional amount under clause 6.3 is payable at the same time as the amount payable in relation to the Supply is payable or to be provided.

6.5 Any additional amount payable in accordance with clause 6.4 need not be paid until the Supplier provides a Tax Invoice to the Recipient.

6.6 If the amount of GST paid is more than is required under the GST law the Supplier shall refund the excess amount to the Recipient. If the amount of GST paid is less than is required under the GST law, the Recipient shall pay the Supplier the difference. For the purposes of calculating further variations under this clause 6, any additional amount referred to in clause 6.3 is taken to be amended by the amount of any earlier variation made under this clause.

6.7 If a party to this Purchase Order is entitled to be reimbursed or indemnified for a cost incurred by a party in accordance with this Purchase Order, the amount of the reimbursement or indemnity shall not exceed the GST exclusive cost of the amount. For the avoidance of doubt, the amount of any reimbursement or indemnity does not include any amount attributable to GST for which the party seeking reimbursement is entitled to an Input Tax Credit.

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6.8 If a party to this Purchase Order is a member of a GST Group, references to GST which the party must pay, and to Input Tax Credits to which the party is entitled, include GST which the representative member of the GST Group must pay and Input Tax Credits to which the representative member is entitled.

7. INVOICING

7.1 On delivery of the Goods or completion of the Services, the Supplier must provide to the Company a valid tax invoice which must include the following details:

a) a reference to the Purchase Order and the relevant contract (if any);

b) a detailed description of the delivered Goods or performed Services, including the Delivery Date or period of Services;

c) an individual reference number for the Company to quote with remittance of payment;

d) the price relating to the Goods or Services, broken down to reflect the same price components on the Purchase Order;

e) the amount of any applicable GST;

f) Company operation and Site; and

g) Company contact name.

7.2 At the Company's request, the Supplier must provide the Company with all relevant records to calculate and verify the amount set out in its invoice.

7.3 The Company is not obliged to approve an invoice submitted in accordance with clause 7.1 and may withhold money due to the Supplier under this Purchase Order if the Goods or Services (or any part of them) are Defective.

7.4 Subject to clause 7.3 and 7.5, the Company will pay all invoices that comply with clause 7.1 within 30 days of receipt of the invoice. Where the Company disputes the invoice:

a) the Company may withhold payment pending resolution of the dispute; and

b) if the resolution of the dispute determines that the Company must pay an amount to the Supplier, the Company must pay that amount within 14 days of resolution of that dispute.

7.5 The Company may reduce any payment due to the Supplier under this Purchase Order by any amount which the Supplier must pay the Company, including costs, charges, damages and expenses and any debts owed by the Supplier to the Company on any account whatsoever. This does not limit the Company's right to recover amounts due to it in other ways.

8. QUALITY

8.1 The Goods or Services must match the description (if any) referred to in the Purchase Order.

8.2 The Goods must be fit for the purpose for which goods of the same kind are commonly supplied or bought and for any other purpose the Company specifies prior to the date of this Purchase Order.

8.3 The Goods must be new, unless otherwise specified in the Purchase Order.

8.4 If the Goods are Defective or otherwise do not comply with this clause 8:

a) the Supplier must replace the Goods at the Supplier's cost; and

b) the Company may hold the Goods for the Supplier at the Supplier's risk.

8.5 If the Services are Defective the Supplier must, if requested by the Company, re-perform the Services at the Supplier#s cost.

9. WARRANTY PERIOD

9.1 If, during the Warranty Period, any of the Goods or Services are found to be Defective, the Company may:

a) return the Defective Goods to the Supplier at the Supplier's cost;

b) reject the Defective Services;

c) repair or make good the Defective Goods; or

d) re-perform or make good the Defective Services.

9.2 The Supplier must (at the Company's election):

a) repair or replace the Defective Goods;

b) re-perform or make good the Defective Services; or

c) reimburse the Company for any expenses incurred in repairing, re-performing or making good (as the case may be) any Defective Goods or Services at the Supplier's cost.

9.3 Without limiting clause 11, the Supplier must pay for any damage to property on or near the Site arising from Defective Goods or Services.

9.4 The Company must receive the benefits of any warranties provided by manufacturers of the Goods or materials and other components which are used in the performance of the Purchase Order where title in the Goods or materials ultimately passes to the Company.

10. CONFIDENTIAL INFORMATION AND INTELLECTUAL PROPERTY

10.1 Where the Supplier has access to any of the Company#sconfidential information, the Supplier must:

a) keep the confidential information confidential; and

b) not (except to the extent required by Law) disclose it to any person without the prior written consent of the Company.

10.2 The Supplier assigns and transfers all Intellectual Property Rights created by the Supplier in supplying the Goods or performing the Services to the Company upon creation. The Supplier warrants that it will not infringe any third party Intellectual Property Rights in supplying the Goods or performing the Services.

