COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

January 31, 2007 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

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.

Water Supply Forecasts

Steve King, National Weather Service River Forecast Center, presented several links available on the NWS website to TMT. King described the 2007 seasonal conditions as not necessarily typical of an El Niño year: higher than average precipitation in Canada, which decreases south / southeast and into Idaho. Water supply forecast runs displayed in the links show two tools: regression and ESP models, generated every week to reflect what physically is coming through the system. It was noted that the two models showed similar predictions. January-July 2007 regression model predictions are 84% of average precipitation in the Snake River area with extremely light snow conditions, and 100% of precipitation average for Grand Coulee, with average snow conditions in the Grand Coulee / The Dalles / Lower Granite areas. King informed TMT members of additional details available in the links: comparisons to the past years, contingency forecasts, details on runoff and trends, normal vs. observed statistics, and other year-to-year comparisons. King noted that the climate predictions issued by NOAA showed above average temperatures in the Midwest/west, for both one month and 90-day forecasts.
The following is a link to the Northwest River Forecast Center's water supply forecast page: http://www.nwrfc.noaa.gov/water_supply/ws_fcst.cgi.

2007 Libby Operations

Cindy Henriksen, COE, gave a power point presentation on the COE's January 5, 2007 one year decision to operate Libby under VARQ flood control procedures. The COE uses a Principal Component Analysis for water supply forecasts for Libby. The STP hydrologic model will be used to determine the Initial Controlled Flow (ICF) at The Dalles to trigger the start of the VARQ refill/outflow at Libby. Henriksen said that exceptions for Libby VARQ outflow operations would include a need to protect human life/safety and the need to maintain an elevation of 1764' at Bonners Ferry.

Henriksen noted that discussion on 2007 Sturgeon operations will occur in-season and be coordinated through TMT. Henriksen cautioned that refill at Libby may not be as likely this year as it was in previous years, and that reducing the likelihood of a double peak might further reduce the refill probability. Henriksen noted that the need for coordination will continue, in order to balance all the needs in the river, especially during the spring and summer months. Henriksen concluded her presentation with an operation scenarios

overview, based on the January final forecast and a later, slightly lesser water supply forecast. Monthly calculations of water supply forecasts will be used to determine the draft and the STP will be used to determine outflows/refill. TMT members acknowledged the COE's decision to operate to VARQ this year, and will work together to help coordinate in-season management of the operations.

Chum Redd GPS

Joe Skalisky, USFWS, gave a power point presentation on redd counts through December 2006: an additional 40 redds were counted at the Ives Island area, and added to the 11/22 assessment for a year-end total of 217. He noted that the locations of the redds were centered around the Ives Island area - Multnomah Falls and 1-205 surveys were also conducted but not included in this presentation. Skalisky noted that the numbers in those areas appeared to be less populated than in the past, due perhaps to higher velocities. Results from the Multnomah Falls and I-205 surveys will likely be available at the TMT meeting on 2/14. Skalisky's presentation included slides with detail on computed redd elevations; redd distribution at flow band levels, and regression between Bonneville tailwater and discharge. Skalisky noted that surveys on bed changes in spawning areas will be conducted this year, and that information will be included in the analysis next year.

> **Action/Next Steps:** A Chum status update will be on the agenda for the 2/14 TMT meeting.

Chum Incubation Status

Paul Wagner, NOAA, recommended on behalf of the Salmon Managers maintaining 13' tailwater at Bonneville through the incubation phase. Surveys were to begin later this week.

> **Action/Next Steps:** Continue the current operation of a minimum tailwater of 13', with one nighttime pulse as needed. TMT will have a chum incubation update on the agenda for the 2/14 meeting.

SOR #2007-01

Tom Lorz, CRITFC, presented an SOR to the Action Agencies to maintain the minimum 13' tailwater below Bonneville, and, based on the water supply forecasts for January and February, recommended conservative use of Grand Coulee to insure no impact on April 10 flood control rule curves. John Roache, BOR, said that the recent cold snap had caused the slight draft at Grand Coulee, and that BOR was cognizant of the priorities of chum operations and power conditions. The COE and BPA also acknowledged the request, and all share an interest with the Salmon Managers in maintaining balance for all needs in the system

Bonneville Outage

Don Faulkner, COE, reported that the COE will need to take 3 power lines out for one day (0700 – 1700 hours), and tentatively suggested 4/16. Faulkner said the goal is to minimize any effects on juveniles in the river, and that 5-7 units would still be available.

