

- **Board of Directors**
Engineering, Operations and Real Property Committee

August 20, 2001 Board Meeting

9-2

Subject

Authorize funding for four Capital Investment Plan projects from Appn. 15371, the Joseph Jensen Filtration Plant Improvements Program: (1) \$5.2 million for ferric chloride retrofit; (2) \$700,000 to replace washwater return pump motor drives; (3) \$300,000 to repair Module No. 1 traveling bridges; (4) \$100,000 to perform studies and investigations

Description

Stage 1 of the Disinfectants/Disinfection Byproducts (D/DBP) Rule and the Interim Enhanced Surface Water Treatment Rule (IESWTR) were promulgated by the U.S. Environmental Protection Agency (USEPA) in December 1998 and will go into effect in January 2002. Another new water quality regulation dealing specifically with arsenic in drinking water will go into effect in mid-2006. These more stringent regulations, combined with the introduction of new water sources into the State Water Project (SWP), such as water transfers, will require increased treatment performance at the Joseph Jensen Filtration Plant (Jensen plant).

Metropolitan has a long-term strategy for addressing the aforementioned treatment issues at the Jensen plant. This strategy includes the implementation of the Jensen Oxidation Retrofit Project (JORP), as well as making other process and equipment upgrades at the plant. The JORP, authorized by the Board in January 2000, will replace chlorine with ozone as the plant's primary disinfectant in early 2005. Metropolitan's approach for addressing the new arsenic regulation and the introduction of new water sources into the SWP is to use ferric chloride as the primary coagulant at the Jensen plant. Additionally, staff has identified a strategy to replace aging and unreliable equipment at the plant. These efforts have led to establishment of the Joseph Jensen Filtration Plant Improvements Program. Three separate projects within this program have been evaluated and recommended by the Capital Investment Plan (CIP) Evaluation Team and are included in the Capital Budget for FY 2001/02. In addition, engineering studies and investigations have been identified as activities necessary to evaluate long-term strategies. See [Attachment 1](#) for the Detailed Report, [Attachment 2](#) for Project Location, and [Attachment 3](#) for the Financial Statement.

- **Ferric Chloride Retrofit (\$5.2 million).** For SWP supplies, ferric chloride has been demonstrated to be a more effective coagulant than alum for turbidity control, Disinfection Byproducts precursor removal, and arsenic removal. This project, which consists of temporary and permanent systems, will construct ferric chloride storage and feed facilities to replace alum as the plant's primary coagulant. Temporary ferric chloride facilities will be brought on-line in early 2002, allowing Metropolitan to comply with the new maximum contaminant levels outlined in the D/DBP Rule while JORP is being constructed, comply with the IESWTR, while maintaining low residual aluminum levels in the treated water leaving the Jensen plant. Long-term use of ferric chloride will be accomplished by the construction of permanent storage and feed facilities that will be brought on-line coincident with the JORP facilities in early 2005. A permanent ferric chloride system will give the Jensen plant additional treatment flexibility to ensure compliance with the IESWTR when treating SWP supplies, as well as any new water sources. In addition, ferric chloride use will allow the Jensen plant to achieve greater arsenic removal, ensuring compliance with the more stringent arsenic regulation in 2006. This project at the Jensen plant is consistent with Metropolitan's current use of ferric chloride at the Mills plant, which also exclusively treats SWP supplies.
- **Replace Washwater Return Pump Motor Drives (\$700,000).** Constructed in 1991, the washwater return pump station operates to return recycled washwater to the influent of the plant for retreatment. Reliable

operation of this pump-back system is a necessary component of Metropolitan's regulatory compliance strategy. The station's existing pump motors have failed on numerous occasions due to fluctuating flows through the station, which lead to excessive motor starts. This project will increase plant reliability by replacing the existing failure-prone fixed-speed motor drives with variable-speed motor drives (VFDs), allowing the existing pumps to operate over a larger range of fluctuating flow conditions. VFDs on the existing pumps will reduce the number of times that the motors are started, prolonging motor life and ensuring efficient and continued operation of the station. This, in turn, is essential for maintaining the plant's overall treatment capacity.

