Schlumberger

OLGA Well Modeling

Simulate transient well behaviors to optimize well design and operation

APPLICATIONS

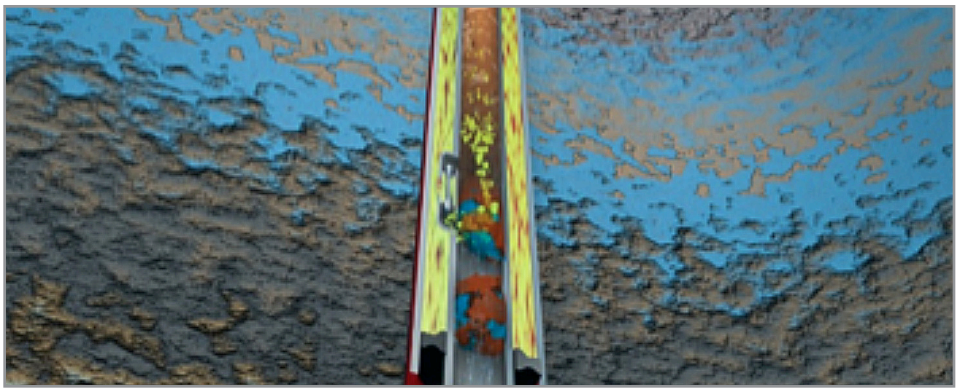
- Well design and operation optimization

BENEFITS

- Dynamic multiphase flow simulation for complex flow assurance challenges in wells
- CAPEX reduction through completions design for the life cycle of the well
- OPEX reduction through operational procedures that minimize downtime
- Optimization of well operations such as cleanup and startup

FEATURES

- Dynamic multiphase technology proven through continuous field-validation research
- Well design for a range of conditions, environments and operational procedures
- Identification of well flow problems, such as liquid loading or slugging



Model complex well operations, such as well cleanup and startup.

The OLGA* dynamic multiphase flow simulator offers an added dimension to well modeling, helping engineers to assess design and, more importantly, operating strategies for varying production conditions. The OLGA simulator models production transients, from changes in reservoir behavior (e.g., deliverability, fluid composition) to changes in surface controls (e.g., choke settings, shut-in, startup, and chemical injection). These changes affect well stability and production, and transient well analysis with the OLGA simulator enables well engineers to identify issues through the virtual well to avoid problems in the actual well.

Simulate flow in any well

The simulator can be used for all types of wells: deepwater, unconventional, and single-component CO_2 injection wells, SAGD injectors and producers, and wells with advanced completions and complex geometries.

Horizontal and multilaterals

By modeling the initial startup procedure, which is critical for clearing mud or completion fluids in the well, as well as liquid accumulation in the horizontal trajectory during production, the OLGA simulator is able to tackle two key production challenges.

For multilaterals, crossflow may occur between laterals and layers during production and shut-in conditions. By determining the contributions of individual laterals and the effects of compositional mixing, the simulator can model the interaction of multilaterals.

Interactions between reservoir, wellbore, and pipeline

In certain cases, the dynamic responses of the reservoir, well, and surface line need to be understood as a system. Such interactions occur in bullheading operations, gas/water reservoir coning, intermittent gas production, chemical squeeze processes, and the Joule-Thomson effect at the wellhead choke during startup and normal operations. The OLGA simulator shows reservoir and surface interactions with these wellbore-related effects.

Injection wells

In operations such as water-alternating-gas (WAG) injection, the well simulator helps to address operational uncertainties related to tubing, venting, resting, water hammers, back surges, and hydrate formation.

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Flow assurance—from concept to operations

Ensuring multiphase production under any set of production conditions is key to reducing well downtime.

The OLGA simulator addresses a range of well flow assurance concerns related to liquids, solids management, and lift challenges—in all phases of a well's life.

