

COAL MINE HEALTH AND SAFETY REGULATION 2006

Approval of Ancillary Report Form in relation to Explosion Protected Diesel Engine Systems

I, ROBERT REGAN, Chief Inspector, NSW Trade and Investment, Regional Infrastructure and Services, pursuant to Clause 59 of the Coal Mine Health and Safety Regulation 2006, approve the form set out in the Schedule below as the Ancillary Report form for all notifiable incidents subject to Clause 56(1)(m) in relation to explosion protected diesel engine systems under that Regulation.

Dated this 20th day of January 2012.

ROBERT REGAN,
Chief Inspector,
NSW Trade and Investment,
Regional Infrastructure and Services



Trade & Investment

Ancillary Report – In Service Failure of Explosion Protected Diesel Engine Systems, Clause 56(1)(m)

Pursuant to Clause 59 of the Coal Mine Health and Safety Regulation 2006, this form is gazetted and additional to the Coal Notification of Incident Form. This Report must be completed and submitted to NSW Trade & Investment within 21 days for all notifiable incidents subject to Clause 56(1)(m) in relation to explosion protected diesel engine systems.

1 About the coal operation where the incident occurred:

Name of coal operation:	
Date of incident:	Mine Identification No. (if known):

2 Machine identification

MDR ¹ or MDA ¹ :	MIR ¹ :
Machine Manufacturer:	Machine Model:
Machine Owner:	

3 Last inspections

Date of last Code D:	Registered Service Facility (RSF) No.:
Date the failed component / part of system was last inspected or tested:	

4 Type of Ex Failure:

There was potential for, or there was evidence of: (only tick the most likely one)

- Spark external to engine Flame external to engine Surface temperature to exceed 150 deg C

5 Location of failure – Diesel engine system component OR Control system:

Which part of the diesel engine system failed? (tick one – root cause only)		
<input type="checkbox"/> Exhaust flame trap (wet/dry) <input type="checkbox"/> Exhaust manifold <input type="checkbox"/> Intake flame trap & housing <input type="checkbox"/> Forced induction (turbo / supercharger)	<input type="checkbox"/> Engine block & cylinders <input type="checkbox"/> Intake manifold <input type="checkbox"/> Exhaust pipe(s) <input type="checkbox"/> Engine head	If one of these components is selected, go to 6 below.
<input type="checkbox"/> Pneumatic/hydraulic control system	<input type="checkbox"/> Electrical control system	If one of these control systems is selected, go to 7.

6 Failure Mode of Engine Component

Which major component failed? Tick one from this column:	How did the major component fail? Tick one only (initial cause) from the same row.	
<input type="checkbox"/> Wet flame trap (conditioner):	<input type="checkbox"/> Exhaust carbon holding up floats <input type="checkbox"/> Float failure issues <input type="checkbox"/> Structural failures	<input type="checkbox"/> Water below LWCO ² when engine stops <input type="checkbox"/> Blocked breather <input type="checkbox"/> Excessive backpressure <input type="checkbox"/> Other
<input type="checkbox"/> Fixed connection (issues):	<input type="checkbox"/> Bolts, nuts & studs <input type="checkbox"/> Gaskets <input type="checkbox"/> Thread issues	<input type="checkbox"/> Surface flatness <input type="checkbox"/> Damage <input type="checkbox"/> Other
<input type="checkbox"/> Open joints (issues):	<input type="checkbox"/> Surface flatness / finish <input type="checkbox"/> Excessive gap <input type="checkbox"/> Thread issues	<input type="checkbox"/> Bolts, nuts & studs <input type="checkbox"/> Damage <input type="checkbox"/> Other
<input type="checkbox"/> Positive flame trap element:	<input type="checkbox"/> Damage <input type="checkbox"/> Excessive internal clearances	<input type="checkbox"/> Other
<input type="checkbox"/> Structural failures:	<input type="checkbox"/> Fatigue / Cracking <input type="checkbox"/> Corrosion <input type="checkbox"/> Physical contact damage	<input type="checkbox"/> Catastrophic failure <input type="checkbox"/> Turbo seal failure <input type="checkbox"/> Other
<input type="checkbox"/> Excessive surface temperature:	<input type="checkbox"/> Cooling system failure	<input type="checkbox"/> Other
<input type="checkbox"/> Other (please specify the component and how it failed)		

Go to Question 8.

¹ MDR – Mine Design Registration number. MDA – Mine Department Approval number. MIR – Mine Item Registration number.

² LWCO – Low Water Cut-Out.

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7 Control system failure

Only answer this question if directed to do so from Question 5.

Which component failed? (tick one from this column)	How did the control system fail? (tick one from this column)
<input type="checkbox"/> Water level sensors <input type="checkbox"/> Shutdown cylinders or solenoid <input type="checkbox"/> Cooling system sensors <input type="checkbox"/> Exhaust temperature sensors <input type="checkbox"/> Engine oil pressure sensors <input type="checkbox"/> Other circuit control valve failure <input type="checkbox"/> All or multiple sensor failure	<input type="checkbox"/> Valve/sensor faults <input type="checkbox"/> Wrong settings <input type="checkbox"/> Circuit contamination or blockage <input type="checkbox"/> Installed wrong <input type="checkbox"/> Loose valve/sensor mounting <input type="checkbox"/> Hose failure
Other (please specify)	Other (please specify)

8 Recommendations for prevention

Causal factors:

If more space is required, please attach additional page(s)

Would a design change prevent or minimise failure? Yes If yes, describe how below No

If more space is required, please attach additional page(s)

Would a Code D overhaul change prevent/minimise failure? Yes If yes, describe how below No

Would a maintenance / testing change prevent/minimise failure? Yes If yes, describe how below No

If more space is required, please attach additional page(s)

9 Other Comments

If more space is required, please attach additional page(s)

10 Signature

Have you informed the manufacturer of this failure? Yes No

Signature of Manager of Mechanical Engineering:	Name:
	Date signed:

NOTES

1. Clause 56(1)(m) of the *Coal Mines Health and Safety Regulation 2006* requires notification of any incident or matter involving the 'in-service failure of the explosion protection characteristics of explosion protection plant'. This Ancillary Report is to provide a consistent approach for all underground coal mines.
2. The AS 3584.2 standard stipulates the explosion protection characteristics and defines the components (characteristics) which form part of an explosion protected diesel engine system.
3. All 'diesel engine system used in underground mines at a coal workplace' must be both design and item registered under Part 5.2 of the *OHS Regulation 2001* before use.
4. For the purpose of clarifying the above provisions, the Department requires the following to be reported – 'Any incident or matter where it is evident an explosion protected diesel engine system has been (or is likely to have previously been) operating in a **non-explosion protected condition**'. A **non-explosion protected condition** means a condition which has potential to ignite either; coal dust on the surface of the engine; or methane in the surrounding atmosphere.
5. Examples of **matters which must be notified** include, (but are not limited to) –
 - a) any explosion protection characteristic failures when discovered during use, routine maintenance or overhaul;
 - b) the failure of a diesel engine system to shut down when required by the control sensors, for example – loss of water in the scrubber; excessive system temperature (above 150°C); failure of engine cooling system, etc;
 - c) a catastrophic failure of the diesel engine system which protrudes external to the engine, such as turbochargers, superchargers, piston, valves, connecting rods, etc.;
 - d) the failure of a primary and backup control sensor, for example temperature, floats, etc;
 - e) the failure of an explosion protected open joint which exceeds the specified dimensions for explosion protection;
 - f) looseness of any explosion protected fixed joint (gasket joint);
 - g) deterioration or significant damage to any dry type flame trap;
 - h) the failure or loosening of any screw type explosion protection joint;
 - i) the failure to replace any explosion protected component, such as a cap, plug, flame trap or other like component, after carrying out maintenance activities;
 - j) any evidence of a fire or spark external to the explosion protected joints, flametrap or water conditioner ;
 - k) any catastrophic failure of a turbo in a dry type exhaust system;
 - l) failure of the cooling system, and/or sensors such that the external surface temperature of the diesel engine and /or exhaust gas temperature at the flametraps appears to have exceeded 150°C;

- m) evidence of thermal degradation of an exhaust filter; and
 - n) the water level not being at or above the minimum safe water level when the diesel engine shuts down automatically.
6. Examples of **matters which are not required to be notified** include, (but not limited to) –
 - a) the failure of a single sensor where backup sensors are installed, functional and the diesel engine system is not in a un-explosion protected condition; for example –
 - (i) a single exhaust float failure where a backup float is fitted and functional;
 - (ii) a single temperature sensor failure where a backup sensor is fitted and functional;
 - b) the failure of an engine to start;
 - c) stopping of the engine system because a sensor has operated;
 - d) failing of the engine cooling system where the engine shuts down; and
 - e) any other failure which does not render the diesel engine system in an un-explosion protected condition.

Please contact your local NSW Trade and Investment office if you require assistance completing the form.

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