

The history of DCP storage cavern Schoenebeck

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Abstract

The salt cavern Schoenebeck has a long-lasting and changeable history, from an initial brine production cavern to a temporary underground waste-storage.

Originally, the cavern Schoenebeck was used to flood underground mine workings of the former rock salt work Moltke shaft. Flooding this mine with an open mine workings volume of about 1.2 Mio. m³ demands a leached cavern volume of approximately 200 Tm³. In 1971 a cavern well was drilled into a 130 m thick rock salt layer in the neighbourhood of the mine. The total depth of the well was 475 m. From 1974 to 1983 a cavern has been leached in a depth range between 395 – 465 m. The total cavern volume was 233 Tm³. Beginning in 1977, an increasing potash fraction of the brine has been observed during leaching operation reaching a 30 % mineralization of the brine at the end of brine production. An increasing blanket-loss occurred with a total volume of 600 m³ oil. The final ultrasonic survey could capture just 80% of the leached volume therefrom at least 40% were filled by insolubles.

In the next stage the cavern Schoenebeck was used as interim storage of Dichloropropane (DCP) which was coming up from the chemical production of polypropylene in Buna. The overall stored volume was 50 Tm³. In 1995 the DCP-storage was finished and the DCP has been pneumatically withdrawn from the cavern. To avoid an impact of the hazardous DCP on the environment an intensive investigation program (consisting e.g. of an extensive ultrasonic survey, pressure build-up tests and rock-mechanical modelling) has been performed to demonstrate the long term stability of the closed cavern system.

The decommissioned cavern was finally filled with compressed air and a residual brine volume of about 50 Tm³. The cavern and the borehole were abandoned by a tight sealing, installation of a barrier plug and cementation.