- **Repair Module No. 1 Traveling Bridges (\$300,000).** The Jensen plant's Module No. 1 was constructed in the early 1970s, and many of the drive mechanisms of the four traveling bridges are original equipment. The existing equipment has been repaired on many occasions, and it is now time to replace some of the key components of the traveling bridges because this equipment is reaching the end of its useful life and is no longer supported by the original equipment manufacturers. This equipment needs to be repaired so that Module No. 1 can continue to provide reliable service to meet upcoming demand projections at the plant, and to ensure that the plant can operate in support of the strategy to comply with the D/DBP Rule and the IESWTR.
- **Perform Studies and Investigations (\$100,000).** These activities include investigating long-term needs and identifying additional projects to be implemented over the next five years. Upon completion of the studies and investigations, staff will return to the Board for any additional authorization to conduct the recommended work.

Policy

Metropolitan Water District Administrative Code Section 5108: Capital Project Appropriation, and
Metropolitan Water District Administrative Code Section 8113: Construction Contract Award.

CEQA

Three Projects. The proposed projects are each categorically exempt under the provisions of the California Environmental Quality Act (CEQA). These projects involve the repair and minor alteration of existing public facilities and mechanical equipment with negligible expansion of use and no possibility of significantly impacting the physical environment. As such, each of the proposed projects qualifies under a Class 1 Categorical Exemption (Section 15301 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to the CEQA, the ferric chloride retrofit (both temporary and permanent), replacement of pump motor drives, and repair of the traveling bridges in Module No. 1 qualify under a Categorical Exemption (Class 1, Section 15301 of the State CEQA Guidelines).

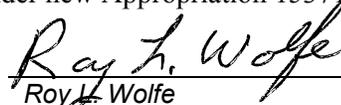
Studies and Investigations. The proposed project is categorically exempt under the provisions of CEQA. Performing engineering studies and investigations at the Jensen plant will consist of basic data collection, research, and resource evaluation activities which will not result in a serious or major disturbance to an environmental resource. These activities 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. As such, the proposed project qualifies under a Class 6 Categorical Exemption (Section 15306 of the State CEQA Guidelines).

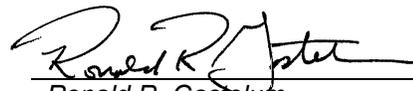
The CEQA determination is: Determine that pursuant to CEQA, the performing of engineering studies and investigations at the Jensen plant qualifies under a Categorical Exemption (Class 6, Section 15306 of the State CEQA Guidelines).

Staff Recommendation

Adopt the CEQA determinations, appropriate \$6.3 million, authorize the Chief Executive Officer to have all work performed, delegate to the CEO the authority to award contracts for the ferric chloride retrofit, replacing washwater return pump drives, repairing Module No. 1 traveling bridges, and conducting studies and investigations as described in this letter.

Fiscal Impact: \$6.3 million of budgeted CIP funds under new Appropriation 15371.

 _____ Roy L. Wolfe Manager, Corporate Resources	7/12/2001 _____ Date
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 _____ Ronald R. Gastelum Chief Executive Officer	7/27/2001 _____ Date
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Attachment 1 – Detailed Report

Attachment 2 – Project Location

Attachment 3 – Financial Statement

BLA #1091

Detailed Report

Ferric Chloride Retrofit (\$5.2 million)

Purpose/Background. Stage 1 of the Disinfectants/Disinfection Byproducts (D/DBP) Rule and the Interim Enhanced Surface Water Treatment Rule (IESWTR) were promulgated by the United States Environmental Protection Agency (USEPA) in December 1998 and will go into effect in January 2002. Additionally, new water quality regulations dealing specifically with arsenic in drinking water will be promulgated in mid-2002 and go into effect in mid-2006. It is anticipated that, in the near future, the California Department of Health Services will propose a new public health goal that will reduce the amount of aluminum in drinking water. Metropolitan currently utilizes aluminum sulfate (alum) at the Jensen plant as a primary coagulant. Under certain water quality conditions, the use of alum can result in increased amounts of aluminum in the plant's finished water. In the future, this may conflict with the anticipated public health goal for aluminum, especially if the increased use of alum is necessary to control disinfection byproduct formation to comply with the IESWTR. Metropolitan is also beginning to utilize water transfers along the California Aqueduct to increase supply reliability. The more stringent regulations, combined with the introduction of new water sources into the State Water Project (SWP), will result in increased treatment requirements at the Jensen plant.

