

- **Board of Directors**
Engineering and Capital Programs Committee

March 11, 2008 Board Meeting

7-3

Subject

Appropriate \$470,000; and authorize three electrical improvement projects at the Jensen and Mills plants (Approps. 15442, 15452)

Description

This action authorizes two electrical reliability studies at the Jensen and Mills plants and preliminary design of seismic upgrades to an electrical building at the Mills plant. The studies are consistent with electrical reliability work underway at the Diemer, Skinner and Weymouth plants. These projects are categorized as Infrastructure Upgrade projects and are budgeted within Metropolitan's Capital Investment Plan (CIP).

Background

The Joseph Jensen Water Treatment Plant was placed into service in 1972 with an initial capacity of 350 million gallons per day (mgd). The plant was expanded in the early 1990s to its current capacity of 750 mgd. The Henry J. Mills Water Treatment Plant was placed into service in 1978 with an initial capacity of 75 mgd. The plant was expanded twice and is currently rated to treat 160 mgd, which is the design capacity of the existing ozone contactors. The Mills Plant Capacity Upgrade Program will increase the capacity of the ozonation process and rehabilitate existing plant facilities to reliably treat 326 mgd.

Portions of the electrical systems at the Jensen and Mills plants are in need of upgrades. The original "backbone" electrical components at both plants are now over 30 years old and their performance has begun to deteriorate, which increases the possibility of equipment shutdowns. When the two plants were constructed, their electrical systems were designed in a radial configuration, with power running through a single path to each local Unit Power Center (UPC) for distribution to powered equipment. The practice of powering all the components of a critical system from a single UPC leaves the plant vulnerable to a shutdown caused by a single failure in the radially powered system. Metropolitan's current approach to treatment plant reliability, which is consistent with industry practice, is to ensure that a single random event will not cause the complete shutdown of a plant.

Staff has embarked on a program to evaluate electrical reliability of Metropolitan's five treatment plants. Recommended electrical upgrades for the Skinner plant have been incorporated into the Skinner Expansion No. 4 and Oxidation Retrofit Program designs, and reliability upgrades to the power systems at the Diemer and Weymouth plants are underway. At this time, staff recommends proceeding with electrical reliability studies for the Jensen and Mills plants, and preliminary design phase activities for seismic upgrades to two Mills plant electrical buildings.

Project No. 1 – Jensen Electrical System Reliability – Study (\$190,000)

Several systems critical to the water treatment process at the Jensen plant have a common power feed. A single component failure within the power system could disable a critical piece of process equipment, impacting the treatment capability of the plant. For example, all the ammonia feed pumps at the Jensen plant are powered from a single UPC and a single motor control center (MCC). Ammonia is fed at the filter outlet to form a chloramine residual in the downstream distribution system to ensure that proper disinfection is maintained. If the ammonia system's UPC or MCC were to fail or be taken out of service for maintenance, the plant's entire ammonia feed capability would be impaired. Staff recommends a detailed assessment to evaluate the Jensen plant's electrical infrastructure and to identify cost-effective solutions to ensure continued reliable operation. These solutions will

include the use of high-efficiency equipment and will consider accommodations for future renewable energy projects.

This action appropriates \$190,000 and authorizes a study to evaluate options to improve electrical system reliability and maintainability, and to increase redundancy of the Jensen electrical system to ensure that a single component failure would not impact the plant's treatment capability. All work will be performed by Metropolitan staff.

Project No. 2 – Mills Electrical System Reliability – Study (\$190,000)

With the exception of new facilities such as the ozonation system, most critical water treatment equipment at the Mills plant does not have electrical backup. For example, a single failure of a main feed in Electrical Building No. 5 could shut down key process equipment including potable water pumps, the reservoir control gates and seepage system, water quality instrumentation, and auxiliary controls for the plant's emergency generator system. Providing backup power sources would enhance reliability and minimize scheduled outages to perform routine maintenance of a UPC. Staff recommends a detailed assessment to evaluate the Mills plant's electrical infrastructure and to identify cost-effective solutions to ensure continued reliable operation. These solutions will include the use of high-efficiency equipment and will consider accommodations for future renewable energy projects.

This action appropriates \$190,000 and authorizes a study to evaluate options to improve electrical system reliability and maintainability, and to increase reliability of the Mills electrical system to ensure that a single component failure would not impact the plant's treatment capability. All work will be performed by Metropolitan staff.

