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Geochemistry of the underground coal gasification cavity at the Majuba pilot plant in South Africa

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Underground coal gasification (UCG) is an innovative technology that aspires to exploit coal reserves that are not minable by current extraction technologies. The gas that is produced can be used for energy production and other chemical processes. Underground coal gasification produces an underground cavity which may be partially filled with gas, ash, unburned coal and other hydrocarbons. In this study we assessed the geochemistry of the cavity and the chemistry of the groundwater in the cavity. The chemistry of groundwater was influenced by surface water that was introduced into the cavity during quenching. This also had an effect on the geochemistry of the cavity as a whole. The coal seam aquifer had saline water that is not fit for human consumption even before gasification.