

SIGNIFICANT INCIDENT REPORT NO: 107

MULTIPLE FUMING AND GAS EXPLOSION

INCIDENT

Eight refinery employees were exposed to ammonia gas from three separate incidents during the modification and recommissioning of a primary flash tank. A flammable gas explosion also occurred during these operations. Symptoms of exposure ranged from shortness of breath to headache, nausea and vomiting. One employee was taken to hospital for further testing.

In the first incident seven employees were exposed to ammonia released when flange bolts were being loosened prior to removal of a temporary relief line.

The explosion occurred during the cutting of a main relief line between the primary flash tank and the relief tank.

Further ammonia exposures occurred later in the day when a fan was being fitted to the relief line and blanks were being swung at the feed end of the flash vessel.

CAUSES

The immediate cause of the incidents was the lack of a safe system of work when conducting modifications and recommissioning the plant, resulting in release of toxic gases and ignition of flammable gases.

Contributing factors included:

- The failure to identify possible gaseous hazards.
- The failure to adequately investigate fumings, fires and explosions in the area which had occurred in the period leading up to the incidents.
- The failure to recognise the significance of process changes happening during the previous months.
- Selection of valve types potentially unsuitable for gas isolation.
- The failure to ensure the system had been correctly isolated.



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- The failure to ensure the system was adequately purged prior to opening or cutting pipework.
- The lack of adequate supervision.
- The lack of adequate gas testing procedures before, during and after the operations.
- The absence of written procedures to perform the tasks.
- The failure to provide adequate protective equipment.
- The absence of personal gas alarms to indicate presence of toxic gases.
- The failure to report initial incidents to management.
- The lack of return to work procedures after exposure.

COMMENTS AND PREVENTATIVE ACTION

The main preventative action is the development and implementation of a safe system of work for dealing with plant that contains significant quantities of toxic and flammable gases. This includes the recognition of hazardous zones, toxic or asphyxiant environments, safe isolation of plant and equipment, gas monitoring procedures and supply of personal protective equipment.

Incident reports need to be followed up and investigated, particularly those which indicate a change in the process. Findings from these investigations and risk assessments should be included in the periodical review of safe work procedures.

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