

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

April 23, 2008 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Gumpert

Notes; Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Official Minutes/Facilitator Notes

The 4/16 conference call facilitator notes and official minutes were posted to the web. TMT members did not have any additional comments on the notes and they were determined to be final as of today.

Priest Rapids Operations

Russell Langshaw, Grant County PUD, reported on rearing protection flows: mean daily discharges ranged from 67-104 kcfs. Langshaw said constraint bands were between 20-30 kcfs. Temperature units reached 800 on 4/17, triggering weekend protection flow bands (weekly minimum flow bands calculated as the mean of the previous Monday-Thursday) that will continue for four weekends.

Action/Next Steps: Langshaw will provide an update at the 5/7 TMT meeting.

3D Cam Update

Don Faulkner and Dan Ramirez, COE, referred TMT to a power point presentation that the COE planned to attach as a link to the TMT agenda by the end of the day. Ramirez said that the COE has performed annual surveys of 3-D cams and governors since 2005, making improvements as needed. Ramirez brought a small physical example of the blade, which allow for fine tuning and regulation of turbine operations and help with 1% peak efficiency. During inspections that took place in the fall of 2007, improved evaluation methods for the 3-D cams were employed. COE developed a way to track the cams' operation via the GDACS computer system at some Corps plants. COE surveyors evaluated three months of operation and found that 3-D cam reliability varied by plant:

- Lower Monumental / Lower Granite are both operating in the high 90% consistency range. (Ramirez noted that the goal is to stay within +/- -0.5 degrees accuracy and efficiency at all projects.)
- McNary: There is quite a bit of variation, 60% to a high of 90%. Efforts have been made to reduce dead band, and there is a new design for transducer monitoring modification.
- Little Goose: Limited data available, efforts have been made to restore consistent programming.
- Ice Harbor: There are frequent faults. There is a potential need for hardware modifications.

Action/Next Steps: More surveys are planned for this summer and the COE will continue to address issues and improve reliability. The COE has identified the need for logging into GDACS software, to support consistent monitoring of efficiency across the projects. The COE will post the power point presentation as a link to the agenda on the TMT website.

Dworshak Operations

Steve Hall, COE, reported on analysis of four operational scenarios for Dworshak, posted as a link to the TMT agenda. He shared the latest ESP forecasts and a range of potential volumes. Hall reviewed the four posted scenarios, noting the uncertainty of flows out of Brownlee. The final graph displayed STP average traces and their impact on flows at Lower Granite. Paul Wagner, speaking on behalf of the salmon managers, commended the display of analysis. It was observed said that based on the current level of snow accumulation, conditions will not likely be at the low end of flow ranges, and there is uncertainty of future precipitation. Wagner said that the Salmon Manager recommendation was to stay with current operations until the middle of next week, when updated forecasts can be discussed.

Action/Next Steps: The COE offered to continue to generate weekly scenarios in a similar fashion, posting them as links to the TMT website, under Document/ESP forecasts. The COE planned to continue operating Dworshak at full power house. This item will be discussed during a TMT conference call on 4/30.

Spring Creek Hatchery Release

Dave Wills, USFWS, provided a summary of 2008 Hatchery releases, posted as a link to the agenda as follow up from the 4/16 TMT conference call. Wills noted the size discrepancy between May 2007 and May 2008 fish, likely attributed to new fish feed. Wills said that continuing studies at the gateway will be conducted this week and next, to evaluate impacts to the hatchery fish at the upper and middle range of turbine operation. He suggested further TMT discussion of the new data on 4/30 to discuss any recommended operational adjustments to the scheduled May 2 release. Dan Feil, COE, noted that the project hydraulic capacity for generation was approximately 176 kcfs when operating at the lower quarter of the 1% range. With the 100 kcfs spill called for in the 2008 FOP, maximum total river flow while operating at the low end of the 1% range would be approximately 276 kcfs. Feil added that if total river flows were to exceed about 280 kcfs, the project would need to move upward in the 1% range. This would be done prior to the need for any involuntary spill.

Action/Next Steps: The COE planned to operate Bonneville at the lower end of 1% for four days under a hard constraint to support the 5/2 Spring Creek Hatchery Release. If river flows exceed 280 kcfs, the project would begin generation above the lower quarter of the 1% range until the upper end of the 1% range is reached. This item will be on the agenda for the 4/30 TMT conference call.

Transportation Operations

Dan Feil, COE, reported that start of transportation was planned for 5/1 at Lower Granite, per the Salmon Manager recommendation. Paul Wagner, speaking on behalf of the

Salmon Managers, acknowledged the start date and noted that 50,000/day were the latest daily passage numbers. This operation is court-ordered and is expected to provide data that will help inform future decisions.

