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

July 8, 2003 Board Meeting

9-3

Subject

Authorize staff to proceed with planning and/or implementing the use of ozone as the primary disinfectant at all Metropolitan treatment plants

Description

At the June 9, 2003 Engineering and Operations Committee meeting, a motion to recommend to the Board that Metropolitan proceed with the ozone retrofits at all Metropolitan treatment plants was passed by a vote of 13 to 4. The motion was originally made during a discussion on the Alternative Disinfectant Evaluation (ADE) Board Workshop that was held on May 20, 2003.

Background

The Board previously authorized construction of ozone facilities at the two plants (Mills and Jensen) that treat 100 percent State project water (SPW). The on-line dates for Mills and Jensen ozone facilities are 2003 and 2005, respectively. In March 2002, Metropolitan's Board authorized $3.511 million for the ADE to evaluate chlorine dioxide as an alternative to ozone for compliance with the U.S. Environmental Protection Agency's (USEPA's) Stage 1 of the Disinfectants/Disinfection By-Products (D/DBP) Rule at the blend plants (Weymouth, Diemer, and Skinner), as well as enhance the ability of these plants to treat higher blends of SPW. Preliminary information indicated potential cost savings for chlorine dioxide, although limited information existed on full-scale applications.

Alternative Disinfectant Evaluation Board Workshop

At the May 20, 2003, ADE Board Workshop, staff presented information that supports moving forward with ozone at the Skinner plant, in part because ozone is less expensive than chlorine dioxide. This recommendation, based on the need for adding sedimentation basins for the chlorine dioxide option, will be the subject of a separate board letter at the July board meeting. The proposed on-line date for the Skinner ozone facilities is 2007. Staff also presented information showing that there is a potential capital cost savings associated with the implementation of chlorine dioxide at Weymouth and Diemer of approximately $85 million in Year 2002 dollars, since both plants already have sedimentation basins, although there remain a number of unknowns. The Capital Investment Plan (CIP) Oxidation Retrofit Program (ORP) total program estimates for ozone facilities are $157.5 million for Weymouth ORP and $186 million for Diemer ORP ($343.5 million total).

Three major issues remain unresolved before chlorine dioxide can be recommended for the Weymouth and Diemer plants. First, it is unknown if chlorine dioxide will be completely effective against fishy/swampy/grassy odors or if the use of powder activated carbon (PAC) would need to be increased substantially (from the expected two weeks per year). A substantial increase in the frequency of PAC usage would significantly increase the operations and maintenance costs for chlorine dioxide, making ozone a more cost-effective option. Second, the robustness and operability of feeding chlorine dioxide, ferrous chloride, and powdered carbon must be evaluated at the demonstration plant. It is possible that the combination of these chemicals would result in new solids handling or treatment capacity constraints at these plants. Third, chlorine dioxide could be used to augment ozone at the SPW plants (Mills and Jensen) during periods of high bromide concentrations to minimize the formation of bromate. This information may be obtained if work continues on the ADE effort.

Engineering and Operations Committee Meeting

At the June 9, 2003 meeting, the committee passed a motion to proceed with ozone retrofits at all five treatment plants. Members of the committee expressed a variety of opinions. Several directors believed that the more than 15 years Metropolitan has spent studying ozone and the number of unknowns associated with chlorine dioxide warrants stopping work on the board-approved ADE and moving ahead with ozone at all five plants as soon as possible. Other directors felt that given the relatively small amount of money needed to complete the chlorine dioxide evaluation, as well as the fact that a decision is not needed on a technology for Weymouth and Diemer until October 2003, it is prudent to continue the ADE.

Weymouth and Diemer Oxidation Retrofit Programs' Schedule

The ORPs for both plants are currently in the preliminary design phase, and are considering both treatment technologies (ozone and chlorine dioxide). Metropolitan's existing CIP schedule for implementing ozone or an alternative disinfectant at the Weymouth and Diemer plants includes on-line dates of 2009 and 2012, which were established in an August 1998 board action. There was extensive discussion at both the May ADE workshop and the June Engineering and Operations Committee meeting about accelerating the on-line dates for the Diemer ORP and Weymouth ORP from the current 2009 and 2012 schedule to 2009 for both plants.

Due to the complexity and site constraints of implementing a new treatment technology, 2009 is the earliest date at which the ORP facilities can be placed into service. Both ozone and chlorine dioxide will require significant site modifications to implement either ozone or chlorine dioxide. Buildings will likely need to be relocated to accommodate the ORP facilities. For the Diemer plant, major site/soil remediation work will need to occur prior to the installation of the ORP facilities.

