

ZERO LIQUID DISCHARGE

CASE STUDY

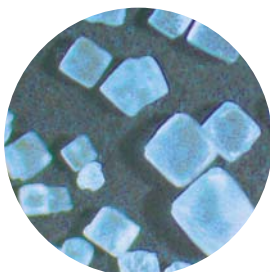
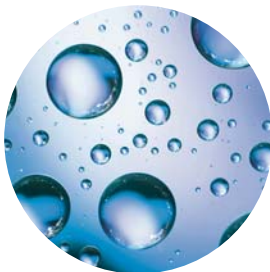
Deuel Vocational Institution – Tracy, CA U.S.A Zero Liquid Discharge System for Drinking Water

The Client

The mission for Deuel Vocational Institution (DVI) is two-fold: DVI's primary mission is a reception center for Northern California counties, and houses inmates who come to DVI primarily from nineteen Northern California county jails.

DVI's secondary mission is to provide general population housing to inmates who are serving their prison sentence at DVI.

Deuel Vocational Institution is part of the California Department of Corrections and Rehabilitation (CDCR).



Project Description

The California Department of Corrections and Rehabilitation (CDCR), in an effort to comply with the State of California requirements for drinking water quality and wastewater effluent quality, undertook an improvement project at Deuel Vocational Institution (DVI).

This facility upgrade would not only improve the quality of drinking water supplied to DVI, but would also provide an environmentally sound solution to optimize groundwater usage that allows no aqueous discharge from the treatment system.



The Client's Needs

A study was conducted by an environmental engineering firm to design a suitable treatment system for the groundwater currently used as the potable water supply for DVI. Reverse Osmosis (RO) was determined to be an effective technology in meeting the applicable standards for water quality. The RO system would remove total dissolved solids (TDS), iron, and manganese from the brackish groundwater originating from wells that supply DVI.

However, the quantity of concentrate from the RO system posed a challenge to minimize the impact of this stream. It was determined that a Zero Liquid Discharge (ZLD) system was the only acceptable option to successfully meet the mandates regarding the elimination of system wastewater effluents.



Solutions & Technologies

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The Solution

The solution to reduce the volume of the RO concentrate was utilization of evaporation technology to minimize waste of this wastewater effluent stream and recover additional treated water. The reduction in wastewater volume allows for effective management of the material in four, small evaporation ponds to comply with the State of California's Zero Liquid Discharge (ZLD) mandates.

Veolia Water Solutions & Technologies was selected to provide HPD® brine concentrator system (BCS) technology for this project. This technology is a key component in maximizing water recovery from the primary treatment waste stream.



Process Description

The entire treatment system is designed to treat 800,000 gallons of water per day of brackish groundwater from four wells on the facility grounds. A three-step filtration process is used prior to the primary treatment in the RO system. The filtered and pretreated raw water enters the RO system where dissolved salts are rejected and permeate is sent to post treatment for final distribution to DVI as potable water.

The resulting concentrated reject from the RO system is then sent to the HPD-BCS where up to 250 gallons per minute of concentrate is processed in a single-stage, falling film evaporator. The BCS reduces the volume of this wastewater effluent stream by ~98% and returns high-quality distillate to post treatment where it is blended with the RO permeate.

The HPD brine concentrator uses seeded-slurry, falling film evaporation technology. It is driven by mechanical vapor recompression (MVR), which optimizes energy efficiency.

The Results

The HPD brine concentration system, designed and supplied by Veolia Water Solutions & Technologies, was commissioned in the spring of 2009. The system has proven performance beyond design requirements.

The high-quality distillate produced from treatment of the reverse osmosis reject is blended with the RO permeate for use as potable water.

The product water from the brine concentration system is significantly below the required 10ppm non-volatile TDS (total dissolved solids).