

CRUDE OIL SPLASH AT PIPELINE PUMP STATION IN INDIA

1.0 INCIDENT DESCRIPTION:

In May' 2012 during the morning hours , a major crude oil spray occurred at one of the pipeline Pump station due to the failure of a gasket of the scrapper launching barrel valve flange located within the pump station of a Crude oil pipeline in India. Due to the high pressure in the pipeline, crude oil sprayed beyond the station area to a food industry located adjacent to the installation. Emergency Shut Down system operated immediately to stop the oil spillage. There was no fire or injury due to the incident.

2.0 AFTER EFFECT OF THE INCIDENT

Due to the incident, crude oil delivery to feeder Refinery stopped immediately. Sprayed oil was retrieved and the site was made hydrocarbon free. District administration reached site and a FIR was lodged by the private industry against the oil company operating the pipeline.

3.0 PIPELINE PUMP STATION OVER VIEW

Oil Company's pipeline installation is spread over an area of 60,000 square meters. It is surrounded by Industrial area on the north and east side. This pipeline pump station installation is one of many such pump station for about 1200 km long crude oil pipeline. This crude oil pipeline delivers crude for one of the high capacity refinery.



4.0 INCIDENT ANALYSIS

4.1 The failure of metallic gasket of higher pressure rating (in this case 600#) capable of withstanding a design pressure of 101 Kg/cm² is very rare. At a pressure of ~ 70 Kg/ cm², failure in gasket occurred in the segment of 11 to

1 “O” clock position of the flange connected to Motor Operated Valve in which part of worn out gasket materials also came out. Such phenomenon indicates either poor quality of gasket or poor workmanship during installation.

4.2 Failure of the gasket may be due to any one or combination of the following probable reason:-

4.2.1 Gasket installed may not be of appropriate class rating to withstand pressure rating of 70-74 Kg/cm². Initially when it was operated at low pressure it might have sustained but failure could have happened gradually due to prolonged operation at higher pressure.

4.2.2 During installation of gaskets, while tightening the valve flange stud and bolt, the gasket could have been damaged. With the passage of time, during pigging, spiral wound materials of the gasket might have given away resulting in weakening the flange joints and subsequently it failed.

4.2.3 As the flange was totally covered with insulating materials, any minor leakage from the flanges, have gone unnoticed. Due to this, any indication of gradual failure by the operation or maintenance personnel could not be noticed.

4.2.4 Since there was no inner ring found on the retrieved gasket which otherwise provide securing the gasket material in place and also add to the strength of the gasket, failure of gasket in this case could be due to non-availability of inner ring.



Inner Ring of the gasket



Damaged gasket (w/o inner ring)

4.2.5 The sudden failure of the gasket is rare; perhaps the flange was leaking for quite some time which could not be identified due to the insulation.

5.0 LESSONS LEARNT

5.1 All the station piping gaskets of the flanges to be checked for appropriate class / pressure ratings and of reputed make. While

replacing gaskets, material and work to be inspected / supervised by competent person.

- 5.2 After replacement of gaskets, the pipe section should be hydro tested to meet the MAOP / Design pressure requirement.
- 5.3 All the flanges where thermal insulating material is to be provided should be provided with inspection window, so that at least once in a month, inspection of flanges for any leakage can be checked.
- 5.4 It shall be ensured that all gaskets are fitted with an inner metallic ring.