

Dennis Denney, *JPT* Technology Editor

**Deepwater Drillship**—Shell EP Offshore Ventures and Frontier Drillships will build and roll out a new drillship concept, known as the “Bully” rig (**Fig. 1**). This rig design is a smaller vessel suited for deepwater and arctic drilling. Delivery of the first rig is expected for the Gulf of Mexico by early 2010. The drillship will be capable of drilling to a depth of 40,000 ft with surface blowout preventers in water depths to 12,000 ft. The vessel will feature an ice-class hull, allowing operation in arctic conditions. The new drillships will have a significantly reduced environmental effect because of lower emissions through reduced fuel consumption, high-efficiency/low-emission engines, and reduced steel use for construction. The 617-ft-long ship will have a transit speed of 12 knots.

*For additional information, visit [www.shell.com/ep](http://www.shell.com/ep).*

**Environmentally Compliant Fluids**—Baker Hughes Drilling Fluids has introduced its Terra-Max system, a customizable, high-performance water-based mud for low-salinity environments. Combining state-of-the-art drilling-fluid technologies, the system delivers total inhibition of formations encountered onshore and on inland water-drilling applications. As a water-based fluid, the system presents no associated

environmental-liability issues, no waste-management problems, and minimal lost-circulation effect. The system provides wellbore stability; clay inhibition; reduced torque and drag; and reduced environmental effects, dilution rates, and disposal costs. All components of the system have undergone rigorous toxicological and biodegradation tests to ensure compliance with environmental onshore regulations including land farming.

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**Microimaging**—Weatherford’s Compact microimager provides formation images in wellbores containing water-based muds for dip and fracture detection, sedimentary-structure characterization, thin-bed evaluation, facies analysis, and orientated resistivity and dipmeter computation. The borehole coverage and high-resolution imaging capabilities of this tool enable enhanced reservoir characterization. The tool consists of a memory section and a measurement section. High-resolution, time-based data are recorded into memory while 3.937-in. depth-based data are transmitted to surface. The measurement section can be run without the memory section as a borehole-geometry tool. The imager enables visualization of complex structures; identification of faults, fractures, and their orientation; definition

of crossbeds, thin beds, and net-to-gross ratio in sand/shale sequences; as well as formation evaluation. The tool has 176 button electrodes, distributed equally over eight pads for borehole coverage (**Fig. 2**). Each button electrode provides a high-vertical-resolution microresistivity measurement, enabling enhanced reservoir characterization. The upper calipers provide tool centralization, while the lower calipers act independently to improve pad contact. The integrated orientation package is positioned close to the caliper mechanism, enabling a precise borehole-geometry measurement.

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**Extended Parallel Processing**—Roxar released its Tempest 6.4 software suite for advanced reservoir simulation. The extended parallel-processing capabilities perform the grid calculations such as transmissibility calculations. This ability increases the size of the problem that can be run in parallel because the grid storage is not duplicated across the processors. Speed improvements in both serial and parallel simulation runs, together with the ability to handle larger models, allow greater detail in the simulation model and increased honoring of the geological characteristics of the reservoir. With improved covisualization of measured and simulated data, historical



**Fig. 1**—Shell EP Offshore Ventures and Frontier Drillships’ “Bully” rig drillship concept.



**Fig. 2**—Weatherford’s Compact microimager-tool pads.



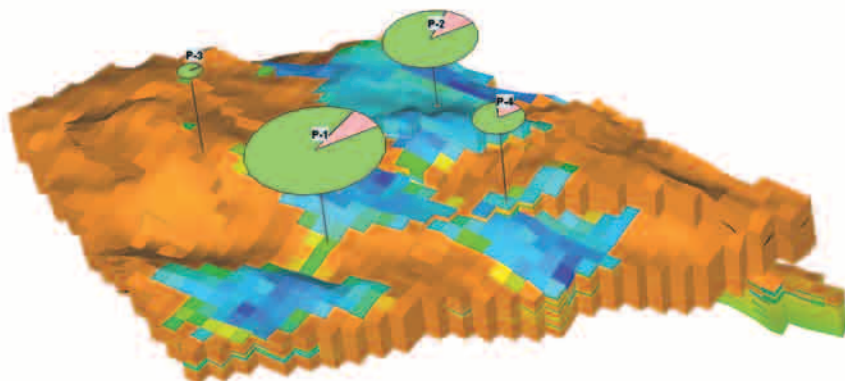
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**Fig. 3—Roxar's Tempest software display of pie charts showing individual-well production.**

measurements are loaded directly into the viewer and displayed on sets of user-defined graphs (Fig. 3). The software comprises four integrated software modules. A full-field simulator is capable of running black-oil or compositional simulation models; a graphical interactive program provides simulation pre- and post-processing; another module provides fluid characterization; and an integrated tool for economic evaluation and risk analysis works directly on simulator output to estimate field cash flow and net present value.

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#### **Removing Asphaltene Deposits—**

Under static reservoir conditions, asphaltenes normally are held in a stable suspension. Changes in fluid temperature and pressure associated with oil production may cause asphaltenes to flocculate and precipitate out of suspension and adsorb to the rock or pipe surfaces. Halliburton's DuraKleen service uses an environmentally enhanced water/aromatic-solvent emulsion system to maintain production rates. The dispersing effects of the surfactant enhance its high-solvency power. Asphaltenes and waxes are stripped from tubulars and from the formation (Fig. 4). The formation is left in a water-wet state, which delays deposition of asphaltene. The system contains no benzene, ethyl benzene, toluene, or xylene; therefore, it is environmentally safe. The flash point is higher than 145°F. The system requires less transport of chemical components because of the high water content, and all components are fully miscible. The

system was developed for use in environmentally sensitive regions of Italy.