See **Attachment 1** for the detailed report.

Policy

Metropolitan Water District Administrative Code § 5108: Capital Project Appropriation

California Environmental Quality Act (CEQA)

CEQA determinations for Option #1:

- Planning for and/or Implementation of the Use of Ozone as the Primary Disinfectant at All Metropolitan Treatment Plants; Modify CIP Schedule to Include On-line Dates for Weymouth and Diemer ORP of 2009:

  Mills Plant

  The environmental effects from the design, construction, and operation of the Mills ORP were originally evaluated in the Henry J. Mills Water Filtration Plant Expansion Final Environmental Impact Report (Final EIR), which was certified by the Board on February 12, 1991. The Board also approved the Findings of Fact, the Mitigation Monitoring and Reporting Program, and the overall expansion, including the ORP itself. Based on the Board's previous approval of that environmental documentation, the proposed action contained in this current board letter fully complies with CEQA and the State CEQA Guidelines. As such, no further CEQA documentation is necessary for the Board to act on the proposed action.

  The CEQA determination is: Determine that the proposed action has been previously addressed in the 1991 certified Final EIR and that no further environmental analysis or documentation is required.

  Jensen Plant

  To comply with CEQA and the State CEQA Guidelines, Metropolitan as the Lead Agency prepared and processed the Mitigated Negative Declaration (MND) for the Joseph P. Jensen Filtration Plant ORP. Board adoption of the MND and its mitigation monitoring and reporting program (MMRP), along with approval of the Jensen ORP, occurred on August 19, 1994. Based on the Board's previous approval of that environmental documentation, the proposed action contained in this current board letter fully complies with CEQA and the

State CEQA Guidelines. As such, 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 has been previously addressed in the adopted 1994 MND and its MMRP, and that no further environmental analysis or documentation is required.

Diemer Plant

The environmental effects from the design, construction, and operation of the Diemer ORP utilizing ozone were evaluated in the Robert B. Diemer Filtration Plant Improvements Project Final EIR, which was certified by the Board on February 13, 2001. The Board also approved the Findings of Fact, the Statement of Overriding Considerations, the Mitigation Monitoring and Reporting Program, and the Diemer ORP itself. The present board actions would establish the on-line date of the Diemer ORP with the primary disinfectant still being ozone. This board action would not result in any changes to the approved Diemer ORP itself. Hence, the previous environmental documentation taken by the Board in conjunction with the proposed actions fully complies with CEQA and the State CEQA Guidelines. As such, no further CEQA documentation is necessary for the Board to act on the proposed actions.

The CEQA determination is: Determine that the proposed actions have been previously addressed in the certified 2001 Final EIR and that no further environmental analysis or documentation is required.

Skinner Plant

The environmental effects from the design, construction, and operation of the Skinner ORP were originally evaluated in the Robert A. Skinner Filtration Plant Reliability and Quality Program (Program) Final Program Environmental Impact Report (Final PEIR), which was certified by the Board on July 8, 2003. The Board also approved the Findings of Fact, the Mitigation Monitoring and Reporting Program, and the overall Program, including the Skinner ORP. Based on the Board's previous approval of that environmental documentation, the proposed action contained in this current board letter fully complies with CEQA and the State CEQA Guidelines. As such, no further CEQA documentation is necessary for the Board to act on the proposed action.

The CEQA determination is: Determine that the proposed action has been previously addressed in the 2003 certified Final PEIR and that no further environmental analysis or documentation is required.

Weymouth Plant

The implementation of preliminary design, technical studies, and environmental documentation relating to the proposed Weymouth Plant Oxidation Retrofit Project (Weymouth ORP Project) was previously determined to be categorically exempt under the provisions of CEQA and State CEQA Guidelines. These activities associated with the proposed Weymouth ORP Project were found to be exempt under Class 6, Section 15306 of the State CEQA Guidelines on March 12, 2002. A Notice of Exemption (NOE) was filed at that time and the statute of limitations has ended. With the current board actions, there is no substantial change to the proposed Weymouth ORP Project since the original NOE was filed with the minor exception of the establishment of the on-line date and planning for the use of ozone as the primary disinfectant. Hence, the previous environmental documentation in conjunction with the proposed actions fully complies with CEQA and the State CEQA Guidelines. Prior to formal approval of the proposed Weymouth ORP Project from the Board, environmental documentation will be prepared and processed in accordance with CEQA and the State CEQA Guidelines. The Board will then review and consider the environmental documentation before taking further action on the Weymouth ORP Project, including the use of ozone as the primary disinfectant. As such, no further CEQA documentation is necessary for the Board to act with regard to the proposed actions.