The Salmon Managers expressed the need to have this outage coordinated with the end of chum emergence.

2007 Water Management Plan

Bernard Klatte, COE, thanked TMT members for their comments and said that the latest draft would be posted on the web by the end of 2/2. The latest draft will include the Libby VARQ operation and chum updates. Jim Adams, COE, asked TMT members to pay special attention to revisions in Appendix 4, Section 3.1, on the spill program.

> **Action/Next Steps:** TMT members are asked to review the draft WMP and Fall/Winter Update and submit edits, comments, etc. based on 2007 expectations to Bernard Klatte, COE, before the next TMT meeting on 2/14.

Operations Review

Reservoirs: Grand Coulee was at 1273.5', releasing outflows to meet power needs; Hungry Horse was at 3535.82, ', meeting Columbia Falls minimums; Libby was at 2093.1', with outflows at 8.8 kcfs and an end of January target of 2393.7' Dworshak elevation was at 1531.8', releasing 5.8 kcfs and with an end of January target of 1532.3'. Albeni Falls was operating within a 1' range, between 2052.3' – 2053.3', with outflows at 15 kcfs.

Fish: (See chum status) Paul Wagner, NOAA, said he expects NOAA's transportation permit to extend for another year, while awaiting a new BiOP. There will be a more detailed update on this at the 2/14 TMT meeting

Power: Nothing to report at this time.

Water quality: Jim Adams, COE, reported a one-day outage at Lower Monumental on 1/26: the project went to speed/no load for 8-10 hours and TDG levels were between 113-114%.

Next TMT Face-to-Face Meeting, February 14th, 9:00-noon

Agenda Items will include:

- Final Water Supply Forecasts
- Chum Incubation Status and Survey Update
- WMP – latest draft comments due before 2/14!
- Transportation Permit - Official Update
- Operations Review

Technical Management Team Meeting Notes

January 31, 2007

1. Welcome and Introductions

Today's meeting was chaired by Robin Harkless, with representatives from COE, NOAA-F, BPA, USFWS, BOR, NWRP, and the states of Oregon, Washington, Idaho and Montana in attendance. 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 TMT meeting.

2. Review Minutes

There were no comments on the January 17, 2007, meeting minutes, which are posted on the Corps website at: http://www.nwd-wd.usace.army.mil/tmt/agendas/2007/.

3. January Water Supply Forecasts

A. Main Water Supply Page – Overview. Steve King of the National Weather Service gave a presentation explaining the final water supply forecasts on the Northwest River Forecast Center web page (www.nwrfc.noaa.gov). The mid month water supply forecast for April-Sept. 2007 shows above normal water supply in the Northern Cascades, Washington and Canada, and below normal supply in the Snake River area and southeastern Oregon.

B. Current Month Precipitation. The January final forecast had an assumption of 75% precipitation from Jan. 15-Feb. 1, then normal precipitation for the rest of the month. The current month's forecast will include the early bird forecast, showing 60% precipitation basinwide from Feb. 1-15, then normal precipitation throughout the rest of February.

King explained the three different types of forecasts. The final forecast, typically issued on the 6th working day of each month from January to July, incorporates all information gathered regarding snow, precipitation and runoff through the previous month. It is the most official forecast of the region's water supply. To provide updates, the RFC also issues a midmonth forecast and an early bird forecast, issued near the first of each month.

C. Seasonal Month Precipitation. The weekly update of seasonal precipitation (Oct. 1-Jan.22) shows fairly wet conditions for the season in the northern Cascades, healthy conditions in Canada, and dry conditions in the south and east, particularly southeastern Oregon.