11. INDEMNITIES AND INSURANCE

11.1 The Supplier will indemnify the Company and its employees, agents, consultants and contractors **(Indemnified Parties)** for liability, loss, damage, cost, charge or expense suffered or incurred by any of them arising from:

a) any personal injury, disease or illness suffered by, or the death of, any person engaged by the Supplier to Supply the Goods or perform the Services under the Purchase Order;

b) personal injury, disease, illness suffered by or death of any person caused, or contributed to, by the acts or omissions of the Contractor or the Contractor#s Personnel, except to the extent that the indemnity under clause 11.1(a) applies;

c) physical loss of or damage to property of the Company or any third party caused, or contributed to, by the acts or omissions of the Supplier or its employees, agents, consultants or contractors;

d) any interest in or right over, or any alleged interest in or right over, (whether by encumbrance, lien, charge, mortgage or any other interest or right recognised by the law of any relevant jurisdiction) any goods that the Supplier does or seeks to sell, transfer, lease, licence or otherwise dispose of to the Company;

e) any infringement, or alleged infringement, of any third party's Intellectual Property Rights; and

f) any criminal or fraudulent act or omission, or wilful misconduct of the Supplier or its employees, agents, consultants or contractors,

provided that the Supplier's liability to indemnify the Company will be reduced proportionally to the extent the liability, loss, damage, cost, charge or expense is caused, or contributed to by, a negligent act or omission of the Indemnified Parties.

11.2 The Supplier must maintain workers' compensation insurance as required by applicable Laws, public liability insurance for an amount (if any) specified on the Purchase Order and any other insurance specified on the Purchase Order.

RTI DE RELEASE - DNRM

12. TERMINATION

12.1 The Company may terminate this Purchase Order by notice in writing to the Supplier:

a) if the Supplier fails to Supply the Goods or perform the Services (as applicable) by the Delivery Date;

b) if the Goods supplied are Defective and the Defective Goods are not replaced;

c) if the Services performed are Defective;

d) if the Supplier fails to remedy a breach of any other term or condition of this Purchase Order within 5 Business Days of being directed in writing to do so by the Company; and

e) in its absolute discretion at any time and for any reason by giving the Supplier 14 days written notice.

12.2 Immediately upon the termination of this Purchase Order, the Supplier will:

a) cease the Supply and the Services and, unless otherwise directed by the Company, remove all of its plant, equipment and materials from Site, minimising disruption and remediating any damage caused by removal;

b) if directed by the Company, remove the Goods from Site;

c) clean the Site at which the Goods were supplied or the Services were performed; and

d) provide to the Company all confidential information, any items in respect of which intellectual property rights are held by the Company, and any property, including records or information, belonging to the Company or relating to the Goods or Services.

13. FORCE MAJEURE

13.1 If a party becomes unable by reason of a Force Majeure event to carry out an obligation under this Purchase Order, that party must give written notice specifying the details of the Force Majeure event and its affect on that party's operations and performance of its obligations.

13.2 Upon service of notice pursuant to clause 13.1, the obligations of the affected party will be suspended, but only to the extent that, and for as long as, the affected party is unable by reason of the Force Majeure event to carry out those obligations in accordance with this Purchase Order.

14. AGENCY AND AUTHORITY

If the Company consists of more than one person or enters into this Purchase Order as agent of persons in a joint venture:

a) an obligation of those persons is several and those persons' liability is several in proportion to the respective interests that are disclosed from time to time by the Company (including on the Company's website); and;

b) a right of those persons is held severally.

15. GENERAL

15.1 The Law applicable to this Purchase Order is the Law applicable at the location of the Site.

15.2 Any part of this Purchase Order that is held to be unlawful or unenforceable by a court of competent jurisdiction is severed and the remaining provisions will continue to operate.

15.3 If a dispute arises between the parties in relation to the Goods and/or Services, neither party can commence litigation (other than urgent injunctive proceedings) until a representative from each party meets to attempt to resolve the dispute, and the dispute cannot be resolved within 14 days of that meeting.

15.4 A notice given under this Purchase Order must be in writing addressed to the recipient at the address on the Purchase Order cover page.

15.5 It is the intention of the Company and the Supplier that their relationship is one of principal and independent contractor.

16. DEFINITIONS

Company means the Peabody entity named in the Purchaser Order.

Defective means Goods or Services (or any aspect of them) which are not in accordance with the Purchase Order or which are damaged, deficient, faulty, inadequate or incomplete.

Delivery Address means the place for delivery specified in the 'ship to' box in the Purchase Order.

Delivery Date means the date for delivery of the Goods or completion of the Services specified in the Purchase Order.

Force Majeure means:

a) lightning strikes, earth quakes, landslides, floods, typhoon, drought, cyclones, storms, bush fires or any other natural disaster or other severe weather event; or

b) acts of terrorism, riots, civil commotion, hostilities at war (whether declared or not) or the occurrence of which could not have reasonably be controlled by the party seeking to rely on the occurrence of such an event.

Goods means the goods, if any, described on the Purchase Order.

Health and Safety means health, safety, environment and community.

Intellectual Property Rights means all beneficial and legal ownership and intellectual and industrial protection rights throughout the world, both present and future, including rights in respect of or in connection with any confidential information, copyright (including future copyright and rights in the nature of or analogous to copyright), moral rights, inventions (including patents), trade marks, service marks and designs (whether or not now existing and whether or not registered or registrable) and includes any right to apply for the registration of such rights and all renewals and extensions.

Law means:

c) Commonwealth, State and local government legislation including regulations, bylaws, orders, awards and proclamations;

d) common law and equity;

e) authority requirements and consents, certificates, licences, permits and approvals (including conditions in respect of those consents, certificates, licences, permits and approvals); and

f) guidelines of authorities with which the Supplier is legally required to comply.

Price means the price set out in the Purchase Order which is exclusive of GST, but is inclusive of all other costs and charges.

Purchase Order means:

a) the purchase order for Goods or Services issued by the Company to the Supplier containing, amongst other things, a description of the Goods or Services; and

b) these Purchase Order Terms and Conditions.

