

Characterisation of Ypresian clays in Belgium with reference to geophysical well logs

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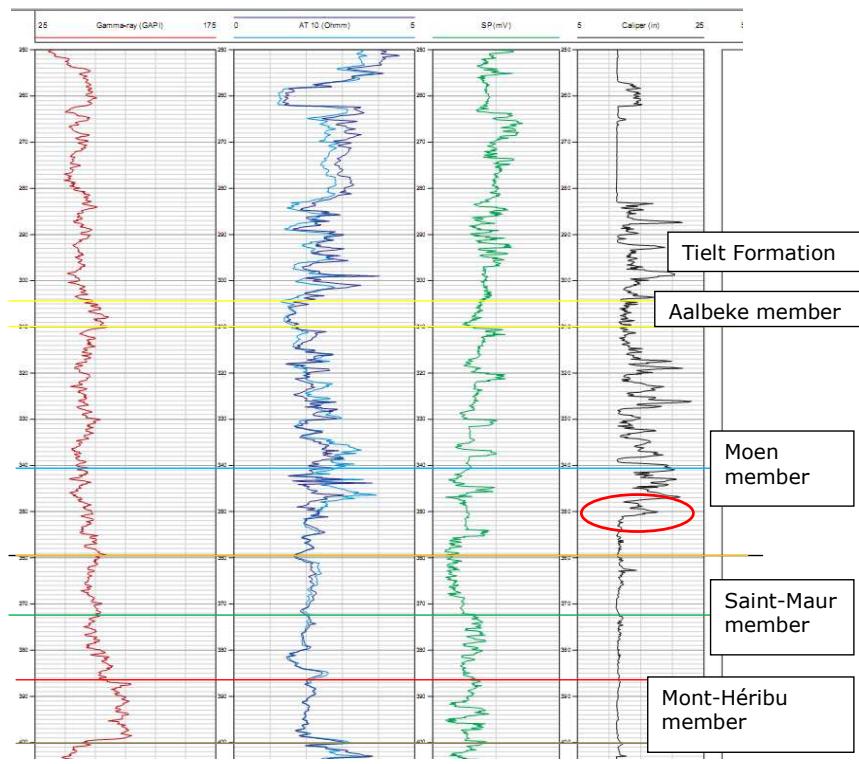
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For the long-term management of high-level and/or long-lived radioactive waste, the Belgian Agency for Radioactive Waste and Enriched Fissile Materials (ONDRAF/NIRAS) advises deep geological repository in a plastic clay host rock. Since the seventies, Oligocene Boom Clay has been extensively studied for this purpose and is, in the Belgian context, considered as the reference host rock with Mol as the reference site. The alternative host rock, the Ypresian clays, has been studied for their basic properties, from the late nineties onwards, with Doel as reference site. Two drilling campaigns, carried out in the framework of potential radioactive waste disposal at Doel and Kallo, allowed to collect new data and describe the Ypresian clays. Unexpected breakouts in the Ypresian clays were however noticed on caliper logs on both wells, registering changes in diameter of the bore-hole over restricted vertical intervals, mainly in the Roubaix/Moen Member. ONDRAF/NIRAS entrusted the GSB with a study in order to determine if this feature was restricted to a stratigraphic interval, related to a region, or mechanically induced and to find out about the cause.

Borehole breakouts represent changes in borehole geometry caused by a rotating and down cutting drill bit under normal operating conditions, hence linked to lithological - geotechnical characteristics and the stress regime of the geological formation. An overview of the geophysical well logs showed that breakouts were widespread but also quite different between the wells: not always observed, nor over the same stratigraphical interval nor over a comparable vertical section. They seem linked to the mixing of the different granulometrical and mineralogical components of the Ypresian clays. This unexpected phenomenon necessitated a revision of the electrical lithostratigraphy of the Ypresian clays.



A large increase of the diameter above the base of the transition silt - clay
Example : Kallo – 14E0355