CASE STUDY

OISD/CS/2023-24/E&P/11 **Dt.: 27.09.2023**

INTRODUCTION

Title: Major fire incident at cluster location.
Location: On-land Workover Location.
Loss/ Outcome: Major loss of Asset.

BRIEF OF INCIDENT

Workover operation was being carried out at a well, by a rig, situated within a cluster including three more wells. One well was producing; the remaining wells were temporarily closed. Unexpected release of hydrocarbon was detected near one of the temporarily closed well. Release of hydrocarbon was from the flange joint between gate valve and NRV in flow line of one of the well. The situation escalated, resulting in an uncontrolled eruption of oil and gas which caught fire within few minutes.

OBSERVATION / LAPSES

Following observations were made during investigation by visit at the incident site, interaction with the related officials, their written statements, and available documents:

- Simultaneous Operations (SIMOPS) procedure was not followed, including Annexure-G of OISD-STD-186.
- The Pre-Workover Conference (PWOC) didn't discuss hazards and risks associated with cluster location.
- There were no essential barriers for safeguarding Xmas tree of cluster wells.
- No work permit system followed while working on other wells at cluster location.
- The control wheels of valves on the X-mas tree of temporarily closed wells were not removed.
- Non-metallic compressed asbestos sheet was used as the gasket for flange of gate valve 4"X400#RF type instead of spiral bound metallic gasket.
- Standard Operating Procedures (SOPs) for flushing operations of flow lines have not been developed.
- The identification of temporarily closed wells was not earmarked through signage.
- Chikson pipe which was connected to a temporary closed well was lying above Chikson connection of other well.
- There was one combined flow line for six wells.

ROOT CAUSE OF THE INCIDENT

- Selection of non-metallic gasket for 4”X400#RF class gate valves instead of spiral wound metal gasket was not as per best industrial practice.
- There was absence of recorded pressure monitoring for the flow line of producing well at cluster location, following the flushing activities conducted at other well which was connected to the flow line of producing well. Due to this, constant building up of pressure in the flow line of producing well went unnoticed.
- The SIMOPS (Simultaneous Operations) procedure was inadequately followed. The rig crew was uninformed about the temporary closure status of wells. They attempted to close an already closed well, loosing precious time in which flowing well & downstream gate valve could have been closed to avert fire incident.
- Source of fire could have been either from continuous collision of Chikson pipes or striking of some stones to the metal. This continuous collision likely generated frictional forces, resulting in a spark that ignited fire.

RECOMMENDATIONS

- Before the rig move to the cluster location, appropriate mitigation measures should be taken up as per SIMOPS checklist (Ref: Annexure G of OISD-STD-186).
- PWOC checklist should be reviewed for covering all the aspects and compliance of simultaneous operations specially in cluster location.
- Temporary closed wells shall be clearly identified at site with prominent signage or symbols and the control valves of the X-Mas tree shall be completely closed and control wheels be removed.
- The well head shall be preferably covered with suitably designed portable protective cover as a security measure.
- Clearance(work-permit) from SIMOPS in charge (company man/ installation manager (Rig) shall be obtained before undertaking any job on any cluster well.
- All rig crew members shall undergo comprehensive training on SIMOPS.
- The flange joint should be provided with either spiral wound metallic gaskets or metallic ring type gaskets, depending upon the piping class. Metallic gasket should be used for Raised Face flanges (RF) as per best industrial practice.
- Comprehensive SOP for flushing of flow lines from oil well to GGS shall be prepared including post flushing procedures.
- Separate flow lines for each well should be ensured to minimize the potential for wax buildup and back pressure.

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.





Flange between NRV & Gate valve that leaked



Questioned gasket which gave way.

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