

Gas Storage – Well Integrity Solutions to Ensure a Safe Environment

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Germany is Europe's established leaders in underground gas storage, possessing active working gas capacity of 1,326bcf., citing Emden, Rehden and Etzel ESE as the major active underground gas sites. With high capacity and capability to operate gas storage wells, comes the need to ensure that such wells are monitored and maintained to optimal well integrity calibre meeting regulatory HSE standards. For Astora as prudent operator well integrity is critical to the safety and injectivity performance of gas storage wells, ensuring well control with sufficient barriers, avoiding geo-fluid slippage and damage to the environment and the inhabitants. Meeting regulatory safety requirements both internal and external integrity must be considered, periodically monitored, and evaluated to ensure timely intervention. This paper examines internal integrity in the form of well tubulars and external integrity of fluid movement external to the production casing/ casing strings, including how to safely permanently plug and abandon wells at end-of-life utilising specialist downhole technologies that have recently been deployed in Germany for diagnosis and preventative measures.

Internal Borehole Integrity - Tubing and Casing – Inevitable over time material degradation, exposure to harsh environment and vertical stress changes (reservoir de-compaction) results in corrosion. Eroded, corroded, or damaged tubular strings have potential to lead to the creation of leak paths, hence fluid can migrate through the barrier(s), or reduce the maximum pressure the tubulars can hold without burst or collapse.

Solution – Downhole electromagnetic thickness imagers enable gas storage well Operators to assess casing barriers and wall thickness. Including level of corrosion present, prognosis future corrosion and rates to indicate correctly when to intervene mitigating integrity issues. Such surveys are utilised to calibrate the aging models the Operators utilise in calculating the MAASP/M(AW)OP levels.