

Blowout During a Completion Operation with a Snubbing Unit

Case Study



BACKGROUND:

Wild Well Control (WWC) Personnel responded to a blowout on a completion operation on a multi-well pad in Ohio. This project was completed by removing the rig and snubbing unit and capping the well. The client was then able to return to normal operations.

EVENT SUMMARY

This incident occurred while drilling out plugs in a post-fracture stage of the completion. The cause was suspected to be movement of the wellhead, BOP and snubbing unit while drilling out the plugs. This instability at the wellhead was noted upon arrival and suspected to be the primary reason for the wellhead component failure. During the drilling operations, the wellhead and snubbing equipment was reported to have demonstrated slight freedom of movement. The tubing spool wing valve was tied into a flow line to the gas production equipment on location. This line was buried and did not move along with the wellhead components, placing stress on the connection at the wellhead. The flanged connection at the tubing spool wing valve and the wellhead ultimately failed and began to leak. The leak quickly intensified, and the location was evacuated.



The initial site assessment noted the following challenges:

- A workover rig and rig-assist snubbing unit were installed and would need to be removed if the well could not be killed initially.
- There was tubing through the snubbing unit and BOPs and a power swivel hanging in the rig elevators further complicating the process of removing these assets.



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- The failure at the tubing spool body dictated that the tubing spool would have to be removed to secure the well.
- There were 3 additional wells in close proximity to the subject well with the potential for escalation into a multiple well event.

WWC personnel were successful in the removal of the workover rig, snubbing unit and the tubing spool. The well was capped and shut-in with a single blind ram to contain the wellbore. The client was then able to proceed with the final workover to install a new tubing spool and continue with the well operations.

OPERATIONAL SUMMARY

Most well control operations involve multiple phases to achieve the ultimate goal of regaining control of the well. The following operational phases were completed for this project to reach the final resolution.

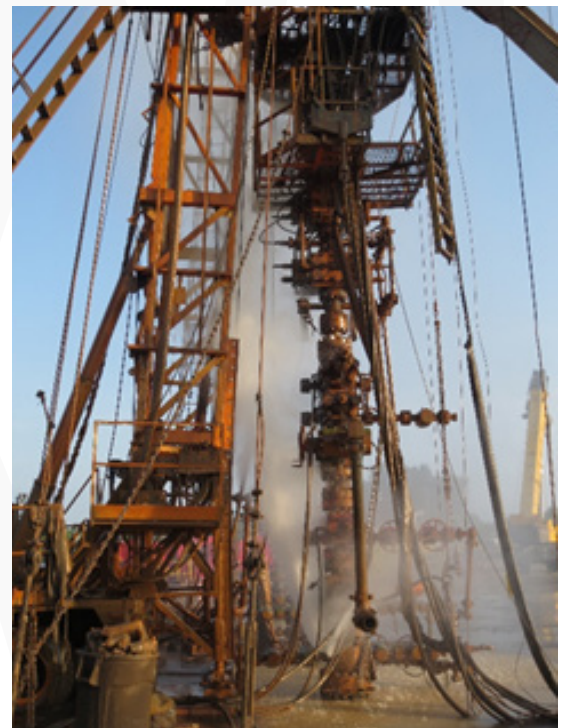
INITIAL KILL ATTEMPT

In some cases, it may be possible to kill the well to allow intervention operations to proceed. In this case, the snubbing work string was in the lateral section of the wellbore drilling plugs when the event occurred. This provided the necessary conduit to attempt a kill attempt. The kill attempt was made with a 16.5 ppg OBM. Mud returns were noted at the exit early on, suggesting that the tubing had been subsequently compromised. The kill attempt was abandoned, and the operations progressed to the next phase.

WELLHEAD ACCESS AND LOCATION PREPARATIONS

The plan then moved towards the removal of the failed tubing spool. This would require the removal of the workover rig, snubbing unit, BOP equipment and frac valves. Along with direct actions to the subject well, the adjacent wells had protective cages installed to limit possible escalation. These were fabricated by the client and installed over the 3 additional wells on the pad.

The tubing was cut in the snubbing basket to allow the power swivel to be removed. The rig blocks were secured to the derrick and the tubing board was removed with a crane. The workover rig hydraulic system was plumbed into an auxiliary source and the derrick was scoped in and laid down, allowing the rig to be removed from the well site. With the rig removed, operations proceeded to the next phase.



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WELLHEAD PREPARATION

The next phase of the intervention was to make an abrasive jet cut on the lower frac valve. The snubbing unit, BOP equipment and frac valves would all be removed with the crane upon completion of the cut. The crane was tied onto the snubbing unit lifting bridle and the necessary pumping equipment was rigged up and tested for the abrasive cut. The WWC Abrasive Jet Cutter (AJC) was installed on an Athey wagon and the cut was completed without issue. The snubbing unit and additional components on the stack were removed leaving the tubing spool and bottom flange from the lower frac valve. The crane was tied to the tubing spool and the spool was removed from the casing spool – thus removing the failed component from the wellhead. The capping BOP could now be installed on the casing spool for securing the well.

CAPPING AND KILL OPERATIONS

The capping stack for this operation was a single blind ram. The well was planned to be shut-in and would not require any diversion as the previous failed tubing spool was now removed, and the original wellhead that was installed was unaffected by the event. The capping BOP was landed on the casing spool with no issues and closed, securing the flow from the well. The client began planning the wellbore recovery operations.

