

Flexible Cement System Achieves Zonal Isolation Objectives, Norway

CemFIT Flex system provides high bond quality

An operator drilling in the Norwegian Continental Shelf achieved all zonal isolation objectives and high bond quality using CemFIT Flex* flexible cement system. The CemFIT Flex system reduced cement content by 66% compared with a conventional foamed cement system, enabling a reduction in CO₂ emissions.

Install and cement production casing and liner as hydraulically sealing barriers

The operator wanted to install a 13³/₈-in cemented casing to act as the secondary barrier element against the reservoir section, where the top of the cement was to be placed 100 m above the sand formation. In the subsequent section, the operator wanted to install a 9⁵/₈-in cemented liner as the primary barrier element prior to drilling into the reservoir zone and placing the top of cement up to the 13³/₈-in casing shoe. The job required a minimum of 30 m of hydraulically isolating cement to be placed in the cemented interval, where verification of the barrier was performed using an ultrasonic inspection tool (USIT) and cement bond log (CBL).

Determine optimal cement system for anticipated pressures and temperature cycles

Schlumberger performed a well life study using CemSTRESS* cement sheath stress analysis software to determine which cement system would be best suited for exposure to the anticipated pressures and temperature cycles during the injection and production wells. Based on the simulation results and subsequent recommendations, the operator decided to use CemFIT Flex system.

Deliver continuous cement slurry

The operator drilled the 17¹/₂-in open hole using RheGuard* flat rheology drilling fluid system to 1,888-m MD without any issues. The cementing crew mixed and pumped 18.9 m³ of CemFIT Flex system slurry. During displacement, no losses were observed as the spacer entered the annulus, and a consistent lift pressure was observed as cement entered the annulus. The job signature pressure match conducted using CEMENTICS* zonal isolation software indicated that the openhole size was very close to gauge hole.

The 12¹/₄-in open hole was drilled using RheGuard system at 1.45 sg, and the 9⁵/₈-in liner was run to TD without any issues. For this operation, a 2 × 12-m³ batch mixer was mobilized to the rig as a residence tank for the fly-mixed slurry prior to pumping the spacer downhole. This ensured that the slurry volume was ready to be pumped downhole.

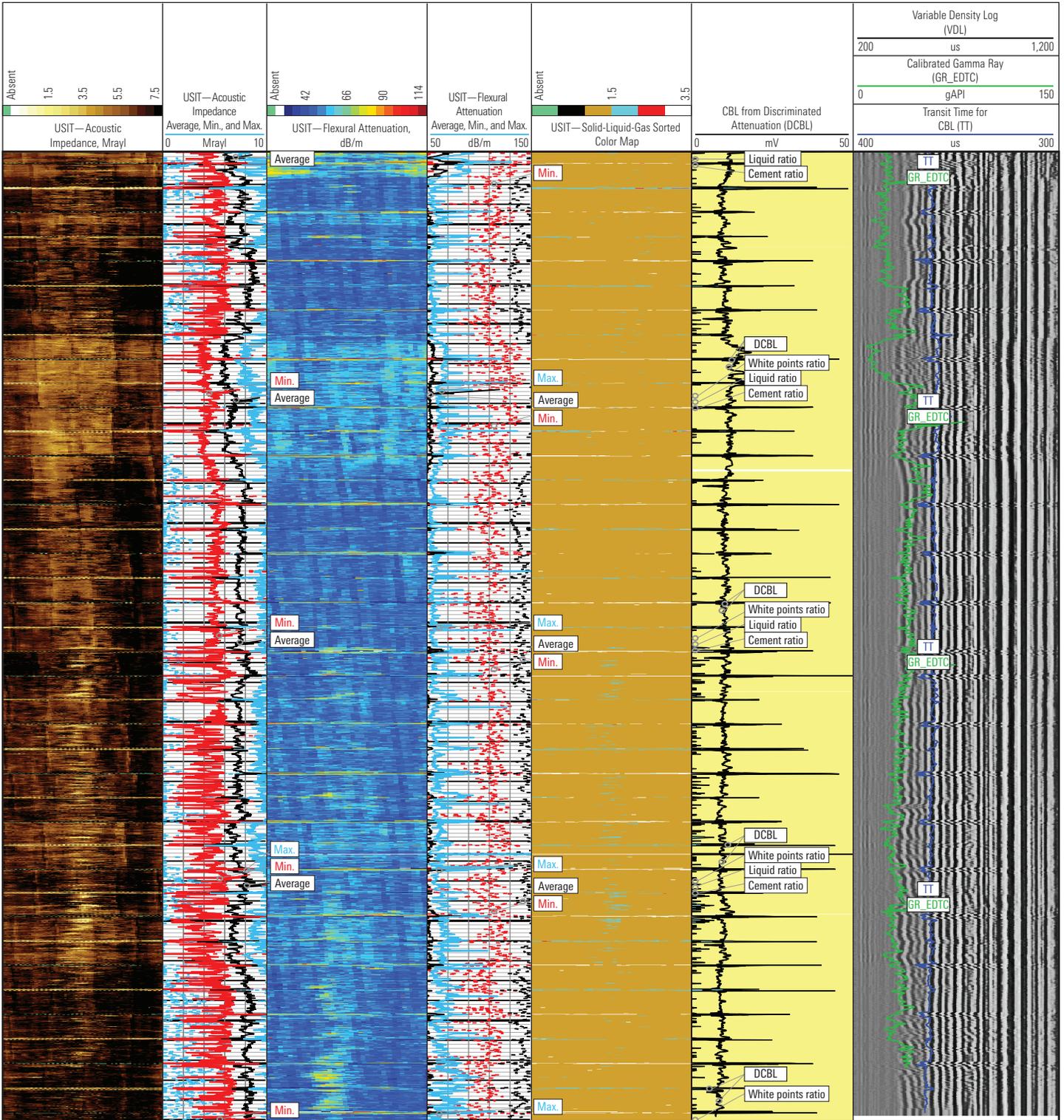
The 9⁵/₈-in liner job was successfully executed. The continuous cement slurry mixing to the batch mixer was very smooth with a total of 16.1 m³ of 1.60-sg CemFIT Flex system slurry pumped downhole. Compared with a conventional foamed cement system, the CemFIT Flex system reduced cement content by 66% and simplified the job by eliminating foam usage. No losses were observed during the job, and a consistent lift pressure was recorded during the entire displacement stage. The liner was logged using Schlumberger USIT and CBL tools, with a top-of-cement bond identified at the 13³/₈-in casing shoe with a total of 330 m of hydraulically isolating circumferential cement.

When compared with a conventional foamed cement system, the CemFIT Flex system reduced cement content by 66% and simplified the job by eliminating foam usage. CemFIT Flex system is also rated 100% poses little or no risk (PLONOR) and has eliminated the use of micropolymers and plastics used to impart flexibility.

Provide high bond quality

The operator achieved the required isolation objectives to install the cemented liner as the primary barrier element prior to drilling into the reservoir zone. The solution achieved exceptional USIT and CBL results. CemFIT Flex system provided a high bond quality from 1,882 to 2,130 m.

Case study: Flexible cement system achieves isolation objectives, Norway



Ultrasonic log shows CemFIT Flex system provided competent isolation across the fully cemented 330-m interval, enabling the operator to meet NORSOK D-010 isolation requirements.

slb.com/CemFITFlex

*Mark of Schlumberger
 Other company, product, and service names are the properties of their respective owners.
 Copyright © 2022 Schlumberger. All rights reserved. 21-WCFL-976009

