



CASE STUDY

OISD/CS/2019-20/P&E/02

INTRODUCTION

Title: **Fire Incident near Oily Water Sewer (OWS)**

Location: **Gas Processing Plant**

Loss/ Outcome: **Explosion, fire and death of 4 persons**

BRIEF OF INCIDENT

On the day of incident there was heavy rain in plant area. Security person posted near OWS pit felt suffocated due to presence of hydrocarbon vapours in storm water channel. He also noticed overflow of storm water channel liquid across road. Firefighting crew members wearing SCBA set reached incident site and started searching source of hydrocarbon leakage along with operation group. Suddenly, there was explosion followed by major fire. Fire was brought under control within hours with support from mutual aid partners.

OBSERVATIONS/ SHORTCOMINGS

- Gas processing plant receives gas from offshore pipelines. Pigging operation in this gas pipeline was carried out few months back but no pig received after opening barrel at plant end. About 15 days prior to incident, high condensate/ muck flow observed inside gas pipeline due to sudden pig movement. This unexpected event resulted in huge amount of condensate/ muck routed to process units. In many units OWS pits were reported choked with muck. Muck was collected in drums. Filter elements choked with oil laced muck were also reported lying in unit area
- Plant has provision of routing Storm water from gas processing units to OWS Pit if contaminated with Oil. All the associated units storm water drain was lined up to OWS pit at the time of incident. OWS pit Pump-A was out of order. Pump-B was put on load but no reduction in pit level observed. Trend of OWS Pit showed Pit overflow.
- Hydrocarbon detectors were found to be activated intermittently in one of the gas processing unit on the day of incident. Probable causes of presence of hydrocarbon in this unit could be release of hydrocarbon from the muck due to heavy rain or leakage from pump/ process equipment.
- At the time of incident, there was condensate in storm water channel due to overflow of OWS pit. Firefighting crew reached the incident site wearing SCBA set. Operation group along with firefighting team started searching the source of hydrocarbon to take corrective action.
- At around 07:00 hrs there was explosion followed by major fire. This fire extended outside plant area as well to around 1.2 km open channel to sea. Fire was completely extinguished within few hours by plant firefighting team and support from mutual aid partners.

Provided for information purpose only. This information should be evaluated to determine if it is applicable in your operations, to avoid recurrence of such incidents.

- Fire damage was observed in security cabin, parked vehicle at incident site, around OWS pit area, overhead cable trays, storm water channel of connected unit etc.

REASONS OF FAILURE/ ROOT CAUSE

Root cause of explosion and fire was primarily due to loss of primary containment caused by:

- Failure of both the OWS pit pumps during monsoon period leading to overflow of light condensate from pit.
- Presence of hydrocarbon muck in the unit because of which rain water was diverted to OWS Pit. The fire got further spread due to presence of hydrocarbon laced muck in storm water channel.
- Suspected leakage from one of the Unit where hydrocarbon detectors activated intermittently prior to incident.

CONCLUSION

OWS pit receive condensate from process units & pump it out to effluent treatment plant as per requirement. In OWS pit, Pump-A was out of order and no reduction in level was observed after Pump-B was put on load. Storm Water channel (rain water) of respective units was also lined-up to OWS pit. Heavy rain on the day of incident and non-availability of pumps resulted in overflow of OWS Pit. Condensate in storm water channel at incident site was result of OWS pit overflow. As observed in CCTV footage, the probable source of ignition could be starting the vehicle parked at incident site or spark while firefighting crew member entered this vehicle wearing SCBA.

RECOMMENDATIONS

- Pit pumps of OWS pit should be kept in healthy condition all the time.
- In case of hydrocarbon leak, no vehicular movement to be permitted and affected area must be cordoned off.
- Storm water system adequacy study to be carried out.
- Hydrocarbon muck should not be stored in the plant area and should be disposed-off as quickly as possible.
- In absence of OWS Pit pumps, alternate arrangement for hydrocarbon removal from Pit should be provided.
