

Optimization of Lateral Well Placement

Case study: Hardy doubles production and extends field life in offshore India's Cauvery basin

Challenge

Develop an efficient way to drain a reservoir with existing wells and better understand the lateral variation of the formation properties to optimize future well placement.

Solution

Use Petrel* seismic-to-simulation software to build a 3D geological model and visualize the distribution of formation properties within the reservoir.

Results

Hardy sidetracked lateral wells through the predicted high-quality zones of the reservoir in three existing wells and enhanced the average production by 477 m³/d [3,000 bbl/d] in each well.

Determine petrophysical properties and identify pay zones

The PY-3 field, operated by Hardy Exploration and Production India (Hardy), was developed in the Campanian sand reservoir of the Cauvery basin off the east coast of India. This reservoir is known for its lateral and vertical heterogeneity. PY-3 is the deepest subsea field on floating production facilities in India.

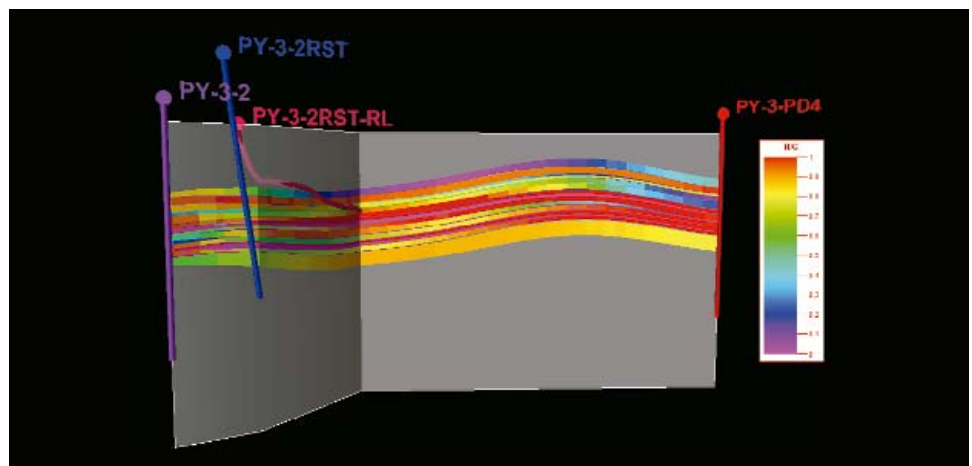
Initial production of 1,749 m³/d [11,000 bbl/d] was obtained from four vertical wells off a single floating production unit. In the second phase of field development, Hardy decided to drain the reservoir by drilling lateral wells from the existing wells. The company wanted to obtain a better understanding of the lateral variation in the reservoir.

Use existing well data to perform a detailed reservoir petrophysics study

Hardy constructed a 3D model of the Campanian reservoir using Petrel seismic-to-simulation software since conventional 2D maps could not provide the resolution needed. Although the PY-3 field contained only four wells, 3D modeling techniques provided the way to show lateral variation in formation properties and reservoir quality. These techniques were key to identifying optimum well locations for future drilling.

“Petrel helped Hardy Exploration and Production India drill three lateral wells that increased field production by 8,000 bbl/d.”

Dr. J. N. Sahu
Exploration Manager
Hardy



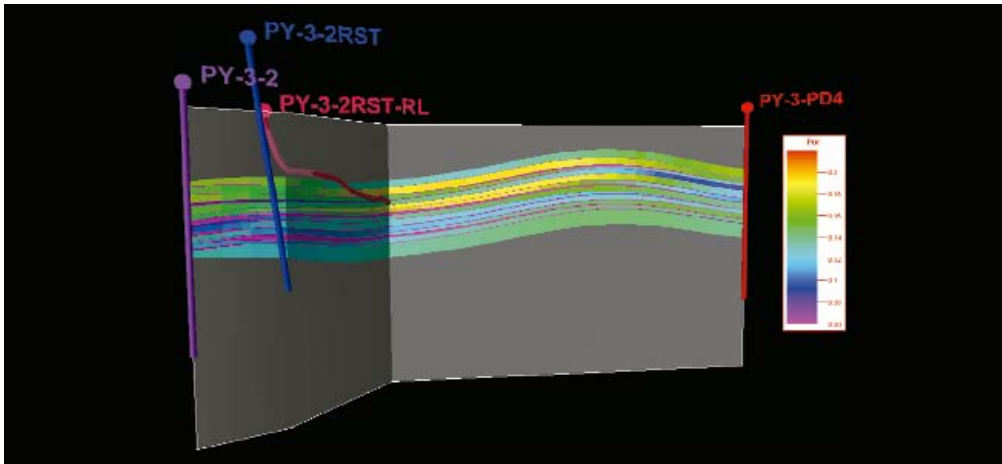
Cross section through the PY-3 field showing the planned lateral well penetrating the predicted high-quality zones of the Petrel model.



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Using Petrel software played a key role in identifying optimum well locations.



The ability to easily view the 3D distribution of reservoir formation properties with the Petrel presentation was of immense benefit to Hardy.

Visualize the distribution of formation properties

The final Petrel model was used in generating and visualizing several cross sections. Based on the Petrel model, Hardy planned optimal well paths and successfully sidetracked lateral wells from three of the existing vertical wells through the predicted target zones of the reservoir. The wells were designed and drilled with lateral penetrations of 248 to 592 m [814 to 1,942 ft]. Initial average oil production from each of these wells was about 477 m³/d [3,000 bbl/d].

In addition to increasing total production in the PY-3 field from 636 m³/d [4,000 bbl/d] to 1,272 m³/d [8,000 bbl/d], Petrel tools helped Hardy extend the field's projected life.

E-mail sisinfo@slb.com or contact your local Schlumberger representative to learn more.



PY-3 floating production platform.

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