



GAPS[®]

GEOPHONE ARRAY PRODUCTION SURVEY SERVICE

THE GAPS SERVICE
PROVIDES AN **ARRAY OF
SENSORS** FOR A **BETTER
3D INTERPRETATION.**

**Detects flow rates too low for standard noise tools
because of its extreme sensitivity**

**Distinguishes between vertical and horizontal flow
using multicomponent sensors**

**Runs in pressurized and open wells, with or without
borehole fluids**

PINPOINT THE PROBLEM

Fluid flow behind the casing generates sound, which we can track. The more precisely you can capture those vibrations, the higher the probability of pinpointing and mitigating the unwanted fluid flow on the first attempt.

As part of an industry-exclusive service, the Weatherford Geophone Array Production Survey (GAPS) service profiles and pinpoints background noises and flow direction throughout the length of your well. Using our patented* GAPS process, we hone in on the location of the unwanted fluid flow and precisely target the remediation services.

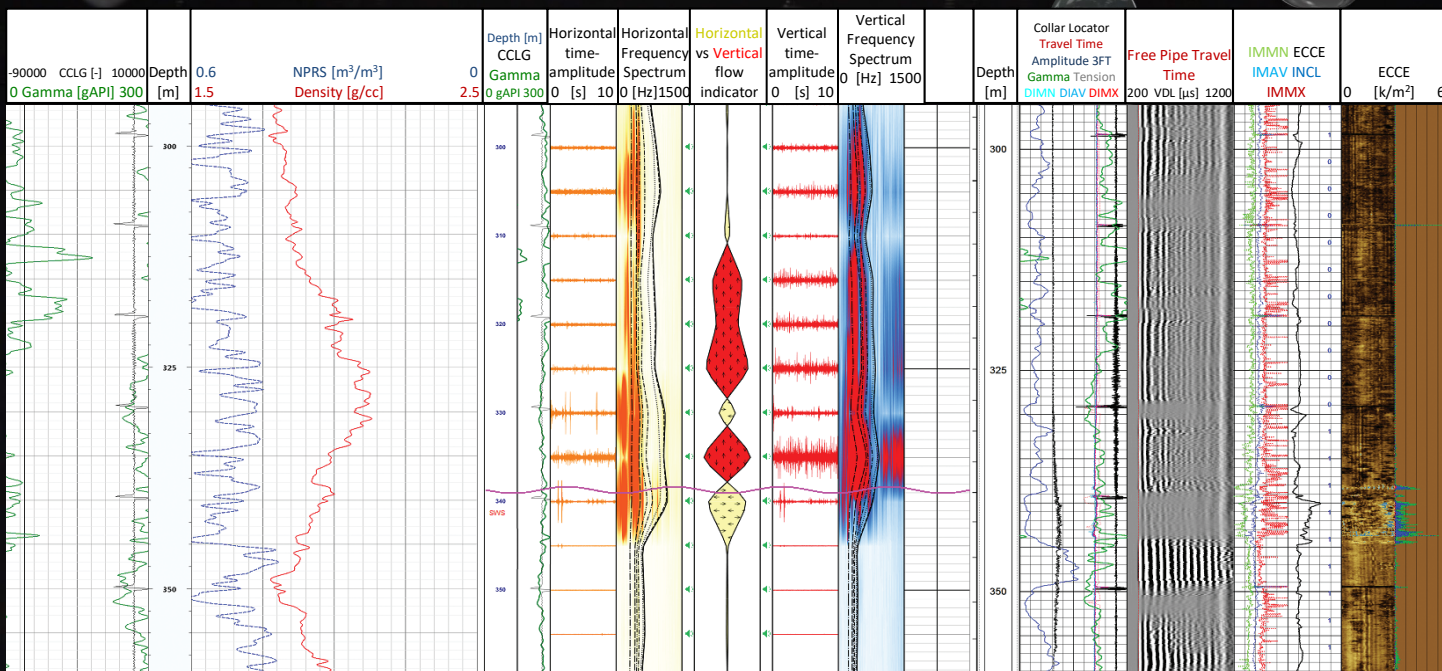
Multiple sensors in the GAPS service create a log plot that identifies noises originating above, below, and lateral to the array. This well log identifies areas behind the casing where fluid is flowing, with a precision that was unachievable before the GAPS service. The multicomponent sensors produce directional measurements and record lower frequencies than can be detected with conventional hydrophone-based noise tools.

RUN WORLDWIDE SINCE 2015

Kentucky, USA
SAVED \$150,000
BY AVERTING REPAIRS
IN WRONG WELL

Alberta, Canada
SAVED \$120,000
BY PRECISELY LOCATING
THE REMEDIATION ZONE





C-THRU

Compact through-casing evaluation service log

Gamma | CCL | Porosity | Density

GAPS

Geophone array production survey log

Gamma | CCL | Horizontals (amplitudes and frequencies)
Flow Indication | Verticals (amplitudes)
Tube Waves (up and down)

URS

Ultrasonic radial scanner log

Amplitude | Tension | Gamma | CCL | Cement Bond
Impedance Traces | Percentage of Water/Cement

Our GAPS service detects and pinpoints fluid flow behind the casing as well as gas migration. As part of the analysis, we use openhole data (or, if not available, C-Thru logs) to identify possible sources. We use cased-hole cement evaluation data (from an UltraView® log) to detect escape paths, such as a cement channel, for fluid flow behind the casing. With an accurate understanding of unwanted fluid flow, we can fix the problem with one intervention instead of two or more, which means faster results at a lower cost.

DETECT SOUNDS WITHOUT RELYING ON WELLBORE FLUIDS

Deployed by wireline truck, the GAPS service records sounds transmitted through the casing.

Electromechanical locking arms press the sensors against the casing

Casing-transmitted sounds eliminate reliance on wellbore fluids

Enhanced sound sensitivity enables detection of frequencies and flow rates beyond the threshold of standard noise tools.

LOCATE FLUID SOURCES WITH MORE PRECISION

At even the lowest frequencies, our GAPS service detects surface-casing vent flows, leaks, and gas-migration issues.

Four geophone sensors with three directional components in each detect noises in the wellbore

Recorded data analysis distinguishes between vertical and horizontal flow

Multiple-sample interpretation helps to differentiate between sounds and improve source detection

INCREASE REMEDIATION EFFECTIVENESS

Our GAPS service serves as an important step in preparing for casing remediation success.

Geophone array captures more samples for increased accuracy in interpretation of flow

Precision source locating improves placement of perforation and squeeze work to solve the problem

Leak elimination mitigates threats to the environment, safety, and reputation

Find out how to pinpoint the problem in your well at
weatherford.com/gaps



© 2019 Weatherford. All rights reserved.