

Integrated field development plan for multiple fields improves production and recovery factors

Innovative solutions revive rapidly declining assets in mature field

Overview

An operator in Latin America with a rapidly declining asset containing 17 fields needed a full update of its comprehensive field development plan (FDP) to obtain feasible and integrated solutions for achieving optimal production in these mature field assets. The Halliburton Consulting team developed a fully integrated plan, from seismic to production, that considered the original oil in place (OOIP) and provided high-grade strategies for all 17 fields in the asset.

Challenge

The key challenges for the FDP were to mitigate the high well decline rates, along with the high rates of uneconomical new wells per year. The asset was also suffering with low recovery factors. The FDP also needed to improve the efficiency and design in the fields' well construction and completion projects. Overall, the plan needed to maximize the fields' net present value (NPV) and extend asset life cycles.

CHALLENGE

- Provide feasibility and integrated solutions for 17 fields that need a full field development plan (FDP) update
- Perform stochastic reserve rankings and risk assessments to prevent faulty investment allocations to low-potential production
- Rapidly identify initiatives to increase low recovery factors and extend field life cycles
- Offer state-of-the-art completion technologies to improve underperforming well productivity

SOLUTION

- Provide stochastic reserve evaluations and field selections based on risk management and opportunities to meet short-term goals with maximum reserves and minimum capital expenditures (CAPEX) investment
- Conduct multiple field enhanced oil recovery (EOR) screening analyses to identify benefits
- Perform stimulation and completion technology screenings to select technologies and meet immediate goals

RESULT

- Identified tight oil fields with greater reserves to pilot unconventional technologies in reservoir analysis, new well designs, EOR, and well intervention recompletion techniques
- Created a new FDP to improve recovery factors from less than 20% to 35–43%, depending on the field
- Incorporated new technologies (such as multistage fracturing, refracturing, and field operation and production management) to remove facility bottlenecks

Solution

To evaluate the fields, the Halliburton Consulting team considered the OOIP and performed asset stochastic reserve analyses and rankings for all 17 fields. The team recharacterized the asset subsurface understanding to design a new strategy for maximum reservoir contact wells and target sweet spots. The team also designed production profiles per well for the entire portfolio of 17 assets, identifying the key technologies and solutions to impact immediate, short-term, and mid-term production objectives spanning a 15-year period. The team's approach focused on optimizing asset development plans by minimizing operational expenditures (OPEX) and capital expenditures (CAPEX), and by applying unconventional field development solutions, such as horizontal wells, to improve well productivity performance.

Result

The Halliburton Consulting team generated a field development plan that increased daily production by over 30%. To accomplish this, the team applied unconventional technologies to these tight oil fields to improve well production by 1,000 times in some cases and to provide additional well payouts in just days instead of months. The team also identified assets for early enhanced oil recovery (EOR) development, effectively targeting the opportunity to improve recovery factors from 20% to over 38% in the asset. Halliburton also incorporated new technologies (such as multistage fracturing, refracturing, and field operation and production management) to remove facility bottlenecks.

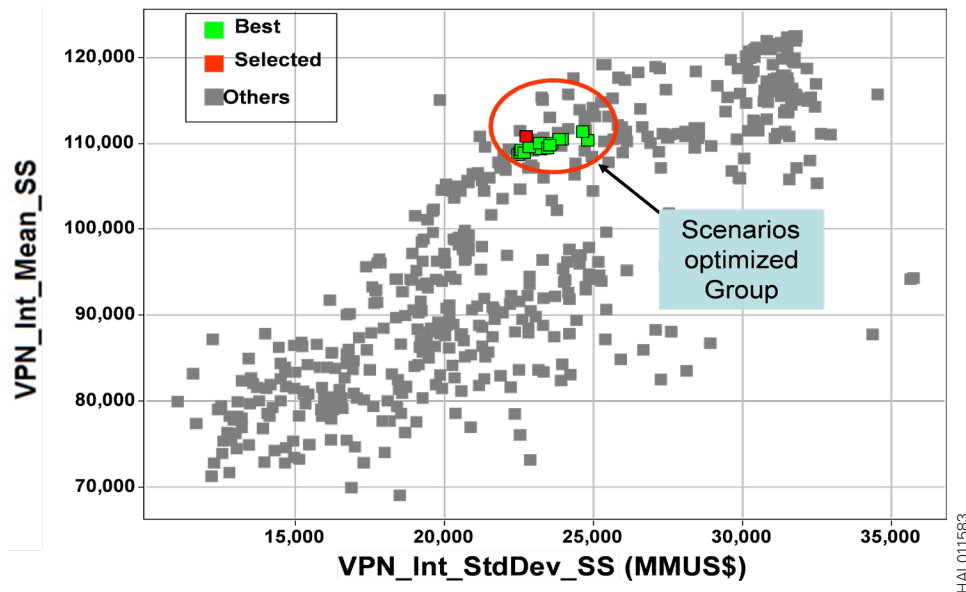


Figure 1: Portfolio analysis and scenario selection

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