



## Ensure accurate, efficient and consistent hydraulics monitoring and control

### i-Trak automated hydraulics optimization services

i-Trak™ automated hydraulics optimization services from Baker Hughes optimize your wellbore hydraulics with a range of automated monitoring, advisory, and control applications.

#### MAINTAIN SAFE DRILLING PRESSURES

The i-Trak automated hydraulics optimization service helps you maintain a safe pressure envelope while drilling by safeguarding against exceeding limits of the borehole's pore, collapse, and fracture pressures. The service uses a digital twin that's updated while drilling using real-time downhole data to continuously simulate along-string annular pressure regimes. The service continuously compares these pressures to equivalent static density (ESD) and equivalent circulating density (ECD) along the wellbore. If the ESD and ECD curves exceed the pressure gradient limits anywhere along the wellbore, the service automatically alerts the drilling team to adjust the current mud and drilling parameters to bring ECD back within the desired pressure boundary conditions. By automatically visualizing and communicating this simulated along-string-pressure regime for

the entire openhole section, the i-Trak service helps you confidently stay within your drilling window to maintain wellbore integrity and minimize non-productive time (NPT) and invisible lost time (ILT) risks.

The service also provides a "look ahead" capability — allowing engineers to see if their drilling parameters and fluid properties will remain within the desired envelope for the formation all the way through section TD. The result: a proactive, digital approach to managing hydraulics.

The i-Trak borehole pressure subservice delivers more intuitive visualization by seamlessly integrating any additional measurements from along-string sensors deployed as part of alternative telemetry—including Smart Solution XACT™ acoustic telemetry or third party wired-pipe systems.

#### MAINTAIN A CLEAN WELLBORE

The i-Trak automated hydraulics optimization service can also be leveraged to help optimize hole cleaning. The service employs deep learning-enabled, physics based models that visualize beds and in-transport cuttings in a 2D well schematic view. Based on these

#### APPLICATIONS

- Automated drilling operations
- Drilling in formations with narrow pressure gradients
- Tortuous wellbores with higher risk of stuck pipe incidents

#### BENEFITS

- Minimize NPT risks
  - Prevent pressure envelope violations
  - Avoid wellbore collapse
  - Reduce stuck pipe incidents
- Reduce ILT
  - Drill at higher ROPs due to effective hole cleaning
  - Get prescriptive recommendations of clean-up time



models, the service uses advanced algorithms to automatically calculate and deliver real-time recommendations on the required flowrate. With this information, you can continuously optimize surface parameters while drilling to maintain a clean wellbore. If the drilling operation builds beds, the service can automatically pinpoint their precise position in the wellbore for faster and more effective remediation and forecast likely clean-up time requirements.

### MAINTAIN CONSISTENT PROGRESS TO TD

The i-Trak automated hydraulics optimization service can also be deployed to provide early warning of potential stuck-pipe events that would otherwise add significant time and cost to your drilling and liner-running jobs.

The i-Trak service samples torque and drag parameters in real-time—including pick-up drag, slack-off drag, rotating-off-bottom torque, and breakover torque—and presents them graphically as broomstick charts.

The torque and drag service then combines discrete, AI-enabled parameter sampling with real-time modelling and machine learning to generate early-warning alarms automatically in advance of stuck-pipe events that could impact your drilling strings, casing, and liners. The service also uses high-frequency hook load data to discreetly identify the root cause of friction.

Deploying this service provides you with an efficient, effective means for maintaining safe drilling pressures, simplifying hole cleaning, and avoiding stuck-pipe risks.

Contact your Baker Hughes representative to learn how the i-Trak automated hydraulics optimization services can bring greater efficiency and consistency to your drilling operations.



The i-Trak hydraulics optimization service can automatically calculate and display a spatial distribution of cutting beds and cutting concentrations alongside contextual information including depths, mud flow rates and drillstring rotation. The service can also automatically calculate cuttings buildup severity levels based on hole inclination and provide automated alerts.