



CITY OF SAN DIEGO
COUNCILMEMBER SHERRI S. LIGHTNER
DISTRICT ONE

M E M O R A N D U M

DATE: July 7, 2009

TO: Jim Barrett, Public Utilities Director

cc: Honorable Mayor Jerry Sanders
Honorable Councilmembers
Andrea Tevlin, Independent Budget Analyst

FROM: Councilmember Sherri S. Lightner 

SUBJECT: **Items 31 & 330, Council Docket July 7, 2009.** Response to Memo dated June 25, 2009 - Response to Memo dated April 21, 2009, Regarding Request for Continuance of the Reconsideration of Item 330 from March 24, 2009, Docket (Limnology and Reservoir Detention Study of San Vicente Reservoir for the IPR/RA Demonstration Project)

References:

1. Memorandum from Councilmember Sherri Lightner, dated April 21, 2009.
2. Memorandum from Jim Barrett dated June 25, 2009.
3. Notes from CDPH Meeting, dated March 5, 2008.
4. Notes from IAP meeting, dated June 24, 2009.
5. Report to City Council No. 08-125, Proposition 218 Noticing for Proposed Water Rate Increase to Meet New Rates Charged by the San Diego Water Authority and to Fund an Indirect Potable Reuse Demonstration Project, dated September 3, 2008.

I have provided four options for going forward with this project that I believe provide an improved use of science, improved fiscal responsibility and greater assurance for the public that the public health issues will be properly evaluated.

Many San Diegans have concerns about the safety of Indirect Potable Reuse (IPR). They deserve the highest quality scientific study that does what it says, acknowledges its limitations, and spends tax dollars transparently with accountability.

At some point, we must break with the culture of the past that led the City into financial difficulty in which elected officials said they were not experts themselves and so they had to rely on outside “experts”. This practice led to findings of negligence, and in some cases charges of fraud and millions in wasted funds.

I initially supported the award of the modeling contract, because I am supportive of the study of IPR/Reservoir Augmentation (RA) under the proper conditions – good science and fiscal responsibility. After the Council approval of the contract, more information revealed that the proposed study methodology may not provide the information requested by the California Department of Public Health (CDPH).

In my memorandum of April 21, 2009 (Reference 1), I articulated a number of concerns with the sole-sourced Flow Sciences contract and the proposed Statement of Work. In Reference 2 you responded to some of my questions and agreed with some of my comments.

However, my primary concern and question remains unanswered. In particular, is the proposed approach sufficient, in and of itself, for CDPH to issue a permit for the IPR/RA full scale project injection site location at the San Vicente Reservoir (SVR) or will additional testing/modeling of the enlarged SVR be required? What additional studies or information will the CDPH require to assure the public health is not jeopardized?

I believe that the answer to the first question is yes – additional testing/modeling will be required and I believe that the answer to the second question is “we do not know”. Item 11 of Reference 3 makes clear CDPH’s concerns with the proposed methodology and the following areas of research regarding the SVR were specifically suggested:

1. Short-circuiting (of the AWT) during winter, **especially at expanded lake capacity**
2. Development and calibration of a more sophisticated three-dimensional model of the lake hydrodynamics
3. Consultation with a limnologist
4. **More tracer work to define horizontal mixing and calibrate model**
5. **Evaluate ability of model to predict hydrodynamics in expanded lake**
6. **Where to introduce (AWT) and where to withdrawal [sic][Emphasis added]**

The current statement of work or contract does not satisfy sub items 4 and 5 and sub items 1, 2 and 6 might also not be satisfied, because there is no plan to collect data or perform studies and model calibration for the expanded SVR. Is this another part of the pilot project that is as yet not identified or funded?

As you stated in Reference 1, “Once the approved full-scale project is operational we anticipate there will be requirements for an on-going reservoir monitoring and management program. **These real-world monitoring and management actions will track the retention time, theoretical age, and possibly the distribution of the AWT [Advanced Water**

The above implies that the modeling study is not sufficient for the CDPH sign-off of the injection process. In fact, the validation of the models and important reservoir parameters will be done with actual data, but not during this contract or for validating the modeling of the Pilot Project. It will be done for the full-scale implementation. With some luck it may be that the data collected, after the full scale project is complete, substantiates that the modeling performed during the Pilot Project accurately predicted the AWT's optimum injection site.

