CASE STUDY

HALLIBURTON

SOUTH AMERICA

Innovative well remediation with support frame technique achieves rapid, safe, and cost effective return to production

Surface casing failure repaired and well returned to production

CHALLENGE

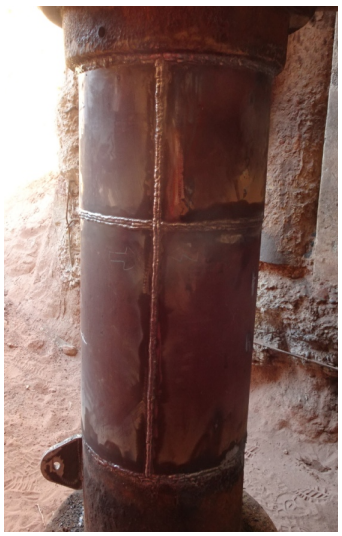
- Repair 20-in. surface casing failure with installation of a support frame and restore well to production

SOLUTION

- Multidisciplinary engineering and operational approach to repair 20-in. casing and install landing base

RESULT

- Achieved objectives in three months
- Performed operation safely with zero incidents in a cost-effective manner
- Avoided heavy workover operation to change wellhead
- Reconnected well to former production rates



Overview

An onshore operator removed a highly productive well from service after a 20-in. casing failure at the surface. Upon consideration of heavy workover remedial options (with potential high costs and long delays), the operator sought alternative solutions to return the well to production with the shortest delay.

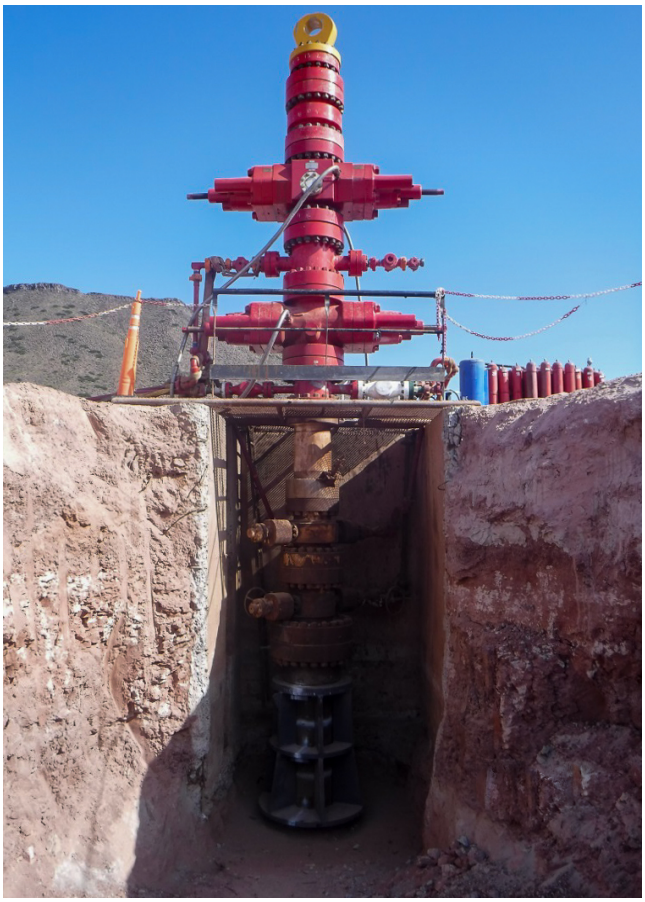
Background/challenges

During a cellar cleaning campaign, the operator observed the 20-in. casing parted at the cellar level below the start of the casing head with evidence of corrosion. The cut was buried in sediment for an unknown period and the operator suspected prolonged exposure to water and sediment accumulation in the cellar. The customer reported wellhead movement caused by thermal expansion (axial and lateral). Additionally, Annulus B (formed by the 13 3/8-in. casing × 9 5/8-in. casing annulus) was pressured with 16 bars. The wellhead was not supported by the landing base and axial/torsional force cycles during production/shutdown periods. This generated fatigue on the 20-in. casing. This load combination, combined with a lack of inspections and cellar cleaning, resulted in casing failure at the surface.

Solution

After a review of the engineering and execution plan, the operator selected the Halliburton Boots & Coots® team to perform the repair. The team treated this operation as a workover (well secured with blowout preventer) and the primary stages were as follows:

- Install downhole plugs, monitor annular pressure, and perform bleed-off operations
- Remove surface installations: cellar floor and wall (trench excavation)
- Cut the corroded section of 20-in. casing 50 cm below cellar excavation
- Built concrete foundations and rig up strand-jack lifting equipment. Installed and closed a BOP to secure the well. Install the tensioning spool, the system, and all casing and tubing strings to 465 kips to achieve 34-mm displacement and compensate for thermal retraction (perform engineering calculations using WELLCAT™ computer software)
- Replace the 20-in. corroded section with two new, half-moon 20-in. casing sections (welded)
- Installed support frame (designed with Finite Element Analysis FEA software)
- Release tension on the custom-designed support frame



20-in. casing repair: Trench and cellar view with tensioning/capping system and strand jack installed.

Results

All objectives were achieved through this innovative and multidisciplinary engineering and operational approach. In total, preparation and engineering required three months. The operation was performed safely (with zero incidents), in a cost-effective manner, and this repair helped the operator avoid heavy workover to change the wellhead. Halliburton Boots & Coots reconnected the well and restored it to its former production (430,000 sm3/D with peaks-choke not fully open).

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