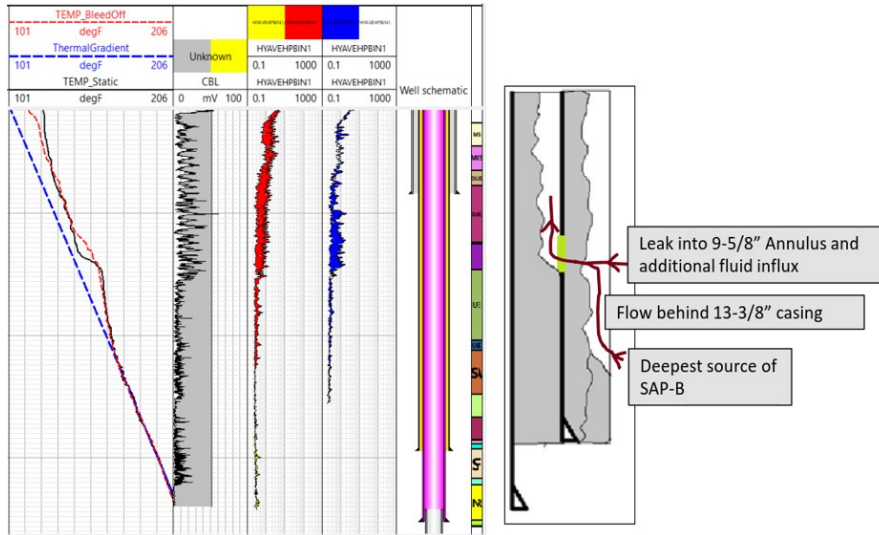


GAPS® Service, Temperature Logging Identified Sources of Sustained Annulus Pressure in a Deviated Wellbore, Optimized Remedial Action



The composite interpretation of the GAPS service and temperature data identifies the sources of B and C sustained annulus pressures at the wellhead.

Objectives

- Identify the source(s) of sustained pressure at B and C annulus and suggest depth intervals for remedial action.
- Confirm the flow path from fluid entries into the wellbore up to the wellhead.
- Confirm the isolation of various aquifers and pay zones.

Our Approach

- Weatherford deployed the GAPS geophone array production survey service and a high-precision temperature logging string. The GAPS service can listen to minute flow signals originating from fluid flow behind the casing, differentiating between the horizontal and vertical flow signal. This analysis can locate surface-casing vent-flow issues (leaks) and can also help identify production issues such as behind-casing crossflow between zones in the well.
- Before the operation, the Weatherford wireline logging team collaborated with the customer and established a fit-for-purpose logging plan.
- Field personnel performed a GAPS service run and temperature logging in two separate well states: a baseline pass was recorded with both annuli shut, and another one was recorded with individual annuli open.

LOCATION
Middle East

WELL TYPE
Development

HOLE SIZE
17-1/2 in.

CASING SIZES
9-5/8 and 13-3/8 in.

LINER SIZE
7 in.

TEMPERATURE
206°F (96°C)

MEASURED DEPTH
8,500 ft (2,590 m)

WELL DEVIATION
60°

OTHER
Slowing building SAP- B (100 psi) and SAP- C (30 psi)

PRODUCTS/SERVICES

- GAPS geophone array production survey service
- Temperature logging tool



GAPS[®] Service, Temperature Logging Identified Sources of Sustained Annulus Pressure in a Deviated Wellbore, Optimized Remedial Action

Our Approach (continued)

- Weatherford's proprietary software interpreted the GAPS station data, with a careful examination of the individual frequency bin response.
- The interpretation from the composite data clearly identified the fluid entries behind two casing, the flow paths upwards, and the entry of fluids in the first annulus that flowed to the wellhead.
- Based on the data interpretation, Weatherford experts presented the customer with a recommendation of cement remedial intervals.

Value to Customer

- Weatherford's GAPS service and temperature logging provided valuable information on fluid leaks and subsequent travel to the wellhead with high accuracy behind the casing.
- Such slow building sustainable annulus pressures (SAP) evaluations are usually not successful with traditional spectral noise logs.
- The GAPS service also confirmed isolation of deeper pay zones and other aquifers behind the casing.
- The recommended remedial actions successfully fixed the sustained annulus pressure at the wellhead, saving time and cost for the customer. The alternative would have been the more-costly blind remedial action.



The Weatherford GAPS service is deployed in a cased borehole to profile the background noise levels throughout the length of the well. The background noise profile is analyzed to pinpoint areas with significant gas or water movement occurring behind the casing.

