Water Quality Team Meeting Notes

May 12, 2005

1. Greetings and Introductions.

Today's Water Quality Team meeting was chaired by Mark Schneider and facilitated by Robin Harkless. The following is a summary (not a verbatim trancript) of the topics discussed and decisions made at this meeting. Anyone with questions or comments about these notes should contact Kathy Ceballos at 503/230-5420.

2. McNary Computational Flow Dynamics Model.

Steve Juul explained that, back in the mid-1990s, there were some issues concerneing temperatures at McNary, and their impacts on juveniles. We contracted with Larry Weber of the University of Iowa to develop a computational flow dynamics (CFD) model for McNary to help us manage those impacts, Juul said. In 2004, we undertook an extensive data collection effort in the McNary forebay, which Larry then fed into his model.

Weber then provided an overview of the model, touching on the following topics:

- The background of this project
- The use of parallel processing to drive the model
- It is a "steady state" or average flow model
- How the model was developed and validated
- Model extends 13,000 feet upstream of the dam
- Includes both an overall forebay model and a single-unit model
- Model validated against laboratory data collected at Vicksburg; accurate within 1%
- Conditions under which field data was collected (spill vs. no spill, etc.)
- Boundary conditions – inlet and outflow
- Model outputs – Case 1, Case 2
- Temperature measurement stations – where data was collected in the forebay
- Average velocity through the reservoir was about 0.5 feet per second
- CFD-predicted temperatures vs. actual temperatures – fairly constant across the

reservoir, with some vertical variation
- Predicted temperatures correlate closely with actual temperatures from units 5-13; predicted temperatures off by about 1 degree C at other units, at least in the initial simulation

Weber said the CFD model work had yielded several potential operational and configurational changes that could be made to reduce gatewell water temperatures at McNary, including

- Changing the intake groove to reduce the volume of warm surface water drawn into the gatewell; modeling showed the change in temperatures resulting from this modification to be minimal (about 0.2 degrees)
- Extending a BGS-type curtain device to isolate the warmer south shore water; modeling showed slight cooling (again about 0.2 degrees) in the lower-numbered gate slots

Weber noted, however, that these exercises were aimed more at validating the McNary CFD model than for practical application. Moving on, Weber touched on

- How the CFD model incorporates wind as a variable
- Overall, the CFD model results show that the flow field in the reservoir and intakes was predicted well; that there is good agreement between measured and predicted temperature profiles; that the model's ability to predict the heat flux through the surface needs to be refined further; that gatewell temperatures were predicted reasonably well, and that the introduction of wind as a variable had a significant impact on the simulation results.

In general, said Weber, the model can be used as a predictive tool, once we get the heat flux boundary condition working, and can be used presently to predict relative changes in temperature due to operational and structural conditions. Warming on the southern shore due to differential atmospheric heating appears to be a key factor in drawing warmer water into gatewells 1-4. Temperatures also appear to be uniform across the width of the reservoir at the inlet, something that was unknown prior to last year's data collection effort. One last thing, said Weber – we have produced a draft report, and are awaiting final comments from the Corps. It is likely that this report will be available for distribution within one month.

The WQT offered a few clarifying questions and comments, touching on additional modeling scenarios, including the incorporation of small amounts of surface spill to skim off the warmest surface water; the possibility of simulating the effects of an RSW on temperature (it is possible); and on the comment process for the report. Juul said he will provide copies of the report to the other WQT participants as soon as it is available.

3. Overview of New Washington Department of Ecology TDG Waiver Language.

Chris Maynard noted that WDOE had worked closely with ODEQ, the Corps, NMFS and the utilities to develop its approval conditions. Standards for adjustments were approved in 1997 based on a NMFS risk analysis, so that we can adjust our standards pretty close to Oregon's, he said. The waiver effort is tied to the production of gas abatement plans by the dam owners. We have approved four gas abatement plans to date, one for the Corps, and one to each of the Mid-Columbia PUDs – Douglas, Chelan and Grant. In step with Oregon, we have approved these plans through the 2007 spill season, Maynard explained.

Two of the Mid-Columbia utilities are pretty close to the end of their FERC relicensing process, and are very interested in improving their efforts to abate gas, Maynard continued. He added that biological monitoring is required under the WDOE waiver, particularly studies that, after a literature search, will be aimed at data gaps.

