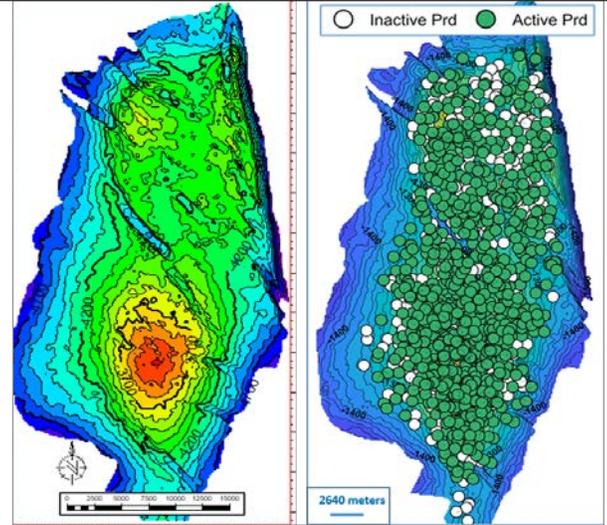


SpeedWise Reservoir Opportunity Helps Customer Detect Behind-pipe Potential in Existing Wells

RESULTS

- Delivering feasible and actionable inventory only took four weeks and involved ten person-weeks.
- The asset team was rewarded with much shorter decision cycles and smarter decisions than the labor-intensive, traditional simulation approach that offers unpromised returns.
- The efficiency and automation of the workflow provided the ability to consistently run multiple deterministic scenarios for a design of experiments. This allowed assessment of a range of potential models that reflected the uncertainty of reservoir variables, resulting in a solid understanding of the downside risk and upside potential.



Structure map (left) and map of inactive and active producing wells (right).

APPLICATIONS

SpeedWise® Reservoir Opportunity*

CUSTOMER

Major operator in the Middle East

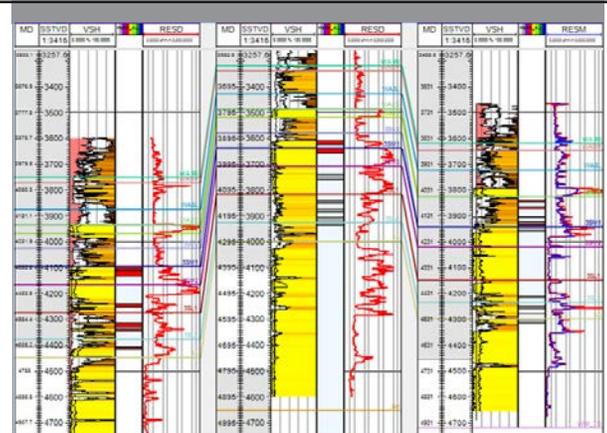
CHALLENGE

The asset is a giant sandstone with over 55 years of production history and more than 1000 producers. Oil production peaked at near 2 MMSTB/D and had declined to 0.8 MMSTB/D by the time of the study.

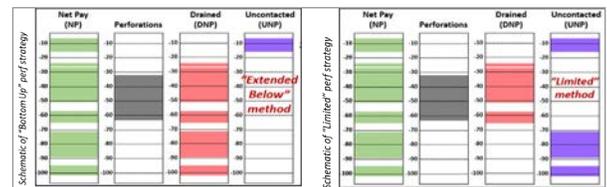
The asset team was looking to identify recompletion prospects in existing wells for a short-term increase in production. The long history, commingled production, and geological complexity (120 producing zones with different properties) made it very challenging to update the inventory effectively. The existing workflow was labor-intensive (took more than a year) and was unable to account for uncertainty in several vital parameters nor incorporate the most recent production data that reflected current reservoir conditions.

SOLUTION

The asset team utilized SpeedWise Reservoir Opportunity to overcome the existing obstacles and detect any remaining behind-pipe potential that could be tapped into by recompleting existing wells. More than 30 scenarios were generated to account for uncertainty in several key parameters. The post hoc analysis revealed that the current water-oil



Middle Cretaceous giant fluvial and deltaic sandstones with interspersed shales vertically compartmentalizes the reservoir.



SRO cases with varied settings to flag uncontacted net pay (UNP) provided a range of potential cases for review.

*US Patent Pending

contact, net-pay identification criteria, and drainage estimation method were the most influential parameters for the inventory outcome.

Thousands of contenders for each scenario were examined. After applying a series of filters (e.g., minimum initial rate, minimum oil thickness, maximum acceptable uncertainty) and the inspection of geologists, reservoir engineers, and production engineers, the final inventory consisted of 155 feasible options.

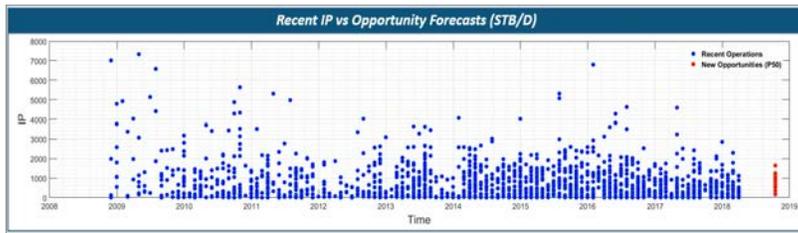
RESULTS

After performing a multifaceted risk assessment, the candidates were grouped into 25 high-confidence selections with average initial production of 400 STB/D, and 130 mid-confidence prospects with an average initial production of 600 STB/D. The base scenario included 116 recompletions with an estimated total potential oil gain of 63,000 STB/D.

