

SpecStar™ Spectral Gamma Ray Service

NATURAL GAMMA RAY SPECTROSCOPY AND BOREHOLE IMAGING WHILE DRILLING

OVERVIEW

The SpecStar™ spectral gamma ray service from Sperry Drilling provides the industry's most advanced logging-while-drilling (LWD) natural gamma ray spectroscopy measurements. In addition to a bulk azimuthal gamma ray measurement, the service provides elemental concentrations of potassium (K), uranium (U) and thorium (Th), based on spectral analysis of the natural gamma rays emitted from the formation. These elemental concentrations form the basis for a variety of formation evaluation techniques, including clay typing and the estimation of total organic carbon content.

INCREASE RESERVOIR UNDERSTANDING WITH HIGH-PRECISION MEASUREMENTS

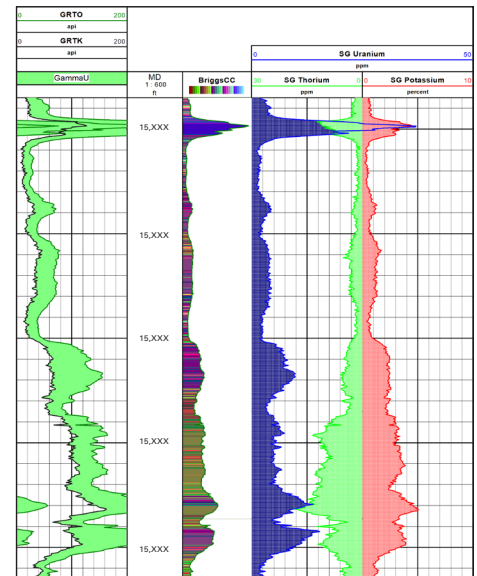
The advanced performance of this service comes from a highly sensitive gamma ray detector, built around a large sodium-iodide scintillation crystal. Measurement sensitivity is a crucial aspect of a high-quality spectral gamma ray measurement. To maximize sensitivity, the tool uses the largest crystal as close to the formation as possible, within the confines of the LWD collar. A thin sleeve of titanium covers the detector, protecting it from the drilling environment, while minimizing attenuation of gamma rays from the formation to provide a very high count rate. The high count rate gives rise to high-precision measurements of the K, U and Th elements in the surrounding formation or per quadrant around the tool. This information can be used in real time to identify the most productive zone of the reservoir with clay-volume analysis or to increase the reservoir understanding with clay typing techniques.

EASILY IDENTIFY TARGET ZONES FOR IMPROVED WELL PLACEMENT

In addition to the sophisticated tool design, the service also provides a simple method for displaying the results. The Briggs color cube presentation is an easy and intuitive way to represent each combination of elemental concentrations with a unique color. This makes visual discrimination between rock types much easier, particularly in geosteering applications, where the same formation layer may appear repeatedly within a logged interval. The Briggs color cube display and the azimuthal gamma ray measurements allow operators to geosteer easily to formation layers with specific elemental characteristics.

FEATURES

- » High-quality, real-time measurements of K, U and Th concentrations in the formation
- » Real-time borehole images based on total gamma ray binning and elemental concentration quadrants
- » Clear visualization of results, using a Briggs color cube presentation
- » Fully compatible with all Sperry measurement-while-drilling and LWD systems and telemetry types
- » Rated for operation up to 329°F (165°C) and 25,000 psi (172 MPa)



Sample log from the SpecStar™ spectral gamma ray service, showing elemental concentrations as traditional curves and respective distribution, using the Briggs color cube display.

BENEFITS

Enhance Reservoir Understanding

- » Accurate clay-volume calculation improves petrophysical evaluation in real time and helps identify the most productive zone of the reservoir
- » Accurate clay typing for increased knowledge of depositional environment, stratigraphy and field petroleum system

Drill to Produce

- » Improve well-placement accuracy and maximize reservoir contact by geosteering with the visual and intuitive Briggs color cube presentation
- » Reduce uncertainty by easily distinguishing between formation layers with different combinations of K, U and Th concentrations

Reduce Well Time

- » Easily identify the optimal target zone, maintain position within it, and avoid unplanned sidetracks