### Schlumberger



Multifunction LWD service

# EcoScope

- Drilling optimization
- Formation evaluation
- Well placement

APWD\* While Drilling

Three-axis shock and vibration

SAFER

#### Multifunction LWD service provides a full suite of measurements for productive drilling to put wells in the best place in less time.

- Increases efficiency and safety by integrating all sensors in one collar
- Saves time by acquiring quality measurements at high penetration rates
- Mitigates risks associated with traditional chemical sources
- Reduces depth uncertainty by using colocated sensors
- Improves confidence in interpretations by introducing new LWD measurements and quality control indicators
- Provides real-time measurements to guide decisions using TeleScope\* high-speed telemetry-whiledrilling service and new **Orion\* II high-speed telemetry** platform to increase effective data transmission rate
- Assists well placement by acquiring nuclear measurements close to the bit

he EcoScope\* multifunction LWD service<sup>†</sup> incorporates decades of Schlumberger experience in providing quality measurements for productive drilling. The EcoScope service integrates a full suite of formation evaluation, well placement, and drilling optimization measurements in a single collar to increase operational efficiency, reduce risk, and increase confidence in data interpretation and calculations of production and reserves.

Designed around a pulsed neutron generator (PNG), the EcoScope service uses technology developed by Schlumberger and Japan Oil, Gas and Metals National Corporation. In addition to the suite of resistivity, neutron porosity, and azimuthal gamma ray and density measurements, this service provides the first commercial LWD measurements of elemental capture spectroscopy, neutron gamma density, and sigma. Drilling optimization measurements include APWD Annular Pressure While Drilling, caliper, and shock.

The PNG used in the EcoScope service allows generation of neutrons on demand. This design eliminates the need for an americium beryllium (AmBe) chemical source, substantially reducing risk during transportation and at the wellsite.

Measurement of formation density without the side-mounted cesium source is an option, making the EcoScope service the first to offer commercial LWD nuclear logging without traditional chemical sources.

#### FASTER

The EcoScope service integrates multiple LWD sensors in a single collar. This compact design reduces the amount of rathole that must be drilled to provide comprehensive formation evaluation measurements. Because there is only one collar, flat time associated with making up and breaking down the BHA is reduced. Having fewer connections also enhances BHA reliability.

The EcoScope service's large memory capacity allows recording of 2 data points/ft at ROPs up to 450 ft/h. A high effective data transmission rate, provided by the TeleScope service and its Orion II telemetry platform, ensures that the full suite of EcoScope measurements is available in real time to improve decisions and mitigate risk.

#### **SMARTER**

orositv Sigma

Spectroscopy Neutron gamma density

The EcoScope service provides more downhole information from a single collar than any other LWD service.

2-MHz and 400-kHz resistivity

Dedicated internal diagnostic electronics record information used for EcoScope preventive maintenance, which can significantly extend drilling footage between failures and reduce NPT.

The PNG generates more neutrons, with much higher energies, than a traditional AmBe chemical source. This provides deeper, more precise measurements and also enables the EcoScope service to acquire industry-first nuclear spectroscopy, density, and sigma measurements in addition to the formation evaluation suite of measurements. These nuclear measurementsmade close to the bit-further reduce the uncertainty in data interpretation.

The answer product from the EcoView\* integrated petrophysical interpretation system assists in the analysis of the comprehensive EcoScope data suite and computes an advanced petrophysical interpretation requiring only water salinity as input from the user. EcoView software uses 2D and 3D visualization tools to combine the advanced petrophysical interpretation with the EcoScope multiple borehole images.

## EcoScope



#### **FEATURES**

- Drilling and formation evaluation sensors located in one collar
- Formation evaluation measurements of elemental capture spectroscopy, sigma, porosity, gamma ray, density, and resistivity
- Drilling performance measurements of annular pressure, caliper, and shock



- Electrical generation of more neutrons with higher energies than traditional chemical sources
- Built-in diagnostic chips to provide information for preventive maintenance
- EcoView answer product for data integration and interpretation

www.slb.com/scope



'Japan Oil, Gas and Metals National Corporation (JOGMEC), formerly Japan National Oil Corporation (JNOC), and Schlumberger collaborated on a research project to develop LVID technology that reduces the need for traditional chemical sources. Designed around the pulsed neutron generator (PNG), EcoScope service uses technology that resulted from this collaboration. The PNG and the comprehensive suite of measurements in a single collar are key components of the EcoScope service that deliver game-changing LWD technology.