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Petrel Reservoir Engineering

Reservoir engineering in context to enhance reservoir understanding

APPLICATIONS

- Extensive tools for planning and evaluating greenfield development scenarios; field management for large operational fields; and optimized infill well and workover design in brownfields
- Powerful simulation environment for all types of simulation studies

BENEFITS

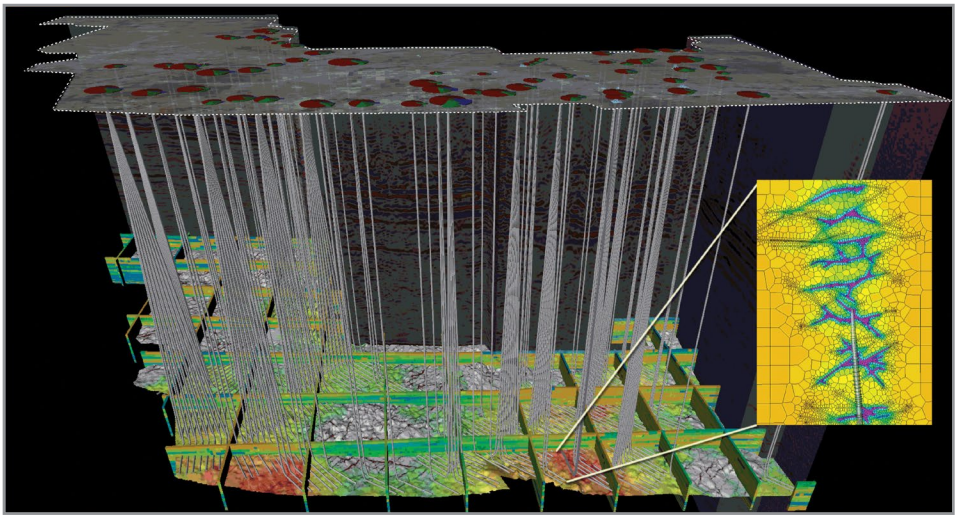
- Facilitate multidisciplinary collaboration between reservoir specialists
- Cascade changes in data through to the simulation model
- Create, submit, and analyze a large number of simulation runs
- Design and precisely place complex wells such as fishbone and fork wells
- Design advanced completions with inflow control devices and flow control valves
- Simplify and streamline history-matching process

FEATURES

- Single, model-centric subsurface representation built from multidisciplinary knowledge
- Models that stay in sync with the latest operational information via integrated production data
- Quick plots, interactive 3D analysis, and other powerful analysis tools
- Multiple upscaling methods that build models at the appropriate scale
- State-of-the-art visualization tools
- Easy access to production history (via OFM* well and reservoir analysis software), relating actual well production data to geology

The Petrel* E&P software platform enables reservoir engineers to collaborate effortlessly with each other, as well as with geoscience, geomechanics, and production specialists. Combining knowledge from all these disciplines into a single, model-centric subsurface representation means that changes in seismic interpretation, in the geological model, or in newly acquired well data easily cascade through to the simulation model.

Changes dictated by simulation studies are fed back into the subsurface interpretation and model, while integrated production data allows subsurface models to stay in sync with the latest operational information. The Petrel platform offers extensive tools for planning and evaluating greenfield field-development scenarios, field management for large operational fields, and optimized infill well and workover design in brownfields.



An unconventional study performed in the Petrel platform. Petrel Reservoir Engineering offers an easy-to-use environment to assemble, quality control, run and manage black oil, compositional, thermal, EOR, and unconventional simulation studies.

Integrated reservoir simulation environment

The Petrel Reservoir Engineering module provides a powerful simulation environment for all types of simulation studies, supporting the ECLIPSE* industry-reference reservoir simulator and the INTERSECT* high-resolution reservoir simulator. Petrel Reservoir Engineering offers an easy-to-use environment to assemble, QC, run, and manage black-oil, compositional, thermal, EOR and unconventional simulation studies. Powerful analysis tools such as quick plots and interactive 3D analysis (used in geological context) make it an efficient, powerful, and productive environment to aid reservoir engineering studies and the decision making process.

