Geo-Vista

Trip Logging System (TripLog)
Lithology Logging While Drilling System (LithoLWD)

Wireless Measurement While Drilling-B (MWD-B)

Electromagnetic Propagation Resistivity-B (EPR-B)

Bi-directional Communication Power Module-B (BCP-B)

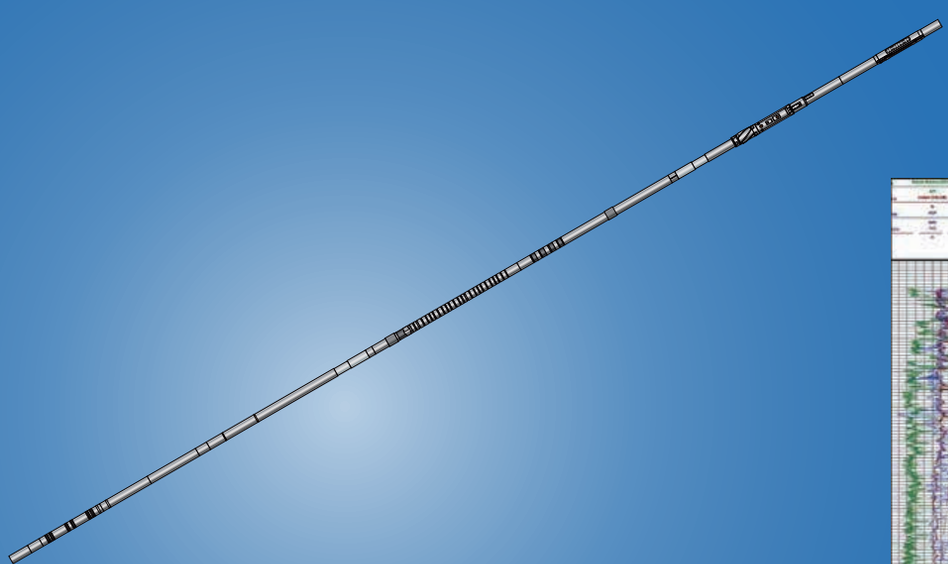
Caliper Corrected Neutron Porosity (CCN) & Rotary Azimuthal Density (RAD)

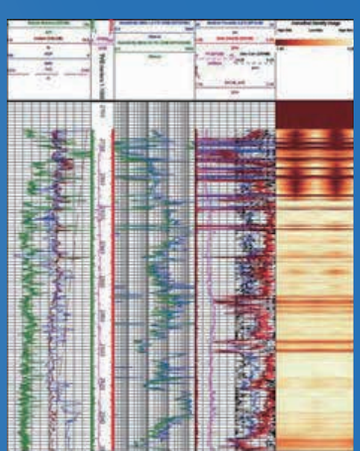
Nuclear Magnetic Resonance Imaging While Drilling (MRI)

Acoustic While Drilling (AWD)

Ultrasonic Imaging While Drilling (UID)

Formation Tester While Drilling (FTD)





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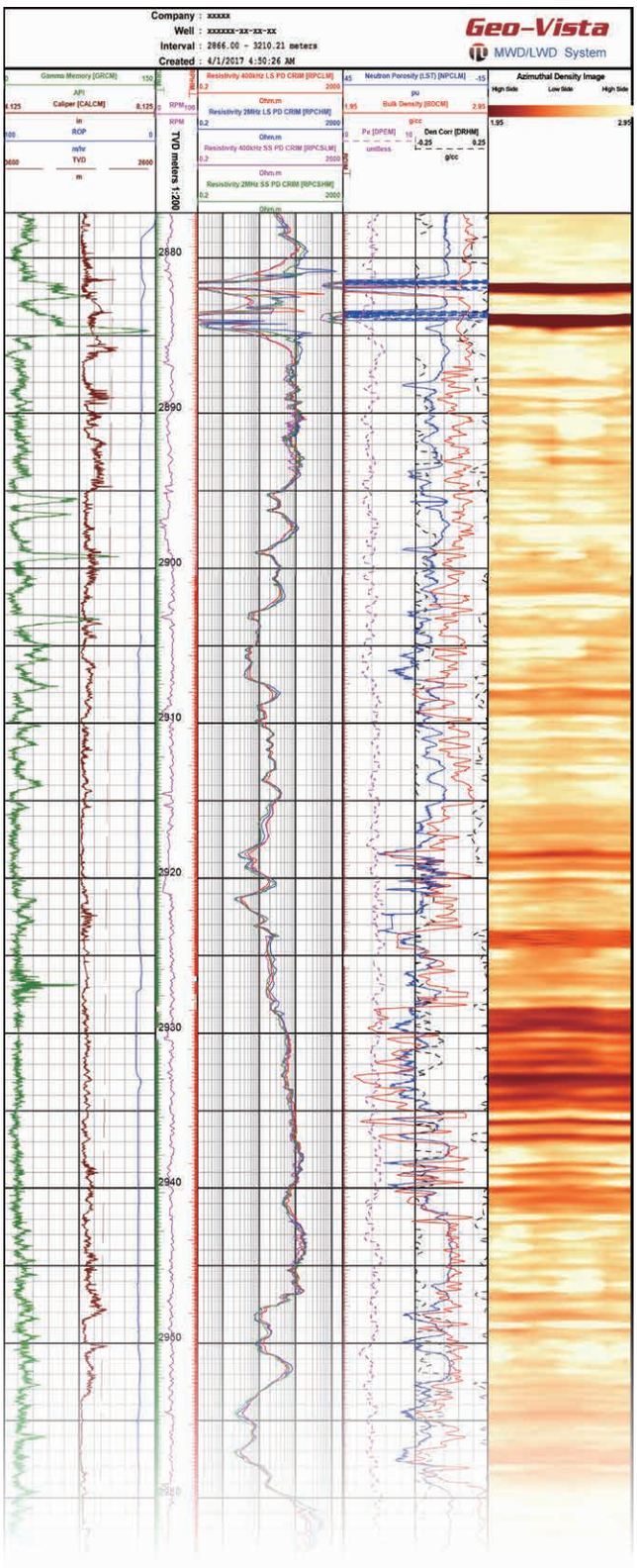
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Geo-Vista
MWD/LWD System
Gamma Memory [GRCM]
Caliper [CALCM]
ROP
TVD
Resistivity 400kHz LS PD CRIM [RPCLM]
Resistivity 2MHz LS PD CRIM [RPCHM]
Resistivity 400kHz SS PD CRIM [RPCSLM]
Resistivity 2MHz SS PD CRIM [RPCSHM]
Neutron Porosity (LST) [NPCLM]
Bulk Density [BDCM]
Pe [DPEM]
Den Corr [DRHM]
Azimuthal Density Image
High Side
Low Side
TVD meters 1:200
2880
2890
2900
2910
2920
2930
2940
2950

