

## **IMPACTS FROM SURFACE MINING ON GROUND-WATER SYSTEM: A TWENTY-YEAR RECORD<sup>1</sup>**

by

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**Abstract.** Groundwater impacts from a surface lignite mine in east-central Texas have been predicted and monitored since 1974. Minimal impacts on groundwater quantity and quality were predicted. Because aquifers in the mine area have very low permeabilities, volumes of groundwater to dewatering pits and reclaimed spoils were expected to be small. Potential groundwater contamination was predicted to be insignificant because of the geology of the area. Seeping to and dewatering from the mine pits were predicted to prevent any potential contamination because the flow would be toward the mine pits. The predictions made are proved correct. Groundwater depletion and recovery have been observed in six mine blocks. Compaction of the spoil is heterogeneous. The bottom of the spoil deposit has higher porosity and permeability causing rapid resaturation and preferential flow. Groundwater recovery rate is predictable, reaching a steady-state condition within 7 to 8 years after reclamation begins. Examination of the geochemical evolution of groundwater in spoil aquifers reveals many trends. Most ion concentrations exhibit an increasing trend until groundwater recovery is complete. After that the ion concentrations decline as groundwater is flushed and reacting minerals precipitate. The groundwater quality monitored is not abnormally higher than state groundwater standards.

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