*For additional information, email [stimulation@halliburton.com](mailto:stimulation@halliburton.com).*

#### **Downhole-Vibration Measurement—**

National Oilwell Varco has introduced its Russell Subsurface Systems (RSS) Downhole Data Logger. This new sensor records downhole drillstring-vibration events as determined by a user's preset minimum threshold. The drillstring vibration and temperature are monitored for equipment use and maintenance tracking, and vital data are acquired for post-run string-failure analysis. The user sets the sampling interval at 4 seconds to 66 minutes, as well as the sampling and vibration threshold intervals. Downloaded memory files can be processed for graphical display and integrated with other data sets. If a detailed assessment of a particular portion of a run is required, graphical representation can be reset to show a small part of the result, enabling engineers to determine if something specific occurred by looking at high- or low-vibration measurements at that time. This tool can monitor and identify the slightest movement of an assembly component or a calamitous shock above the expected norm. Orientation of downhole devices also can be recorded with independent monitoring by biaxial sensors.

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**Satellite Services Platform—**OPE has introduced its Satellite Services Platform, a patented spherical-shaped floating vessel with a unique center column for use as a floating production, storage, and



**Fig. 4—Bottomhole assembly with asphaltene (left) and with Halliburton's DuraKleen service (right).**

offloading (FPSO) vessel. It provides excellent motion characteristics while moored offshore and does not require weathervaning, as required with a conventional FPSO. It has excellent motions in complex seas where swells, current, and wind may be from different quadrants. The round-shaped hull design is inherently stable and immune to "free surface" effects, is hydrodynamically smooth from the aspects of storm waves, and does not suffer from wave slam and wave run-up. The freeboard eliminates green water on the deck. This design can achieve high payload/vessel ratios compared to conventional floating production units. For crude-oil-storage applications, this design can provide higher payload ratios than ship-shaped FPSO units. Recent tests performed at Marin's basin facilities in The Netherlands resulted in less than 4° significant pitch/roll in Katrina-type storm conditions and less than 0.07-g heave acceleration in a 1-year Gulf of Mexico winter storm. The tested model had a 1,250,000-bbl oil-storage capacity and 80,000-BOPD-production capacity.

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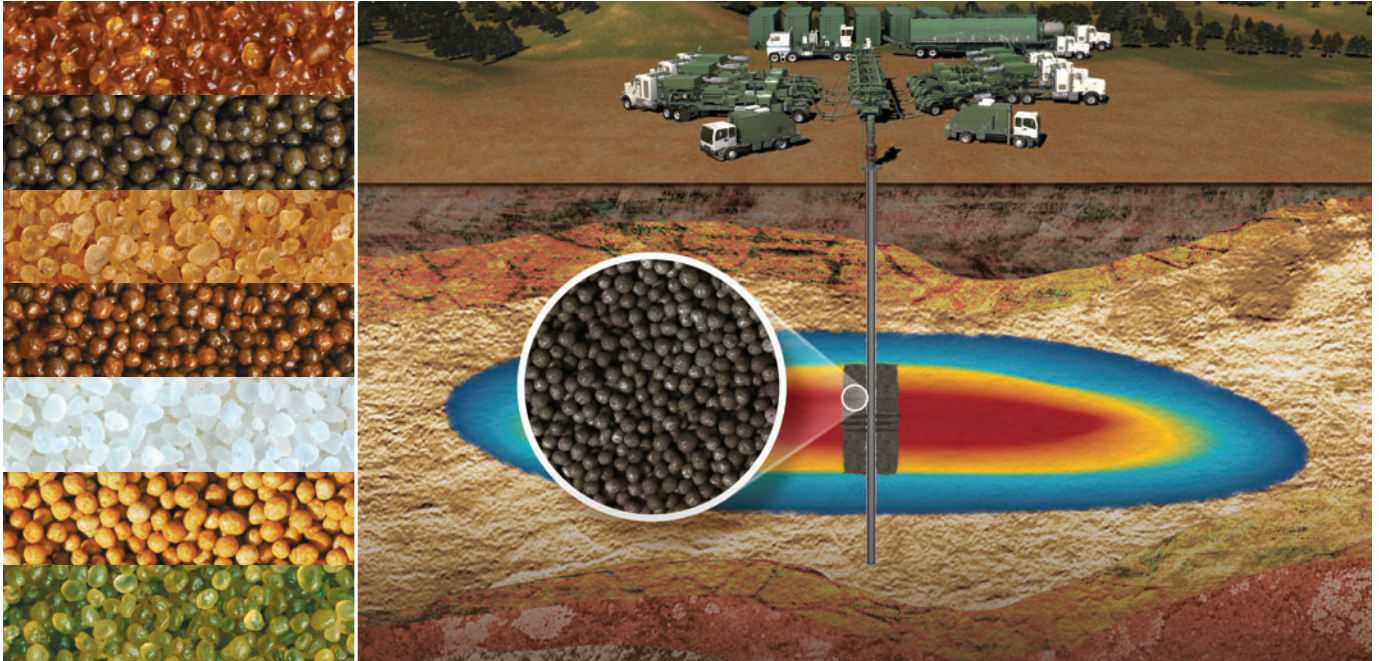
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