

Implementation of technical requirements for improving well integrity of underground storage facilities in Europe

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Abstract

Storage caverns which were built starting in the 1970s and 1980s have now reached an operating time of more than 30 years. As a result of the high number of European storage caverns in operation and especially due to their gradually reached design life time, well recompletion is an issue for cavern operators which becomes more and more important. After decades of use there is a potential need to replace the downhole equipment in storage caverns by subsurface installations according to the current state-of-the-art.

Besides technical progress, also increased safety requirements and focus on well integrity leads to a significant need for cavern well assessment. Furthermore, incidents which occurred at oil and gas storage caverns in Europe were followed by a more emphasized focus on well integrity of underground storages for gas and oil. This resulted also in the recent update of the technical standards *DIN EN 1918 Gas infrastructure - Underground gas storage* and *API Recommended Practices 1170 / 1171*. In general, ensuring the well integrity is more prioritized – demanding for e.g. double-barrier-systems, subsurface safety valves, well integrity assessment and risk analysis.

For these reasons, technical requirements and considerations for underground storage facilities have been reviewed within cavern industry. This is accompanied with the necessity for recompletion of underground storage facilities with the aim to improve the overall well integrity. The paper highlights technical options for recompletion of storage cavern wells to achieve the current state-of-the-art and to fulfill newly set technical requirements.

Key words: storage operation, gas caverns, design lifetime, flooding, recompletion, well integrity,