Site means site of the Company described in the Purchase Order.

Site Standards and Procedures means Peabody Energy Australia's Cardinal Rules, the Company standards, procedures and policies relating to safety, the environment, quality, energy, operations and purchasing and such standards, procedures and policies as notified by Company, as amended from time to time and any other guidelines, rules, requirements or Site specific conditions which the Company makes available to the Supplier from time to time.

Services means the services, if any, described on the Purchase Order.

Supplier means the entity to which the Purchase Order is addressed.

Supply includes the supply, delivery and storage of Goods in accordance with this Purchase Order.

Warranty Period means the period of 12 months commencing on the Delivery Date or 12 months from the date on which the Services are completed.

RTI DL RELEASE - DNRM

LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Tuesday, 10 June 2014 8:02 AM
To: Lamont, Brett W
Subject: Re: Compressor Oil Testing

OK. Thanks Brett.

Greg Manthey
Principal Occupational Hygienist
Simtars
Phone: (07)38106364
Mobile: sch4p3(3) Prejudice

Sent from my iPhone

On 9 Jun 2014, at 10:11 pm, "Lamont, Brett W" <BLamont@peabodyenergy.com> wrote:

> Greg,
>
> Please do not progress anything with the oil samples. We are considering our options and looking into having the samples tested by a specialty petrochemical lab.
>
> I will be in touch within the next 24 hours.
>
> Regards,
>
> **Brett W Lamont**
> Mine Production Superintendent
>
> Phone: 61 7 4847 1451
> Mobile: 61 (

From: MANTHEY Greg [mailto:Greg.Manthey@simtars.com.au]
Sent: Friday, 6 June 2014 5:38 PM
To: Lamont, Brett W
Cc: david.pass@health.qld.gov.au; MULLER Sean; FORRESTER Lauren
Subject: FW: Compressor Oil Testing

Brett,

Just following up on the e-mail below. Do you want me to proceed with the oil testing?

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388 | M +6 | greg.manthey@simtars.com.au | www.simtars.com.au

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<image001.jpg>

RTI DL RELEASE - DNRM

From: MANTHEY Greg
Sent: Monday, 2 June 2014 11:00 AM
To: 'Lamont, Brett W'
Cc: 'david.pass@health.qld.gov.au'; MULLER Sean; FORRESTER Lauren; HOLLYER Jeremy
Subject: Compressor Oil Testing

Brett,

I have contacted Queensland Health Forensic and Scientific Services and David Pass from that laboratory has had a look at the compressor. David thinks that a sample of oil could be recovered and tested for LPG-type gases. David was cautious however as to the likelihood of recovery as there is uncertainty over the solubility of the propane / butane gases in the oil.

I have also spoken to Wayne from NB Industries. The compressor has been sealed since recovery by NB Industries from site and the 'head-space' in the compressor may hold residual gas that was dissolved in the oil and has subsequently evaporated. Wayne indicated that there should also be around 100mL of oil in the compressor reservoir.

The testing that Qld Health would do will include analysis for butane and iso-butane, the presence of which would suggest a flammable gas in the refrigerant. It will also include tetrafluroethane which is the component in the R134a non-flammable refrigerant. The presence of this would suggest a non-flammable refrigerant.

There are two options that we could follow:

- Extraction and analysis of the gas from the head-space in the compressor,
- Drain oil from the compressor and test.

Costs

- Qld Health have indicated cost for their analysis of around $900 + GST,
- Simtars costs would be in the order of $600 + GST which includes delivery of samples to and coordination of Qld Health analysis.

With regard to the fan motor, David's opinion was that there was no likelihood of successful recovery of oil from the fan blades.

Brett - With your approval, I will arrange for:

1. Extraction of head-space gas sample - analysis by Simtars for natural gases and analysis by Qld Health which will include butane / iso-butane and tetrafluroethane.
2. Extraction of oil sample from compressor – analysis by Qld Health for dissolved gases, which I believe would include butane / iso-butane and tetrafluroethane.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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Release

LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Wednesday, 18 June 2014 1:24 PM
To: 'Lamont, Brett W'
Cc: WINTER Matthew
Subject: RE: Compressor Oil Testing

Brett,

I have contacted Petrolab (Jan Bon) and am arranging for freight of the following today:

1. Compressor unit,
2. Receiver / dryer unit,
3. Fan motor.

The final gas analysis report was waiting on oil analysis decision as I was intending to report the gas and oil analysis in the one document, however will now arrange for the gas report to be finalised and sent, subject to your approval.

If you would like to nominate a time Friday for discussion and let me know. I am available at any time that suits you. Did you want my direct manager involved in that discussion?

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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-----Original Message-----
From: Lamont, Brett W [mailto:BLamont@peabodyenergy.com]
Sent: Wednesday, 18 June 2014 11:59 AM
To: MANTHEY Greg
Subject: RE: Compressor Oil Testing
Importance: High

Good Morning Greg,

As per my phone message to you today, can I please request SIMTARS, through yourself, to send the oil samples via courier service to Petrolab PVT at 45 Woodforde Road Magill SA 5072 to the attention of Paul Bon. Paul can be contacted on 08 8364 1500 if you could please organise a courier to ferry the samples and place the costing on the invoice for the testing of our account.

I would also like to discuss a phone hook-up with yourselves on Friday to discuss the comments in the draft report around the possible contamination of the cylinders that contained samples.

I further note that we are yet to receive the final report from your office, however given the context of the conversation on Friday, holding off of supplying the final report may be beneficial.

