

Mining Wastewater Treatment & Recycling System Case Study

CURRENT SITUATION ANALYSIS

Wastewater generated from phosphate ore preparation and beneficiation processes has a variable character due to high suspended solids, phosphate compounds, and dissolved minerals. Especially during rainy periods, high turbidity and sudden flow increases can occur.

The existing treatment system could not provide the required water quality for process water reuse under changing load conditions. As a result, a significant amount of water was discharged and fresh water consumption increased. Therefore, there was a need to increase the water recovery rate and reduce dependence on water resources.

TECHNICAL SOLUTION APPROACH

Within the scope of the project, the characteristics of phosphate mining wastewater and operating conditions were carefully evaluated, and a multi-stage treatment and water recovery system was designed to ensure stable performance under high suspended solids and changing flow conditions. The system was developed with a modular structure to allow future capacity increases.

The technical solution includes thickening and chemical clarification as pre-treatment stages, followed by special glass media filtration, ultrafiltration (UF), and reverse osmosis (RO) systems to produce high-quality recovered water. Automatic chemical dosing and a central automation system provide reliable and continuous operation under changing raw water conditions.

Vatek provided a turnkey solution covering process design, equipment selection, mechanical and electrical integration, site installation, commissioning, performance tests, and operator training. After commissioning, optimization studies ensured the target water quality and recovery performance in a sustainable way.



PROJECT INFORMATION



Phosphate Mine Wastewater
Treatment and Water
Recycling System



5000 m³/day



Jordan



Mining Industry - Phosphate
Mine



Adaptation to
Variable Water
Characteristics



Customized Design



High Water Recovery
Rate



Stable and Continuous
Operation



Operational Robustness

Mining Wastewater Treatment & Recycling System Case Study

ACHIEVED RESULTS



After the project, high suspended solids and phosphorus removal were achieved, providing stable effluent quality and reliable operation under changing load conditions.

A water recovery rate of 75-90% was achieved across the plant, significantly reducing fresh water consumption. Optimized energy and chemical usage also helped reduce operating costs.

By reducing discharge volume and improving resource efficiency, environmental impact was minimized and sustainable water management goals were supported.



KEY RESULTS



< 1 mg/L

Total Phosphorus (TP)



< 100 μ S/cm

RO Product Water Conductivity



≈ %75-90

Water Recovery Rate



STABLE OPERATION

Under Variable Raw Water Conditions