The Studio* E&P knowledge environment enables efficient collaboration and data sharing across all domains of the asset team, while Petrel Guru—a Petrel module that delivers in-context guidance—provides a library of ready-to-use and customizable model tests, reports, and guided workflows.

Petrel Reservoir Engineering

High-resolution modeling and field management

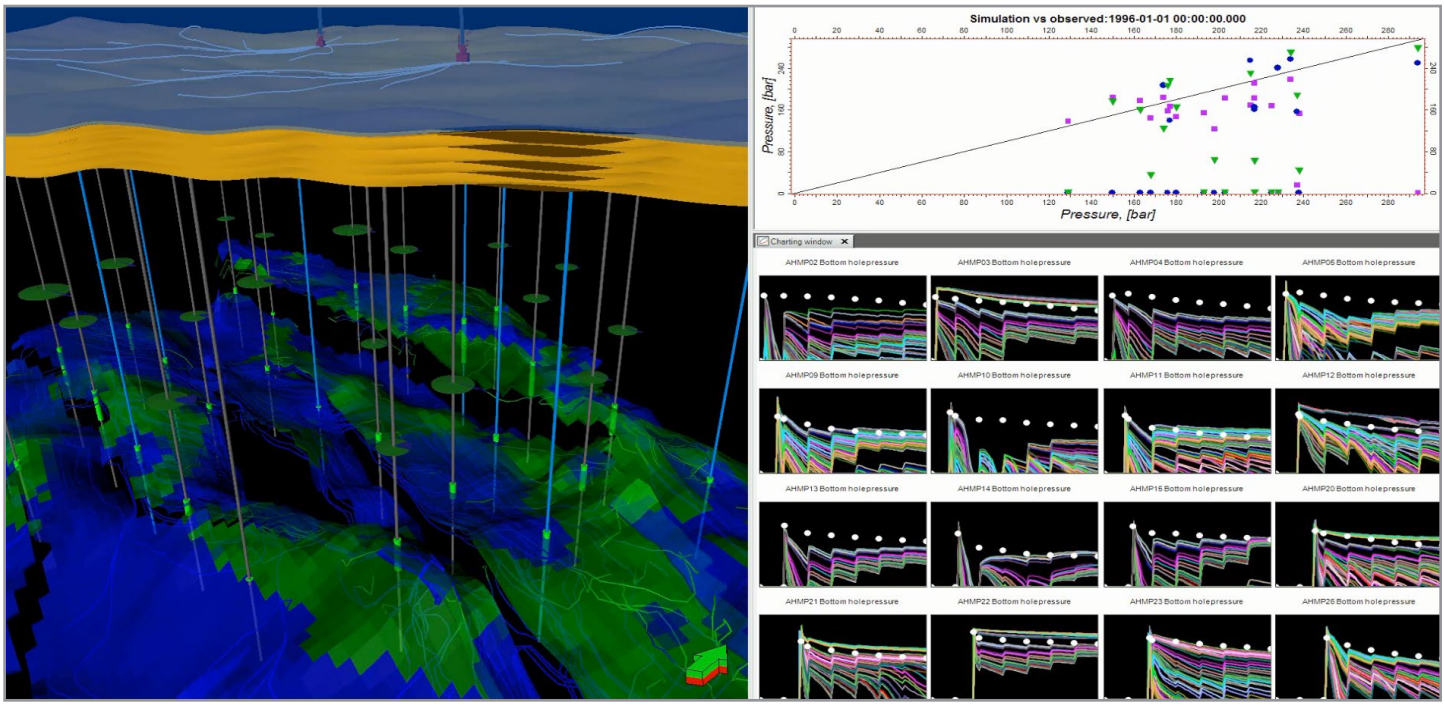
The Petrel platform offers a variety of gridding techniques. These include corner point grids, stair-step (IJK) gridding for complex faults (e.g., highly inclined or Y faults), as well as both structured and unstructured local grid refinements (LGRs) for challenges associated with coning and horizontal and multilateral wells. The INTERSECT simulator can be used seamlessly with these grids to run geological scale models. The Petrel platform provides a framework to build models at appropriate scale for your field development study.

