

DRILLSCENE PROACTIVE DRILLING DECISIONS



RISE TO THE CHALLENGE OF **REAL-TIME DRILLING CONTROL**



Today's oil and gas drilling operations present significant technical challenges in remote locations and increasingly demanding geological settings. There has never been greater pressure on drilling teams and operations managers to optimize drilling activities.


The industry has invested substantial amounts of time and money in developing technologies that allow real-time management of drilling operations. Despite this, most drilling operations are still managed reactively.



BUT THERE IS AN ALTERNATIVE

Sekal has enhanced the performance of real-time drilling models and refined the way they use real-time data. Our advanced software creates a detailed and constantly updated picture of borehole conditions along the length of the well.

Operators can use this improved understanding to detect incipient drilling problems and take preventive action. The result is safer, more consistent and more efficient drilling.



USING DRILLSCENE, YOUR TEAM CAN ANTICIPATE AND AVOID ISSUES SUCH AS POOR HOLE CLEANING, STUCK PIPE, LOST CIRCULATION, FORMATION DAMAGE AND BOREHOLE INSTABILITY.

OPTIMIZE YOUR DRILLING OPERATIONS WITH DRILLSCENE®

DrillScene is an advanced software tool for monitoring and trend analysis during drilling. It creates a dynamic, real-time picture of the entire wellbore with differences between modeled and actual data visualized as trends graphs. DrillScene helps drilling analysts and engineers to optimize operational performance and to proactively avoid borehole problems.

Automatic conversion of raw well data into five clear, dynamic trends and modeled ECD enables teams to drill with a higher degree of control, whatever the downhole conditions. DrillScene is the only commercially available software that simplifies real-time data analysis by using trends and deviations between modeled and actual data to monitor wellbore conditions.

DrillScene improves drilling operations by:

- / Revealing changing conditions along the wellbore.
- / Simplifying real-time analysis and accelerating decision making.
- / Showing hole cleaning effectiveness as deviation between realistic modeled cuttings volume and measured pit volume.

/ Detecting increased risk of stuck pipe and allowing corrective actions.

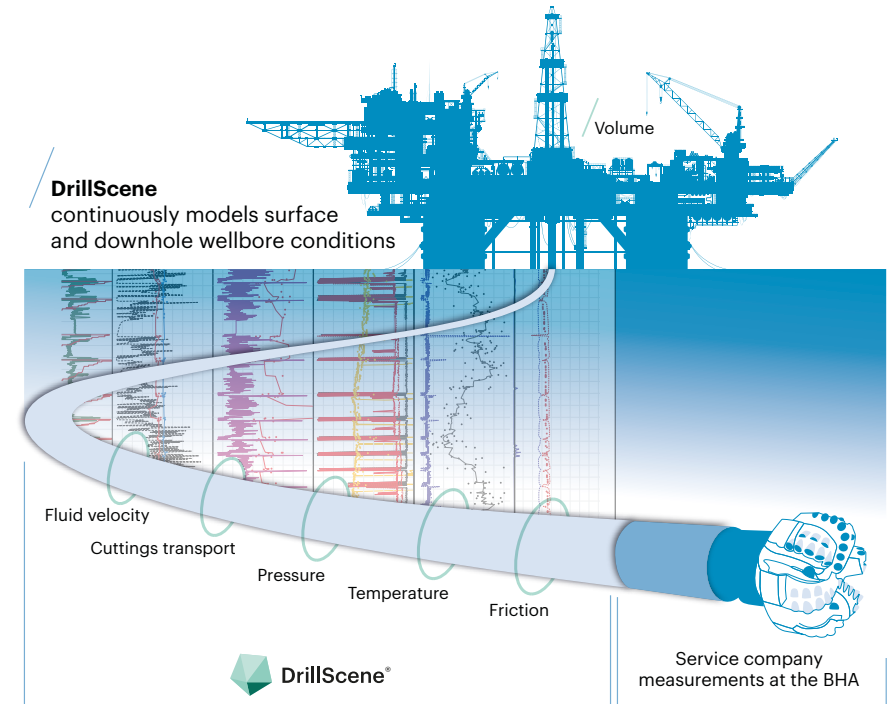
/ Ensuring safe and controlled drilling and tripping in narrow ECD windows.

