

Invizion Evaluation and Isolation Scanner Services Help Operator Isolate Shallow Aquifer

Integrated data interpretation workflow delivers improved well integrity and productivity while eliminating uncertainties of gas isolation, Eagle Ford Shale

CHALLENGE

Optimize cementing barrier design and placement to ensure no shallow flow of gas or water after operations.

SOLUTION

- Implement the Invizion Evaluation* well integrity evaluation service to analyze openhole data, plan cement barrier placement, and interpret acoustic cement bond.
- Collaborate with dedicated petrotechnical experts to develop best practices for operations as well as real-time optimization of cement operations, design, and execution.

RESULTS

Achieved proper isolation of shallow fluids, which allowed completing the in-zone lateral and ensured well integrity and productivity.



Perform integrated analysis to mitigate well integrity issues

An operator in the Eagle Ford that was not satisfied with the well integrity resulting from conventional cement barrier placement practices decided to perform an integrated analysis on the well to optimize operations. The operator also needed to develop best practices to mitigate shallow fluids based on the well integrity workflow interpretation of a 13½-in openhole section using formation evaluation logs, cement barrier placement data acquired during job execution, and cement bond logs for the 10¾-in surface casing.

Maximize flexibility for unconventional system

A 13½-in hole was drilled vertically from surface to 4,525-ft MD [1,379-m MD] while maintaining inclination below 1.5°, with top of cement designed to reach the surface and isolate potential flow zones to enable drilling to the next section. Based on data from offset wells, the potential flow zone was identified between 250-ft MD [76.2-m MD] and 600-ft MD [182-m MD]. An integrated team of petrotechnical experts collaborated to optimize cement barrier design by using the openhole formation evaluation and caliper data.

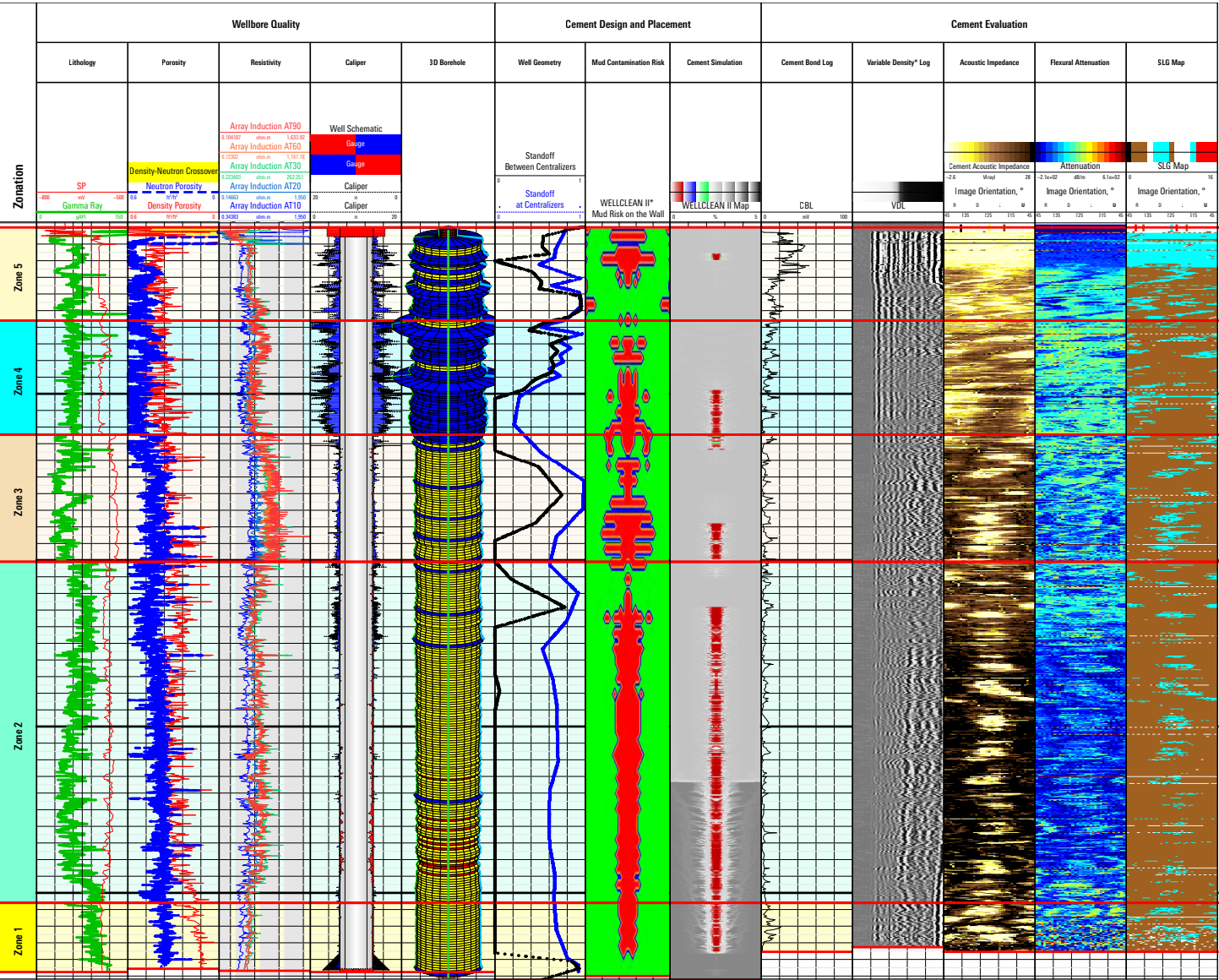
Although the wireline openhole logs did not confirm the potential gas flow zone seen at the offsets, a gas migration system was carefully planned to cover the annulus length. Lead cement slurry using a lightweight cement blend with a gas migration control agent and tail slurry proved to be a quick-setting design using Class A cement. A centralization program was designed to provide better standoff across the potential flow zone above 3,000-ft MD [914-m MD]. Isolating the surface barrier was paramount to ensure that the 5½-in lateral could reach 12,947-ft MD [3,946-m MD].

Ensured well integrity using the Invizion Evaluation service

After losses were observed during the cement barrier placement, the Isolation Scanner* cement evaluation service was run to verify annular zonal isolation. Using the Invizion Evaluation well integrity evaluation service's well integrity workflow, a comprehensive log display was generated within four hours of processing the Isolation Scanner service's logs. Interpretation was enhanced by having cementing placement information and openhole logs displayed in the same place, which enabled easier identification of top of solids and azimuthal cement coverage of isolation areas.

A solid, liquid, and gas (SLG) map was used to complete further analysis, which allowed the operator to identify postplacement indication of shallow water and confirm the need for the external casing packer as a secondary surface barrier. As a result of the integrated approach, no gas migration was observed, proper isolation for shallow fluids was implemented, drilling continued to the next section, and the 5½-in segment of the lateral was successfully completed as planned. The integrated data interpretation workflow and cement job recommendations provided critical guidance to achieve isolation of shallow fluids by the surface casings for continued well integrity.

CASE STUDY: Operator isolates shallow fluids using integrated data interpretation workflow, Eagle Ford Shale



Data integration and analysis using Invizion Evaluation well integrity evaluation service enabled the operator to determine the quality of the cement bond and confirm that the cement had properly set.

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