FINAL - Meeting Summary Notes
Lewis River License Implementation
Engineering Subgroup
January 15, 2009
Fish Passage Meeting Notes

Subgroup Participants Present: (16)

Bryan Nordlund, NMFS
Michelle Day, NMFS
John Johnson, USFWS
Eric Kinne, WDFW
Neil Turner, WDFW
Curt Leigh, WDFW (via phone and web conference)
Clifford Casseseka Yakama Nation
George Lee, Yakama Nation
Frank Shrier, PacifiCorp
Todd Olson, PacifiCorp
Monty Nigus, Black & Veatch
Dennis Anderson, Black & Veatch (via phone and web conference)
Alex Bjelica, Black & Veatch (via phone and web conference)
Ken Bates, Kozmo
Dana Postlewait, R2 Resource Consultants
Suzanne Picard, R2 Resource Consultants

ADMINISTRATIVE

Welcomed attendees and reviewed agenda.

General Meeting Handouts:

Distributed via email on 01/9/2009 by Kim McCune:

- Meeting agenda for 1/15/2009 subgroup meeting
- Copies of the draft 12/12/2008 subgroup meeting notes

Distributed at meeting 1/15/2009 (paper copies):

- Meeting agenda for 1/15/2009 subgroup meeting

FUTURE MEETING DATES

Future meeting dates were presented to the group for review, as follows:

- March 19th, 2009 (New Date! Rescheduled due to ES member conflicts)
- May 21st, 2009 (New Date! Rescheduled due to ES member conflicts)

Future meeting dates will be scheduled at 6 week intervals through the end of the year by Kim McCune.

OTHER ADMINISTRATIVE ITEMS

None.

o MERWIN TRAP PROJECT

Handouts

- Plots of Entrance Weir Hydraulic Characteristics showing river flow, attraction flow, head drop across entrance weir, and entrance weir width.
- Plots of Entrance Weir Hydraulic Characteristics showing all of the above, plus the phased water supply and entrance options.
- Entrance Weir Hydraulic Characteristics and phased approach options in chart format.
- Drawings – Merwin Fish Upstream Conveyance Concept Hopper Concepts
- Drawings – Merwin Hydro Plant Layout Sorting Table
- Drawings – Merwin Concept Draft for 250 Gallon Vehicle

Presentations

- No PowerPoint presentations.

Review of Previous Meetings' Merwin Action Items: See status summary table below.

No.	SUMMARY OF PENDING MERWIN ACTION ITEMS (remaining from previous Meetings)	STATUS
M103	All – Review the draft Phased-Approach Flow Diagram handed out by Arnold Adams and provide feedback at the next Subgroup Meeting.	Pending next meeting.
M105	WDFW/R2 (Kinne, Dan Turner) Test for potential electrical interference problems due to proximity of R9500 CWT Detector and Electro-Anesthesia System. Complete testing ASAP, as this is critical path item for 60% design phase.	Done, see action item M110 for follow-up.
M106	Black & Veatch/R2 (Nigus, Postlewait) Update sorting table design, and refine sloped floor concept (slope or steps).	Done today.
M107	Subgroup (all) Provide feedback on Merwin Decision Log format and content to R2 at next subgroup meeting.	Done today.
M108	Black & Veatch (Nigus) Investigate what it would take to add more flexibility to the flow distribution between the corner entrance and the second entrance.	Done today.
M109	R2 (Postlewait) Coordinate with WDFW on the design of the 250-gallon tanks and transport truck by the first week of January to prevent construction delays for Pond 15.	Done today.

Additional Comments on Last Meeting's Merwin Notes:

None. Notes can be finalized.

MERWIN TRAP AGENDA TOPICS

Attraction Flow Distribution Between Corner and Second Entrances

- Further investigation into the hydraulic characteristics of the entrances led the team to identify the necessity of evaluating not just the 4 and 6 ft entrance weir widths, but also a 3 ft weir width for the 300 cfs flow at the second entrance.
- A summary of anticipated hydraulic operational characteristics of five scenarios relating to the phased implementation plan were graphically presented at this meeting.
- Figure 1: Phase I, Corner entrance only/2 pumps/4 ft weir width – The resulting graphic revealed that this scenario could provide 1.5 feet of head drop across the entrance weir at many of the most common operating conditions (i.e. river flows of 1,200 cfs, 2,500 cfs, and 4,200 cfs). However, there was a gap, or dead band, between what could be achieved in the transition zone between one and two pump operation. This limitation was recognized by B&V, but was not thought to be problematic, considering that the transition could be achieved with head drop within the prior guidance of operating within a band from 1.0 to 1.5 ft head drop.
    - Seeing this gap, the discussion revealed that the ability to maintain 1.5 ft of head drop across the entrance weir over the full 1,200 – 11,400 cfs range of river flow was a

high priority (Nordlund). Three particular ideas were identified that the team will investigate to close this gap in the Phase I scenario.

