Innovative Process Solutions

Zero Liquid Discharge (ZLD)
Why Zero Liquid Discharge?

Water shortages and increasing concerns for environmental impact from industrial use place a high degree of importance on recycling and reuse of this valuable resource.

Environmental awareness and regulation, coupled with water conservation efforts worldwide, are putting progressively strict limits on aqueous discharge and wastewater treatment.

Management of the entire water cycle for industrial applications drives efficiency and innovation towards zero liquid discharge (ZLD) in nearly every major industrial application.

Technical Expertise for ZLD

HPD, with over 60 years of experience, has grown into the largest provider of custom-engineered evaporation and crystallization technology in the world. Experience over a wide range of industries allows for innovations gained from one market to be utilized in other applications.

This expertise extends to the fully integrated systems for zero liquid discharge, supported by a total project solution that includes:

- Worldwide Design-Build project execution
- State-of-the-art, 50,000 sq. ft. Research & Development facility
- A part of Veolia Water Solutions & Technologies, the world leader in water and wastewater technologies

Case Study

Qatar Shell GTL Limited  Ras Laffan Industrial City, Qatar

The Pearl project is the world’s largest Gas-to-Liquid (GTL) project with outputs of GTL products, condensate, liquefied petroleum gas, and ethane.

Veolia Water Solutions & Technologies was selected to provide an environmentally sound water treatment complex to treat the effluents with the highest efficiency of water reuse within the plant with no aqueous discharge.

HPD provided the evaporation and crystallization process design for the zero liquid discharge system to minimize waste volumes from the overall process and concentrate the effluent stream to a solid residue. The plant will rely on the water recovered from this system as a major portion of the overall makeup demand.
HPD’s innovative process solutions for evaporation and crystallization are demonstrated through decades of industrial projects executed on a worldwide basis.

This same level of expertise is reflected in the experience for **Zero Liquid Discharge** and volume reduction applications across several industries:

- **Power Generation**
  - Combined-cycle power plants
  - Flue Gas Desulfurization (FGD) effluent treatment
  - IGCC wastewater
  - Radwaste
  - Chemical Processing

- **Oil & Gas**
  - Oil & Gas refining
  - SAGD (Steam Assisted Gravity Drainage) produced water
  - Synfuel production
  - Landfill Leachate
  - Other industrial effluents

- **Chemical Processing**
Located in southwest Phoenix, this natural gas-fired, combined-cycle power plant generates nearly 1,000 megawatts of electricity for the Southwestern United States.

HPD supplied a ZLD system designed to treat the plant’s effluents and produce high quality condensate for boiler feed water. A single, 500 gpm falling film evaporator recycles a majority of the water back into the process. This is followed by a 15 gpm brine crystallizer that concentrates the effluent solids to dry cake for landfill disposal.
Bayswater Power Station, a 4 x 660 MW generation facility, is a vital producer of electricity for the people of New South Wales and is located 250 km north of Sydney. Veolia Water Solutions & Technologies was awarded the project for an overall plant upgrade of the entire water plant including optimization of the existing ZLD system.

As part of this project, HPD provided much needed process and equipment modifications to the brine concentration system to increase salt removal and treatment capacity. An additional falling film evaporator was integrated into the system to control operating conditions with a resulting improvement in power consumption, increased process efficiency, and extension of current equipment life.

A brine crystallizer was also incorporated into the process to remove more water from the waste stream to reduce the overall volume directed to the existing on-site brine decant basin.
HPD is a global leader for innovative process solutions utilizing evaporation and crystallization as core technologies. In addition to providing evaporation and crystallization process designs, HPD supplies fully integrated water and wastewater treatment facilities on a design-build basis.

Operating globally, HPD has delivered proven, custom engineered solutions to the Metals & Mining, Chemical Processing, Pulp & Paper, Power Generation, Salt, Fertilizer, Chlor-Alkali, Biofuels, Oil & Gas, Soda Ash, and Chemical Processing industries.

HPD is a subsidiary of Veolia Water Solutions & Technologies (VWS), the global leader in unique water and wastewater solutions worldwide.