Moving on, Maynard said WDOE has some concerns about the operation of the B2 corner collector. If it is generating gas above 120%, where is that being measured? he asked. At Cascade Island, replied Jim Adams. If it is a problem, what can be done? Maynard asked. I would consider it a spillway bay, even though the corner collector is not co-located with the rest of the spillway, and would look at the issue of Bonneville gas generation as a package, John Kranda replied. If you look only at the corner collector, I don't think that operation has ever approached 120% TDG, Kranda added. Mike Schneider added that picking off isolated structures from the overall gas abatement plan at Bonneville would result in a skewed view of how the addition of that structure might impact the system. This topic will be discussed at the May 25 FPOM meeting; it was agreed that the WQT will receive a report on the outcome of that meeting at its June meeting.

4. Winter Monitoring and Related TDG Topics.

Harkless noted that this topic was discussed at the WQT's April meeting; at that meeting, it was agreed that a WQT subgroup would meet to develop a long-term winter water quality monitoring strategy for the reach below Bonneville, particularly with respect to monitoring TDG and water depth at the Multnomah Creek spawning site. She asked whether the subgroup had met, and, if so, what they had concluded.

Also, said Harkless, at the WQT's April meeting, it was agreed that the Corps would be contacting the states, which were not represented at that meeting, regarding their overall winter water quality monitoring needs and expectations.

Mark Schneider said that, with respect to the first point, he had attempted to convene a subgroup meeting to discuss winter monitoring below Bonneville, but had been unable to do so. He said he will continue his efforts to find a date on which all subgroup members can meet, and will provide a further update at the WQT's June

meeting.

With respect to the second question, Jim Adams noted that the Corps has devoted considerable effort to identifying the most appropriate sites for its in-season fixed monitoring station program; what this issue boils down to is the fact that, until recently, what has not been addressed is, what are the most appropriate locations to monitor for TDG during the winter? Right now, we are monitoring at Dworshak tailwater, and Lower Granite, Ice Harbor, McNary and Bonneville forebay and tailwater. The winter tailwater station at Bonneville is Warrendale, he added. I also believe that the Pasco gauge is operated during the winter, said Adams.

To me, he continued, the logic is that, on the Snake and Columbia, we're monitoring the gas levels coming into and leaving our projects. The Pasco gauge is operational because we want to see what's being delivered to our projects from the Mid-Columbia. The question is, given the fact that, year after year, there are never any exceedences at any of the projects we monitor during the winter, do we need to continue to operate all of these stations? Should we operate any of them, some of them or all of them? It is an expense to the Corps to go out every two weeks to calibrate these stations and to ensure that they're continuing to provide accurate data, Adams said. Do we need to continue to operate these stations, in the WQT's view, and what is the appropriate strategy for monitoring gas during the winter?

One WQT participant noted that, in his view, some monitoring of "sensitive areas," including the chum spawning sites below Bonneville, need to be monitored during the winter months. Adams noted that there is a wide range of historic water quality monitoring data available for the winter period, dating back to the early 1990s; he said he can provide this data to the other WQT participants, but noted that it may not be possible to do so in time for the group's June meeting.

After a brief discussion, Adams noted that his goal was not to reach WQT consensus on a monitoring strategy at today's meeting. He asked that the state water quality agency representatives and other WQT participants review the historic data and discuss their winter water quality monitoring expectations in-house, and come to the August WQT meeting prepared to discuss the monitoring program they would like to see. It was further agreed that the WQT subgroup meeting might include a discussion of potential sensitive areas where monitoring is desired, although, at today's meeting, the Multnomah Creek spawning area was the only sensitive area identified. Mike Schneider noted that NMFS has a database containing this information; he volunteered to provide it to the WQT via email.

David Wills noted that, this spring, in preparation for the operation of the B2 corner collector in support of the Spring Creek Hatchery release, water quality measurements were taken. They showed that TDG levels were already above the 105% TDG level that was recommended as a threshold for the protection of the chum redds downstream of Bonneville. As we proceeded through the Spring Creek release, he said,

we had to try to juggle both TDG levels and compensation depth over the chum redds at Multnomah Creek; it was suggested at one of the TMT meetings that it would be helpful to have a data logger at that site to provide real-time information for use in managing Bonneville spill operations. This may be something that is only applicable during low-flow years, he said, but I think it's important that we have the capability to monitor TDG and water depth at that site. It's probably an item we need to follow up on, he said, adding that the true critical period is February and March.