Metropolitan has a long-term strategy for complying with the D/DBP Rule, the IESWTR, a more stringent arsenic regulation, a more stringent aluminum regulation, and the introduction of new water sources to the Jensen plant. This strategy includes the implementation of the Jensen Oxidation Retrofit Project (JORP), as well as making other process and equipment upgrades at the plant. The JORP was authorized by the Board in January 2000, and will replace chlorine with ozone as the plant's primary disinfectant in early 2005. Metropolitan's approach for addressing the new arsenic regulation, the new aluminum regulation, and the introduction of new water sources into SWP is to use ferric chloride as the Jensen plant's primary coagulant.

In the period between Stage 1 of the D/DBP Rule (January 2002) and the completion of the JORP (early 2005), an interim operational strategy for DBP control is needed to ensure that the water delivered from the Jensen plant will meet new DBP maximum contaminant levels (MCLs). As the levels of bromide and organic carbon have increased in SWP water, so have the concentrations of DBPs produced at the Jensen plant. In the past, DBP levels leaving the Jensen plant have exceeded the new MCL of 80 µg/L. Furthermore, it is anticipated that in order to meet the new MCL, elevated amounts of alum will have to be used on a continual basis. Under certain SWP conditions, specifically those in which the pH of the raw water entering the plant rises above 8.0, increased levels of aluminum will occur in the Jensen plant's finished water.

Numerous studies have shown ferric chloride to be a more effective primary coagulant for DBP precursor removal in SWP supplies. The Mills plant currently uses ferric chloride as the primary coagulant to treat 100 percent SWP water. The application of ferric chloride at this plant has been shown to minimize DBP formation. The use of ferric chloride will be required to help control DBP formation until ozone is available at the Jensen plant. Additionally, the use of ferric chloride will allow Metropolitan to maintain low levels of aluminum in the finished water at the Jensen plant and comply with the future public health goal.

Project Description. This project consists of constructing temporary and permanent ferric chloride storage and feed systems at the Jensen plant. Temporary ferric chloride facilities will include ferric-compatible tanks, pumps, control valves, and piping to a single injection point in the existing plant influent conduit. District forces will procure and install equipment and piping to enable ferric chloride as the primary coagulant. To the greatest extent possible, existing materials and supplies will be used to reduce the costs

of the temporary system. For example, surplus tanks at the Mills plant may be suitable for relocation to the Jensen plant for this temporary application.

The permanent ferric chloride retrofit will consist of ferric chloride rail and truck unloading, storage, and feed system piping to injection points at each module. Due to site restrictions, overlapping work areas, and overlapping construction schedules, staff recommends that the permanent ferric chloride retrofit be constructed under the competitively-bid Jensen Oxidation Retrofit Project (JORP) general construction contract.

Actions and Milestones

- March 2002 – Complete temporary ferric chloride system installation
- April 2005 – Complete permanent ferric chloride retrofit (coincident with JORP construction)

Replace Washwater Return Pump Motor Drives (\$700,000)

Purpose/Background. The washwater return pump station receives used filter backwash water that has been treated in the Washwater Reclamation Plant (WWRP) Nos. 1 and 2. The station has five pumps that discharge the reclaimed washwater back to the influent of the Jensen plant. Reliable operation of this pump station is a necessary component of Metropolitan's regulatory compliance strategy.

In recent years, the station's existing pump motors have failed on numerous occasions due to fluctuating flows through the station, which, in turn, leads to an excessive number of motor starts. For certain plant flow conditions, the output from a single fixed-speed is too high for the station's small collection sump. Consequently, the pump repeatedly turns on/off over short periods of time. In one documented series of events, a pump motor experienced 700 start/stop cycles in a 2-week period. Because of these severe operating conditions, the station's 60-hp fixed-speed motors have unexpectedly failed on several occasions.

Conversion of the motor drives to variable-speed motor drives (VFDs) will increase water treatment efficiency and will allow Metropolitan to comply with future regulations and stay within our current operating goals for the treatment plant. The use of VFDs will allow the existing pumps to operate at lower pumping rates, reduce start/stop cycles, and prolong the life of each pump's electric motor. VFDs also will allow Metropolitan to retain the use of the existing concrete pump sump that cannot be enlarged due to site constraints. Through the use of VFDs, variable pumping rates from the station will be achieved, which, in turn, will dampen spikes of reclaimed washwater flows into the plant's influent conduit. This improvement will permit the plant to even out chemical feed rates into the influent water and gain improved overall treatment efficiency. This modification is consistent with upcoming regulations that will limit the ratio of return water to the main plant flow as a way to optimize micro-organism removal.