The CEQA determination is: Determine that the proposed actions have been previously addressed in the approved 2002 NOE (Class 6, Section 15306 of the State CEQA Guidelines) and that no further environmental analysis or documentation is required.

- Discontinue further ADE program expenditures and finalize all testing currently underway; discontinue the parallel design effort of implementing chlorine dioxide at the Weymouth and Diemer plants:

  None required

CEQA determinations for Option #2:

- Planning for and/or Implementation of the Use of Ozone as the Primary Disinfectant at All Metropolitan Treatment Plants; Modify CIP Schedule to Include On-line Dates for Weymouth and Diemer ORP of 2009:

  Same as CEQA determination for Option #1 for the same activities listed

- Continue the ADE Program to evaluate the feasibility of augmenting ozone with chlorine dioxide during periods of high bromide concentrations:

  The implementation of the ADE Program was previously determined to be categorically exempt under the provisions of CEQA and State CEQA Guidelines. The ADE Program and its related activities (i.e., basic data collection and minor modifications to existing public facilities) were found to be exempt under Classes 1 and 6, Sections 15301 and 15306 of the State CEQA Guidelines on March 12, 2002. A Notice of Exemption (NOE) was filed at that time and the statute of limitations has ended. With the current board actions, there is no substantial change to the ADE Program since the original NOE was filed. Hence, the previous environmental documentation in conjunction with the proposed action fully complies with CEQA and the State CEQA Guidelines. As such, no further CEQA documentation is necessary for the Board to act with regards to the proposed action.

  The CEQA determination is: Determine that the proposed action has been previously addressed in the approved 2002 NOE (Classes 1 and 6, Sections 15301 and 15306 of the State CEQA Guidelines) and that no further environmental analysis or documentation is required.

- Discontinue the parallel design effort of implementing chlorine dioxide at the Weymouth and Diemer plants:

  None required

CEQA determinations for Option #3:

- Proceed with the ADE Program:

  Same as CEQA determination for Option #2 for continuing with the ADE Program

- Proceed with the concurrent preliminary design of ozone and chlorine dioxide facilities at the Weymouth and Diemer plants; direct staff to return to the Board in October with a recommended technology selection for the Weymouth and Diemer plants:

  Diemer Plant

  For ozone option: Same as CEQA determination for Option #1 for the Diemer plant

  For chlorine dioxide option: The environmental effects from the design, construction, and operation of the Diemer ORP utilizing chlorine dioxide were evaluated in the Robert B. Diemer Filtration Plant Improvements Project Final Supplemental Environmental Impact Report (Final SEIR), which was certified by the Board on August 20, 2002. During that same meeting, the Board also approved the amended Findings of Fact, the amended Mitigation Monitoring and Reporting Program, the amended Statement of Overriding Considerations, and the proposed modifications to the originally approved Robert B. Diemer Filtration Plant Improvements Project. This documentation fully complies with CEQA and the State CEQA Guidelines, and as such, no further CEQA documentation is necessary for the Board to act on the proposed actions.

  The CEQA determination is: Determine that the proposed actions have been previously addressed in the certified 2002 Final SEIR and that no further environmental analysis or documentation is required.

Weymouth Plant

Same as CEQA determination for Option #1 for the Weymouth plant

- Modify CIP schedule to include on-line dates for Weymouth and Diemer ORP of 2009:

  Same as CEQA determination for Option #1 for modifying the CIP schedule

Board Options/Fiscal Impacts

Option #1

Adopt the CEQA determinations and

a. Direct staff to proceed with the planning for and/or implementation of the use of ozone as the primary disinfectant at all Metropolitan treatment plants;
b. Discontinue further ADE program expenditures and finalize all testing currently underway;
c. Discontinue the parallel design effort of implementing chlorine dioxide at the Weymouth and Diemer plants; and
d. Modify the CIP schedule to include on-line dates for the Weymouth ORP and Diemer ORP of 2009.