Margaret Filardo and Jerry McCann, Fish Passage Center, reported that results from 4/15 surveys indicated that gas bubble trauma was up to 25% in smolts, adding that this week's data was expected later in the day. Jim Adams noted that TDG and flow levels at Lower Granite and Little Goose had been relatively low for this time of year.

Little Goose Spill Operations

Dan Feil, COE, reported that 14 days of night spill will commence at 1800 hours on 4/25, and will likely conclude by 5/15, per the Salmon Manager's recommendation. Jim Adams, COE, said that the current Little Goose gas cap is 30 kcfs and gave TMT members head's up that the Lower Monumental gas cap may shift as a result of this operation. The spill cap at Lower Monumental was at 27 kcfs on 4/23. BPA noted that a four day lead time was preferable and that two days notice is the minimum amount of time needed for operational shifts.

Water Management Plan Spring/Summer Update

Jim Adams, COE, reported that comments on the Water Management Plan spring/summer update had been received from BOR, NOAA and MT. Comments were expected to be posted on the TMT website within the next day or two.

Action/Next Steps: TMT members should send their comments on the draft to the COE by 4/25. TMT will finalize the document at a future meeting, and this item will be on the agenda for the 5/7 TMT meeting.

TMT Guidelines

Facilitator Robin Gumpert asked if TMT members had any suggested changes to the TMT Guidelines and clarified that the updated version will be included as an appendix to the 2008 Water Management Plan. No edits/changes were offered during the meeting.

Action/Next Steps:

- Paul Wagner, NOAA, said that he would send his changes via email to DS Consulting.
- WA, ID, and MT said they would review the document and send any changes to DS Consulting by 4/30.
- DSC will send the revised document out for final review prior to the 5/7 meeting, and TMT will look to finalize the document at the 5/7 meeting.
- TMT members suggested that the Guidelines should be revisited regularly and that August or September may be appropriate timeframes for review.

Operations Review

Reservoirs: Libby was at 2395.6' with 4 kcfs out and an end of April flood control target elevation of 2402.2'. Albeni Falls was at 2055.6', with inflows of 22.2 kcfs and operating within the range of 2055-2056' through the end of April. Dworshak was at elevation 1481.2' with inflows ranging between 5-6 kcfs and outflows of 10.7 kcfs. The 7-day average flows at Lower Granite were 64.2 kcfs, 159 kcfs at McNary and 175 kcfs at Bonneville. Grand Coulee was at elevation 1237.4' with an end of April flood control elevation target of 1228.8'. Hungry Horse was at 3501.56' with 4.6 kcfs out.

Updates: The COE reported that Lower Granite units 1 and 2 were out of service, and likely would be for some time; FPOM discussion of this and any resulting recommendations may be brought up at the next TMT meeting. A 4-unit outage at John Day was scheduled for 4/24. Three gates were closed at Ice Harbor; this issue which was being vetted through FPOM. The COE said the project would be back in compliance with FPP by the end of the week.

Fish: Paul Wagner, NOAA, reported that Spring Chinook passage over Bonneville had increased, in the range of 1500-2500 passing per day for the past few days, and numbers were expected to continue to climb; Cindy LeFleur, WA, said to expect a peak in early May. Steelhead numbers were improving, approaching 50,000/day passage at Lower Granite. Yearling Chinook were passing Bonneville at rates of 25,000/day, nearly 5,000/day at McNary and approaching 15,000/day at John Day. Sampling efforts were underway at Little Goose and Lower Monumental.

Power system – Nothing to report.

Water quality – Jim Adams, COE, referred TMT to the TDG chart linked to the TMT website. He noted that the spill cap at Lower Monumental was set to 29 kcfs on Sunday which resulted in an exceedance at the tailwater gauge. As a result, the spill cap will be lowered to 27 kcfs. Most projects were generally staying below spill caps.

Next TMT Meeting: a conference call scheduled for 4/30 at 9am

Agenda Items include:

- Dworshak Operations
- Spring Creek Hatchery Release

5/7 TMT meeting

Agenda Items include:

- Priest Rapids Operations
- Spring Spill Operations
- TMT Guidelines
- Water Management Plan spring/summer update
- Operations Review

**Columbia River Regional Forum
Technical Management Team Meeting
April 23, 2008**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (D.S. Consulting), with representatives of BOR, USFWS, BPA, NOAA, COE, FPC, CRITFC, Montana, Idaho, Washington and others attending in person or by phone. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at the meeting. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Meeting Minutes

TMT finalized the facilitator notes and official minutes for the April 16 conference call.