Trip Logging System (TMLog)
Lithology Logging While Drilling System (LithoLWD)

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Applications

LithoLWD Service Benefits to clients are listed as:

- A selection of Tool sizes for to accommodate a wide variety of bit size
- Fully Compensated High Quality Density Measurement
- High Resolution Real-Time Formation Density Image
- Accurate Borehole Caliper Measurement
- Fully Characterised Compensated Neutron Porosity Measurement
- Accurate Photoelectric Cross Section Measurement
- Seamless BHA's designed for Rotary Steerable Systems & advanced Formation Evaluation Services

Introduction

LithoLWD include Wireless Measurement While Drilling-B (MWD-B), Electromagnetic Propagation Resistivity-B (EPR-B), Bi-directional Communication Power Module-B (BCP-B), Caliper Corrected Neutron Porosity (CCN), Rotational Azimuthal Density(RAD), Nuclear Magnetic Resonance Imaging While Drilling (MRI), Acoustic While Drilling (AWD), Formation Tester While Drilling (FTD).

The LithoLWD service provides resistivity, azimuthal gamma, Azimuthal Sectored Density Images, as well as Photoelectric and Caliper measurements while drilling. Also can provides lithology-independent porosity, pore-sized istribution, continuous permeability and direct hydrocarbon detection, real-time compressional and shear wave travel-time measurements in slow and fast formations, real-time pressure measurements.

Each data point is tied to a corresponding Caliper measurement to ensure accurate density evaluation with minimal stand-off effect.

Caliper measurements are used also for neutron porosity borehole environmental compensation and give an accurate borehole profile for borehole volumes or wellbore stability applications.

Wireless Measurement While Drilling-B (MWD-B)

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Applications

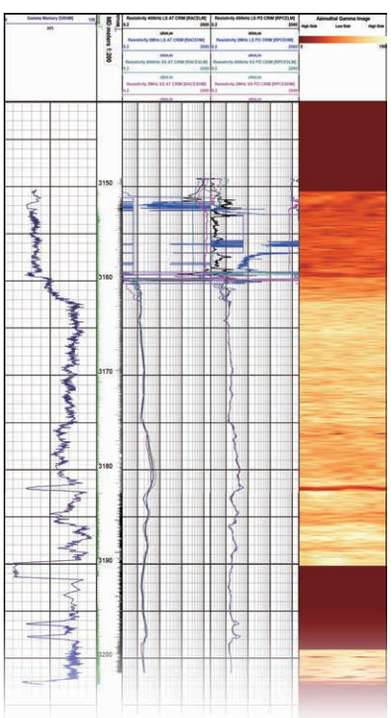
- Steering drilling systems for re-entry and horizontal wells.
- Directional control
- Relief well drilling
- Precision geosteering in high angle wells.

