



CASE STUDY

OISD/CS/2020-21/E&P/01

Dt.: 05.11.2020

INTRODUCTION

Title: Blowout of gas well

Location: Onshore Well Site

Loss/ Outcome: Huge Financial Loss, Environment Damage and Loss of Human Lives.

BRIEF OF INCIDENT

An incident of uncontrolled flow of gas and condensate occurred in an onshore well during workover operation. On testing, Tubing Head spool was found leaking. To replace the spool, a cement plug for 100 m was placed. While removing BOP to install new Tubing Head spool, suddenly well started displacing resulting in blowout.

OBSERVATIONS/ SHORTCOMINGS

- a) Pre work over conference was carried out. However, there was no system of formal handing over/ taking over by GGS/ EPS to Workover. No record of surface pressures in well heads was provided at the time of handing over/ taking over.
- b) BOP was pressure tested on as per BOP test record provided while as per DPR, only function test was carried out.
- c) Cement sample collected during cement plugging job at the well was not set at the time of blowout. After 12 hrs. of WOC, Installation Manager instructed Tool Pusher of contractor to pull out the remaining drill pipe string from the depth of 556.24 m.
- d) The waiting on cement was included in work over plan, but the verification of position and strength of the cement plug was not included in the plan.
- e) After noticing kick, Driller contacted the Tool Pusher over phone, as he was not at site, who waited for instruction from Installation Manager and OGPS crew for next course of action.
- f) Assistant driller was not trained in well control, and also not required as per contract. However as per clause 8.0 of OISD-RP-174, Assistant Driller should also be trained in well control.

REASONS OF FAILURE/ ROOT CAUSE

- a) 27/8" drill pipe was pulled out and N/down BOP before complete setting of the cement sample kept at surface. The WOC was originally planned for 48 hours, but P/O was started after 12 hrs. only and BOP removed after 16 hours approx.
- b) Verification of the position and strength of the cement plug was neither included in the plan nor carried out at the well before nipple down of BOP.

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- c) There was a gas trapped between 3731.5 to 3574 m (157 m length) as circulation was done through puncture in tubing at 3574 m. Due to reduction in hydrostatic pressure, the trapped gas might have migrated and resulted in blow out.
- d) After detecting kick by Driller, the response of crew members of the contractor was neither as per well control procedure nor as per bridging document agreed by operator and contractor.

RECOMMENDATIONS

- a) Work over plan in detail should be prepared by a MDT after due deliberation and consideration of all available information (also key points to be recorded in plan along with well history and past work over jobs in brief). It should take into consideration hazards anticipated and should plan accordingly. It should be signed by all MDT members and approved at appropriate level.
- b) Any change in Work over plan should be approved by competent authority and communicated through mail/ message in writing.
- c) During Waiting on Cement (WOC), there should not be any disturbance in the well. Sufficient time should be allowed to set the cement as mentioned in plan.
- d) Cement plug should be tagged and tested to ensure its strength and position before commencing next operation.
- e) Trip sheet should be prepared properly in the format given in OISD-RP-174 with concluding remarks of fluid gain/ loss. Representative of the operator should also verify the trip sheet periodically to monitor that the well is taking correct amount of brine during pulling out of string. Any reported abnormality in trip sheet should be analysed for corrective actions, if any.
- f) Well should be kept under observation for the time period equivalent to the anticipated time required till re-installation of BOP plus safety margin as required by clause 7.10.4 of OISD-RP-238, before removing X-mas tree or BOP.
- g) All critical operations, which can result in loss of control, should be done in the presence of Key personnel of contractor and operator.
- h) BOP or X-Mas tree, as the case may be, should be kept ready for immediate placement in case of any well activity. This scenario should also be practiced during BOP drill. Non-sparking tools should only be used, in case of any well activity.
- i) Annulus pressure of all flowing as well as non-flowing wells should be recorded periodically by the concerned officials of Production Installation as per clause 9 of OISD-GDN-239 'Guidelines on Annular Casing Pressure Management for Onshore Wells'. Any abnormal pressure build up in Annulus should be monitored closely and timely action should be taken for corrective action.
- j) Handing over and taking over between Work over Services and GGS/ EPS should be as per clause 5.2.4 vii of OISD-GDN-182 in specified format and record maintained.
- k) Installation Manager should be responsible for one workover rig so that he can supervise and monitor the day to day operations as per work over plan and all rig operations. IM should inspect rig on daily basis and record his observations in IM diary. All communications from operator side should be communicated to Tool Pusher/ Rig Manager through Installation Manager.
- l) BOP function test and pressure test should be done in line with OISD-RP-174. These tests should be recorded in DPR and also witnessed by operator's representative. BOP pressure test should be done by test pump with chart recorder.
- m) Other high pressure equipment like choke manifold, kill manifold, FOSV etc. should also be pressure tested as per OISD-RP-174.

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- n) All down hole equipment should be properly checked before lowering into the well. Any pressure build up in annulus 'A', even though annulus is isolated with packer, should be analysed and corrective measures planned.
- o) It should be ensured at all times that two effective barriers are in place in the flow path as per clause 5.1 of OISD-RP-238.
- p) Operator should develop a strong Crisis Management Team, who in normal times should work as faculty for well control school, maintain BOP and related equipment, witness BOP pressure test and BOP drill in field.
- q) Competency and deployment of rig personnel to be ensured as per contract. Competency of key personnel should be verified through interview (especially competency on well control). No person should be deployed without the approval of operator in writing. Competency of crew should also be assessed on job by IM through BOP drill and day to day monitoring.
- r) Detailed internal audit by operator should be conducted within 15 days of deployment of new contract rig as per OISD-GDN-145. Internal audit of all rigs and installations should be carried out by specially constituted MDT once every year as per OISD checklist in line with OISD-GDN-145.
- s) Operator should review all formats being used on rigs and installations including format for DPR in line with OISD Standards and good international practices. Formats should be controlled with unique numbers.
- t) Assistant Driller should also possess mandatory well control training certificate in line with clause 8.1 of OISD-RP-174.
- u) Weekly Safety Meeting should be held on all rigs and installations and record be maintained.
- v) All possible scenarios of well control (including situation when there is no BOP on the well) should be documented in well control procedure and practiced.
- w) Mines Manager should carry out HSE inspection of all rigs and installations under their jurisdiction as frequent as possible.
- x) Competency mapping should be done for all key personnel (including senior management) and necessary trainings should be imparted to bridge the gaps identified.



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