Northwest Power & Conservation Council
System Integration Forum
March 2, 2022

Ben Kujala, NWPCC, began the meeting at 9:30 by introducing the topic and reminding the room that he is looking for feedback on the workplan for the analysis of replacing the Lower Snake River Dams. Kujala stressed that this is about scoping out the work and not pursuing it, as that decision is up to the Council.

Chad Madron, NWPCC, walked the SIF through the best way to interact with the Go-to-Webinar platform. Madron assured attendees that a full list of attendees will be released with the minutes.

Assessing the Power System Contributions of the Lower Snake River Dams Under Different Potential future conditions and Analyzing Options for Replacing these Contributions.
Ben Kujala, NWPCC Presentation
Kujala explained that this meeting is the beginning of a scoping and consideration exercise. He stressed that a draft workplan will be discussed with the Council in March 2022 or later. Kujala said that no actual analysis will occur before the workplan is approved. He outlined a general approach and explained that the process will generate a white paper that will include public comments.

Kujala walked through the Seven Phases of the Scope of Work with the group, answering questions and addressing comments throughout the presentation. There were also some stakeholder questions and comments addressed directly by staff in the question pane and not publicly discussed. These questions, answers, and comments can be found on pages 9-12 of this document.

Jim Robbins, KEC, asked in the question pane if the study will incorporate the feasibility of the transmission needed to replace the LSRD resource [Slide 11]. He wrote that resources without ability to reach the grid are unusable. Kujala said the objective is to examine the results of making that power unavailable. He said they will not look at power flow studies but will examine congestion and consult subject matter experts.

Atul Deshmane, Whatcom PUD, asked who defined the scope and if there is any possibility to expand it, in the question panel. Kujala answered that the scope comes from Council direction and there is the ability to expand and/or limit the scope. He stressed that changing the scope is ultimately up to the Council.

Tom Iverson, Yakama Nation Fisheries, found it curious that this analysis will not include the cost of keeping the dams but will explore the cost of replacing their power services. Kujala stated that they want to examine costs at those projects compared to an alternative set of

costs. He stressed that the goal is not looking at the current system and costs as they are today and make a market analysis to justify those costs.

Scott Levy, Blue Fish, moved back to [Slide 3] to reference the Federal River and Harbor Act of 1945. He pointed out that the Act authorized irrigation and navigation but not hydropower. Kujala thanked him and stressed the need to keep comments to the scope of work.

Levy moved to inherent assumptions on [Slide 9] focusing in on point 2, “removing the output of the LSRDs from the power system makes it less reliable.” He suggested adding the term “in theory” saying the 7th Power Plan shows a surplus and the CRSOCIS suggests that the model is not less reliable in all cases. Referencing the premier text on analyzing reliability, Kujala stood by his point that taking a generator out of the power system makes it less reliable.

James McKenna, Oregon, asked what the assumed "day zero" is for assessing breach in the question pane. He wanted to know if the assumption is for "tomorrow" or at some point in the future. Kujala answered that the analysis will look at three different years to analyze with and without the dams.

Michael Jung, PNGC Power, asked if the study will factor in the role that the LSRD system plays in facilitating compliance with policies advancing decarbonization of the grid, transportation, industry, and buildings, in the question pane. He wrote that it’s not just what the dams provide directly to the grid, but also what the dams further enable, like the capacity to firm up the grid for intermittent renewables. Kujala answered that policy compliance is a big part of analytic structure and there will be more of that discussed this afternoon. He assured him that policy compliance, including greenhouse gas emissions, will be a big part of the analytic structure.

Jennifer Joly, OMEU, asked if replacements will be equivalent, nearly carbon free resources like the LSRDs, in the question pane. Kujala said they will be looking to stakeholders to design replacements and he imagined that many that are interested in nearly carbon free resources.