Regards,

Brett W Lamont
Mine Production Superintendent
Moorvale Mine
Peabody Energy Australia

Peak Downs Highway Phone: 61 7 4847 1451 Via Nebo QLD 4742 Mobile: 61 (0)

PO Box 193 blamont@peabodyenergy.com

Nebo QLD 4742 www.peabodyenergy.com

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Release

LANG Jennifer (Admin Review)

From: Lamont, Brett W <BLamont@peabodyenergy.com>
Sent: Sunday, 20 July 2014 10:32 AM
To: MANTHEY Greg
Subject: RE: Cylinders

Thanks Greg,

I will chase them up. Please let me know if/when they arrive.

Regards,

Brett W Lamont
Mine Production Superintendent

Phone: 61 7 4847 1451
Mobile: 61 (0) sch4p3(3) Pre

From: MANTHEY Greg [mailto:Greg.Manthey@simtars.com.au]
Sent: Friday, 18 July 2014 5:08 PM
To: Lamont, Brett W
Subject: Cylinders

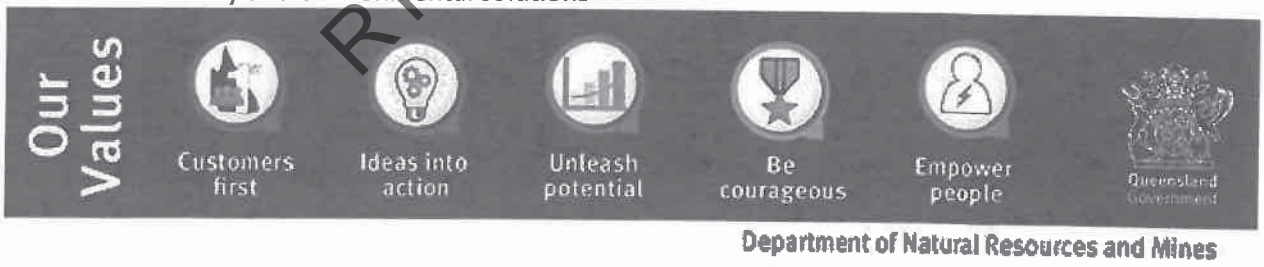
Brett,

Just letting you know that there is still no sign of the additional cylinders.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388 | M +61 [redacted] | greg.manthey@simtars.com.au | www.simtars.com.au

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RTI DE RELEASE - DNRM

LANG Jennifer (Admin Review)

From: Lamont, Brett W <BLamont@peabodyenergy.com>
Sent: Monday, 11 August 2014 8:07 AM
To: MANTHEY Greg
Cc: FORRESTER Lauren; MULLER Sean
Subject: RE: Gas Testing - Moorvale
Attachments: Gas Testing

Good Morning Greg,

Thank you for the update, however I must advise that the delays with the finalised reports are becoming problematic for us. Is there any chance we can get it finalised today before your gas chemist goes off onto sites?

I am under increasing pressure from both the business and the inspectorate around closing this investigation out and the delays for the last month have centred around the time it is taking for SIMTARS to complete reports. Can you please advise as to whether we can expect this process to be expedited? I note that your email of 30/7/14 (attached) advised that we would have the preliminary results early the week of the 4th and the final results "within 10 working days of that" (my estimation being around the 15th).

I would appreciate if we could receive the final report by close of business, Monday 18 August. Please advise if this date is achievable.

Regards,

Brett W Lamont
Mine Production Superintendent

Phone: 61 7 4847 1451
Mobile: 61 (sch4p3(3) Prejud

RTI DL RELEASE - DNRM

From: MANTHEY Greg [mailto:Greg.Manthey@simtars.com.au]
Sent: Friday, 8 August 2014 5:42 PM
To: Lamont, Brett W
Cc: FORRESTER Lauren; MULLER Sean
Subject: Gas Testing - Moorvale

Brett,

The results of the testing of the two additional practice cylinders are being formatted and checked and I plan to have a results-only report available for you on Monday. The gas chemist involved in this job is at a mine site from Tuesday to Friday of next week, so completion of a full report with testing methodology will not be until the week after.

The results indicate that despite the pre-treatment cleaning, all cylinders still held a small residue of contaminant. The composition of the residual contaminants varied from cylinder to cylinder and there were some that we could identify and others that were not able to be matched.

However, two sample cylinders used at site contained a noticeably greater proportion (percentage level differences) of LPG-type contaminants, particularly butane and propane, than the two practice cylinders. Assuming that the two original cylinders and the last two practice cylinders were identically treated by NB Industries, the only difference we are aware of between the two sets was the presence in the two sample cylinders of extracted residual from the air conditioning refrigerant system. This would seem to indicate that the refrigerant line contained LPG-type gas.

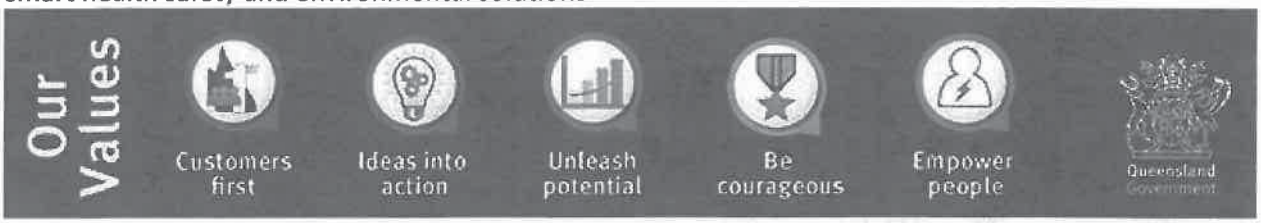
We will get the preliminary and final reports to you as soon as possible.

