The Daily Transcript

San Diego's desal industry owes birth to Camelot era

Kennedy Administration saw seawater as way to make desert bloom

By Jeran Wittenstein, The Daily Transcript

Monday, May 1, 2006

Although San Diego County has yet to build a seawater desalination plant, funding doled out in the early 1960s during the Kennedy Administration has led to a burgeoning community of desalination technology companies based here.

In an effort to step up research and development of ocean water desalination technology, the Department of the Interior's Office of Saline Water, with direction from the Kennedy Administration, funded a number of companies to pursue such programs in the early 1960s. One of those companies was San Diego-based General Atomics.

As a result, there are more than 30 companies in the county that produce, according to estimates, roughly 50 percent of the world's seawater desalination products and services.

"San Diego was one of the early areas of the country that were the forerunners or pioneers of the application of reverse osmosis technology," said Stuart McClellan of the American Membrane Technology Association.

In 1967, General Atomics patented a spiral wound reverse osmosis membrane design which is still used, according to Randy Truby, who worked at GA beginning in 1968. He is now senior vice president at Toray Membrane, a Japanese company that will soon be building a reverse osmosis (RO) manufacturing facility in the area. The membrane acts as a hyper-sensitive filter, blocking all but water particles passing through it under great pressure, effectively removing salt.

"I'd say 99 percent of all of the RO membranes in the world are delivered to customers in the form of a spiral wound design," said Truby.

Over the years, many of the employees at GA who were intimately involved with the desalination technology splintered off to form their own companies, said Truby.

Companies like Desalination Systems Inc. and Codeline Inc. began sprouting up around the San Diego area. Desalination Systems, founded by Donald Bray — whose name, according to Truby, was listed on the GA patent for the spiral RO design — began producing membranes in Escondido. Today the company is owned by General Electric.

Codeline was founded by Peter Darby, another ex-GA employee, according to Truby. The company, which was acquired by Pentair, specializes in manufacturing fiberglass membrane housings.

Poseidon Resources which is currently contemplating the construction of a seawater desalination plant in Carlsbad, estimates San Diego reverse osmosis technology companies generate approximately $200 million of revenue per year. One of these, Oceanside-based Hydranautics, is one of the world's three largest suppliers of seawater membranes, according to McClellan of the AMTA.

These companies, which provide services ranging from the production of reverse osmosis membranes to offering desalination process engineering services, serve a worldwide desalination industry of approximately 21,000 plants, according to Peter MacLaggan, senior vice president of project development for Poseidon.

"(Desalination plants) constantly require replacement parts and there's new ones being built all the time," said MacLaggan. "I guess there's about 3 billion gallons a day of production capacity that's already deployed, with more being deployed every day."

In the early 1960s, the Kennedy administration was intent on developing viable seawater desalination plants throughout the United States. According to the UCLA School of Engineering Web site, the slogan was, "go to the moon and make the desert bloom."

According to Doug Fouquet, manager of public relations for GA, in 1974 the firm sold its reverse osmosis branch to another local company, Universal Oil Products, or UOP, which had a Fluid Systems Division in San Diego.

Poseidon's MacLaggan went to work for UOP's Fluid Systems Division fresh out of college. He worked as a process engineer when the plant was located near Lindbergh Field.

UOP's Fluid Systems Division was acquired and is now called Koch Membranes, located in Scripps Ranch.

Ironically, as local companies offering desalination and RO services grew, San Diego County was slow in implementing the application of their products.

Currently, there are no seawater desalination plants in San Diego County. There are, however, two groundwater desalination plants operating in the county: one in Oceanside, which began operations in 1994, and one in Chula Vista operated by the Sweetwater Authority, which began in 1999. These plants desalinize "brackish" groundwater, which can be as much as 10 times less saline than seawater, and therefore require less energy to operate.

If all goes as planned, this paradox is about to change. As part of the San Diego County Water Authority's Capital Improvement Plan—designed to ween the area off of imported water in the future—the agency calls for seawater desalination to account for 10 percent of the county's needs by the year 2020.

Since 1998, Poseidon has been researching and planning the feasibility of constructing a seawater desalination plant next to the existing Encina Power plant in Carlsbad, capable of producing 50 million gallons of water per day.

According to MacClaggan, who is in charge of Poseidon's test program, which has been running at the power plant since 2000, the ultimate construction of the plant is expected to cost $240 million. Of that figure, $170 million will be on products that will come from a number of these local companies.

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