Benefits

- Automated directional control
- Improved horizontal TVD control
- Reduced hole tortuousity
- Azimuthal kick off mode

Features

- Adopt insert mode, different size (4.75 in./6.75 in.) instrument can share circuit, reduce the cost.
- Azimuthal gamma ray confirmation formation boundaries and orientation, guides directional drilling operations better



Specifications

Measurement	Range	Resolution	Accuracy
Inclination	0°-180°	0.1	± 0.15°
Azimuth	0°-360°	0.35	±1.0 @ INC>10°
Toolface	0°-360°	1.4	± 1.5°
Magnetic	0°-360°	1.4	± 1.5°
Gravity	0°-360°	1.4	± 1.5°
Temperature	10°C-150°C, 175°C optional	1.1	± 3.0°C
Total Magnetic Field	30,000-66,000 gamma	100	± 300
Transmission Rates	0.4 bit/s～2 bits/s Pulse Width Selectable: 3.0/2.0/1.5/1.0/0.8/0.5/0.36/0.32/0.24 sec		
Directional Probe OD	1.75 in.		
Max Temperature	350°F (175°C)		
Max Pressure	25000 Psi (172.4 MPa)		
MTF/GTF Switching, Inclination Degrees: MTF/GTF Switching, Operator Selectable (default set at 3°) Inclination Degrees			

Vibration Measurement		
Sensor Type	Axial Vibration	One Accelerometer, Z direction
	Lateral Vibration	Two Accelerometers, X-Y direction
Acceleration Range		0-15 g
Frequency Range		0-82 Hz
Realtime Log Options		Lateral and Axial vibration; Transmitted as severity level (scaled to g-RMS)
Post Run/Memory Log Options		Average & Max. lateral and axial vibration in g-RMS and as severity level

Rotation & Stick-Slip Measurement	
Sensor Type	Two Axis Magnetometer
Rotation Speed	0-±1000 RPM
Accuracy	±1%
Realtime Log Options	Downhole RPM, Stick-Slip transmitted as severity level
Post Run/Memory Log Options	Min., Max., & Average RPM, Stick-Slip & Backward Rotation severity

Azimuthal Gamma Ray Specifications	
Sensor Type	Scintillation
Measurement	API GR
Real Time	Yes
Recorded	Yes
Range	0-500 API
Section Quantity	8
Accuracy	±3% of full scale
Statistical Repeatability	±3 API @ 100 API and ROP = 60 ft./hr
Vertical Resolution	6 in.

Electromagnetic Propagation Resistivity-B (EPR-B)

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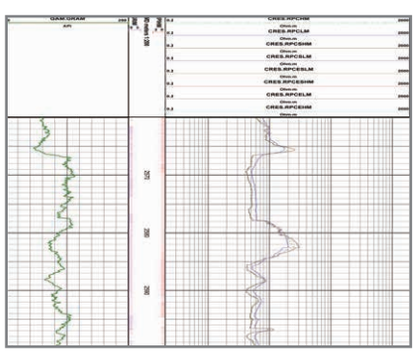
Applications

- Provides formation resistivities
- Provide realtime formation evaluation services.
- Provide wellbore placement
- Improve geosteering capabilities
- Operates at frequency of 2 MHz and 400 kHz Compensated antenna design with dual spacing transmitter pairs.

Features

- 8 quantitative resistivities with separate depths of investigation works in all mud types.
- Adopt insert mode, different size (4.75 in. /6.75 in.) instrument can share insert probe, reduce the cost.



Introduction

EPR-B transmits electromagnetic waves into the formation and measures the changes in the physical characteristics of the returned electromagnetic waves. The changes in the physical characteristics of the electromagnetic waves indicate the formation resistivity.

Specifications

Tool O.D.		4.75 in. / 6.75 in.	
Max Operating Temp		350°F (175°C)	
Max Working Pressure		25000 Psi (172.4 MPa)	
2 MHz	Phase Difference	Range	0.1-3000 ohm-m
		Accuracy	± 1% (0.1-50 ohm-m); ±0.5 mmho/m (> 50 ohm-m)
	Attenuation	Range	0.1-500 ohm-m
		Accuracy	± 2% (0.1-25 ohm-m); ±1.0 mmho/m (> 25 ohm-m)
		Vertical Resolution	8 in. (203 mm)
400 kHz	Phase Difference	Range	0.1-1000 ohm-m
		Accuracy	± 1.0% (0.1-25 ohm-m); ±1.0mmho/m (>25 ohm-m)
	Attenuation	Range	0.1-200 ohm-m
		Accuracy	± 5.0% (0.1-10 ohm-m); ±5.0mmho/m (>10 ohm-m)
		Vertical Resolution	12 in. (304 mm)

Bi-directional Communication & Power System While Drilling-B (BCP-B)

Geo-Vista

Applications

- Transmission of downhole data to surface.
- Transmission of surface commands to downhole.

Features

- Long working time without replacing battery under generator mode

Introduction

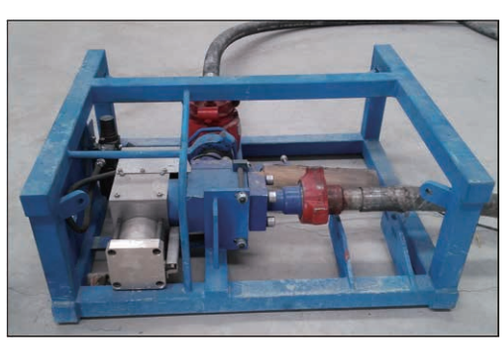
Bi-directional Communication Power Module-B (BCP-B) and downlink devices (BPC-B, NPG). The BCP-B (Bi-Directional Communication & Power Module-B) is capable of generating 300 Watt power output, providing 33 Vdc to the HbuildLWD system, providing circuit breaker protection for upper and lower mounted instruments, detecting downlink data by monitoring turbine speed, transmitting data to the surface via a pulser. It can be installed in any position of the instrument string,which provides a lot of conveniences for the logging.