Nicholas Garcia, WPUDA, added that the public policy of the day demands that there be no more carbon emissions in the baseline. He asserted that assumptions should make it clear that there will be no new coal or natural gas in the baseline. Kujala thanked him but reminded him that sometimes people make different assumptions, pointing to the Federal EIS that picked two systems, one with no additional emissions and one with gas.

Deshmane stated that he sees the LSRDs as a portfolio asset and sometimes assets that perform poorly hurt system reliability, in the question pane. He asked if Kujala agrees. Kujala said that generating projects do not inherently hurt reliability. Kujala agreed that resources with a lot of outages or are affected by markets are hard to depend on but do not hurt reliability based on accepted theory.

Craig Lacy voiced discomfort with taking the economic viability of these projects off the table as the Power Council is mandated to find the least cost energy supply. Kujala said he will take that

comment to the Council. He then explained the scope was drafted this way to address a complicated question and might have different implications for BPA, BPA's customers, and the region as a whole.

Heather Nicholson referenced her question in the question pane: Will you incorporate the GHG emissions of the Lower Snake dams themselves and acknowledged the response: Our intent is to use a methodology similar to the Plan for evaluating emissions from the system. There will be a need to revisit if we assumed there were any emissions assumed for the dams as there are conflicting studies.

Nicholson then asked what the Plan methodology was. Kujala said he will follow up offline. He revealed that Plan work determined that the research was insufficient to assign a methane emission number but that could change.

Dr. Gary Nelson, Zynrgy Group Inc, wrote that we could install a modern nuclear reactor at each site to replace the power and use the transmission equipment [Slide 17]. Kujala said that will be in another phase but if that is what stakeholders agree on Staff can look at those assets.

Iverson confirmed that fish constraints missed into the 2021 Plan analysis will be incorporated into the model during Phase One. Kujala agreed that this is when constraints will be thoroughly discussed, explored, and added. Kujala pushed back against the notion that the 2021 Plan did not contain fish and wildlife constraints and agreed that constraints need to be captured appropriately at this point of the process.

Jim Waddell said you can't talk about the cost of the LSRDs without looking at the original 2002 feasibility study, calling it comprehensive and easily updated. He then said that cost could easily be fed into the GENESYS model. Kujala said he will take that into consideration adding that the most recent EIS and other studies reference the 2002 work.

Levy suggested adding the 7th and 6th Power Plan to the documents listed on [Slide 16.]

Adam Schultz, ODOE, asked for additional explanation on how the Council would model potential future regional resource portfolios before you initiate evaluation of how the system performs with/without LSRDs, in the question pane. He gave the example of assumptions about projects added to the regional portfolio to backfill future coal retirements, calling it critically important.

Kujala answered that they are looking for different approaches that get into different futures. He gave the example of a system facing a lot of retirements, explaining that resources wouldn't just retire with no resource replacement.

Lacy suggested taking climate change into account when estimating dam operations under uncertain futures. Kujala assured him that the 2021 Plan focused strongly on the effects of climate change and plan to look at climate change information as well as historic stream flows.

Fred Heutte, NW Energy Coalition, asked if the idea is to model the non-LSR components of MO3 versus other possibilities in the question pane. Kujala said no, the scope is not to reproduce MO3 but staff could pull parts forward if needed.

Levy moved to [Slide 19] to say a close read of the CRSO EIS will yield important information. Levy then asked about the "any more questions…" on [Slide 18]. Kujala stated that it is purposely open-ended, and a meeting might yield new questions. Levy confirmed that these questions could lead to model inputs. Kujala agreed.

Marc Sullivan wrote that the NWED-sponsored study was, it's important to emphasize -- actually carried out by the independent and highly respected consulting firm Energy Strategies, in the question pane [Slide 26].

Schultz asked if returning the power system to a "similar level of reliability" would operate within the realm of a single annualized LOLP metric, in the question pane. He thought that removal of the LSRD projects might have a disproportionate impact in some months vs. other months that an annualized evaluation wouldn't capture. Kujala stated that he said "similar level of reliability" intentionally, explaining the council uses LOLP but there is an action item in the Power Plan to examine and research LOLP to determine if it should be modified.

