Technical Management Team Meeting Notes

March 16, 2005
Corps NW Division Headquarters
Portland, Oregon

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS
Facilitator: Donna Silverberg

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.

Update on SOR 2005-2:
Dave Wills re-capped operations at Bonneville over the last two weeks, per SOR 2005-2: The Spring Creek hatchery release began on March 2 and the corner collector operation at Bonneville began the afternoon of March 3. Surveys taken on March 4 showed TDG levels in the Ives Island area at 106%, with about 1' of depth compensation. In the Multnomah Falls area, due to tidal influences, there was low depth compensation coverage and TDG levels were around 107%. Given this, the tailwater elevation was raised to 13.5' for 24 hours, and the operation ended in the afternoon on March 5. During this operation, 60% of the Spring Creek release passed Bonneville. TDG levels remain high below Bonneville, which is a concern without depth compensation. Many questions were raised during this operation, and the salmon managers would like to continue logging data (temperature/TDG/depth) at known chum spawning areas to aid management actions later. The Warrendale gauge does provide some information, but more accurate information could be gathered through the data loggers.

ACTION: The COE will explore the possibility of putting data loggers in chum spawning areas this season. The salmon managers will confirm what the appropriate TDG levels for chum should be based on scientific literature.

Bonneville Spillgate Calibration Update:
Nathan Higa, COE, reported that the COE discovered a discrepancy between spill calibrations and actual spill at Bonneville upon completion of flow deflector work at the project in 2004. As a result, a study was conducted (linked to the TMT web page). The Dalles appeared to be correct in its calculations, so was used to define new rating curves, and an 'actual spill' equation was developed for Bonneville. Table 1 in the study shows reported vs. actual spill – for example, where 49.9 kcfs was reported, 23.1 kcfs was actually spilled. The new calculation will correct this discrepancy. It was clarified that TMT will need to consider TDG and study operations with the new corrections. There may be a need to reevaluate BiOp numbers once the actual effects on the river and fish are known.

The Dalles Spillway Gate Operation in 2005

Mike Langeslay, COE, reminded TMT that a test in Bay 6 at The Dalles revealed that the condition of wire ropes on the spillway gates was deemed unsafe. The COE is looking at operations that will meet BiOp spill through fixed gate settings; operating bays 1-6 open using two openings and three settings through spring should get the project close to 40% spill. Daily fluctuations are the biggest concern. The COE is also looking at a long term replacement plan for bays 1-6, to be completed by next year's spill season. There was a call scheduled for 8 am on 3/17 to report on the condition of the ropes. The COE will have additional information to report at the next TMT meeting.

WMP Spring/Summer Update

The latest draft spring/summer update was posted on the TMT web page today (3/16). It includes the March final water supply forecast, which is down from the February final. Comments from the TMT on the update are welcome. Some information will be included in a later draft (e.g. prospects for meeting flow objectives and sturgeon pulse operations). Changes from the previous draft include: language was added about the potential to not meet April 10 refill at Hungry Horse, and that an estimated 175-225 kaf will be available for Upper Snake flow augmentation this year.

ACTION: Tony Norris, BOR, will provide information about the composition of available water volume for Upper Snake flow augmentation at the next TMT meeting.

MOP: The Update includes MOP operations that were implemented last year (MOP +1 at all projects except Lower Monumental) in the Snake River projects. No dredging has occurred yet so the COE plans to implement the same MOP operations as recent years to maintain the safety of navigation channels.

Ice Harbor Balloon Tag Test: Spill at the Lower Snake usually begins on April 3. An 11-day balloon tag test at Ice Harbor is scheduled to start on March 31, at different levels of flow – the 'high' flow test will require that the full operating range be used at all Lower Snake reservoirs. The purpose of the test is to study injuries to fish from the spillway deflector. The issue is being discussed at FFDRWG, who is working out the schedule and details of the test. There is some concern with having enough flow in early April for migrants. If anyone has comments on the operation, call Mike Smith (COE) at 509-527-7275.

ACTION: TMT will discuss this at its March 23rd conference call.

Q Adjust Runs: Julie Ammann, COE, shared the latest Q Adjust runs. The models take the current water supply forecast and runs it 69 different ways based on observed historic runoff, to meet multiple objectives. The model shows that Grand Coulee will likely refill for the June target. It was noted that the model points out the need to find a balance between spring and summer operations this year.

ACTION: TMT will discuss Priest Rapids and Bonneville flow objectives at the March 30 TMT meeting. The COE welcomes feedback on the format of the model.