3. Priest Rapids Update

Over the past two weeks, daily flows at Priest Rapids Dam have ranged from 67-104 kcfs, with a 64.4 kcfs minimum and 112 kcfs maximum, Russell Langshaw (Grant Co. PUD) reported. Daily deltas ranged from 2.9-9.2 kcfs. On Saturday, April 18, 800 temperature units accumulated, which triggered weekend protection flows for chum. They will start this coming weekend for four consecutive weekends, meaning minimum flows will be equal to the mean minimum flow for Monday through Thursday of the previous week. Langshaw will continue to check in at regularly scheduled TMT meetings, the next on May 7.

4. Update on 3-D Cam and 1% Operation Improvements

Don Faulkner and Dan Ramirez (COE) gave an update on installation of equipment to improve the 1% operation for fish at dam turbines.

The COE's Hydroelectric Design Center (HDC) does an annual survey of 3-D cams, governors, and other equipment the Walla Walla district has installed to improve operations at 1% of turbine efficiency. All COE plants in the Columbia and Snake river systems use original mechanical governors that were installed sometime during the 1950s through the 1980s. The mechanical governors are supposed to position the turbine blade and gate in an optimal relationship for peak 1% efficiency; they position other turbine equipment as well.

Some of the original cam blades work in 5- to 10-foot head increments, which can be 5-7 feet off in terms of optimal positioning, Ramirez explained. In

the early 1990s, in an effort to solve this problem, the COE developed a 3-D cam controller that electronically fine-tunes turbine blade and gate positioning.

Walla Walla District; In 2005-06, the Walla Walla District tested all the flood units of every 3-D cam in its service territory and developed cam tables which were included in today's presentation (subsequently linked to today's TMT agenda). In 2004-05, the COE performed "snapshot" surveys consisting of 1-2 days' onsite evaluation. These short-term reviews of the cam controllers did not reveal any problems. However, that changed last fall when the district was able to access GDACS information regarding 3-D cam operation. For the first time, the district was able to do a historical analysis of how well the 3-D cams are working. Results were varied – some good, some not so good. Ramirez focused on specific projects.

Lower Monumental and Lower Granite dams. The 3-D cams are operating as well as can be expected, based on approximately 3 months of historical data.

McNary Dam. Surveys were done in August 2007 and again in March 2008. Based on approximately 3 months of data, three issues were found to be affecting 3-D cam operation at McNary. These problems were addressed, including a new design now being installed. The changes are expected to reduce blade positioning errors.

Lower Granite Dam. The 3-D cam malfunctioned for the entire month of September 2007 because of software problems, resulting in blade errors of up to 2.5 degrees. Programming was restored in December; Ramirez presented subsequent monitoring results for 3 months as of March 2008. Large blade errors such as those occurring at Lower Granite in September 2007 indicate lost turbine efficiency. This is a good example of why it's important to monitor 3-D cam operation closely and fix any problems quickly.

Ice Harbor Dam. There was not much information available on 3-D cam operation at this project. A March 2008 survey indicated problems with unit 5 which are now being addressed. The survey will be repeated this summer as part of the district's overall drive to improve the reliability of 3-D cam operations.

Portland District. Values for 3-D cam operations in the Portland district aren't logged (as they are in the Walla Walla District) because digital 3-D cam governors have not yet been installed in these dam turbines. Limited surveys have identified no significant 3-D cam issues in recent months.

There were significant problems in the fall of 2007, but these were addressed, and spring 2008 surveys showed significant improvement. The COE will continue to do surveys of its 3-D cams and institute changes as part of a goal to have all 3-D cams operate at peak efficiency 99% of the time (which Lower

Monumental does now). There appears to be no reason this goal isn't achievable. This presentation on 3-D cam operation will soon be available online, linked to today's TMT agenda.

5. Dworshak Operations

Steve Hall (COE) presented four operational scenarios based on ESP forecasts. (They are: Dworshak runoff volume already passed; volume required to meet minimum flows; volume required to refill the project; and flows that could be shaped as the reservoir refills). The four scenarios are linked to today's agenda. To find them on the TMT web page, go to Documents, then ESP Forecast, then Volume Forecast. Hall discussed each scenario.

