- **Board of Directors**
  Engineering and Operations Committee

November 18, 2003 Board Meeting

8-3

Subject

Authorize $1,037,000 for final design of two Skinner Improvements Program projects (Approp. 15365) and design of chemical tank farm roofs at the Jensen and Weymouth plants (Approp. 15415)

Description

The following planned projects are recommended to ensure continued compliance with drinking water and environmental regulations, increase safety and reliability of plant operations, and reduce operations and maintenance costs.

Skinner Filtration Plant Improvements Program ($585,000)

Skinner Flocculators and Tube Settlers Replacement

The Washwater Reclamation Plant No. 2 (WWRP 2) at the Robert A. Skinner Filtration Plant (Skinner plant) was built in 1991 to process used filter backwash water. The WWRP 2 utilizes submerged horizontal flocculators which are continually subjected to abrasive and corrosive operating conditions caused by the solids in the used filter backwash water. These conditions trigger excessive maintenance. The WWRP 2 also utilizes tube settlers to aid in the settling of solids. Their use maximizes the solids removal efficiency of the existing WWRP 2 basins. The original plastic tube settlers have deteriorated due to sun exposure and have reached the end of their useful life. This action authorizes design of the replacement work.

Skinner Water Quality Monitoring Vaults Expansion

Skinner Plant 1 has six water quality monitoring vaults that were built in 1976 (Modules 1 and 2) and 1979 (Module 3). The existing vaults are too small to house required instruments for individual filter effluent monitoring, which is required by new water quality monitoring regulations. In addition, the interior elevation of the vaults is too high to provide the necessary pressure for proper operation of many instruments. This project will modify the existing vaults and construct six larger water quality monitoring vaults adjacent to the existing vaults to accommodate the required water quality monitoring instrumentation. This action authorizes design of the vaults' expansion.

Staff has completed preliminary design for both projects. This action authorizes $585,000 for all final design activities. Final design will be performed by a consultant, Lee & Ro, Inc., under an existing consultant agreement. Lee & Ro, Inc., was selected through a competitive process (RFQ 578) to perform this type of work, and authority to enter into a professional services agreement was approved by Metropolitan's Board in June 2003.

Design of Roofs for Chemical Tank Farms ($452,000)

Staff recently conducted a study and life cycle cost analysis to evaluate handling and disposal of rainfall captured in unroofed chemical tank farm sumps at Metropolitan's filtration plants. Such rainfall captured within the tank farms is considered contaminated and cannot be released to the local storm drainage system. The life cycle costs of monitoring, handling and disposal of the contaminated liquid were compared to the cost of retrofitting each unroofed tank farm with a roof. Based on this study, it is cost-effective to construct roofs to avoid the formation of contaminated liquids. Staff recommends constructing roofs at this time on four chemical tank farms at the Joseph Jensen Filtration Plant (Jensen plant) and three chemical tank farms at the F. E. Weymouth Filtration Plant (Weymouth plant). The estimated payback period for these projects is 3.5 years. No work is required at this time

for the Diemer plant because contaminated liquid is discharged to the sewer under a relatively low-cost industrial waste discharge permit. Chemical tank farms at the Mills plant are already roofed. Roof construction for the Skinner plant tank farms will take place in conjunction with other projects to be constructed at that facility.

Metropolitan staff will perform preliminary design for three tank farm roofs at the Jensen plant and three tank farm roofs at the Weymouth plant. A consultant (MWH Americas, Inc.) will perform preliminary and final design for one tank farm roof (Jensen Main Chemical Tank Farm) under an existing consultant agreement. MWH Americas, Inc., was selected through a competitive process (RFQ 578) to perform this type of work, and authority to enter into a professional services agreement was approved by Metropolitan's Board in June 2003.

This action appropriates $452,000 for preliminary design activities for adding chemical tank farm roofs to the Jensen and Weymouth plants and for final design activities for the Jensen Main Chemical Tank Farm roof retrofit.

