

Halliburton Water Conformance Tool Suite Instrumental in Adding 1 MMscf/d to Production without Additional Water

RETRIEVED DATA REVEALS WATER CROSSFLOW AND AIDS IN DECISION TO SHIFT OPEN A CLOSED SLEEVE

ALASKA

CHALLENGES

- » Find entry points of water and gas behind gravel pack screen
- » Identify opportunities to shut off water and also add production in a mature gas field
- » Remote location
- » Production held back by high-gas rate wells in a low-pressure reservoir
- » No surface-handling facility for water disposal

SOLUTION

- » Recommended a Halliburton water conformance suite of tools, including the Acoustic Conformance Xaminer® (ACX™) tool, Thermal Multigate Decay 3-Detector™ (TMD-3D™) tool, and production logging tool (PLT), to collect data about water flow, gravel pack quality, and production profile

RESULTS

- » Identified water crossflow between two adjacent wells
- » Influenced decision to shift open a sleeve that was previously closed
- » Added 1 MMscf/d to one well without increasing water
- » Identified water shutoff opportunity in third well

OVERVIEW

An operator needed a way to find entry points of water and gas behind gravel pack screen. Additionally, the operator was looking for opportunities to shut off water and also add production in a mature gas field.

CHALLENGE

The wells were high-gas rate in a low-pressure reservoir and sensitive to water holding back production. The field where the wells were located was remote without road access. A seasonal barge was the only chance to deploy a unit to location. Due to the lack of a surface-handling facility, disposal of produced water was expensive and limited daily production.

SOLUTION

Several historical production logging tool (PLT) logs from the field were reviewed and interpreted, which provided insight for tool recommendations. Halliburton proposed the use of a water conformance suite of tools, including the Acoustic Conformance Xaminer® (ACX™) tool, Thermal Multigate Decay 3-Detector™ (TMD-3D™) tool, and production logging tool (PLT), to provide information relating to water flow, gravel pack quality, and production profile. The ACX tool measures acoustic noise with an eight-hydrophone array and, using advanced array processing, would be able to identify depths of fluid entries behind the gravel pack while the well was flowing.

A third-party wireline unit was staged in the field year round. Using a third-party cased-hole surface system, all services were performed from the third-party unit. All tools, surface equipment, and a logging engineer were able to be flown to location via the operator's air service.

RESULTS

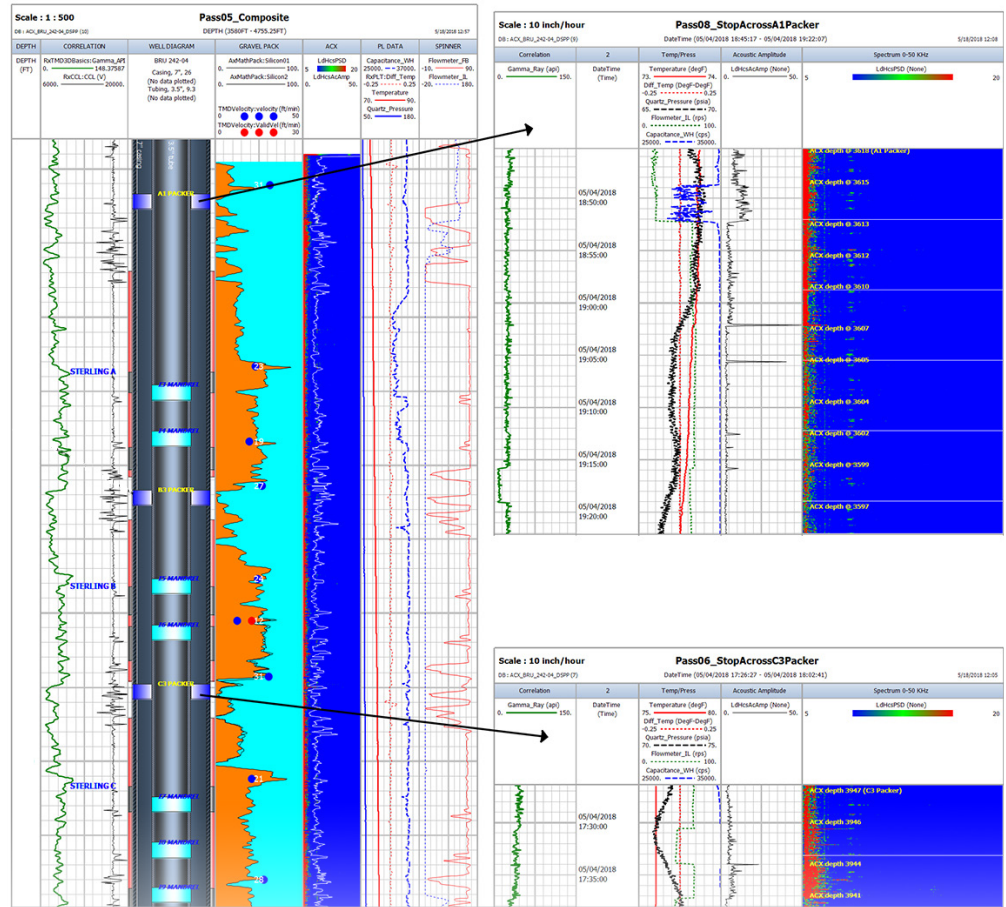
The three wells were logged initially with the water conformance suite. Two of the wells were immediately adjacent to each other, and the log data revealed a water crossflow between them. The data allowed the operator to make the decision to shift open a sleeve that was previously closed. This resulted in adding 1 MMscf/d to the production without the consequence of additional water.



The operator is currently faced with pipeline construction to aid in the disposal of produced water. Water is being trucked to the operator's two disposal wells, which limits how much water the operator can handle. This means shutting in or choking back well production to limit the amount of water to be physically handled. The pipeline would be built to connect all the wells in the field to the disposal wells. The third well logged shows the opportunity to set a plug and shut off over 50% of the daily water production without the loss of significant gas contribution.

The ability to perform services from a third-party unit also saved the operator from having to deploy a Halliburton unit, crane, and pressure control equipment to location on one of the seasonal barge runs, which allowed the operator to use the barge space for other projects. The entire operation was performed with zero HSE events.

The operator has identified 15 additional wells with similar opportunities to add gas rate and shut off water using this Halliburton water conformance solution.



Stationary measurements taken over perforated intervals to pinpoint the exact depths of fluid/gas entry into the annulus.

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