Regards,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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LANG Jennifer (Admin Review)

From: MANTHEY Greg
Sent: Friday, 8 August 2014 10:15 AM
To: 'Lamont, Brett W'
Cc: FORRESTER Lauren; MULLER Sean
Subject: RE: Gas Testing - Moorvale

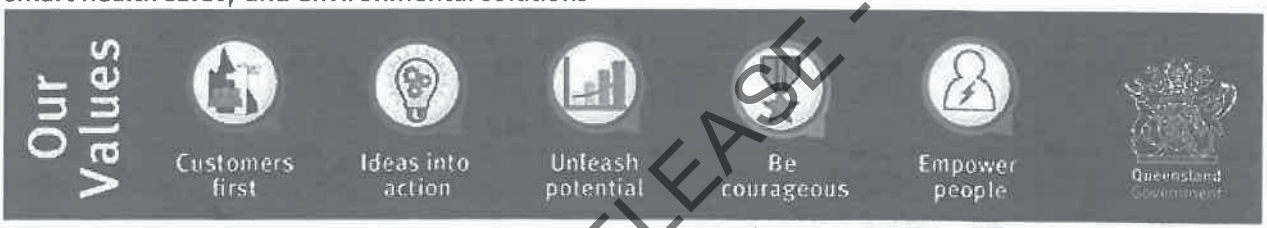
Brett,

I have been in the field for the last two days, back this morning. The two additional test cylinders have been processed and the results are being checked / verified this morning. I will give you a call a little later today to discuss results.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
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RTI DL RELEASE - DNRM

From: Lamont, Brett W [mailto:BLamont@peabodyenergy.com]
Sent: Wednesday, 6 August 2014 8:14 PM
To: MANTHEY Greg
Cc: MULLER Sean; FORRESTER Lauren
Subject: RE: Gas Testing

Good Evening Greg,

Can you advise as to where we are in this process now? Can we expect to have a final report to our fire expert in the near future? As you can understand, ourselves and the Mines Inspectorate are interested in resolving this investigation as soon as practicable.

I look forward to your advice,

Brett W Lamont
Mine Production Superintendent

Phone: 61 7 4847 1451
Mobile: 61 (

From: MANTHEY Greg [mailto:Greg.Manthey@simtars.com.au]
Sent: Wednesday, 30 July 2014 2:25 PM
To: Lamont, Brett W
Cc: MULLER Sean; FORRESTER Lauren
Subject: Gas Testing

Brett,

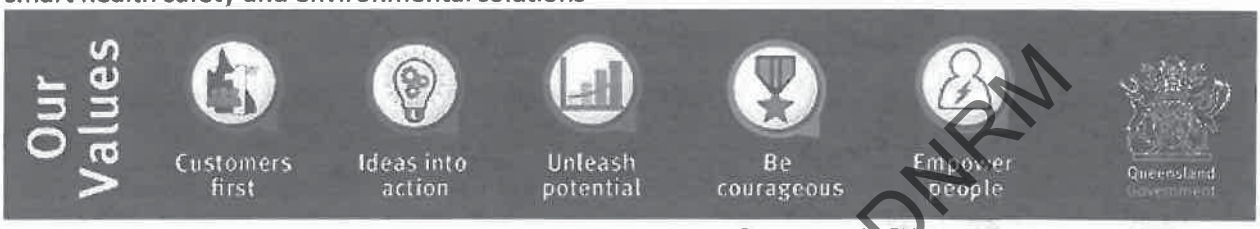
Just a quick update on the continuing testing. We have both our senior gas chemists back on board this week and I anticipate that your two cylinders will be tested later this week. All going well, I expect you will have preliminary results early next week. Final report within 10 working days of that.

Please call me in need.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

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LANG Jennifer (Admin Review)

From: Lamont, Brett W <BLamont@peabodyenergy.com>
Sent: Monday, 11 August 2014 4:31 PM
To: MANTHEY Greg
Cc: FORRESTER Lauren; MULLER Sean; WINTER Matthew
Subject: RE: Gas Testing - Moorvale

Good Afternoon Greg,

Thank you for committing to the 18th. I can live with the date, I obviously have to try to get this locked down as soon as practicable. I appreciate your team working towards a solution that we can all live with, so thank you.

Regards,

Brett W Lamont
Mine Production Superintendent

Phone: 61 7 4847 1451
Mobile: 61 (sch4p3(3) Prejudi

From: MANTHEY Greg [mailto:Greg.Manthey@simtars.com.au]
Sent: Monday, 11 August 2014 4:11 PM
To: Lamont, Brett W
Cc: FORRESTER Lauren; MULLER Sean; WINTER Matthew
Subject: RE: Gas Testing - Moorvale

Brett,

I appreciate that the delay is causing you some problems. I have both gas chemists working on the data and report at the moment. The intention is to have a results report to you first and I understand that this may still be available today. The full report will have the background and methodology details and this will be worked on during the week. I can't avoid having Sean away from tomorrow, but I will be collaborating with him with regard to the report details while he is in the field. The goal is to have this for you by CoB Monday 18th.