Kujala continued saying a regional adequacy metric is very different than trying to gauge if the system would still be reliable when replacing a resource that is no longer there. He said this needs to be explored and noted different metrics used by different groups.

Heutte asked if resource costs, and other inputs, will potentially be updated from the 2021 Plan as there may be more data available from new utility RFPs. Kujala said they would start with 2021 Plan assumptions but there may be updates. He thought they would have to meet a certain threshold before staff took them up.

Jim Smith, Klickitat PUD, asked how we can run a model with an emerging technology in the question pane. He said that by definition, it is emerging, but not in place and proven, asking if we need portfolios that are built on proven technologies that we know can meet Resource Adequacy requirements. He felt that doing otherwise puts the results, and our supply system, at risk.

Kujala said there is always a question about the capabilities of emerging technologies, but long-term planning often calls for making these kinds of assumptions.

Shauna McReynolds, PNUCC, voiced concern about diving into a study before the tools are ironed out. She predicted the reliability issue will be huge and staff may have to spend more time on it than expected. Kujala agreed but clarified that regional resource adequacy is not the same as looking at the reliability of replacing individual resources which might require a higher standard.

Levy moved to [Slide 24] and suggested adding sequestration to the second bullet to spur a fairer discussion.

Heutte addressed Kujala's earlier comment about a resource replacement being held to a higher adequacy standard. Kujala said that determining the higher standard will be part of a conversation. Heutte referenced his organization's standard work which included a monthly look provided by GENESYS. He agreed that we don't want less reliability within the year even if it meets a yearly standard.

Kujala said we should be open to discussing if this is the right standard for this question. He explained the difference between a regional adequacy study and studying an individual resource saying that he didn't want to come in with the assumption that the same standard would work for both.

Waddell noted that Kujala used the word "replacement" many times and wondered if the resource would actually need replacement in its entirety. Kujala said the strategy is to start with the system that looks in the future and meets some kind of reliability and then analyze it with and without the resource to meet a similar level of reliability. He stressed that "similar level of reliability" needs definition.

Garcia noted that reliability is important but not as vital as reliability during critical weather like a cold snap or a heat dome. Kujala called that a good example of why this needs to be a separate question. He agreed this work shouldn't put the region is a worse position and explained that this is what is driving the conversation.

Heutte asked if part of the study would include power flow analysis to better look at the transition side [Slide 29]. Kujala said the idea is to stick with AURORA and GENESYS but thought there should still be a conversation based on the replacement resource portfolio. He stressed that they are not transmission experts but would take power flow analysis and try to reasonably incorporate it their models.

Zoe Roberts, USRTF, asked where to send comments after the presentation. Madron answered that comments can be sent to him, Kujala, or comments@nwcouncil.org.

Levy stated as for "Phase 5 Previous Study Considerations" a close read of the final (not draft) version of CRSO EIS answers the bullet of "reinforcement project for the Tri-Cities" in the question pane. He continues, writing the CRSO EIS shows MO3 reducing transmission congestion in almost all cases, with 120 hours fewer congested hours on the CA interchange system.

Kujala stressed that previous studies will be used to set up constraints, but conclusions will be run through staff's own process which includes vetting assumptions.

Heutte asked some process questions [Slide 35] wondering if this work will take place in the SIF or if a separate advisory committee will be formed. Kujala was not sure what form the process will take but said it will be very public with plenty of opportunity for involvement and comment.

BREAK

Crystal Ball, PNUCC, readdressed Heutte's earlier question writing that she heard the phrases constant public involvement, keep the Council updated, and analysis done in public, but did not hear how. She thought that the vetting process should be better described in the detailed work plan. Kujala agreed that is important and will add something clearer in the work plan.

