OmniSphere SGR

Slimhole petrophysics evaluation-while-drilling service

APPLICATIONS
- Conventional and unconventional reservoir drilling
- High-angle horizontal drilling
- Clay typing and lithology

BENEFITS
- Aids formation evaluation and completion decisions in real time in complex reservoirs
- Enhances reservoir evaluation by correctly identifying clay volume in pay containing radioactive nonclay minerals
- Guides and geosteering in unconventional pay
- Saves rig time through early formation evaluation

FEATURES
- Real-time uranium, thorium, potassium, total gamma ray, and uranium-free gamma ray
- Total organic carbon
- Automated environmental corrections in real time (for borehole potassium)
- Sourceless and batteryless operations

OmniSphere SGR service uses spectral gamma ray (SGR) to provide while-drilling insight into the mineral composition of formations, enabling petrophysical decisions through clay typing and lithology in complex formations—particularly where sand-shale sequences are present.

Evaluate complex lithologies in real-time
Real-time SGR eliminates missing reservoir layers in the presence of nonclay clastics or carbonates with radioactive minerals. The total gamma ray spectrum is resolved into three most common naturally occurring radioactive elements—potassium, thorium, and uranium.

Place the well accurately and geosteer in unconventional pay
With real-time identification of thorium and potassium, OmniSphere SGR service guides well-to-well correlation through clay typing in unconventional wells. Using uranium content, OmniSphere SGR service aids geosteering through the identification of organic carbon–rich zones.

Perform automated environmental corrections in real time
OmniSphere SGR service measurements are environmentally corrected for borehole size, eccentricity, mud type, and mud weight. It detects the potassium content in the mud and automatically corrects for ensuring an accurate measurements of formation potassium.

Reduce HSE risks and improve efficiency with sourceless and batteryless operation
The detector design of OmniSphere SGR service eliminates the chemical source for gain regulation. Powered by MWD tools, OmniSphere SGR service can be used in back-to-back runs, eliminating the need for changing batteries at the wellsite.

General Specifications		
Drill collar nominal OD, in		4¾
Thread connections	Uphole	NC 38 (3½ IF) Box
	Downhole	NC 38 Box
Makeup length, ft		9½
Tool weight, lbm		350
Maximum temperature, degC [degF]		150 [302]

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Mechanical Specifications

Axial

Maximum WOB	$$\text{WOB} = \frac{4.6 \times 10^9}{L^2}$$ where: WOB = maximum allowable WOB, lbf L = unsupported length of the collar, in

Bending

Maximum tool curvature	Rotating	15°/100 ft
	Sliding	30°/100 ft

Hydraulics

Maximum operating pressure, psi	25,000 (external)
Maximum flow rate, gpm	400
Mud type	Oil- and water-based muds

Mud Properties

Maximum dissolved oxygen content of the drilling fluid, ppm	1
Minimum pH of the drilling fluid	9
Maximum lost circulation material (LCM) size	Medium nut plug
Maximum LCM concentration, lbm/bbl	50
Maximum sand content, %	1

Measurements Specifications

Range of measurement, gAPI	0–1,000	
Intrinsic vertical resolution, in	12	Vertical resolution without any depth averaging

Accuracy (100 ft/h logging speed)

Total gamma ray	Max. ±(5% or 2 gAPI)	For total count rate
Computed gamma ray	Max. ±(7% or 3 gAPI)	Computed from Th and K yields
Thorium	Max. ±(5 % or 0.5 ppm)	
Uranium	Max. ±(5 % or 0.5 ppm)	
Potassium	Max. ±(5 % or 0.002 fraction)	

Precision (Repeatability)

Total gamma ray	2.0 gAPI
Computed gamma ray	10 gAPI
Thorium	2.3 ppm
Uranium	1.5 ppm
Potassium	0.004 fraction

Measurements Characteristics

Detector type	NaI scintillation
Vertical resolution, in	12
Depth of investigation, in	9½

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Schlumberger