

## **Solution Mining with Two Boreholes for Gas Storage in Zuidwending, the Netherlands**

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### **Abstract**

In the north-east of the Netherlands, Gasunie Zuidwending B.V. (GU), a subsidiary of NV Nederlandse Gasunie, is currently realizing the gas storage project “Aardgasbuffer Zuidwending”. The project is located on the Zuidwending salt dome, approximately 30 km east of Groningen, in direct vicinity of the existing cavern field operated for salt production by Akzo Nobel Salt (AN). Six gas storage caverns in Zechstein rock salt are either already gas-filled or under construction. Brine from the GU project is delivered to AN for further saturation in their salt production caverns and serves as commodity for the AN salt factory in Delfzijl.

To achieve high gas injection and withdrawal capacities, GU decided to drill two boreholes for each cavern. In the first four caverns equipped with two wells, the leaching was performed through one well. During the leaching phase, the second well was filled with nitrogen to protect the open hole section directly underneath the casing shoe from leaching. The second borehole was used for sonar surveys during leaching.

For the realization of the fifth GU cavern, a different operational approach has been chosen in which both wells are used for the leaching process. Fresh water is injected into one well and the same borehole is used for moving up the blanket in preparation of new leaching steps. The other well is used for brine extraction.

The present paper describes particular observations, operational measures, advantages, disadvantages and ‘unexpected’ events which occurred during the solution mining with focus on the “two boreholes” design.

**Key words:** Leaching technology, two boreholes, The Netherlands, Zechstein Salt, Brine concentration, borehole connection, blanket management.