- Scenario 1 (base case). Leave full powerhouse flows immediately and drop to the lower ESP average outflow. This operation would result in flows of approximately 6 kcfs through refill at the end of June, with upper and lower bounds of 9.5-3.5 kcfs.
- Scenario 2. Run full powerhouse through the end of April and see how that affects refill. Under this scenario, the average outflow appears to drop to 5.5 kcfs, with a maximum outflow of around 9.5 kcfs and a minimum of less than 3 kcfs.
- Scenario 3. Extend full powerhouse into the first weekend of May. This scenario essentially brings the average outflow down to just under 5 kcfs, with a minimum of approximately 2 kcfs and a maximum of 9 kcfs.
- Scenario 4. Extend full powerhouse operations through mid-May. Under this scenario, the average flow drops to 4 kcfs and maximum flow drops to 9 kcfs, with no need to meet minimum flows. Dworshak reservoir would be about 5 feet from full by the end of June. While that doesn't mean the reservoir couldn't refill in July, it does mean the reservoir would not meet its target of refilling by the end of June.

Hall presented another slide showing expected impacts to Lower Granite flows that would result from each of the scenarios. There was discussion of the fact that outflows from Brownlee Dam are impossible to predict, not under TMT's control, and can amount to four times the volume of flows released from Dworshak. While the varying flow amounts in the above scenarios appear to shift flow volumes by about 2 days between May 5-19, in reality, flow volumes could shift by up to 5 days from where they appear in the STP traces, Robyn MacKay (BPA) said. Others agreed the forecasts are limited. It's unlikely at this point that snowpack in 2008 will turn out to be below average, Wagner and Hall agreed.

After discussion at FPAC, the Salmon Managers recommended continuing the current operation at Dworshak of full powerhouse (10.8 kcfs outflows)

through next week, Wagner said. The Salmon Managers will check in after the May 1 forecast is released. TMT planned to revisit this issue on its April 30 conference call. Meanwhile, the COE will continue to produce these graphs as updated forecasts become available. They are very useful, Wagner said.

6. Spring Creek Hatchery Release

Dave Wills (USFWS) presented new information on the size of fish that will be released from the hatchery on Friday, May 2. Apparently, the switch to new fish feed is resulting in larger fish this year than last year's May release. Wills showed TMT online data and noted that subyearlings were exceptionally small in 2004. The hatchery calculates average size per pound for the release to account for variation among samples, he explained.

Wills said he'd contacted the researcher doing gateway studies at Bonneville to address the question of how turbines should be operated for this release. USFWS requested the low end of 1% operation for the May release, pending any updated information.

Because slightly higher mortality rates have been observed at the upper end of 1% vs. the lower end, the COE is willing to provide an operation at the lower end of 1% for this release, Dan Feil (COE) said. That means the Bonneville 2nd powerhouse capacity will be about 80 kcfs, with capacity at the 1st powerhouse of 96 kcfs. Currently, Bonneville is spilling approximately 100 kcfs, equivalent to a 276 kcfs river flow. Therefore, the caveat is: if flows exceed the 270-280 kcfs range, the COE will have to start ramping up units at the Bonneville 2nd powerhouse in order to maintain the spill level specified in the Fish Operations Plan. Uncontrolled spill above 100 kcfs would be likely to impact adult passage. TMT will revisit this issue during its April 30 conference call.

7. Transportation Operations

The COE plans to initiate transportation on May 1 at Lower Granite, unless the Salmon Managers change that request today, Feil said. (Next week's call would be too late to give project staff the necessary 3 days' lead time.) FPAC discussed this yesterday and chose to stick with the May 1 start date, Wagner said. The court-ordered operation differs from what was proposed in the draft BiOp. The point (in any study) of providing a different operation for comparison with the specified operation is to test the true effect of the specified operation, he explained. That's why people want to provide a different operation this year – to evaluate the effect of starting transportation after dates specified in the BiOp. Transportation will thus begin on May 1 this year.

There was discussion of gas bubble trauma problems that have recently been reported at Little Goose. Margaret Filardo and Jerry McCann (FPC) together explained that reported rates of around 25% for some samples are not

the result of errors in reporting methodology in recognizing symptoms of GBT. Given that gas levels in the river have been low recently (110% at Lower Granite gate, 106% in the Little Goose forebay), there is no obvious explanation for these findings. FPC staff will continue to monitor this problem closely and will notify TMT if adverse findings continue.

8. Little Goose 14-Day Nighttime Spill to Cap Operations

It's time again for the Salmon Managers to decide when to request spill for 14 days to the nighttime gas cap (currently 30 kcfs) at Little Goose beginning sometime after April 22, Feil said.

The Salmon Managers have discussed this and want it to start at 6 p.m. Friday night, April 25, and continue for 14 consecutive nights until further notice, Wagner said.

Adams commented that the increase in gas production at Goose is likely to influence gas caps farther downstream. The Lower Monumental gas cap is currently 27 kcfs and could be lowered as a result of this spill.

