



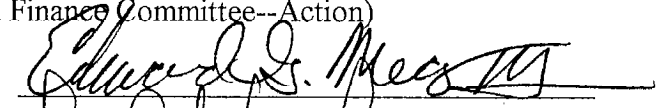
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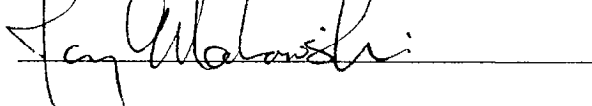
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

8-15

April 3, 1997

To: Board of Directors (Engineering and Operations Committee--Action)
(Business and Finance Committee--Action)

From: General Manager 

Submitted by: Jay W. Malinowski
Chief of Operations 

Subject: Urgent Necessity Repair of Bank 1, "C" Phase Transformer at Gene Pumping Plant

RECOMMENDATION

It is recommended that the Board of Directors ratify an urgent necessity contract entered into by the General Manager with General Electric for the repair of the Bank 1, "C" Phase transformer at Gene Pumping Plant in the Approximate Amount of \$300,000.

SUMMARY

On February 16, 1997, a differential relay action on Bank 1 at Gene Pumping Plant caused the Bank 1 circuit breakers to open. Staff conducted extensive testing of the components of Bank 1 and isolated the fault to the "C" phase transformer. Physical internal examination of the transformer revealed damaged windings. A rewind of the transformer is necessary to return it to a serviceable condition. In the meantime, we are operating with a spare transformer but, like the spare tire in the trunk of a car, we have only one. A second failure, lacking a spare, would reduce our pumping capacity by more than 1,200 acre-feet a day. Staff contacted three potential repair facilities. Two proposed to reverse engineer the transformer to conduct the rewind. The third, General Electric, is the original equipment manufacturer. They have records of the original design and of a rewind done in 1978 after a lightning strike. They also have a transformer design team in Pittsburgh, PA that would provide a winding design that meets or exceeds all current mechanical and electrical integrity standards. The other facilities do not have this capability. Because of the criticality of the Colorado River Aqueduct, staff has initiated a contract with General Electric to repair the transformer. Their estimate for the repairs, based upon conditions currently known, is \$288,825. This amount does not include taxes and may change if there is more damage than the physical inspection revealed. Staff will return to your Board after the repairs are completed and report the actual cost incurred.

DETAILED REPORT

There are seven single phase transformers installed at the Gene Pumping Plant. Four (one each for "A," "B," and "C" phases and a spare) were installed during the original construction. Manufactured by General Electric, each is approximately the size of a two-story circular stairwell. Three more were installed in the 1950s during the Aqueduct expansion. The transformers are installed in two banks to keep their physical size manageable and to provide redundancy. These transformers take 230,000 volt electric power from Hoover and Parker Dam power plants and other sources on the southwest grid and transform it to 69,000 and 6,900 volts. The 69,000 volt power is transmitted to Intake Pumping Plant. There it is transformed to 6,900 volts and used to operate the plant. The 6,900 volt power from the Gene transformers is used to operate the Gene Pumping Plant.

In 1978, the Bank 1, "C" Phase transformer was struck by lightning. The resulting damage required a complete rewind to restore the transformer to service. General Electric performed that work.

In February of this year, the Bank 1 circuit breakers opened in response to a differential relay action. Subsequent extensive electrical testing of the components of Bank 1 by staff isolated the problem to the "C" Phase transformer. The spare transformer was installed in place of the "C" Phase transformer and the plant restored to full operation. Physical examination of the transformer on February 22, 1997 revealed extensive damage to the primary winding.

Staff solicited repair proposals from three repair facilities. Two facilities proposed to reverse engineer the damaged winding to determine their repair. General Electric proposed to take their original design specifications, the 1978 rewind specification, and contemporary transformer design specifications and develop a new rewind design. The new design will provide the serviceability of the original design as well as the benefits of modern knowledge of ensuring the maintenance of mechanical and electrical integrity. They will do this design work at their Pittsburgh, PA transformer design and manufacturing facility. The actual rewind work will be performed at their Anaheim facility. General Electric is also the only facility that can do all of the work in-house. The other facilities would be subcontracting the actual fabrication of the windings. They also estimated several more weeks to complete the repair than General Electric.

Because of the criticality of the reliability of the Colorado River Aqueduct to Metropolitan, staff has initiated a contract with General Electric to perform the necessary repair work. Their estimate for this job is \$288,825 plus tax. Once the work is completed, staff will report back with the actual cost of the repair.

This contract was not competitively bid as staff has deemed the repairs as an urgent necessity in accordance with Section 8103. (b) of the Administrative Code to ensure the continuing reliability of the Colorado River Aqueduct. Ratification of the contract is required by Section 8115. (b) (3) of the Administrative Code for the contract to be binding on the District. It is recommended that the Board of Directors ratify an urgent necessity contract entered into by the General Manager with General Electric for the repair of the Bank 1, "C" Phase transformer at Gene Pumping Plant in the approximate amount of \$300,000.

(OPSEXEC\BOARD\C-PHASE)