SAFETY ALERT - #22-2005

FLASH FIRE – WORKER SUSTAINS 1ST AND 2ND DEGREE BURNS

RELEASE DATE: MARCH 14, 2005

Injury: 1st and 2nd degree burns to hands and face

Location: Gas Plant

Incident Date: December 23, 2004

Incident Description:

On Thursday, December 23, 2004, a worker sustained a lost time injury during operating activities at a gas plant site. As a contract relief operator, the worker was performing daily checks in the refrigeration building at the site when he noted that the glycol pump was not circulating glycol back to the glycol re-boiler.

Attempting to restart glycol circulation, the worker was adding glycol from the storage tank into the re-boiler and adjusting the glycol level in the Low Temperature Separator (LTS). Due to the lack of hot glycol circulation the glycol-heating coil in LTS glycol boot was not providing adequate separation of condensate out of the rich glycol returning to the re-boiler. While adjusting the glycol level, the worker was unaware that excessive amounts of condensate was flashing off of the glycol re-boiler still column into the underground tank and that condensate vapors were accumulating around and in the refrigeration building where he was working.

With the automatic activation of the glycol re-boiler main burner, the condensate vapors ignited, creating a flash fire that encompassed the west and south sides of the building and entered into the refrigeration building via the opened south door. The flash fire passed through the south entrance of the building engulfing the worker. The fire detection system, located in the refrigeration building, detected the fire and activated an emergency shutdown of the plant.

The worker was wearing Fire Retardant Clothing (FRC) and full Personal Protective Equipment (PPE) at the time of the incident, which significantly reduced the incurred injuries. The flames and heat, however, did contact his face and hands when he made an attempt to shield himself from the flames. He was able to evacuate out the west exit of the building and proceeded to “stop, drop and roll” in the snow in order to extinguish any remaining flames. He then called for assistance. Response personnel and Emergency Medical Services (EMS) were dispatched to the scene.

The worker was following the Working Alone Call-in procedure, as prescribed by his employer. Should the worker not have been able to call for help, the call center would have (and did) notified his employer of the failure to check-in at the expected call-in time.

The worker was transported to hospital and the remaining fire at the site was extinguished. He was hospitalized, treated for first and second-degree burns to his face and hands, and later released.

Incident Analysis:

Upon investigation, it was determined that the glycol circulation pump had stopped pumping due to a low level in glycol accumulator. The lack of glycol circulation to the glycol-heating coil in Low Temperature Separator (LTS) glycol boot did not provide adequate separation of condensate from the glycol stream. Excessive amounts of condensate entrained in the glycol stream from the Low Temperature Separator (LTS) (operating at approximately 5600 kPa at –30 C) was dumped into the glycol re-boiler (operating at atmospheric pressure at 120 C), which resulted in the flashing off of the condensate creating flammable vapors. As the glycol re-boiler temperature cooled down the temperature controller automatically called for the main burner to activate. The activation of the main burner resulted in condensate vapors to be drawn into the burner.

DISCLAIMER:

This Safety Alert is designed to prevent similar incidents by communicating the information at the earliest possible opportunity. Accordingly, the information may change over time. It may be necessary to obtain updates from the source before relying upon the accuracy of the information contained herein. This material is presented for information purposes only. Managers and Supervisors should evaluate this information to determine if it can be applied to their own situations and practices.

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Immediate Causes:

1. Close proximity of the glycol still column vent lines and associated underground tank allowed condensate vapors to accumulate around and in the process building.
2. A faulty flame arrestor allowed the back flash to negate the protection of the flame arrestor resulting in the ignition of the combustible vapors outside the flame arrestor.

Critical Controls That Worked Which Minimized The Loss:

1. Response of emergency services, company and industry personal.
2. Work Alone procedure/notification.
3. Fire Detection (fusible link in the building).
4. Emergency Shut Down (ESD'd) the plant.
5. Worker's Personal Protective Equipment (i.e. boots, Fire Retardant Clothing (FRC), hard hat, safety glasses).

Corrective Action For Immediate Causes:

1. Glycol still column vent lines were re-piped to an above ground storage tank located away from potential ignition sources (e.g. glycol re-boiler burner);
2. A emergency shut down was installed on the glycol re-boiler supply gas linked to a remote manual activation device;
3. The flame arrestor was repaired/tested and the maintenance inspection program was assessed at all properties. Other properties were audited to identify similar process equipment design and retrofitted as determined necessary based on risk assessment.
4. Communicated to all company field staff and contract operators the incident findings, lessons learnt and re-confirmed the need for proper hazard identification and management.

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View looking northeast at process building.

Recommended Actions for Industry:

1. Identify similar process equipment designs and retrofitted as determined necessary.
2. Evaluate your current flame arrestor maintenance and inspection program(s).
3. Share this incident with your field staff.
4. Continue to encourage/promote hazard identification and communication.

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