Fiscal Impact: The CIP total program estimates for the installation of ozone facilities at the Weymouth and Diemer plants total $343.5 million, which is estimated to be up to $85 million (capital) more than chlorine dioxide disinfection facilities. Discontinuing the ADE program and parallel preliminary design for chlorine dioxide facilities would result in a savings of approximately $1.9 million in previously appropriated funds.

Option #2

Adopt the CEQA determinations and

a. Direct staff to proceed with the planning for and/or implementation of the use of ozone as the primary disinfectant at all Metropolitan treatment plants;
b. Continue the ADE program to evaluate the feasibility of augmenting ozone with chlorine dioxide during periods of high bromide concentrations;
c. Discontinue the parallel design effort of implementing chlorine dioxide at the Weymouth and Diemer plants; and
d. Modify the CIP schedule to include on-line dates for the Weymouth ORP and Diemer ORP of 2009.

Fiscal Impact: Similar to Option #1. Reducing the scope of the ADE and eliminating parallel preliminary design chlorine dioxide facilities would result in a savings of approximately $1.3 million in previously appropriated funds.

Option #3

Adopt the CEQA determinations and

a. Proceed with the ADE program and concurrent preliminary design of ozone and chlorine dioxide facilities at the Weymouth and Diemer plants;
b. Direct staff to return to the Board in October with a recommended technology selection for the Weymouth and Diemer plants; and
c. Modify the CIP schedule to include on-line dates for the Weymouth ORP and Diemer ORP of 2009.

Fiscal Impact: Previously appropriated funds for the ADE and parallel preliminary design of approximately $1.9 million would be expended.

Committee Recommendation

Option #1

6/27/2003
Jill T. Wicke *Date*
Manager, Water System Operations

6/27/2003
Ronald R. Gastelum *Date*
Chief Executive Officer

Attachment 1 – Detailed Report

BLA #2374

Detailed Report

Background

The Board previously authorized construction of ozone facilities at the two plants (Mills and Jensen) that treat 100 percent State project water (SPW). The on-line dates for Mills and Jensen ozone facilities are 2003 and 2005, respectively. In March 2002, Metropolitan's Board authorized $3.511 million for the ADE to evaluate chlorine dioxide as an alternative to ozone for compliance with the U.S. Environmental Protection Agency's (USEPA's) Stage 1 of the Disinfectants/Disinfection By-Products (D/DBP) Rule at the blend plants (Weymouth, Diemer, and Skinner), as well as enhance the ability of these plants to treat higher blends SPW. Preliminary information indicated potentially significant cost savings for chlorine dioxide, although limited information existed on full-scale applications.

Alternative Disinfectant Evaluation Board Workshop

At the May 20, 2003 ADE Board Workshop, staff presented information that supports moving forward with ozone at the Skinner plant, in part because ozone is less expensive than chlorine dioxide. This recommendation, based on the need for sedimentation basins for the chlorine dioxide option, will be the subject of a separate board letter at the July board meeting. The proposed on-line date for the Skinner ozone facilities is 2007. Staff also presented that the potential capital cost savings associated with the implementation of chlorine dioxide at Weymouth and Diemer were significant (approximately $85 million), although there remain a number of unknowns. The capital cost estimate for ozone facilities at Weymouth and Diemer is $254 million.

Three major issues remain unresolved before chlorine dioxide can be recommended for the Weymouth and Diemer plants. First, it is unknown if chlorine dioxide will be completely effective against fishy/swampy/grassy odors or if the use of powder activated carbon (PAC) would need to be increased substantially (from the expected two weeks per year). A substantial increase in the frequency of PAC usage would significantly increase the operations and maintenance costs for chlorine dioxide, making ozone a more cost effective option. Second, the robustness and operability of feeding chlorine dioxide, ferrous chloride, and powdered carbon must be evaluated at the demonstration plant. It is possible that the combination of these chemicals would result in a new solids handling or filtration bottleneck at these plants. Finally, chlorine dioxide could be used to augment ozone at the SPW plants (Mills and Jensen) during periods of high bromide concentrations to minimize the formation of bromate. These issues could be resolved if work continued. The majority of the ADE study will be completed by September 2003, which would allow staff time to make a recommendation to the Board in October 2003 on a disinfection technology for the Weymouth and Diemer plants.

