

**Council Meeting: March 6, 2012****SUBJECT: Approval of Budget Modification No. 25 to Fund a Capital Project for Conversion from Gaseous Chlorine to Liquid Sodium Hypochlorite for the Water Pollution Control Plant Disinfection Process****BACKGROUND**

As Sunnyvale has been developing the plan for rebuilding the Water Pollution Control Plant (WPCP), a number of projects have been identified as needing early initiation. Careful consideration is being given to only build projects that are absolutely necessary, and to maximize the probability that they will be “no regrets” projects that will fit into the ultimate WPCP treatment configuration. This memo identifies a new project that staff is recommending.

The final treatment process at the Sunnyvale WPCP is to disinfect the wastewater using gaseous chlorine and then neutralize the chlorine prior to Bay discharge. Gaseous chlorine has been used at the Sunnyvale WPCP for decades and was historically the disinfectant of choice due to its effectiveness and low cost.

Gaseous chlorine is a very dangerous chemical and by far the most dangerous chemical used at the Sunnyvale WPCP. It is extremely irritating to the alveolar portion of the lungs, even in low concentrations. Inhalation of chlorine gas can cause inflammation of the alveoli of the lung and produce the adult respiratory distress syndrome, which has a 50% death rate. When a wastewater treatment plant utilizes large amounts of gaseous chlorine an extreme hazard exists not only for the plant workers but for the surrounding community as well.

Due to the extreme care and strict operational protocols, there has never been a serious chlorine accident at the Sunnyvale WPCP. However, it is no longer acceptable practice to risk exposing WPCP workers and the public to the hazards of chlorine gas. Wastewater treatment plants around the world are eliminating the use of gaseous chlorine, usually in favor of liquid chlorine (technically, sodium hypochlorite, aka bleach), which is much less dangerous and can meet permit requirements, but is more expensive.

DISCUSSION

Staff is recommending the design and construction of a liquid chlorine disinfection system to replace the gaseous chlorine system. The capital cost is estimated at \$1.6 million. Upon completion, the liquid chlorine system would be used for all disinfection in the short term.

The long-term plan for disinfection at the WPCP is most likely a combination of liquid chlorine and ultraviolet (UV) disinfection. UV disinfection involves no chemicals and is therefore even safer than liquid chlorine. However, the technology of UV disinfection is quite expensive to construct and operate, and immediate installation may be premature since the technology is still improving. A likely scenario in the future is to use “right-sized” UV disinfection for the normal flows to Bay discharge and supplement it with liquid chlorine.

In the long term, liquid chlorine would be used in three situations:

- 1) during very high peak flows as a supplement to UV (to reduce the capital cost of the UV system)
- 2) as a full back-up disinfection system
- 3) for all recycled water (Chlorine residual is required in the recycled water lines as UV does not provide the required residual.)

The annual chemical cost for liquid chlorine is higher than the chemical cost for gaseous chlorine. However, this is almost completely offset by the decreased costs that result from the elimination of the administrative, procedural, training, engineering, operational, equipment, and maintenance programs to satisfy Santa Clara County Toxic Gas Ordinance, the State’s Cal OSHA Process Safety Management of Acutely Hazardous Materials, and the Environmental Protection Agency’s required Risk Management Plan for chlorine gas.

FISCAL IMPACT

The total capital cost of the project, including contingency, is estimated to be \$1.6 million. The current Wastewater Management Fund Long Term Financial Plan reflects approximately \$412 million in funding to renovate both the collection system and the WPCP. Current projects are being funded with a combination of proceeds from the 2010 Wastewater Revenue Bonds and ongoing rate revenue, which is accounted for in the Fund’s reserves.

This project has an impact on wastewater rates, as all other available funding is currently committed. However, the Environmental Services Department is currently reprioritizing its projects in both the water and wastewater utilities, which will mitigate the rate impact of this project by either de-funding or deferring current and/or future projects. Changes will be presented in the FY 2012/13 Recommended Budget.

As noted above, while the product cost of liquid chlorine is greater than that of gaseous chlorine, experience at other plants has shown that this increase will be offset by savings accruing due to reduced requirements needed to handle toxic gases. However as these savings are diverse and difficult to project, staff will include a projected operating cost increase of \$60,000 per year in the new project as a placeholder. Upon completion of the project, any resulting savings or cost increases will be incorporated into Program 365 – Wastewater Treatment. Staff will strive to construct and operate the project so that there is no net impact on operating costs as a result of this project.

**Budget Modification No. 25
Fiscal Year 2011/2012**

	Current	Increase (Decrease)	Revised
Wastewater Management Fund			
Expenditures:			
FY 2011/2012 – New Project – WPCP Chlorine Conversion	\$0	\$1,600,000	\$1,600,000
Reserves:			
Rate Stabilization	\$10,466,597	(\$1,600,000)	\$8,866,597

PUBLIC CONTACT

Public contact was made by posting the Council agenda on the City's official-notice bulletin board outside City Hall, at the Sunnyvale Senior Center, Community Center and Department of Public Safety; and by making the agenda and report available at the Sunnyvale Public Library, the Office of the City Clerk and on the City's Web site.

ALTERNATIVES

1. Approve Budget Modification No. 25 to fund a capital project for conversion from gaseous chlorine to liquid chlorine (technically, sodium hypochlorite) for the Water Pollution Control Plant Disinfection Process.
2. Request staff provide additional background and information on the use of chlorine gas compared to liquid chlorine and evaluate the project in the next budget cycle.
3. Do not approve the chlorine conversion capital project or budget modification and continue to utilize the current gaseous chlorine disinfection process.

RECOMMENDATION

Staff recommends approval of Alternative 1 to provide funding for a project to convert to a liquid chlorine disinfection process resulting in significant reductions in safety concerns while maintaining all effluent limitations for permit compliance. If approved, the need for the expensive programs to satisfy County, State, and Federal requirements for chlorine gas will be eliminated.

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Approved by:

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