Scale Milling Enhancement in Depleted Gas Wells

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Abstract

Objectives/Scope: A major oil and gas producer has been developing deep mature gas fields in the central part of the Sultanate of Oman. One of the technical challenges faced over the wells’ lifetime is downhole halite deposition which reduces well productivity. Halite is a type of salt, the mineral form of sodium chloride (NaCl). Halite precipitation worsens as surface pressures decline. The paper presented will show the enhancement in the intervention strategy resulting in successful well delivery.

Methods, Procedures, Process: Conventional approaches to scale removal in depleted wells include Coiled Tubing milling, an operation which consumes large quantities of fluid as returns need to be established before milling can take place. Consequently, large volumes of Nitrogen need to be injected into the well in order to re-instate hydrocarbon flow after the intervention. This practice was expensive, time consuming and formation damaging, especially due to the existence of thief zones in depleted gas reservoirs. To optimize the operation without jeopardizing well deliverability, an improved milling technique was deployed with a nitrified fluid system, in addition to enhancements to the design of downhole milling tools.

Results, Observations, Conclusions: The Operator conducted a halite milling campaign and managed to reduce well turn-around by applying enhanced solutions of milling techniques, fluid systems and downhole tool technologies. This improvement was done by enhancing key solution methodologies while also optimizing cost and the time required to restore the well.

Novel/Additive Information: The paper presents the successful approach of delivering depleted gas wells following the removal of Halite Scale. Such a challenge is presented through lessons learnt, value and opportunities which could be replicated within the industry to enable well recovery.