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METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

9-20

April 29, 1993

To: Board of Directors (Engineering and Operations Committee-Information)
From: General Manager
Subject: Report on Completion of the Colorado River Aqueduct Pump
Rehabilitation Project

Report

During the early 1980's, maintenance inspection of the Colorado River Aqueduct system revealed that the first three pump and motor units placed in operation in each pumping plant in 1939 were reaching the end of their useful life cycle and required overhaul. A task force investigated and recommended that a five-year program be initiated to rehabilitate Units 1 through 9 at all pumping plants with the goal to improve reliability, increase efficiency, and extend the service life of the units. The Board approved this program for an estimated total cost of \$14,500,000 in capital funds and \$19,500,000 in operations and maintenance funds. In addition to the original project goals, other major projects completed during the rehabilitation project were (1) rehabilitation of eleven 230-kV oil-filled transformers; (2) installation of acoustic flowmeter transducers in all of the delivery lines, (3) new flowmeters at Intake and Hinds Pumping Plants and (4) modification of the overhead bridge crane controls at all five pumping plants. After completion of Phase I on July 28, 1988, your Board approved Revision No. 3 which provided for the purchase of six new replacement stainless steel impellers for Eagle Mountain and Hinds Pumping Plants to replace the existing low pumping capacity stainless steel impellers.

With the successful completion of the performance testing of Gene Unit No. 9 on January 21, 1993, the main goals of the rehabilitation project were achieved. Through the overhaul of the pump and motor units, and the installation of the new or refurbished impellers, the average efficiency of the rehabilitated units was increased from 82.5 percent to 87.75 percent (5.25 percent), and the pumping capacity was

increased by approximately 13 percent, from 205 cfs to 233 cfs. Eleven transformers were rehabilitated and core losses were reduced 50 percent.

With completion of the rehabilitation of the 45 pumping units and eleven transformers, it is estimated that the annual energy cost savings, based on a delivery of 1,212,000 acre-feet of water, is 109 million kilowatt-hours. Based on the current cost of power, approximately 20 mills per kilowatt-hour, this is an annual savings of about \$2,200,000. Additionally, acoustic transducers were installed in all delivery lines to achieve a more accurate flow measurement of the individual pumps. This increased Metropolitan's actual diversion from Lake Havasu by approximately 40,000 acre-feet per year. All of the rehabilitation project work was accomplished while operating the Colorado River Aqueduct at full capacity.

In order to meet the tight demands of the rehabilitation schedule, and the need for tailoring the work force to adjust to the nine phases of the project, Metropolitan contracted for supplemental labor to assist the work crews at the pumping plants and the La Verne shops. The addition of supplemental labor to staff the project, in lieu of hiring permanent employees, resulted in labor savings of \$1 million over the five years of the project.

Currently, system flow tests are being conducted at the five pumping plants for 4, 6, and 8 pump flows using different combinations of units. Information obtained from these tests will assist in identifying a balanced aqueduct flow condition, and the most cost-effective mode of operation of the aqueduct system.

In addition to the completion of the project on schedule, it is estimated that the project will be completed within budget. A compilation of the project's capital and O&M costs is being completed and will be available at the June Board meeting.

Board Committee Assignments

This letter was referred to the Engineering and Operations Committee because of its jurisdiction over the operation, protection, and maintenance of the plants and facilities required for the production, exchange, sale, storage, treatment, and delivery of water and power pursuant to Administrative Code, Section 2431(c).

Recommendation

For information only.


for General Manager

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