MRIL®-Nuclear Magnetic Resonance

DIRECTIONAL MAGNETIC RESONANCE

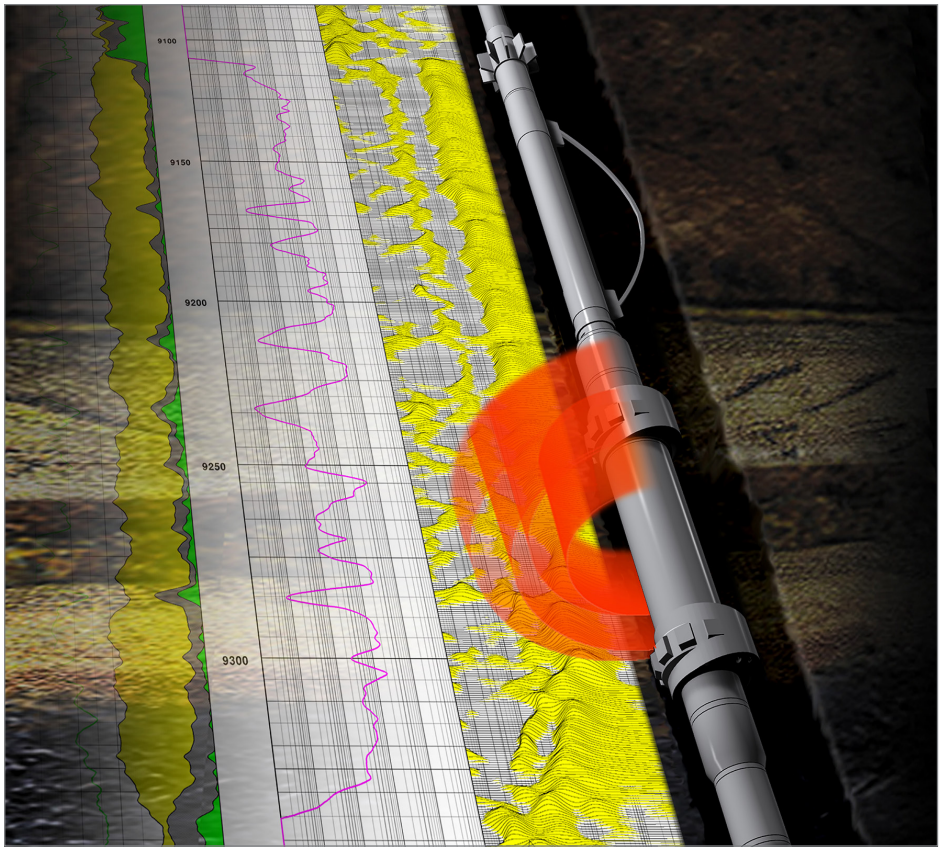
OVERVIEW

The Halliburton DeepSuite™ MRIL®-XL and MRIL®-XL services provide nuclear magnetic resonance (NMR) fluid-filled porosity, which is mineralogy independent.

Direct Reservoir Quality assessment is provided from fractionalizing the total NMR fluid-filled porosity into components of microporosity, capillary-bound fluids, and movable fluid volume. A continuous permeability estimate is available from multiple methods (Coates, Logarithmic mean, and Swanson).

BENEFITS

- Provides robust NMR fluid-filled porosity from a single log pass
- Microporosity, capillary-bound, and movable fluid volumes with a continuous permeability estimate
- DeepSuite™ MRIL®-XL service is combinable with Halliburton openhole sensors for single-log pass efficiency
- Both MRIL®-XL sensors have capability for 7⅞ to 16-in. hole sizes
- Processing capabilities:
  - T_2 apparent
  - Simultaneous T_1T_2
  - T_2D (diffusion and viscosity)
- Drillpipe-conveyed operations capable



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DeepSuite™ MRIL®-XL and MRIL®-XL services have decentralized directional magnetic resonance sensors capable of making high-quality NMR measurements in a large range of hole sizes. The DeepSuite MRIL®-XL service is combinable with Halliburton openhole sensors for single-log pass efficiency.

Wireline NMR Sensor Dimensions and Ratings

	MRIL®-XL	DeepSuite™ MRIL®-XL
Maximum Working Temperature	350˚F (177˚C)	
Maximum Working Pressure	20,000 psi (138 MPa)	30,000 psi (207 MPa)
Maximum Torque Limit	1,000 ft-lb (138 kg-m)	
Maximum Compression Limit	50,000 lb (22 680 kg)	
Maximum Tension Limit	100,000 lb (45 360 kg)	
Sonde OD (without standoffs)	6 in. (15.3 cm)	
Length	44.75 ft (13.64 m)	44.67 ft (13.62 m)
Weight	1,600 lb (726 kg)	1,976 lb (896 kg)
Tool Positioning	Eccentralized	

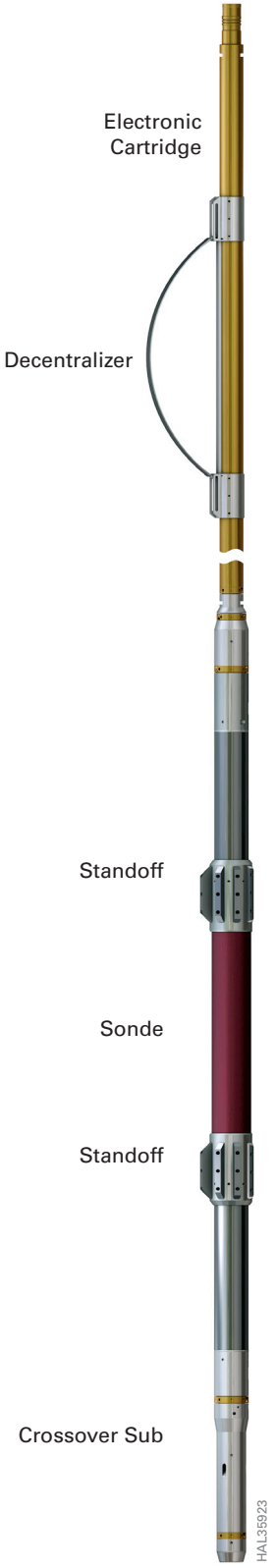
Borehole Conditions

Borehole Fluids	All (0.02Ω•m minimum)
Minimum Borehole Size	7.875 in. (20 cm)
Maximum Borehole Size	16 in. (40.6 cm)
Open/Cased Hole	Open
Rugosity Effect	No effect if not in sensitive volume
Mudcake Effect	No effect if not in sensitive volume

Measurement

Frequencies of Operation	9
MRIL Measurement Geometry	9 concentric arcs
MRIL Measurement Accuracy	±1 pu or 5% (whichever is greater)
MRIL Measurement Repeatability	1 pu standard deviation on porosity measurement
Static Vertical Resolution	24 in. (61 cm)

MRIL-XL® and DeepSuite™ MRIL-XL® Tool



For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com