Using the insert mode in the center of the drill collar. The electronic circuit and sensor can be applied to drill collars of different sizes (3.375 inch, 4.75 inch, 6.75 inch and 9.5 inch) only by configuring centralizers of different sizes.
The BPC-B (Bypass Controller) sends commands from the surface to downhole instrument by controlling the NPG (Negative Pulse Generator) which controls the mud flow.

Specifications

Tool O.D.	3.375 in.	4.75 in.	6.75 in.	8.25 in.	9.5 in.
Make-up Length	21.33 ft. (6.5 m)	12.14 ft. (3.7 m)	10.50 ft. (3.2 m)	10.50 ft. (3.2 m)	14.11 ft. (4.3 m)
Weight	321 lbs. (145 kg)	708 lbs. (320 kg)	1,128 lbs. (510 kg)	1,274 lbs. (576 kg)	1,900 lbs. (860 kg)
Flow Range	80-160 gpm	125-350 gpm	200-900 gpm	300-1600 gpm	300-1600 gpm
Max. Temperature	350°F (175°C)				
Max. Pressure	20,000 psi (137.9 MPa)				
Max. Turbine RPM	5000				
Output	33 Vdc±1				
Max. Power Output	300 Watts				

Safe Direction Drilling Panel II (SDD II)



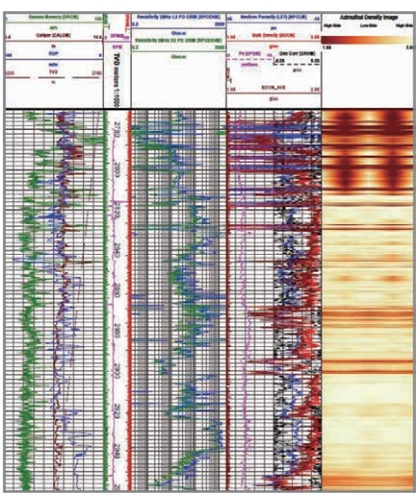
Negative Pulse Generator (NPG)

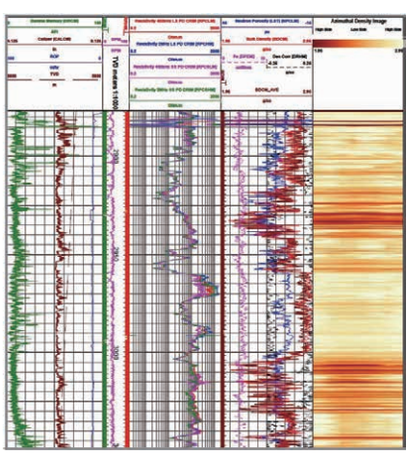
Caliper Corrected Neutron Porosity-Rotary Azimuthal Density-4.75 (CCN-RAD-4.75)

Geo-Vista

Applications

- Accurate, real-time quantification of porosity and gas identification for saturation calculations.
- Reservoir Navigation using high-resolution imaging and gas-oil/water identification in real-time.
- Wellbore stability analysis using azimuthal caliper and density imaging in real-time.
- Structural formation dip analysis and updating reservoir models from density imaging.





Introduction

CCN-RAD offers measurement of formation density, neutron porosity, borehole caliper, and formation imaging. That provides geosteering for maximum reservoir exposure. Neutron porosity and bulk density are critical for the quantification of hydrocarbons in the reservoir.

