

WEST BASIN MUNICIPAL WATER DISTRICT**DECEMBER 8, 2004 - Water Resources**

Little, Kwan

DECEMBER 20, 2004 - Board Meeting

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Approved by: Richard Nagel

ACTION CALENDAR

MEMBRANE TECHNOLOGY SUPPORT SERVICESSUMMARY:

The District is one of the largest users of membrane technology to produce high-quality recycled water and relies heavily on its membranes to produce recycled water for use in refineries and the West Coast Barrier. West Basin has about 21.3 million gallons per day (mgd) of reverse osmosis (RO) membrane capacity in its recycled water and brackish groundwater desalination facilities. The District also has 17.3 mgd of microfilter (MF) membrane capacity which is used to pre-treat the recycled water prior to RO. In all the District uses 6,456 RO membranes and 2,700 MF modules in its facilities. Last fiscal year, the District sold 12,960 acre-feet of recycled water treated using RO membranes, accounting for 53% of total recycled water sales. Revenues from RO treated recycled water amounted to about 60% of recycled water sales.

With the completion of the Phase IV Expansion, the District will increase its RO capacity to 26.3 mgd consisting of 7,212 RO membranes. The District will also have 30.2 mgd of microfilter membrane pre-treatment capacity after the expansion consisting of 4,332 MF modules and bundles.

Making sure the membranes are operating properly is critical to meeting water quality specifications for the refineries, the Barrier, and the brackish water Desalter. The District utilizes specialized membrane consulting services to help monitor the performance of the membranes to determine whether they are operating properly. The membrane consultant works closely with United Water Services (UWS) and District staff to determine steps to improve poorly performing membranes. The consultant looks at operating data to determine if normal cleaning chemicals and cleaning procedures are adequate or whether special measures need to be taken to maintain the performance of the membranes. Working with UWS and District staff, the membrane consultant analyzes the performance of the RO membranes based on specific flux, differential pressure of the train, permeate conductivity of the train, differential pressure of each stage of a train, and permeate conductivity of individual pressure vessels. The membrane consultant also analyzes the performance of MF membranes based on filtrate turbidity, filtrate silt density index (SDI), trans-membrane pressure, and pressure decay tests.

The District also uses specialized membrane consulting services to help with feasibility studies for industrial applications of recycled water that require membrane treatment to meet the end user's water quality specifications and to help with the research and development of the ocean-water desalination membrane processes.

Last year, staff distributed a "Request for Proposals" (RFP) for membrane operations support services, engineering support services for feasibility level studies, and ocean-water desalination research and development support services. Staff assembled an interview panel that, in addition to District staff, included staff from Orange County Water District and the Long Beach Water Department. Based on the proposals, interviews, and experience of the proposed teams, the panel recommended Separation Processes, Inc. (SPI) to provide the three types of support services. It was the panel's opinion that SPI had the most relevant membrane experience, including manufacture of membranes, design of membrane systems, and operating membrane systems. SPI's principal team member has over 25 years of experience with RO membranes and another key team member has 15 years of experience in microfiltration, including working for Memcor for five years, prior to its acquisition by U.S. Filter, starting up full scale and pilot MF units. The Board approved an agreement with SPI. to provide operations support services, engineering support services, and ocean-water desalination support services in August 2003. The agreement designated \$250,000 for operations support, \$50,000 for engineering support, and \$90,000 for ocean-water desalination support.

The agreement expires in February 2005. Expenditures through February are projected to be \$210,000 for operations support, \$40,000 for engineering support, and \$90,000 for ocean-water desalination support. Staff will require additional specialized membrane consultant support beyond February 2005.

Staff has identified two options for moving forward for more specialized membrane consultant support. The first option is to extend the SPI contract for two years in the following amounts: additional \$387,500 for operations support, additional \$59,000 for engineering support, and additional \$325,000 for ocean-water desalination support, for a total contract amount of \$773,500.

The second option is to issue an RFP for specialized membrane support services as was done in July 2003 and select a consultant based on the proposals received.

Staff recommends Option 1 – extending the SPI contract for two years. SPI has done an outstanding job supporting the District's efforts in all three areas over the past 18 months. Under operations support services SPI has:

- Analyzed daily MF and RO data to determine the performance and performance trends of the MF and RO units;
- Held monthly meetings with UWS and District staff to discuss MF and RO performance issues;
- Wrote periodic reports on the performance of all membranes;
- Developed technical portions of MF procurement specifications for the Barrier and Exxon Mobil facilities;
- Developed technical portions of RO procurement specification for the Exxon Mobil facility;
- Witnessed testing of specified membranes;
- Worked with UWS and chemical vendors to identify more effective cleaning chemicals and procedures after the standard cleaning chemical and procedure did not adequately clean RO membranes;

- Worked with UWS and District staff to develop ways to reduce the potential for errors during RO chemical cleaning procedures;
- Developed a special cleaning procedure to try to knock down high differential pressure in RO trains at El Segundo;
- Conducted RO and MF training sessions for plant operators; and
- Conducted RO workshops for District staff.

Under engineering support services SPI has:

- Developed concepts and feasibility level cost estimates to serve El Segundo Power with high-quality recycled water;
- Looked at the feasibility of retrofitting the existing Title 22 gravity filters with microfilter technology; and
- Developed concepts and feasibility level cost estimates to expand the Chevron RO facilities at the Water Recycling Plant for additional recycled water use at Chevron.

Under ocean-water desalination support services SPI has:

- Assisted with writing grant funding for the National Water Research Institute (NWRI) and the U.S. Bureau of Reclamation;
- Developed test protocols;
- Designed membrane process;
- Monitored operating data and written supporting reports;
- Performed feasibility studies and cost estimates for full-scale concept design (at Chevron and El Segundo Power for 20 and 40 mgd);
- Performed feasibility studies and developed cost estimates for demonstration (0.5 mgd) design (at Chevron and El Segundo);
- General support of ocean-water technology issues
 - Diablo Canyon assessment;
 - Affordable Desalination Collaboration;
 - Nano/Nano Filtration process assessment;
- MF vendor pre-qualification assessment; and
- Participated in NWRI seawater workshop on behalf of West Basin.

FISCAL IMPACTS:

Funds are available in the Water Recycling Operations and Maintenance and Water Resources Planning Budgets for fiscal year 2004-05.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

COMMITTEE STATUS:

This item was reviewed by the Water Resources Committee on December 8, 2004 and recommended for approval at the December 20, 2004 Board meeting.

RECOMMENDED MOTION:

That the Board authorizes the Co-Acting General Managers to extend the agreement with SPI for two years to provide membrane technology consulting services in the amounts of \$387,500 for operations support services; \$59,000 for engineering support services; and \$325,000 for ocean-water desalination support services, for a not-to-exceed amount of \$773,500.

LIST OF EXHIBITS:

None.

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