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A Complete Overhaul of Technical and Operational Processes for Rigless Wireline Services at the Strategic Petroleum Reserve (SPR) Results in Improved and Safer Well-Site Operations

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Abstract

Rigless wireline services, ranging from gas-liquid interface identification and oil sampling to well integrity diagnostics, are one of the most common well-site activities performed in cavern storage wells. Despite their recurring need, they present the highest level of operational risk due to their use at or above cavern pressure with a limited number of wellhead pressure control mechanisms.

A complete review of the technical, operational, and procedural framework for all wireline work was initiated at the SPR in conjunction with a new competitive process for multi-year wireline services, to capture and incorporate any changes necessary to address the identified gaps when a new contractor provides its services.

The subsequent investigation resulted in the implementation of several tasks, including the revision of wireline operation's process hazard analysis (PHA), expansion of site personnel competencies via external well control training, modification to the contractor's equipment and personnel pre-job auditing process, as well as other activities.

What stood out from all the improvements was the need to upgrade wellhead pressure control equipment, which resulted in an update in operational risks during the PHA review. It was decided to move from the use of a single-ram manual wireline vale (also known as BOP) to a dual-ram hydraulically-actuated wireline valve. The aforementioned assessment determined that this hardware component would deliver a two-fold improvement, increased safety redundancy and remote operation, both beneficial towards the prevention of an uncontrolled well flow.

Resulting from this project, well-site controls have substantially improved through a more effective wireline contract management. In addition, SPR contingency processes are now better aligned to the Health, Safety, and Environmental standards required by the Department of Energy (DOE), improving overall safety.

Cavern operators would benefit from revisiting the safety and process protocols of non-workover field activities, as they may overlook risk factors that are not necessarily evident from other well-site work with reduced footprint or manpower requirements.

Key words: Cavern Operations, Cavern Testing, Corrosion, DOE (Department of Energy), Gulf Coast of the U.S. and Mexico, Leak, Louisiana, Mechanical Integrity, MIT (Mechanical Integrity Test), Strategic Petroleum Reserves, Storage Cavern, Texas, Well Cement Evaluation, Well Logging