COLUMBIA RIVER TECHNICAL MANAGEMENT TEAM
May 3, 2023
Facilitator's Summary
Facilitation Team: Emily Stranz & Colby Mills, DS Consulting

The following Facilitator's Summary is intended to capture basic discussion, decisions, and actions, as well as point out future actions or issues that may need further discussion at upcoming meetings; it is not intended to be the "record" of the meeting. Official minutes can be found on the TMT website: http://pweb.crohms.org/tmt/agendas/2023/. Suggested edits for the summary are welcome and can be sent to Colby at colby@dsconsult.co.

Review Meeting Summaries & Minutes – TMT Members will review the April 26 official meeting minutes and Facilitator's summary at the next TMT meeting.

Spill Priority List – Dan Turner, Corps, followed up on requested changes to the Spill Priority List (SPL), as discussed at the April 26th TMT meeting. He noted that the Corps and BPA use the SPL to manage TDG during system-wide lack of load to protect against geographic hot spots of high TDG. The SPL is implemented on an hour-by-hour basis.

Following internal discussions between the Corps and BPA over the last week, Dan reported that Options A and B presented last week are not implementable. Lower Granite cannot be moved above John Day, because according to FOP operations, John Day will already be at 125%; similarly, 40% spill at Lower Granite is not implementable because it too will already be at 125% and the 40% spill rate is specifically for managing high flows, rather than lack of load. Dan noted the complexity given how the performance standard spill blocks can shift within a day, and that the SPL is implemented on an hour-by-hour basis.

Tony Norris, BPA, expanded, noting that John Day would not be flexing during lack of load conditions. Additionally, the 40% spill at LWG is not implementable at that increment to manage lack of market conditions. The priority for performance standard spill is Little Goose to achieve 30%, then Lower Monumental and Lower Granite. He clarified that the 40% tool at Lower Granite, as it was coordinated and utilized in 2022, was a high flow tool implemented to minimize adult delay due to large within-day flow changes at the project and downstream. BPA may implement similar operations as in 2022, if flow changes are predicted to exceed approximately 70 kcfs, while prioritizing achieving 30% 8-hour blocks at Little Goose. Adjustments to this FOP operation can be made if there is observed adult delay. At this time, the Corps will continue with the existing SPL as currently written (posted to the TMT website).

After further discussion and questions and answers among the TMT, in an effort to clarify SPL operations, BPA provided an in-depth example of how operations would be implemented in real time.

Jay Hesse, Nez Perce Tribe, noted concern that Ice Harbor and McNary are at the top of the list of projects, given the operations in the FOP don't include a flex operation, they should already be at 125% at all hours; footnote #2 doesn't apply. Jay would prefer the 2 projects be deleted from the SPL, given they are already the standard operation. It was suggested that projects 1-8 are deleted from Level 1, as they are simply FOP operations and including them in the SPL is confusing. Some Fish Managers thought that the structure of the SPL needs further discussion to clarify the various complexities and clearly define "high flows", either at a TMT business or process. Dan was open to considering revisions to make the SPL a more effective tool at communicating the operational expectations.

- **ACTION**: The SPL will be added to the May Process Meeting agenda.
- **ACTION**: Dan and team will consider TMT's input on how to improve the SPL as a communications tool (i.e., remove Level 1, numbers 1-8, shading, etc.).

Regarding moving Lower Granite to 40% spill to manage for high flows. There is concern among fish managers that a 70 kcfs fluctuation in flow is detrimental to fish. Jonathan Ebel, IDFG, and Jay asked the Action Agencies to begin implementing the 40% spill as soon as possible to avoid these fluctuations. For juvenile and adult fish benefit, fish managers would like to avoid pooling above MOP and raising TDG to 130% and would like to minimize fluctuations in the forebay elevation and discharge. Instead, it would be better for fish to increase to 40% spill when flows are around 120 kcfs (or so) at Lower Granite.

Dan noted that the Lower Granite spill cap was recently raised and Julie Ammann, Corps, thought that there was some flexibility in the FOP and committed to discussing the issue further with BPA.

- **ACTION**: The Corps and BPA will discuss options available to address the increasing flows and river fluctuations.

2023 Libby Dam Releases for Sturgeon and Bull Trout Flows – Ryan Bart, USFWS, reported on 2023 Libby Dam releases. The 2020 BiOp defines a tiered flow strategy for Kootenai sturgeon flow augmentation. The tier or volume is dependent on the May/April through August volume runoff forecast. This year, given low snowpack and spring rain/snow events, operators have prepared on the edge of Tier 1 and Tier 2 volumes (cutoff 4.8 maf for runoff forecast). The final May/April through August volume runoff forecast is 4.41 maf, putting operations in a Tier 1 year; no volume specifically for sturgeon. In short, USFWS will not be requesting a sturgeon pulse in 2023.

Leon Basdekas, Corps, reported on 2023 spring and summer season Libby Dam Operations (see slides posted to the TMT website). Since the beginning of February 2023, the project has been on minimum outflows and slowly drafting due to the low natural inflows into the project. Refill was initiated on May 1, with inflows starting to come up. He shared a general hydrograph (conceptual plan) of median project inflows and outflows. This is a dry year, without a sturgeon pulse. Leon noted that the May 1 water supply forecast is 72% of average: with sturgeon volume at 0.0 maf, bull trout minimum flows (May 15-September 30) of 6 kcfs, and an end of September elevation of 2,439 feet.

This water year inflows have been below the 30-year average. May forecast inflows appear to be near average and starting in June, inflows look to be below average for the remainder of the summer. Leon reviewed SWE gauges in the Kootenai, showing downward trends in SWE. The general flow plan following the commencement of spring refill on May 1 includes: operating to VarQ and bull trout minimums (whichever is greater), refilling Lake Koocanusa to 2,454 feet (depending on inflows), Lake Koocanusa end of September target of 2,439 feet, and avoiding double peaking and a smooth descending outflow once peak has passed.

Mid-Columbia River Weekly Average Flows – Tony reported that flows are increasing, and that the STP had a reasonable assumption for mid-Columbia flows; BPA expects to see more the following week as well.

