

## **Use of resistivity borehole imaging to assess the structure, sedimentology and insoluble content of the massively bedded Preesall Halite NW England**

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### **Abstract**

Solution mining of salt caverns for gas storage is likely to become an important part of the UK's energy infrastructure. Assessing the stratigraphy of a salt deposit is essential for quantifying its economic prospectivity for developing gas storage solution caverns. Two attributes are critical for this: the thickness of any intra-halite mudstone intervals that could affect the cavern stability / sealing and the thickness and purity of the halite intervals which strongly influence the economic viability of the deposits.

The stratigraphy and lateral continuity of a sequence can only be assessed either by direct means (i.e. coring) or indirectly by geophysical borehole logs. The use of "traditional" geophysical logs in subsurface exploration is well established but these have a very low resolution with a typical vertical logging sample interval of 6 inches, meaning that these tools provide, at best, a generalised view of the stratigraphy penetrated by the borehole.

This paper highlights Halite-Energy Group's innovative acquisition and application of resistivity borehole imaging tools characterising the Preesall Saltfield succession, NW England. Such tools have been widely used in the hydrocarbons industry for nearly 20 years but their potential value has yet to be fully recognised in the solution mining industry. This paper describes the first application the Schlumberger's FMI™ tool to a detailed understanding of the sedimentology, stratigraphy and structure of the Preesall Halite succession.

In addition, this tool has allowed the development of a completely new technique to statistically quantify the proportion of insoluble (mud) content in the halite. This will allow a more accurate calculation of a planned caverns sump area and working volume, thereby helping to assist in maximising the efficiency of cavern design and construction.

**Key words:** Caverns for Gas Storage, Geology, Geophysics, geophysical logging, borehole imaging, United Kingdom