5. Camas/Washougal Gauge/Bonneville Spill Recalibration.

Adams noted that there has been some sensitivity associated with the recalibration of the spill gates at Bonneville; the spill volumes provided have been somewhat different than what has been provided in the past. As a result, the Corps has been doing some modeling. Adams put up a series of overheads, touching on:

- The results of the recalibration of the Bonneville spill gates – new actual spill volumes vs. old calibration amounts
- Actual spill delivered under the old calibration was 25% less at lower spill volumes, 10% less under higher spill volumes. In 2004, when the Corps said they were spilling 75 Kcfs during the day at Bonneville, they were actually spilling only 50 Kcfs.
- 2004 spill caps at Bonneville
- 2004 actual vs. reported spill

Adams noted that, so far this year, actual Bonneville operations have not been all that significantly different than they were in 2004. While the Corps is now spilling an actual 75 Kcfs during the day, rather than 50%, elevated TDG readings downstream have constrained the nighttime increase to the TDG cap. The bottom line is that, while we are following the UPA, our 2005 spill operations at Bonneville are not that different from our 2004 operations, he said.

Moving on, Adams touched on:

- TDG levels at Warrendale – historic
- TDG readings at Camas/Washougal – historic
- TDG levels at Kalama – historic (in 1995, 60% of the readings were 110-115%, indicating the persistence of TDG downstream of Bonneville)
- Diurnal fluctuations in the historic TDG readings below Bonneville
- Not until the river reaches Wauna Mill (RM 42) do the TDG levels passing through Bonneville substantially dissipate

Adams said that, based on the historic record, the Corps is concerned that, if the Camas/Washougal gauge is removed, TDG levels downstream of Bonneville will increase. Second, he said, we're not sure how far downriver these TDG levels are persisting, or what kinds of biological impacts they are producing in the estuary.

The group discussed the impact of environmental factors and natural processes on TDG levels below Bonneville. Mark Schneider noted that, according to the existing research, TDG levels of 120% and below have no significantly detrimental biological effects. The point I'm making is that elevated TDG levels measured at Bonneville are persisting in the river, past Camas/Washougal and beyond, said Adams. Fish species will be exposed to these higher levels of gas for a significant part of the post-Bonneville reach, he said.

Adams said the Corps had modeled a number of "what if" scenarios using SYSTDG. In particular, he said, we modeled what if we were to remove the Camas/Washougal gauge from the management of spill at Bonneville, and managed spill using the Cascade Island FMS – what would then be the TDG levels at Camas/Washougal? We also tried to model it so that there would be no exceedences – in other words, we took a very conservative approach. The bottom line is that, if we were to manage the spill at Bonneville using Cascade Island only, SYSTDG predicts a 2-2.5% increase in TDG at Camas Washougal.

Margaret Filardo noted that, on May 4, based on SYSTDG results, Bonneville's daytime spill volume was reduced to 65 Kcfs. Yet, despite what the model predicted – 111% at Camas/Washougal – the criteria were exceeded because of environmental variables. My point is that, due to environmental effects downstream, we are artificially restricting Bonneville spill, because the management actions we take do not have the desired effect, Filardo said. I think if you ask any biologist in the region, they would tell you that there is a comfort zone at any TDG level below 125%, as long as there is depth compensation, she said.

Maynard noted that there has been some confusion, in the past, as to what Washington's water quality standards actually say. We are applying the Camas/Washougal monitoring site as a required monitoring site, currently, because our 2003 standards, in which Camas/Washougal is removed, have not yet been approved by EPA. One suggestion would be that, if the WQT is still grappling with this question, that they kick it up to the IT, so that they can put some pressure on EPA to approve, or at least partially approve, our 2003 standards, he said, adding that it may make sense to apply a stricter standard at certain sensitive areas in the system.

6. May 5 2005 Implementation Team Long-Range Work Plan Update.

This topic was not addressed at today's meeting.

7. WQT Guidelines Discussion.

This topic was not addressed at today's meeting.

8. Other.

Harkless noted that, in the past, a WQT representative has reported back to the group on water quality-related issues raised at TMT, IT and in other forums. She encouraged the group to resume this practice. It was also agreed that, whenever possible, the WQT will resume its practice of meeting on the second Tuesday of each month.

9. Next WQT Meeting Date.

The next meeting of the Water Quality Team was set for Tuesday, June 14. Meeting summary prepared by Jeff Kuechle, BPA contractor.