

Dewatering and slope stability in a tropical lignite mine, Neyveli, Tamil Nadu, India

Project Location:	Neyveli, Tamil Nadu, South India
Client(s):	KfW Bankengruppe, Frankfurt (German Development Bank)
Date Completed:	1975
Project Budget:	\$ 40,000



Ground water discharged by submersible pumps.

Project Summary

The Neyveli Industrial Complex processes mined lignite. At the time of the study, lignite production was to be doubled with development capital provided by the German Government through KfW Bankengruppe. The significant extension of production and the associated increased speed of mining necessitated an assessment of concepts and methods hitherto applied in dewatering and excavating the mine.

By use of ground data and satellite imagery (ERTS E-1110-04334-7-01), it was determined that the mine pit was located in a large recharge area, while some of the future open pits were to be located in a major discharge area. The groundwater chemistry in the recharge area was dominated by lateritic weathering. Evaporation of groundwater at newly opened faces led to cementation of unconsolidated material by precipitation of Al and Fe minerals within hours of mining the face. This caused problems for the operation of bucket wheel excavators and additional special mining equipment had to be applied.

Services Provided

- * Hydrochemical and hydrodynamic investigation of the mine proper and the wider surrounding area, based on available data, additional drilling, and evaluation of ERTS satellite imagery.
- * Determination of the reasons for the existence of unusually hard consistency and steep overburden slopes at the mining faces of the open pit walls

Deliverables or Results

- * Preparation of a report on findings with recommendations on groundwater-dependant improvement of mining within the existing open pit.
- * Recommendations on the soft consistency of mining faces in the newly planned open pits within the nearby groundwater discharge area. There, the chemistry of the groundwater was dominated by major ions. Evaporation of this groundwater at the open pit walls would not lead to cementation of the unconsolidated overburden. Hence a different set of mining equipment would have to be acquired for efficient mining of the new pit. Upon opening of the new open pit these predictions proved to be correct.