Project No. 3 – Mills Electrical Buildings Nos. 1 and 2 Seismic Upgrades – Preliminary Design Phase (\$90,000)

Metropolitan's practice has always been to design its facilities in accordance with the most current applicable codes and regulations at the time of construction. Over time, design standards and building codes have become more stringent based on new knowledge and research into events such as earthquakes. A geotechnical study that was conducted in the 1990s for the Mills Oxidation Retrofit Program provided up-to-date seismic design criteria for the Mills plant.

Metropolitan staff is systematically assessing the seismic integrity of structures at the Mills plant. This assessment applies up-to-date seismic criteria to all of the existing structures, which were built over a 30-year period under different code requirements. This approach produces a consistent level of seismic strength and risk across the plant. Of the eight Mills structures that were evaluated, six structures have been found to be adequate and two facilities require upgrades. This project addresses these two structures, Electrical Buildings Nos. 1 and 2, that require upgrades to ensure continued reliable operation in the event of a major earthquake. Both buildings were constructed in 1976.

Electrical Buildings Nos. 1 and 2 are 50-foot by 25-foot prefabricated steel buildings that house electrical equipment (MCCs and switchgear) essential for plant operations. Staff recommends seismically upgrading the buildings by constructing new concrete block walls around the outside of each building to provide lateral support during a seismic event. The existing roofs would be demolished and replaced with new roof framing supported by the block walls. By constructing a new shell for each building, the existing electrical equipment can remain in place.

This action appropriates \$90,000 and authorizes preliminary design phase activities for seismic upgrades of Mills Electrical Buildings Nos. 1 and 2. These activities will include detailed structural analyses, preparation of environmental documentation, and development of a preliminary construction cost estimate. All work will be performed by Metropolitan staff. The estimated cost for this project through construction is anticipated to range from \$0.9 million to \$1.5 million.

Summary

This action appropriates \$470,000 and authorizes three electrical improvements projects at the Jensen and Mills plants. Each project has been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds have been included in the fiscal year 2007/08 capital budget. These funds are included under two capital programs within Metropolitan's CIP. See **Attachment 1** for the two Financial Statements, and **Attachment 2** for the Location Maps.

These projects are consistent with Metropolitan's goals for sustainability by enhancing reliability of the existing treatment, conveyance and distribution system, in order to maintain reliable water deliveries in the future.

Project Milestones

August 2008 – Completion of preliminary design of the Mills Electrical Buildings Nos. 1 and 2 Seismic Upgrades

March 2009 – Completion of Jensen and Mills electrical reliability studies

Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations

California Environmental Quality Act (CEQA)

Project No. 1 – Jensen Electrical System Reliability – Study

CEQA determination for Options #1 and #2:

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed action consists of basic data collection and resource evaluation activities, which do not result in a serious or major disturbance to an environmental resource. This may be strictly for information gathering purposes, or as part of a study leading to an action which a public agency has not yet approved, adopted, or funded. Accordingly, the proposed action qualifies as a Class 6 Categorical Exemption (Section 15306 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under a Categorical Exemption (Class 6, Section 15306 of the State CEQA Guidelines).

CEQA determination for Option #3:

None required

Project No. 2 – Mills Electrical System Reliability - Study

CEQA determination for Options #1 and #2:

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed action consists of basic data collection and resource evaluation activities, which do not result in a serious or major disturbance to an environmental resource. This may be strictly for information gathering purposes, or as part of a study leading to an action which a public agency has not yet approved, adopted, or funded. Accordingly, the proposed action qualifies as a Class 6 Categorical Exemption (Section 15306 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under a Categorical Exemption (Class 6, Section 15306 of the State CEQA Guidelines).

CEQA determination for Option #3:

None required

Project No. 3 – Mills Electrical Building Nos. 1 and 2 Seismic Upgrades – Preliminary Design

CEQA determination for Option #1:

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. In particular, the proposed action consists of preliminary design and modifying existing public facilities with negligible or no expansion of use beyond that existing at the time of the lead agency's determination. In addition, the proposed action will not have a significant effect on the physical environment. Accordingly, this proposed action qualifies as a Class 1 Categorical Exemption (Section 15301 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under a Categorical Exemption (Class 1, Section 15301 of the State CEQA Guidelines).