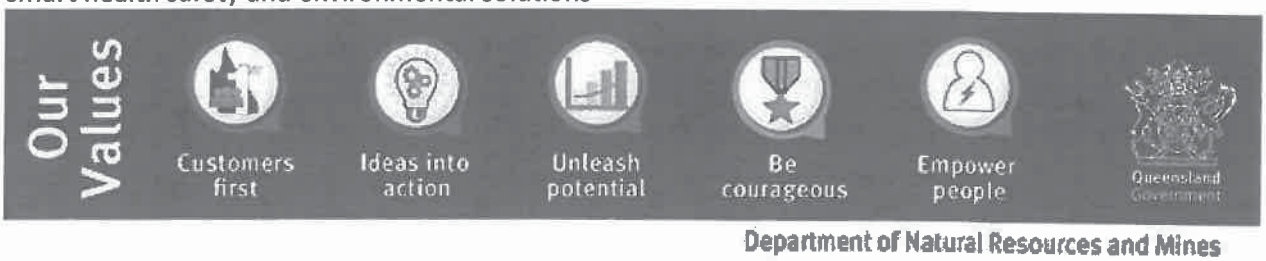
If it assists you, I can explain the delay to the Mines Inspector.

Please call me in need.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388 | M +61 | greg.manthey@simtars.com.au | www.simtars.com.au

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From: Lamont, Brett W [mailto:BLamont@peabodyenergy.com]
Sent: Monday, 11 August 2014 8:07 AM
To: MANTHEY Greg
Cc: FORRESTER Lauren; MULLER Sean
Subject: RE: Gas Testing - Moorvale

Good Morning Greg,

Thank you for the update, however I must advise that the delays with the finalised reports are becoming problematic for us. Is there any chance we can get it finalised today before your gas chemist goes off onto sites?

I am under increasing pressure from both the business and the inspectorate around closing this investigation out and the delays for the last month have centred around the time it is taking for SIMTARS to complete reports. Can you please advise as to whether we can expect this process to be expedited? I note that your email of 30/7/14 (attached) advised that we would have the preliminary results early the week of the 4th and the final results "within 10 working days of that" (my estimation being around the 15th).

I would appreciate if we could receive the final report by close of business, Monday 18 August. Please advise if this date is achievable.

Regards,

Brett W Lamont
Mine Production Superintendent

Phone: 61 7 4847 1451
Mobile: 61 (0 sch4p3(3) Prejudi

RTI DL RELEASE - DNRM

From: MANTHEY Greg [mailto:Greg.Manthey@simtars.com.au]
Sent: Friday, 8 August 2014 5:42 PM
To: Lamont, Brett W
Cc: FORRESTER Lauren; MULLER Sean
Subject: Gas Testing - Moorvale

Brett,

The results of the testing of the two additional practice cylinders are being formatted and checked and I plan to have a results-only report available for you on Monday. The gas chemist involved in this job is at a mine site from Tuesday to Friday of next week, so completion of a full report with testing methodology will not be until the week after.

The results indicate that despite the pre-treatment cleaning, all cylinders still held a small residue of contaminant. The composition of the residual contaminants varied from cylinder to cylinder and there were some that we could identify and others that were not able to be matched.

However, two sample cylinders used at site contained a noticeably greater proportion (percentage level differences) of LPG-type contaminants, particularly butane and propane, than the two practice cylinders. Assuming that the two original cylinders and the last two practice cylinders were identically treated by NB Industries, the only difference we are aware of between the two sets was the presence in the two sample cylinders of extracted residual from the air conditioning refrigerant system. This would seem to indicate that the refrigerant line contained LPG-type gas.

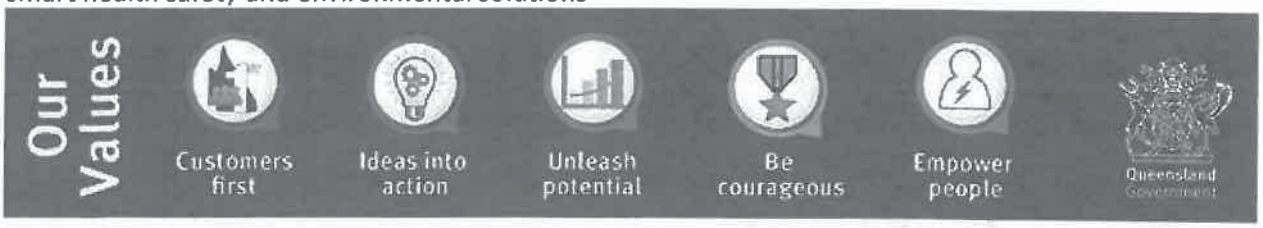
We will get the preliminary and final reports to you as soon as possible.

Regards,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388 | M +61 sch4p3(3) Preju | greg.manthey@simtars.com.au | www.simtars.com.au

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LANG Jennifer (Admin Review)

From: Lamont, Brett W <BLamont@peabodyenergy.com>
Sent: Tuesday, 22 July 2014 9:02 AM
To: MANTHEY Greg
Subject: RE: Method of Gas Sampling Detection by NB Industries

Thanks Greg,

That is good news.

Regards,

Brett W Lamont
Mine Production Superintendent

Phone: 61 7 4847 1451
Mobile: 61 (0 sch4p3(3) Prejudice

-----Original Message-----
From: MANTHEY Greg [mailto:Greg.Manthey@simtars.com.au]
Sent: Tuesday, 22 July 2014 8:44 AM
To: Lamont, Brett W
Subject: RE: Method of Gas Sampling Detection by NB Industries

Brett,

Just received the two cylinders. Will get back to you later today with more info.

