San Joaquin River Dissolved Oxygen Total Maximum Daily Load Technical Working Group (TWG) Meeting Notes

Tuesday, December 14, 2010
9:40 a.m.–12:10 p.m.

ICF International
630 K Street, 2nd Floor
Sacramento, CA 95814

Attendees

Name	Agency
Atkins, Carol	CA Department of Fish and Game
Brown, Russ	ICF
Brunell, Mark	UOP
Centerwall, Steve	ICF
Cory, David	SJVDA
Joab, Christine	Central Valley Regional Water Quality Control Board
Kamei, Gary	U.S. Army Corps of Engineers
Lee, G. Fred	GFL & Associates
Litton, Gary	UOP
McLaughlin, Bill	CA Department of Water Resources
Parlin, Larry	City of Stockton
Petruzzeli, Ken	SJRGA
Tilly, Darle (notetaker)	ICF
Turner, Melissa	MLJ LLC
Westcot, Dennis	San Joaquin River Group
Wilson, Danielle (facilitator)	ICF
Wingfield, Jeff	Port of Stockton

Introductions and Welcome

Danielle Wilson opened the meeting with a round of introductions.

Updates and Announcements

Central Valley Regional Water Quality Control Board Update (Christine Joab)

An information item on the results of the 2-year Aeration Facility Demonstration Project is scheduled to be on the meeting agenda for the February or April meeting of the Regional Board. The February and April Board Meetings are scheduled for February 2, 3, 4 and April 6, 7, and 8. Christine will notify the TWG of the exact date once the item is confirmed on the Board meeting schedule.

TWG members are encouraged to submit relevant comments and questions, including each agency's stand on aeration, to the Board by January 20 so that they may be included as part of the meeting packet sent out in advance. Background on the Aeration Facility Demonstration Project would be useful to Board members, who are charged with evaluating, and at some point confirming, methods to increase dissolved oxygen (DO) concentrations. They likely will approve a list of options rather than choose a single method to address the problem. For example, recommendations may include best management practices to reduce causes, not just remedies.

The Board meeting dates for calendar year 2011 also may be found at http://www.waterboards.ca.gov/centralvalley/board_info/meetings/#2011 and are:

1. February 2/3/4
2. April 6/7/8
3. June 8/9/10
4. August 3/4/5
5. October 12/13/14
6. December 7/8/9

Queried about the current status of Board membership, Ms. Joab responded that it is somewhat in a state of flux; whether the new governor will approve the retention of members or appoint new ones is not known. Six of seven members are in position, so a quorum is possible.

A listing of current Board Members can be found at:
http://www.waterboards.ca.gov/centralvalley/about_us/board_members/index.shtml

Current Board Members, including new appointees, are:

1. Katherine Hart
2. Dr. Karl E. Longley
3. Dan Odenweller

4. Sandra O. Meraz
5. Sopac Mulholland*
6. Lyle Hoag*
7. Vacant

* recently appointed to Board (December 2010) but needs Senate confirmation.

Ms. Joab broached the subject of whether the TWG would like to consider meeting after the termination of the current Department of Water Resources (DWR) contract with ICF at the end of 2010, and offered Regional Board facilities for subsequent meetings should the group wish to continue meeting. Consensus appeared to favor keeping the group together even in the absence of funding. She asked whether other agencies/entities would be willing to offer meeting space; both DWR and the Port of Stockton volunteered, and ICF also is willing to continue providing their meeting space. Is there interest in renewing the TWG contract with ICF? Generally, yes, depending on economics; it is assumed to be about a 40-hour commitment for meeting, notes, website updates, etc. Steve Centerwall will let the TWG know associated costs. Fees for hosting the website are about $500/year and maintenance costs are approximately $20,000 per year. The site can be transferred easily to a new organization.

Stockton Deep Water Ship Channel Demonstration Dissolved Oxygen Aeration Facility (Bill McLaughlin)

Bill McLaughlin reported that DWR has completed field studies and is reviewing the final Aeration Facility Demonstration Project report. The final report is nearly complete, with the incorporation of a few comments, appendix information, and operating costs outstanding. It will be posted on the DWR and TWG websites. DWR's Aeration Facility website now contains a staff report on historical background of low DO concentrations. Dissolved oxygen monitoring in the Deep Water Ship Channel (DWSC) will end in June 2011. Data will be available. Christine Joab asked what the process would be for any new entity taking over the Aeration Facility. For example, would they have to buy their own monitoring equipment or could monitoring equipment from DWR be part of the package received by a new public entity? Bill McLaughlin responded that including equipment would be a possibility, but raised the point that perhaps not all monitoring stations would be necessary for long-term operations.