Question and Comments from Members of the Public – Charles Pace asked about reporting and review for adult fish counts, noting difficulty in accessing count data via the TMT website. It was noted that adult counts are reviewed at least 1-2 times per month, in the Operations Review section of TMT business meeting agendas. Jonathan noted that last year at this time, major focus was put on adult fish passage because of spill bay outages at Lower Monumental that were impacting passage at the project. Passage at this time seems to be progressing smoothly so far. Erin Cooper, FPC, noted that despite website updates taking place, data is still available and functioning on the FPC website.

Ruth Burris, PGE, asked if drum gate maintenance is complete or if Grand Coulee has been released to fill up to 1,290 feet? Joel Fenolio, Reclamation, reported that drum gate maintenance is done and Grand Coulee is refilling slow and ongoing.

The next scheduled TMT meeting is on May 10, 2023 at 9:00 AM.

Columbia River Regional Forum
Technical Management Team
OFFICIAL MINUTES
Wednesday, May 3, 2023
Minutes: Andrea Ausmus, BPA (contractor, CorSource Technology Group)

Today's TMT meeting was held via conference call and webinar, chaired by Doug Baus, Corps, and facilitated by Emily Stranz, DS Consulting. A list of today's attendees is available at the end of these minutes.

1. **Review Summaries and Minutes – April 26 (Pending)**

   - Minutes and Summaries will be available for next meeting

2. **Spill Priority List –** ***Tom Lorz, CRITFC, Dan Turner, Corps-NWD, & Tony Norris, BPA***

   a. Spill Priority List

   Reminder: The *Spill Priority List* is used to manage TDG during system wide lack of load to protect against geographic hotspots of high TDG. It is implemented on an hour-by-hour basis.

   - Two proposed revisions
     - Included an intermediate spill level at 40% at Lower Granite.
       - Not implementable – The 40% spill rate at Lower Granite is specifically for managing high flows not lack of load.
     - Move Lower Granite above John Day.
       - Not practical – given how the performance standard spill blocks can shift throughout the day (implemented on an hour-by-hour basis) .
       - At this point, the Corps will stick to the current/existing Spill Priority List.
       - Last week there was follow up conversation between the Corps and BPA
   - BPA Explanation – Tony Norris, BPA
     - Proposed move of Lower Granite above John Day
       - Not something that can be implemented because John Day will already be at FOP spill target of 125% TDG spill.
       - The spill performance standard blocks at John Day are movable and optional, so they would not be flexing John Day during a period of lack of load conditions.
       - Additionally, the 40% spill at Lower Granite is not implementable at that increment to manage market conditions because Lower Granite would already be 125% spill per the prescriptions of Table 3 of the FOP.

- The priority is to have Little Goose achieve the 30% Performance Standard Spill, so if needed, first Lower Granite, and then Lower Monumental performance standard blocks would be either delayed or interrupted per the Footnote A in the FOP.
- The FOP is written to prioritize achieving those performance standard blocks at Little Goose, Lower Monumental, and then Lower Granite.
- Tom Lorz, Umatilla/CRITFC, asked at a previous TMT (April 26, 2023) about the 40% as it was coordinated and utilized in 2022.
    - It was a high flow tool and it was implemented to minimize adult delay due to large within day flow changes at the project and downstream projects.
    - BPA may implement this based on what was learned in 2022, when they predict that the within day flow changes at either Lower Granite or the downstream projects would exceed approximately 70 kcfs while they are prioritizing achieving the 30% 8-hour block at Little Goose.

Note: Adaptive Management (as in 2022) if in season conditions warrant an adjustment to this FOP operation if they see adult delay or based on how they are implementing the operation as prescribed in the FOP.

Jonathan Ebel, ID, would like to discuss the move to 40% for managing high flows after the discussion of the spill priority list because we are close to the threshold that Norris had mentioned.

Stranz said she would circle back.

Jay Hesse, Nez Perce, said he appreciates the discussion. He said that the two projects at the top of the list, Ice Harbor and McNary, not having performance standard spill gives the perception that the Action Agencies are not fully implementing the FOP targeting 125% and that further adjustments could be made for lack of load. That perception concerns him. He understands in practical terms that having them on or off the list would not make a difference because going down the list would be at 125%. He would feel better if they were off the list. He said that in this case footnote 2 also does not apply.

Stranz asked Turner if there was a reason why he included the two projects on the list and included them with the footnote.

Turner said that the list has evolved over time. At one point, four to five years ago, Ice Harbor and McNary's Level 1 cap was different from what was in the FOP. He said it was to some extent continuing with what was available in the past so it can be compared. Turner said that he believes that he understands what Hesse is saying and agrees that Ice Harbor and McNary are there only as placeholders at this point rather than being implemented. He said that he would like to use this list as a tool to explain what they are doing and why they are doing it. Turner said that if there are ways that they can clean it up and make it more readable and reflective of actual operations he is open to suggestions and feedback. Turner said he heard Hesse about the Footnote 2. As for McNary and Ice Harbor, he will do some thinking about how to convey the information without looking like they forgot some of the projects.

Erick Van Dyke, OR, asked Turner to explain how he defines the difference between Level 1 “not exceed the Water Quality Standard” and Level 2 “Not exceed daily TDG threshold”.

Turner explained that the difference is Level 1 is the water quality standard, which is the FOP operation, and Level 2 is 125% TDG 24 hours/day seven days a week with no performance spill blocks, which is above the water quality standard.

Van Dyke made the connection that it would be anything below that as well. He asked what priority list is being used when the status being able to achieve the 125% TDG.

Turner explained that it would mean that we would not be in lack of load conditions.

Van Dyke said his understanding is that lack of load happens regardless of what is being done for spills.