Specifications

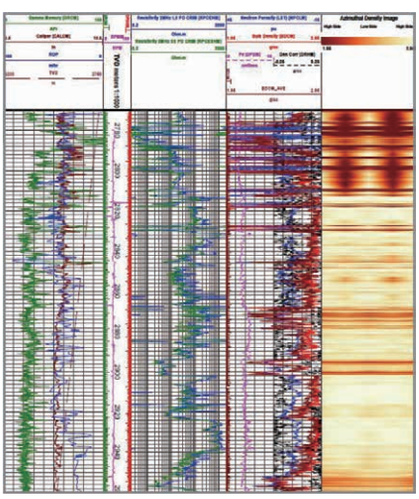
Diameter	4.75 in. With 5.59 in. upset
Max. Pressure	20000 psi (137.9 MPa)
Max. Temperature	300°F (150°C)
Weight	1100 lbs. (498 kg) (CCN-RAD 4)
Max. Dogleg Severity	15°/100 ft. (15°/30 m) Rotating 30°/100 ft. (30°/30 m) Sliding
CCN	
Service	Formation Porosity
Tool Type	Caliper Corrected Neutron
Detectors	Lithium-6 Iodide Crystal with Photomultiplier tube for both Near and Far detectors
Porosity Accuracy	0.5 pu below 10 pu, 5% of reading for 10-50 pu
Vertical Resolution	24 in. (61 cm)
Statistical Repeatability	± 0.6 pu@20 pu @ 200 ft./hr.
Max. Logging Speed	180 ft./hr (@2 points/ft.)
Depth Of Investigation	10 in. estimated for 8.5 in. 10 pu borehole
Radioactive Source	Am 241-Be Strength: 5 Curies (185 GBq)
Measure Point	4.6 ft. (1.4 m) (From downhole tool end)
Voltage	30 Vdc
Current Draw	160-170 mA
RAD	
Service	Formation Bulk Density Service with Hole Caliper
Tool Type	Rotational Azimuthal Density
Detectors	NaI Scintillation Crystal with photomultiplier tube for both Long and Short Spaced detectors
Density Specifications	
Range	1.6-3.1 g/cc
Accuracy	± 0.025 g/cc@200 ft./hr (60 m/hr) and 2.5 g/cc
Statistical Repeatability	18 in. (45 cm) (full resolution)
Downhole End Measure Point	5.1 ft. (1.5 m)
Photoelectric Factor Specifications	
Range	1-10 Barnes/electron (B/e)
Accuracy	± 0.25 B/e from 2-5 B/e
Statistical Repeatability	± 0.25 B/e@200 ft./hr (60 m/hr)
Vertical Resolution	6 in. (150 mm) (full resolution)
Downhole End to Pe Measure Point	5.1 ft. (1.5 m)
Acoustic Standoff Caliper Specifications	
Range	0-2 in. (Out of housing)
Accuracy	±0.075 in. (0 to 0.5 in.) ±0.125 in. (0.5 to 1.0 in.) ±0.25 in. (1.0 to 2.0 in.) Out of housing
Max. Logging Speed	180 ft./hr (@2 points/ft.)
Radioactive Source	Cs137 Strength: 2 Curies (74 GBq)
Voltage	30 V
Current Draw	350 mA~390 mA

Caliper Corrected Neutron Porosity (CCN)

Geo-Vista

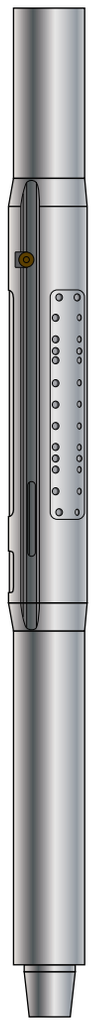
Applications

- Accurate, real-time quantification of porosity and gas identification for saturation calculations.
- Reservoir Navigation using high-resolution imaging and gas-oil/water identification in real-time.
- Wellbore stability analysis using azimuthal caliper and density imaging in real-time.
- Structural formation dip analysis and updating reservoir models from density imaging.



Introduction

The CCN and RAD offers measurement of formation density, neutron porosity, borehole caliper, and formation imaging. That provides geosteering for maximum reservoir exposure. Neutron porosity and bulk density are critical for the quantification of hydrocarbons in the reservoir.



Specifications

Diameter	4.75 in. With 5.59 in. upset	6.75 in. with 7.50 in. upset	8.25 in. With 10.125 in. upset
Max. Pressure	20000 psi (137.9 MPa)		
Max. Temperature	300°F (150°C)		
Weight	1100 lbs. (498 kg) (CCN and RAD 4)	893 lbs. (405 kg)	1325 lbs. (600 kg)
Service	Formation Porosity		
Tool Type	Caliper Corrected Neutron		
Max. Dogleg Severity	15°/100 ft. (15°/30 m) Rotating 30°/100 ft. (30°/30 m) Sliding	9°/100 ft. (9°/30 m) Rotating 16°/100 ft. (16°/30 m) Sliding	6.5°/100 ft. (6.5°/30 m) Rotating 12°/100 ft. (12°/30 m) Sliding
Detectors	Lithium-6 Iodide Crystal with Photomultiplier tube for both Near and Far detectors		
Porosity Accuracy	0.5 pu below 10 pu； 5% of reading for 10-50 pu		
Vertical Resolution	24 in. (61 cm)		
Statistical Repeatability	± 0.6 pu@20 pu @ 200 ft./hr.		
Max. Logging Speed	180 ft./hr (@2 points/ft.)		
Depth Of Investigation	10 in. estimated for 8.5 in. 10 pu borehole		
Radioactive Source	Am 241 - Be Strength: 5 Curies (185 GBq)		
Measure Point	4.6 ft. (1.4 m) (From downhole tool end)		
Voltage	30 Vdc		
Current Draw	160 - 170 mA		

Rotary Azimuthal Density (RAD)

