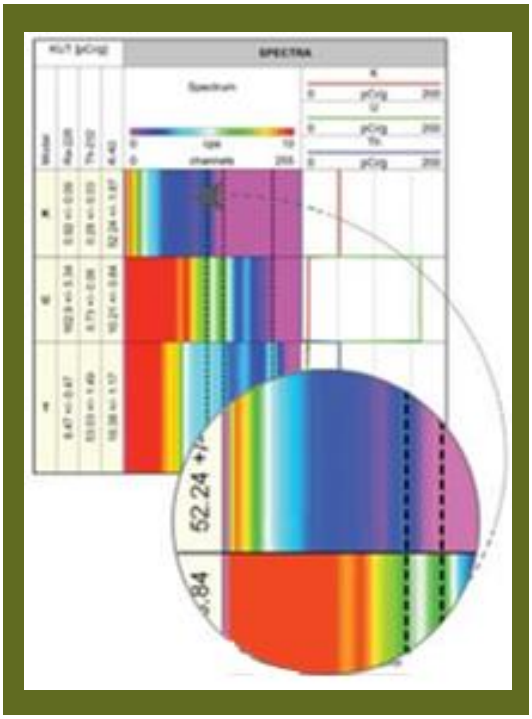
QL40 ▲ SGR

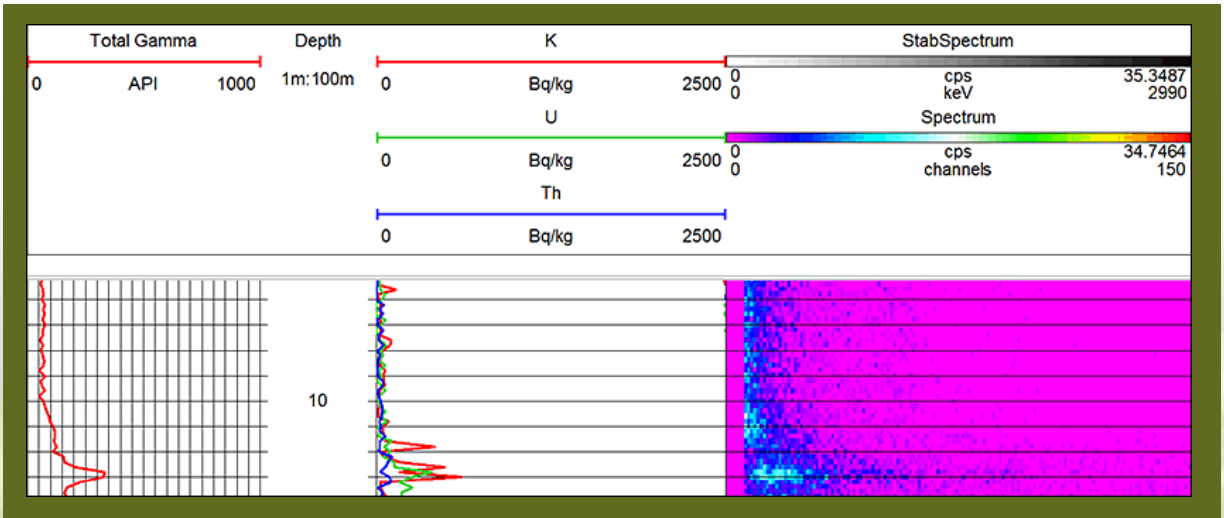
Spectral Gamma Ray

The QL40-SGR probe measures the total gamma counts in API as well as the full energy spectrum of the natural gamma radiations emitted naturally from within the formations. A Full Spectrum Analysis (FSA)1 is performed on the recorded energy spectra. The FSA derives in real time the concentration of the three main radioisotopes 40K, 212 Th and 238U and thus provides insight into the mineral composition of the formations. The QL40 SGR is equipped with a scintillation BGO (Bismuth Germanium Oxyde) crystal. The BGO crystal has a high scintillation efficiency, good energy resolution and is mechanically strong. The QL40-SGR is supplied as an inline sub. It can be combined with other logging tools of the QL40 (Quick Link) product line or can be operated as a standalone tool. It is compatible with Matrix, BBOX and ALTlogger acquisition systems.



