

Customer Analyzes Sand Blockage Interrupting Water Disposal Well Water Injection

INNERVUE™ WELLSUITE SURVEY PRECISELY LOCATES BLOCKAGE

RUSSIA FAR EAST

CHALLENGE

- » Suspected sand blockage hindering injection of water into disposal well

SOLUTION

- » Use Halliburton InnerVue™ WellSuite technology to collect and analyze pressure wave data for locating blockage
- » Establish temperature, pressure, density, bulk modulus, and acoustic velocity profiles

RESULT

- » Accurately estimated position of sand blockage (at depth of 1,889 m +/- 35 m)

OVERVIEW

Halliburton Sakhalin Limited was contracted by a Major Operator to perform an InnerVue™ WellSuite survey in annular space between the 9-5/8-in. and 7-in. casings. This annulus was being used in normal operation to inject water into the waste disposal well (WDW)—located at the wellsite in the remote region of northeastern Russia.

However, this routine procedure had to be stopped due to a suspected sand blockage at the inlet of the formation. Complexity of fluid properties were exacerbated by downhole conditions, requiring detailed and extensive pre-engineering to understand the fluid and system conditions to ensure the highest possible accuracy.

PROJECT DETAILS

Halliburton's high-tech InnerVue WellSuite survey technique was implemented to assess the position of the blockage in the annular space. The operation was performed in "static mode," with the annular space filled with Arctic Diesel. The survey was executed by one specialist from Halliburton Pipeline and Process Services, with the assistance of customer personnel and further expertise from Halliburton Cementing, in a matter of days.

Repeatable and consistent times of flight were measured between the wellhead at surface and the blockage in the annular space, with an average of 2.872 seconds. Temperature, pressure, density, bulk modulus, and acoustic velocity profiles were also established for the

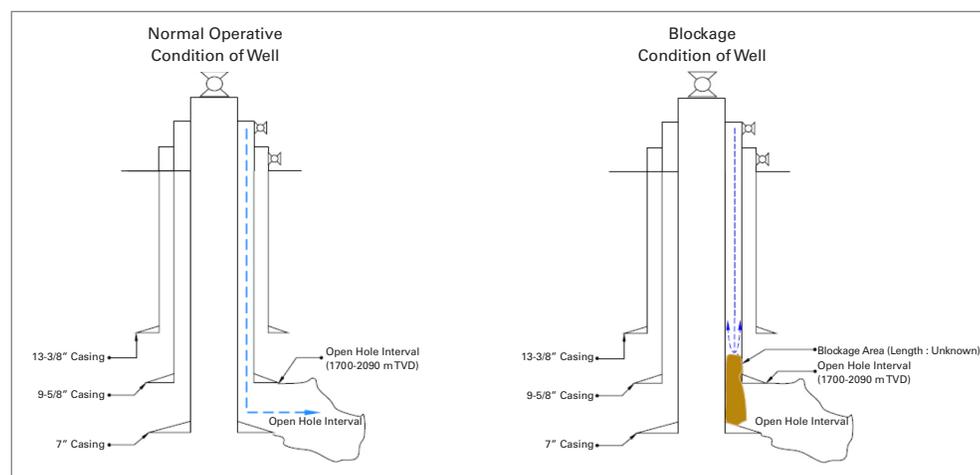


Figure 1. Comparison of operating conditions with and without the sand blockage.

annular space between the two casings filled with Arctic Diesel. Combining the time of flight and the acoustic velocity profile, the position of the blockage was estimated at 1,889 m +/- 35 m.

PROJECT OUTCOME

Results of the InnerVue WellSuite surveying efforts provided the information needed to evaluate and engineer well intervention requirements. The customer gained an understanding of the fluid properties and how the well characteristics changed these properties with regards to the depth profile of the well, allowing the blockage to be located with a high degree of accuracy (within 35 m).

DID YOU KNOW

The InnerVue WellSuite diagnostics service is a low risk, fast and accurate technique used to map the quantity and distribution of what may be limiting the throughput of the wellbore flow path, such as wax, hydrate, collapsed casing or stuck tool. A pressure wave is created at the wellhead and travels through the flow path to total well depth at the speed of sound. A reflected signature wave is returned, which corresponds to actual conditions within the wellbore flow path, including:

- » Changes in flow velocity from deposits/debris
- » Changes in medium properties, such as density, viscosity and phase

Analysis of critical data collected by the “pressure wave” technology will increase your understanding of a given wellbore flow path system and provide valuable insight for decisive performance management. The InnerVue WellSuite diagnostics service locates top of cement depth, top of plug depth and depth of blockages to high accuracies within 0.4% of well depth.

www.halliburton.com

Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.

H012752 5/18 © 2018 Halliburton. All Rights Reserved.

HALLIBURTON