


Sondex Array Tools

KAPPA


SONDEX ARRAY TOOLS

Module #13

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CAT



Temperature rating	177 degree C
Pressure rating	15,000psi
Tool body diameter	1 11/16" (43mm)
Make-up Length	55.5" (1410mm)
Weight	17.3lbs (8.1kg)
Number of fluid sensors	12
Orientation sensor	Indicates which sensor is "up"
Maximum pipe size	7" casing
Toolbus Standard	Ultrawire for memory or SRO

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Sondex – Capacitance Array Tool



SONDEX - CAT
12 Probes

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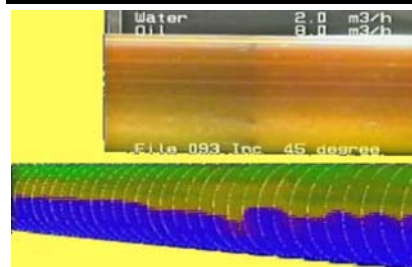
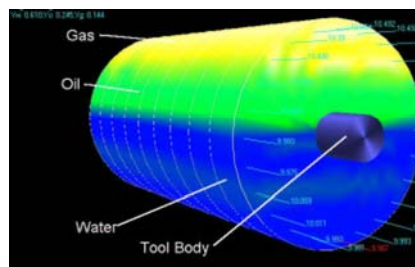
Capacitance Array Tool

OPERATING PRINCIPLE

Oil, Gas & Water have different dielectric constants. The output frequency of a sensor changes with the dielectric constant of the fluid surrounding it. A simple calibration of the sensors enables the identification of the fluid surrounding each sensor.

APPLICATIONS

- Phase identification in horizontal & highly deviated wells.
- Calculation of % of each phase present.
- Plotting of phase composition along the wellbore.
- Identification of water entry areas.
- Changes of wellbore fluids with time or different abstraction conditions.



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CAT

CAT: (CN1,...,CN12; RELB)

CAT-N: (NCAP01,...,NCAP12; CATROT)

CAT-R: (RCAP01,...,RCAP12; CATROT)

Probe #	Mnemo	Reading Gas cps	Reading Oil cps	Reading Wat cps
1	RCAP01	0.0000	0.2000	1.0000
2	RCAP02	0.0000	0.2000	1.0000
3	RCAP03	0.0000	0.2000	1.0000
4	RCAP04	0.0000	0.2000	1.0000
5	RCAP05	0.0000	0.2000	1.0000
6	RCAP06	0.0000	0.2000	1.0000
7	RCAP07	0.0000	0.2000	1.0000
8	RCAP08	0.0000	0.2000	1.0000
9	RCAP09	0.0000	0.2000	1.0000
10	RCAP10	0.0000	0.2000	1.0000
11	RCAP11	0.0000	0.2000	1.0000
12	RCAP12	0.0000	0.2000	1.0000

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RCAP & NCAP

- Raw (RCAP) or normalized (NCAP) capacitance values can be loaded.
- Raw values (RCAP)
- When raw values are used, the normalization is governed by the "Calibration" option of the [Survey-Tool Info Multiple probe' dialog](#).
- Individual probes normalization is possible with 3 end points defined for each probe: gas phase reading, oil phase reading and water phase reading.
- The raw values from the tool are whole numbers from 0 to 255. Normalized capacitance is defined as Gas = 0.0, Oil = 0.2 and Water = 1.0
- The normalization of the raw data uses gas and oil phase readings if the raw CAT data is within the segment defined by these 2 values. Otherwise, it uses the oil and water readings.

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QAQC - CAT

- Check for individual normalisation applied on NCAP values. It is possible to re-normalise individual sensor in Emeraude ('calibration' option in Survey-Tool Info-Multiple probe).
- Check for individual sensor response by making image view and cross section view of each pass.
- Check for the tool rotation (relative bearing data/CATROT) along the logged interval.
- There are several options in Emeraude for MPT processing: probe status (active/ignore/disable), average values (arithmetic/stratified).

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RAT



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	<h2>RAT</h2>
<p>RAT: (RATHU01,...,RATHU12, RATROT)</p> <p>The RATHUxx curves are recognised by EMERAUDE as Water Holdup curves</p> <p>NOTE: These RATHUxx curves are calculated from the raw RAT curves using a SONDEX software called RATUTIL</p> <p>© KAPPA 1988-2009 9</p>	

	<h2>SAT</h2>
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SAT: (SPIN1,...,SPIN6; FLOW1,...,FLOW6, SATROT)

The FLOWx mnemos are not actual measurements but provisions to load velocity channels calculated by the Sondex acquisition software. This is optional.

It is always possible to define a user tool when different mnemos are encountered.

One can also use a distinct bearing channel with an arbitrary offset if necessary