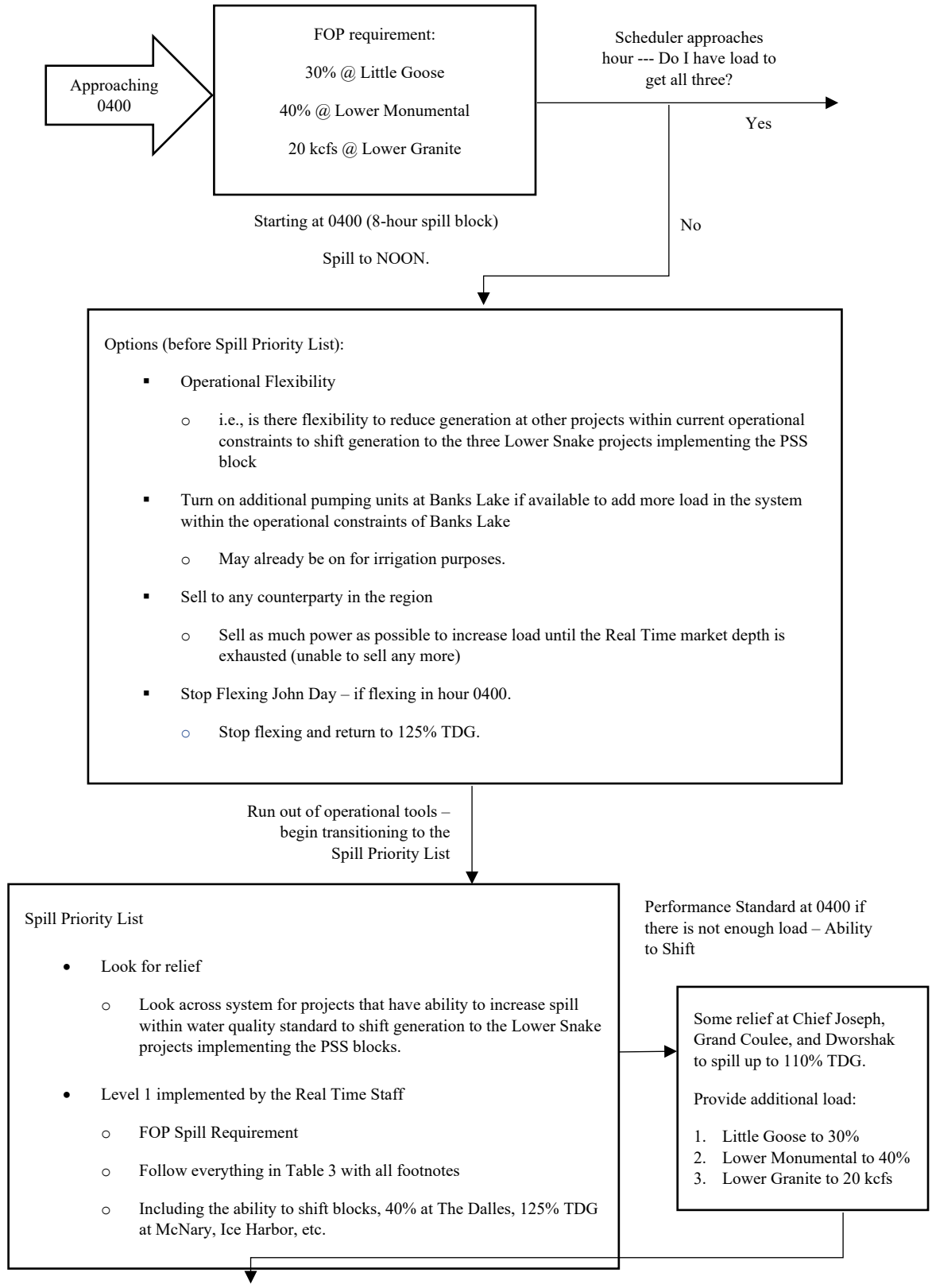
Turner said that if they were in min gen spill the rest everywhere then they would be in Level 1. Their first priority would be to bring everything to FOP level spill.

Van Dyke asked if they would use lack of load situation in the brief moment that they have it to follow the list even if they are not at the 125% TDG. He said that this is the explanation for why that have not been willing to make a change. Van Dyke said that is why he is confused about the details about how the spill priority list is used typically and how it is used in brief occurrences that are unplanned. He feels that there are inconsistencies in the descriptions being made by Turner on why he is unwilling to move a project within the list currently.

Stranz stepped in to ask Turner for clarification because Van Dyke and Turner did not seem to be describing the process of the Spill Priority List in the same way.

Norris introduced Shane Mosier, BPA, to walk through how a real time operator would implement the Spill priority list.

Mosier explained for the example below as approaching 0400 hour where the FOP requirement is performance standard spill blocks 30% at Little Goose, 40% at Lower Monumental, and 20 kcfs at Lower Granite for eight consecutive hours through noon.



Lower Granite and Lower Monumental would be at 125% TDG to get the first priority project at Little Goose (start with 30%). Then they will try to get 40% at Lower Monumental and lastly 20 kcfs at Lower Granite.

This is done on an hourly basis. If they cannot do this within the hour-block, they have the ability to shift it out to the next hour to repeat the process.

Van Dyke said that it helped clear up some things. He said that what is clear to him is that BPA's focus is on the performance hours when we are talking about a list that is about a lack of load that can occur at any time. He feels that it is inconsistent from what he expects the list to be used for and how he can go about recommending changes that would be beneficial for fish. He feels that this topic could benefit with more discussion.

Baus noted that this list, as had already been noted, has been rigorously coordinated through TMT over time for fish benefits and as part of that fish benefit this list is intended to achieve, for example, adult passage in the Lower Snake River. He said as it relates to the term fish benefit he wanted to be clear that due to delay issues in the past there has been a desire to improve adult passage in the Lower Snake River. By the development of this list, in the order of the Lower Snake River projects and effort to achieve an adult fish passage benefit this list has been coordinated. He shared that he wanted to highlight that perspective.

Stranz thanked Baus for the input.

Van Dyke said thank you for highlighting the perspective but this a lot to fish passage benefits. He said that Baus selected one that is unlikely to be part of the issue of concern in April and early May. He appreciates that input but he said that the group was talking about the Spill Priority List not the FOP or the larger spectrum of the discussion.

Baus said that they are related and they cannot be decoupled. They are an integral part of one another. It is a system with tools that are interrelated; the Spill Priority List is part of the FOP.

Norris said that he believes what Van Dyke is trying to say is that essentially Level 1 steps 1 through 8 are FOP operation. From a lack of load step situation, if we wanted the list to be reflective of the spill that would occur outside of what has been prescribed in the procedure for achieving the performance standard spill blocks it would be just leaving steps 9 through 10.

