Subsurface-Release Plug Locator System

Enables Secure Subsea Cementing, Provides Accurate Cement Displacement With 70-bbl Correction

Objectives

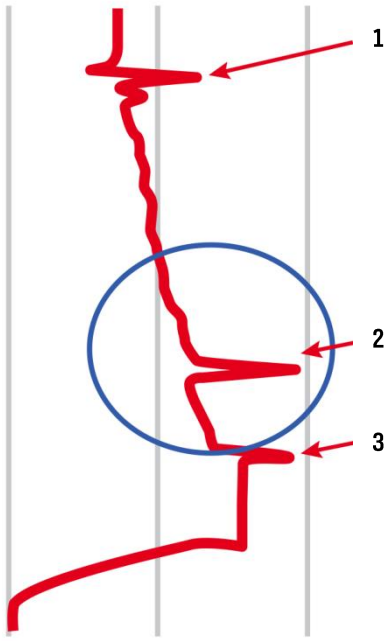
- Provide accurate cement displacement during a 13 5/8-in. liner-running and cementing operation in a subsea well. The well plan calls for the displacement of 1,460 bbl (232 m³) of synthetic oil-base mud down the drillpipe and casing.
- Account for fluid compressibility in the 23,900-ft (7,285-m) string.
- Land the top plug and enable the planned volume and height of annular cement fill to be pumped behind casing per regulatory requirements.

Our Approach

- To mitigate known displacement inefficiencies in long and large-diameter casing strings, a Weatherford well-construction team recommended the subsurface-release plug locator system. The tool eliminates errors in cement-displacement volumes by producing a recognizable indication when the cementing top plug passes through the locator collar.
- The operator ran the plug locator collar downhole with the 13 5/8-in. liner. After pumping cement downhole, they began displacement with synthetic oil-base mud.
- The operator observed an 800-psi (5.5-MPa) increase in displacement pressure, which served as a positive indicator that the top plug had passed through the locator collar. This determined the top-plug location and helped to make an adjustment to the calculated displacement volume, which ensure that the plug and cement would displace to the float collar.
- Displacement continued beyond the calculated 1,460 bbl (232 m³). The operator landed and bumped the top plug with a total displacement volume of 1,530 bbl (243 m³).

Value to Customer

- The Weatherford subsurface-release plug locator system provided accurate cement displacement for a subsea liner-running operation.
- The system accounted for fluid compression and enabled a 70-bbl (11 m³) differential in displacement volume—increased from 1,460 to 1,530 bbl (232 to 243 m³)—and facilitated a secure cement job that met stringent regulations.
- Displacement until the positive indication enabled the operator to place an effective primary cement barrier as designed. Had the operator displaced with the planned volume, approximately 1,000 ft (304 m) of cement would have been left inside the casing, which would have failed the design objectives.



The above graphic indicates the subsurface-release plug locator system operation:
Spike 1 shows the bottom plug landing and rupturing, which allows displacement at a constant 4 bbl/min.
Spike 2 indicates the top collar plug passing through the locator collar.
Spike 3 shows the top plug landing on the float collar and holding pressure integrity, which indicates a successful displacement.

LOCATION
Gulf of Mexico, USA

WELL TYPE
Subsea oil development

WATER DEPTH
9,500 ft (2,896 m)

HOLE SIZE AND ANGLE
17-in. open hole with 30° inclination

WELL DEPTH
23,900 ft (7,285 m) MD

LINER SIZE
13-5/8 in. 88.2 lb/ft

PRODUCTS/SERVICES
- 13-3/8 to 14-in. plug locator system
- Top plug
- Locator collar

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