

Exceptional Cost and Time Optimization with Successful Leak Repair and Restoration of Oil Production: West Kuwait Case Study

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Abstract : Well intervention was done along with Production Logging Tools (PLT) to detect sources of water, and to check well integrity for two West Kuwait oil wells started to produce 100 % water. For the first well, to detect the source of water, PLT was performed to check the perforations, no production observed from the bottom two perforation intervals, and an intake of water was observed from the top most perforation. Then a decision was taken to extend the PLT survey from tag depth to the Y-tool. For the second well, the aim was to detect the source of water and if there was a leak in the 7" liner in front of the upper zones. Data could not be recorded in flowing conditions due to the casing deformation at almost 8300 ft. For the first well from the interpretation of PLT and well integrity data, there was a hole in the 9 5/8" casing from 8468 ft to 8494 ft producing almost the majority of water, which is 2478 bbl/d. The upper perforation from 10812 ft to 10854 ft was taking 534 stb/d. For the second well, there was a hole in the 7" liner from 8303 ft MD to 8324 ft MD producing 8334.0 stb/d of water with an intake zone from 10322.9-10380.8 ft MD taking the whole fluid. To restore the oil production, W/O rig was mobilized to prevent dump flooding, and during the W/O, the leaking interval was confirmed for both wells. The leakage was cement squeezed and tested at 900-psi positive pressure and 500-psi drawdown pressure. The cement squeeze job was successful. After W/O, the wells kept producing for cleaning, and eventually, the WC reduced to 0%. Regular PLT and well integrity logs are required to study well performance, and well integrity issues, proper cement behind casing is essential to well longevity and well integrity, and the presence of the Y-tool is essential as monitoring of well parameters and ESP to facilitate well intervention tasks. Cost and time optimization in oil and gas and especially during rig operations is crucial. PLT data quality and the accuracy of the interpretations contributed a lot to identify the leakage interval accurately and, in turn, saved a lot of time and reduced the repair cost with almost 35 to 45 %. The added value here was more related to the cost reduction and effective and quick proper decision making based on the economic environment.

Keywords : leak, water shut-off, cement, water leak

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