Van Dyke still finds some inconsistencies that stand out to him.

Norris does not understand Van Dyke's inconsistencies.

Van Dyke said that the use of Level 1 is also when there is a low flow, minimum gen, spill the rest situation. Not just at 125.

Norris said that they would not be able to reduce generation at the projects that were at minimum generation spill the rest. They would be similarly irrelevant. Norris said if we wanted to limit the list to what would occur for lack of load, they would just remove steps 1 through 8 in Level 1 because steps 1 through 8 are FOP implementation.

Van Dyke said that is the part that stands out.

Baus said that in the past, the robust and rigorous list has been construed as too complicated and the simplified list people do not see the big picture. He showed frustration that both directions have not proven to be able benefit the group.

Trevor Conder, NOAA, commented that Norris said that Level 1 is strictly FOP implementation. Conder disagreed with this comment; his understanding was that John Day would lose the performance spill hours on this so that would not be FOP.

Norris said that because John Day's performance standard block is flexible. They would have taken this step before they would have accessed the Spill Priority List. They can move around the performance block as necessary.

Conder said that it is something that can be done in some scenarios.

Norris said that it is something that can be done in every scenario, there is no reason they would increase John Day's generation during a lack of market condition because the John Day spill is optional.

Conder asked if they would go to a 24-hour spill at John Day at 125% TDG versus [Norris interrupted]

Norris reminded Conder that it is a hourly operation, so they would approach every hour separately. If there were a period of 36-hours of the same condition then they would not flex John Day at all.

Conder said that he sees this as different as the FOP.

Norris said that it is not different, the FOP says that the performance blocks at John Day *MAY* occur. It is a flexible operation; they are not required to occur. They would not flex John Day during a period that would exacerbate a lack of load condition that would preclude the 8-hour performance blocks on the Lower Snake projects. They would push the blocks to other hours outside of those periods. Then on those other periods that would affect the amount of generation on the system during the periods of performance, standard blocks on the Lower Snake projects John Day would already be at the target level of 125% TDG.

Conder asked if they are going to 110% TDG at Grand Coulee after losing the performance blocks at Little Goose or before.

Norris said looking at lack of market; they would spill up to the gas standard at Grand Coulee, Dworshak, and Chief Joseph to achieve those blocks if necessary.

Conder said that this list is confusing to his now.

Norris said removing steps one through eight. The FOP covers step one through eight, it is the target spill operation and is covered in all of the various footnotes that they use for their hourly operation. To look at what will be spilled due to lack of market conditions outside of what is highlighted in the FOP then just look at steps 9, 10, and 11.

Conder said just showing those steps would be better because he was not interpreting the list in that way.

Norris said that is fine with BPA because that is how they use the list. Steps one through eight are FOP implementation and are covered by a myriad of steps included in FOP table 3 and associated footnotes.

Morrill thanked Mosier for walking through a real time scenario he found it helpful. He commented that removing McNary and Ice Harbor from the list might be done by putting them in footnotes. He also said that having the table only show steps nine through eleven and have the footnotes explain that the table addresses only the FOP operation.

Ebel shared a different historical interpretation on the list, contrary to Baus' perspective of coordination for adult passage. He shared that prior to flex spill, the list was originally used to improve or to increase juvenile fish passage through the Lower Snake projects. The Lower Snake projects were at the top of the list prior to the flex spill agreement. The list was stable for a long time until issues in 2020 and Little Goose was moved down. Last year Lower Monumental was moved down the list because fish were delay by spill bay outages. Lower Granite moved down the list because the need to move the fish that were delayed at Lower Monumental. Ebel said that this all happened in Level 1 last year and it appears that the interpretation has changed. He does not want a lot of discussion about it, he is okay with the discussion as it is, but he just wanted to point out that it is a more recent phenomenon of adjusting the list for adult passage. In the concern over Lower Granite, and the suggestion of moving it toward a 24-hour spill. The adult passage issues at Lower Granite are not as acute as Lower Monumental and Little Goose and Ebel wanted to return it to that and provide his historical interpretation of how the list changed over time.

Norris responded saying that in the past the list had Lower Snake projects above the others when the target spill operation was below the water quality standard. Now the target spill operation is the water quality standard. Norris said that is when the shift came, as they began to modify the list to improve the likelihood that we would be able to maintain the performance standard spill blocks for adult passage.

Ebel said that was not how it was implemented. That the request to change the list came at times of adult delay.

Hesse said it seems like the structure and refinement of the [Spill Priority List] table needs continued discussion and he would gladly engage in it. He said that during the conversation the 40% targeted spill level, rather than 20 kcfs, for performance standard at Lower Granite had been brought several times and was taken off the table because it was not part of the FOP. He felt that as the discussion of adaptive management that the fish managers were identifying this as an appropriate step to manage fish passage and spill volumes. He asked; if the Action Agencies do not believe that it is an available tool because it is not listed in the FOP, is there a way that the Fish Managers make it an option on the table. He said that they have identified it as a desirable tool and asked if they go forward with an SOR or if there is another process.

Ammann said that typically when they are changing operations from what has already been coordinated in the FOP it is due to some new information. Generally, the changes are based on real-time conditions in the baseline where they were having challenges trying to meet the FOP; they were coming up with operations that would alleviate situations. She said that traditionally TMT is used for identifying situations that they are trying to fix unintended consequences and she has not heard that any new information that would prompt the use of the 40%. She asked what situation are they trying to fix by changing an operation at Lower Granite to 40%.

Hesse responded that it would be maintaining adult passage and allowing for more spill. It would maintain fish conditions that are more desirable. He shared that there has been analysis on this and requests to go there. It would also fix and/or add flexibility for lack of load conditions.

Ebel requested that the group finish talking about the spill priority list before moving on to the next topic.

Stranz asked if this new conversation is the one that Ebel had mentioned earlier.

Ebel said it is but he wants to complete the Spill Priority List conversation first before beginning the second conversation.

Stranz asked Baus about his question on the Spill Priority conversation.