D. Snow. Snow conditions are light at present throughout much of the Columbia Basin. Precipitation in fall has been warmer and wetter than usual. Snow conditions in the Snake are extremely sparse and dry. Approximately 30% of runoff in the Pacific Northwest comes from Canada, where snow conditions are generally above normal, and another 30% comes from the northern Rockies, where snow conditions are light at present. Conditions are average in the northern Cascades. Overall, King said. We can expect to see reasonably healthy water supplies at Grand Coulee this year, and lesser than normal water supplies in Lower Granite, with The Dalles reflecting a combination of the two forecasts.

E. Water Supply Seasonal Volume Forecast/ESP. King noted that we are in an El Nino year, but that in many cases, observed weather patterns have not reflected what is assumed to be typical for El Nino years. Conditions are drier than normal this spring. The RFC runs several different models for forecasts, including a traditional regression-based forecast, and one based on ensemble streamflow predictions, or ESP. King showed the two forecasts side by side for three areas.

Lower Granite Dam/Snake River (Jan.-July 2007). The most expected water volume is 84% of normal now, reflecting low observations of snow and rain according to the regression forecast. The ESP forecast is 25 maf, which is equivalent to the 25 maf regression forecast for the same period.

Grand Coulee Dam/Columbia River (Jan-July 2007). The regression forecast shows water supplies at Grand Coulee as approximately 100% of normal thanks to a large snowpack in Canada. The ESP forecast for the same period is 55 maf, which is quite a bit drier than the regression forecast. ESP forecasts are more up to date, King said. Both forecasts use reliable techniques of prediction. Many NWRFC customers use forecasts based on traditional regression techniques, however, one use of ESP forecasts is to use it as a trending tool.

The Dalles Dam/ Columbia River (Jan/July 2007). This isn't as close to normal as Grand Coulee, said King. The Jan-July regression forecast is103 maf, 96% of normal. The ESP forecast for the same period is 94.6 maf, also lower than normal.

King gave a brief overview on how to navigate the NWRFC web page. On a graph showing the history of forecasts issued this year for The Dalles, every water supply forecasts showed a downward trend. He demonstrated a climate forecast product that indicated that areas of the Columbia Basin are likely to be warmer than normal for February.

4. Libby 2007 Operations

Cindy Henriksen (COE) gave a presentation on VARQ flood control operations at Libby Dam for 2007. Other documents that contributed to the operations decision for 2007 were the Corps After Action Report of November 2006and the final Upper Columbia EIS in April 2006.These documents can be found on the web at the following link: http://www.nws.usace.army.mil/Template/Display/More. The EIS is final, although the Corps hasn't signed the ROD yet, Henriksen said. The Corps has signed a ROD on the 2006 USFWS BiOp.

In 2007, people can expect reduced flexibility than previous years as the Corps implements strict VARQ flood control. In addition there will releases for sturgeon and summer salmon runs. On Jan. 5, 2007, General Martin signed a determination and finding for flood control and operation at Libby, which is available at the following link: http://www.nws.usace.army.mil/PublicMenu/documents/PUBLICAFFAIRS/Libby.

Henriksen explained how the one-year determination to operate in accordance with strict VARQ procedures will affect operations at Libby. The outflow from Libby will not be reduced below the VARQ outflow if the reduction will reduce the flood storage capability that may be available at Libby from April to June. The only exception is that Libby may reduce the outflow fro one or two days to keep the stage at Bonners Ferry below elevation 1764 feet. If the National Weather Service lowers the flood stage at Bonners Ferry to elevation 1762 feet, the Crops will operate to elevation 1764 feet this year. Libby is currently on track to meet January VARQ flood control elevations.

*VARQ Refill Outflow Calculations***.** During the refill period, VARQ refill outflow will begin 10 days prior to the initial controlled flow (ICF) at The Dalles. Both regression and ESP forecasts could be used to make various decisions regarding reservoir operations in the Northwest. Regression forecasts are generally water supply forecasts or volumes of water over a period of time. The Corps uses the ESP forecast as a streamflow, inflow forecast for hydrologic operation of reservoirs. At Libby, the Corps prepares its own water supply forecast to determine the end of month draft. These forecasts are very similar to the water supply forecasts the RFC prepares. At Libby, the Corps will begin refill outflow 10 days prior to the initial controlled flow at The Dalles. Based on forecasts, the Corps might have to begin a VARQ draft with a quick turnaround time at Libby. Once VARQ outflow is calculated, the Corps won't reduce outflows below that amount unless needed to protect human life and safety downstream of Libby Dam. The Corps will, to the extent practical, avoid exceeding the flood stage of 1,764 feet elevation at Bonner's Ferry.

