

Comments on the Draft

San Joaquin River Deep Water Ship Channel Demonstration Dissolved Oxygen Aeration Facility Initial Study/Mitigated Negative Declaration

Prepared by Jones and Stokes, Sacramento, CA, dated February 2005

Submitted by

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March 9, 2005

Overall

This draft EIR is significantly deficient in its discussion of the potential water quality impacts of the proposed aeration demonstration project. The failure of the draft EIR to recognize that exposure of fish to oxygenated water near the aerator discharge ports that can lead to gas bubble disease makes this EIR uncertifiable as a credible discussion of issues that need to be evaluated as part of this proposed project. The issue of gas bubble disease can be of sufficient magnitude to require that the proposed discharge of oxygenated water be changed and necessitate the redesign of the aerator system to eliminate the discharge of aerated water that contains more than 110% total dissolved gas saturation.

As cited below, several statements are made in the draft EIR that reflect a lack of familiarity with and/or understanding of the literature on the issues that need to be considered to properly develop a credible EIR. The authors of the needed revisions of this EIR and those who review the revised EIR should become familiar with the existing literature and technical issues pertinent to the low dissolve oxygen problem in the Deep Water Ship Channel (DWSC).

Comments on Specific Issues

Page 1 second paragraph states, *“DO is a form of oxygen that is available for use by organisms living in the water. Low DO levels correlate with high algae and ammonia nitrogen concentrations, warm water temperatures, and low river flows in the San Joaquin River that occur in the months from May to September.”*

This statement is somewhat misleading and incorrect. The low DO in the SJR DWSC occurs in other months especially February. It can also occur in the fall months.

Page 2 first paragraph: The reference to a Jones and Stokes report is not a particularly good source of information on the impacts of low DO on the DWSC water quality. A

much more reliable and comprehensive reference to low DO impacts in the DWSC is the synthesis report,

Lee, G. F. and Jones-Lee, A., “Synthesis and Discussion of Findings on the Causes and Factors Influencing Low DO in the San Joaquin River Deep Water Ship Channel Near Stockton, CA: Including 2002 Data,” (2003).

as well as Lee and Jones-Lee (2004), and other paper/reports on [www. gfredlee.com](http://www.gfredlee.com) in the Watershed Studies San Joaquin Watershed Program Delta section.

Page 4 first line lists as an objective,

“.. gather additional information on impacts that may occur as an unintended consequence of large-scale aeration.”

As discussed below, the draft Negative Declaration is significantly deficient in addressing the potential adverse impacts of aeration using pure oxygen and of the proposed deep U tube aeration.

Page 11 the last sentence of listing of potential impacts of the proposed project states,

“Therefore, the environmental factors below would have no potentially significant impacts from the proposed project.”

That statement is inappropriate in that the potential adverse impacts on fish of using pure oxygen for adding oxygen to water, related to causing fish gas bubble disease, have not been addressed. Further, the proposed method of aeration, using a deep U tube, can lead to much greater supersaturation of dissolved gases than if surface aeration were used. As discussed in the US EPA Water Quality Criteria 1986, for Gases Total Dissolved, US EPA (1987),

“To protect freshwater and marine aquatic life, the total dissolved gas concentrations in water should not exceed 110 percent of the saturation value for gases at the existing atmospheric and hydrostatic pressures.”

The problem of fish gas bubble disease has been recognized for decades; a search of the Internet for fish gas bubble disease shows that there are hundreds of papers and reports on this problem.

The use of deep U tube aeration, as is proposed, is somewhat similar to the situation that occurs downstream of dams; water discharged from the dam leads to supersaturation of dissolved gases in the downstream waters. A recent report on this topic has been published by Beeman et al. (2003) who studied gas bubble disease in the Columbia River fish below Grand Coolee Dam.

Another issue of potential concern with the use of pure oxygen is the potential to increase the concentration of oxygen-derived free radicals in the aerated water. Free radicals are highly active molecules that tend to cause cell disruption in aquatic life.