CEQA determination for Options #2 and #3:

None required

Board Options

Option #1

Adopt the CEQA determinations and

- a. Appropriate \$470,000 in budgeted funds;
- b. Authorize electrical system reliability studies at the Jensen and Mills plants; and
- c. Authorize preliminary design of seismic upgrades to Mills Electrical Buildings Nos. 1 and 2.

Fiscal Impact: \$470,000 of budgeted funds under the following appropriations:

Approp. 15442: \$190,000

Approp. 15452: \$280,000

Business Analysis: This option will enhance electrical reliability at the Jensen and Mills plants. The electrical system reliability projects will provide backup capability for critical components of the treatment process. Seismic upgrade of the two electrical buildings will enhance the capability of these facilities to withstand a major seismic event, and will provide a consistent level of seismic strength and risk across the Mills plant.

Option #2

Adopt the CEQA determinations and

- a. Appropriate \$380,000 in budgeted funds;
- b. Authorize electrical system reliability studies at the Jensen and Mills plants; and
- c. Do not authorize seismic upgrades of Mills Electrical Buildings Nos. 1 and 2 at this time.

Fiscal Impact: \$380,000 of budgeted funds under the following appropriations:

Approp. 15442: \$190,000

Approp. 15452: \$190,000

Business Analysis: This option would enhance electrical reliability at the Jensen and Mills plants by providing electrical backup capability for critical components of the treatment process. The seismic upgrades of Mills Electrical Buildings Nos. 1 and 2 would be deferred until 2010 when other major work underway at the plant has been completed, including addition of Contactors Nos. 3 and 4 and rehabilitation of Modules Nos. 1 and 2.

Option #3

Do not proceed with the three electrical improvement projects at this time.

Fiscal Impact: None

Business Analysis: This option would forego an opportunity to improve electrical reliability at the Jensen and Mills plants, increasing the risk of failure, and would not provide a consistent level of seismic strength and risk across the Mills plant.

Staff Recommendation

Option #1



Roy L. Wolfe
Manager, Corporate Resources

2/25/2008

Date



Jeffrey Kightlinger
General Manager

2/26/2008

Date

Attachment 1 – Financial Statements

Attachment 2 – Location Maps

BLA #5882

Financial Statement for Jensen Improvements Program - Phase II

A breakdown of Board Action No. 3 for Appropriation No. 15442 for the Jensen Electrical System Reliability project is as follows:

	Previous Total Appropriated Amount (Oct. 2007)	Current Board Action No. 3 (Mar. 2008)	New Total Appropriated Amount
Labor			
Studies and Investigations	\$ 180,000	\$ 124,000	\$ 304,000
Final Design	128,000	-	128,000
Owner Costs (Program mgmt., envir. doc.)	247,000	53,000	300,000
Construction Inspection and Support	44,000	-	44,000
Metropolitan Force Construction	647,000	-	647,000
Materials and Supplies	455,000	-	455,000
Incidental Expenses	24,000	4,000	28,000
Professional/Technical Services	270,000	-	270,000
Equipment Use	19,000	-	19,000
Contracts	-	-	-
Remaining Budget	162,000	9,000	171,000
Total	\$ 2,176,000	\$ 190,000	\$ 2,366,000

Funding Request

Program Name:	Jensen Improvements Program - Phase II		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15442	Board Action No.:	3
Requested Amount:	\$ 190,000	Capital Program No.:	15442-I
Total Appropriated Amount:	\$ 2,366,000	Capital Program Page No.:	E-40
Total Program Estimate:	\$ 9,600,000	Program Goal:	I – Infrastructure Reliability