Baus appreciated BPA's ideas on how to move forward but he did not hear Turner's, Turner plays the leadership role and Baus would like to have his comments on the recommendations to revise the list.

Turner said that he wants to look into making the list as useful as a communication tool and something that is practical and implementable. He believes that there should be further discussion. Turner said that in terms in changing operations they are going to continue with the current solution as is presented. The Corps will stay with the continue using the current existing Spill Priority List as written.

- **Action: Dan and his team will consider TMT's input on how to improve the SPL as a communications tool (i.e. remove level 1 #1-8, shading, etc)**

Conder asked if an intermediate step could be added to the list, i.e. 40% at Lower Granite. Usually all of these steps go to some type of a state water quality standard gas cap; an intermediate step would not necessarily would not be to that level. For summer spill, we had tried bulk and uniform spill at Lower Monumental for a similar reason but they both went to the state water quality standards. He asked if the Corps' resistance to the 40% is due to an organizational reason for not wanting to go to the 40%. He sees what seems to be a formality with going to an intermediate step that is not to a state water quality standard level. He asked if that is organizational or if there is a more serious reason for not adding the intermediate step.

Norris shared that following the procedures in the FOP to achieve the performance standard blocks precludes the 40% step because the objective of the FOP is to achieve the performance standard block. For Lower Granite the FOP performance standard block is 20 kcfs. The 40% would be a change to the FOP; it would already be at 125% TDG.

Conder said that it had been an example, he was saying adding an intermediate step to the spill priority list that has an intermediate cap. Not necessarily have a water quality cap.

Norris said that because they would already be at 125% TDG there would not be an intermediate step. They would be trying to achieve the 8-hour performance blocks following the procedure outlined in the FOP outlined in Table 3.

Conder said that he does not believe that Norris understood his question and asked Turner if he understood.

Turner said that he believes that he understood but there is not a lot of flexibility with the performance standard blocks and how they are implemented. Turner said conceptually it would be great to have the intermediate step but it would not work with the FOP and the performance standard blocks that are used on an hourly basis.

Norris said that they are not accessing the Spill Priority List until they have gone through all of the steps in the FOP to achieve the performance standard blocks.

Conder asked why can't they go through the steps and then prior to Chief Joseph at 110% TDG; go to Lower Granite at 40%.

Norris said that it is possible at any given hour that Lower Granite is already at 125% TDG prior to going to Chief Joseph, Grand Coulee, or Dworshak because they would have moved the blocks around. Each hour needs to be looked at separately.

Conder said he thought Level 1 followed the FOP.

Norris said that it is an extensive procedure on how to achieve 8-hours of performance standard spill, which includes moving the blocks around as needed for Lower Granite, Lower Monumental, and Little Goose to achieve the performance standard blocks. At any given hour they would likely already be at 125% TDG because they had followed the procedures laid out.

Conder feels that he is being told two different things.

Norris feels that this may be better worked through in a process meeting so that the group can go through the intricate hour to hour of the list.

Stranz agreed.

Lorz said his understanding of the spill priority list is that once you need to use it you are trying to do everything you can to move things around to do generation and as a salmon manager we are trying to give you our recommendations where best to do that. Lorz continued saying that their strategy is if the spill priority list needs to happen then there should be fish benefit. He sees their strategy as trying to implement the FOP as best as possible. Lorz asked if there were some of the interim steps on the list would it be a problem. Lorz asked if they worked to make optional interim steps if it would be a problem for the list. For example if they put Lower Granite at 40%, if you are already there just move past it and go to your next steps. If there are opportunities (not at a gas cap at that point) and it shows a fish benefit, great – if it does not, move on to the next step. Lorz said that it appears that the group has divergent ideas of how the list is viewed or used to some degree.

Norris said that the confusion lies in the intricacies of implementing Table 3 of the FOP on an hourly basis and the tools that are described in there to achieve the performance blocks because right now 40% spill is still not a performance standard block at Lower Granite, 20 kcfs is a performance standard block. The FOP is engineered to achieve those performance standard blocks. Norris said that if they need to spend time offline or in a process meeting to provide an understanding on how the blocks work he is available.

Lorz said that by his understanding of the spill priority list, they are trying to shift or add spill to somewhere. He said that spilling at Chief Joseph is not in the FOP and it does not

benefit fish but at that point in the list Lorz feels they are outside the FOP operations. He said at that point it is not an emergency but there is lack of load and there is a need to shift things around. He asked why they would not use adaptive management. If they are already using the list because there is lack of load. Currently there is a 40% at Lower Granite to help with high flows can it be used to help with the intricacies and challenges of the systems in a lack of load system as well.

Norris said they are using Level 1 to achieve the performance spill blocks at the Lower Snake project to benefit adult fish. Chief Joseph, Grand Coulee, and Dworshak are the last steps before they enter Level 2 and start interrupting spill blocks in their entirety.

Mosier said that a few reasons interim 40% may or may not make sense are:

1. Trying to start the block at 0400 and do not have enough load to get it started.
    - In that case, all three Snake River projects, Lower Granite, Little Goose, and Lower Monumental would have been at 125% TDG at 0300.
    - Starting at 0400, after exhausting all of the operational tools and spilling through Grand Coulee and Dworshak, their first priority is 30% at Little Goose.

      If they try to make an interim step in that situation of taking Lower Granite down from 125% TDG down to 40% it will take generation that could have been used to get Little Goose down to 30%. This goes against prioritizing getting as much load as possible to start the 30% at Little Goose.
2. Start all the at all three Snake project as prescribed at 0400 and Lower Granite is at 20K, Lower Monumental at 40%, and Little Goose at 30%.
    - Now loads fall off the system and they are having a hard time maintaining blocks at all three.
    - If a scheduler cannot do 20 kcfs then they will return to 125% TDG as the load falls off the system. They will wait until the load comes back and then they will try to go and get a second block later.

      Mosier said it would make more sense if there were a step between 20 kcfs that he could increase spill higher up to 40% at Lower Granite and still count it as a performance standard hour and maintain the block between 20 kcfs and 40% as opposed to the instructions currently being implemented in the FOP.

      It is not a step that should be added into the Spill Priority List. Mosier said that it should be the ability to count a performance standard hour between 20 kcfs and 40% under lack of load conditions.