All three projects within this action were evaluated and recommended by Metropolitan's Capital Investment Plan Evaluation Team, and funds have been included in the fiscal year 2003/04 capital budget under the following programs: Skinner Filtration Plant Improvements Program (Approp. 15365) and All Facilities – Install Roofs for Chemical Tank Farms Program (Approp. 15415).

See **Attachment 1** for the detailed report and **Attachment 2** for the financial statement.

Policy

Metropolitan Water District Administrative Code § 5108: Capital Project Appropriation
Metropolitan Water District Administrative Code § 8117: Professional and Technical Consultants

California Environmental Quality Act (CEQA)

CEQA determinations for Option #1:

Skinner Filtration Plant Improvements Program: Skinner Flocculators and Tube Settlers Replacement Project and Skinner Water Quality Monitoring Vaults Expansion Project

The two projects were previously determined to be categorically exempt under the provisions of CEQA and State CEQA Guidelines. The Board found these projects to be exempt under Class 1, Section 15301; Class 2, Section 15302; and Class 3, Section 15303 of the State CEQA Guidelines on January 14, 2003. A Notice of Exemption (NOE) was filed on the projects at that time and the statute of limitations has ended. With the current board actions, there are no substantial changes proposed to the projects since the original NOE was filed. Hence, the previous environmental documentation in conjunction with the projects fully complies with CEQA and the State CEQA Guidelines. Accordingly, no further CEQA documentation is necessary for the Board to act with regards to the proposed actions.

The CEQA determination is: Determine that the proposed actions have been previously addressed in the 2003 NOE (Class 1, Section 15301; Class 2, Section 15302; and Class 3, Section 15303 of the State CEQA Guidelines) and that no further environmental analysis or documentation is required.

All Facilities – Install Roofs for Chemical Tank Farms Program: Joseph Jensen Filtration Plant

To comply with CEQA and the State CEQA Guidelines, Metropolitan as the Lead Agency prepared and processed a Mitigated Negative Declaration (MND) for the Jensen Filtration Plant Oxidation Retrofit Program (Program). The MND was distributed for a 30-day public review period that ended on June 29, 1994. Board adoption of the MND and the mitigation monitoring and reporting program (MMRP) along with Program approval occurred on August 19, 1994. The current board action solely authorizes the funding for the designing of roofs for four chemical tank farms at the Jensen plant that has been previously addressed in the MND. Based on the Board's previous approval of the environmental documentation, the proposed action contained in this board letter fully complies with CEQA and the State CEQA Guidelines. Accordingly, no further environmental documentation is necessary for the Board to act on with respect to the proposed action.

The CEQA determination is: Determine that the proposed action relating to the Program has been previously addressed in the adopted 1994 MND and its MMRP, and that no further environmental analysis or documentation is required.

All Facilities – Install Roofs for Chemical Tank Farms Program: Weymouth Filtration Plant

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed action involves the funding for the designing of roofs for three chemical tank farms within existing public facilities at the Weymouth plant, along with the construction of minor appurtenant structures with negligible or no expansion of use and no possibility of significantly impacting the physical environment. Accordingly, the proposed action qualifies under Class 1 and Class 3 Categorical Exemptions (Sections 15301 and 15303 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under two Categorical Exemptions (Class 1, Section 15301 and Class 3, Section 15303 of the State CEQA Guidelines).

CEQA determination for Option #2:

None required

Board Options/Fiscal Impacts

Option #1

Adopt the CEQA determinations and

a. Appropriate $1,037,000 in budgeted CIP funds;
b. Authorize final designs of the Skinner Flocculators and Tube Settlers Replacement, and Skinner Water Quality Monitoring Vaults Expansion projects;
c. Authorize preliminary design of the Jensen and Weymouth chemical tank farm roof retrofit projects; and
d. Authorize final design of the Jensen Main Chemical Tank Farm roof retrofit project.

