Water Quality Team Meeting Notes

October 23, 2006

1. Greetings and Introductions.

The October meeting of the Water Quality Team was chaired by Mark Schneider and facilitated by Robin Harkless. The following is a summary (not a verbatim transcript) 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. Corps 2007 Draft Total Dissolved Gas Plan of Action.

Jim Adams provided an overview of the Corps' draft 2007 TDG plan of action. The group offered a few minor comments and clarifications, which Adams incorporated in the course of the discussion. He said he will distribute the revised Plan of Action to the WQT membership via email, and asked that any additional comments be forwarded to him by October 27.

3. Pumped Sample Approach to TDG Monitoring.

Joe Carroll led this presentation, noting that there are some advantages to not relying solely on fixed monitoring stations. One alternative is the pumped sample approach, he said, in which water is pumped from a reservoir into a holding tank for sampling. This approach is used to monitor dissolved oxygen at many Corps projects in the southeast, he explained; we should be able to apply the same approach here. Carroll said he had had the opportunity to evaluate two pumped systems for the Portland District this summer.

Using the overhead projector, Carroll touched on the following major topics:

- TDG monitoring using submersible pumps – an alternative method using a submersible pump to deliver sample water to an onshore instrument was evaluated during the summer of 2006; testing was completed at two separate locations adjacent to existing fixed monitors to acquire comparable data for the

evaluators. The two locations were The Dalles tailwater station and the Cascade Island station below Bonneville Dam.

- Purpose: to evaluate an alternative method that may be employed for TDG monitoring in locations not suitable for the more conventional in-situ approach. Turbulence and hydrodynamics associated with the Bonneville spillway tailrace has presented two concerns for operation of the fixed monitor at Cascade Island.
- Approach: ½-horsepower submerged well pumps that are easily deployed with low power consumption; by placing the pumps at depth in the river; we can maintain positive pressure equivalent to or greater than the hydrostatic pressure of the sampled water as required to air in solution; it also minimizes heating of the sample.
- Objectives: to compare the pumped sample with in-situ measurements, to describe the extent of thermal change
- Sampling methods
- Photographs of the pumped sampling system
- Calibration and maintenance
- The Dalles Dam tailwater test schedule 63 days of near-continuous pumped sampling at the bottom of the standpipe, 24 days for a second pump placed near the surface at the top of the standpipe
- Bonneville Dam Cascade Island test schedule: operated intermittently from June 23-July 6; more intermittent operation, with a total of six sampling events in that time. A portable generator was required to operate this sampling unit.
- The Dalles tailwater TDG data results – readings from the two instruments fluctuated closely in response to conditions in the river (graphs)
- The Dalles depth of monitor comparison – 1.5 meters of difference in depth compensation experienced by the two instruments; they averaged 37 mm apart, which implies bias. The shallow instrument consistently showed a lower gas reading, even at a consistent water temperature.
- The Dalles pumped TDG data results – TDDO vs. PTDDO (FMS vs. pumped sample): the dissolved gas difference between the instruments was consistent – 8.8 +/- 2 mm Hg higher TDG pressure for the pumped sample. Consistent daily cycles were apparent for both instruments. Temperatures were consistently 0.5 degrees C higher for the pumped sample, which serves to explain the difference in TDG pressure.
- Thermal correction: with thermal correction, the difference between the two instruments is reduced to 1.4 mm Hg. This leads to the conclusion that the results for the two instruments are consistent enough to conclude that pumped sampling is a viable alternative to fixed monitoring station sampling.
- Statistical comparison (table): difference was small for the corrected TDG pressure and saturation
- Cascade Island pumped TDG data results: CCIW vs. PCCIW (FMS vs. pumped sample): average corrected TDG pressure difference was about 5 mm, with a temperature differential of about 0.25 degrees C. Corrected TDG pressure

averaged 0.5 mm, +/- 0.7 mm Hg.

- Observations: the monitor comparison results were consistent for both locations tested; the depth of instrument submersion appeared to produce a bias in the measured TDG pressure measured by an average of 37 mm Hg, 5% saturation.
- Conclusions: pumped sampling is a viable alternative to FMS monitoring; differences seen were within manufacturers' specs.
- Recommendations: this approach could likely be applied at locations similar to the CCIW site where equipment loss is probably; the approach would also lend itself to sampling a wider variety of locations in a river which could address known sampling bias problems.
- Future considerations: power supply (DC pumps and solar power operation for remote locations); cost of installation; standpipe height to avoid bias in TDG measures; use of insulation to prevent sample water temperature changes; sedimentation effects on pump operation; dual monitoring at selected sites for further evaluation.

Has this been tried elsewhere for dissolved gas? John Picininni asked. It has been used to monitor for dissolved oxygen, for which the protocols are the same, Carroll replied. However, it has not been used specifically to monitor TDG. The difference between the two is that temperature isn't a concern for dissolved oxygen – you're measuring a mass, Mike Schneider observed. Perhaps a temperature sensor at the intake might be a solution, he added. Good suggestion, said Carroll – we just need to account for any differences in temperature. You could also run your pipe halfway out into the channel, cap it, and port the pipe to allow you to draw all along its length, Schneider said – that would give you an integrated, composite sample.