Mosier said that he does not see how an interim step would help on the Spill Priority List but he feels that they would have to go down the path of redefining the performance standard spill hour.

Ammann commented that there are complications with litigation covering some aspects of operations due to legal and stay agreements. Especially when it comes to changing

operations without demonstrating a real response to new information. She said that some of the conversations were making her uncomfortable.

- **Action: We will add SPL to the May Process agenda,**

Ebel said that he has been watching operations as the Snake River has come up over the last couple of days. Currently, the Corps has started to do limited within MOP range "ponding" in order to implement the 20 kcfs at Lower Granite. It has reached a threshold that looks like it is about the result in daily flow fluctuations at downstream projects. Ebel gave the example at Lower Granite TDG during gas cap spill hit 126% 12-hour average. He said that part of this was from dropping the pool within the MOP range and then adjusting it and then more flow during gas cap spill hours. These are starting to translate downstream:

- Daily flow change at Little Goose is 40 kcfs.
- Lower Monumental the Corps appear to have used their full MOP range yesterday (May 2, 2023) to implement barge transit and that resulted in a daily change of 75 kcfs.
- Which translated downstream to Ice Harbor to a daily change of 175 kcfs.

Ebel said that in the FOP there is a high flow shift to 40% at Lower Granite, that to his knowledge is undefined. Norris had said earlier an expected 70-75 kcfs daily change of flow. Ebel said that this was the first time he had heard this expressed, but noted that we are moving in that direction. He did request a source from Norris. He asked if it would be prudent to switch to the 40% during performance spill before getting into a situation of high daily change and flow.

Turner clarified that the raised the spill cap at Lower Granite, they did not spill above the spill cap the planned spill resulted in the TDG above 125%. Turner said that the TDG would come back down.

Hesse appreciated that this was brought up, to his knowledge the definition of high flows and managing/utilizing the 40% is not defined or has been discussed. He would like to recommend that a threshold be established and implemented at 120 kcfs total flow. He said that the 120 kcfs would include the powerhouse capacity and the 20 kcfs spill, and anything about 120 kcfs would switch to a performance standard operation of 40% and minimizing the swaying, the 70 kcfs that Norris mentioned.

Norris said that the high flow condition in 2022 and the subsequent adult delay that we saw in result of implementing the spill standard blocks created those enormous within-day swings to achieve because they had limited turbine capacity at Little Goose and they had to reduce discharge at Little Goose for 8-hours down to about 100 kcfs. That was the bottleneck. The high range was in the range of 140 kcfs when they started to see the within-day swings that resulted in the adult delay in Ice Harbor. Norris said that this year, there are five units available and the threshold that we would see the big swings would be closer to 160 kcfs. There are tools outside of that in the FOP to achieve the performance standard blocks within all those rules. The rule of thumb for within day actual river flow threshold high flow would be dependent on turbine availability at any of the projects, in particular the projects that are achieving performance standard spill blocks that would

have to reduce their discharge during that period they are close to turbine capacity. That could change given a turbine outage that last a couple of days. Norris said that he does not find setting a specific flow range appropriate. The real-time crew use rule of thumb of within-day changes at the site or downstream projects exceeds approximately 70 kcfs flow range is when they might utilize that 40% tool if it felt necessary. Norris said that it probably would not cover the barge traverses, he is not sure if there is any solution for the within-day swings at those projects to accomplish that.

Mosier added that there is a FOP footnote that talks about another tool for high flow scenarios to get to the 20 kcfs performance spill block at Lower Granite. He said it would include ponding water above MOP and then there is a specific operation of maintaining full powerhouse and passing inflow from 1200 to 1600 and then drafting the pond back into MOP prior to 0400 the next morning using spill up to 130% TDG. Mosier said that this operation is described in the FOP as a tool to get to the 20 k performance center spill.

Ebel said that appreciates that information. He would like to avoid operations like that ponding from a fish perspective, especially from a juvenile fish perspective we would want to implement a 40% first before doing something like ponding and then 130% TDG. He did not hear where the 70% came from; he said looking at Lower Monumental it looks like that is the daily flow change. At Lower Monumental yesterday, that was the daily flow from using the entire MOP range. Ebel said that 70 kcfs is still a lot and the movements of filling the pool in the morning is probably the worst thing that can be done to juveniles, in this context. Anything that can be done to avoid doing this daily especially as fish are passing the dam, i.e. shoulder hours, would be preferable. Ebel thinks that is where we could use the 40% in defining a high flow as a fish benefit. Ebel would like to have more clarity on the 70 kcfs threshold so he can tell whether it is appropriate from a fish perspective.

Norris said that the 70 kcfs is rooted in the rate of change in the tail water. He thinks each projects on the Lower Snake River have a tailwater rate of change of a foot and a half and 70 kcfs is noted in there. He said it is also a reduction of the 140 kcfs within day swings they saw in 2022. Implementing the tool of 40% was able to cut that in half. Norris was not sure if it was precisely tied to the rate of change in the tail water but it is coincident with the value that is in the water control manual for those projects. He also thinks that it was also an identification during the flow changes last year the adjustments that were made included the up to 40% reduced the within-day swing by about half to ~70 kcfs. Applying the lessons learned from 2022 was the measure and it is a "may" because the conditions can be different across the projects. Norris said that BPA would implement the tools if they thought they could reduce the swings to equal or below 70 kcfs during those conditions. He also wanted to note that filling above MOP to achieve the performance spilling blocks is currently prescribed in the FOP as part of the procedure to achieve the blocks and again a change to prioritize to spilling up to 40% before filling to MOP would be a change to the FOP.

Hesse said that Norris' last statement is debatable. He thinks the FOP language clearly identifies the utilization of 40% at higher flows. He does not believe that the FOP adequately describes all these details that we are providing. Hesse said that he thinks that there needs to be some very specific clarification right now. He said the issue is real-time, so it is not something that waited on. He asked if it is possible to do a 40% at Lower

Granite right now and when it is above 120 kcfs total river flow and still maintain performance standard at Little Goose and Lower Monumental.

