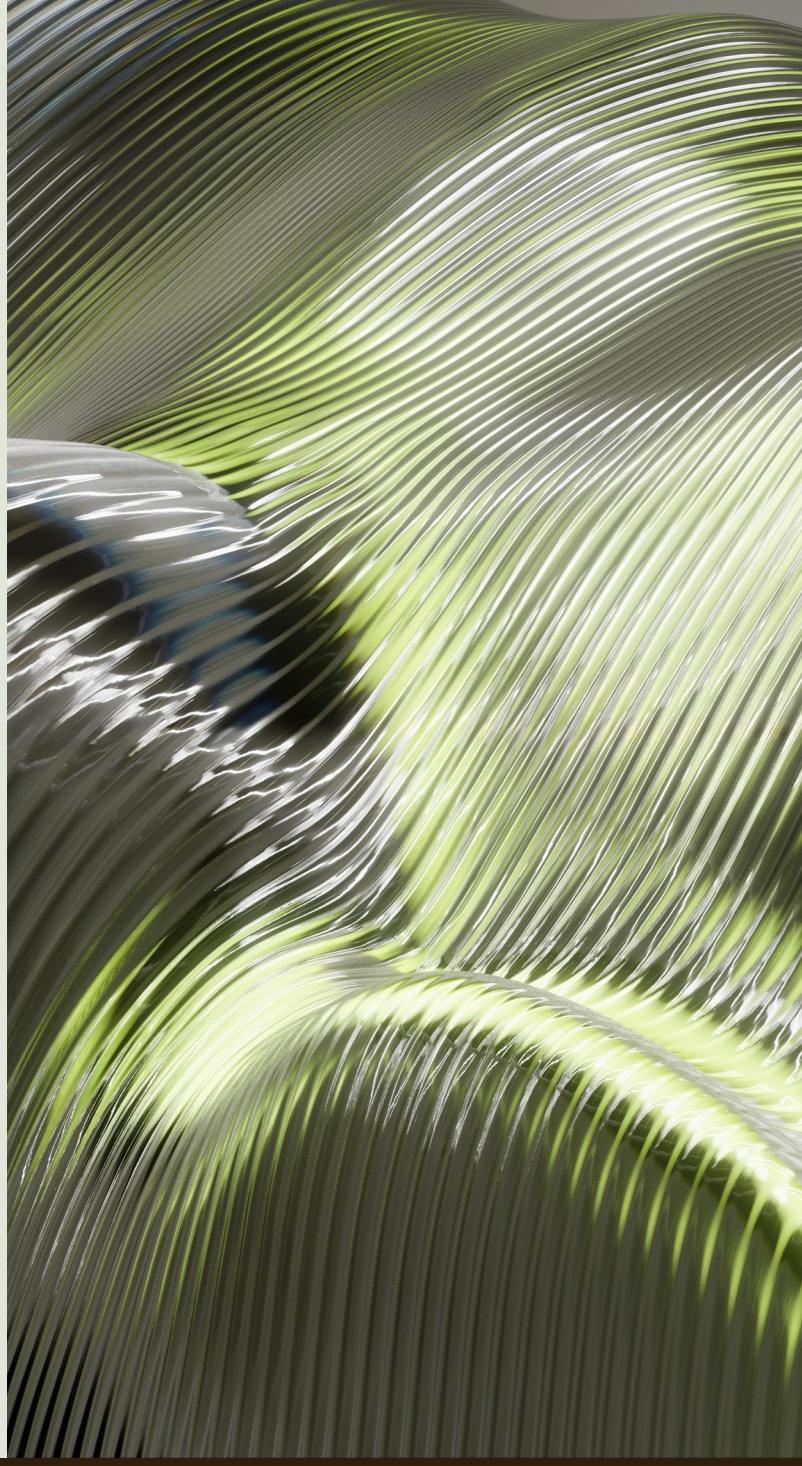
Complete Wireline Deployed Solution for Installing & Monitoring Temporary Dual Barriers during Gas Cavern Well Workover



Region
Canada, Americas

Year
Apr 2025

Case Study

Interwell

Region
Canada, Americas

Case Study
Complete Wireline Deployed Solution for Installing & Monitoring Temporary Dual Barriers during Gas Cavern Well Workover

Year
Apr 2025

Key Capabilities:

- → High Expansion Retrievable Bridge Plug technology (HEX)
- → Acoustic Barrier Verification & live surface monitoring technology (ABVS)
- → Power mechanical wireline Electronic Pull & Stretch Tool (EPST)
- → Rapid global mobilisation of equipment and personnel

Benefits:

- → Avoided costly workover rig days
- → Established confidence in dual barrier integrity and well control
- → Enhance safety with real-time, wireless cavern monitoring of pressure & temperature

Key Applications:

- → Wellbore restriction barrier installation
- → Real-time wireless surface readout of pressure & temperature across a barrier
- → Powered mechanical installation and retrieval of HEX workover barriers on wireline

Challenge

A high-profile gas storage cavern well in Canada required a workover, which entailed a wellhead changeout in preparation for installation of a liner system. The well construction was varying weights of 9⅝" (244,8 mm) casing, with the previous wellhead having a 6.125" (155,6 mm) ID restriction.