It would be possible to break up this operation and not run it for 14 consecutive days within the specified window as long as this spill provision is completed by May 15, Feil said. BPA would like at least 2 days' notice, 4 days preferably, if the nighttime spill is to be stopped and started again, Norris said. That means nighttime spill at Little Goose could be stopped and started once during the specified window (April 22-May 15).

9. Water Management Spring/Summer Update

The COE has received WMP comments from BOR, NOAA, and the state of Montana, Jim Adams reported. These comments will be posted to the TMT webpage within the next few days. USFWS plans to comment by the end of this week, April 25. There will be a status report on this topic May 7, with a goal of finalizing the WMP spring/summer update at that meeting.

10. TMT Guidelines

Robin Gumpert polled TMT members on whether they will have comments to the TMT guidelines, which were revised last March but never finalized. NOAA will send a few comments, but they're not substantive. BPA and BOR will probably not comment this year; BPA advocated annual reviews of the TMT guidelines. BOR had no comments today. Washington, Idaho and Montana had not yet reviewed the document. Gumpert requested that comments be sent to the facilitation team by April 30 so the guidelines can be finalized on May 7.

11. Operations Review

a. Reservoirs.

Libby is at elevation 2,395.6 feet, with an end of April flood control elevation target of 2,402.2 feet. The April final water supply forecast is 101% of normal. Libby is still passing minimum flows of 4 kcfs.

Albeni Falls is still operating within a 1-foot range through the end of April, maintaining an elevation of 2,055-2056 feet. Inflows are 22.2 kcfs.

Dworshak (discussed at length) is at elevation 1,481.2 feet, with inflows of 5-6 kcfs and outflows at full powerhouse (10.7 kcfs).

The 7-day average for inflows at Lower Granite is 64.2 kcfs. Units 1 and 2 will be out of service for a couple months, meaning Lower Granite is down to units 3-6, Don Faulkner reported. FPOM will look at unit priorities for Lower Granite and alert TMT if there are any recommended changes.

John Day units 13-16 will be out of service the afternoon of April 24. The navigation lock will be operated using a floating bulkhead, which could happen again over the next several months. This outage, a departure from the Fish Passage Plan, has already been discussed at FPOM and nobody objected, Feil noted.

The 7-day average for inflows at McNary is 159 kcfs. The 7-day average for inflows at Bonneville is 175 kcfs.

Grand Coulee is at elevation 1,237.4 feet, with an April 30 flood control elevation target of 1,228.8 feet.

Hungry Horse is at elevation 3,501.56 feet, discharging 4.6 kcfs. No changes in outflows are anticipated, pending the May forecast.

b. Fish. Spring Chinook are showing up in more significant numbers of 1,500-2,500/day at Bonneville Dam over the past few days, Wagner said. These numbers are expected to peak in early May. Lower Granite Dam is passing yearling Chinook smolts at the rate of nearly 50,000 per day. McNary Dam is passing 5,000 per day; John Day Dam, 13,000 per day, just in time for the 24-hour spill previously planned. Bonneville Dam is passing nearly 25,000 yearling Chinook per day.

Steelhead passage at Lower Granite Dam is approaching 50,000 per day, similar to yearling Chinook. Many of these are hatchery fish. The traditional split is 80% hatchery fish vs. 20% wild fish; this run is closer to 85% hatchery fish vs. 15% wild fish. Moving downriver, McNary is passing 3,500 steelhead per day; John Day, 1,800 steelhead per day; Bonneville, less than 1,000 per day.

c. Power System. There was nothing to report today.

d. Water Quality. There have been a few exceedances in the past week, but all projects are currently operating under water quality criteria, Adams said. TDG levels are currently low. Only Lower Monumental is approaching its spill cap. The spill cap at Little Goose was raised from 27 kcfs to 29 kcfs last Sunday, which immediately produced a tailwater exceedance at Lower Monumental. It looks like the threshold for tailwater exceedances at Lower Monumental is about 27 kcfs. Temperatures are still too low for exceedances in the Ice Harbor forebay. Bonneville Dam is spilling the full 100 kcfs allotted, while The Dalles, John Day and McNary are spilling 40%, 30% and 40% respectively, as specified in the 2008 Fish Operations Plan (2008 FOP). Flows are too low at Ice Harbor to spill to the spill cap at night, but IHR is spilling 45 kcfs during most daytime hours.

7. Next Meeting

The next TMT meeting will be an April 30 conference call to review Dworshak operations and conditions for the Spring Creek Hatchery release. The next regular TMT meeting will be on May 7. This summary prepared by consultant and writer Pat Vivian.

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