Norris said right now that would be a deviation from the FOP operation. He thinks that they would need to follow some process to change the target operation to the 40% as a performance standard block.

Hesse said he does not believe that to be true and thinks that they need to walk through the FOP. Setting aside the FOP clarification he asked, physically, if we are constrained with the flows at Little Goose from achieving 30% with the powerhouse capacities and 40% at Lower Monumental.

Norris said that as of today we are still able to achieve the 30% performance block at Little Goose but that could change by the weekend depending on Lower Granite's inflow forecast. Norris said that it looks like we are going into that zone by the weekend. Currently, they are following the procedures in the FOP are able to achieve the 8-hour performance standard blocks.

Hesse asked if people are hearing the request made by fish managers that they are asking to minimize the fluctuations in river flow, the 70 kcfs is not a value that Hesse had agreed to or was aware. They are trying to minimize any fluctuations in those flows as much as possible within day swings. He asked if he understood correctly that implementing a 40% performance standard spill is not possible and if it is not he asked what it would take to implement it in the very near future.

Norris said that it is physically implementable but it is not the FOP operation, currently the FOP operation targets 20 kcfs. Spilling up to 40% is not identified for managing lack of market conditions. Operating to 40 % instead of delaying the block to the next hour or the time constraints it would exacerbate the lack of load condition. It would preclude our ability to hit the 30% at Little Goose because you would be adding generation to the system during a lack of load condition and it would impinge on your capability of being able to achieve the 30% block.

Hesse said that he is not thinking about this in a lack of load condition rather he is thinking about this in terms of real-time every day here for the next three weeks.

Norris said that is a change to the FOP.

Ammann took a moment to read what the footnote said:

> During periods of high river flow the 8-hour Lower Granite performance standard spill may increase from 20 kcfs up to 40% of total river outflow if needed to improve conditions to meet performance standard blocks.

Hesse said that is the is the language that he is referencing that makes him think gives them that flexibility.

Ammann said that the nuance Hesse recommended of a flow threshold of 120 kcfs where is results in us going to 40%. She countered saying that what was used in 2022 was another tool for BPA to use to help them accomplish the goal. It was in addition to all the other tools that were in the FOP. She is nervous when it sounds like there are requirements to go to 40%. She would like to give a counter proposal of a potential tool

for performance standard blocks during high flows to meet performance standard blocks at Little Goose and Lower Monumental and limit a block to 40% Lower Granite as opposed to going to 125% 24/7. She said that Norris and she have not been able to caucus about this question prior to this meeting and would like to know if they should pause before continuing.

Stranz said that she was thinking the same as Ammann. She said that she heard that Fish Managers are looking to avoid the fluctuations as much as possible. She asked if the Action Agencies have ideas on how to avoid those fluctuations and things that they could implement in real-time.

Ebel said to add for the agenda today because it is imminent and it is something that he noticed while looking at the data. It appears (and Ebel will start providing data queries with graphics in the future) that the Action Agencies are starting to use space, dropped to 2733 this morning, and are now on the upswing. There are a couple of things that Ebel would like to minimize from a fish perspective:

- Minimize the change in forebay elevations
- Minimize the change and discharge downstream of the projects within day changes
- Within day movement with the 1.5 MOP range is also not preferable

Ebel said these are interacting and it is a complex situation. Moving to 40% sooner than later would be optimizing fish conditions rather than maximizing. Ebel said it would be better to figure it out over time rather than doing crisis management.

Stranz asked if the Action Agencies have a clear enough understanding from the Fish Managers of what their interests are that they can take the conversation offline and see what their operational flexibility is.

Norris said that he does not think that they have the flexibility to make some of the changes because they would be changes to the FOP as they see it. So it is a little late to be rewriting the FOP at this level of detail and right now we would expect to move through this period of high flows on the Snake on this weekend. They may see the use of the 40% tool to manage as they did in 2022 if the Snake flow forecast comes in as forecasted. He said that is a little late to be making these changes considering the amount of work that went into coordination the current operation.

Stranz said that she thought she heard from Ammann's perspective there was some flexibility based off the footnote she had read.

Ammann said that there is some flexibility already in the FOP. Some of the flexibility, for example footnotes B and C, where they are having to pond water and get it back out in order to achieve those blocks. Those tools have been in the toolbox for the last couple of years. Those are still there and sounds like BPA is trying to utilize those. The new tool available this year is the ability to take Lower Granite performance standard up to 40% to help manage high flows, which we are entering that period. She said Norris had mentioned that it is a tool that they will likely use this weekend. Ammann wanted to make sure that from the Corps perspective that the 40% is not a requirement but rather a

tool that can be used if needed. If can be used to help smooth Lower Snake River flows, but when flows get this high and there are fixed performance standard hours it jacks the river around and they need to use their pools, which they have the flexibility to use. They will also be able to use that 40% if it will be helpful.

Tony agrees.

Hesse asked if while they think about that if they could think about the 120 kcfs or some other threshold to trigger that flexibility. He appreciates the sensitivity to requirement, he did not intend to use that but for meeting the Fish Manager desires to minimize within day flow fluctuations he felt there needed to be a balance point. High flows are not defined and he is trying to add clarification to what it might be. He said 120 may not be the magic number but it has got to be somewhere between 120 – 140.

- **Action: Norris and others? Discuss threshold of high flows**

Ammann said she really appreciates the clarification and finds it helpful. She confirmed that Hesse was trying to define the high river flow is this year to help BPA realize that the tool is in their toolbox a little more succinctly. She said that she is not sure that they have the answer today but she believes that she had heard Norris mention a flow of 160 but that is something that they can ponder.

Hesse said that if they could discuss that because within day fluctuations of 70k are not acceptable and if there is a tool to minimize or reduce it that would be his recommendation.