The INTERSECT simulator supports flexible, advanced field management capabilities, such as optimization of rigs and other resources by specifying complex strategies with constraints and conditional logic. The Petrel platform provides an easy-to-use interface to effectively configure and control these advanced workflows.

Uncertainty and optimization

Understanding the impact of uncertainty on reserves estimates and production forecasting is essential to making effective field development decisions. The Petrel platform allows for fully integrated uncertainty studies. Static volumetric uncertainty and dynamic model connectivity can be obtained from fast streamline calculations using the Geoscreening plug-in for the Petrel platform; considering both allows for better screening, ranking, and selection of models to be used for detailed simulation.

The Petrel platform's uncertainty and optimization (U&O) framework enables you to create, submit, and analyze a large number of simulation runs. It also provides objective function definition, experimental design techniques, and proxy models. State-of-the-art visualization tools, such as correlation analysis, cluster analysis, and tornado charts enable excellent results analysis for improved forecasting and decisions.



The Petrel platform enables integrated history matching studies through objective functions, a range of global optimization algorithms, and a sophisticated run management system. Extensive and flexible analysis tools are available to understand the quality of the results.

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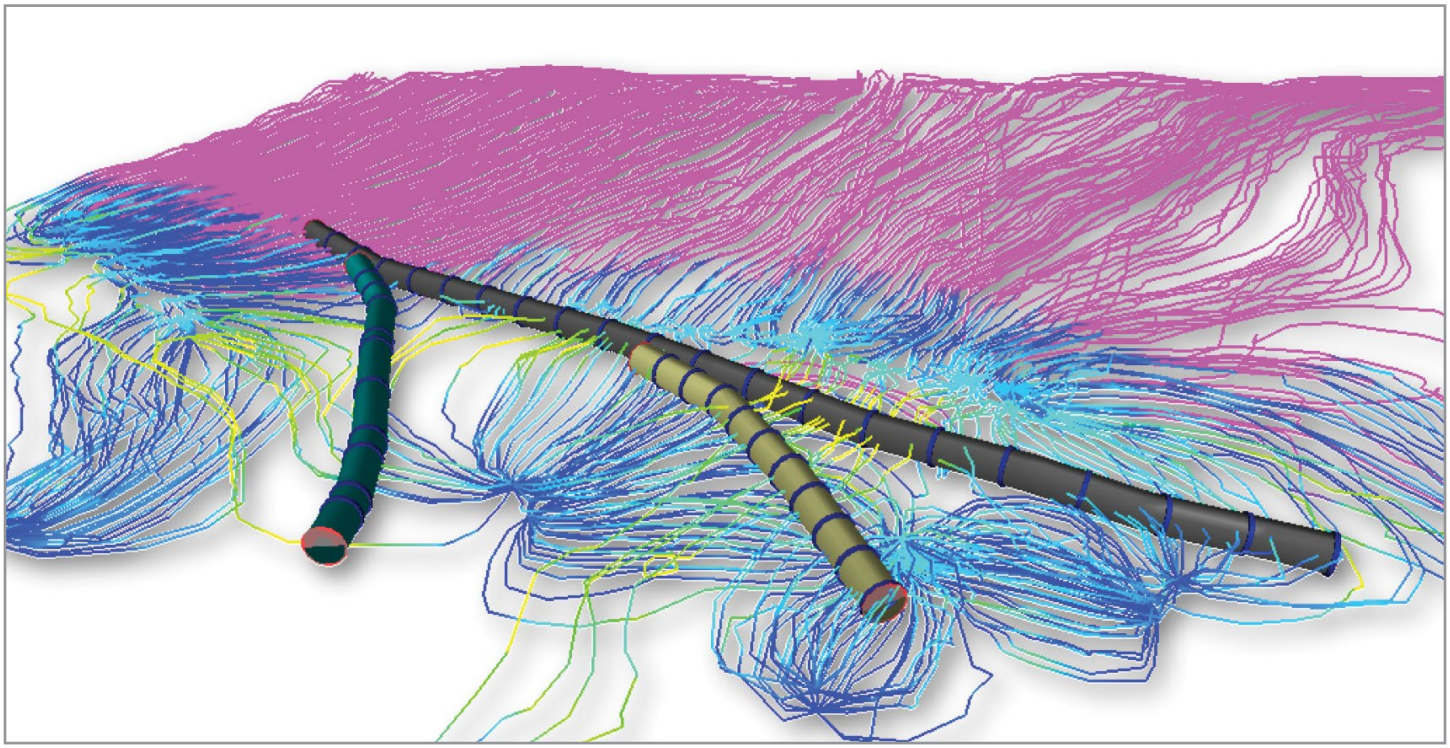