Fiscal Impact: $1,037,000 of budgeted CIP funds under the following appropriations:
Appropriation No. 15365 (Skinner Filtration Plant Improvements Program) - $585,000 budgeted
Appropriation No. 15415 (All Facilities – Install Roofs for Chemical Tank Farms Program) – $452,000 budgeted

Option #2

Do not authorize Skinner Flocculators and Tube Settlers Replacement and Skinner Water Quality Monitoring Vaults Expansion final designs. Do not authorize preliminary design of the Jensen and Weymouth chemical tank farm roof retrofit project and final design of the Jensen Main Chemical Tank Farm roof retrofit project. Implementation of this option will reduce assurance of compliance with drinking water and environmental regulations, reduce reliability of plant operations, and forego an opportunity to reduce long-term O&M costs.
Fiscal Impact: None.

Staff Recommendation

Option #1

10/20/2003
Roy L. Wolfe *Date*
Manager, Corporate Resources

10/27/2003
Ronald R. Gastelum *Date*
Chief Executive Officer

Attachment 1 – Detailed Report

Attachment 2 – Financial Statements for Skinner Improvements Program 15365 and All Facilities – Install Roofs for Chemical Tank Farms Program 15415

BLA #2538

Detailed Report

Skinner Filtration Plant Improvements Program

The Robert A. Skinner Filtration Plant (Skinner plant) was placed into service in 1976 to supply treated water to Riverside and San Diego counties. Since its original construction, the plant has been expanded three times and now consists of six treatment modules that are operated as two distinct filtration plants (Plants 1 and 2). Plants 1 and 2 have capacities of 240 mgd and 280 mgd, respectively, for a total combined rated capacity of 520 mgd. Metropolitan's member agencies that receive water from the Skinner plant include Eastern Municipal Water District, Western Municipal Water District of Riverside County, and San Diego County Water Authority.

The Skinner Filtration Plant Improvements Program was established to implement multiple projects necessary to ensure plant reliability and comply with drinking water and environmental regulations.

Skinner Flocculators and Tube Settlers Replacement ($373,000)

Background/Purpose

Used filter backwash water from the Skinner plant is processed by the 43.5 mgd Washwater Reclamation Plant No. 2 (WWRP 2). WWRP 2 is typically operated round-the-clock. WWRP 2 has three treatment trains, each with a flocculation basin and a sedimentation basin with tube settlers. The horizontal flocculators and the tube settlers were installed during the original construction of WWRP 2 in 1991.

Each WWRP 2 flocculation basin train has nine horizontal flocculators. This equipment is continually subjected to harsh operating conditions. Solids in the used filter backwash water are both corrosive and abrasive to moving flocculator parts, such as submerged bearings and interlocking shafts, and eventually cause failure of the moving parts within the basin. Bearing failure of the WWRP 2 flocculators is a recurring maintenance issue. Repair of the WWRP 2 basin mechanical equipment requires treatment train dewatering, so that mechanics can access the components. Approximately $110,000 per year is spent on WWRP 2 flocculator equipment maintenance.

The WWRP 2 sedimentation basins use tube settlers and a chain-and-flight system to collect the settled sludge. At Metropolitan, use of tube settlers is unique to the Skinner plant. The tube settlers consist of small, inclined plastic tubes placed at a 60-degree angle to minimize hydraulic short-circuiting, provide increased area for efficient settling, and improve the removal of used filter backwash water solids by gravity.

By including tube settlers in the design of the original WWRP 2, the size of the basins was reduced. Efficient performance of the tube settlers is a key factor in the WWRP's ability to process used washwater. The expected service life of tube settlers is approximately eight to ten years, depending on the application. The WWRP 2 tube settlers have been in service for eleven years. The plastic tube settlers have deteriorated due to sun exposure and are bent in many locations, resulting in inefficient solids collection.

In January 2003, the Board authorized $20,000 for studies and investigations of the project. The preliminary design has now been completed.