Which brings me to the following question again, is the expenditure of \$420,000 (more than the original \$385,000 of Reference 5) to perform three-dimensional modeling without full scale model validation a good use of taxpayer dollars? Given that the CDPH has no experience with regulations for an Indirect Potable Reuse/Reservoir Augmentation (IPR/RA) project, are we in the position of iteratively exploring, at our expense, what will be sufficient for CDPH to allow the injection of AWT into the enlarged SVR? Is the proposed modeling a requirement of CDPH or something that was offered to them and considered by CDPH to be "nice to have?" If it is a requirement of the CDPH, how will they use the results in the permitting process? If it is a "nice to have," is it possible some other, less expensive methodology would be sufficient?

In my memorandum of April 21, 2009, I questioned whether the uncalibrated three-dimensional model of the enlarged reservoir is the most reliable and cost effective method for locating the AWT injection site and evaluating the retention times for the AWT. Why not use the existing data base for SVR, the existing SVR one-dimensional modeling results, the SVR tracer studies and the 30 year experience of Virginia Reservoir to do this without costly and uncalibrated modeling?

As a general rule, computer simulations are only useful if the simulations actually predict real-world, verifiable results. The previous one-dimensional computer simulation for the San Vicente Reservoir performed by the consultant, deviated significantly from real world performance. By adjusting (tuning) some of the model's parameters, the model was able to accurately predict real world performance. The use of a three-dimensional model that will only be tuned to the smaller SVR (and not the enlarged reservoir) configuration to predict behavior for the expanded San Vicente Reservoir concerns me. The three-dimensional modeling proposes to provide the optimum location for the AWT inlet to minimize short-circuiting of the inlet flow and maximize retention and reaction in the reservoir. Does the consultant believe that the extrapolated three-dimensional model does not need to be calibrated? Is the consultant willing to warrant the results of the three-dimensional modeling and refund the money or provide for free additional modeling, if in fact the three-dimensional simulations do not predict the real-world behavior of the expanded reservoir?

Or, is it possible, that the modeling of the enlarged reservoir is not needed, because either the water quality is believed by some to be so good that the environmental buffer provided by the reservoir is actually not needed or that the AWT inlet location is not sensitive to the additional reservoir volume?

There is no discussion about the validity of the model and the need to calibrate or not calibrate the model for the enlarged reservoir. It would be helpful if this question could be specifically addressed in the report from the IAP.

It is clear that we are not using chemical models to simulate the pilot plant portion of this project – it will actually be built and the various purification methodologies will be evaluated with real world equipment and data. Is it true that the \$7,400,000 (Ref. 5) allocated for the AWT demonstration plant will be used to duplicate the AWT plant used by Orange County? Is this a CDPH requirement? How will the plants be different?

Given the scope of the project and the questions raised by CDPH in Reference 3, is this modeling the best use of the funds available to demonstrate proof of concept to the CDPH? It may be better to spend the money on the other items to be researched and do the AWT inlet modeling when we move to the full-scale project.

Recommendations

I initially supported the award of the modeling contract, because I am supportive of the study of IPR/Reservoir Augmentation (RA) under the proper conditions – good science and fiscal responsibility while achieving CDPH certification. I believe the approval of the Flow Sciences consulting agreement should be reconsidered to assure that those conditions are met in one of the following ways:

1. Amend the contract's scope of work to include testing of the real world, expanded reservoir to validate the model used for the enlarged SVR. If this takes too long, because the full capacity of the SVR is needed, then move forward with the proposed statement of work and state the limitations of the proposed study and what will be required for the CDPH certification of the full scale project.
2. Amend the statement of work to perform only limited limnology and not the retention evaluation. Is the study actually necessary given the results for the existing SVR (testing and validated model) and the proof of concept with the 30 year experience of Virginia Reservoir? Is it possible to do the AWT inlet siting with the enlarged reservoir for the full-scale project?
3. If the contract is amended and there are excess funds, as described in recommendation 1 or 2, use these funds to address the other CDPH issues to be researched that are identified in Reference 3.
4. Amend the statement of work to have Flow Sciences warrant the results of the three-dimensional modeling and refund the money or provide for free additional modeling, if in fact the three-dimensional simulations do not predict the real-world behavior of the expanded reservoir.
5. Make the decision to move forward with this study as a bureaucratic requirement with the understanding that this model is not good enough to earn CDPH certification without testing of the full scale reservoir

SL:jr

ATTACHMENT 1

Comments on March 5, 2008 Meeting on the City of San Diego San Vicente Augmentation with Highly Treated Recycled Water

