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METROPOLITAN WASTEWATER DEPARTMENT

May 26, 2005

Scott Tulloch, Director
Metropolitan Wastewater Department
9192 Topaz Way
San Diego, CA 92123

Re: BAF Peer Review
CEA No. 04044

Dear Mr. Tulloch:

Thank you for the opportunity to participate in this interesting and important project. I'd also like to express my appreciation for the cooperation and hospitality of you and your staff, as well as that of Brown and Caldwell. Overall, the work was of high professional quality and a credit to the City and its consultants.

My efforts have consisted of: review of protocols and data; a site visit to the pilot plant and discussions of results with City and Brown and Caldwell personnel; review of the draft report; and, a meeting with City staff and Brown and Caldwell personnel to discuss the draft report. At the last meeting, we discussed and resolved a number of technical issues that I will not reiterate here.

In my opinion, the major findings from the pilot study are:

- The Biological Aerated Filtration (BAF) worked extremely well and was able to treat Chemically Enhanced Primary Treatment (CEPT) and Densadeg effluents to secondary treatment standards.
- The BAF proved to be extremely robust, showing almost no degradation of effluent quality at simulated storm flow loadings.
- It was clearly shown that Biofor-C was capable of consistently meeting secondary effluent standards without the necessity of a second Biofor-N column.
- Should the City choose to move forward towards secondary treatment at Point Loma, the City should select CBOD₅ as the basis for effluent limits. Nitrification,

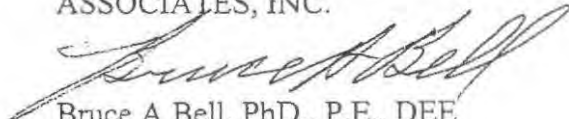
which occurred in both Biofor and Biostyr, makes meeting secondary effluent limitations for TBOD₅ problematical.

- The Densadeg high rate clarifier thickener did not perform well during the pilot test. Performance was erratic and chemical usage was significantly higher than chemical usage in the existing CEPT. The poor performance of the Densadeg units was likely more related to the lack of automation in the pilot units than the potential performance of full-scale Densadeg units. That being said, in my view, given the excellent performance of the existing CEPT units, they should be retained unless unavailability of land makes reinvestigating Densadeg necessary.
- The pilot study confirmed that the basis for the cost estimate previously prepared by Brown and Caldwell was valid. The cost estimate could be updated to account for the fact that Biofor-N is not needed to meet secondary treatment requirements and to adjust for escalation in construction costs. Should more precision be desired in the cost estimate, it will be necessary to perform a 10% design.
- It is possible, given the robust performance of both CEPT and BAF that the number of primary tanks may be reduced. If land becomes a critical issue, further investigation into this possibility may be warranted.
- Although not contained in the draft report, at my last meeting with staff and consultants, there was considerable discussion of the desirability of constructing a demonstration scale BAF system treating CEPT effluent. The exact size would be a function of available modules and how such a unit might fit into a final design. In my opinion, several benefits would accrue from a demonstration scale BAF unit. Such a system would allow testing of BAF using full-scale equipment and controls over an extended period of time. A demonstration scale system would allow for operator "buy in" to a more complex biological treatment system. If the City ultimately decides to utilize BAF for secondary treatment at Point Loma, the demonstration unit could serve as a very useful operator training facility.

In summary, the pilot plant work met its major goals of confirming the viability of BAF as a treatment process that can meet secondary treatment effluent limits at Point Loma, and confirming that the basis of Brown and Caldwell's previous cost estimate was valid.

I enjoyed working with City staff and consultants on this effort. Please contact me if you have any questions or need any additional information.

Sincerely,
CARPENTER ENVIRONMENTAL
ASSOCIATES, INC.



Bruce A Bell, PhD., P.E., DEE
President