/ Reducing invisible lost time by eliminating unnecessary wiper trips and minimizing hole cleaning time.

ANTICIPATE PROBLEMS AND AVOID THEM

DrillScene fills the data gap behind the bit, enabling operators to assess crucial factors such as fluid volumes, fluid velocity, cuttings proportions, pressure, temperature, ECD and friction along the complete drillstring from bit to surface. This helps to identify the optimum conditions for each section being drilled.

Using DrillScene, your team can anticipate and avoid issues such as poor hole cleaning, stuck pipe, lost circulation, formation damage and borehole instability. This helps to keep your drilling plans on schedule and ensures effective cost control for every well.



USING DRILLSCENE SIMPLIFIES REAL-TIME DATA ANALYSIS BY USING TRENDS AND DEVIATIONS BETWEEN MODELED AND ACTUAL DATA TO MONITOR WELLBORE CONDITIONS.



AN EARLY INDICATION OF STUCK PIPE RISK

DrillScene provides reliable, early indications of changes in well condition that could lead to stuck pipe. In this example, which shows backreaming out of a long, high angle section, it is difficult to spot abnormal behavior or changes on the standard real-time monitoring display.

As the drillstring moves to shallower depths within the well, parameters such as ECD, torque, hook load and standpipe pressure are decreasing as would be expected, but conventional operational monitoring cannot always quantify these changes (a).

Adding DrillScene modeled data shows that there is an increase in deviation between raw data and modeled data. This is indicated by the dashed line and color band in (b).

The pack off behavior is clearly visible (c). The transient modeling during the pack off incident also provides a useful reference when taking remedial action and evaluating its impact.

The lead-up to the incident is indicated by three complementary DrillScene trends observed over a four-hour period (d).

A notification could have been sent to the rig at 22:00 to prevent the potential stuck pipe situation.