Regards,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388 | M +61 [redacted] | greg.manthey@simtars.com.au | www.simtars.com.au

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-----Original Message-----
From: Lamont, Brett W [mailto:BLamont@peabodyenergy.com]
Sent: Monday, 21 July 2014 12:32 PM
To: MANTHEY Greg
Cc: MULLER Sean
Subject: Re: Method of Gas Sampling Detection by NB Industries

Thanks Greg.

Sent from my iPhone

> On 21 Jul 2014, at 10:08 am, "MANTHEY Greg" <Greg.Manthey@simtars.com.au> wrote:
>
> Thanks Brett.
> [redacted] Will have a look over it tomorrow and let you know.
>
> Greg Manthey
> Principal Occupational Hygienist
> Simtars
> Phone: (07)38106364

> Mobile: sch4p3(3) Prejudic
>
> Sent from my iPhone
>
> On 20 Jul 2014, at 10:46 am, "Lamont, Brett W"
<BLamont@peabodyenergy.com<mailto:BLamont@peabodyenergy.com>> wrote:
>
> Greg,
>
> Please find attached a stated methodology used to collect the sample of gasses from Drill 12 air-conditioning system. Do you also need an outline of how the trial bottles were handled?
>
> Regards,
>
> Brett W Lamont
> Mine Production Superintendent
> Moorvale Mine
> Peabody Energy Australia
>
> Peak Downs Highway Phone: 61 7 4847 1451
> Via Nebo QLD 4742 Mobile: 61 (0)
>
> PO Box 193 blamont@peabodyenergy.com<mailto:blamont@peabodyenergy.com>
> Nebo QLD 4742 www.peabodyenergy.com<http://www.peabodyenergy.com/>
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LANG Jennifer (Admin Review)

From: Lamont, Brett W <BLamont@peabodyenergy.com>
Sent: Tuesday, 22 July 2014 10:45 PM
To: MANTHEY Greg
Subject: RE: Method of Gas Sampling Detection by NB Industries

Good Evening Greg,

How did things go today?

Brett W Lamont
Mine Production Superintendent

Phone: 61 7 4847 1451
Mobile: 61 (0 sch4p3(3) Prejudic

-----Original Message-----
From: MANTHEY Greg [mailto:Greg.Manthey@simtars.com.au]
Sent: Tuesday, 22 July 2014 8:44 AM
To: Lamont, Brett W
Subject: RE: Method of Gas Sampling Detection by NB Industries

Brett,

Just received the two cylinders. Will get back to you later today with more info.

Regards,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
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From: Lamont, Brett W [mailto:BLamont@peabodyenergy.com]
Sent: Monday, 21 July 2014 12:32 PM
To: MANTHEY Greg
Cc: MULLER Sean
Subject: Re: Method of Gas Sampling Detection by NB Industries

Thanks Greg.

Sent from my iPhone

> On 21 Jul 2014, at 10:08 am, "MANTHEY Greg" <Greg.Manthey@simtars.com.au> wrote:
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> Greg Manthey
> Principal Occupational Hygienist
> Simtars
> Phone: (07)38106364
> Mobile:
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> Brett W Lamont
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RTI DL RELEASE - DNRM

LANG Jennifer (Admin Review)

From: CONNOR Leanne
Sent: Thursday, 1 May 2014 10:01 AM
To: MANTHEY Greg
Subject: RE: Moorvale Coal - Collection of Gas Cylinders

Thanks

Leanne Connor
Administration Officer | Simtars

Department of Natural Resources and Mines
169 Sydney Street Mackay Qld 4740 | PO Box 453 Mackay Qld 4740 Australia
T +61 7 4999 5300 | F +61 7 4999 5301 | leanne.connor@simtars.com.au | www.simtars.com.au

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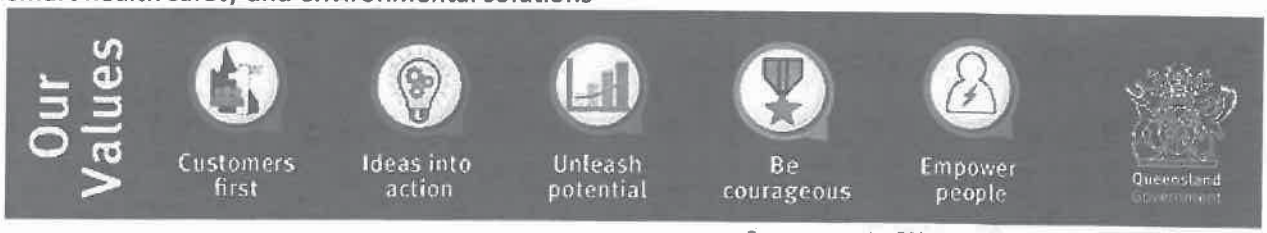
From: MANTHEY Greg
Sent: Thursday, 1 May 2014 9:49 AM
To: CONNOR Leanne
Subject: RE: Moorvale Coal - Collection of Gas Cylinders

8101533 (MST Gas Group)

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388 | M - sch4p3(3) Prejudice | greg.manthey@simtars.com.au | www.simtars.com.au

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From: CONNOR Leanne
Sent: Thursday, 1 May 2014 9:28 AM