Sturgeon Operations in 2007. The Corps expects to release water from Libby Dam to meet tiered volume outflows specified in the USFWS 2006 BiOp.

The current water supply forecast prepared by the Corps is 6.995 maf, 110% of normal. The corresponding tiered volume is 1.169 maf, or approximately 28 days of outflow full-powerhouse from Libby Dam. Every year, sturgeon flow timing is a bit different, and the Corps will work with USFWS to determine the objectives of sturgeon flows this year. However, the Corps won't use the anticipated release of the sturgeon volume to lower a VARQ outflow because releasing less than VARQ flows could potentially compromise flood control storage capacity.

However, when VARQ outflows are combined with sturgeon flows, less refill can be expected this year than in 2003-06, Henriksen said. The combination might also result in a double peak operation at Libby, which is a high flow in May or early June for sturgeon, followed by lower flows to refill in June, then high flows in July and August to reach the draft limit of elevation 2,439 at Libby. Refill in 2007 might not be as likely as it was in past years, and reducing the double peak operation in June would make refill even less likely. The Upper Columbia EIS was based on refill during the month of July and included the double peak operation during nearly half the years modeled. The planning of sturgeon flows, as well as any double peaks, will be coordinated through the TMT.

Probabilities of refill under different scenarios are shown in the Upper Columbia EIS, as well as online at the Corps website shown on page 1 of these notes. The probability of refill table is Table 3-15 of the EIS document. Under Alternative LV1, or Libby operation with VARQ flood control and a sturgeon operation at full powerhouse outflow beginning May 20, the probability of refill in July to within 1 foot of full was 12%; to within 5 feet of full, 31%.

There may be spill to meet VARQ outflow if there is an unexpected outage. The Corps will try to make the best choices for May-July operations to meet all goals of the ESA under VARQ constraints, Henriksen said. A graph modeling an inflow volume of 6.995 maf – which is close to the Corps' January final water supply forecast – shows Libby drafting through the end of April, then beginning VARQ refill on May 1. The sturgeon outflow began May 20 and released the tiered volume per the 2006 US Fish and Wildlife BiOp. In this scenario the reservoir filled to about elevation 2445 feet, about 14 feet from full. TMT will be informed as to the requirements of drafting to VARQ draft points, and the refill outflow. There is also a scenario where the Libby inflow volume was 6.5 MAF. In this scenario the VARQ outflow began May 1 and the sturgeon outflow began May 20. Because of the shape of the inflow in this second scenario, the VARQ outflow was low for the first two weeks of May until the sturgeon outflow began. This was a later inflow shape than the other scenario and the reservoir filled to about elevation 2455 feet, about 4 feet from full. The message here is that the shape of the inflow will influence the reservoir refill and the potential need for a double peak operation at Libby in 2007.

Initial Controlled Flow. ICF is the unregulated flow – as if there were no dams in the Columbia basin – as measured at The Dalles. ICF determines when

refill of upstream reservoirs should begin. This is an important factor in VARQ operations. Once the unregulated flow at The Dalles reaches that quantity, which varies by year , the objective will be to regulate outflow at the dams to meet that particular flow as a regulated flow at The Dalles for the remainder of the refill period. The TMT web page has links to end-of-month flood control elevation targets for all of the Pacific Northwest dams. Monthly ICF calculations are shown at the bottom of that flood control web page. ICF is based on many variables updated frequently – it is a constantly moving technical target, Henriksen said. Flood control elevations are calculated monthly, with water supply forecasts prepared by the National Weather Service, primarily.

