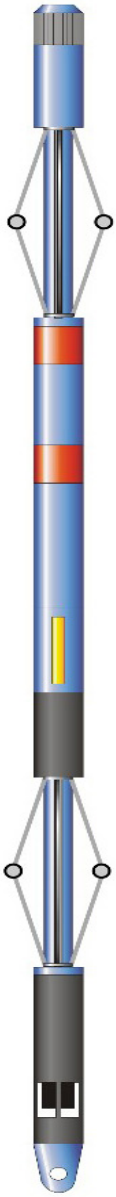
Cased hole

ZAS-TSh-42 COMPLEX NOISE ACOUSTIC TOOL

The equipment was development by AO NPP VNIIGIS in cooperation with OOO NPC ECO-Technology Foundation



SCOPE OF APPLICATION

Designed for cement bond quality control of casing strings, location of behind-the casing cross flows, casing leak intervals, evaluation of perforation effect on cement, control of hydro swabbing

FEATURES AND ADVANTAGES

- the tool operates on a single-core cable up to 6000 m length;
- the tool enables to be delivered to the interval of survey through a 2.5" diameter tubing;
- the tool allows to measure dynamic and kinematic parameters of elastic waves, has passive noise logging mode and temperature logging;

SPECIFICATIONS

Probe scheme	$T_2$0,25$T_1$1,5R
Centralizers	Bow spring
Transmitters	magnetostriction, radial
Receivers	piezoceramic
Measurement range: - Transit time, mcs/m - Attenuation rate, dB/m - Noise period, mcs - Temperature, °C - Well/ string diameter range	 120–160 no less 36 300–3000 0–120(150) 60–168 мм / 2,5"–7"
Max hydrostatic pressure, MPa	80
Max operating temperature, °C Modification 1: Modification 2:	 120 150
Tool dimensions, mm diameter (without centralizers) length	 42 2450
Number of cores used, pcs	1
Tool weight, kg	max 12

Designations in the figure:

t1 – near transmitter

t2 – far transmitter

T – high-resolution thermometer

SSR, SLM – sonic signal receiver, sound level meter

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Case Study No.1

Example of Location of Tubing Sticking Using ZAS-TSh-42 Tool

Challenge

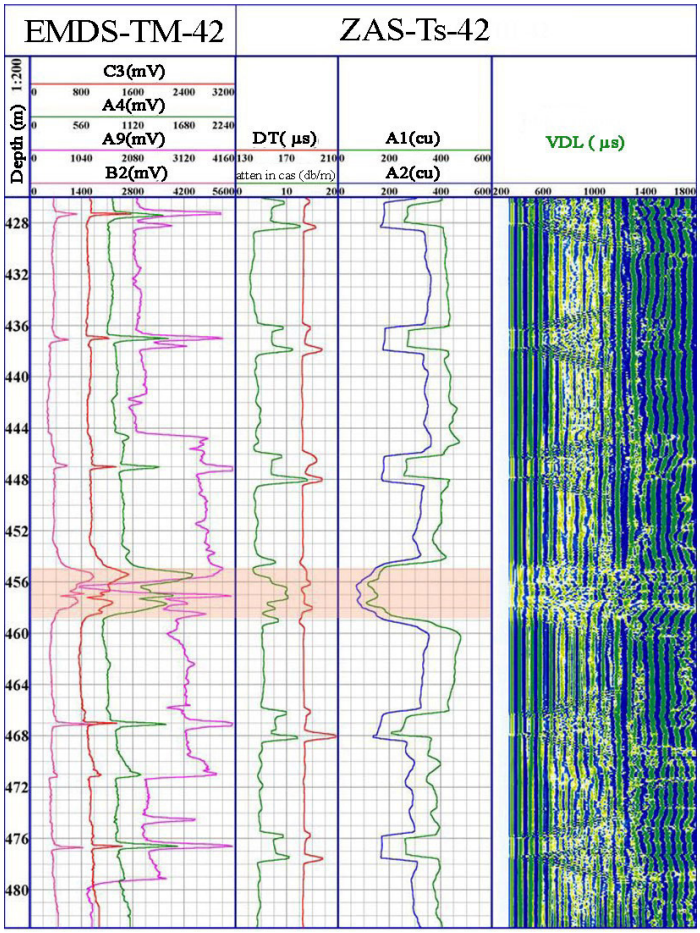
Tubing sticking location diameter 2,5"

