

Executive Summary

Purpose: Evaluate the cement bond in the well HW-8104.

Solution Methodology: Survey the casing with Isolation Scanner and CBL-VDL Tools

General: The well HW-8104 is a heater well and has a 7-5/8", 26.4# casing from surface to 2128ft. CBL-VDL and Isolation Scanner Logs were run from 2128ft to surface. A combined CBL-VDL and Isolation Scanner presentation is in this report.

During the drilling stages, no cement plug was needed in the well to prevent loss circulation to ensure a quality cement job for the 7-5/8" casing.

The Schlumberger's Isolation Scanner cement evaluation service provides more certainty for light weight cements by combining the pulse-echo technique with a new ultrasonic technique that induces a flexural wave in the casing with a transmitter and measures the resulting signal at two receivers. The attenuation calculated between the two receivers provides an independent response that is paired with the pulse echo measurement and compared with a laboratory – measured database to produce an image of the material behind the casing. By measuring radially beyond traditional cement evaluation boundaries, Isolation Scanner service confirms zonal isolation.

This well has been cemented using light lead slurry of 9.5ppg followed with tail slurry of 15.5ppg in order to mitigate possible lost circulation during cementing operations. Both the conventional CBL-VDL and ultra sonic pulse-echo techniques rely on a significant contrast in acoustic impedance between the cement and the displaced drilling mud to determine whether or not: a) there is cement behind the casing rather than drilling mud and b) the cement is bonded to the casing and the formation. Due to the use of light weight cement in this well which results in lower contrast, the conventional CBL-VDL and ultra sonic pulse-echo techniques have to be supported with the Schlumberger's Isolation Scanner tool.

Summary of Findings: The Isolation Scanner Log from the raw curve measurements and all the images indicate Top of Cement (TOC) at 206ft.

Four different zones of cement bond log quality can be seen from the analysis as follows:

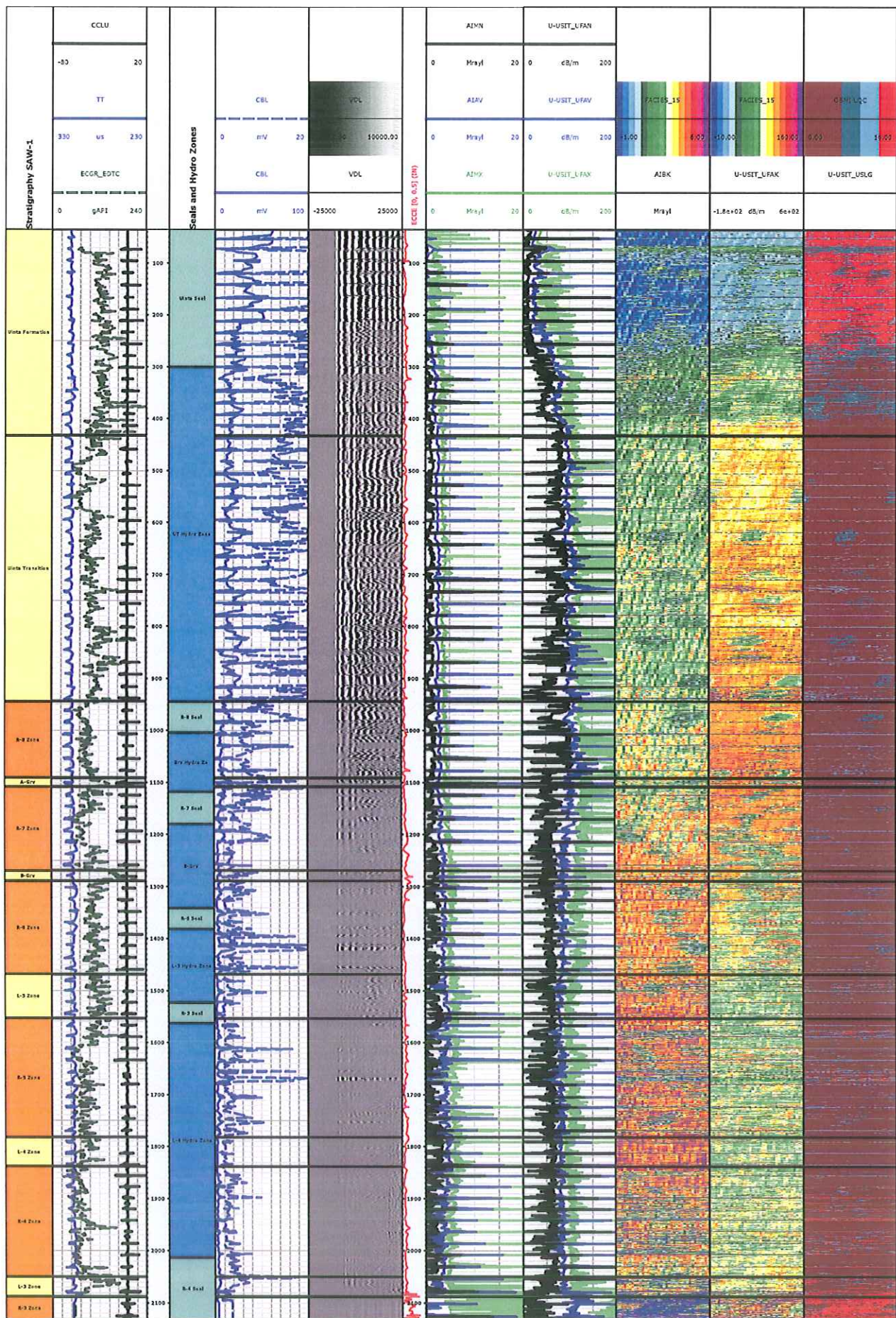
Zone 1 - 1475ft – 2128ft: The flexural image map indicates cement is present in the annulus behind the casing and that casing is bonded. Adequate isolation exists. This is the tail cement at 15.5ppg. There is indication of cement on the inside wall of the casing from 2078ft to 2128ft from the caliper logs, which has resulted to tool decentralization.

Zone 2 - : 400ft – 1475ft: The flexural image map indicates that adequate cement for isolation exists. There are local channels with patchy cement in certain intervals as seen on the image map. Overall the cement condition is fair to good bonding.

Zone 3 - : 206ft – 400ft: Above 400ft, the annulus is liquid filled with some cement microdebonding. Overall the cement coverage is fair to poor in this depth interval 206ft -400ft. There is adequate bond to isolate the deeper production zones and the saline water interval from the overlying water bearing interval because of the good cement coverage in zone 1 and zone2.

Zone 4: Surface – 206ft: The flexural conventional CBL amplitude indicates the Top of Cement (TOC) at 206ft which shows free pipe amplitude above this depth. The isolation scanner image log indicates air in the annulus preventing quantitative cement analysis. Spotty cement is visible on the image map. These indicate presence of cement fall-back during the curing process.

Conclusions: The Isolation Scanner Cement Bond Analysis indicates that cement bond is present in the annulus behind the casing. Adequate bonding exists to isolate the production zone and the saline water interval from the overlying water bearing intervals. The Top of Cement (TOC) is at 206ft.



SAW1 Well Stratigraphy with well 8104 Borehole Cement Plug Data 20 Sep 2012