Robbins wrote that when you talk about reliability of the system, it is good to look at monthly/seasonal/ early resource adequacy. He then wrote that in a real-world system, reliability is on a minute-to-minute and second-to-second process and the ability of the replacement resources to match load changes in a critical period. John Ollis, NWPCC, said this will be covered in the afternoon session.

Heutte pointed to significant climate and energy policy changes adopted after the Power Plan and wondered how they will be captured for this analysis [Slide 39]. Kujala said some of that was captured in the 2021 Plan's supporting material, but this work will look at the current set of policies and best efforts to capture them will be made. Heutte pointed to ongoing programmatic as well as policy efforts underway. Kujala thought these efforts were already incorporated in the Power Plan but was open to more exploration.

Robbins asked about the estimated cost for time and labor to do this study. Kujala said a study like this will shift priorities but will probably not require new staff members. He said new costs will be brought to Council members. Kujala was not sure about BPA cost and did not want to come up with an hour estimate.

Garcia referenced CAISO's dynamic transmission adequacy approach which might lead to a capacity reduction during peak use. He said if this is true, stressing that he is not sure, it should be reflected in this effort. Kujala said we start with reasonable planning assumptions and look to regional transmission planning experts to incorporate those considerations.

Garcia said it appears that transmission operations to protect reliability are going to look different in the future. Kujala understood, saying he's seen the RC change and the grid evolve and those changes will probably continue. He stressed that he would leverage insight from transmission planning experts.

McReynolds encouraged a Phase 0, meaning more meetings and discussion before moving forward. She asked when work would start if the Council decided to move forward. Kujala stressed that Phase 1 would include a lot of sharing and discussion of models. He said an ok from the Council means work would start right away, but if the Council says no there is still

plenty of direction in the 2021 Power Plan that would have to happen. Kujala said he would add extra language about examining the models further.

Ryan Hall, MT Elec CoOp Assoc, introduced his organization saying his group is concerned about whether these studies are necessary noting a 2020 investment of $40 million to study the issue. He added that using Council staff and resources to duplicate this work is a waste of ratepayer funds. Hall added that there are still concerns about the GENESYS model and unvetted early results could be used improperly. Hall concluded by saying Council involvement could impact perceptions of impartiality. Kujala said he will pass these concerns to the Council, stressing that this work will not reproduce EIS but will go deeper and narrower.

Council Technical Capability Summary
John Ollis, NWPCC Presentation
Ollis explained the presentation is based on the Council approving the work go forward. He said the scope would assess the Power System Contributions of the LSRDs under different potential future conditions and analyzing options for replacing said contributions. He stressed that the relevant technical capability described are specific to the scope.

Levy asked about framing the replacement portfolio as an improvement, i.e., a battery vs a mechanical turbine [Slide 3]. Ollis said the goal is to independently assess attributes of the resources and characterize improvements.

Levy asked why there is no talk about including the expertise of Fish and Wildlife staff as returning salmon to Idaho is the whole reason for this exercise [Slide 7]. Ollis said they will leverage the best expertise available but was not sure how staff will be allocated.

Leslie Bach, NWPCC, insisted they will not not consider fish and wildlife, but the energy models look at constraints as opposed to fish benefits. Levy thanked her adding that he is asking on behalf of someone else. Levy said that third party asked, “isn’t fish why the NWPCC exists?” Levy said the white paper could include salmon information.

Bach insisted that the Council has multiple reasons for existence but agreed that fish are one of the reasons this is being examined. She stressed the models look at energy, but output can also be used by others for fish analysis.

Garcia moved to [Slide 5] noting that WA energy plan estimates a 90% increase in electricity use to meet climate goals. He said that level of demand was not considered in the 2021 Plan and asked if outyear demand will be considered for this work. Ollis answered that the 2021 Plan is intended as a starting point and will be re-evaluated as needed. Ollis reminded Garcia that the Pathways to Decarbonization scenario yielded a lot of information.

Garcia noted public policy changes since Plan inputs were locked down and called for this work to think about state objectives in the baseline. Ollis agreed and noted that staff track these changes as part of their regular work.

