Cased hole

EMDS Electro-Magnetic Defectoscope

FEATURES AND ADVANTAGES

- Separate determination of wall thickness and metal loss in three casing strings (EMDS-3) and four casings (EMDS-4)
- Undesirable noise discrimination using gradient of static magnetic field measurement
- Inspection of casing strings with four electromagnetic probes with different direction of magnetic axis of sensors
- EMDS-3 and EMDS-4 tools have examined more than 2000 wells in Russia, China, the Middle East
- Availability of GR and temperature sensors

SPECIFICATIONS

	EMDS-3 (EMDS-TM-42)	EMDS-4
Maximum diameter of the pipes inspected, mm	340	550
Total wall thickness of pipes, mm	30	40
Basic accuracy of thickness determination, %:		
First casing string	5	5
Second casing	10	10
Third casing	15	15
Fourth casing	-	25
Minimal length of the detected through defect along the pipe axis:		
First casing	p/9	p/9
Second casing	p/4	p/4
Third casing	p/3	p/3
Fourth casing	-	p/2
Crosswise to the axis of the first pipe	p/6	p/6
Temperature range, °C	0 – 120 (150)	0 – 120 (150)
Temperature sensor sensitivity, °C	0,01	0,01
Range of natural gamma radiation, μR/hr	3–100	3–100
Max.operating temperature, °C	120 (150)	120 (150)
Max. hydrostatic pressure, MPa	60 (80)	60
Tool diameter, mm	42 (48)	58
Tool length with centralizers, mm	3700	3700

VNIIGIS®

Research and production enterprise that creates special and unique methods and technologies for geophysical research of oil and gas, ore and coal wells

info@vniigis.com
market@vniigis.com
+7 (34767) 7-19-00
+7 (34767) 7-20-99

Case Study No.1

Pipes Integrity Determination by EMDS Tool in Three- and Four-String Well Design

Challenge

Determination of casing and tubing integrity for planning further operation, workover or well shut-in in multi-string well programs. According to the Client information, there is a risk of leaking strings on two wells.

Solution

Conducting electromagnetic defectoscopy with EMDS-3 tool for inspection of three internal strings or EMDS-4 tool for four casing strings. Each electromagnetic probe contains a generator coil, through which heteropolar current pulses are passed, and a receiver coil, in which the signal from the secondary electromagnetic field is excited. The received signal variation in time after the current cut-off reflects the wall thickness of casing strings, indicates casing parting and structural elements (collars, packers, hangers, etc.)

Results

Both wells showed serious (more than 20%) metal losses of the far barriers: 2nd and 3rd pipes for well A (Fig. 1), 3rd and 4th pipes for well B (Fig. 2).

It is recommended to perform a workover in case of active corrosion of production casing and surface casing; or well shut-in in case of slight corrosion of production casing and active corrosion of intermediate casing and surface casing

Features and Advantages

- Separate determination of wall thickness and metal loss in three casing (EMDS-3) and four casing strings (EMDS-4)
- Undesirable noise discrimination using gradient of static magnetic field measurement
- Inspection of casing strings with four electromagnetic probes with different direction of magnetic axis of sensors
- EMDS-3 and EMDS-4 tools have examined more than 2000 wells in Russia, China, the Middle East

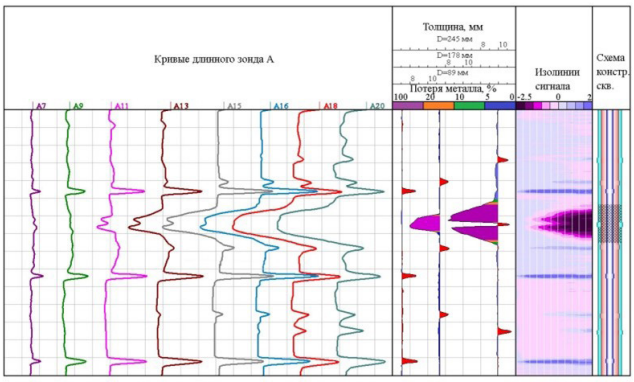

Fig.1 Active corrosion of production string (metal loss of ML≤53%) and surface string (ML≤70%)) showed the need for urgent workover. EMDS-3 tool log job through tubing

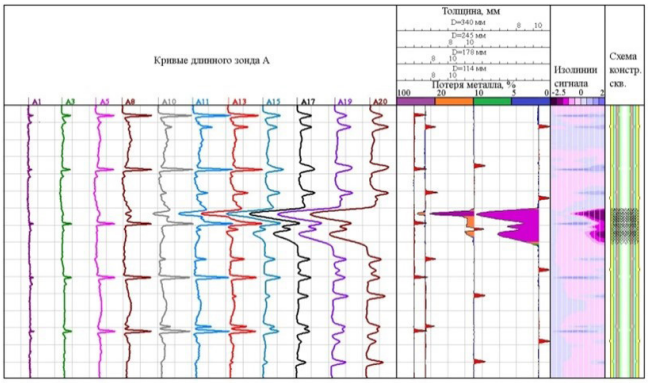

Fig.2 Slight corrosion of production string (ML≤15%), active corrosion of intermediate string (ML≤71%) and surface casing (ML≤84%) show the need for annual monitoring. EMDS-4 tool log job through tubing

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