Start of Spill at Bonneville: The current BiOp calls for spill start at Bonneville on April 10 at 75 kcfs. Given high TDG levels and low water in the river, the COE would like feedback from the salmon managers about how to manage this.

ESP Runs and Graphics

Randy Wortman, COE, shared different graphic depictions of ESP runs for April-June Dworshak, Hungry Horse and Libby inflows. The COE would like feedback on the presentations.

ACTION: TMT members should review the nine options and select those most preferred for the March 30 meeting. A suggestion was made to include bull trout minimums into calculations for Libby.

ACTION: TMT will discuss decision-making around the start of spill at Bonneville during low water years at the March 30 TMT meeting.

Status of Operations

Reservoirs – The March final forecast is down from February. Libby is at 5.3 MAF and elevation 2412-13'. The USFWS sturgeon pulse operation recommendation for Libby is forthcoming. Grand Coulee is at elevation 1265.2'. Hungry Horse is at 3546.5' and operating to meet Columbia Falls minimums. The Dworshak water supply forecast is 1.4 MAF (54% of normal). The project is at elevation 1569' and refilling. The Lower Granite water supply forecast is 9.96 MAF (less than in 2001).

Fish – The salmon managers shared slides from the chum redd field trip. Ron updated on chum numbers, which can be found on the Fish Passage Center website. Emergence timing is somewhat early, but overall this year's chum emergence appears to be similar to 2004. TMT will continue discussions as the season progresses. The salmon managers will begin discussing chum operations criteria now to stay ahead of a potential 'emergency' operation given the decreasing water supply forecast.

ACTION: Ron will send chum information to Cindy to attach to future agendas until the end of chum emergence.

Power system – The system is operating to meet 11.5' tailwater at Bonneville and 1255' at Grand Coulee.

Water quality – Nothing to report.

ACTIONS/NEXT MEETING AGENDA:

Actions from 3/16/05 meeting:

- Explore the possibility of putting data loggers at chum spawning areas – COE
- Share composition of estimated volumes for Upper Snake flow augmentation – Tony Norris
- Provide feedback to the COE on Q Adjust and ESP model formats – TMT
- Send chum information to be linked to future TMT agendas – Ron Boyce

*There will be a **TMT Conference Call** on March 23, to discuss the following*:

- Ice Harbor balloon tag test and operations
- Preliminary information on spring flow shape from salmon managers

*The next **TMT Face to Face Meeting** will be held on March 30, 9am-noon. The agenda will include the following items*:

- Chum update
- Spring Creek spill update
- Upper Snake operations
- WMP Spring/Summer Update
- The Dalles operations
- Bonneville spill
- Water supply at Priest Rapids
- Feedback on graphics/graphics
- Chum operations during low flow years

1. Greetings and Introductions.

Today's Technical Management Team meeting was chaired by Cindy Henriksen and facilitated by Donna Silverberg, who led a round of introductions and a review of today's agenda. The following is a summary (not a verbatim transcript) of the items discussed and decisions made at this meeting. Anyone with questions about these notes should contact Henriksen at 503/808-3945.

2. Update on SOR 2005-2 Operation.

David Wills said that, on March 2, the fish were released as scheduled from Spring Creek Hatchery; on Thursday morning, we were out on the river taking pre-operational TDG measurements. Corner collector operation started at 3:30 on March 3. Adult attraction spill at the Bonneville end bays was shut off at that time to minimize TDG, and water levels were starting to come up. The next morning, we took some more TDG readings; the Ives Island spawning area was covered by a foot of water, with TDG at about 106% – plenty of depth compensation. The depth compensation didn't translate as well to the Multnomah Creek spawning area, however; soon after the corner collector operation began, we were seeing TDG of about 107% with no depth compensation at that site, said Wills.

The TMT held two conference calls on Friday, March 4, and decided to shorten the duration of the operation and raise the Bonneville tailwater to 13.5 feet for 24 hours. By Saturday afternoon, the operation had ended, and end-bay spills were turned back on Sunday morning. The operation wasn't a complete success, said Wills; only about 60% of the release group had passed Bonneville by the time the operation ended. Also, TDG levels have remained high, which is a concern for both the Ives Island and Multnomah spawning sites. We'll need to have some further discussion about the questions and implications raised by this year's operation, said Wills. In terms of next steps, we have

asked the Corps to put automatic data recorders for TDG, water depth and temperature at the Multnomah and Ives Island spawning sites, to see if we can get some data on how our operations are affecting the emerging chum, Wills added.