LUNCH

Lacy thought that the Classic GENESYS had a lot of functionality that will not be used in this study [Slide 14] including cost of replacing existing dams and the current cost of operating dams. Ollis said some costs are fixed and some are variable (fuel and O&M as example) and the classic model can understand some production costs. He thought the benefit of both GENESYS might be the difference (delta) in production costs while the fixed costs might require different kind of logic.

Robbins said siting a replacement resource will have to include something about transmission and the grid [Slide 16]. He wondered if this was part of the strategy. Ollis said staff have tools that can delineate this and choosing a resource will take conversation. As far as transmission concerns, Ollis stressed that they will need to rely on outside power flow expertise.

Robbins added that there are access questions in this process that will significantly impact cost and delivery to the grid adding that it is "dam" difficult to build transmission. Ollis agreed.

Jung wrote that there seems to be some overlap in capabilities for these tools, in the question pane. He asked if these various models are posed the same questions to check for consistency. He also asked how this is resolved when they differ [Slide 17]. Ollis said models are run with the same attributes to see if they give similar answers as a consistency check.

BREAK

Levy wrote that BPA and others place public comment towards critiquing the 2021 Power Plan's Redeveloped GENESYS not being sufficiently vetted in the question pane. He wondered what will follow if some items that support BPA's comment are found in this process as he sees several directions that could take place. Ollis said the model structure is good and its vetting assumptions that is being called into question. He said changes can be made and the vetting process is always ongoing.

Thomas Lorz, Critfc, asked where one can find model assumptions for fish operations such as spill and what spill operations are currently being used in the model, in the question pane. Staff directed him to
http://pweb.crohms.org/tmt/documents/wmp/2022/Final/20211227_WMP_Final.pdf

Ollis asked that Lorz follow up offline for more detailed information but said it follows HYDSYM. John Fazio, NWPCC, added that they emulate operations in the biological opinion and the water management program.

Bach added that annual water management plan can be found at the technical management team website.

Jay Hesse, Nez Perce, called attention to terminology, noting that fish operations are labeled as constraints. He called that label biased and asked that it be swapped out for something less power-centric. Ollis agreed that language matters and care will be taken

Bach added that fish requirements/considerations are constraints in the model and that is desirable as you want the model to be held to those constraints. Hesse wondered why fish requirements are called constraints when other limiting factors are not. Fazio suggested using "non-power operating considerations" as there is more than just fish & wildlife like navigation, logging and recreation. Heutte added that flood risk management is also a major constraint and consideration.

Levy asked if public comment would come before Council members vote on moving forward with this analysis. Kujala said the agenda is up to the Council chair but staff will flag the issue.

Iverson addressed fish consideration and spill modeled from the 2020 biop, noting that models can test ranges. He urged testing a range of potential fish considerations with the dams in and out. Kujala agreed the models look at fish operations and a sensitivity could be part of the conversation.

Krestine Reed, PNVoices, asked that the Q & A file be made available for public review. Madron explained that the Q&A will be synthesized in the minutes and the recording and attendee list will be available soon.

Kujala ended the meeting at 3:00.

Questions and Comments Addressed but not Discussed

Martha Bibb

I worry about the reliance on historical records for weather and water availability when we all know that we are in a different world due to rapidity of climate change.

- Staff reply

  Hi Martha, definitely check out the work we did to integrate climate change into the recently approved 2021 Power Plan. Here is more info:https://www.nwcouncil.org/2021powerplan_integrating-climate-change-policies-and-data

  The current intent would be to use the same climate change data sets we used for the 2021 Plan which included climate change effects on temperature and precipitation (thus hydro runoff).

Scott Levy, Bluefish

Yes, PNNL study shows around 89 CO2E. I do not recall anything conflicting with that study.

- Staff reply

Is this the study you are referring to https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22297.pdf ?

Levy
GHG Researcher John Harrison is pursuing this research and mostly has asked Council for funding. If not, Council should reach out. -- Just a comment, not a question.