1. Get more detailed data from the pump manufacturer about operating beyond the pump curves' limits.
2. Bleed off some of the flow from the second pump during 2-pump operation.
3. Look into varying entrance weir widths between 4 and 6 feet for an intermediate fixed width that may resolve the issue.

- The discussion further revealed the need to clearly define an operating plan to use during the biological evaluation period. The plan would likely be adjusted to reflect the results of the biological evaluation.
- Decision: Trap entrances shall be designed to provide the capability to operate at a slightly broader range of head drop values than the desired operational range. As such, the trap entrances shall be designed to have the capability to operate at head drops between 1.0 and 1.7 ft to encompass the target operational range of 1.3 – 1.5 ft of head drop.
- The group discussed the possibility of using an entrance weir with automatically adjustable sidewalls, which was eliminated during the conceptual design phase. This idea has two main drawbacks. First, Bryan Nordlund reiterated his goal to keep the entrance configuration simple, with no moving parts if possible, in order to reduce maintenance needs and potential operational problems. Second, defining a good weir coefficient to use to calculate rating curves would involve a lot of uncertainty. After discussion, it was agreed that the weir coefficient concern is minor, as the ultimate operation would be monitored for the target flow. Nevertheless, the group agreed that the adjustable width weir idea was given low priority.

o Figure 2: Phase II, Corner entrance only, 3 pumps, 6 ft weir width – The addition of a third pump to the corner entrance water supply would provide the capability to operate the trap entrance at 1.5 ft of head drop for all river flows from 1,200 cfs to 11,400 cfs.

o Figure 3: Phase III, Dual trap entrances, 3 pumps, 4 ft corner entrance weir, 3 ft wide second entrance weir – Based on the estimated weir curves, the corner entrance could maintain a 1.5 ft head drop for design river flow values below 1,700 cfs and above 3,400 cfs, with a gap in between. The second entrance could achieve a 1.5 ft head drop for all river flows below 7,000 cfs, which would be the majority of the time. The most common river flow values are 1,200 cfs, 2,500 cfs, and 4,000 cfs with flows generally staying below 6,000 cfs for 65% of the year based on the project's flow duration curve.

o Figure 4: This figure approximates how the water supply would split between the two entrances if no valving is used. While the head drops across the two entrances would not be equal, this operational scenario does demonstrate the ability to provide head drops between 1.0 and 1.5 ft for most river flow values.

- Three possible strategies for leveling out the head drops between the two entrance weirs were discussed. The first is to throttle the pumps with their respective variable speed turbine, and the second is to use valves to influence flow distribution. The

third possibility would be to use an entrance weir with automatically adjustable sidewalls as briefly described above.

- Figure 5: Two entrances, 3 pumps plus gravity flow from penstock stubout– Using a stubout from the penstock as the sole water supply to the second entrance would not provide good performance at the second entrance during high flow times. Three possible strategies for increasing flow distribution to the second entrance were discussed.

    1. Send the water supplied by the stubout to the corner entrance and run the second entrance off of one of the pumps.
    2. Add valves to redistribute flow.
    3. Adjust weir widths.

    - For optimizing the flow distribution system for this scenario, the flow would most likely be redistributed to provide either the maximum 600 cfs to the corner entrance and 200 cfs to the second entrance or 500 cfs to the corner entrance and the maximum 300 cfs to the second entrance. It was noted that the maximum attraction flow being provided (i.e. 800 cfs) does not match the combined maximum capacity of the two entrances (i.e. 900 cfs – 600 cfs at the corner entrance and 300 cfs at the second entrance). Thus, both entrances cannot be operated simultaneously at their maximum capacity.
    - The idea of adding a larger stubout to feed the second entrance was brought up. Black & Veatch will discuss the ramifications of this idea with Arnold Adams offline before the next meeting.

- Clifford Casseseka and George Lee stated the Yakama Nation's long-term "Gravel-to-Gravel" goal, and asked when it would be appropriate to discuss their big picture target of providing volitional access for fish through the entire watershed. They also stated that this goal should be an overall consideration when the engineering subgroup makes engineering decisions during the trap and collector design. To address the Nation's concern, Frank Shrier noted that the next phase of the license implementation to begin looking at alternatives to transport fish directly over Merwin Dam would be at License Year 13. The group discussed the aspects of the design that are being directly influenced, such as, for example, expanding the fish lift currently being designed to transport fish from the trap to the conveyance flume to potentially one day (sometime after License Year 17), lifting the fish directly over the dam into the reservoir above or provide some other means (new technology?) to allow adults to pass over or around the dam. Frank Shrier also noted that this issue was addressed in the Settlement Agreement and will be discussed at the appropriate time by the ACC.

Conveyance from Lift to Sorting Facility

- Dana described the operating sequence associated with the hopper transition to the conveyance flume concept drawings, which have been expanded significantly from the 30% design report. As the hopper is lifted to the top of the conveyance flume, a lip on the hopper exit gate will catch on the flume and will slowly open the gate as the hopper is lifted to its full height. