NSW DEPARTMENT OF
PRIMARY INDUSTRIES

SAFETY BULLETIN

In-service failures of explosion-protected diesel engine systems

BACKGROUND

Following a number of incident investigations and audits there appears to be inconsistency in incident notifications from underground coal operations with regards to the reporting of '*the in-service failures of the explosion-protection characteristics of explosion-protected plant*' on explosion-protected diesel engine systems.

LEGISLATION

Clause 56 (1) (m) of the *Coal Mine Health and Safety Regulation 2006* requires notification to the Chief Inspector and the industry check inspector of any incident or matter involving the:

'*the in-service failure of the explosion-protection characteristics of explosion-protected plant,*'

This Safety Bulletin clarifies the above notification provision, in relation to explosion-protected diesel engine systems, to provide a consistent approach for all underground coal mines.

ADVICE TO INDUSTRY

1. Explosion-protected diesel engine systems are assessed (for the purpose of registration) against the requirements of AS 3584.2:2003, '*Diesel engine systems for underground coal mines, Part 2: Explosion protected*.' 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.
2. All '*diesel engine systems 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.
3. For the purpose of clarifying the above provisions, NSW DPI 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.
4. Examples of **matters which must be notified** include, (but are not limited to):
   a) any explosion-protection characteristic failures when discovered during routine maintenance activities
   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 150^0C); 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 back-up 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

ABN 51 734 124 190
www.dpi.nsw.gov.au

Mine Safety Report No: SB08-05
Prepared by: G.Johnston and P Sunol.
Phone: 02 4931 6666
Date Created: 5 May 2008

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, flame-trap 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 flame-traps appears to have exceeded 150^0C
m) evidence of thermal degradation of an exhaust filter
n) the water level not being at or above the minimum safe water level when the diesel engine shuts down automatically.

5. Examples of **matters which are not required to be notified** include, (but are not limited to),:
   a) the failure of a single sensor where back-up sensors are installed, functional and the diesel engine system is not in a non-explosion-protected condition; for example:
      (i) a single exhaust float failure where a back-up float is fitted and functional
      (ii) a single temperature sensor failure where a back-up 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) failure of the engine cooling system where the engine shuts down
   e) any other failure which does not render the diesel engine system in an non-explosion-protected condition.

RECOMMENDATIONS

1. Underground coal mine managers and engineering managers should review their reporting/NSW DPI notification system for consistency with this Safety Bulletin.
2. Where safety-related failures have been identified, an internal audit system should be set up to review and identify safety improvements and provide feedback to the designer/manufacturer.

NOTE: Please ensure all relevant people in your organisation receive a copy of this Safety Bulletin, and are informed of its content and recommendations. This Safety Bulletin should be processed in a systematic manner through the mine's information and communication process. It should also be placed on the mine's notice board.

Signed

Rob Regan
DIRECTOR
MINE SAFETY OPERATIONS BRANCH
NSW DEPARTMENT OF PRIMARY INDUSTRIES

View more safety alerts at www.dpi.nsw.gov.au/minerals/safety/safety-alerts. If you would like to receive safety alerts by email, send your contact details to mine.safetyalert@dpi.nsw.gov.au