In the past, in the ongoing tradeoff between the river and the reservoir, double peaks have been damaging to the river environment, Jim Litchfield (Montana) said. Montana would like to see stable flows in summer months into September. The operation Montana favors would be managing outflows at Libby in late June through September to produce the most stable outflows possible, based on storage volume plus expected inflows, with weekly or biweekly adjustments based on how inflows are changing. The point is to avoid crashing in June and July, then maxing outflows in August to move salmon downstream, which is damaging to the river environment. Jim Litchfield observed that the modeling prepared for the EIS included nearly half the years modeled having a double peak operation. I did not do the modeling, Henriksen said, but I understand that 44% of the years modeled had a double peak. With this low level of refill and the double peak, we need to be mindful of the end of season sturgeon operation, said Litchfield. Even with the scenarios you showed in your presentation, these steady outflows are not necessarily what Montana would like to see. Reducing outflow to 20 kcfs flow for the entire summer is not particularly attractive in Montana, where the resulting high flows would cause problems for resident fish.

5. Chum Redd GPS Locations and Modeled Tailwater Elevations

Joe Skalicky (USFWS) gave an update on his studies of chum incubation in the Columbia River near Ives Island. Redds have been mapped through December, including an additional 40 to the previous assessment of 177, for a total of 217 redds in the Ives area. Four pages of maps at the end of the SOR considered today (see discussion to follow in these notes) show the exact chum redd locations. Unlike other years none of the redds are documented on the Oregon shore or downstream at the I-205 area – all are in an isolated area near Ives Island. Skalicky noted that redds are particularly hard to sight this year due to turbid conditions and limited depth visibility of only a foot or so. Paul Wagner (NOAA-F) noted that the area on the Oregon side of the river between Ives Island and the shoreline – normally a popular area for spawning – is less populated this year than usual. Skalicky said that might be due to the fact that flows have been higher, so redds are planted deeper in the river and harder to

sight than normal, given recent poor visibility. For the most part, river velocities have been too high this year for chum to spawn in that area.

Skalicky cautioned against making false assumptions that redds will be safe if their elevations are below tailwater elevations. Because water flows downhill, the decrease in water surface elevations is hard to predict. He provided all redd elevations (Table 1 in the SOR) but can't say, for any given tailwater elevation, how many redds will remain underwater (Table 2 in the SOR). The vast majority of redds most likely to survive low flows are at the mouth of Hamilton Creek, where there has been an intentional effort to keep redds at lower elevations. The effort has apparently succeeded, Skalicky noted. Skalicky's presentation includes a regression flow model, which shows a 13-foot tailwater corresponds to approximately a 140 kcfs flow; the map depicts which redds would be covered and which exposed. Table 3 describes the range of scenarios and problematic natures of managing flows and tailwaters for the Ives Island chum. Tidal effects on tailwater levels were not analyzed, but could be considered later, Skalicky said.

6. Chum Incubation Status

Maintaining a 13 foot tailwater is of enormous value to chum incubation, said Wagner. Half a foot less in elevation means another 30% of the chum population would probably dry up. The main objective this year is to maintain a 13 foot elevation at the Tanner Creek gage, if at all possible; that is the preferred alternative for salmon managers. The current operation level is to maintain a minimum tailwater of 13 feet with at least one pulse of 20 minutes' duration or greater than 13.5 feet once a day, Bernard Klatte (COE) said.

Harkless asked, should chum incubation be a standing TMT agenda item? Wills (USFWS) replied that the February water supply forecast will be available by the next TMT meeting. Wills said he would supply numbers for the I-205 and Multnomah Falls chum redd counts on the TMT web page, so this item can be covered in subsequent emails and doesn't need to be on the next agenda. Cathy Hlebechuk reiterated what Bernard Klatte had said, the current operation is to maintain a minimum tailwater of 13 feet with at least one pulse of 20 minutes duration greater than 13.5 feet once a day.