Would the Warrendale gauge be a good surrogate for conditions at Multnomah? Henriksen asked. Warrendale seemed to be close, but there are diurnal differences, Wills replied. Also, the Warrendale gauge won't give us depth information. Would the data loggers be a part of a larger study? Henriksen asked. My thought was that information from the data loggers would give us information on whether or not our chum protection operation is having the desired effect this year, Wills replied. It would also give us information that could be useful in the future, said Paul Wagner; the Multnomah spawners represent about 30% of the mainstem chum population, and we did change the Spring Creek operation to protect them. It would be nice to know whether that worked.

Henriksen noted that the data loggers will not provide data that would be useable in season. Still, it could help us make decisions about spill for fish passage later this spring, Wills replied. Henriksen said the request for data loggers had taken her somewhat by surprise; however, we can explore that possibility, she said. How solid is the information on the impacts of various TDG levels on redds, and how important is depth compensation? Russ Kiefer asked. My understanding is that, from a TDG perspective, the eggs aren't as much of a concern as the alevins, Wills replied; the 105% threshold comes in part from the Oregon state standard. My understanding is that the pressure difference with depth is a known, well-substantiated fact, said Wills. The 105% threshold came from a literature search conducted by NOAA Fisheries biologists years ago, said Wagner; it is part of established protocol, but it may need to be revisited.

We'll get a further chum update at the next TMT meeting, said Silverberg.

3. Bonneville Spill Gate Calibration Update.

Nathan Higa of the Corps provided this update, noting that he had done many of the calculations underlying the revised rating curve. The Bonneville spill gate calibration project was undertaken by the Corps in response to our discovery, last summer, that the spillway gate openings and spill volumes were not what we thought at Bonneville, said Henriksen. The Corps undertook a study to correct that problem; that study is now available via the Corps homepage.

Higa provided an overview of this report, using the overhead projector. He touched on the following major topics:

- History – gate seal modifications in the 1970s changed Bonneville's spill performance, but the rating curves were not updated. This was not necessarily a major problem until the flow deflectors were installed and the spill pattern changed. The rating curve at The Dalles is, to Higa's knowledge, correct; the Corps used it to change Bonneville's rating curve.
- The relationship between reported and actual spill at Bonneville
- Table 1 – comparison for spill patterns used since 2002, both ratings corrected for gate opening. Assumed correction applied to all gates to determine "Actual Gate

opening." All values are based on a Bonneville forebay elevation of 74.0 feet NGVD.

Higa noted that the study showed that the smaller the gate opening, the larger the error – for example, at a reported spill volume of 50 Kcfs, only 23.1 Kcfs spill was actually being provided at Bonneville. At 75 Kcfs reported spill, only 47.6 Kcfs was actually provided. At 100 Kcfs reported spill, 74.8 Kcfs was actually provided. At 150 Kcfs reported spill, 131.1 Kcfs was actually provided. Again, said Higa, at the older spill patterns, this wasn't a big deal, but now it is.

Higa added that he has recommended that spill be monitored during the 2005 season, to ensure that the new rating curve is actually correcting the problem. Otherwise, he said, a more expensive field study will be required. How will you know whether, based on the discrepancy between Bonneville and The Dalles, that there is a need to calibrate further? Boyce asked. We'll look at the streamflow data and other available measurements, and if everyone is happy, we'll probably call it good, Higa replied. We feel that, with the recalculated rating curve, we now have a much better idea about what is actually being spilled at Bonneville, he added – we're confident that the anomaly between Bonneville and The Dalles spill and flow will be corrected this year. If the discrepancy remains, is there anything we can do in season? Boyce asked. I think the two projects will be very close this year, said Henriksen – we probably will not see a significant discrepancy, but we will continue to monitor the data. The bottom line is that, when we order the project to spill 75 Kcfs, we will actually be spilling 75 Kcfs, she said.

Is there any other project at which this problem may be occurring? Boyce asked. You have to bear in mind that, at small gate openings, it's difficult to precisely calculate spill, particularly at projects with a large spillway and a lot of small openings, replied Tony Norris. We haven't discovered any other discrepancies like this one, Henriksen said. Each project has its own unique large spill gates and spillways, however. The newer projects – those which use tainer gates -- were all hydraulically modeled, Norris added, so their coefficients and spill characteristics are well known. Higa added that Bonneville is a unique project, one which utilized a variety of somewhat theoretical concepts which, for a variety of reasons, have never been used on another project.