Completion design

By simulating production for various trajectories, well engineers can examine the effects of wellbore slugging, liquid accumulation, and waterlock. The simulator predicts flow stability and calculates pressure-temperature profiles, which form the design basis. The well simulator can also be used to model smart wells, the sizing and placement of inflow control devices and inflow control valves, and to determine flow control requirements.

Liquid management

Liquid loading affects almost every well at some point in its productive life. The well simulator can show the onset of loading with the pressure and rate limits more closely identified. Operating settings can minimize instabilities propitiated by wellbore slugging and ensure liquids can be handled by surface facilities.

Artificial lift

Some form of artificial lift is required over the course of well production. The OLGA simulator can model gas, electric submersible pump (ESP), and plunger lifts, and other processes including:

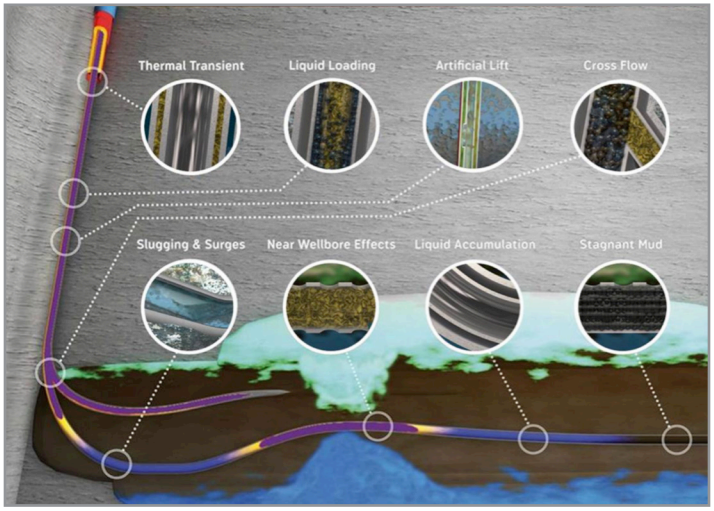
- Artificial lift design, performance and optimization
- Gas-lift performance for highly undersaturated reservoir oil, where lifting gas may or may not dissolve into the reservoir oil
- Dual-tubing gas lift allocation and gas robbing

Solids management

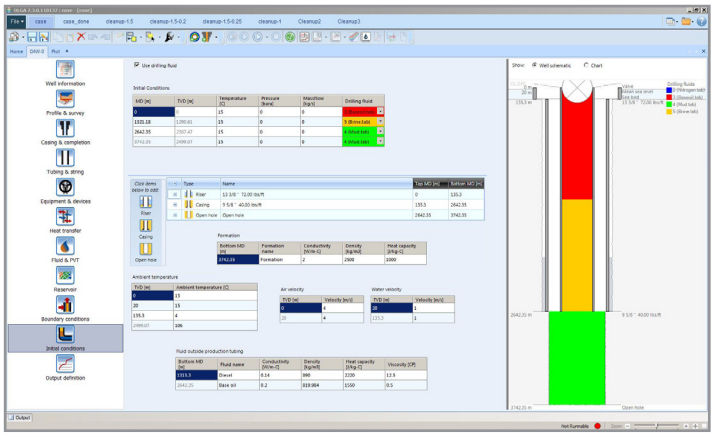
Hydrates and wax are the two main well blockages that can occur in steady-state and, more critically, transient operations such as well shut-in or startup. Modeling time-changing conditions in the simulator helps to determine the no-touch time of hydrate risk during operations. Simulation can also help to determine wellhead insulation requirements and quantify inhibitor requirements during both steady-state and transient operations. In addition, engineers can make estimates to determine the downhole installation depth of the SCSSV.

Work with your virtual well

The ability to simulate any well condition, or predict well behavior in advance, helps to minimize costs and ensure safe operations. The OLGA simulator can be used as a virtual metering tool to predict downhole conditions, match simulation results to measurements in surveillance and testing, and help monitor corrosion, erosion, and leaks to ensure well integrity.



Simulate transient well effects with the OLGA simulator.



Model cleanup operations of a mud-filled well.

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