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MIT Program Improvements for Crude Oil Storage Cavern Access Wells at the Strategic Petroleum Reserve

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Abstract

The Strategic Petroleum Reserve (SPR) Mechanical Integrity Test (MIT) Program for crude oil storage cavern access well evaluation has recently been redesigned. The previous MIT process plan had changed little since put into practice in 1984. The SPR Management and Operations (M&O) contractor Cavern Integrity Department initiated a project to identify potential process deficiencies and enhance well integrity procedures. By refining the SPR well integrity testing principles, implementing consistent field practices, improving nitrogen interface test calculation precision for gas leak detection and developing diagnostic analyses methods that assist in results interpretation and validation, the MIT Program has been dramatically improved and the preservation of long-term integrity of SPR wells has been reemphasized. This paper presents the fundamental principles of integrity testing consistent with applicable regulatory requirements, field practice modifications promoting test process efficiency, modifications made to nitrogen leak rate calculation methods and an introduction to simple diagnostic analysis tools for the evaluation of test results. In addition, example cases are provided where diagnostic analysis methods would prove beneficial to the results evaluation process. By refining the MIT Program at, 40 cavern access wells across 22 caverns have been successfully and reliably evaluated since implementation in 2017.

Key words: MIT (Mechanical Integrity Test), Nitrogen Interface Test, Caverns for Liquid Storage, Strategic Petroleum Reserve, Dormal Salt, Well Integrity, Regulatory Compliance

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