Project Description

The existing horizontal paddle-wheel flocculators will be replaced with vertical hydrofoil units (with non-submerged bearings) in the three WWRP 2 flocculation basins. Access platforms and supports will be provided for the new flocculators, and tube settlers will be replaced in the three WWRP 2 sedimentation basins.

The final design work will be a combined effort by Metropolitan staff and Lee & Ro, Inc. The project scope of work has already been included in Metropolitan's professional services agreement with Lee & Ro, Inc., which was authorized by Metropolitan's Board in June 2003. Lee & Ro, Inc., was selected through a competitive process (RFQ 578) to perform this type of work, and authority to enter into a professional services agreement was approved by Metropolitan's Board in June 2003.

Project Milestones

January 2005 – Board award of construction contract for flocculators and tube settlers replacement

May 2007 – Completion of all construction

Skinner Water Quality Monitoring Vaults Expansion ($212,000)

Background/Purpose

The six existing water quality monitoring vaults at Skinner Plant 1 were built in 1976 (Modules 1 and 2) and 1979 (Module 3). These buried vaults are located on the east and west sides of each of the three water filtration modules. The vaults were constructed to house pumps to transport filtered water samples to the Administration Building laboratory for analysis. The original design of the vaults in Skinner Plant 1 did not include provisions for the multitude of on-line water quality monitoring equipment that is currently required to comply with water quality reporting regulations. The increasing reliance on on-line instrumentation requires additional space. In addition, the interior elevation of the buried vaults is too high to provide the needed pressure for the proper operation of turbidimeter and particle counter instrumentation. Such instrumentation provides early warning of filter breakthrough.

Over the years, as water quality requirements have become more stringent, the frequency of employees entering the vaults has increased significantly. The six vaults at Skinner Plant 1 serve 54 filters. Ingress and egress from the vaults is via ladders, making it difficult to carry equipment into the vaults to perform instrument calibration and maintenance. The existing vaults have also been subject to flooding which has damaged monitoring equipment in the past.

In contrast, Skinner Plant 2 has larger water quality monitoring galleries with sufficient room for future instrumentation and easy stairway access for personnel performing calibration and maintenance. Stairs to ingress and egress the Skinner Plant 1 water quality monitoring vaults would make it safer for employees to access the structures, especially at night or during inclement weather.

In January 2003, the Board authorized $40,000 for studies and investigations of the project. The preliminary design has now been completed.

Project Description

The six existing water quality monitoring vaults will be modified to provide stairways and construct six larger and deeper water quality monitoring vaults adjacent to the existing vaults to accommodate relocation of existing and additional water quality monitoring instrumentation.

The final design work will be a combined effort by Metropolitan staff and Lee & Ro, Inc. The project scope of work has already been included in Metropolitan's professional services agreement with Lee & Ro, Inc., which was authorized by Metropolitan's Board in June 2003. Lee & Ro, Inc., was selected through a competitive process (RFQ 578) to perform this type of work. .

Project Milestones

January 2005 – Board award of construction contract for water quality monitoring vaults expansion

June 2007 – Completion of all construction

Cost Estimate

Attachment 2 shows the total requested funding of $585,000 for all work in advance of award of competitively bid construction contracts for these two projects. The final design cost, as a percentage of the estimated total construction cost is approximately 13 percent. The Engineering Services goal for design of projects with construction costs less than $10 million is 9 to 15 percent.

Design of Roofs for Chemical Tank Farms ($452,000)

The Joseph Jensen Filtration Plant (Jensen 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 plant exclusively treats California state project water supplies and delivers treated water to Metropolitan's Central Pool portion of the distribution system.

The F. E. Weymouth Filtration Plant (Weymouth plant) was placed into service in 1941 with an initial capacity of 100 mgd. The plant was expanded twice to its current capacity of 520 mgd. The plant delivers treated water to Metropolitan's Central Pool portion of the distribution system.