Solution

Determination of tubing sticking position is performed with ZAS-TSh-42 tool in combination with EMDS-TM-42 tool

Results

Well survey conducted by EMDS-TM-42 and ZAS-TSh-42 tool string allowed to identify the place of stuck tubing. Two methods, using different physical basis, mutually confirmed each other in determining the place of contact of two strings and stuck tubing.



Features and Advantages

- ZAS-TSh-42 tool is designed for cement bond quality control of casing strings, location of behind-the casing cross flows, casing leak intervals, evaluation of perforation effect on cement, control of hydro swabbing;
- the tool operates on a single-core cable up to 6000 m;
- the tool enables to be delivered to the interval of survey through 2.5" tubing;
- the tool allows to measure dynamic and kinematic parameters of elastic waves, **has passive noise logging mode** and temperature logging;
- for locating of behind-the-casing cross flows and casing leak intervals, the dynamic mode of logging and point-by-point static survey is used.

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Case Study No.2

Example of Location of Behind-the-Casing Cross Flow by ZAS-TSh-42 Tool

Challenge

The customer needed to find a leak in three-strings well program (strings 7", 9" and 13"). The problem was with permanent annular pressure. The region of work is the Middle East.

Solution

The following measurements in the well were proposed and carried out:

- Background - static mode, valves of annulus intervals were closed.

- The pressure in the **first** annuli was released (valve is opened). The logging by tool in noise meter mode during pressure build-up (valve is closed) was performed.

- The pressure in the **second** annuli was released (valve is opened). The logging by tool in noise meter mode during pressure build-up (valve is closed) was performed.

Results

Measurements indicate a fluid leak of collar casing string joint at 4,710 feet depth.

Features and Advantages

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- the tool operates on a single-core cable up to 6000 m;
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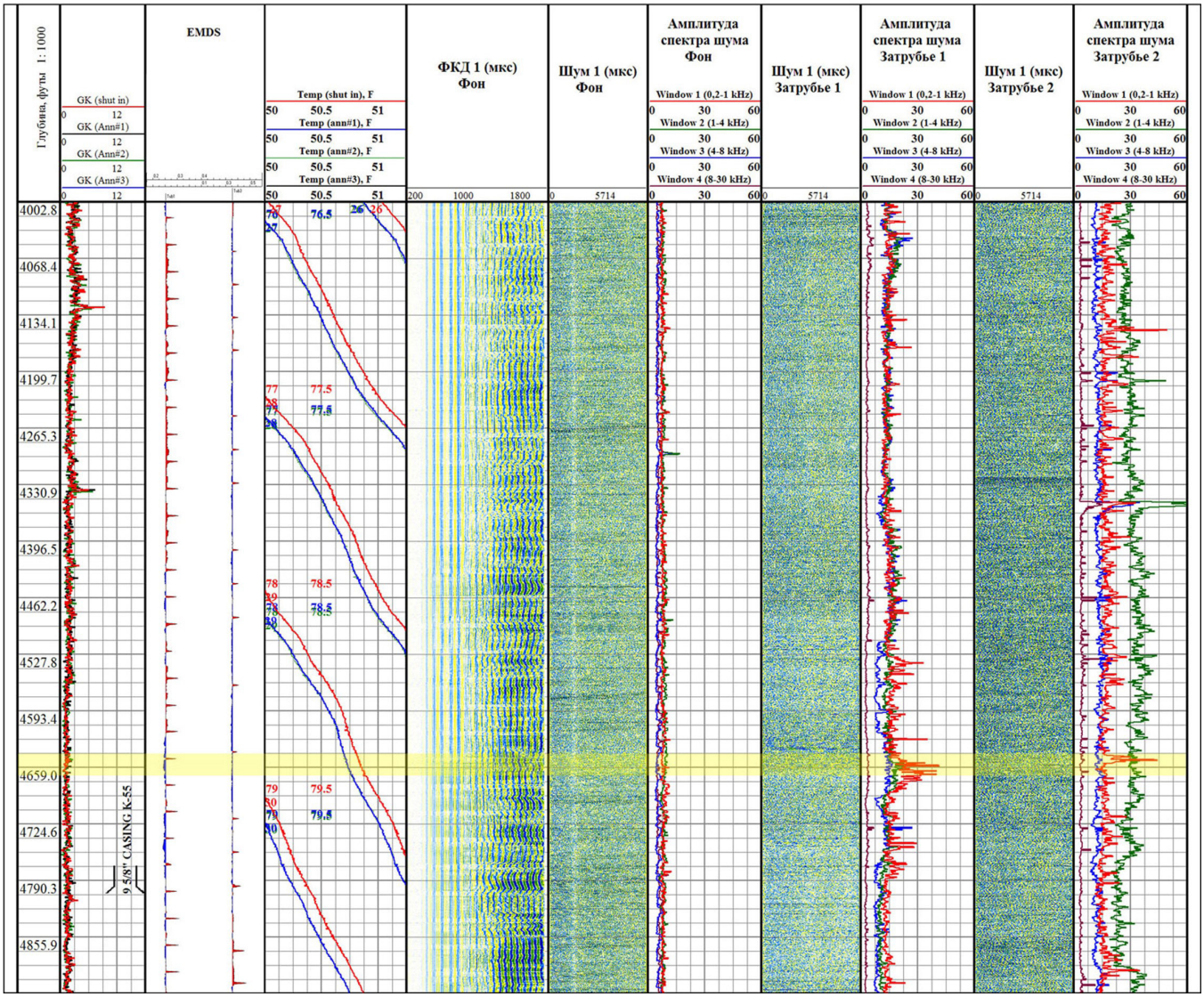
Результаты