Fig a/

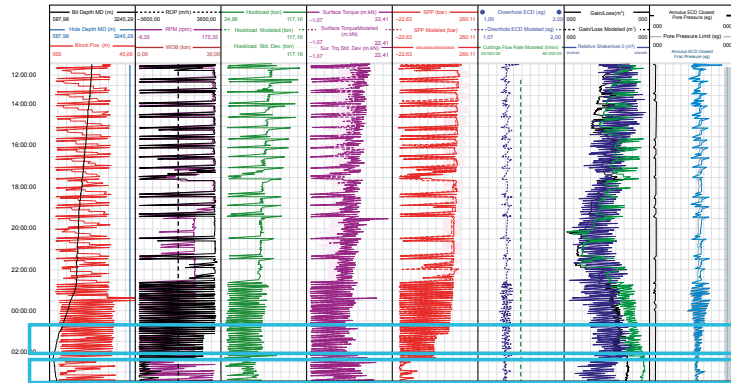


Fig c/

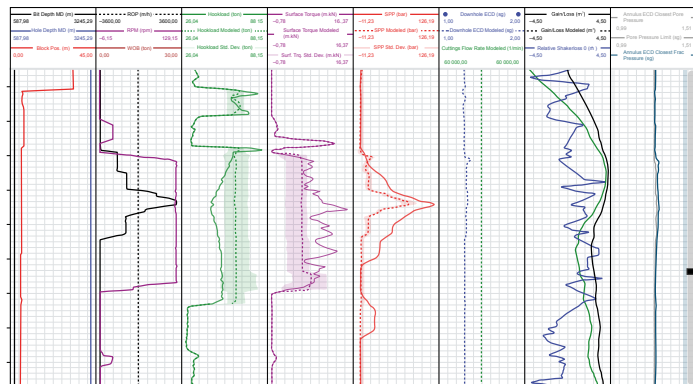


Fig b/

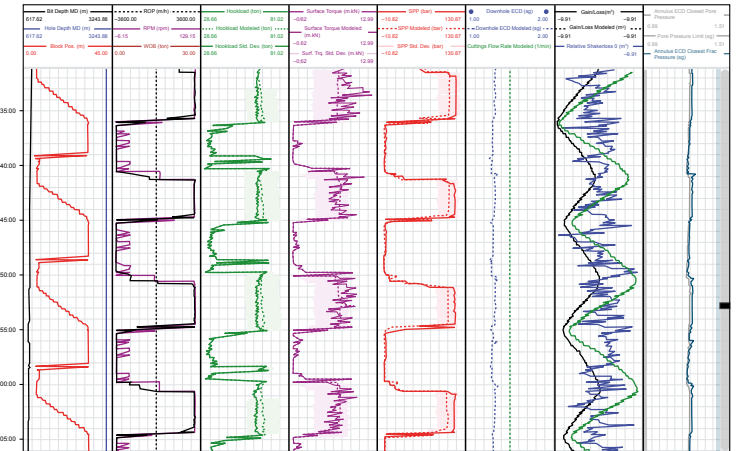
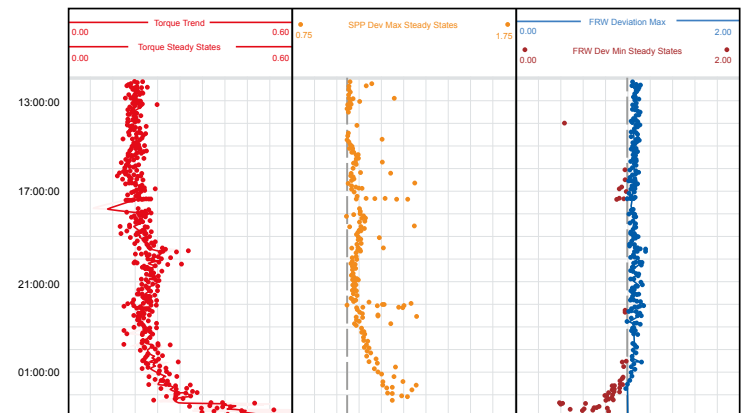



Fig d/





USING DRILLSCENE, YOUR OFFICE-BASED EXPERTS CAN HELP RESOLVE POTENTIAL PROBLEMS AT THE RIG SITE, RATHER THAN RESPOND AFTER A PROBLEM HAS OCCURRED. THIS PROACTIVE TREND ANALYSIS AND COLLABORATION DRIVES DOWN COSTS AND BOOSTS EFFICIENCY.

TECHNOLOGY YOU CAN RELY ON

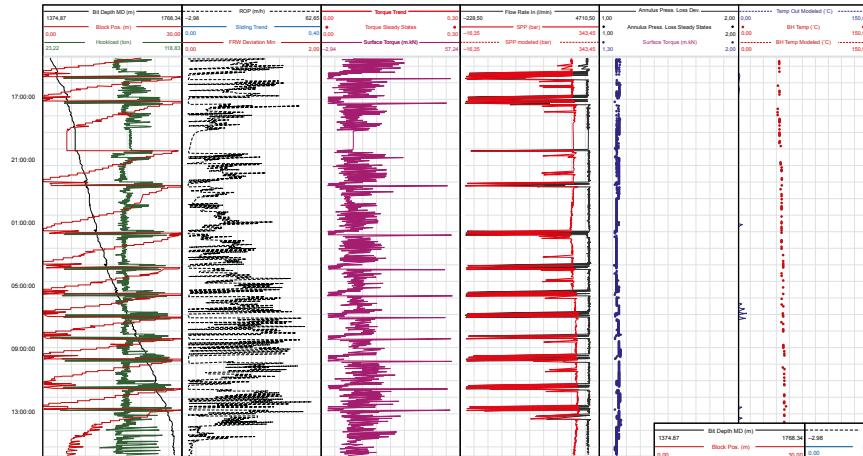
DrillScene has been used on more than 100 major drilling operations worldwide. One early adopter has used the software to overcome an issue of frequent sidetracks. Following its introduction, the client completed more than 500 days of drilling without a sidetrack or significant drilling incident.

DrillScene software is built on technology developed over the last 20 years with the International Research Institute of Stavanger (IRIS). Sekal and IRIS are actively collaborating to extend the drilling performance optimization capabilities provided by DrillScene.

