

FRISIA SALT Netherlands; Deepest squeeze mining in the world

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Abstract

Frisia Zout BV via ESCO part of the K+S Group in Germany will establish the deepest solution mining programme in the world in a new subsea permit area called Havenmond (Harbor mouth). The project will be marginally deeper than ARKEMA's salt mining in Vauvert in France and the existing Frisia salt mines.

The Havenmond development will require ca. six km along hole directional wells, drilled from the factory premises at the Harlingen harbour with a lateral outstep of ca. four km underneath the Waddenzee and a true vertical depth of 3.2 km. The requirement for these extreme wells is driven by subsidence considerations that dictate that the subsidence bowl after mining ca. 32 million tonnes through four Havenmond caverns will not affect the main sea dikes.

Frisia has built up confidence for this project from drilling and production experience with a highly deviated land well BAS-3 drilled in 2003, in production since then and planned to be sidetracked in 2012.

This paper will cover the experience to date with salt mining in the different production permits and via the BAS-3 well in particular, the well engineering challenges, the cavern behaviour during mining, subsidence effects of mining for the Havenmond project and general rationale why such wells can economically be applied for salt mining.

Key words: Cavern Operation, Subsidence, Surveying, Well Design, Drilling and Completion, Abandonment, Zechstein, The Netherlands