3. **2023 Libby Dam Releases for Sturgeon and Bull Trout Flows –**
Ryan Bart, USFWS; Leon Basdekas, Corps-NWS;
Greg Hoffman, Corps-Libby Dam, and; Scott Bettin, BPA

- Tiered Flow Strategy for Scrutiny Sturgeon
    - Tier or Volume is dependent on May: April – August Runoff Forecast
        - Low snow pack in the East Kootenai's BC.
        - Preparing on Tier 1 or Tier 2 volumes – cut off being 4.8 maf
    - Final May: April – August Runoff Forecast
        - 4.4 maf
        - Tier 1 year
        - No volume for sturgeon or ecological flows
        - USFWS will not be requesting SOR for 2023
- Libby Dam Operations 2023 – Spring and Summer
    - Koocanusa Reservoir Operation
        - December and January
            - Drafting for the end of the month risk management level
            - Based on the respective WSF forecasts

- February Forecast
    - Came in dry and stayed dry
    - Minimum outflows 4 kcfs, except for a bump to prevent ice from forming on the fish hatchery.
    - Reservoir is drafting due to low natural inflows
- Initiated refill on May 1
    - Flows started coming up since then.
- Future Forecast (as shown on slide)
    - Conceptual in nature and do not expect outflows to be so blocky in shape
    - Forecast a dry year
    - No sturgeon pulse
    - It has been ~20 years since there has not been a sturgeon pulse.

o May 1 Water Supply Forecast

- 4.41 maf (72% of average)
- Sturgeon Volume: 0.0 maf
- Bull Trout Min flows
    - May 15 through September 30
    - 6 kcfs
- Libby Flow Augmentation Draft
    - 2439 feet
    - End of September
    - < 15th percentile

o Water Supply Volume

- Since the beginning of the water year, monthly averages have been below the respective 30-year averages.
- May is forecast to be close to average.
- June and the rest of the summer are forecast to be below average.

o Snowmelt

- Showed sample of four gauges near the Kootenai
- As of May 1, show a downward trend
- East side heat wave showed a dramatic loss of Snow Water Equivalent (SWE)

o Flow plan

- Spring Refill – May 1

- Operate to VarQ and Bull Troat minimums
    - Whichever is greater
- Refill Lake Koocanusa to 2439.0', depending on inflows
- Lake Koocanusa end of September target is 2439.0'
- Avoid double peaking and smooth to descending outflow hydrograph after peak has passed –

- Probability Chart
    - Used for general guidance only – model results
    - Operate to VarQ and minimum bull trout and then on June 1 the logic switched to refilling and meeting the end of September elevation. There is some operational flexibility and it will not be a dramatic stair step.
- Bonner Ferry Stage
    - Early peak due to local inflows
    - Using RFC traces
    - Another pulse in Early June from snow melt is predicted
- Bonners Ferry Flow
    - Similar early peak
    - Secondary peak due to snow melt
- Koocanusa elevation
    - Peak earlier 2453.7' (July 7)
    - 2439.1' (September 30)

Basdekas said that it is a little early this year but reminded the group of what happened last year, not that it would repeat, but that there is no way to know which of results from the 41 member ensemble (from RFC) would be closest.

Marotz told Basdekas thank you for the good presentation. He continued saying Tier 1 without having a volume to release for sturgeon. He is glad that Basdekas pointed out the conceptual model being blocky will not be the case. The Corps has shown that in the past to try to shape the discharge for some shape of normalcy has always been the case and he is sure they would do it again. He was glad that Basdekas brought up the bull trout minimum discharge and how the VarQ mandatory discharge can also be shaped to achieve a fairly normal hydrograph and a gradual decline after the peak.

4. Mid-Columbia River Weekly Average Flows – *Tom Lorz, CRITFC, & Tony Norris, BPA*

- Flows are heading up.
- FTP had a reason expectation for Mid-C flows looking at a week average basis.
- Norris expects to see more of the same next week.
- The concerns from a few weeks ago are now gone.

5. Public Comments:

Charles Pace said that he appreciated the discussion of flows. He was surprised that there was nothing on the adult counts. He was also concerned because he did not see it on the agenda for the following meeting on the 10th. He had expected there to be several meetings with the focus to be on adult counts as it was last year. He assumed it was on the agenda but would like to know to when it has been postponed.

Secondly, he wanted to bring up in light of the counts and given the SCOTUS taking up a reconsideration of Chevron Deference. He thinks the Corps should look at it for both the transmission system and the power system.

Stranz responded saying that there are adult counts under the operations review agenda item. It will be on next week's agenda.

Pace mentioned that the FPC website for the adult counts says that it is under construction.

Stranz said that you have to click on the tab that says 'daily adult counts' in the upper right hand corner.

Ebel said last year he was FPAC chair and was presenting information to TMT. Last year around this time a major focus was on adult passage because of the spillbay outages at Lower Monumental were negatively impacting adult passage at the project.

Ruth Burris, PGE, asked by chat, "Question – Has the Drum Gate work been completed?"

Joel Fenolio, Reclamation, responded, "Drumgate maintenance is done and Coulee is refilling"

He continued verbally with an affirmative. He said that maintenance it done and they are refilling which is slow and ongoing. It should speed up with the warm up but it will largely be at the whim of Mother Nature.

6. Set agenda for next meeting – May 10, 2023

Today's Attendees:

Agency	TMT Representative(s)
Army Corps of Engineers	Doug Baus (chair), Julie Ammann, Lisa Wright
Bonneville Power Administration	Tony Norris, Scott Bettin, Ben Hausmann
Bureau of Reclamation	Joel Fenolio
NOAA Fisheries	Trevor Conder
US Fish & Wildlife Service	Dave Swank
Washington	Charles Morrill
Oregon	Erick Van Dyke
Idaho	Jonathan Ebel
Montana	Brian Marotz
Nez Perce Tribe	Jay Hesse
Umatilla Tribe	

Colville Tribe	
Warm Springs Tribe	
Kootenai Tribe	
Spokane Tribe	

Other Attendees (non-TMT members):

Corps – Dan Turner, Alexis Mills, Aaron Marshall, Greg Hoffmann, Leon Basdekas

USFWS – Ryan Bart

BPA – Shane Mosier

DS Consulting – Emily Stranz (Facilitator), Colby Mills

BPA – Andrea Ausmus (note taker, Contractor with CorSource Technology Group)

Oregon DEQ – David Gruen

Clearing Up – K.C. Mehaffey

Columbia Basin Bulletin – Mike O'Bryant

Grant PUD – Peter Graf

Douglas County PUD – Andrew Gingerich

Public – Charles Pace