7. Bonneville SOR #2007-01

In light of the previous two presentations (VARQ operations requirements and chum spawning elevations), Tom Lorz (CRITFC) presented the salmon managers' concerns for this year. They are asking for judicious operation of Grand Coulee to maintain the 13 foot elevation below BON through chum spawning season, given that dropping to lower elevations may mean a loss of 30% of the redds. John Roache (Reclamation) said Reclamation is aware of the declining water supply conditions and have been discussing future operations

with BPA accordingly. He also stated Grand Coulee's operational priorities for this time of year are to meet ESA obligations (April 10 URC and chum flows) as well as the power requirements that are placed on the project. Robyn MacKay (BPA) reiterated these statements adding that below normal temperatures in the Northwest load centers in January resulted in the increased draft rate at Grand Coulee and that temperatures in February are forecasted to be warmer. Cathy Hlebechuk of the Corps said the Corps defers to Reclamation and BPA on this issue. Maintenance of drum gates at Grand Coulee may proceed if flood control drafts the project below a 1,255-60-foot elevation for a five week period, Roache said.

8. Bonneville Transmission Outage

The tentative outage date is April 16, from 7 am to 5 pm, which was chosen because it's likely to be after chum have emerged. Three power lines will be out of service for one day, which means approximately 5-7 units will remain available. Spill for juvenile salmonid migration will start on April 10. Daytime operation at Bonneville is supposed to be 100 kcfs of spill for 24 hours/day at that time. Five to seven units are planned to be on, Scott Bettin (BPA) said. At least 3 units must be operating to get minimum generation requirements. This would be happening during a spill period, so spill would be occurring anyway, Wagner noted. Once the date is chosen, it is inflexible. Delaying it would mean moving into May, when flows are higher and chances of exceeding the gas cap increase dramatically. The TMT agreed on April 16 for the outage.

Chum are still incubating, so there are no predictions yet regarding emergence. Regarding spill, one of ODFW's concerns is that, if spill doesn't start until April 10, field sampling will be delayed. It appears that spill will be needed prior to April 10 to do the chum study, Rick Krueger (Oregon) said. If researchers wait too long, they won't get fish. The TMT will receive chum incubation information before the next TMT meeting.

9. Water Management Plan

TMT members have until the next meeting on Feb. 14 to comment on the fall/winter update to the Water Management Plan, Klatte (COE) said. There have been updates since TMT members last commented on the plan; the current version is posted on the TMT website. The latest draft includes new language regarding chum incubation, as well as VARQ information, so Klatte urged TMT members to review it. The revisions appear in track-changes mode so they are visible; Klatte said there should be no big surprises.

Appendix 4, dated Jan. 18, includes a table describing the proposed spill program, project by project, based on an agreement between the action agencies and tribes that was submitted to the court, Adams said. Adams gave an example of how the material in the table has been interpreted. Last year, the Corps

assumed that the prescribed operation for Lower Monumental was 27 kcfs during spring, meaning that 27 was a maximum. This year, it's considered an estimate, and the Corps will spill to the spill cap, which may be less than the maximum spill rate. Questions and comments on Appendix 4 and on the water management plan should be directed to Klatte. The TMT will finalize the plan at their next meeting Feb. 14. The IT has requested a briefing on it at their March 1 meeting.

10. Operations Review

A. Reservoirs. Hungry Horse is at 35.82 elevation; putting out 25-26 kcfs. This operation level will continue until the next forecast, Roache said.

Grand Coulee is at 1,273.5 elevation; with releases being made to meet power demands and maintain a 13 foot tailwater.

Libby is at 2,394, with 8.8 kcfs outflow. The end of January flood control elevation is 2,393.7 feet.

Dworshak elevation is 1,531.18. The end of January flood control elevation is 1,532.3.

Albeni Falls is still operating within a range of 2,052.3-2,053.3 elevation, with 15 kcfs outflow.

B. Fish. Other than the chum concerns already discussed, the only thing to report is that the transportation permit will be extended for another year until the BiOp is complete, Wagner said. There will be an official update at the next TMT on transportation.

C. Power System. There is nothing new to report, McKay said.

D. Water Quality. During a one-day outage at Lower Monumental, gas levels got as high as 113-114%.

11. Next TMT Meeting

The group will meet next on Feb. 14, Valentines Day. The agenda will include the final water supply forecast, chum incubation status, an update on the chum spawning study, final water management plan, transportation permit status, and the usual operations review. Anyone with agenda items to add should contact Cathy Hlebechuk or Robin Harkless. This summary prepared by BPA contractor Pat Vivian.

Technical Management Team Meeting Participants
January 31, 2007

Name	Affiliation
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