

## **Desalination and Water Purification Research Program**

### **Research Laboratory-Scale Projects – one year projects**

#### **Subsurface Intake Study for Ocean-Water Desalination; West Basin Municipal Water District, California**

**Reclamation Funding: \$150,000**

**Total Project Cost: \$622,000**

West Basin Municipal Water District will be implementing a field study using a guidance manual they have prepared in order to test the viability of an ocean-water desalination subsurface intake. The district has conducted a research desktop study on available or soon-to-be available subsurface seawater intake technologies. The purpose of the study is to better understand available seawater intake technologies so as to reduce environmental impacts associated with full-scale ocean-water desalination.

#### **Advanced Pretreatment for Nanofiltration of Brackish Surface Water: Fouling Control and Water Quality Improvements; University of Houston, Texas**

**Reclamation Funding: \$150,000**

**Total Project Cost: \$202,698**

Brackish surface waters typically contain higher concentrations of pathogenic microorganisms, turbidity, natural organic matter and disinfection by-product precursors, in addition to carcinogenic or mutagenic organic chemicals, and toxic inorganic ions when compared to brackish groundwater. Membranes are amongst the best available technologies for treating brackish surface water but fouling often limits membrane performance and increases cost. This study will look to provide the necessary proof-of-concept to scale-up advanced pretreatment and nanofiltration membranes for treatment of brackish surface water to drinking water standards.

#### **Development of Photovoltaic Electrodialysis (PV-ED) Desalination System; California State California State Polytechnic University, Pomona**

**Reclamation Funding: \$99,992**

**Total Project Cost: \$99,992**

California State Polytechnic University, Pomona has developed and constructed a photovoltaic electrodialysis (PV-ED) system and under this project it is targeting to upgrade the unit in order for it to be able to provide between 500 and 10,000 liters/day of clean water for small communities. The work will be focused on characterizing performance, increase automation of the unit, and investigate the photovoltaic capability as a source of power for the ED portion of the treatment system. Testing will be conducted at the Brackish Groundwater National Desalination Research Facility in Alamogordo, N.M.

#### **Activated Sludge Aeration Waste Heat for Membrane Evaporation of Desalination Brine Concentrate: A Bench Scale Collaborative Study; University of Texas at San Antonio**

**Reclamation Funding: \$85,587**

**Total Project Cost: \$97,587**

The topic of this study focuses upon membrane evaporation processes to reduce brine volume. The study will investigate the potential of coupling membrane evaporation with waste heat generated from activated sludge aeration blowers. The San Antonio Water System (SAWS) operates both the water treatment and wastewater treatment facilities for the city of San Antonio. SAWS will be partnering with UT San Antonio for this work to assess the efficacy of this coupling.

**Pilot-Scale Projects – two year projects, second year funded upon successful completion of first year**

**Demonstration of Monovalent Selective Ion Exchange Membranes for Desalination and Reuse Enhancement; New Mexico State University**

**Reclamation Funding: \$199,944**

**Total Project Cost: \$514,478**

The project will pilot-test the newly developed monovalent selective ion exchange (IX) membranes from GE Water (CR671 and AR112B) on a 10-15 gallon per minute electro dialysis reversal (EDR) unit at two test sites: Kay Bailey Hutchison Desalination Plant in El Paso, Texas and the Brackish Groundwater National Desalination Research Facility in Alamogordo, NM. The technical and economic information to be gathered during the proposed project should deliver a ready-to-go practical solution for utilities experiencing reuse and desalination challenges associated with various salinities and concentrate management.

**Pilot Testing Program for the Proposed Camp Pendleton Seawater Desalination Project; San Diego County Water Authority, California**

**Reclamation Funding: \$200,000**

**Total Project Cost: \$5,781,500**

San Diego County Water Authority has completed a series of feasibility and technical studies allowing for the phased implementation of a seawater reverse osmosis (SWRO) project with an initial capacity of 50 million gallons per day (MGD). This pilot test program will focus on testing open ocean intake and subsurface intake option to provide feedwater for an operating large-scale SWRO desalination plant. The pilot testing program will determine variability in water quality from subsurface and open ocean intakes, optimize pretreatment, compare energy use and operating costs for both intake types, establish baseline water quality data for future plant design, demonstrate ability to meet drinking water standards, obtain all information needed for concentrate management, and provide valuable information to the desalination community regarding open ocean and subsurface intake systems.

**Pilot Scale Groundwater Desalter Brine Concentrator Study; Eastern Municipal Water District, California**

**Reclamation Funding: \$131,057**

**Total Project Cost: \$546,683**

Eastern Municipal Water District (EMWD) under this study is proposing to install and operate an advanced water treatment system for brine recovery to test and evaluate physical and chemical parameters under actual field conditions. The system utilizes electro dialysis reversal (EDR) and crystallization seeding to reclaim brackish groundwater in the area of Perris, California. EMWD is proposing to test the technology under three scenarios for a period of three weeks each. This project will allow EMWD to potentially reduce the concentrate (brine) that is disposed of via the Inland Empire Brine Line (IEBL) which is expensive, encountering increasing environmental obstacles, limited capacity, and threatened by in-pipe chemical precipitation which poses significant maintenance and reliability problems.

## **Continuing Pilot-Scale Projects from FY 2013:**

### **City of Corpus Christi Desalination Pilot Study; City of Corpus Christi, Texas**

**Reclamation Funding: \$200,000**

**Total Project Cost: \$1,600,000**

City of Corpus Christi has been dealing with drastic drought conditions over the last decade and this pilot project will aid in exploring a variety of options to optimize the pre-treatment process. These results will form the basis of design for full-scale facility, operating parameters, cost information, and product water quality to assess the feasibility of a seawater and/or brackish groundwater supply.

### **Reverse Osmosis Concentrate Management through Halophyte Farming; University of Arizona**

**Reclamation Funding: \$186,328**

**Total Project Cost: \$421,999**

This project will continue building on some previous research done in the area of concentrate management via halophyte farming and using this salt resistant crop to manage concentrate produced from water desalination. The pilot project would be conducted at the Brackish Groundwater National Desalination Facility in Alamogordo, NM and will be enable the construction of the agricultural research testing area at the facility.