The All Facilities – Install Roofs for Chemical Tank Farms Program was established to reduce handling and disposal costs associated with contaminated rainfall and to ensure environmental compliance.

Background/Purpose

At the time the Jensen and Weymouth plants were constructed, environmental regulations did not stipulate requirements for the containment of chemical spills in bulk storage tank farms. Since then, Metropolitan has upgraded each plant's chemical tank farm secondary containment area and spill storage capacity to meet the hazardous material storage guidelines outlined in the Uniform Fire Code as part of Metropolitan's spill containment program effort.

A study commenced in 2002 to examine issues related to handling and disposal of contaminated rainfall captured in unroofed chemical tank farms. Rainfall thus captured is considered contaminated by regulation and cannot be released to local storm drainage systems. The contaminated liquid may, in some cases, be discharged to the sanitary sewer but is more often removed and trucked offsite. Staff evaluated the current amount of labor, laboratory analyses, and disposal costs associated with the contaminated rainfall liquid versus the estimated capital costs of retrofitting the unroofed tank farms with roofs in a life-cycle present worth cost analysis comparing the unroofed and roofed situations.

The cost analysis showed that chemical tank farm roof retrofits would save approximately $16.5 million in labor, laboratory analyses, and disposal costs over the 25-year life of the roofs at the Jensen and Weymouth plants. The estimated payback period for these projects is 3.5 years. In addition, roofs would significantly extend the life of electrical and mechanical components of the chemical feed systems and would lessen the workload for Metropolitan staff that monitor and coordinate disposal of captured rain. As a result, with increasing disposal costs and toughening environmental regulations, roofing the chemical tank farms at Jensen and Weymouth plants is recommended.

At the Robert B. Diemer Filtration Plant, contaminated liquid is discharged to the Orange County Sanitation District's sewer under an industrial waste discharge permit. Based on foreseeable sewer discharge rates, roofing the Diemer chemical tank farms is not recommended at this time. This recommendation will be reexamined if and when disposal costs increase substantially or regulations change.

Chemical tank farms at the Henry J. Mills Filtration Plant are already roofed and no further work is required at this time.

Roofs will be constructed for the Skinner plant chemical tank farms in conjunction with the Oxidation Retrofit Program (ORP) and Skinner Expansion No. 4 project.

In June 2003, Metropolitan's Board authorized the Chief Executive Officer to have all work performed in advance of award of a competitively bid construction contract for the Jensen Main Tank Farm Chemical Containment System Upgrade project. At that time, several plant engineering agreements for the filtration plants' improvements programs were also authorized by the Board. MWH Americas, Inc. (MWH) is currently performing final design of the Jensen Chemical Containment System Upgrade project under the Jensen Improvements Program. This project will replace the existing asphalt flooring and perimeter spill containment wall with poured-in-place concrete. The footings for the recommended roof retrofit must be structurally tied into

the new flooring design. To derive maximum value from MWH's work, staff recommends using MWH Americas, Inc., for the Jensen Main Chemical Tank Farm roof retrofit preliminary and final designs.

Project Description

Roofs will cover four unroofed chemical tank farms at the Jensen plant and three unroofed chemical tank farms at the Weymouth plant. Metropolitan staff will perform preliminary roofing design of three unroofed chemical tank farms at the Jensen plant and three unroofed chemical tank farms at the Weymouth plant. MWH Americas, Inc., will perform preliminary and final design of the Jensen Main Chemical Tank Farm roof retrofit (using an existing consultant agreement) and will incorporate the roof retrofit into the tank farm chemical containment system upgrade project. The project scope of work has already been included within Metropolitan's professional services agreement with MWH Americas, Inc., which was authorized by Metropolitan's Board in June 2003. MWH Americas, Inc., was selected through a competitive process (RFQ 578) to perform this type of work.

The final design cost, as a percentage of the estimated total construction cost for the Jensen Main Chemical Tank Farm roof is approximately 9.1 percent. The Engineering Services goal for design of projects with construction costs less than $10 million is 9 to 15 percent.

