



Compact™ Spectral Gamma Ray (SGS) Tool

Weatherford's Compact spectral gamma ray (SGS) tool measures the natural gamma radiation and separates the gamma rays according to their energy level to determine the quantities of potassium (K), uranium (U), and thorium (Th)—the three most common elements found in radioactive sands and shales. The presence of uranium is often associated with organic matter, while potassium and thorium are the primary radioactive elements in clays. From the ratios of these three elements, SGS measurements can be used to identify the type and volume of clays.

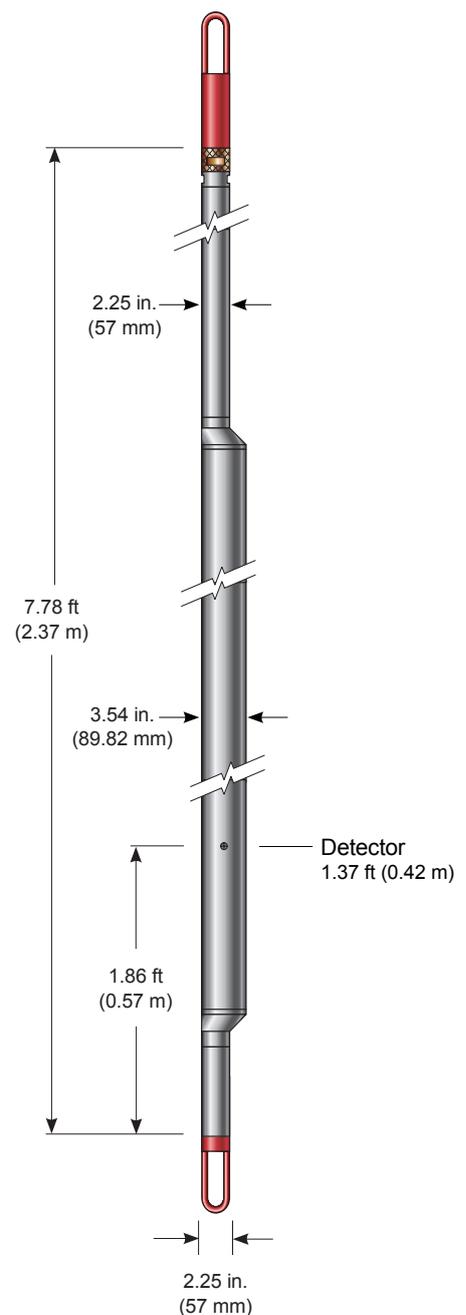
The SGS tool houses a large scintillation crystal with high-detection efficiency and sensitivity. The scintillation crystal generates a precise total gamma ray log for well-to-well correlation. Clay volume is calculated by subtracting uranium from the total gamma ray count. The ratio of thorium to potassium (Th/K) in the formation, when used in combination with P_e data from the photodensity tool (MPD), provides information about the types of clay minerals and a more accurate determination of formation permeability.

Applications

- Identifying clay-mineral composition, including heavy minerals
- Determining clay volume and type
- Differentiating between radioactive pay zones and shales
- Identifying fractured zones where high uranium concentrations are present
- Determining permeability
- Correlating well-to-well detail
- Delineating the reservoir

Features, Advantages and Benefits

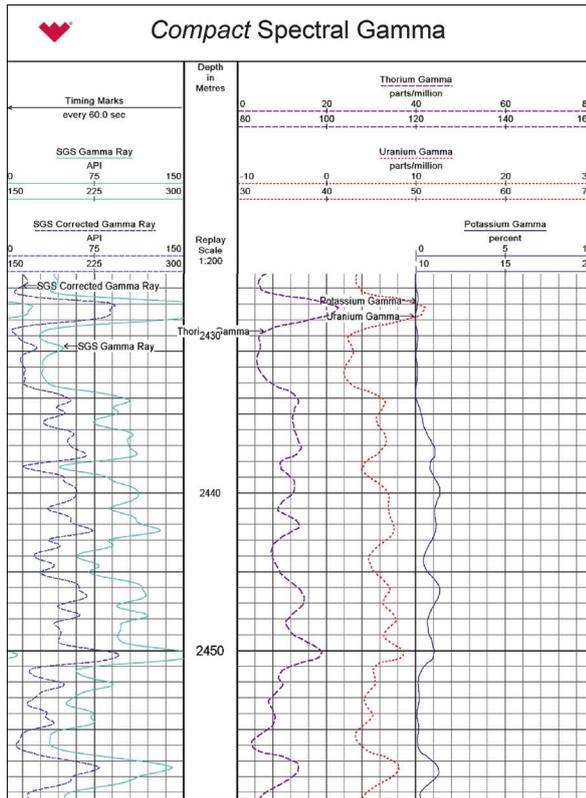
- The highly sensitive NaI detector provides accurate spectral analysis of natural gamma ray energy, resulting in improved identification of pay zones and detailed well-to-well log correlation.
- The improved statistical response of the detector enables the accurate measurement of gamma rays through several strings of casing.





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Log Presentation



Specifications

Measurement specifications

Data	Gamma (K, U, Th)
Logging speed	800 ft/hr (250 m/hr)
Measurement range	0 to no practical limit
Vertical resolution	12 in. (305 mm)
Accuracy	K ± 0.4% Th ± 3.2 ppm U ± 2.3 ppm
Depth of investigation	24 in. (60 cm)
Borehole fluids	WBM OBM Air

Mechanical specifications

Maximum outer diameter	3.5 in. (90 mm)
Length	7.8 ft (2.37 m)
Total weight (in air)	107 lb (48.5 kg)
Maximum temperature	275°F (135°C)
Maximum pressure	15 kpsi (103 MPa)
Maximum borehole diameter	18 in. (457 mm)
Minimum borehole diameter	4.10 in. (103 mm)