NSW GOVERNMENT

NSW Resources Regulator

SAFETY ALERT

DATE: September 2020

Concerns about possible tampering with explosion protected diesel engine safety systems

This safety alert provides safety advice for the NSW mining industry.

Issue

A tradesperson, who was investigating an issue with an explosion protected diesel engine system (ExDES) found that both scrubber floats were damaged due to heat exposure. This indicated the engine had been operating in a non-explosion protected state.

Figure 1 Heat-affected scrubber floats

Circumstances

A fitter in an underground diesel workshop was working on a broken-down skid steer loader. He found that the loader's two scrubber floats had been exposed to heat. One had melted and fallen off, which was preventing the machine from starting. The engine system may have been operating for some time without water in the scrubber. Both floats were replaced, and the low water cut out tested satisfactorily. With no other issues found to restore normal operation, other than replace the damaged

floats, it was considered that the safety system may have been temporarily defeated. Investigations are continuing at the time of publication. With this model of plant, it is possible to defeat both the water make-up reservoir level sensor and exhaust conditioner level sensor (floats) by securing the test valves closed.

Other examples

The incident above is the latest in a number of recent notifications of a failure of the explosion-protection characteristics of explosion-protected plant where it is suspected that safety circuits had been defeated.

Southern coal fields

While completing a daily inspection on an underground personnel transport vehicle a worker identified that the coolant loss air relief had been tampered with. Electrical tape was placed over the air relief on the coolant loss sentinel, rendering the coolant loss valve ineffective, preventing the machine from shutting down.

Western coal fields

During a daily mechanical safety inspection on a skid steer loader, a mechanical tradesperson conducted a test on the coolant loss valve and the engine failed to shut down. The flow restrictor in the safety circuit was allowing too much air flow to enter the safety circuit. The flow was reduced, and shut down functions verified. The restrictor adjustment screw was lock wired in position and fitted with a lead seal.

Recommendations

The following recommendations are made:

- Mine operators should communicate to workers:
  - that ExDES must be operated and maintained in accordance with their design and item registration technical requirements and conditions
  - safety shut down systems such as those used on ExDES must not be defeated or altered from registration specifications
  - workers should use the appropriate defect reporting systems or notify their supervisors of any plant defects and tag out-of-service plant that is unfit for service.
- Mine operators should also communicate that while they are at work, workers must take reasonable care that their actions to not adversely affect the health and safety of other

people and must co-operate with any reasonable policy or procedure they have been notified about, with regard to health and safety. (See WHS Act 2011 No. 10 s28 Duties of workers).

- Mine operators should conduct an audit of variable flow restrictors fitted to explosion protected diesel engine systems and confirm they are protected against unauthorised tampering.
- Mine operators and original equipment manufacturers (OEMs) should review the availability and suitability of ways to reduce unauthorised adjustment of variable restriction device and prevent the deliberate tampering of safety systems.
- Mine operators should review the inspection frequency and accessibility for inspection of tamper proofing mechanisms where used.
- When developing new equipment, OEMs should consider more robust and fault tolerant alternatives to pneumatic safety circuits reliant on fine flow rate adjustments.

DOCUMENT CONTROL	
CM9 reference	DOC20/732076
Mine safety reference	SA20-07
Date published	11 September 2020
Authorised by	Chief Inspector of Mines Office of the Chief Inspector