Levy
Yes, and the 89MMT CO2E was a follow up study by John Twa, Engineer of Boise Idaho.

- Staff reply

Thanks. I believe we have seen both of those studies. But I will forward them to the rest of staff to make sure.

Levy
Please send along a page number (or the text) that is the "sensitivity based on MO3 that looked solely at LSRDs breach.

- Staff reply

We will have to follow up. I am not sure I have the page number at my fingertips. Apologies

Levy
There is a tiny bit in an appendix but I want to be sure I am not missing something from the voluminous CRSO EIS.

Dr. Gary Nelson, Zynrgy
We could install a modern nuclear reactor at each site to replace the power and use the transmission equipment.

Nelson
What will it take to consider SMRs as power replacement?

- Staff reply

We will certainly consider the feedback of stakeholders when considering all replacement portfolios. Not sure there is a particular threshold right now. Hopefully that helps Hi there, I'd also refer you to our page about SMRs and related emerging tech as part of the power plan: https://www.nwcouncil.org/2021powerplan_emerging-technologies_generating-resource-reference-plants

Heather Nicholson
Will you incorporate the GHG emissions of the Lower Snake dams themselves?

- Staff reply

Our intent is to use a similar methodology as we used for the plan for evaluating emissions from the system. I will need to revisit if we assumed there were any emissions assumed for the dams. I remember there being conflicting studies.

Craig Patterson

How much power currently is produced from the dams in question?

- Staff reply

It depends. Annual, Seasonal and Daily? You can usually see all sorts of stats about the dams at the Army Corps site https://www.nwd-wc.usace.army.mil/dd/common/sysmap/www/index.html?lat=47&long=-118&zoom=6 Let us know if that helps.

Patterson

What percentage of all dams do these dams in question represent?

- Staff reply

All regional dams or federal dams? Sorry. I need more specifics to try and estimate for you. Also see resources at: https://www.nwcouncil.org/energy/energy-topics/power-supply

Patterson

How might the removal of these dams add to the benefits in the fish and wildlife programs and intent?

- Staff reply

As per my answer below, we are still scoping. Unclear at this point.

Patterson

Have you quantified the benefits verses liabilities with these dams removal verses fish and wildlife benefits?

- Staff reply

We are in the scoping process currently. Still trying to figure out what a study might look like, per our discussion today.

Patterson

Will you identify how fish and wildlife costs and benefits with be DIRECTLY impacted by the removal of these dams? What level of analysis will you address these trade-offs?

- Staff reply

Unclear at this point. Right now the focus is on power system services replacement

Patterson

If with retirement of coal plants, the region experiences shortfalls with subsequent price increases (similar to the 1970's) then in 1982 Peter Johnson was saying the shortfall is over and we have a surplus. How are you addressing the market factors into your future planning?

- Staff reply

We will be discussing our approach in more detail for assessing the market in the technical capability portion of our discussion today. In general, our process has been that we address retirements in the system outside the region via a fundamentals-based long term capacity expansion in AURORA. This gives us a picture of the market

available. Then we discuss with stakeholders about assumptions for market reliance during adequacy situations. We then try to balance the fundamentals and stakeholder information in our analysis. More detail in the afternoon... Hopefully that helps. We will be discussing our approach in more detail for assessing the market in the technical capability portion of our discussion today. In general, our process has been that we address retirements in the system outside the region via a fundamentals-based long term capacity expansion in AURORA. This gives us a picture of the market available. Then we discuss with stakeholders about assumptions for market reliance during adequacy situations. We then try to balance the fundamentals and stakeholder information in our analysis. More detail in the afternoon... Hopefully that helps.

Patterson

What lessons of use patterns have you learned from Covid and how have you included those changes in the modeling?

- Staff reply

We continue to monitor data as they become available to see if there are quantifiable ways to capture any impacts from Covid. Up to this point we feel our range of loads captures many risks which COVID may fall within. If we have data down the road that show something different, we will bring them into this process.