Are the updated, corrected numbers now being reported on the website? Wills asked. Yes, Henriksen replied. Dave Clarkston noted that there may be some ramifications of this change for fish operations – in gas exchange, for example, because gas levels may be higher. We have also established a limit of 120 for nighttime spill, based on adult studies – the actual number may turn out to be lower, once a more accurate volume of spill is being delivered.

4. The Dalles Spillway Gate Operation 2005.

Mike Langeslay said that, about a month ago, when the Corps was going to do its vortex suppression test in Bay 6, they were notified that that bay couldn't be used because the wire ropes were in such poor condition. Mechanical design section hired a cable expert to look at the entire spillway, and he told us that we shouldn't operate The Dalles spillway this year, because the cables appeared to be more than 40 years old and

were in deplorable condition, Langeslay said. We have been looking at our options, including dogging the gates open. The question is, at what setting? How can we meet the BiOp 40% total river flow spill requirement at a single gate opening? We feel we may be able to change the openings once or twice during the season; 6 feet and 8 feet have been suggested for early and later in the season. It also appears that the cables at two of the gates – Bays 1 and 2 – may be in better shape than the others, so it may be possible to operate those bays with greater flexibility, Langeslay said.

Boyce asked what the Corps would do later in the spring, when flows increase during the freshet. That's what Mike was saying about a second gate opening, 8 feet – that would give us a total of about 72 Kcfs of spill, which should be adequate, Henriksen replied. The question is how close we can come to 40% of total river flow, said Langeslay – we're either going to be over it or under it, depending on the flows that are coming down. He added that, at 6 feet open, each bay (Bays 1-6) would spill about 9 Kcfs; at 8 feet open, each bay would spill 12 Kcfs. In response to another question, Langeslay said the Corps is already working on a long-term fix for this problem; however, it is expected to take a year to replace the wire ropes and, probably, the drums, for Bays 1-6.

Henriksen noted that WES and FPOM have been discussing this situation, with some physical modeling being done at WES. The Corps' current strategy is to operate Bays 1-6 at a fixed opening – 6 feet – during the early spring and summer, and at a fixed 8 feet during the freshet. Personnel are out at the dam today examining the feasibility to operate bays one and two this summer. More information will be known about those tests tomorrow. Discussions are continuing within FPOM and with BPA to prepare a final recommendation. This topic will be brought back when more information is ready to be shared.

5. Spring/Summer Update.

As we discussed at the last TMT meeting, we did get a revised spring/summer update out this morning, said Henriksen. It is in legislative format to show what has been changed. Please note that the full text of the revised spring/summer update is available via hotlink from today's agenda on the TMT homepage. She went briefly through the revised spring/summer update to show the TMT what is new. This is primarily updated technical data in response to the water supply forecast, she said, and I would like to accept these legislative changes and start with a clean copy next time.

Henriksen noted that the March final water supply forecast at Libby is 5.37 MAF, down significantly from the February final forecast; this will result in a Tier 2 sturgeon pulse in 2005. At Hungry Horse and Libby, it is unlikely that the April 10 flood control elevations will be met, said Tony Norris. However, that doesn't mean the projects won't refill by June 30, he added. The minimum flow requirement at Columbia Falls is what really drives Hungry Horse operations, Norris added. At Grand Coulee, the spring/summer update reports that it is not realistic to expect the project to reach full – elevation 1290 – by July 1. We could get there, but it would be at the expense of flows. We're still expecting to draft Grand Coulee to 1278 by August 31.

This is the first time I've heard that Grand Coulee will not refill in 2005, said Boyce. Again, we can refill the project, but that will result in low flows in the lower river, said Norris. The TMT will need to continue to discuss the balance between flows and refill.

Henriksen noted that the Corps intends to fill Dworshak by June 30. With respect to Upper Snake flow augmentation in 2005, Reclamation is now forecasting that between 175 and 225 kaf of water will be available in 2005. Norris noted that southern Idaho is in the throes of a severe drought; the Upper Snake flow augmentation water is made available on a willing buyer/willing seller basis only. He said he will bring a breakdown of where that water will come from to the next TMT meeting.

Moving on, Henriksen touched on the revised and updated flood control elevations at each project; these elevations have gone up as the water supply forecast has continued to decline. Henriksen noted that the planned minimum operating pool operations have not changed since the last draft of the spring/summer update. Ice Harbor, Little Goose and Lower Granite are planned to operate at MOP +1, while Lower Monumental is planned to operate at MOP. This operation is the same one that has been implemented in the lower Snake River for the past several years. This operation is expected to continue because the Corps has been unable to complete any dredging in the lower Snake River again this year. Last year was a low water year and the siltation issues within the navigation channel have not abated. Therefore, the Corps expects to have to operate the projects at these same elevations again this year to maintain the fourteen-foot navigation depth through the channel.