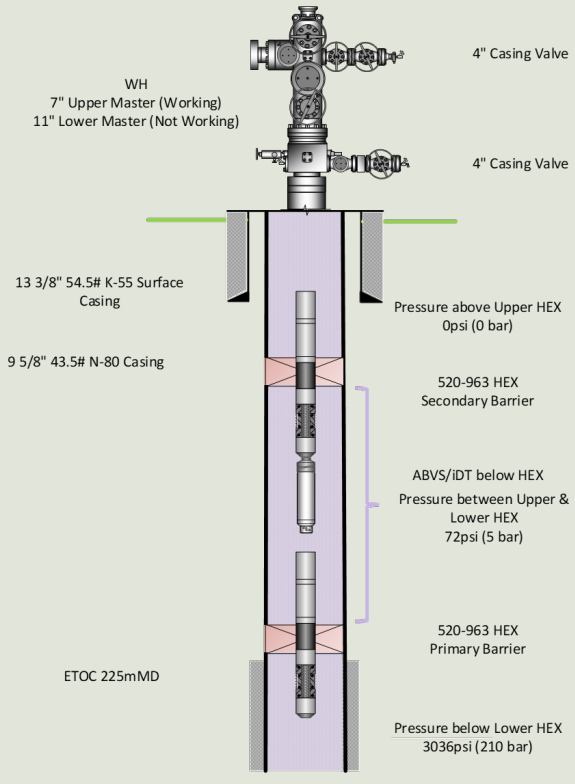
Historically, securing these wells for the wellhead replacement would require the installation of inflatable packers and dumping cement on top, followed by a milling operation once the workover was completed; all being executed on a snubbing unit. Alternatively, the wells could be frozen for a short period of time to form a barrier to the gas cavern, given special approval.

These barrier solutions carry a high HSE and operational risk profile, so the engineering firm responsible for the execution of this operation challenged the resources available in the region to provide a safer, more efficient, and cost-effective barrier solution to secure their well.

Solution

In close collaboration with the engineering firm and operator, Interwell proposed using a rigless, fully wireline-deployed solution to install and retrieve the temporary well barriers. The barriers consisted of two 520-963 High Expansion (HEX) mechanical Retrievable Bridge Plugs (RBPs), which were independently V0 qualified to the required cavern pressure and installation temperature.

Each of these plugs were installed with a non-explosive Surface Powered Electronic Setting Tool (SP EST), which enabled the live monitoring of the RBP installation and live log interpretation from Interwell's IO support team in Norway.



Key Capabilities:

- → High Expansion Retrievable Bridge Plug technology (HEX)
- → Acoustic Barrier Verification & live surface monitoring technology (ABVS)
- → Power mechanical wireline Electronic Pull & Stretch Tool (EPST)
- → Rapid global mobilisation of equipment and personnel

Benefits:

- → Avoided costly workover rig days
- → Established confidence in dual barrier integrity and well control
- → Enhance safety with real-time, wireless cavern monitoring of pressure & temperature

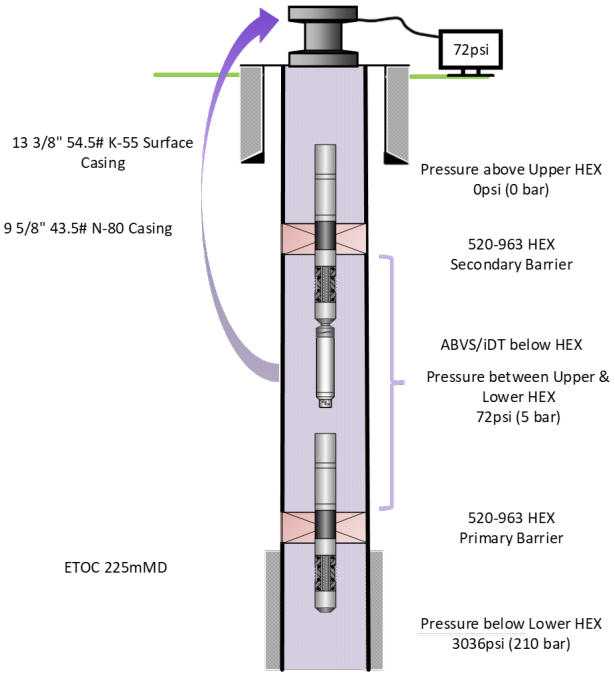
Key Applications:

- → Wellbore restriction barrier installation
- → Real-time wireless surface readout of pressure & temperature across a barrier
- → Powered mechanical installation and retrieval of HEX workover barriers on wireline

To ensure that both plugs were independently tested and performance monitored at the surface during the topside workover, a new cutting-edge Acoustic Barrier Verification System (ABVS) was installed below the upper HEX RBP. Once the ABVS surface receiver was magnetically attached to the wellhead, acoustic telemetry carrying live temperature and pressure readings from between the two HEX RBPs could be received and logged at the surface, with a cloud-based data stream for remote monitoring.

This innovative add-on assured the clients that two independent barriers were successfully installed and tested, and well integrity was maintained during the wellhead changeout operation. Additionally, maintaining the dual barriers during the wellhead changeout operation meant no requirement for fluids above the barriers, as nitrogen was used to pressure test the RBPs. Upon completion of the wellhead changeout, both 520-963 HEX RBPs were successfully retrieved on wireline using Interwell's power mechanical Electronic Pull & Stretch Tool (EPST), which itself de-risks the retrieval operation by mechanically locking the HEX RBPs back into its initial run-in hole configuration.

Value Created

The engineering firm and operator were able to meet an accelerated rig schedule to execute the next phase of the workover operation due to the efficiency of Interwell's wireline deployed technology. The overall cost of the wellhead changeout was reduced due to not requiring a rig to execute the first phase of the operation. HSE risk exposure was minimised and the emissions footprint associated with both the rigless operation and security given from using industry-leading mechanical RBPs and barrier monitoring technology was significantly reduced.

Interwell's solution was able to reduce the amount of product gas that was bled off from the cavern by maintaining the initial cavern pressure without utilising fluid to displace, providing additional value to the engineering firm and operator.