Artificial Recharge of Groundwater in Mining

Mine & Water

Water is required in mining operations

Groundwater accompanied frequently mine activity

Mine water must be abstracted through drainage wells, pumping stations and galleries

Objectives of artificial recharge

The required protection of aquifers from contamination and depletion

The convenience of water storage to meet the demands for different uses

The increasingly stringent regulations on water resources for sustainable development

Mining is the only industrial activity producing water

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Mt Newman
Pilbara, Western Australia
Openpit Iron Mine

Newman town

Ophthalmia Dam

Recharge: 7,9 Mm³/year
Recharge period: 190 days/year
Infiltration: 20 cm/day (storage dam)
4 cm/day (fluvial dam)

Carlin Trend
Nevada, USA
Gold Mine

Preventive in advance drainage
Internals & perimeters drainage pumping wells
Total pumping yield: 3,670 l/sec

Water utilization
• 5 % Mine requirements
• 10% Irrigations 2,000 hectares (in increasings)
• 85% Reinjection into the aquifer through:
  • deep wells
  • recharge dams
Drenage

Reinjection

Las Cruces
Sevilla, Spain
Copper Openpit Mine

Cross Section

Water Protection System

Aquifer Protection

Piezometric map

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Porto Trombetas
Pará, Brazil
Bauxite Openpit Mines

Solo orgânico (0,5 m)
Argila amarela (10 m)
Bauxita nodular (2,5 m)
Laterita (1,0 m)
Bauxita maciça (4,0 m)
Silte / argila com lentes de arenito (> 80 m)