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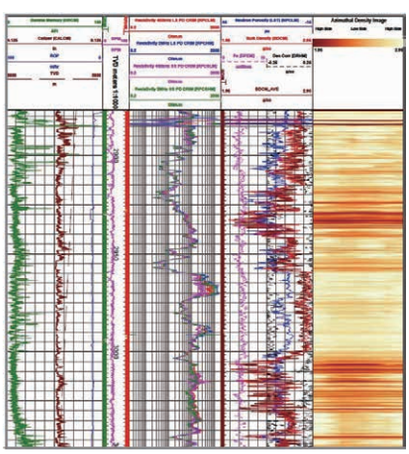
Applications

- Accurate, real-time quantification of porosity and gas identification for saturation calculations.
- Reservoir Navigation using high-resolution imaging and gas—oil/water identification in real-time.
- Wellbore stability analysis using azimuthal caliper and density imaging in real-time.
- Structural formation dip analysis and updating reservoir models from density imaging.
- 8 or 16 sector azimuthal density, Pe and borehole caliper measurements.



Introduction

The CCN and RAD offers measurement of formation density, neutron porosity, borehole caliper, and formation imaging. That provides geosteering for maximum reservoir exposure. Neutron porosity and bulk density are critical for the quantification of hydrocarbons in the reservoir.

Specifications

Diameter		4.75 in.	6.75 in.	8.25 in.
Max. Pressure		20000 psi (137.9 MPa)		
Max. Temperature		300°F (150°C)		
Weight		1100 lbs. (498 kg) (CCN and RAD 4)	1092 lbs. (495 kg)	1945 lbs. (881 kg)
Service		Formation Bulk Density Service with Hole Caliper		
Tool Type		Rotational Azimuthal Density		
Max. Dogleg Severity	Rotating	15°/100 ft. (15°/30 m)	9°/100 ft. (9°/30 m)	6.5°/100 ft. (6.5°/30 m)
	Sliding	30°/100 ft. (30°/30 m)	16°/100 ft. (16°/30 m)	12°/100 ft. (12°/30 m)
Detectors		NaI Scintillation Crystal with photomultiplier tube for both Long and Short Spaced detectors		
Density Specifications				
Range		1.6-3.1 g/cc		
Accuracy		± 0.015 g/cc		
Statistical Repeatability		± 0.025 g/cc@200 ft./hr (60 m/hr) and 2.5 g/cc		
Vertical Resolution		18 in. (45 cm) (full resolution)		
Downhole End Measure Point		5.1 ft. (1.5 m)		
Photoelectric Factor Specifications				
Range		1-10 Barnes/electron (B/e)		
Accuracy		± 0.25 B/e from 2-5 B/e		
Statistical Repeatability		± 0.25 B/e@200 ft/hr (60 m/hr)		
Vertical Resolution		6 in. (150 mm) (full resolution)		
Downhole End to Pe Measure Point		5.1 ft. (1.5 m)		
Acoustic Standoff Caliper Specifications				
Range		0-2 in. (Out of housing)		
Accuracy		±0.075 in. (0 to 0.5 in.) ±0.125 in. (0.5 to 1.0 in.) ±0. 25 in. (1.0 to 2.0 in.) Out of housing		
Max. Logging Speed		180 ft./hr (@2 points/ft)		
Radioactive Source		Cs137 Strength: 2 Curies (74 GBq)		
Voltage		30 V		
Current Draw		350 mA~390 mA		

Nuclear Magnetic Resonance Imaging While Drilling (MRI)

Geo-Vista

Applications

- Continuous,real-time,lithology-independent porosity without chemical sources.
- Resistivity-independent pay identification.
- Continuous,real-time permeability evaluation.
- Thin-bed characterization.
- Carbonate facies characterization.
- Irreducible water saturation.
- Gas-bearing reservoir evaluation.
- Heavy oil and tar identification.
- Hole size distribution

Introduction

By providing lithology-independent porosity, pore-size distribution, continuous permeability and direct hydrocarbon detection, the MRI delivers a step change in real-time producibility assessment for complex reservoirs.
While drilling a well with a challenging trajectory to target a complex carbonate reservoir the MRI (The high-quality, real-time magnetic resonance) to evaluate rock and fluid properties and obtain accurate lithology independent porosity and continuous permeability to optimize placement of the wellbore, the advanced petrophysical evaluation improved testing and completion design and calculated reservoir producibility for focus on well.

