Seawater Desalination is Breaking the Energy Barrier October 14, 2004

New low-energy solutions are making affordable potable water from the ocean in California a reality. Industry leaders and government agencies are combining their efforts to pilot a new desalination technology that will produce drinking water from seawater for 60% less energy than was possible just a few years ago. The Affordable Desalination Collaboration (ADC) is a non-profit organization comprised of a group of leading companies and agencies within the water industry that are combining their efforts and sharing their expertise in a mission to help make seawater desalination affordable. Some of the member participants include U.S. Naval Facilities Engineering Service Center Seawater Desalination Test Facility, West Basin Municipal Water District of Southern California, Metropolitan Municipal Water District of Southern California, California Department of Water Resources, California Energy Commission, and the U.S. Bureau of Reclamation. Joining them are private sector desalination technology leaders including Carollo Engineers, Dow Filmtec (Low-Energy Membranes), David Brown Union Pumps-Textron, and CodeLine Pressure Vessels. Energy Recovery, Inc, a private San Francisco Bay Area manufacturer of breakthrough energy-saving technology, initiated the project.

The Project will build and operate a full-scale demonstration plant at the U.S. Navy's Seawater Desalination Test Facility in Pt. Hueneme, California.

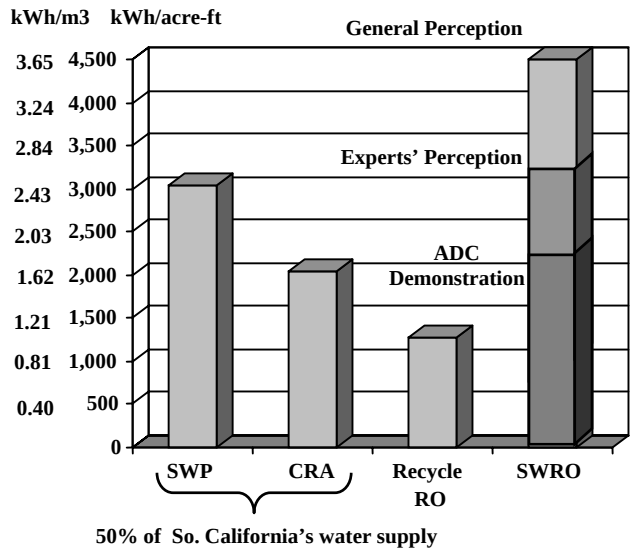
US Navy's Seawater Desalination Test Facility

The Project will use a combination of proven technologies developed primarily in the United States to demonstrate to California, to the U.S., and to the world that seawater desalination is a technically and economically viable source of potable and irrigation water. The major goal of the Project is to demonstrate seawater reverse osmosis (SWRO) at 1.7 kWh/m^3 (6.6 kWh/kgal, 2200 kWh/acre-ft) of permeate produced. The budget for the demonstration project is approximately US$ 600,000.00 and it is scheduled to run from January to June 2005.

According to World Health Organization estimations, the number of people living in regions with moderately severe to severe water availability problems will almost double, from 1.5 billion in 1990 to 2.8 billion in 2050. Since many of these water-stressed populations reside in coastal areas, seawater desalination represents a significant water resource. However, the main factor limiting the use of this resource has been the cost of desalination, which is due, in part, to its high energy consumption.

For this reason, it can be argued that the energy consumption of SWRO plants is the single most important variable holding back the development of a reliable, affordable and environmentally responsible source of fresh water. Reducing the power consumption of SWRO to that of conventional sources would be a monumental achievement. In some cases SWRO has already achieved this goal. For example, it requires between 1.6-3.1 kWh/m^3 (2000-3800 kWh/acre-ft) to pump water to various areas in Southern California by way of the State Water Project (SWP) and Colorado River Aqueducts (CRA), and by taking advantage of recently-developed breakthroughs in SWRO membrane and energy recovery technologies it is now possible to produce potable water from seawater at less than 1.7 kWh/m^3 (6.6 kWh/kgal, 2200 kWh/acre-ft).

Figure 1. Typical Energy Requirements and the ADC



Despite these advances, major California SWRO projects now on the drawing board are being hindered by legacy designs with energy consumption of 3-5 kWh/m3 (3700-6200 kWh/acre-ft). For this very reason, the ADC has come together to demonstrate SWRO as a reliable, affordable and environmentally responsible source of fresh water.

For more information on the ADC, contact John MacHarg. Tel # 510-483-7370, e-mail: jmacharg@affordabledesalination.com