The Petrel platform provides advanced well handling capabilities with automated placement and completion optimization.

Well path and completion design optimization

The Petrel platform provides advanced well handling capabilities with automated placement and completion optimization. You can easily design complex wells, such as fishbone and fork wells and place them inside geological bodies with precision. In addition, the Petrel platform supports design of advanced completions, such as inflow control devices and flow control valves.

The platform also supports sliding sleeve devices that allow individual branches of a multilateral well to be shut. Sliding sleeves can be modeled, visualized, and configured for reservoir simulation. With these comprehensive well design tools, in combination with uncertainty and optimization workflows, you can evaluate and optimize well placement and spacing, as well as the type and number of laterals and completions.

Integrated production data and history matching

The Petrel platform provides easy access to production history via a connection to OFM well and reservoir analysis software, which supports integration of production data from both well and completion level. The asset team can incorporate dynamic simulation and production data, and use production analytics capabilities. Production analytics studies extend to well performance analysis, reservoir calibration with rate transient analysis, forecasts using decline curve analysis, and diagnostics of production trends and losses (e.g., skin and wellbore storage).

Further visualization techniques (e.g., bubble mapping, production grid mapping, and well section window track for production) integrate the production history into the earth model, providing an integrated environment for relating the actual well production data to geology.

The Petrel Well Deliverability module enables reservoir engineers to validate and tune reservoir simulation models using hydraulic vertical flow performance tables and nodal analysis. Reservoir engineers can then evaluate and choose optimum well completions or predict well productivity, based on the impact of mechanical changes and work overs on well inflow performance.