With respect to spring spill at the Snake River dams, the forecast continues to show flows of less than 70 Kcfs through the Lower Snake this spring; the current forecast at Lower Granite is 9.96 MAF, which translates into an average flow of less than 50 Kcfs. That means there will be no regular spill at the Lower Snake collector projects this spring. Henriksen noted that the details of the spring spill programs at The Dalles, Bonneville and other Lower Columbia projects are still being worked out; she urged anyone with questions about these operations to refer to the text of the revised spring/summer update. In response to a question from Kiefer, Henriksen said the action agencies are interested in comments on the spring/summer update.

Henriksen noted spill would normally start at the Lower Snake projects on April 3. However, an 11-day balloon-tag test is scheduled to start at March 31 at Ice Harbor; the test includes high, medium and low-flow treatments. We will need to use the full operating range of all four Lower Snake projects in order to achieve the high flows required for the test, Henriksen said. What are the flows going to be if you use the full operating range at all four pools? Boyce asked. I don't have that information in front of me, said Larry Beck; the purpose of the test is to look at injuries associated with the spillway deflectors at Ice Harbor, at various tailwater elevations. On what dates would the water be drafted and refilled? Boyce asked. Mark Smith replied that the Corps sent out a heads-up objectives and treatment schedule to FFDRWG two weeks ago; we're still developing the actual patterns we're going to test, he said. The RSW will be installed at Ice Harbor by the 25th or the 26th, and the test will start after that. To answer your original question, we're still working out some of the fine details of the test, Smith said. My

concern is flows in the lower river during April, when we will have some migrants coming down through the system, said Boyce.

We need an average of about 22 Kcfs coming through the system during the test period, added Beck; right now, we're right on the edge. Julie Ammann noted that, during the high-flow treatment, a day-average flow of more than 50 Kcfs will be needed. Wouldn't it be possible to do this test later, when you wouldn't have to artificially inflate flows? Boyce asked. My understanding is that that would impact the telemetry study, Smith replied. Also, we wouldn't be able to operate the projects at MOP, added Ammann. Smith asked anyone with questions or comments on the Ice Harbor balloon-tag test to contact him directly at 509/527-7275.

Moving on, Ammann summarized the results of the Corps' most recent QADJ model runs. These show the likelihood of the seasonal flow objectives being met at Priest Rapids, Lower Granite and Bonneville, based on the current water supply forecast, shaped 69 different ways based on historic water years. The bottom line is that the QADJ runs show that Grand Coulee is likely to refill (55 out of 69 years) if the seasonal average flow target at Priest Rapids is adjusted downward somewhat. At Bonneville, the resultant flows would be below 125 Kcfs during the first part of April during about half of the scenarios modeled. At Lower Granite, spring seasonal average flows (April-June) fluctuate between 41 and 50 Kcfs, depending on the shape of the runoff; there is virtually no chance that any of the monthly April-August flow targets will be met at that project. The same is true of McNary. This is based on the March final forecast? Wagner asked. Correct, Ammann replied. And the forecast is continuing to trend downward? Wagner asked. Correct, Ammann replied.

In response to another question, Ammann said that, under an assumed Priest Rapids flow of 70 Kcfs during April, it was possible to meet the 125 Kcfs, 11.5-foot minimum tailwater objectives at Bonneville in only about half of the 69 historic years. The group devoted a few minutes of discussion to the table of period average flows, by project.

I guess the bottom line is that this is a year when we'll really need to talk about the balance between spring and summer, Boyce observed. Yes, and it also underscores the fact that our flexibility is very limited at Grand Coulee this year. When do we need to start making some operational decisions? Silverberg asked. By April 1, Norris replied.

Moving on to the start of spill at Bonneville, Henriksen reiterated that, according to the most recent QADJ model runs, even with Grand Coulee drafting to elevation 1240 under some scenarios, flows at Bonneville are quite low during some months. As per the UPA, the plan is to start spill of 75 Kcfs during the day, and up to the gas cap at night, on April 10 at Bonneville, Henriksen said. As the tailwater at Bonneville Dam is 11.5 feet and there is minimal depth coverage over the redds at Ives Island and Multnomah Falls I would like the salmon managers to consider whether starting spill at Bonneville with its resultant TDG on April 10 is the best choice for emerging chum redds downstream. It would probably be a good idea for the other TMT participants to start thinking about the Priest Rapids and Bonneville operations in what is expected to be a very low-flow year.

