OVERVIEW

Accurate positioning of the wellbore in the target zone is a critical element to maximizing recovery in any well that is drilled. With the rise in the number of complex wells that involve multi-laterals, severe deviations and long horizontals, this becomes even more important. More horizontal wells are being drilled faster, closer together, with thin target zones, and in previously developed fields. To respond, engineers must drill quickly while avoiding geologic hazards and well collisions to steer the bit to the profitable pay zone.

COMPASS™ software is the industry’s premiere application for directional well path planning, survey data management, plotting and anti-collision analysis. This software, designed for both oil companies and drilling contractors, can improve safety, efficiency and cost effectiveness of directional well programs. It features multiple 2D and 3D planning methods, torque and drag analysis, cost and re-entry optimization, plotting, survey data analysis and driller’s target generation.

COMPASS software is deployed on the Engineer’s Data Model™ (EDM™) database ensuring data consistency and reduced planning cycle times in a shared data and workflow environment. Automatic updates and notifications ensure that asset team members are aware when changes occur and that engineering results are updated in real time.

COMPASS software is an integral component of collaborative well planning in multidisciplinary asset team environments. Integration with OpenWorks® geosciences database ensures that geoscientists and engineers recognize trajectory changes made by the other discipline so each member of the team can immediately provide the feedback required to achieve both engineering and subsurface objectives.

BENEFITS

Accurate and cost-effective well plans

COMPASS software quickly optimizes simple or complex trajectories based on cost, torque and drag, or anti-collision and can recommend the most appropriate well to sidetrack when carrying out infill drilling. No matter which operating challenge you face from deepwater to unconventional, COMPASS software enables users to accurately position the wellbore to optimize reservoir recovery.

Avoid costly collision incidents

Drilling in mature fields or in unconventional shale opportunities requires close monitoring so as not to collide with existing wellbores. To always keep you aware, anti-collision scans can be run interactively with planning, surveying or projecting ahead, while warnings can be configured to alert users when well paths converge at specified minimum criteria.
Reduced well-planning cycle time
Data level integration with the Engineer’s Data Model database and cross domain workflow integration with OpenWorks projects improves planning cycle times and improves operational performance.

FEATURES

Comprehensive well path planning
An interactive editing worksheet allows the user to build the well trajectory in sections. At each stage of well planning, the well path graphics dynamically update as changes are made. The user can revisit, insert, delete or change variables for any section of a plan and the entire plan will be recomputed. Automated slot optimization is available for assigning or re-assigning plans to available slots to improve anti-collision results.
Survey data management
Data can be entered in a spreadsheet, imported using industry standard formats or automatically populated in real time using OpenWire® software. Surveys can be spliced together to form a definitive best path. Incoming survey data can be analyzed for quality via several methods. Survey data is also shared with OpenWells® software, eliminating duplicate entry. Users can project ahead from any point in a survey and determine the optimum path to get back on plan or to hit a target.

Anti-collision analysis
COMPASS software provides spider, ladder (including equivalent magnetic distance), 3D proximity and traveling cylinder plots as well as numerous hard-copy reports. Anti-collision scans can be run interactively with planning, surveying or projecting ahead while recording new survey stations. Warnings can be configured to alert the user when well paths converge per company-specified minimum criteria.

Multiple depth referencing support
Flexible depth reference support allows sidetracks to be drilled using rigs with elevations different from that of the parent bore. An active viewing toolbar allows for quick swapping of depth referencing.

ISCWSA survey tool modeling
Supports the latest Industry Steering Committee on Wellbore Survey Accuracy (ISCWSA) gyro and Measurement While Drilling (MWD) models and uses the ISCWSA survey tool error model where users can configure error terms and weighting functions.

POSC model conformance
Data model conforms to the Petrotechnical Open Software Corp. model for well, wellpath, and directional surveys. Wells may have multiple sidetracks or laterals.

Industry Standard Geomagnetic models (BGGM and NOOA) support
If a company is subscribed to any of these services, the COMPASS software allows the calculation of geomagnetic declination for survey azimuthal correction using these models.

Real-time support
A look-ahead plan can be enabled for use with real-time data feeds. This plan is automatically computed based on the latest survey data. It combines the current survey data, a projection back to the plan and the current plan to total depth (TD). This functionality used in conjunction with WELLPLAN™ enables the user to ascertain the impact of the current actual trajectory with respect to operations when the well is drilled to TD. The look ahead plan is, at any given time, the most accurate representation of the wellbore to TD.

Integration with EDM™ database applications
COMPASS software includes shared data navigation with other EDM database applications using the Well Explorer. It supports EDM database architectures for Reference Datum Levels, Simultaneous Activity Monitor, security, unit management, data migration, electronic document attachment, catalog editor, XML import and export, and field and office data transfer.

OpenWorks database integration
The software communicates directly with OpenWorks geoscience database. Plans, targets, surveys, casings and formation tops can be moved between drilling and geology with a button click or set automatically. Additionally, COMPASS software can transfer information directly to DecisionSpace® Well Planning suite via an automated transfer.

Directional difficulty Index
Tortuosity and Directional Difficulty Index (DDI) information is provided for plans and surveys. The DDI is a measure of the difficulty of drilling the directional profile based on the paper IADC/SPE 59196.

Well path optimizer
The software integrates torque and drag cost and anti-collision analysis into the planning module to determine the best combination of trajectory design parameters. Designs can be optimized for time and cost, torque and drag or anti-collision. The optimizer recognizes designs that are not viable due to mechanical or operational limits and recommends potential sidetrack candidates, saving days of trial and error analysis.

Site/Platform placement optimization tool
Given a group of targets, the COMPASS software determines the best location of pads or platforms to drill in the shortest distance possible.

Wall plot composer
Comprehensive drafting package designed to produce quality presentation graphs for small- or large-format plotters.
System and Software

**SOFTWARE REQUIREMENTS**

- Engineer’s Data Model (EDM)
- Microsoft Database Engine (MSDE)

**OPERATING SYSTEMS**

- Microsoft Windows® 7 Enterprise 64-bit with SP1
- Microsoft Windows Vista Enterprise 64-bit with SP2
- Windows 2008 Server SP2, 64-bit
  - Citrix XenApp 6.0
  - Oracle 11.2.0.2
  - Oracle 10.2.0.4
  - SQL Server 2008 R2 SP1

Numerous graphs, text boxes and bitmaps can be incorporated into one plot. Graph options give complete control over scaling, additions, labels, fonts and shading. Use designed layout to create templates for future plots for the chosen paper size.

**Sliding sheet and SAG corrections**

The software can perform 3D survey corrections based on directional drilling sliding sheet information and/or SAG corrections based on WELLPLAN Torque and Drag string position calculations using the stiff string model, BHA information, mud weight and other relevant parameters.

**Complex data transfer and DB synchronization capabilities**

Compass allows data transfer between different data repositories allowing easy conflict resolution when there are data differences. This is extremely useful when moving data from the rig to the office and vice versa.

Precise wellbore positioning is essential to optimize reservoir contact and avoid hazards and well collisions to maximize drilling effectiveness.

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