STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY

PETE WILSON, Governor

DEPARTMENT OF HEALTH SERVICES
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Peter MacLaggan
Director Water Reclamation
San Diego County Water Authority
3211 Fifth Avenue
San Diego, CA 92103-5718

Dear Mr. MacLaggan:

We have completed our review of the San Diego County Water Authority's (SDCWA) Water Re-purification Feasibility Study report. This project would augment a drinking water supply reservoir with a significant percentage of highly treated repurified water. If implemented, this will be the first planned indirect potable reuse project involving surface water in California. Therefore, because of the precedent that this project will establish, we have undertaken our assessment from a conservative public health perspective.

The proposed project was reviewed in the context of over three decades of experience in California with the use of recycled water for groundwater recharge. The Department recognizes that extensive research conducted in San Diego and elsewhere demonstrates the capability to safely repurify water for augmentation of surface water supplies. Therefore, the Department is of the opinion that the proposed water repurification project represents a logical extension of California's existing water resources management strategy.

In general, we have concluded that the project, as described in the report, should provide sufficient barriers to the contaminants found in municipal wastewater to ensure that the quality of the drinking water derived from San Vincente Reservoir is not compromised. This conceptual approval assumes that specific critical features of the proposal described in the report will be incorporated into the Water Reclamation Permit adopted by the Regional Water Quality Control Board for the discharge to San Vincente Reservoir. These critical features included:

Source Water and Initial Treatment

A source control program to minimize the contribution of high toxic materials to the wastewater.

Wastewater treatment consisting of primary, secondary, and tertiary treatment (without disinfection) at the North City Water Reclamation Plant that meets criteria which will ensure that the water repurification treatment plant will be able to meet requirements. Facilities shall be provided to divert the treated wastewater away from the water repurification plant when these criteria are not met.

Water Repurification Treatment Plant

The repurified water shall meet all drinking water chemical maximum contaminant levels prior to introduction to the reservoir. This requirement should be readily achievable with the proposed treatment and it provides a measure of the effectiveness of the pretreatment program and the repurification process.

Reverse osmosis treatment shall be provided for the entire flow.

The total organic carbon content of the repurified water shall not exceed a monthly average of 2 milligrams per liter prior to discharge.

A 6-log virus inactivation and 3-log Giardia cyst inactivation shall be continuously achieved with ozone disinfection.

A free chlorine residual shall be continuously maintained in the 20-mile conveyance to the reservoir. A 5 to 6-log virus inactivation shall be achieved (allowable variation with time yet to be determined).

The treatment process shall be designed and operated to minimize disinfection by-products.

Facilities shall be provided to divert the repurified water to alternative destinations from the treatment or conveyance facilities at any time.

In addition, a Reservoir Management Program would be required which would contain the following criteria:

The treated repurified water shall comprise no more than 50% of reservoir water withdrawn over any 36-month period.

The methods for introducing and withdrawing the repurified water from the reservoir shall be designed to minimize short circuiting.

A 12-month theoretical hydraulic retention time for treated repurified water in the reservoir shall be maintained at all times.

> The repurified water shall be discharged above the thermocline, and withdrawals shall be below the thermocline, when the thermocline is established. Other withdrawal options may be approved based on the results of the field studies to be conducted on short circuiting.

A monitoring and control program would also be required as part of the Water Reclamation Permit and the Reservoir Management Program to ensure that all components for the project including treatment processes and reservoir operation are reliably achieving the required objectives.

In light of the requirements listed above, there are several details that must be resolved:

1. Minimizing the potential for short circuiting of repurified water in the reservoir is a crucial reliability feature and an additional barrier to pathogens. More studies are required before the compliance standard for this requirement can be set. These studies should include estimates of the fraction of the repurified water withdrawn that has been in the reservoir less than 30, 60, and 90 days under conditions of high flows and low reservoir volume levels. The distribution of residence times must be calculated for these worst case conditions. In addition, field studies must be conducted to corroborate the theoretical calculations. These field studies are to be completed before plans and specifications for the project are finalized. If it cannot be demonstrated that short circuiting can be satisfactorily controlled at the proposed discharge location, then either the discharge point must be moved, or another means must be found for assuring that short circuiting does not occur.

2. The proposal suggests a 6-log inactivation of virus with ozone and chlorine. It is necessary to show how you plan to demonstrate a 6-log virus inactivation when the available CT tables only go to a 4-log inactivation.

3. The Real Time Monitoring and Response Program (Table 9-6) needs to be supplemented in several areas.

There should be a response to tertiary filtration effluent turbidities in excess of two turbidity units.

It is important that the reverse osmosis process be continuously monitored to assure the integrity of the membrane. The methods proposed to monitor the performance of the reverse osmosis process are not sensitive enough to indicate a failure to achieve the estimated full 6-log removal of virus (Table 9-1). Leakage of approximately one gallon per million gallons treated would make a 6-log removal impossible. Conductivity monitoring will not detect such a small leak. Perhaps particle monitoring could detect a performance failure and trigger a response. The reliability assurance plan should sufficiently address the need to take corrective action for failure to achieve the minimum log removal. As to the latter issue, the report needs to identify the minimum log removal below which diversion would occur.

Table 9-1 also indicates that an estimated 4-log reduction in virus and protozoan cysts will be achieved as a result of reservoir storage. We would like a more detailed discussion of the basis for that estimate. It should be noted that if the required removal credits for microbial agents through reservoir retention or reverse osmosis treatment can not be satisfactorily justified or assured, these removals could possibly be achieved with additional disinfection.

Along with the requirements contained in the Water Reclamation Permit and the Reservoir Management Program, the City of San Diego's (City) water permit for the Alvarado Water Filtration Plant which includes the use of San Vincente Reservoir will need to be amended. The City will be required to continue to comply with the State's Surface Water Filtration and Disinfection Rule. The amended permit will also condition the continued use of San Vincente Reservoir, once the proposed project is implemented, to a three year demonstration period to ensure that the project consistently achieves all requirements. With a satisfactory completion of the three year demonstration period, a final permit amendment will be written.

Finally, we want to recognize the excellent work by SDCWA and its consultants. We appreciate the conservative and well-thought out approach taken, particularly with regard to protecting the health of the public. As noted above, this project is the first of its kind in California and arguably in the nation. If successful, it will permit SDCWA greater flexibility in managing its limited available water resources to meet anticipated future demands.

If you have any questions, please contact me at (916) 322-2308.

Sincerely,

Harvey F. Collins

Harvey F. Collins, Ph.D., P.E., Chief
Division of Drinking Water and
Environmental Management