

Onshore Quick Value Assessment (QVA[®])

Case Study

iStore utilizes a powerful set of standard tools and technologies within a proven framework to configure its web-based oil and gas products and solutions.

Overview

A giant onshore oilfield operated by a National Oil Company (NOC) that was discovered in the 1930s covers an area of about 45,000 acres (182 km²). The primary producing formation is Cretaceous carbonate with gross thickness of about 200 meters. The field has a total of 7 productive formations between depths of 2,000 meters to 3,000 meters, including shallower Tertiary channel fill sand deposits. A total of 985 wells have been drilled in the field to date. About 250 wells are currently active, 580 wells are shut in, and about 155 wells have been plugged and abandoned. Cumulative production is more than 1.8 billion barrels of oil equivalent during the 80 years of production history. Water injection was initiated about 20 years after first production and about 3 billion barrels of water have been injected to date.

iStore Role

iStore was commissioned to work with the NOC asset team to assist in quickly reviewing this field and evaluating the remaining production and reserves potentials of this mature oilfield using its Quick Value Assessment (QVA[®]) proprietary software and the technical consulting expertise available to iStore. The study was completed in four months by a joint multidisciplinary team of experienced engineers, geologists, geophysicists, petrophysicists, and data managers from the NOC and iStore. The installed software directly accessed corporate and asset level data sources required for the study and enabled the QVA study in a short time frame.

The QVA® study resulted in the following key observations:

- The primary producing formation still had considerable remaining undrained bypassed oil reserves.
- The productive limits of the field were larger than originally projected.
- Shallower formations that were present over a major portion of the field, were identified for testing to establish their productive capabilities.
- Over 350 of the shut in wells were identified with numerous recompletion opportunities in pay zones behind pipe that could be completed for additional production and reserves.
- Water injection patterns could be modified to improve sweep efficiency and recover oil from unswept portions of the reservoir.
- Hydraulic fracturing with proppants could recover oil from tighter lower permeability portions of the producing formation.
- Horizontal producing and injection wells could improve reservoir performance.
- The producing mechanism in portions of the field was a combination of gas cap expansion and bottom water. Optimum well placements (to take advantage of gas cap expansion), gravity drainage, and bottom water drive were recommended.
- Reservoir pressure in portions of the field had dropped below bubble point pressure and a pressure maintenance pilot project was recommended.
- Recommendations were made to carefully manage the reserves and production balance during field optimization activities.
- The presence of a very high quality regional source rock was present in this field and recommendations were made to test the potential of this resource oil play.
- Reactivations of shut in wells were recommended to increase total field production.
- Artificial lift systems modifications were recommended to improve field performance.
- A field-wide water management program was recommended to effectively handle and treat produced water.
- Original oil and gas in place values and remaining reserves were larger than originally projected.
- Recommendations were made to achieve better data quality and data completeness for analysis and ongoing operations of the field.

The NOC elected, on the basis of this work process, to initiate the following actions:

- Undertake review of the 300+ wells with unperforated behind pipe net pay.
- Review modification of the artificial lift systems in identified wells.
- Initiate a program of recompletion opportunities for wells identified in the study.
- Drill new wells to test the potential of shallower identified channel sand deposits.
- Drill a horizontal well to test the resource oil play in the field.
- Drill step out wells to extend the producing limits of the field.
- Initiate a study for a pilot up dip gas injection project.
- Initiate a study for a pilot water injection program with a modified water injection pattern.
- Create a program to conduct production tests and reservoir pressure tests to assist with determining current reservoir pressure and remaining reserves in the field.