The UC Davis fish study will be posted when it is finished. Two studies have been completed on fish exposure to high DO from the Aeration Facility for 5 days, an in lab study and a field study. No adverse effects were apparent.

San Joaquin River Water Quality Management Group

No formal updates were provided, but Russ Brown introduced discussion on the generation of algae in the San Joaquin River, seeded by agricultural drainage from the San Luis Drain, which has very high algae content and drains through Mud Slough to the San Joaquin River and eventually to the DWSC. He asked whether algae from the San Luis Drain to Mud Slough and

the San Joaquin River have decreased. The answer was that salt and selenium have been reduced by about 75%. The San Luis Drain source of algae has likely been reduced substantially, but the effects on river algae in the San Joaquin River are unknown. Also noted during the discussion was Stockton's upgrade of its wastewater treatment plant as a factor contributory to the improvement in DWSC DO concentrations.

Dennis Westcot pointed out that the State Water Board would be considering new or revised salinity objectives for Vernalis and these could possibility influence the decisions that need to be considered in the future by the TWG as these may change flows and timing of flows in the San Joaquin River. Those hearing are to begin in early January.

Presentation

Final Report on the Stockton Deep Water Ship Channel Demonstration Dissolved Oxygen Aeration Facility Project (Russ Brown)

The Final Report on the Stockton Deep Water Ship Channel Demonstration Dissolved Oxygen Aeration Facility Project will be available soon, incorporating data from 2009 and 2010. What should happen next? Does the aerator have a future role in alleviating low DO concentrations in the DWSC? If the answer is yes, an operational strategy is required. A long-term total maximum daily load (TMDL) monitoring strategy should be developed to identify periods when the Aeration Facility should be operated, based on the DWSC DO measurements and upstream San Joaquin River flow and water quality monitoring at Mossdale or Vernalis to forecast the DWSC DO profile.

What measurements are needed to determine this strategy, based on the 3-year study? Periods of low DO in the DWSC are generally considered to be the result of three factors: the DWSC geometry, low flows, and high biochemical oxygen demand (BOD) loads from upstream river algae or treated wastewater effluent. Dr. Brown discussed possible TMDL "accounting procedures" that could be used to estimate the relative contributions of the factors causing low DO concentrations in the DWSC and to evaluate the benefits (increased DO) from various implementation measures. Anticipating DO sags would be facilitated by the use of the TMDL accounting procedures, and they potentially could be used to identify and allocate stakeholder responsibility for operating the Aeration Facility to alleviate future low-DO periods in the DWSC.

The presentation centered on figures compiled from the report (see attached handout) depicting, among other information:

- Measured DO at DWSC monitoring stations and estimated DWSC and San Joaquin River flows for September 2009
- Estimated DO increments at points upstream and downstream of the Aeration Facility for September 2009
- Sensitivity of the DWSC longitudinal DO profile to various levels of BOD
- Average daily DO at monitoring stations June–September of 2007, 2008, 2009, and 2010
- Possible San Joaquin River DO TMDL accounting procedures

TWG Questions and Discussion

A baseline is needed to show results of the San Joaquin River DO TMDL and then improvement from year to year. Does anyone know of a place in the U.S. where this is done?

The selenium TMDL for Site B (discharge) was cited.

What measurements are necessary?

Some information may be available from the Irrigated Lands Regulatory Program for some locations. It was pointed out that Irrigated Lands discharge measurements need follow-up measurements downstream in the river.

Algae (BOD) estimated from DO measured at Mossdale is affected by other factors such as wastewater effluent, aging of algae, etc., before entering the DWSC; it is necessary to measure inflow BOD into the DWSC, but that's complicated. Figure 10 shows the challenge of tracking river variables; it even is difficult to determine the net flow of the DWSC. Downstream studies could improve the tracking of river conditions. Figure 11 shows the increment of DO attributable to operation of the Aeration Facility, which can raise the DO in DWSC by 1 mg over a period of 2 or 3 days. Some improvement can be detected in the first day. The full effect spans 1 mile upstream and 1 mile downstream of the Aeration Facility.