Application

- Recognition of radioactive materials
- Contamination studies
- Lithology characterization
- Well to well correlation
- Sedimentology - differentiation of facies and depositional environment
- 4Mineral composition



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QL40 ▲ SGR

Spectral Gamma Ray

Principle of measurement

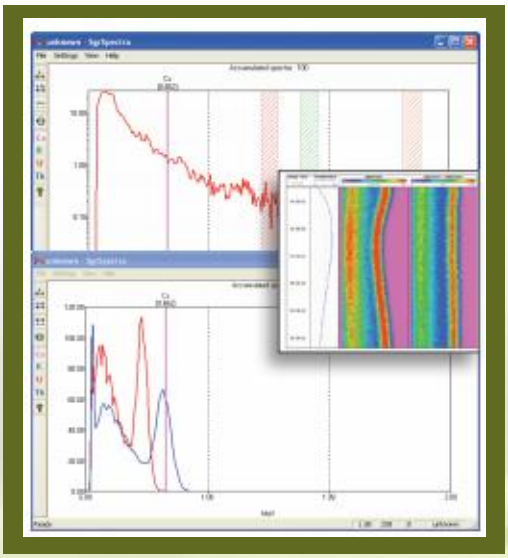
The QL40 SGR is equipped with a BGO scintillation crystal. When exposed to gamma rays, the BGO crystal emits light as a function of the gamma ray energies. The pulses of light are amplified by a photomultiplier tube and converted into electrical pulses which are distributed into 256 discrete energy channels. Gamma ray analysis is performed in two steps. First spectrum stabilization will be performed: each multichannel spectrum in the data set will be converted to a spectrum having all count peaks at the corresponding energy position. This process implies a close comparison with the reference spectra obtained during the calibration process of the spectral gamma tool at the Medusa calibration facility. In a second step the stabilized spectrum will be convoluted into concentrations of naturally occurring radionuclides (40K, 238U, 232Th) or other man-made nuclides like 137Cs or 60Co. Corrections taking borehole diameter, rock density, casing type and thickness, tool position and borehole fluid conditions into account can be applied.

Measurements / Features

- 256 channels gamma ray energy spectrum
- Stabilized spectrum
- Total gamma counts
- Concentration of radioisotopes [Bq/kg or ppm]
- Concentration Error of radioisotopes [Bq/kg or ppm]

Operating Conditions /Compatibility

- Open or cased borehole
- Water filled or dry borehole



Technical Specifications

TOOL

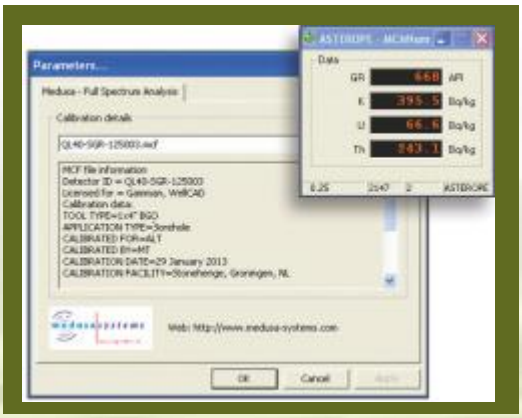
- Diameter: 40 mm (1.6”)
- Length: 0.93 m (36.6”)
- Weight: 6 kg (13 lbs)
- Max. Temp: 70ºC (158 ºF)
- Max. Pressure: 200 bar (2900 psi)

SENSOR

- BGO crystal - 2.22cm x 10.16 cm (0.875” x 4”.00)
- Measurement range: up to 3 MeV

MEASUREMENT RANGE

- Measurement point : 0.21 m (8.29”) from bottom
- Measurement range: up to 3 MeV



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