Project Description. This project will replace the existing fixed-speed motor drives with VFDs. This modification will allow the existing pumps to operate over a larger range of fluctuating flow conditions within the confines of the existing small sump. Metropolitan staff will study, design, procure and install equipment, and construct plant modifications necessary to replace the five fixed-speed electric motor drives with VFDs and appurtenant electrical equipment at the return washwater pump station.

Actions and Milestones

- December 2001 – Complete design
- October 2002 – Complete installation and construction

Repair Module No. 1 Traveling Bridges (\$300,000)

Purpose/Background. Module No. 1 was constructed with the original Jensen plant, with the four traveling bridges in the module have been in operation for over 30 years. These bridges traverse the basins to physically remove settled particles and sludge. The bridge's mechanical drive components have

a 30-year expected operating life, depending on service time and environment. In recent years, the mechanical drive components have shown significant signs of wear, including journal bearing wear and seizure, chain drive failure, and track misalignments. To date, these problems have been repaired on an as-needed basis, but due to the age and frequency of repair of the equipment, staff has determined that the equipment has reached the end of its useful life and needs to be replaced. If the mechanical drive components are not repaired, eventually the traveling bridges will not operate, and the entire Module No.1 will be unavailable for treating water.

It is essential to repair the Module No. 1 traveling bridge as part of Metropolitan's strategy to comply with the D/DBP Rule and IESWTR. This strategy includes increasing the detention time in the treatment modules to achieve increased particulate removal efficiencies in the sedimentation process. Consequently, the traveling bridges will need to operate reliably in order for Module No. 1 to stay on-line to achieve this treatment goal. If the traveling bridges are unreliable, plant flow may need to be reduced to comply with the D/DBP Rule. Additionally, this equipment needs to be repaired so that Module No. 1 can continue to meet anticipated increased demand projections at the plant.

Project Description. This project will repair existing traveling bridge equipment so that Module No. 1 at the Jensen plant can continue reliable service. Metropolitan staff will conduct design, procure equipment, install new equipment, and construct plant modifications necessary to replace deteriorated equipment. Major components to be replaced or repaired include electrical power rack bars, gear/chain drive components, bridge tracks and control system upgrades.