Adam Schultz, ODOE

Can you clarify the 'potential schedule' language from [Slide 10] Wouldn't the regional resource mix look different in 2025 vs 2030 vs 2035? As would the associated costs of potential replacement solutions. Don't you have to make an assumption about when the projects would need to be replaced?

- Staff reply

Yes. However, we do have limited staff time so we will be considering the feedback of stakeholders about test years. But our current intent is to test in the 2020s, 2030s and 2040s to see at a broad level the effect of the value as the clean requirements increases throughout the WECC

Zeecha Van Hoose, Clark PUD

Question for staff - no need to answer - Would "cost benefit" analysis avoid some of the discussion amongst the audience regarding the "cost" of removing the resource?

Attendees via Go-to-Webinar

Jeff Allen, NWPCC
Bill Arthur, Sierra Club
Leann Bleakney, NPWCC
Crystal Ball, PNUCC
Susan Bauer, PNNL
Kerry Berg, NWPCC
Scott Bettin, BPA
Dhruv Bhatnagar, PNNL
Martha Bibb
Tami Black
Ed Bowles, ODFW
Cecilia Brown, BPA
Pat Byrne, BPA
Daniel Catchpole, News Data

Matt Chaney
Gillian Charles, NWPCC
Rynda Clark
Kendra Coles, NWPCC
Korenna Colquitt, N Wasco
Kurt Conger, N Wasco
Chris Connolly, NW Energy
Dave Cummings, Nez Perce
Mitchell Cutter, ID Conserv
Duane Dalgleish, Cowlitz PUD
Britni Davidson, Oreca
Karen Davis,
Dennis Daw, USRTF
Michael Deen, PPC
Atul Deshmane, Whatcom PUD
Rob Dies, Windy Bay Power
David Doeringsfeld, Port of Lewiston
Debra Ellers,
Sandi Friel, Rock Island
John Goroski, Flathead
Nicolas Garcia, WPUDA
Michael Garrity, DFW
Jane Goforth,
Christine Golightly, Critfc
Peter Gordon, BPA
Jen Graham, CTWSBNR
M Grant,
Ryan Hall, MTCO-ops
Ryan Harnish, PNNL
Will Hart, ICUA
Scott Hauser, USTRF
Jay Hesse, Nez Perce
Fred Heutte, NW Energy
Pam Hickey
Dean Holecek, USACE
Stacy Horton, NWPCC
Tom Iverson, Yakima Fish
Gary Ivory, DCPUD
Jeff Jackson, USACE
Tina Jayaweera, NWPCC
Gunnar Johnson, EPA
Doug Johnson, BPA
Jennifer Joly, OMEU
Tucker Jones, ODFW
Massoud Jourabchi, NWPCC
Michael Jung, PNGC
Laurie Kerr, Pacifier
Cathy Kellon, NWPCC
Tyler King
Patti Kramer
Craig Lacy
Scott Levy, Blue Fish
Su Libby
Ted Light, Lighthouse Energy
Douglas Logan
Alison Longley
Thomas Lorz, CRIFC
Art Martin, OR
Ian McGetrick, Idaho Power
James McKenna, OR
Shauna McReynolds, PNUCC
K. C. Mehaffey, News Data
Erik Merrill, NWPCC
Andrew Missel, Advocates West
Dr. Gary Nelson, Zynrgy Group
Heather Nicholson
Jim Norton
Patty O'Toole, NWPCC
Elizabeth Osborne, NWPCC
Patrick Oshie, NWPCC
Norris Palmer
Craig Patterson
Chris Pinney
Louie Pitt, NWPCC
Krestine Reed, PN Voices
Jim Robbins, KEC
Zoe Roberts, USRTF
Denny Rohr
Eric Rothwell, USBR
Sashwat Roy, Renewable NW
Micky Ryan
Rod Sando, MIndspring
Adam Schultz, ODOE
Alec Shebiel, Umatilla