

## **NEW INSIGHTS IN SALT MINING POSSIBILITIES CLOSE TO THE EASTERN NETHERLANDS REGIONAL BOEKELO FAULT ZONE**

Tjeerd Koopmans\*, Marinus den Hartogh\*\* and Maaïke Broos\*

\* MWH, Arnhem, The Netherlands

\*\* AkzoNobel Industrial Chemicals, Hengelo, The Netherlands

### **Abstract**

Since 1918, AkzoNobel has been mining salt from brine fields located in the eastern Netherlands near the cities of Hengelo and Enschede. Using solution mining, Triassic Röt salt is being mined from caverns at depths ranging from 300 to 500 meters. To secure the continuation of salt mining on the long term, AkzoNobel is investigating several expansion zones located close to the present brine field. Salt mining in these areas should cover the time span of approximately 5 years until salt mining in another concession area is anticipated to commence.

A west-northwest to east-southeast trending regional fault zone, the so-called Boekelo fault zone, forms the south-western border of the present brine field. A detailed geological study has been conducted to obtain further insight into salt mining possibilities close to this zone. Geological models were developed using high quality source information including very accurate information from 60 boreholes and detailed interpretations of over 80 kilometers of seismic lines. During the seismic interpretation study specific attention was paid to the fault characteristics in order to delineate potential exclusion zones for salt mining.

From the seismic study and the results of the following geological modeling it was concluded that the fault zone can be divided into three distinct parts, an easternmost part, a middle part and a western part, even though the length of the fault zone within the study area is only about 6 kilometers. Large differences are observed between these three areas, for example with respect to the width of the disturbed zone, the offset along the fault and the relative movement of the north-eastern and south-western fault blocks. Explanations for these strongly differing characteristics can be found in the presence of thickened Zechstein salt deposits (and adjacent rim-syncline) located several kilometers southwest of the fault zone. These salt deposits may have absorbed extensional and compressional movements during several tectonic events. The many fault activity cycles and the nearby presence of the major Gronau fault zone may have played a role as well.

Based on the detailed study of the fault zone, it was concluded that salt mining too close to the fault zone should be avoided as salt deposits are disturbed. The fault zone was delineated, distinguishing an inner zone with heavily disturbed Röt salt and adjacent zones in which salt deposits still appear to be present in bedded form. The reliability of this delineation differs per area depending on seismic coverage.

Future research, consisting of different geophysical observation techniques and drillings, will focus on further determining the extent of disturbed and undisturbed bedded salt deposits in those areas where Röt salt mining is deemed potentially interesting based on depth and thickness.

**Key words:** The Netherlands, Geology, Bedded Salt Deposits, Cavern Development, Seismic