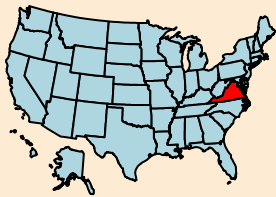


Mining & Primary Metals, Northern West Virginia, USA

MINING COMPANY: ZLW Facility



ZERO LIQUID WASTE (ZLW) FACILITY



West Virginia
USA

CONTRACT SCOPE

Site: Northern West Virginia
Scope: Design, Build, Operate (DBO)

CONTRACT DATA

Duration: 10 years

ACTIVITY SECTOR

Mining & Primary Metals
Mine water treatment

EXPERTISE

- Zero Liquid Waste (ZLW) system
- Water Impact Index measurement (WIIX)

The challenge

The coal mining industry is now faced with new regulatory requirements that limit the discharge of chlorides into receiving streams. The project was undertaken to meet a new regulatory limitation imposed by the West Virginia Department of Environmental Protection for chlorides discharged to surface waters.

Veolia's solution

Veolia entered into a DBO contract with a mining company for its mine water treatment facilities. Veolia designed and built a 3,500-gpm centralized Zero Liquid Waste (ZLW) system using advanced treatment technologies. The system will generate clean water for reuse in various energy endeavors or for discharge to the environment, with no residual waste from the treatment process leaving the site.

The system is designed to treat a maximum flow of approximately 5 million gallons per day of mine water from six remote sites to comply with a monthly average discharge limit for chlorides. Veolia uses a combination of water softening, chemical precipitation and multimedia filtration with reverse osmosis and evaporation/crystallization to treat 1.83 billion gallons (6.96 billion liters) per year. Solid waste from the operations is non-hazardous and is disposed in an on-site landfill.

**1.8 billion gallons
per year of mine
water**

**9,300 tons of
chlorides
removed**



The benefits for our client

The process utilizes state-of-the-art membrane treatment to achieve the discharge criteria, and evaporation and crystallization technology to manage the brine from the water treatment process. As a result, the system creates clean water for discharge while generating zero liquid waste. The desalinated water can be used for various energy endeavors or discharged back to the receiving stream.

The residuals from the treatment process, including softening sludge and mixed salts, are concentrated into a solid waste that is disposed in a landfill on site. As a result, no residual solid waste from the water treatment operations leaves the property.

To provide an accurate measure of the benefit provided by the facility, the Water Impact Index was applied. The Water Impact Index is a comprehensive water footprint indicator developed by Veolia. It integrates all the aspects of the water cycle, including water quality, water availability in the local environment, and volume to provide an accurate measure of environmental benefit. The study showed that the treated discharge from the facility will ultimately improve the water quality of the Monongahela River.



PLANET

Veolia has developed (WIIX) a comprehensive water footprint indicator that integrates all the aspects of the water cycle, including water quality and availability in the local environment. By combining the Water Impact Index with carbon footprinting and economic evaluations, an improved measure of total sustainability is achieved.

Process description

The facility integrates chemical precipitation, reverse osmosis and thermal technologies developed by Veolia to maximize the recovery of clean water for return to the environment.

Key stages of the process :

- Pretreatment with softening and precipitation chemistry
- Clarification and filtration polishing
- Sludge dewatering
- Reverse osmosis (RO)
- Pretreatment of the RO reject with softening and precipitation chemistry
- Evaporation of the softened RO reject
- Crystallization of the brine stream
- Crystallizer solids dewatering
- Remineralization of the combined RO permeate and evaporator distillate prior to discharge to the environment

>85% of the chlorides are removed to meet a monthly average permit limit of <218 mg/l

