MATURE FIELDS

CASE STUDY

Halliburton Project Management Successfully Delivers First Integrated P&A Under-River Well Project

MULTI-PSL HALLIBURTON TEAM EXECUTES P&A OPERATION IN COMPLEX AND REMOTE ENVIRONMENT

MAGDALENA RIVER, COLOMBIA

CHALLENGES

- Design and implement a custom solution for a complex under-river P&A project
- Mitigate significant well integrity issues due to the age and location of the under-river well
- Design solutions to align with HSE, social, and technical regulations for this complex P&A operation

SOLUTION

- Establish a multidisciplinary project team comprising experienced personnel from Halliburton PSLs
- Gather crucial data from studies, and then design and build a customized work platform
- Collaborate with the customer and subcontractors to generate an effective operational program, along with a robust risk management plan

RESULTS

- Achieved 100% operational success with zero HSE or service quality incidents
- Completed P&A project in total compliance with the customer's contract requirements and all local regulations
- Delivered project 6% ahead of schedule

OVERVIEW

In Colombia, the Halliburton Project Management team was selected to provide integrated plug-and-abandonment (P&A) services for a well located midstream in the Magdalena river. The well was in a remote area in the middle of the Magdalena riverbed, with difficult access hindered by currents and flooding. Many studies of the riverbed were carried out, the results of which were used to model various scenarios of the riverbed conditions. These study results and modeled scenarios were applied as an input for designing the structures and providing safe, customized solutions. This project was executed utilizing specialized Halliburton technologies, such as well control services from Boots & Coots, hydraulic workover (HWO) unit from Production Solutions, and other well services involving wireline, cementing, fluids, and completion tools. Additionally, Halliburton provided engineering studies, river support barges, and well abandonment equipment. Halliburton teams also designed, built, and installed work support structures (providing piling and positioning) for the high fluctuations of water levels.

EXECUTING P&A PROJECT IN A COMPLEX AND REMOTE ENVIRONMENT

The under-river P&A project was performed in a very complex environment. River conditions and water depths allowed for only a limited operational window; therefore, in-depth analysis of the location, river, and well condition were required in order to properly plan and safely execute the project.

Since the well had remained closed for 40 years and was located in the middle of Magdalena river, well integrity was another main challenge.

Other challenges that had to be addressed prior to the start of operations included:

- Designing and implementing a customized solution based on a structure design suitable for a shallow-water environment and for supporting snubbing operations
- Developing a complex readiness process that included civil works; structure design and construction; health, safety, and environmental (HSE) and COVID-19 protocols; a social approach; local content development; and environmental permits and licenses
- Evaluating, contracting, integrating, and managing a multitude of local and diverse subcontractors, and establishing a safe work environment in this complex location for all involved

To solve these challenges, the Halliburton team designed and implemented a customized solution reducing environmental and operational risks by maintaining well integrity and utilizing a robust risk management plan.

COLLABORATION AND ADVANCED PLANNING PROVE CRITICAL TO THE PROJECT'S SUCCESS

Given the challenges of this sensitive and complex environment, Halliburton Project Management assembled a multidisciplinary project team with experience in well integrity and hydraulic workovers in order to address the planning, preparation, and execution phases. This team included personnel from multiple Halliburton product service lines (PSLs) and local support functions (such as logistics and procurement), as well as subcontractors.

In addition to the complexity of the riverbed, another constraint that had to be considered during planning involved the seasonal river level, which allowed only a 10-week operational window when the barges could navigate through the river. Therefore, prior to execution, Halliburton collaborated with a local institution to carry out expert studies, such as soil surveys, along with the hydrology, topography, and bathymetry of the riverbed.

Once the engineering studies were completed, and detailed well and location data were evaluated and analyzed, the team established the well programs and multiple contingencies. The abandonment plans were aligned with key suppliers and the customer.

Based on modeling and studies of the complex river stream and riverbed environment, a working platform was designed and built, and then transported and installed at the well's location with a secured piles structure.

Next, Halliburton collaborated with the customer and subcontractors to generate an effective well integrity solution, along with a robust risk management plan for operations. To address significant deterioration of the wellhead, the Boots & Coots team performed a hot-tap job to evaluate and relieve annular pressures. This team also replaced deteriorated valves and other wellhead components.

While mobilization and execution timings were designed to take advantage of the seasonal river level, the Halliburton Project Management team also had to consider global COVID-19 restrictions on travel and safety for all project personnel.

The Halliburton Project Management team also collaborated with the customer on procurement and social plans, focusing on the integration of the local community within the influence area. This was accomplished by hiring local personnel, subcontracting local providers, and safely performing the operations in compliance with the local requirements and regulations.

DELIVERING A PROJECT WITH EXCELLENT SERVICE QUALITY

Despite the many environmental and well integrity challenges, comprehensive advance planning and preparation activities played key roles in the successful execution of this under-river P&A project. All phases (included well intervention, mobilization, and demobilization) were accomplished with no recorded HSE or service quality issues. This project was also delivered 6% ahead of schedule, and in full compliance with customer contract requirements and local regulations.

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