Injury and death of fish associated with aeration is a well-recognized problem. Rather than ignoring the problems with supersaturation of dissolved gases and the potential problems of using pure oxygen for aeration, this project needs to include a comprehensive study of the potential impacts of the proposed aeration project on aquatic life. That study should be conducted by independent experts on fish physiology, disease and related areas.

Page 37 last paragraph states,

“Oxygen will be discharged to the DWSC through a diffuser system. There is concern that high levels of oxygen in the discharge may be harmful to fishes. For example, the initial concentration of oxygen at the discharge would be 43 to 66 mg/l. However, the diffuser system will dilute initially high oxygen concentrations by a ratio of 10:1. Therefore, the oxygen concentrations at the diffuser would be well within the tolerance limits of aquatic organisms (oxygen would be 4.3 to 6.6 mg/l). In the long run, successful aeration of the DWSC would prevent low DO levels in the DWSC and enhance it as a habitat for sensitive fishes and other aquatic life.”

This analysis ignores the potential for some fish to congregate at the diffuser discharge.

Page 47 under VIII. HYDROLOGY AND WATER QUALITY states,

The response to the query, would the project:

“a. Violate any water quality standards or waste discharge requirements?” was listed as *“Less-than-Significant Impact”*.

This analysis is based on a superficial analysis of the potential impact of using pure oxygen to aerate the DWSC waters.

Page 49 first paragraph states,

“High San Joaquin River flows of greater than 2,000 cfs can prevent low DO by diluting oxygen-depleting substances in the DWSC and transporting these substances quickly through the DWSC.”

The dilution of oxygen demand applies only to city of Stockton ammonia; it does not apply to upstream-derived algal oxygen demand. Under conditions of elevated flows, the loads of oxygen demand to the DWSC is increased.

Also in the same paragraph, the statement is made,

“The growing algae at the surface can provide DO to the DWSC through photosynthesis, but the net effect of the algae is to reduce DO as the algae respire and bacteria decompose dead algae.”

This statement is incorrect with respect the algae that develop in the DWSC. As discussed by Lee and Jones-Lee (2003) in their Synthesis Report, as long as the DO in the surface waters of the DWSC is below DO saturation, the net impact of algae developed in the DWSC is zero; photosynthesis = respiration in the DWSC.

Page 50 last paragraph, states,

“f. Otherwise substantially degrade water quality? Less than Significant.”

There is need to discuss the potential water quality problems associated with dewatering the excavated area for impacts of the groundwaters pumped from the project area on

receiving waters. The characteristics of the groundwater that will be pumped from the area of the excavation of the project area need to be determined. How the project will manage potential water quality impacts associated with the discharge groundwater also needs to be discussed.

Page 72 states,

“XVII. MANDATORY FINDINGS OF SIGNIFICANCE.

a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?”

As discussed herein, there are significant potential water quality problems associated the proposed project that have not be adequately or correctly discussed in the draft EIR.

References

Beeman, J. W; Venditti, D. V; Morris, R. G; Gadomski, D. M; Adams, B. J; VanderKooi, S. P; Robinson, T. C; and A. G. Maule, A., G., “Gas bubble disease in resident fish below Grand Coulee Dam,” US Geological Survey Western Fisheries Research Center Columbia River Research Laboratory Cook, WA (2003).

Lee, G. F. and Jones-Lee, A., “Synthesis and Discussion of Findings on the Causes and Factors Influencing Low DO in the San Joaquin River Deep Water Ship Channel Near Stockton, CA: Including 2002 Data,” Report Submitted to SJR DO TMDL Steering Committee and CALFED Bay-Delta Program, G. Fred Lee & Associates, El Macero, CA, March (2003). <http://www.gfredlee.com/SynthesisRpt3-21-03.pdf>

Lee, G. F. and Jones-Lee, A., “Supplement to Synthesis Report on the Low-DO Problem in the SJR DWSC,” Report of G. Fred Lee & Associates, El Macero, CA, June (2004). <http://www.members.aol.com/duklee2307/SynthRptSupp.pdf>

US EPA, "Gases, Total Dissolved," Quality Criteria for Water 1986, US EPA 440/5-86-001, Office of Water Regulations and Standards, Washington, DC, May (1987).