Specifications

Max. Tool O.D. (Single-sleeve Stabilizer)	6.9 in. (175 mm) (single-sleeve stabilizer)	
Max. Pressure	20,000 psi (137.9 MPa)	
Max. Temperature	300°F (150°C)	
Make-up Length	32.38 ft. (9.87 m)	
Weight	3385.4 lbm. (1535.6 kg)	
Borehole Size Range	8.25 to 10.375 in. (20.96-26.36 cm)	
Normal Collar O.D.	6-3/4 in. (171.5 mm) API tolerance	
Thread Connections	GT6 box up/ GT6 box down	
Vertical Resolution Static	1.5 in./min.-4 in./min. (3.81 cm/min.-10.16 cm/min.)	
Vertical Resolution Dynamic	10 in.@50 ft./h (25.4 cm@15 m/h)-0.25 m/min. 20 in.@100 ft./h (50.8 cm@30 m/h)-0.5 m/min.	
Measurement of Porosity	0-100 pu	
Min. mud Resistivity	0.02 ohm.m	
Shell Diameter	15 in. (381 mm)	
Shell Thickness	0.24 in. (6 mm)	
Max. Number of Echoes	2000	
Min. Echo,Spacing	0.6 ms	
T_2 Distribution	0.5 to 5,000 ms	
Precision	＜10 pu/PAP	
Depth of Investigation	14 in. (356 mm)	
Static Field Gradient	58 gauss	
Freq of Sensitive Volume	245 kHz	
Operating Position	Centralized	
Hole Deviation	Vertical to Horizontal	
Power Supply	Turbine alternator	
Dogleg	Sliding	16°/100 ft. (16°/30 m)
	Rotating	8°/100 ft. (8°/30 m)
Max. System Shock Level	30 min. at shock level 5 (50-gn threshold or accumulatd 200,000 shocks above 50 gn)	
Torque	23,500 ft. lbf (31,800 N.m)	
Max. PH	＜9	

Acoustic While Drilling (AWD)

Geo-Vista

Applications

- Optimize mud-weight selection
- Predict pore pressure independent of temperature and salinity effect.
- Identify top-of-cement
- Understand rock mechanical properties
- Measure porosity sourceless
- Position bit-on-seismic using synthetics
- Identify gas influx or formation gas.
- Perform many other standard sonic applications.

Introduction

Acoustic While Drilling (AWD) provides real-time compressional and shear wave travel-time measurements in slow and fast formations. Shear and comressional slowness with computed semblance values are acquired using a state-of-the art acoustic source combined with multiple arrays of receivers.Advanced downhole processing and wavefrom stacking techniques ensure reliable and fully compensated measurements.

Specifications

Diameter		4.75 in.	6.75 in.
Tool O.D.		4.82 in. (122.43 mm)	6.9 in. (175.26 mm)
Hole Size		5.625 in. to 8 in. (143 to 203 mm)	8.5 in. to 10.625 in. (216 mm to 270 mm)
Max. Operating Temperature		300°F (150°C)	
Max. Operating Pressure		20,000 psi (137.9 MPa)	
Length		30 ft. (9 m)	23.8 ft. (7.254 m)
Weight		1,760 lbm (798 kg)	2,500 lbm (1,134 kg)
Thread Connections	HbuildLWD	GT4 box up/ GT4 pin down	GT6 box up/ GT6 pin down
	ComLWD	NC38 box up/ NC38 pin down	NC46 box up/ NC46 pin down
Makeup Torque		8845 ft.-lbf (11,984 N.m)	25,000 ft.-lbf (33,895 N.m)
Max. Dogleg Severity	Rotating	15°/100 ft. (15°/30 m)	8°/100 ft. (8°/30 m)
	Sliding	30°/100 ft. (30°/30 m)	16°/100 ft. (16°/30 m)
Max. Flow Rate		400 gal US/min. (1,514 L/min.)	800 gal US/min. (3,028 L/min.)
Max. Sand Content		3%	
Max. LCM Size		0.63 in. (16 mm)	
Average Inertia		62 in.	
Transmitters Number		1	
Receivers Number		4	
Measurement Type		Compression Wave & Shear Wave	
Accuracy, us/ft. (us/0.305 m)		± 1	
Measurement Range		All tools 40-230 us/ft. dependent on mud type	
Max. Shock		250 g for 100,000 cycles	
Measure Point From Tool Bottom		14 ft. (4.267 m)	

Ultrasonic Imaging While Drilling (UID)

Geo-Vista

Applications

- Fracture characterization
- Borehole breakouts and geomechanics
- Borehole geometry evaluation
- Thin-bed identification
- Structural dip determination
- Lithology and porosity variations
- Secondary porosity identification
- Sedimentary features identification

Features

- Measures both Amplitude and Travel Time to obtain fully sampled images of the borehole surface.
- Enables client to evaluate borehole quality
- Enables a 256 sector circumferential resolution (1.4°) which is sufficient to fully sample the borehole wall in the typical
  ROP and RPM ranges experienced while drilling

Benefits

- High quality ultrasonic acoustic transducer
- 3D Borehole image visualization
- High sampling rate

Introduction

Ultrasonic Imaging While Drilling (UID) provides high-resolution borehole images while drilling in OBM/WBM.
Borehole imaging has been used to calculate borehole caliper, stress, breakout orientation, stratigraphic and geologic structure imaging in conventional wells. Borehole wall images are commonly used for fracture characterization during well planning to optimize hydraulic stimulation and maximize the possible return from a reservoir.
The image service is only avalable in memory mode while drilling, caliper is in real-time.