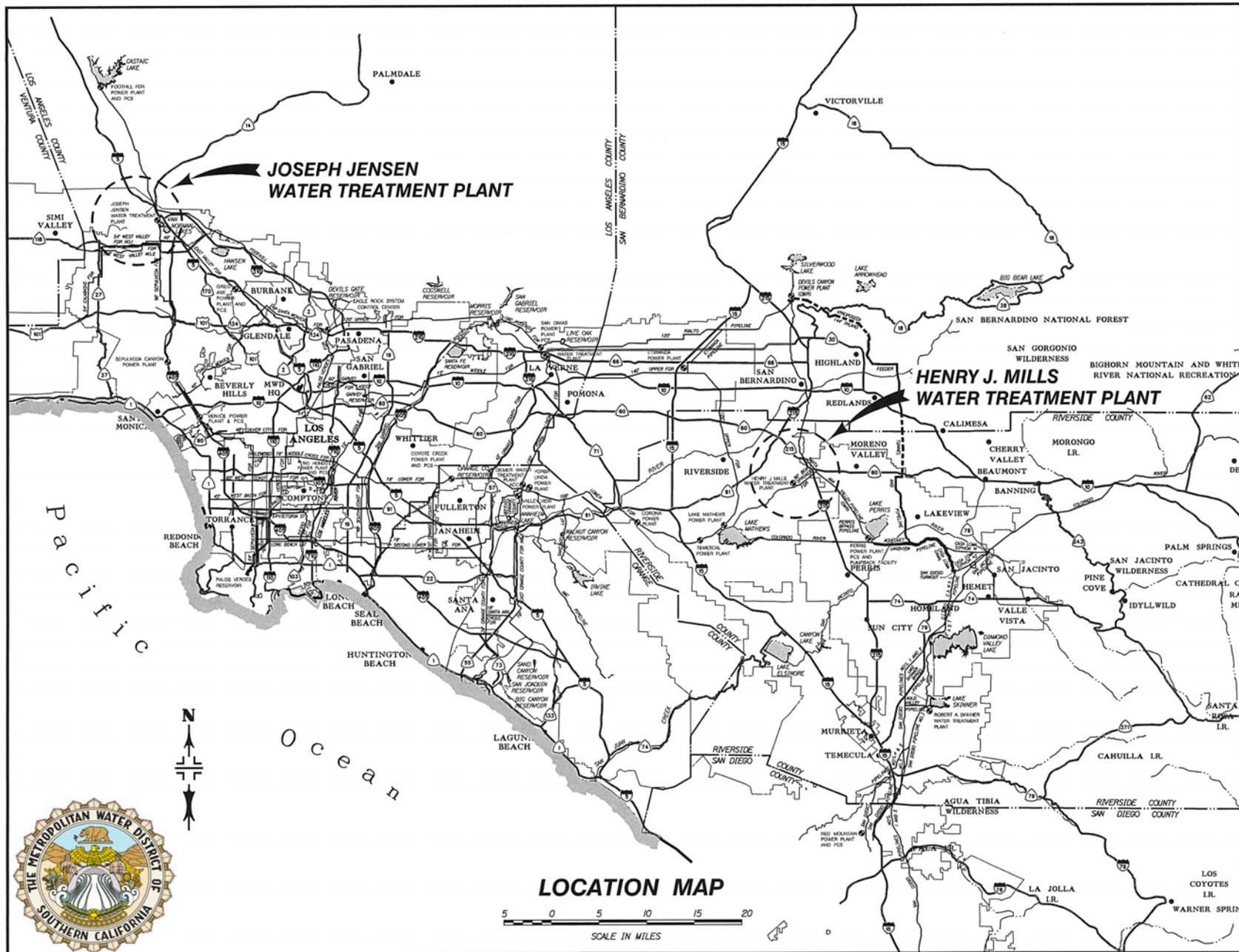
Financial Statement for Mills Improvements Program - Phase II

A breakdown of Board Action No. 1 for Appropriation No. 15452 for the Mills Electrical System Reliability Study and Electrical Buildings Nos. 1 and 2 Seismic Upgrades is as follows:

	Current Board Action No. 1 (Mar. 2008)
Labor	
Studies and Investigations	\$ 166,000
Final Design	-
Owner Costs (Program mgmt., envir. doc.)	97,000
Construction Inspection and Support)	-
Metropolitan Force Construction	-
Materials and Supplies	-
Incidental Expenses	4,000
Professional/Technical Services	-
Equipment Use	-
Contracts	-
Remaining Budget	13,000
Total	\$ 280,000

Funding Request

Program Name:	Mills Improvements Program - Phase II		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15452	Board Action No.:	1
Requested Amount:	\$ 280,000	Capital Program No.:	06706-I
Total Appropriated Amount:	\$ 280,000	Capital Program Page No.:	E-47
Total Program Estimate:	\$ 2,206,000	Program Goal:	I – Infrastructure Reliability



JOSEPH JENSEN WATER TREATMENT PLANT



HENRY J. MILLS WATER TREATMENT PLANT