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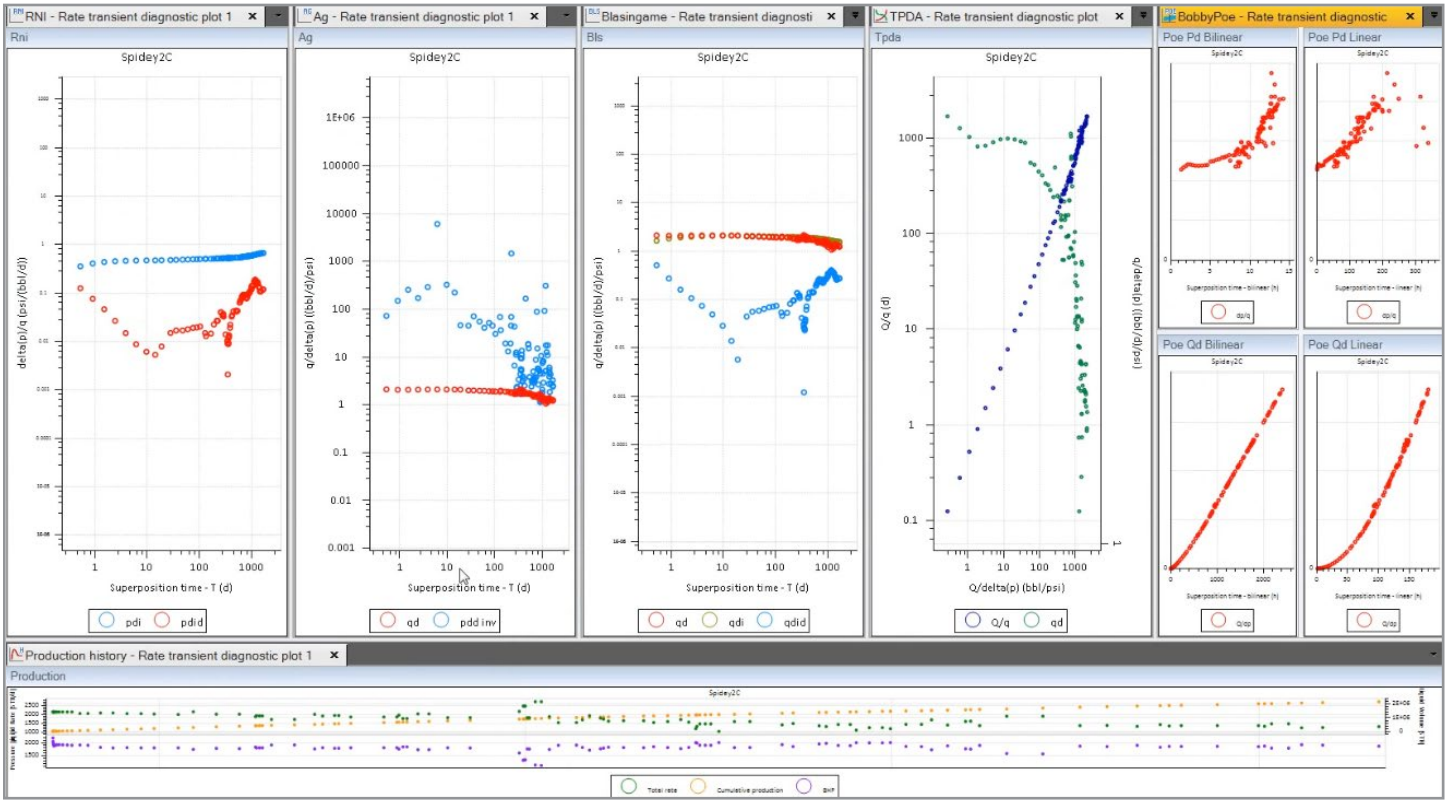
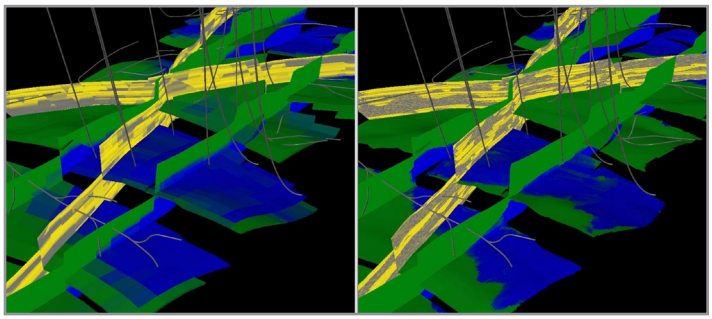


The Petrel platform includes production analytics workflows, enabling asset teams to diagnose production trends, make decline curve studies, etc.

History matching is essential to the continual improvement of the predictive capability of reservoir simulation models. This process can be time consuming and difficult when there are multiple wells, data types, and hundreds of simulation runs to be managed. The Petrel platform streamlines this process, enabling you to define history matching objective functions, select from a range of global optimization algorithms, and submit simulation runs through a sophisticated run management system. In addition, analysis tools that help to interpret and aid understanding of the history matching results are also available.



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