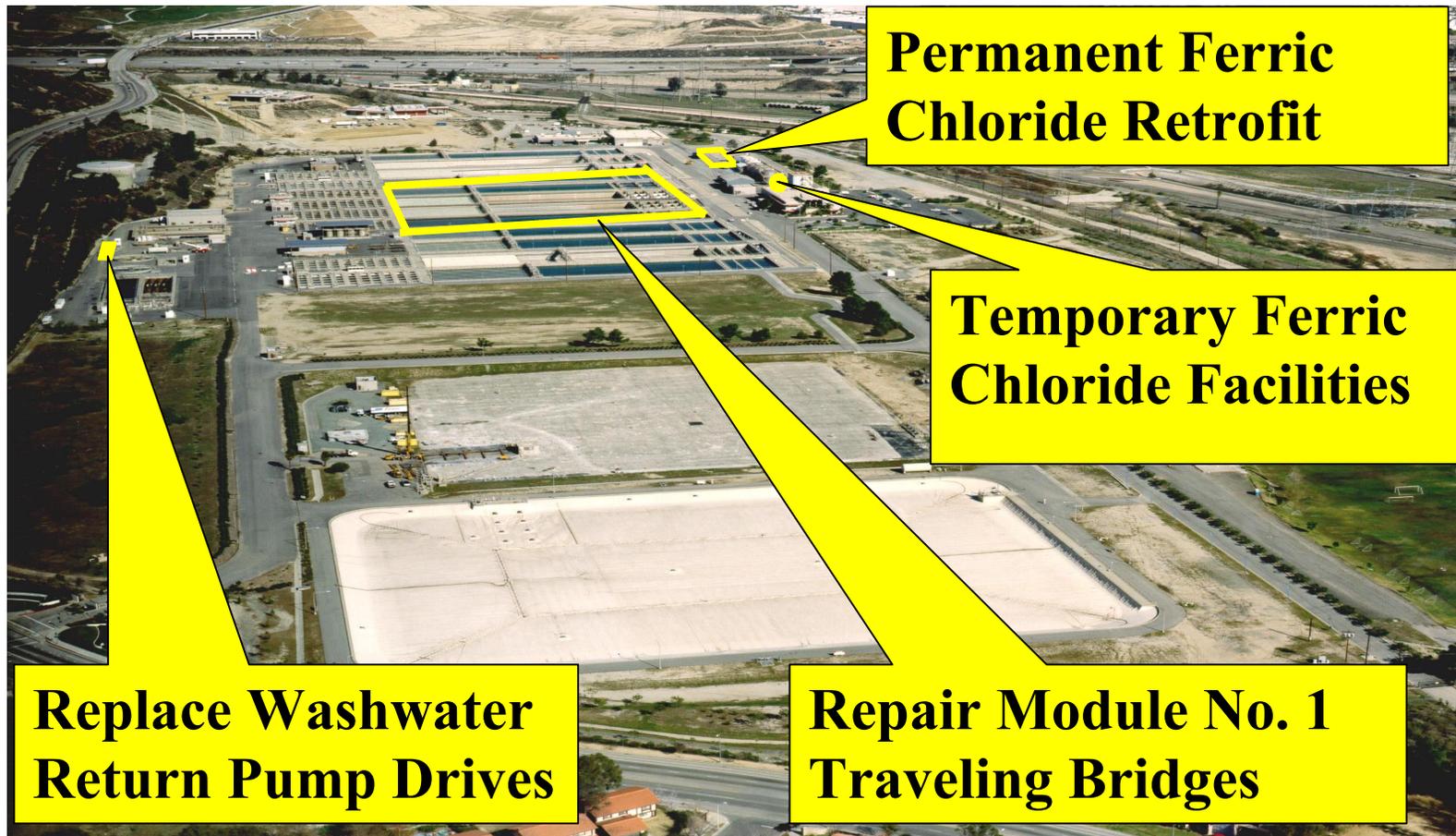
Actions and Milestones

- December 2001 – Complete design and procurement
- January 2002 – Begin installation
- July 2002 – Complete installation and return Module No. 1 to service

Studies and Investigations (\$100,000)

Purpose/Background. The Jensen plant is over 30 years old. As part of the Infrastructure Reliability and Protection Plan, a comprehensive study and planning effort has been undertaken by staff to identify modifications and improvements that are necessary at the Jensen plant to ensure reliable plant operations. To generate a more accurate assessment of long-term needs and required projects to be implemented over the next five years, a series of studies and investigations will be performed on selected equipment and systems at the plant.

Jensen Filtration Plant



Financial Statement – Jensen Filtration Plant Improvements Program

A breakdown of Board Action No. 1 for Appropriation No. 15371 to finance study, design, purchase of equipment, and preparation of bid documents to award contract for ferric chloride retrofit, replace washwater return pump drives, repair Module No. 1 traveling bridges, and conduct studies at the Jensen plant is as follows:

**BOARD ACTION
NO. 1
August 2001**

Labor	
Conceptual Designs	\$ 170,000
Studies and Investigations	100,000
Final Design and Preparation of Specifications	551,000
Owner Costs (Program Management, Environmental Documentation, SCADA, Bidding Process)	151,000
Construction Management and Support	310,000
District Forces Installation and Construction	275,000
Materials and Supplies	575,000
Incidental Expenses	31,000
Professional/Technical Services	75,000
Equipment Use	55,000
Contracts	3,100,000
Remaining Budget	907,000
Total	<u>\$ 6,300,000</u>

FUNDING REQUEST

Program Name:	Jensen Filtration Plant Improvements Program		
Project Name:	Ferric Chloride Retrofit, Replace Washwater Return Pump Drives, Repair Module No. 1 Traveling Bridges		
Source of Funds:	Construction Funds (possibly General Obligation, Revenue Bonds, Pay-As-You-Go Fund)		
Appropriation No.:	15371	Board Action No.:	1
Requested Amount:	\$ 6,300,000	Capital Program No.:	01215-I
Total Appropriated Amount:	\$ 6,300,000	Capital Program Page No.:	E-30
Total Program Estimate:	\$ 6,300,000	Project Goal:	Infrastructure Reliability