

**WEST BASIN MUNICIPAL WATER DISTRICT**

**OCTOBER 9, 2002 – Water Resources**  
 McDonald, Little  
**OCTOBER 28, 2002 – Board Meeting**  
 Prepared by: Wyatt Won  
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 Approved by: Darryl G. Miller

**ACTION CALENDAR**

EXXON-MOBIL REVERSE OSMOSIS TRAIN NOS. 1 AND 2 MEMBRANE REPLACEMENT

SUMMARY:

West Basin provides high quality recycled water to Exxon-Mobil's boilers in Torrance. The recycled water is treated using microfiltration and reverse osmosis similar to Barrier Train No. 3 at the main plant in El Segundo. There are four reverse osmosis trains at the Exxon-Mobil plant that have been in operation since mid-1998. The plant has a total capacity of 2,200 gallons per minute.

Train Nos. 3 and 4 use industry standard 40-inch long thin-film composite membranes. Train Nos. 1 and 2 use 60-inch long thin-film composite membranes. The 60-inch long membranes were used in Train Nos. 1 and 2 because they were lower in initial cost than the 40-inch membranes. They were not used in Train Nos. 3 and 4 because the manufacturer could not produce enough membranes for all four Trains to meet the Districts construction schedule. The 40-inch membranes were delivered to the District at the lower 60-inch long price.

The District has to meet certain water quality specifications for water delivered to Exxon-Mobil's boilers. One of the main constituents of concern is total dissolved solids as measured by conductivity. The maximum conductivity allowed under the agreement with Exxon-Mobil is 50 micro-mhos per centimeter. The District has met and is continuing to meet this level of conductivity with the blend of water produced from all four trains. However, over the past several months, the conductivity in Train No. 1 has exceeded 50 micro-mhos per centimeter and the conductivity in Train No. 2 has climbed to around 50 micro-mhos per centimeter. By comparison the conductivity on Train Nos. 3 and 4 are about 40 micro-mhos per centimeter.

The feed pressures in Train Nos. 1 and 2 are also 10 - 20% higher than the feed pressures in Train Nos. 3 and 4. Staff believes that the 60-inch long membranes are the cause of the higher pressures.

Staff issued a request for bids to replace the elements in Train Nos. 1 and 2 with 40-inch long "premium" thin-film composite membranes. "Premium" membranes, which reject a slightly higher percentage of minerals than the membranes used at West Basin's other facilities, are required in this application because of Exxon-Mobil's water quality requirements. Two bids were received and are summarized in the following table.

Manufacturer	Unit Price	Total Price
Koch Membrane Systems	\$475 per membrane element	\$203,300
Hydranautics	\$478 per membrane element	\$204,584

Staff's estimate was \$252,600. The existing membranes will be evaluated to help identify the cause of the deterioration in performance. If the analysis indicates that the membranes' performance will be stable, the membranes will be stored at the water recycling plant. The

Membranes could be re-used at Barrier RO Train No. 1 or 2 or at the Carson plant if needed. The membranes cannot be re-used in the Chevron RO Trains because they would not meet the hardness limit. The performance of the membranes are adequate to meet the current water quality requirements for the Barrier; however, the membranes from Exxon-Mobil Train No. 1 may not meet the proposed requirement for Total Organic Carbon when the Barrier system is expanded. It should be noted that there are not enough membranes in Exxon-Mobil Train Nos. 1 and 2 to fill any of the Barrier or Carson Trains. Some new membranes would have to be purchased in order to replace an entire Train at the Barrier or Carson.

FISCAL IMPACTS:

Funds are available in the Facility Replacement Fund. The District has been collecting monies from Exxon-Mobil for replacement of the membranes.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

COMMITTEE STATUS:

This item was reviewed by the Water Resources Committee on October 9, 2002 and was recommended for approval at the October 28, 2002 Board meeting.

RECOMMENDED MOTION:

Authorize the General Manager to enter into an agreement with Koch Membrane Systems to supply and deliver RO membrane elements for Exxon-Mobil Train Nos. 1 and 2 for a price not-to-exceed \$203,300 plus ten percent for contingencies.