Why haven't we been trying this over the years? Picininni asked. We have been, in other parts of the country, Carroll replied. We did review a proposal from Brian Dow several years ago, which put forward a similar approach, including microprocessor controls to allow you to shut the pump down, he added. We've been arguing about FMS locations for years, Picininni noted – it seems to me that the pumped sampling approach would give us significantly more flexibility to address some of those concerns.

What about the ability of this type of system to withstand high-energy environments? asked Jim Britten. I can't give you a definitive answer, but the pumps themselves only cost $450 at the low end, vs.$6,000 for a monitoring instrument, Carroll replied. The pipe is another expense, of course. Do you plan to do a cost analysis of this approach? Harkless asked. I haven't done so yet, but I've been thinking about it, Carroll replied.

What kind of deployment would you suggest to address the problems we've seen at Cascade Island? Mark Schneider asked. You could put two or three of these instruments in the river for what it would cost to install a single FMS, Carroll replied.

There is lateral gradient at that site; to resolve it, we would need to decide whether it would be beneficial to go further out into the river, or monitor at multiple sites, more cheaply than with the in situ approach. I like the idea of a manifold system that could draw a composite sample, using a single pump, Schneider said. One consideration is the exchange of gas, Carroll said – any time you have negative pressure, you draw gas out of the water, while positive pressure will increase gas. In other words, you need to be sensitive to the potential for bias associated with changes in hydrostatic pressure.

In response to a question, Carroll said that where this technology goes next is up to the WQT – if you see significant benefits in implementing it here in the basin, it does appear to be a viable alternative to the in situ approach, and may provide you greater flexibility in solving specific problems. I would like to continue to pursue this, Mark Schneider said – if anyone here disagrees with that conclusion, I would like to hear your thoughts. No disagreements were raised to Schneider's statement. We will pursue it, said Britten, within the budget constraints we face. In response to another question, Carroll said it will be necessary to place the pumps at Cascade Island this spring by boat, before spill begins.

4. Draft "Rapid Response Plan for Zebra Mussels in the Columbia River Basin."

Steven Phillips and Paul Heimowitz led this presentation. Phillips noted that this is the pair's third presentation to the WQT; he added that their work has largely been funded by BPA. The various working groups addressing the potential zebra mussel infestation problem all concluded that a rapid response plan is needed in the event that zebra mussels do show up in the system, Phillips said; we have developed a draft rapid response plan, which is available from the www.hundredthmeridian.org website.

We hope you've had a chance to review this workplan, Heimowitz said; we are here today to get any comments you want to offer. Heimowitz briefly reviewed a few of the changes that have been made in response to comments received to date. We're eager to get any feedback the agencies may have as soon as possible, he said; we would much rather get it now, rather than waiting until we actually have a problem. Phillips noted that one major work initiative is the drafting of a memorandum of understanding covering rapid response to a potential zebra mussel infestation between the federal agencies, the states and tribes. Another work initiative is a review of the juvenile sampling facilities looking for areas vulnerable to zebra mussel infestation, he said. We have also contracted with Bruce Sutherland to look into the state and federal permits necessary to allow chlorine to be used to combat zebra mussels under the ESA, CWA and other authorities.

What you're describing is the bureaucratic stuff that needs to be done, said Picininni – has the Corps set up a pre-qualified list of contractors to deal with a problem if one is found – a "ready response team," as opposed to an emergency response

team? Are there things the Corps can set up ahead of time, on its own? Yes – we are working with Rock Peters on just that issue, but the Corps is still in the initial stages of that process, Phillips replied. the Corps has been looking at this potential problem since 1999, but so far, has done little of a concrete nature. They could incorporate it into its SPCC plan. My concern is that if you're waiting for all of the agencies to sign an MOU before preparing to take action, you could be too late, Picininni said – permitting can be a very long process. We agree, and that is Bruce's role, Phillips replied. The bad news is, if the zebra mussels show up tomorrow, we're unprepared. The good news is, so far, we have no authentic reports of zebra mussel infestations in Northwest waters, although there have been reports of boats entering the system with zebra mussels attached, Heimowitz said.

Heimowitz went briefly through the current steps in the zebra mussel rapid response plan; he noted that prevention, early detection and monitoring continue to be the effort's number one priority, and the focus of 90 percent of its efforts. One participant noted that, within his agency, he still isn't seeing significant concern about or support for the zebra mussel initiative. We are providing support and training to individual agencies, Heimowitz replied; that might be one avenue to raise awareness within yours.

What's the time-frame for the next action on this document? Schneider asked. It is still open for comment, Phillips replied; once we get farther along in the permitting process, I would anticipate that we will receive significant agency input. So at this point, what can the WQT do to help? Schneider asked – is individual agency review and comment of the draft plan the most helpful thing? Yes, Phillips replied, and providing any information Bruce may need for the permitting work. Also, if you know someone in your agency or organization who should look at this, it would be very helpful if you could pass it along. Picininni suggested that action item 4 in the action plan be moved to the head of the list – who will be responsible for doing what in the event that a zebra mussel infestation is found is a critical piece of this puzzle, he said. I would echo that, said Schneider.

5. Next WQT Meeting Date.

The next meeting of the Water Quality Team was set for Tuesday, November 21. Meeting summary prepared by Jeff Kuechle, BPA contractor.