Глубина, футы 1: 1000
GK (shut in)
GK (Ann#1)
GK (Ann#2)
GK (Ann#3)
EMDS
Temp (shut in), F
Temp (ann#1), F
Temp (ann#2), F
Temp (ann#3), F
ФКД 1 (мкс) Фон
Шум 1 (мкс) Фон
Амплитуда спектра шума Фон
Шум 1 (мкс) Затрубье 1
Амплитуда спектра шума Затрубье 1
Шум 1 (мкс) Затрубье 2
Амплитуда спектра шума Затрубье 2
Window 1 (0,2-1 kHz)
Window 2 (1-4 kHz)
Window 3 (4-8 kHz)
Window 4 (8-30 kHz)
4002.8
4068.4
4134.1
4199.7
4265.3
4330.9
4396.5
4462.2
4527.8
4593.4
4659.0
4724.6
4790.3
4855.9
9 5/8" CASING K-55

Case Study No.3

Determination of Barite Deposit Interval and Tubing Sticking by ZAS-TSh-42 Tool

Challenge

Determination of barite deposition interval and sticking of tubing in the well at formation temperature in the range of 150-160˚C, pressure of 80-94 MPa and filled with drilling mud on barite base with density of 1.77 g/cm^3.

Solution

The operation was carried out with an experimental thermobarostatic modification of ZAS-TSh-42 tool, designed for maximum pressure of 100 MPa and temperature of 155˚C. The survey was performed in a tubing with inner diameter of 57 mm.

Results

As a result of variable-density logs (VDL) processing, amplitude and time parameters of acoustic signal along tubing were obtained. On VDL the collar joints are distinguished by the first arrivals of longitudinal wave and amplitude drops on the collars.

According to temperature log data, a temperature anomaly is located at the depth interval of 3510-3654 m.

According to ZAS-TSh-42 tool surveys, the interval of barite deposition and stuck tubing at the depth of 3632.7-3672 m was identified.

The interval of 3847.3-3855.3 m is marked by a decrease in the wave amplitude along the tubing, which is most likely associated with barite deposition and contact of the tubing with the casing string.

Features and Advantages

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- for locating of behind-the-casing cross flows and casing leak intervals, the dynamic mode of logging and point-by-point static survey is used.

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Logging Results. Location of Tubing Sticking