Project Milestones

November 2005 – Board award of construction contract for chemical tank farm roof retrofit projects

February 2007 – Completion of all construction

Cost Estimate

Attachment 2 shows a breakdown of the total requested funding of $452,000.

Financial Statement for Skinner Filtration Plant Improvements Program

A breakdown of Board Action No. 7 for Approp. No. 15365 for final design of two projects as part of the Skinner Filtration Plant Improvements Program is as follows:

	Previous Board Action No. 6 (May 2003)	Skinner Expansion No. 4 Reallocation* (July 2003)	Current Board Action No.7 (Nov. 2003)	New Total Appropriated Amount
Labor				
Studies and Investigations	$ 1,120,000	($ 580,000)	$ 0	$ 540,000
Design and Specifications	650,500	0	30,000	680,500
Owner Costs (Program management)	583,500	(130,000)	95,000	548,500
Construction Inspection and Support	695,600	0	0	695,600
Metropolitan Construction	234,300	0	0	234,300
Materials and Supplies	335,000	(60,000)	2,000	277,000
Incidental Expenses	56,000	(20,000)	2,000	38,000
Professional/Technical Services	1,150,000	(650,000)	380,000	880,000
Equipment Use	25,000	(20,000)	0	5,000
Contracts	4,794,500	0	0	4,794,500
Remaining Budget	1,471,300	(300,000)	76,000	1,247,300
Total	**$ 11,115,700**	**($ 1,760,000)***	**$ 585,000**	**$ 9,940,700**

Funding Request

Program Name:	Skinner Filtration Plant – Improvements Program		
Source of Funds:	Construction Funds (General Obligation, Revenue Bonds, Pay-As-You-Go Fund)		
Appropriation No.:	15365	**Board Action No.:**	7
Requested Amount:	$ 585,000	**Capital Program No.:**	15365-I
Total Appropriated Amount:	$ 9,940,700	**Capital Program Page No.:**	E-67
Total Program Estimate:	$ 82,362,000*	**Program Goal:**	I-Infrastructure Reliability

* The capital budget for fiscal year 2003/04 states a program estimate for the Skinner Improvements Program (Approp. 15365) of $193,860,000. In July 2003, Metropolitan's Board approved the new Skinner Expansion No. 4 Program (Approp. 15410), which reduced the scope of the Skinner Improvements Program and reallocated $1.76 million (associated with Skinner Module No. 7 preliminary design) from Approp. 15365 to Approp. 15410.

Financial Statement for All Facilities – Install Roofs for Chemical Tank Farms Program

A breakdown of Board Action No. 1 for Approp. No. 15415 to fund preliminary design of chemical tank farm roofs at the Jensen and Weymouth plants and final design of a chemical tank farm roof at the Jensen Main Chemical Tank Farm, as part of the All Facilities – Install Roofs for Chemical Tank Farms Program, is as follows:

	Board Action No. 1 (Nov. 2003)
Labor	
Studies and Investigations	$ 184,000
Design and Specifications	0
Owner Costs (Program management)	77,000
Construction Inspection and Support	0
Metropolitan Installation and Construction	0
Materials and Supplies	0
Incidental Expenses	5,000
Professional/Technical Services	127,000
Equipment Use	0
Contracts	0
Remaining Budget	59,000
Total	**$ 452,000**

Funding Request

Program Name:	All Facilities – Install Roofs for Chemical Tank Farms Program		
Source of Funds:	Construction Funds (General Obligation, Revenue Bonds, Pay-As-You-Go Fund)		
Appropriation No.:	15415	**Board Action No.:**	1
Requested Amount:	$ 452,000	**Capital Program No.:**	15415-R
Total Appropriated Amount:	$ 452,000	**Capital Program Page No.:**	E-5
Total Program Estimate:	$ 5,218,000	**Program Goal:**	R-Regulatory-Other