Weymouth and Diemer Oxidation Retrofit Programs

The F. E. Weymouth Filtration Plant was placed into service in 1941 with an initial capacity of 100 million gallons per day (mgd). The plant was expanded twice to its current capacity of 520 mgd. The plant uses conventional water treatment processes including coagulation, flocculation, sedimentation, filtration, and disinfection. The plant delivers treated, chloraminated water to Metropolitan's Central Pool portion of the distribution system.

The Robert B. Diemer Filtration Plant (Diemer plant) was placed into service in 1963 with an initial capacity of 200 mgd. The plant was expanded in 1969 and now has a design capacity of 520 mgd. The plant uses conventional water treatment processes including coagulation, flocculation, sedimentation, filtration, and disinfection. The plant delivers treated, chloraminated water to Orange County and parts of Metropolitan's Central Pool portion of the distribution system.

Both the Weymouth and Diemer plants typically treat a blend of SPW and CRW. The long-term strategy to comply with the D/DBP Rule at the Diemer and Weymouth plants is to use a treatment technique such as ozone disinfection or an alternative disinfection technology (chlorine dioxide). Metropolitan's current CIP schedule for implementing ozone or an alternative disinfectant at Diemer and Weymouth by 2009 and 2012 was established in an August 1998 board action. There was extensive discussion at both the May ADE workshop and the June

Engineering and Operations Committee meeting about accelerating the on-line dates for the Diemer and Weymouth ORP from the current 2009 and 2012 to 2009 for both plants.

Due to the complexity and site constraints of implementing a new treatment technology as described below, 2009 is the earliest date at which the ORP facilities can be placed into service. Both ozone and chlorine dioxide will require significant site modifications to implement these technologies. Because of these site issues, a selection of the technology prior to a board action in October 2003 would not allow an earlier on-line date than 2009.

In March 2002, Metropolitan's Board authorized preliminary design activities for ozone and chlorine dioxide facilities at both plants. Preliminary design activities are currently underway for the Diemer ORP and are scheduled to be completed in April 2004. Due to site constraints at the Diemer plant, the complexity of designing and constructing facilities for ozone or another disinfectant at Diemer will require longer durations than for similar work at the Skinner plant.

A Weymouth plant site study that will recommend the location of future plant facilities, including the ORP, is scheduled for completion in September 2003. Staff has commenced Weymouth ORP preliminary design activities and has initiated environmental documentation for multiple facilities including the ORP, the buildings that must be relocated to make room for the ORP, and other new plant facilities. Complexities at the Weymouth plant include hydraulic constraints and resolving existing site constraints to fit new ORP structures within the area now used for service shops and other non-treatment functions. Prior to commencing construction, several Water System Operations facilities must be relocated.

The Diemer plant is located on top of a hill with few remaining areas that are suitable for new facility construction. The ozone contactors (or chlorine dioxide reactors) will be located at the southwest portion of the plant on the main plant level, requiring relocation of the existing warehouse facility. Geotechnical investigations and preliminary design to stabilize the southwest slope are ongoing. The southwest slope ORP structure is expected to be under the jurisdiction of the California Department of Water Resources, Division of Safety of Dams (DSOD), which must approve the designs of the stabilization and hydraulic structures. Additionally, issues related to the plant's hydraulic capabilities are being thoroughly examined during preliminary design. These hydraulic and site constraints may dictate the use of unique configurations for the contactors (or reactors).

Final design of the south slope stabilization is scheduled to be completed by mid-2004, followed by review by the DSOD. The south slope stabilization includes demolition of the existing warehouse facility, removal of an inter-tie pipeline between the east and west washwater tanks, construction of a temporary reclaimed washwater line, deep excavation and tieback shoring, protection of the Second Lower Feeder pipeline, and road relocation at the toe of the slope. Construction of the slope stabilization is planned to be completed in early 2006. Additional work that must be coordinated with the slope stabilization includes relocation of the warehouse facility, the northwest hill grading project, and construction of the Yorba Linda Feeder Bypass. Construction of the Diemer ORP is planned to commence in mid-2006.

Staff plans to return to the Board to initiate final design for the Diemer plant in April 2004 and to consider the environmental documentation, in conjunction with the approval of the Weymouth ORP, and initiate final design for the Weymouth plant in October 2004.

Project Milestones

- April 2004 – Board authorization and funding for final design of ozone or an alternative disinfection technology at the Diemer plant
- October 2004 – Board consideration and action on environmental documentation, authorization and funding of the ORP for final design of ozone or an alternative disinfection technology at the Weymouth plant
- 2009 – Completion of Diemer ORP and Weymouth ORP construction