Extending Injection Well Life, Reducing Risk and Lowering OPEX: The Economic Impact of Science on Disposal and Injection Wells

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Abstract

A goal of operators is to reduce risk and lower OPEX. With respect to disposal and injection wells this is achieved with reliable and consistent long-term injectivity. To achieve this goal, incorporating analytical evaluations for a clear understanding of the mechanics of the target formation are necessary. Including, the quality of injection fluids, rock-fluid interactions, analysis to aid adjustments to surface facilities. Focusing on improved and extended injection without expensive and risk mitigation. Discussed are key analytical evaluations that are critical to extending the quality and life of a disposal/injection well. Implementing these testing protocol lowers the risk of a short-lived injection well and eliminates OPEX associated with frequent, risky mitigation. Basic protocols are: 1. Understanding the reservoir quality, 2. Impact of water quality - contents injected into the well, 3. Rock-Fluid & Fluid-Fluid Interactions Initial selection for a quality disposal reservoir begins with a geological evaluation. Which includes, identification of a quality reservoir, areal extent, and is followed by reservoir/rock quality assessments. Basic assessments include analytical testing of target zones from core and/or cuttings. To understand reservoir quality, fundamental testing should include: porosity, permeability, clay identification, and pore throat size and distribution. Critical but often overlooked, protocols include a thorough review of water quality. Operator experiences demonstrate water quality is key to lowering OPEX for long-lived disposal/injection. This requires understanding the variations of produced water quality over the life of a field. Detailed water analysis will describe amounts and types of total dissolved and

suspended solids which determine cleanliness of injection water and the likelihood of plugging. Formation and injectability evaluations often accompany water quality studies. A detailed understanding of the quality of the injected fluid should be combined with a proper analysis of the target zone, the in-situ fluid, and conditions of injection to identify potential problems. One final evaluation step designed to reduced risk is understanding the interaction between the injected fluid with the formation and in-situ fluid. Best practices recommend preforming this analysis before completing injection wells to reduce near wellbore damage, plugging, scale, restricting pore throats, and wettability alteration. It is common to have more than one damage mechanism in an impaired well. Incorporating information from these analytical techniques reveals the type or types of potential impairment. Additionally, implementing the correct testing protocol early in field development will lower the risk of short-lived injection wells and reduce OPEX associated with frequent corrective actions.

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