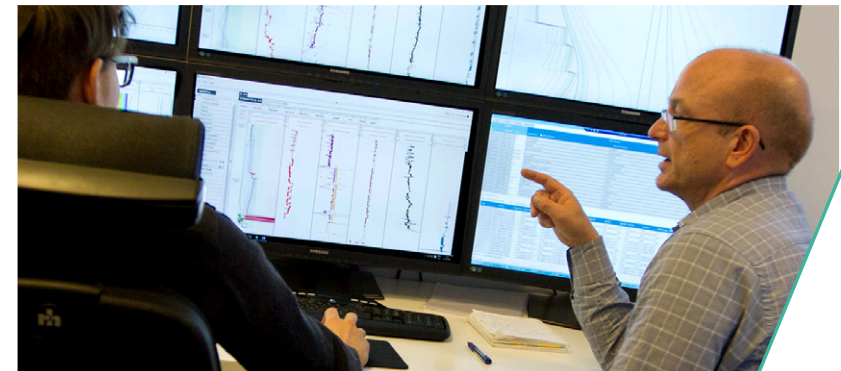
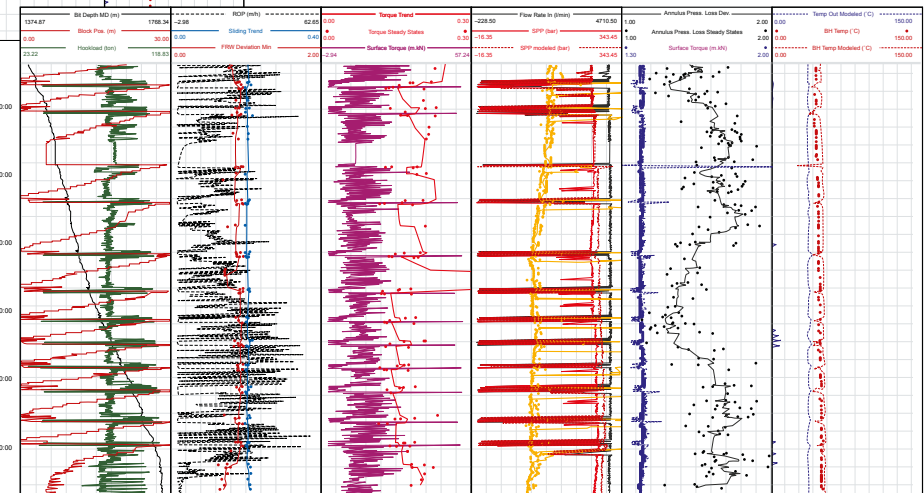
REPLAY ANALYSIS

DrillScene Replay studies help to establish the causes of non-productive time in relation to issues such as stuck pipe, formation fracturing, fluid influx, and hole collapse. These studies analyze all of the real-time data recorded by the BHA and on the rig to establish the actions and hole conditions that led up to an NPT event.

The planning and operation team can then apply this understanding to avoid similar issues in subsequent wells.



/ **DrillScene Replay** was used to analyze symptoms ahead of a severe drilling event caused by a washout. It revealed an increase in annulus pressure loss around 17:00 indicating a potential cuttings build up, as expected with increasing ROP. However, at the same time there is a standpipe pressure deviation occurring. This is typical of a washout in the pipe.





THE POWER OF DYNAMIC MODELING

Sekal technology is based on three tightly coupled real-time dynamic models – **hydraulic, mechanical and thermodynamic** – that simulate wellbore condition and characterize improvement or deterioration during drilling. These models continuously assess drilling performance, borehole conditions, and associated risks based on real-time symptom detection.

Our products offer real-time modeling of key drilling variables such as hook load, surface torque, cuttings transport, pit volumes, standpipe pressure and dynamic ECD. They also calculate fluid temperature and density evolution, mechanical and hydraulic friction in the wellbore, all of which highlight changing hole conditions and potential problems.

Sekal AS is an international technology company offering uniquely powerful software systems and expertise for real-time dynamic monitoring and integrated drilling process automation in the oil and gas industry. We help clients to control drilling activities from their operations centers. We also drive down costs and reduce risk exposure through automation and by moving personnel from the rig site to the office.

Our aim is to be recognized as an industry leader, setting the standard for real-time monitoring and automation of drilling operations and shaping the future of drilling technology.

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