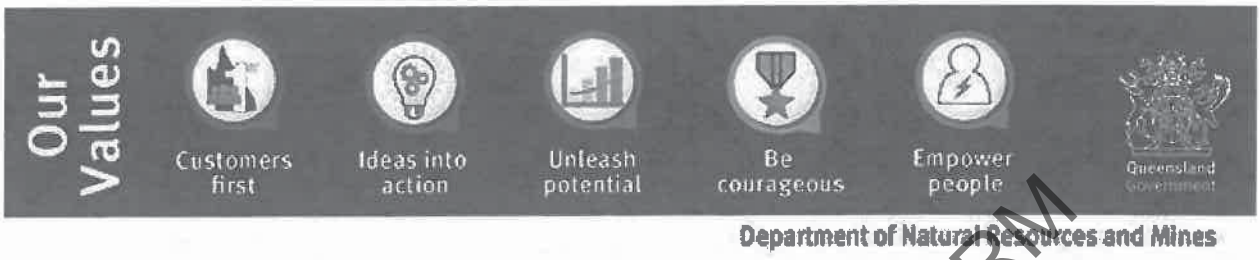
To: MANTHEY Greg
Subject: RE: Moorvale Coal - Collection of Gas Cylinders

Ok thanks. Do you know what cost centre I need to charge these to?

Leanne Connor
Administration Officer | Simtars

Department of Natural Resources and Mines
169 Sydney Street Mackay Qld 4740 | PO Box 453 Mackay Qld 4740 Australia
T +61 7 4999 5300 | F +61 7 4999 5301 | leanne.connor@simtars.com.au | www.simtars.com.au

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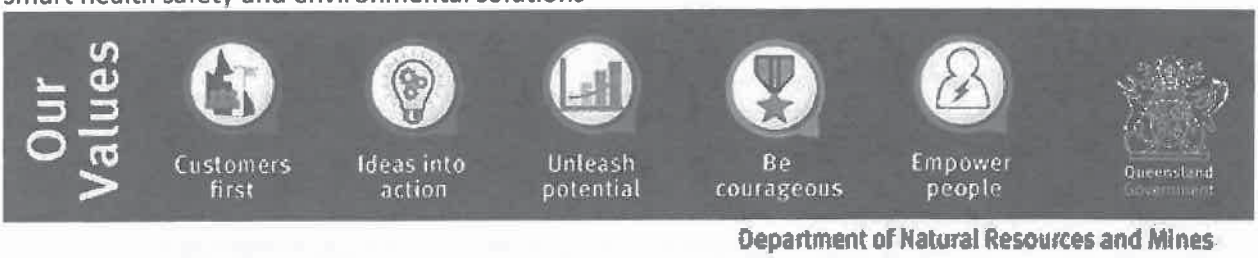
From: MANTHEY Greg
Sent: Thursday, 1 May 2014 9:24 AM
To: CONNOR Leanne
Subject: RE: Moorvale Coal - Collection of Gas Cylinders

Not as far as I am aware. The cylinders are empty (under vacuum) so no toxic or flammable contents.

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388
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From: CONNOR Leanne
Sent: Thursday, 1 May 2014 9:23 AM
To: MANTHEY Greg
Subject: RE: Moorvale Coal - Collection of Gas Cylinders

Hello Greg

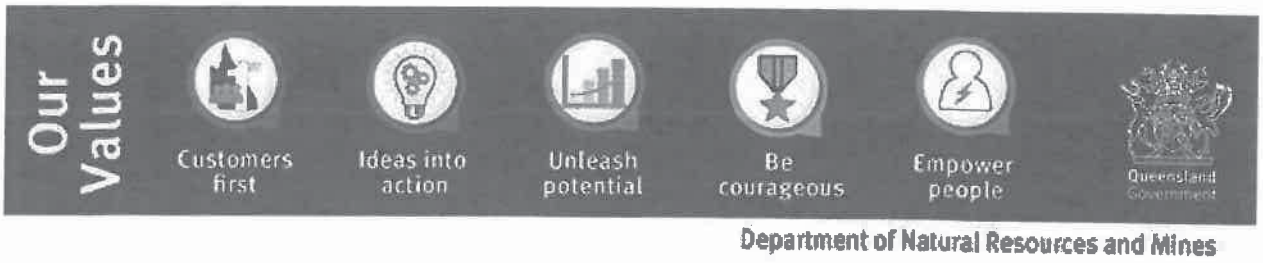
Do you know if there are any special requirements to freight these cylinders?

Thanks

Leanne Connor
Administration Officer | Simtars

Department of Natural Resources and Mines
169 Sydney Street Mackay Qld 4740 | PO Box 453 Mackay Qld 4740 Australia
T +61 7 4999 5300 | F +61 7 4999 5301 | leanne.connor@simtars.com.au | www.simtars.com.au

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RTI DL RELEASE - DNRM

From: MANTHEY Greg
Sent: Wednesday, 30 April 2014 5:15 PM
To: SimtarsMackay
Subject: Moorvale Coal - Collection of Gas Cylinders

Dear Mackay,

There is an Air Conditioning Contractor providing me with a couple of gas cylinders for an investigation job. They are based in Mackay and I need someone to collect the cylinders from them and then freight them to me at Redbank.

The contractors are NB Industries – Steve on [sch4p3(3) Prejudice] Can you please assist me.

Thanks,

Greg Manthey
Principal Occupational Health & Hygiene Specialist | Simtars

Department of Natural Resources and Mines
2 Smith Street Redbank Qld 4301 | PO Box 467 Goodna Qld 4300 Australia T +61 7 3810 6364 | F +61 7 3810 6388 | M +61 [redacted] | greg.manthey@simtars.com.au | www.simtars.com.au

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