

Southeast Asia

Intervention solutions provide immediate impact on mature field production wells

Operator realizes significant increase in production while also reducing cost per BOE

Overview

For an operator in Southeast Asia, a Halliburton Consulting team combined cutting-edge logging technology and petrotechnical consulting techniques to identify 250% in additional production for wells in a mature field. Many of these wells suffered from high water cuts, excessive sand production, and suboptimal artificial lift operations, among other mature field challenges. The Halliburton team was able to provide solutions for these issues and also identify where oil saturation existed behind the casings in 15 wells (out of 47) where new production zones could be targeted—thus, providing the client with the potential to increase its total production.

Challenge

The operator's field was discovered in the 1970s, with production beginning in 1986. Several previous operators had managed the field, all with varying degrees of record-keeping disciplines—therefore, insufficient data and poor data quality had become obstacles to increasing production. The current operator took control of the field in 2005 and managed to increase the production of oil and gas in the short term; however, the field's production levels began to decline in 2007. For this operator, gas production was a priority due to the commercial terms in its production sharing contract (PSC), which allowed the operator to keep a larger share of profits from its gas sales than from its oil sales. The field was producing 22.5 MMscf/d of gas and 2.8 Mbbl/d of oil. For the current operator, in addition to having insufficient data for managing this field, other issues that were restricting increases in production included high water cuts in many wells, potential paraffin deposition, excessive sand production in a few wells, the probability of high skin in most of the reservoirs, suboptimized artificial lift operations, and complex hydrocarbon-bearing zones.

CHALLENGE

- Identify additional production opportunities in a mature field with sharply declining production rates
- Decrease the probability of high skin factors for well production
- Avoid high water cuts, excessive sand production, and paraffin build-ups in the mature field's wells
- Replace failed electric submersible pumps (ESPs) in order to optimize artificial lift operations

SOLUTION

- Utilize the RMT-3D™ reservoir monitor tool to locate oil, water, and gas saturation behind well casings
- Identify specific wells that would enable the operator to increase production quickly
- Determine expected production and economic results to help guide the client's decision making
- Provide remediation operations to solve existing production issues

RESULT

- Identified the opportunity for a 250% total production increase, which was determined from just 25% of the client's wells
- Provided custom interventions for each well to maximize production at low cost
- Performed water conformance treatments to effectively reduce existing high water cuts in many of the wells, replaced ESPs to optimize artificial lift operations, and provided various additional remediation efforts to solve or mitigate other issues

Solution

To help this operator increase the mature field's production rate, Halliburton ran its RMT-3D™ reservoir monitor tool in several wells to determine if there was oil, gas, or water saturation behind the well casings. This tool was run in zones that had never been produced before and that were not targeted when the wells were initially drilled. The RMT-3D™ data helped the project team identify where oil saturation existed and where new production zones could be targeted. Near-wellbore damage (involving high skin factors) was estimated to be extensive in most of the producing zones. Reperforating these existing zones would allow for increased production at a relatively low cost. The Halliburton team also recommended an effective water conformance technique that would help avoid the high water-cut issues existing in many of the wells and enable the operator to more rapidly increase production.

Result

The Halliburton team successfully verified the quantity of increased oil and gas production that could be realized with relatively low-cost and low-complexity interventions. The team also identified 15 wells, out of the field's 47 wells, that would be good candidates for intervention, thus providing the client with the potential to increase its total production by over 250%. Additionally, internal rates of return (IRRs) for these interventions would average 100% annually. The proposed Halliburton workovers included replacing failed electric submersible pumps (ESPs), reperforating to decrease the possibility of high skin factors, performing coiled tubing jobs to remove paraffin, and replacing sand screens for wells with excessive sand production. These remediation efforts were far more economic than drilling new wells.

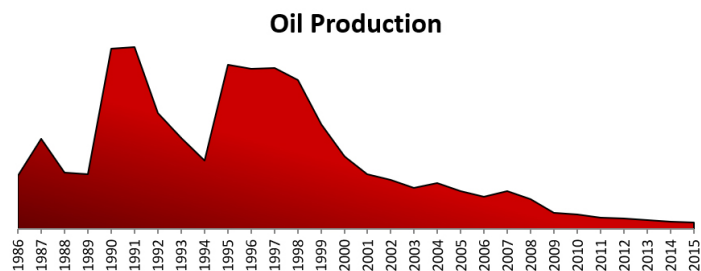


Figure 1: Oil production history

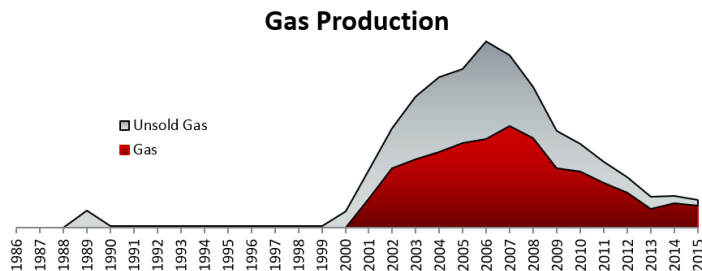


Figure 2: Gas production history

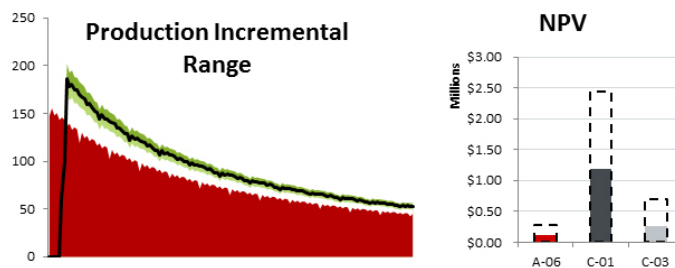


Figure 3: Expected economic results

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