Boots & Coots Regains Control of Well After Underground Blowout and Surface Broach

SUITE OF LOGGING TOOLS HELPS DETERMINE DETAILED SOURCE CONTROL RESPONSE PLAN

SOUTH AMERICA

CHALLENGES

- Contain an underground blowout and surface broach situation involving a damaged wellhead
- Regain control of well despite poor condition of casing and production tubing

SOLUTIONS

- Conduct safety and risk analyses
- Prepare detailed source control response plan
- Install an effective deluge system to assist with gas dispersion
- Replace damaged wellhead, recover production tubing, and regain control of well

RESULTS

- Damaged wellhead components were replaced.
- A snubbing unit was used to safely control and then abandon the well.

OVERVIEW

A gas well in South America broached to surface approximately 300 feet (91 meters) from the wellhead. The operator bled off production casing pressure and directed the gas to a burn pit, but, although the surface broach stopped, the uncontrolled gas released through the annular outlet valve caused erosion of the casing spool. Consequently, the integrity of the wellhead was compromised. The operator contacted Boots & Coots, which responded immediately by mobilizing well control specialists to lead the efforts for safely containing the situation.

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Prior to Boots & Coots regaining control of this well, gas flows in full open mode through the crown valve and a hole in the wellhead.

SOLUTIONS

The Boots & Coots well control team carefully inspected the well area. A comprehensive risk analysis was performed to evaluate the condition of the well, identify existing hazards, and construct detailed procedures and protocols for the operation. As erosion had compromised the wellhead component and there was no longer any casing integrity, a surface kill was inappropriate. Based on the safety and risk analyses, coiled tubing was considered the best method for a well kill through production tubing. However, the coiled tubing encountered an obstruction at 140 feet (43 meters), preventing further progress. An impression block indicated that the obstruction was caused by parted pipe.

The plan considered removing the wellhead and retrieving the top section of the production tubing. The risk analysis and contingency plans were reviewed to accommodate a snubbing operation. The location was cleared, and a deluge system was rigged up to assist with gas dispersion during the operation. The damaged wellhead was then removed and the top section of parted production tubing was recovered from the well. The wellhead was replaced by a blowout preventer (BOP) and a snubbing stack.

After the well had been killed, the remainder of the production tubing was recovered.

The flow from the well was diverted, through a diverter spool, away from the location and into a fire pit. The flow through the diverter line was monitored during the operation to ensure that no leaks developed.

With all safety procedures in place, snubbing operations began by running a 1.66-inch pipe into the well. A nozzle designed by Boots & Coots specialists was installed on the downhole end of the snubbing pipe to assist with guiding it in hole and for performing the dynamic kill operation. After the pipe reached a predetermined depth, the dynamic kill operation was performed and the well was killed. The predetermined depth had been selected based on the dynamic kill analysis, operational conditions, and minimum depth for performing a successful well kill operation.


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Boots & Coots installed a blowout preventer (BOP) stack on the well, and diverted gas flow to a burn pit.

RESULTS

After the well had been killed, the remainder of the production tubing was recovered. Observation at the surface indicated several holes and severe corrosion damage to the tubing.

It was believed that the integrity of the casing in the well was compromised. A suite of logging tools (gamma ray, casing-collar locators, CAST-V™ circumferential acoustic scanning tools, cement bond logs, and variable-density logs) was run in the hole, which confirmed that severe damage was present on the production casing. The operator decided to perform well abandonment operations, basing its plan on the log data and local regulations.


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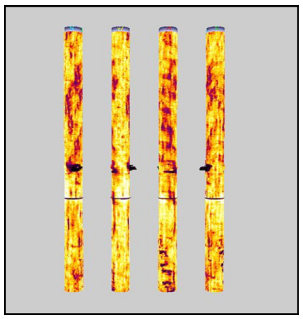
The snubbing unit found multiple instances of corrosion damage in the production tubing that it recovered.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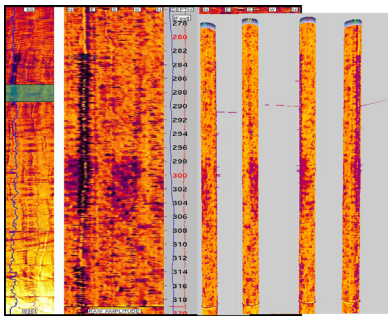
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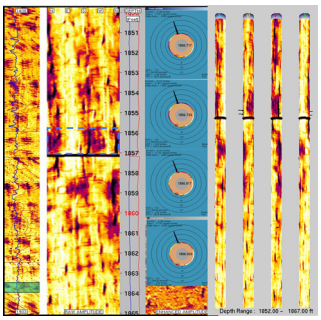
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CAST-V™ logs revealed multiple instances of damage in the production casing.

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