

DATE ISSUED: October 17, 2003

REPORT NO. 03-211

ATTENTION: Natural Resources and Culture Committee
Agenda of October 29, 2003

SUBJECT: Metropolitan Wastewater Department (MWWD)/Pilot Testing of the
Biological Aerated Filter (BAF) Technology at the Point Loma
Wastewater Treatment Plant (PLWTP)

SUMMARY

Issue - What actions should the City Council take regarding the approval of the Pilot Testing of the BAF technology at the PLWTP?

Manager's Recommendations - (1) Authorize the City Manager to issue Brown and Caldwell, the MWWD As-Needed Consultant, a notice to proceed with the pilot testing at the Point Loma Treatment Plant to investigate the BAF technology; (2) Authorize the expenditure of \$707,000 from Sewer Revenue Fund 41509, Dept. 777, Org. 422, Job Order 4055 in Fiscal Year 2004 and \$993,000 in Fiscal Year 2005, contingent upon approval of the MWWD's FY 2005 operating budget, to fund this pilot test.

Other Recommendations - None

Fiscal Impact - The total authorized expenditure is not to exceed \$1.7 million from the Sewer Revenue fund 41509.

BACKGROUND

The MWWD is continuing the process of upgrading the Metropolitan Sewerage System (Metro System), a program that has been ongoing for the past 12 years. MWWD is committed to provide a safe, efficient, regional sewerage system while supplementing our water supply, protecting the environment and meeting federal standards. This goal is being achieved through an aggressive program of planning and research, the use of state of the art technology, new construction, and ongoing maintenance of existing facilities. MWWD treats wastewater from the

Metropolitan area that includes the City of San Diego and 15 surrounding municipalities and agencies. Wastewater from this service area of over 450 square miles is conveyed through thousands of miles of pipelines and 83 individual pump stations to the North City Water Reclamation Plant (NCWRP), the PLWTP, and the South Bay Water Reclamation Plant (SBWRP). Treated effluent is discharged to the Pacific Ocean through two ocean outfalls. Solids from the wastewater treatment plants are processed at the Metro Biosolids Center located on the Marine Corps Air Station, Miramar.

For over 40 years, the PLWTP has been the center of MWWD's operations. With a capacity of 240 million gallons per day (MGD) it comprises about 80% of the total system treatment capacity. Since its construction in the 1960s, the plant has received several upgrades. These improvements have ensured that the plant is capable of meeting all current regulations and permit requirements. Throughout this process MWWD has always investigated innovative and alternative process improvements that may allow the facility to achieve its requirements in the most efficient manner. As a result, the PLWTP has a world-wide reputation as one of the most successful large scale advanced primary treatment plants.

In planning for the system upgrades currently being completed, the Clean Water Program (CWP) in 1990 issued a 9 volume Project Report. This report evaluated several potential secondary treatment processes for PLWTP including Air Activated Sludge (AAS), Oxygen Activated Sludge (OAS), Trickling Filter/Solids Contact (TF/SC), Physical/Chemical, Land Treatment, Rotating Biological Contactor (RBC), Aquaculture with Water Hyacinths, and Biological Aerated Filter (BAF). The only potentially viable secondary treatment option recommended for The PLWTP was the OAS process. To fully implement it also required the acquisition of approximately 1000 linear feet of land to the north of the plant. The report also concluded that because of the restricted location of the PLWTP facility a loss of capacity from 240 MGD to 150 MGD would result. In order to compensate for the loss of capacity (90 MGD) at the PLWTP, other facilities and pipelines would need to be constructed elsewhere in the system. The total cost that would be required to maintain the capacity of the existing system and convert PLWTP to secondary would be approximately \$4 billion, in FY 2002 dollars, for capital costs and financing.

As a result of MWWD's strong Industrial Source Control Program, the excellent performance of PLWTP as an advanced primary treatment plant, a long, deep ocean outfall at PLWTP and a comprehensive ocean monitoring program, the U. S. EPA has granted the PLWTP a modified operating permit that does not require secondary treatment.

The regulatory authority that has allowed the EPA to grant San Diego a modified permit is found in section 301(h) of the Clean Water Act as modified, in San Diego's case, by the Ocean Pollution Reduction Act (OPRA) of 1994. To qualify for a modified permit, the discharge must meet all regulatory standards and have no negative impact on the receiving water environment. OPRA placed additional requirements on San Diego, among those the requirement to reduce the amount of solids discharged over time. Historically, over 100 dischargers have held modified permits. Today that number has fallen to fewer than 40, and San Diego is the largest of those.

The modified operating permit for the PLWTP must be renewed every five years. To ensure the adequacy of the Sewerage System, facility planning must be done over a much longer period of time. It is critical that MWWD include in its long-range planning the necessary steps to determine what potential future options may be available to meet the wastewater treatment needs of the Metro System in the coming decades. Whereas the present modified permit is appropriate, MWWD realizes that in the face of different interpretations of OPRA, the possibility of changing regulatory requirements, and emerging environmental concerns, it is prudent to continue to investigate alternative and innovative treatment processes.