Specifications

Maximum Temperature	300°F (150°C)
Maximum Pressure	20.000 psi (137.9 MPa)
Tool Size	6-3/4 in. (172 mm)
Hole Size	8-3/8 to 10 in. (213 mm to 254 mm)
Tool Weight	825 lbs. (375 kg)
Tool Length	8.8 ft. (2.68 m)
Logging Speed	Up to 400 ft./hr
Mud Type	OBM/WBM
Maximum Mud Weight	16 ppg
Azimuthal Sectors	256

Formation Tester While Drilling (FTD)

Geo-Vista

Applications

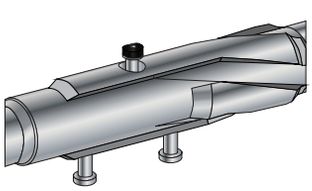
- Optimization of mud weight
- Selection of optimal case
- Estimation of reserves
- Identification of fluids and their contacts.
- Reservoir model refinement
- Well placement

Benefits

- Mitigates risk through reservoir pressure management.
- Improves prediction of reserves using fluid typing.
- Enhances drilling performance through optimal mud weight.
- Saves time and cost by eliminating need for tool orientation.

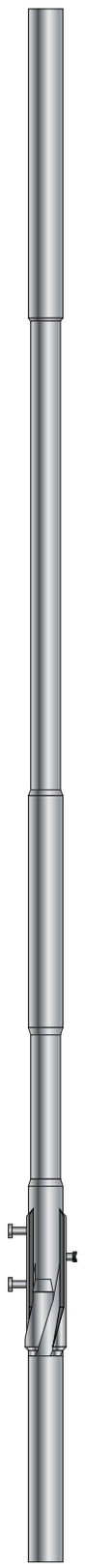
Features

- Provides formation pressure in drilling environment
- Provides direct pore pressure and mobility data for fluid typing and mud-weight optimization
- Used in any hole orientation—vertical or deviated
- Optimizes pretest volume and drawdown to formation characteristics
- Real-time measurements with quality control indicators



Introduction

Formation Tester While Drilling (FTD) service makes accurate measurements that provide direct pore pressure and mobility data for fluid typing, reservoir pressure management, and mud-weight control and optimization. It achieves time savings through a focus on operational efficiency and measurement versatility, accuracy, and quality.



Specifications

		4.75 in.	6.75 in.
Tool Design			
Measurement Type		Probe pretest	
Pressure Gauges		High-precision quartz and strain	
Power Supplies		Battery, MWD turbine power	
Measurement Specifications			
Probe Dimensions		1.75 in. (44.45 mm) OD 0.44 in. (11.18 mm) ID	2.25 in. (57.15 mm) OD 0.56 in. (14.22 mm) ID
Pretest	Volume	0 to 25 cm³, fully adjustable	
	Drawdown Rate	0.1 to 2.0 cm³/s	
	Delta Pressure	6,000 psi (41 MPa)	>6,000 psi (>41 MPa)
Setting Piston Diameter Reach		1.38 in. (35.05 mm) more than tool OD	2.00 in. (50.00 mm) more than tool OD
Memory Capacity		Up to 120 pretests depending on time downhole	80 pretests of 5 min. duration
Battery Capacity		150 pretests 1 cm³/s at 3,200 psi (22 MPa) drawdown at 275 °F (125 °C)	
General Specifications			
Tool Max. O.D.		4.82 in. (122.43 mm) 5.75 in. (146.05 mm) 5.5 in. (139.7 mm) optional	8.25 in. (209.6 mm) 9.25 in. (234.95 mm) with optional collar
Tool Length		40.2 ft. (12.3 m)	31 ft. (9.45 m)
Weight		2,000 lbm (907 kg)	2,866 lbm (1,300 kg)
Thread Connections		GT4 box up/ GT4 box down	GT6 box up/ GT6 box down
Operating Temperature		300 °F (150 °C)	
Mechanical Specifications			
Max. Dogleg Severity	Rotary Mode	15°/100 ft. (15°/30 m)	8°/100 ft. (8°/30 m)
	Sliding Mode	30°/100 ft. (30°/30 m)	16°/100 ft. (16°/30 m)
Axial And Lateral Shocks		10g rms	
Hydraulics			
Max. External Pressure		20,000 psi (138 MPa)	
Flow Range		0 to 400 galUS/min. (0 to 1,514 L/min.)	0 to 800 galUS/min. (3,028 L/min) (standard)
Note: Specifications are subject to change.			

Geo-Vista

Marketing Manager
Xujie Zhang
Mobile: (+86) 13521254100
Email: zhangxj@renhesun.com

Product Manager
Hongai Zhang
Mobile: (+86) 18911632096
Email: zhangha@renhesun.com

International Sales Manager
Sharry Liu
Mobile: (+86) 13911317865
Email: sharry@renhesun.com

International Sales Director
Chen Gang
Mobile: (+86) 13817367599
Email: chengang@renhesun. com

Sales Manager
Dr. Hong Mei
Contact: +1 8323585168
Email: meihong@renhesun.com
Address: 910 Chinquapin Place,
Houston,Texas, USA 77094

Sales Manager
Chen Hua
Contact: +971 524515130
Email: chenhua@renhesun. com
Address: View 18 Office No. 2102,
Downtown Jabel Ali, Dubai, UAE