Civil & Environmental Consultants, Inc.

Advanced Water Treatment Process

CEC's Advanced Water Treatment Process (AWTP) converts contaminated effluent for beneficial re-use, including human consumption, by industrial, mining, or agricultural operations, in contrast to discharging treated effluent water to a POTW or into the environment.

The AWTP is a new wastewater recycling process that utilizes a combination of reverse osmosis, microfiltration, and a fully automated proprietary process to recycle more usable water and generate less reject water than standard reverse osmosis or multi-stage reverse osmosis with chemical treatment.

This advanced design means the AWTP can operate within a wide range of water quality conditions and can treat wastewater, groundwater, reclaimed water, or potable water. Utilizing the AWTP system can lead to a reduction in operation and maintenance (O&M) costs and a reduction in the amount of reject water that requires further action and associated costs.

The major application of the AWTP is to support a separate, emerging proprietary remedial technology called Accelerated Remediation Catalysis (ARC). ARC can very effectively destroy dissolved-phase contaminants and precipitate metals, but has some practical limitations addressing anions like sulfate and chloride.

Unless the effluent will be discharged to a publicly owned treatment works (POTW) or into the environment, the AWTP can meet standards for beneficial re-use classification. Further, the AWTP system may have a critical function at some mining sites for the management of anions like sulfate, where it can function as a stand-alone application.

The enhanced technology of the AWTP is based on three key features:

BRINE MEMBRANES

Brine membranes can tolerate a higher concentration (several thousand ppm) of total dissolved solids (TDS) in the feedwater stream than standard membranes, making them less susceptible to fouling and increasing the amount of water recovered as compared to standard membranes.

AUTOMATED RECYCLE OF PERMEATE

Though less so, brine membranes are still susceptible to fouling as operational time increases, which increases the operating pressure on the feedwater side of the membranes. A sensor continuously monitors that pressure and, when necessary, will interrupt the flow of process water feed. Clean permeate water will then be recycled to the feed connection to flush the foulants from the membrane surface, increasing the flux rate of water across the membranes which, in turn, increases the operational lifetime of the membranes. This recycling reduces the O&M costs associated with frequent membrane replacement.