Since the completion of the project report in 1990, one secondary treatment technology, Biological Aerated Filter (BAF), that was considered but not recommended, has been developed more widely in Europe and is now beginning to be employed in the United States. The lack of large scale applications at the time (1990) and a concern with its ability to reliably meet US treatment standards resulted in its previous lack of recommendation. Since then the technology has developed to where it deserves strong consideration. It now appears that by using BAF it may be possible to achieve the full 240 MGD of secondary treatment at the PLWTP site with the addition of approximately 1000 linear feet to the north of the existing facility. Alternatively, even if BAF cannot achieve the full capacity at secondary, it may provide a means to incrementally reduce the solids in the effluent, insure compliance with OPRA and thereby preserve PLWTP's already constructed capacity. MWWD is investigating this technology and seeks to conduct a one year pilot test of BAF at PLWTP to determine its viability for consideration in future planning scenarios.

DISCUSSION

The BAF is a biological treatment technology that can provide secondary treatment to municipal and industrial wastewater. Although the modern BAF technology was not developed until the late 1970s, the basis for the theory behind the technology goes back at least 50 years. Over several decades, the process evolved into what is now called BAF. Today, there are many installations of this technology. The majority of these are in Europe, where the oldest and largest BAF systems are located. It could be employed at PLWTP by redirecting the plant effluent through the BAF process prior to discharge via the outfall. Benefits of BAF over conventional activated sludge systems that have been considered in the past include:

- Compact footprint
- Quick recovery from organic and hydraulic shock-loading and
- Stable operation

The compact footprint is a key advantage over other systems that have been considered for PLWTP in the past. Current estimates indicate that full implementation of BAF at PLWTP could cost \$400 to \$500 million, much less than the \$2 billion (not including financing costs) for other processes that were presented in the 1990 Project Report.

MWWD staff recently visited two treatment plants within the US that utilize BAF technology. These included a 3.4 MGD facility in Northfield, Minnesota, and a 14 MGD treatment plant in Roanoke, Virginia. MWWD has also visited a 95 MGD Treatment Plant in Geneva, Switzerland, and a 63 MGD facility in Paris, France. The two European facilities have been in operation for 2 years and 5 years respectively. These site visits have further substantiated the potential viability of the application of this process at the PLWTP.

The only way to fully evaluate BAF's applicability in San Diego is to perform a large scale pilot test at the PLWTP. A pilot test will yield critical information as to its performance over a wide range of flows and wastewater constituent variations unique to the PLWTP. In addition, the pilot test will provide data to make engineering determinations regarding the potential maximum capacity that BAF could achieve at the PLWTP, operating costs and regulatory compliance reliability.

MWWD has utilized its As-Needed Engineering Consultant, Brown and Caldwell, to develop a pilot testing program and solicit potential vendors of the BAF technology. Whereas there are multiple suppliers for this product, two primary vendors have been short listed because only they have demonstrated significant success in implementing BAF throughout the world. Each of these two products, although similar in the theory of operation, has its own unique design features. It is proposed to pilot each product. The testing would begin in January 2004 with the field work complete by October 2004 and a final report to be released in January 2005. A scope of work is attached.

CONCLUSION

MWWD is currently in the midst of a large Capital Improvement Program that requires ongoing research and process development. In the face of regulatory uncertainties, divergent interpretation of legislation, and emerging environmental issues, it is prudent and sound planning to investigate innovative and alternative options to meet the potential wastewater treatment needs of the future. In this way regulatory compliance and environmental protection can be assured in a cost effective and efficient manner. The BAF treatment process may allow the PLWTP to operate as a secondary treatment facility or to reduce the solids in the discharge to the ocean, without reduction in capacity, should either scenario become necessary.

To adequately evaluate the potential for BAF, it is necessary to conduct a large scale pilot test at the PLWTP. Authorization is requested to provide a task order to MWWD's As-Needed Consultant, Brown and Caldwell, for the purpose of carrying-out a large scale pilot test of BAF technology at the PLWTP. The cost for this task is not to exceed \$1.7 million. Funds are available in Sewer Revenue Fund 41509.

ALTERNATIVE

1. Do not authorize the pilot testing of the BAF technology at the PLWTP. This alternative is not recommended because in the future the City may be required to implement secondary treatment or to reduce solids discharged to the ocean. This could result due to interpretations of OPRA, changes in legislation and regulations or for emerging environmental concerns. Without investigating alternative technologies, the City still has only the \$4 billion alternative detailed in the 1990 Project Report's recommended plan.

Respectfully submitted,

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Director
Metropolitan Wastewater Department

Approved by: Richard Mendes
Utilities General Manager

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Attachment: [Scope of Work – Biological Aerated Filter Pilot Test at PLWTP](#)