BENEFITS

The study was completed in five weeks and involved ten person-weeks (compared to 24 person-months), which significantly boosted the efficiency compared to the traditional approach.

	Previous Workflow	SRO
Completion Time	12 months	5 weeks
Person-Months Spent	24 months	10 weeks
# of Scenarios	1 case	30 cases



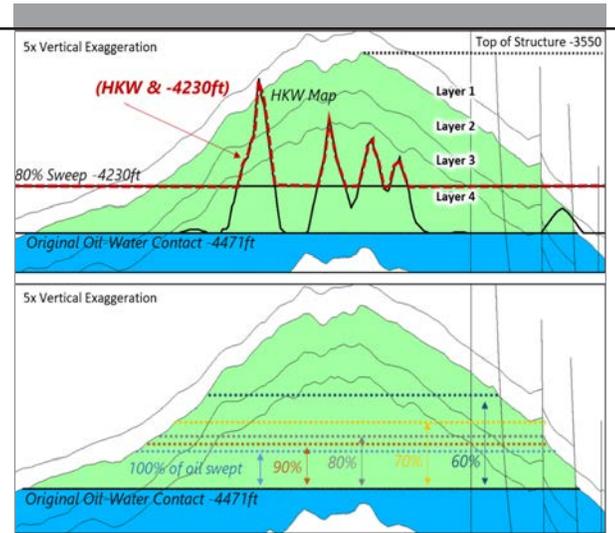
SRO initial production (IP) forecasts (red) versus historical IPs. The SRO forecasts were derived using the STI and TNNFR methods, both of which use zone-specific neighborhood rates and spatially and temporally weight them to provide forecasts.

Cases:	OOWC w/ 5m Standoff		OOWC w/ 30m Standoff		Median HKW -4157		HKW Mapping (75% WCT, Coning Wells) 30m Standoff	
	Net Pay: Any Lim: Contacted	Net Pay: Above Previously Drained	Net Pay: Any Lim: Contacted	Net Pay: Above Previously Drained	Net Pay: Any Lim: Contacted	Net Pay: Above Previously Drained	Net Pay: Any Lim: Contacted	Net Pay: Above Previously Drained
# of Recompletions:	201 (175 wells)	22 (22 wells)	78 (69 wells)	22 (22 wells)	19 (18 wells)	18 (18 wells)	55 (49 wells)	22 (22 wells)
Mean IP (STB/D):	493	342	473	342	480	351	448	342

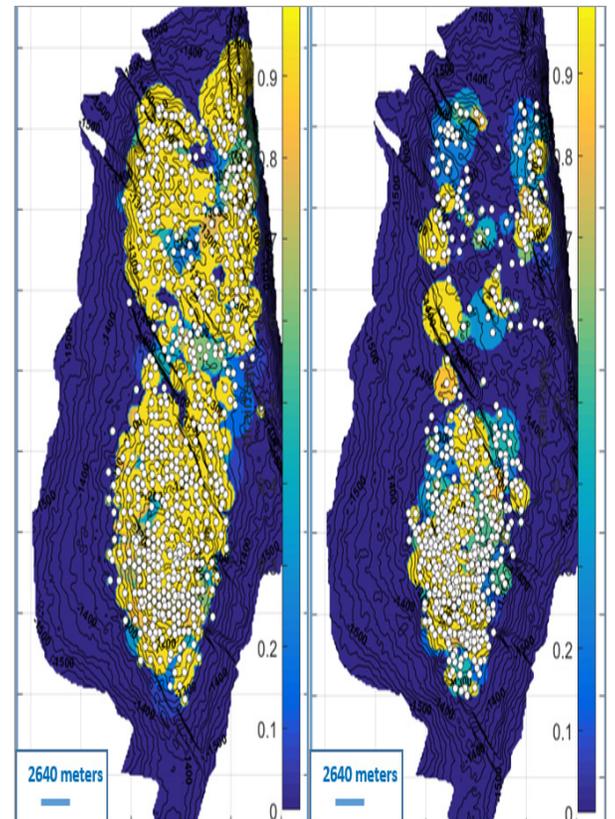
SRO rapidly evaluated multiple cases with varied current OWCs and net pay assumptions to obtain a range of outcomes for each dataset and case.

Emerson Automation Solutions
 6005 Rogerdale Road
 Houston, TX, 77072
 Tel. 281-879-2300

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Several interpretations of the current OWC were evaluated to obtain a range of the potential scenarios.



Intermediate steps of the SRO workflow create drainage maps for each zone in order to identify unswept areas for new opportunities (right and left show how two different zones were drained).