DATA SHEET

HALLIBURTON

FORMATION EVALUATION | PETROPHYSICS

Hostile Array Compensated Resistivity Tool (HACRt™)

Fast, accurate, state-of-the-art array induction for hostile environments

FEATURES

- State-of-the-art processing scheme features:
  - 2D software focusing produce five resolution-matched radial curves with radial focal depths of 10, 20, 30, 60, 90 in., and vertical resolutions of 1, 2, or 4 ft
  - Real-time inversion for Rt, Rx0, Diameter of Invasion for step and linear profiles (no need for inversion charts)
  - Invasion map
  - Proprietary thermal correction scheme
  - Three frequency Skin Effect Correction
  - Real-time borehole corrections with or without caliper inputs (no need for borehole correction charts)
  - Real-time speed correction
- Integrated mud cell and optimized receiver antenna spacings provide improved sensitivity to shallow and mid-range mud-filtrate invasion depths, along with excellent deep response for Rt
- Receiver coil spacings closely approximate computed radial curve depths, which results in fundamentally stable processing
- Asymmetric (shorter sonde)
- Environmental ratings to 500°F and 30,000 psi

Overview

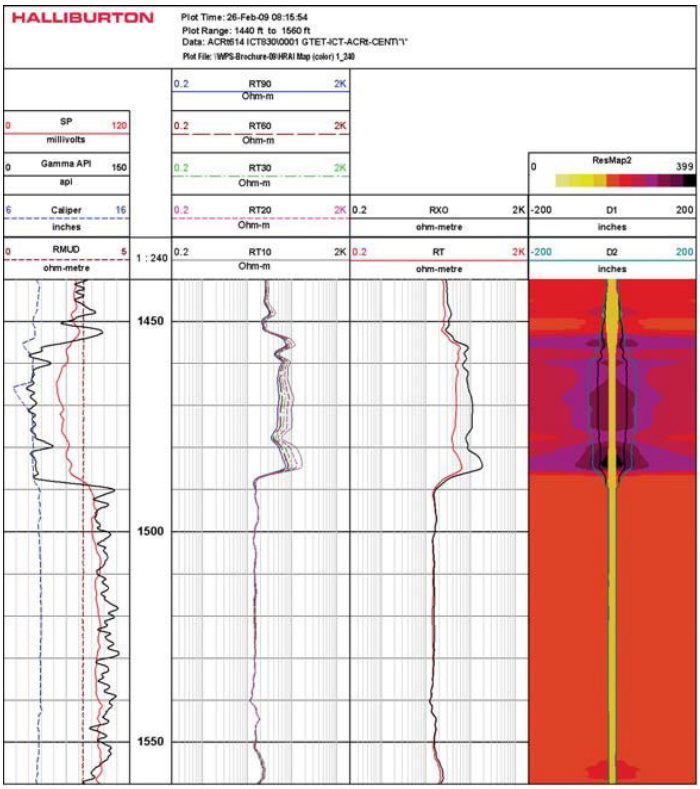
The Halliburton Hostile Array Compensated Resistivity Tool (HACRt™) logging system represents the latest thinking in array induction technology. Every aspect of mechanical, electric, software, and signal-processing design has been optimized to yield array induction measurements that are accurate and stable.

The HACRt tool has an asymmetric design that consists of a single transmitter operating at three frequencies and six receivers antennas with spacing from 6 to 80 in. A simple and robust Skin Effect Correction (SEC) method uses only the in-phase component of the received signals at all three frequencies. This allows for unparalleled and stable SEC, even for very low resistivity formations.

Each tool is individually characterized for thermal drift during manufacturing. This characterization, in conjunction with sonde-mounted temperature sensors, provides the basis for a proprietary and highly accurate temperature compensation method. Real-time borehole corrections are derived from a continuous reading of mud resisitivity (Rm) using the HACRt mud cell and an external caliper. When the caliper is absent (e.g., downlogging) borehole corrections can be derived from the short-spaced receivers data alone. The use of real-time borehole corrections makes unnecessary the use of borehole correction charts. 2D software focusing filters produces five radial curves with matched vertical resolution of either 1, 2 or 4 ft, and radial focal depths of 10, 20, 30, 60, and 90 in. The HACRt tool is combinable with all other hostile tools.

Applications

- Accurate measures of formation resistivity at varying depths of investigation for enhanced estimates of Rt, Rx0, and Diameter of Invasion, either assuming a step (D1) or linear (D1, D2) invasion profile
- Quantitative assessment of Sw, Sx0, and moveable water volumes
- Qualitative assessment of permeability and rock quality
- Array induction measurements are available in formations with resistivities from 0.12 to 2000 ohm-m and in water, air, or oil-filled boreholes
- Analysis of finely bedded formations



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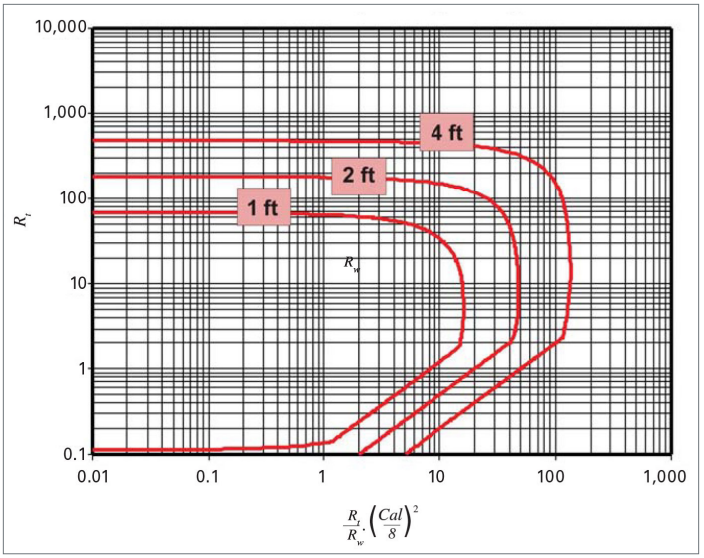
Track 1: SP from an external sub, gamma ray, and caliper, Track 2: depth,Track 3: Radial resistivity curves with DOI of 10, 20, 30, 40, 60, 90 in. Good sensitivity to invasion is in evidence from 1490 to 1450 ft. Track 4 displays the real-time inverted curves Rt and Rxo, and Track 5 shows the two DOI for a linear invasion profile model and a 2D image of the invasion map.



HACRt Preferred Extended Operating Range: 350 to 500˚F

Hostile Array Compensated Resistivity Tool (HACRt™) specifications

LENGTH	MIN BOREHOLE	MAX BOREHOLE	OPERATING PRESSURE	OPERATING TEMPERATURE	WEIGHT	MAX LOGGING SPEED
FT (M)	IN. (MM)		PSI (MPA)	˚F (˚C)	LB (KG)	FT/HR (M/HR)
29.3 (8.9)	4.25 (10.8)	See chart above	30,000 (207)	500 (260)	464 (210.47)	6,000 (1,830)

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

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