1. Form a San Diego Project Independent Advisory Panel to consider and advise on issues, including but not limited to the issues below
2. Demonstration project level research on application of BAT
3. Demonstration project vs. pilot project - is proposed size of 0.2 mgd enough?¹
4. Demonstration-scale removal of organics²
5. Identify type of constituents that can pass through the RO
 - a. e.g., low molecular weight, polar chemicals
 - b. identify a list of chemicals that can act as surrogates for adequate process control of RO (see slide 67)
6. Address AOP issues
 - a. perform research on the optimum dose level of hydrogen peroxide (5, 3, 1)
 - b. formaldehyde is of interest because it may be a byproduct of certain treatment processes
 - c. attempt to identify other by-products of AOP (e.g., Acetaminophen to N-Acetyl-p-benzoquinone imine and other toxic by-products)³
 - d. identify a list of chemicals that can act as surrogates for adequate process control for AOP (e.g., see slide 34)
7. Establish a more robust source control program, looking at it from a drinking water source protection perspective
8. More research on unique trace organic constituents in the effluent of the North City WRP
 - a. unique trace organics from the biotech industry
 - b. unique trace organics from UCSD
9. Perform research to develop a project-specific list of endocrine disrupting chemicals, pharmaceutical, personal care products, or other chemicals indicating the presence of wastewater
10. Attempt to identify good indicator or surrogate chemicals with available analytical methods,
 - a. On-going requirements for their monitoring should be considered in permit

¹ 5 MGD, like OCWD?

² OCWD has demonstrated NDMA removal, but not 1,4-dioxane

³ From "Chlorination of Pharmaceuticals", research at Michigan State - Presented at the WQTC, November 2007

- b. An ongoing monitoring program to address constituents of public concern
- c. Attempt to identify a list of chemicals that can act as surrogates for adequate process control (RO and AOP) that can be monitored frequently;
- d. The San Diego IAP should advise on the locations to monitor these "surrogates"
- e. This list could consist of the constituents that were detected in RO effluent shown on slides 31, 32, and 67

11. Issues to research regarding San Vicente Reservoir

- a. short-circuiting during winter, especially at expanded lake capacity
- b. development and calibration of a more sophisticated three-dimensional model of the lake hydrodynamics
- c. consultation with a limnologist (see slide 60)
- d. more tracer work to define horizontal mixing and calibrate model
- e. evaluate ability of model to predict hydrodynamics in expanded lake
- f. where to introduce water and where to withdrawal

12. Plant reliability issues - demonstration project level research on application of RO integrity monitoring; what is the feasibility of full-scale application and proposed frequency of the techniques on slides 30 and 66?

- a. vacuum hold test prior to installation
- b. conductivity probe
- c. on-line sulfate analyzer
- d. periodic virus challenge experiments with soluble dye spiking and/or TRASAR spiking

13. Operator issues, such as certification and specialized training

14. On page 23 of the PowerPoint presentation, an additional bullet should be added. That bullet should be for "Control of unregulated chemicals, such as nitrosamines, 1,2,3-trichloropropane, 1,4-dioxane, pharmaceuticals, personal care products, hormones, endocrine disrupting compounds and their metabolic byproducts."

15. With several state agencies and taskforces, in addressing future water supplies, pushing and advocating more water conservation and higher usage of urban water efficiency products, what impact will this have on this project as a result of higher TDS in the sewage being treated by the City. Will the City be able to continue to produce the desired quantity of water at the expected yearly operation and maintenance costs or will there be reductions or a need for more facilities?

16. Future research issues may be clarified or raised via the WaterReuse Foundation

- a. For instance, WRF-05-005: "Identifying Pharmaceuticals / Personal Care Products of Most Health Concern and Persistence through Water Treatments Used for Potable Reuse," which is focusing on alternative

methods to efficiently develop regulatory-based human health toxicity criteria for PPCPs and EDCs in wastewater.

- b. WRF-06-018, "Tools to Assess and Understand the Relative Risks of Indirect Potable Reuse and Aquifer Storage and Recovery Projects," is to evaluate and explain human health risks related to the use of recycled water and associated exposure to chemical contaminants.
- c. WRF-06-004, "Identifying Health Effects Concerns of the Water Reuse Industry and Prioritizing Research Needs for Nomination of Chemicals for Research to Appropriate National and International Agencies," is to develop a potential list of chemicals that should have health effects research done.