6. Status of Operation.

Henriksen said the March final water supply forecasts are attached to today's agenda on the TMT homepage. She reiterated that the March final forecast at Libby is 5.3 MAF, the reservoir is at elevation 2412 and refilling slightly. Grand Coulee is at 1265.2 feet and drafting toward 1255 by April 30; Hungry Horse is 3546.5 feet and releasing Columbia Falls minimum flow, said Norris. The Corps reported that Dworshak's water supply forecast is down to 1.42 MAF, 54% of average. The project is on minimum outflow and refilling – it's at 1569 feet, currently, 31 feet from full. As reported earlier, the April-July forecast at Lower Granite is now 9.9 MAF, less than the observed runoff in 2001 of 10.3 MAF. However, it could still rain, Wagner noted – the spring period isn't over yet. This is now officially the third-lowest water supply forecast on record at The Dalles, Norris noted.

Henriksen touched briefly on the Corps' most recent headwater project ESP runs, showing how much flow augmentation volume may be available from the headwater projects over and above what is needed to achieve June 30 refill. Randy Wortman led this presentation, touching on potential daily inflows and outflows at Dworshak. The bottom line is that, for much of the April-July period, both daily inflows are well below the historic means, according to these ESP runs, said Wortman. He noted that any TMT feedback as to how better to model and present the ESP information would be helpful.

All of this translates into estimates of the volume of water available for spring flow augmentation, over and above the volume needed for project refill at the headwater projects, Henriksen explained. At Dworshak, for example, based on the March final forecast, we might have up to 565 kaf available, based on a 50% confidence of refill. That volume falls to 365 kaf under a 70% refill probability, and rises to 769 kaf if the TMT is willing to accept a 25% confidence of refill. At Hungry Horse, the potential flow augmentation volume is 600 kaf at 50%, 486 kaf at 70%, and 726 kaf at 25%. At Libby, the potential volumes are 639 kaf, 400 kaf and 222 kaf, even factoring in an 800 kaf sturgeon pulse. In response to a question, Jeff Laufle said the Fish and Wildlife Service doesn't know yet when the sturgeon pulse will begin; some years it's in May, and some years it starts in June.

Moving on to fish, the group reviewed photos from the late-February TMT field trip to the Ives Island spawning site. Wills said the take-home message from the trip was that, at a tailwater elevation of 11.5 feet, several chum redds were observed to be high and dry, while several others were right at the edge of being dewatered. There has been some discussion of dropping the minimum Bonneville tailwater to 11.3 feet; at this point, the salmon managers are comfortable with keeping the tailwater elevation at 11.5 feet.

Boyce reported that, according to the most recent field survey data, seine catches – about 170 chum to date – are right in the middle of what has been seen in recent years. Emergence timing appears to be essentially normal, perhaps slightly earlier than normal, although overall numbers may be somewhat lower this year, due to lower spawning escapement last fall. He said he expects that emergence will likely end some time in May. Boyce said he will provide additional chum updates at future TMT meetings; in the

meantime, it would probably be a good idea for the TMT to start thinking about criteria for ending the chum protection operation, if a real water supply crunch occurs.

Nic Lane said there are no significant power system issues to report; we're drafting Grand Coulee toward elevation 1255. Jim Adams said there are no water quality issues to report, currently.

7. Next TMT Meeting Date.

It was agreed to schedule a TMT conference call for March 23. The next face-to-face meeting of the Technical Management Team was set for March 30. Meeting summary prepared by Jeff Kuechle.

TMT Meeting Participants

March 16, 2005

Name	**Affiliation**
Donna Silverberg	Facilitation Team
Cindy Henriksen	COE
Ray Gonzales	COE
Nic Lane	BPA
Tony Norris	USBR
David Wills	USFWS
Paul Wagner	NOAAF
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Julie Ammann	COE
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Ruth Burris	PGE
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Paul Koskie	COE
Brad Ebbert	COE
Todd Cook	PPM
Dan Spear	BPA
Ron Boyce	ODFW
Michael Coffey	BPA
Greg Hoffman	COE
Bruce MacKay	Consultant
Glenn Traeger	Avista
Tom Le	PSE
Victoria Watkins	PIRA Energy Group
Mike Buchko	Powerex
Larry Beck	COE
Karl Kanbergs	COE