



NSW DEPARTMENT OF PRIMARY INDUSTRIES

**To: All Managers
Underground Coal Mines**

20 June 2005

File 05/1869
Event 3175 2042 7001

NOTICE PURSUANT TO SECTIONS 61 AND 63A COAL MINES REGULATION ACT 1982

NOTICE PURSUANT TO SECTION 61

I hereby advise that I have obtained the following information, which may, in my opinion, be relevant to the continued safe operation of the mine or the safety of the persons employed at the mine.

There is evidence that under certain conditions an explosion protected diesel engine system may increase in speed, overheat, and continue to run on methane following shutdown of the diesel fuel system. The diesel engine system may not be able to be shut down by normal means.

Investigations have identified that a number of preconditions need to be present before such a situation can arise. These preconditions include:

1. The exhaust gas temperature is hot. Note: Engine speed and temperature will increase in any environment containing methane and may result in the diesel engine system overheating.
2. An additional ignition source is present in the combustion chamber. Note: the additional ignition source may be glowing carbon, glowing exhaust valves, sump oil, diesel fuel, etc.
3. The environment is methane enriched. Greater than 5% methane is required for the diesel engine system to run without diesel fuel

Background

A diesel engine failed to shutdown when exposed to a methane enriched environment in an underground coal mine.

Investigations into this event have confirmed the diesel engine system involved in this incident will run on methane under certain conditions. The explosion protected properties of the diesel engine system and the duration of exposure to the methane environment were causal factors which reduced a very high consequence incident.

Further information can be found in safety alert SA05-08 "*Danger of Methane Explosion from Diesel Engine Systems*".

Coal Mines (Underground) Regulation 1999

Clause 127 states:

"127 Certain transport to be provided with automatic methane detectors"

A mine manager must ensure that any diesel or battery powered transport that operates in a return airway in the mine is, whenever it is located in the return airway, equipped with an approved automatic methane detector set to alarm when the methane content in the air reaches one per cent."

Clause 62(5) states:

"If an automatic methane detector fitted to transport produces and audible or visual alarm, the operator of the transport must immediately:

- (a) withdraw it to an intake airway (so long as it is safe to do so), or*
- (b) shut it down if it cannot be withdrawn to an intake airway safely,"*

Clause 13 states:

"A mine mechanical engineer must ensure that a diesel engine or a diesel engine system is not used underground at the mine unless it is of the approved type"

Significance of the Issue

It is a reasonable deduction from the facts given above that there is a risk that using a diesel engine system in significant methane risk areas, (for example, return headings, adjacent to goaf areas and old workings, in outburst and windblast affected areas, near methane drainage pipelines and boreholes) may initiate a methane explosion if mine environmental controls fail.

NOTICE PURSUANT TO SECTION 63A

I hereby give notice that I am of the opinion that the following matters, things or practices are or are liable shortly to become dangerous to the safety and health of persons employed at the mine.

1. The use of diesel engine systems in significant methane risk areas of the mine. This risk refers to diesel engine systems which cannot be shut down or withdrawn from the area on detection of methane above 1%, as required by the regulations.
2. The use of diesel engine systems which are not explosion protected in accordance with AS3584.2:2003 *"Diesel Engine Systems for Underground Coal Mines – Explosion Protected"* and maintained in accordance with AS 3584.3:2005 *"Diesel Engine Systems for Underground Coal Mines – Maintenance"*, the approval conditions and the manufacturer's recommendations.

I am of that opinion for the reasons and particulars as described above.

I therefore impose upon you the following prohibitions and restrictions, and require you to carry out the following works or do the following things for the purpose of safeguarding the safety or health of the persons employed at the mine:

1. Develop a system, in consultation with equipment manufacturers and mine employees, to manually shutdown all diesel engine systems in an emergency. This is to be done as an interim measure until an approved engineered system is available.
2. The emergency manual shutdown system, referred to in item 1 above, shall be:
 - a) available on all diesel engine systems prior to operating the diesel engine in significant methane risk areas of the mine;
 - b) demonstrated to all operators; and
 - c) able to stop the diesel engine system when running on diesel fuel only, at maximum engine speed and without shutting down the diesel fuel supply.
3. The mines risk management system shall conform with AS 4360:2004 *"Risk management"*, the *"National Minerals Industry Safety and Health Risk Assessment Guideline"*, AS

4801:2001 “Occupational Health and Safety Management Systems – Specification with Guidance for Use” and shall:

- a) identify and document all significant methane risk areas of the mine;
 - b) consider human error, ventilation management, barometer changes, seal failures, leaking seals, goaf falls, damage to methane drainage pipelines, holing into boreholes, equipment failure, or the like, the contents of safety alert SA05-08 and emergency procedures;
 - c) implement mine environmental risk control measures in accordance with the OH&S Regulations, with particular note to Clause 5;
 - d) audit the design of the mine explosion protected diesel engine systems against AS 3584.2:2003, identify the differences, assess the risks and implement control measures in accordance with the OH&S Regulations, with particular note to Clause 5.. The audit is to be completed within six months of the date of this notice;
 - e) document a schedule for the upgrade of all explosion protected diesel engine systems, which operate in significant methane risk areas of the mine, to comply with the latest recognised standard for explosion protected diesel engine systems;
 - f) provide a copy of the schedule referred to in item e) above to the District Inspector of Coal Mines within six months of the date of this notice;
 - g) ensure that any newly manufactured explosion protected diesel engine system conforms with the requirements of AS 3584.2:2003 within 18 months of the date of this notice;
 - h) establish that all diesel engine operators are competent in the use of the emergency shutdown system and the manual diesel fuel shutoff valve; and
 - i) monitor progress for compliance with this notice.
4. Within eight months of the date of this notice install an approved engineered emergency shutdown system on all diesel engine systems operating in significant risk methane areas of the mine.
 5. Within 18 months of the date of this notice install an approved engineered emergency shutdown system on all explosion protected diesel engine systems.
 6. Advise the District Inspector of any event where the diesel engine emergency shutdown system is operated in an emergency.

A copy of this notice shall be placed on the Mines Notice Board for a period of at least 28 days.

Yours faithfully,



Gordon Jervis
Senior Inspector of Mechanical Engineering
Mine Safety Operations Branch
NSW Department of Primary Industries