

## **BRINE DISPOSAL/STORAGE OF BRINE IN UNDERGROUND MINING COMPARTMENTS – A CASE STUDY**

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### **Abstract**

The purpose of this paper is to present the results of a case study where brine from a water treatment plant (WTP) was disposed of in an underground coal mining compartment.

New Denmark Colliery (NDC) has had excess mine water since shortly after it commenced mining. This water is saline with high sodium, chloride, sulphate, calcium, magnesium, and fluoride concentrations. The mine has been coping with this problem through various methods. Many options for influx minimisation have been considered (Hodgson, 2001). A number of potential long term mine water management strategies were identified and are being investigated through ongoing work. This project deals with the groundwater impact assessment of Compartment 321, to back-analyse the past underground disposal of brine from the Water Treatment Plant (WTP), which is one of the strategies investigated. The disposal of brine in an underground mine, as applied at New Denmark Colliery has not been implemented at any other sites in South Africa or internationally. Therefore the approach is novel and if it can be demonstrated to be an effective manner of brine disposal with an acceptable level of environmental impact, could hold great potential as a brine disposal technology.

It was concluded that if Compartment 321 is flooded with brine, sealed off and the overlying goaf saturated (i.e. recovery of groundwater levels) lateral groundwater movement will depend on the flooding status of neighbouring compartments. Assuming that all brine concentrate can be contained in Compartment 321 until mining ceases, groundwater contamination is limited to diffusion from the brine into the saturated goaf above the compartment.

**Key words:** Brine disposal/storage, coal mine, mine water management, groundwater impact assessment