Inflowing BOD is what affects DWSC DO, and we don't measure it! This is a monitoring challenge; the problem is that a complete measurement takes 30 days. There is pretty good correlation with volatile suspended solids, and we should think about using this variable for estimating BOD.

Can you anticipate DO sags?

Dr. Brown: Yes, I think so; the accounting procedure would allow some forecasting of DO conditions. This is done by the Port. Figure 4 shows "natural" DO profiles of the river. The DO sag appears to be the same regardless of the flow, and an accounting procedure (estimating the inflow BOD) should help predict the minimum DO. Figure 8 shows 3 years of data (from 2007 to 2010) for the months with lowest DO—June through September. Figure 1a discusses three calculations needed to estimate low DO in the DWSC:

1. algae at Mossdale (very important parameter and not tracked as well as it should be),
2. inflowing BOD (river algae and diluted wastewater), and
3. estimated minimum DO in the DWSC.

Figure 6 can be used to show the estimation of river algae for 2004, a low-flow year. A seasonal pattern emerges with high algae for 4 months, which seasonally corresponds with low flow; algae measurements are often high when DO in the DWSC is low. As flow goes up, BOD decreases, and vice versa. Predictions of low DO rely mostly on BOD concentration estimates. The City of Stockton has measurement stations near the entry to DWSC; real data match predictions pretty well. This concept needs work, but management options can be explored. If you did this, DO sags could be predicted and perhaps managed by some method, or combination of methods. We may need another monitoring station near the inflow to the

DWSC, and Navy Bridge may be a location. It was noted that future Delta manipulations will result in less Sacramento River water being pumped into the San Joaquin River, which may affect DO downstream of Turner Cut. There is currently no arrangement in place to allow turning on the aerator if needed next summer.

Whom does Russ see in control of this accounting tool?

Maybe the Regional Board, with monitoring data supplied by other entities. Funding is a problem. Jeff Wingfield, Port of Stockton, asked what the cost of operating the Aeration Facility is and noted that it is difficult to figure out the next steps without knowing costs. Costs will be discussed in the final report. Costs discussed in the final report will be a range that depends on the number of days operation is needed to raise the DO.

It was noted that the requirement of a National Pollutant Discharge Elimination System (NPDES) permit should not be a concern of entities considering assuming the administration of the Aeration Facility. The consensus is that operating the facility is not subject to an NPDES permit because oxygen is not a waste or a pollutant.

Continuing TWG meetings with stakeholders to discuss the future of the Aeration Facility was discussed. It might help to know details of monitoring for DO objective compliance, which would affect costs; for example, do we need to maintain 15-minute increments with no violation of the DO objectives? It was pointed out that the Regional Board understands funding constraints and will empathize with good faith effort, perhaps relaxing the 15-minute requirement in view of considering 2–3 day violations of the objectives. There is a possibility that DO objective(s) will be refined in view of new data, particularly the 6 milligram per liter (mg/l) objective for September, which may have been intended to encourage placement of the fall barrier at the head of Old River. Fish agencies may be reluctant to change this September objective, however.

Wrap-Up

Danielle revisited the subject of whether the group should meet again. The consensus was positive. She encouraged the group to use ICF as a clearinghouse through the next meeting, possibly in February, after the final report and appendix on possible SJR DO TMDL accounting procedures are completed.

The Regional Board will entertain participation of others besides the presenter at their meeting considering the Aeration Facility, so TWG members are encouraged to attend; they are reminded to send comments/concerns to Christine, who will submit them for the meeting packet.

Identify Next Steps, Action Items

1. TWG members will provide questions and background information on the Aeration Facility Dissolved Oxygen Demonstration Project, including each agency's stand on aeration, to Christine Joab by January 20 for inclusion in the Regional Water Board meeting packet.

2. Danielle Wilson volunteered to act as the contact or clearinghouse for efforts to arrange a next meeting.

3. Steve Centerwall of ICF will compile costs for providing support services and meetings for the TWG and disseminate the information.

4. DWR will make available the Final Report on the Stockton Deep Water Ship Channel Demonstration Dissolved Oxygen Aeration Facility Project, and the UC Davis report on fish tolerance of the Aeration Facility–added DO.

Danielle closed the meeting and wished everyone happy holidays.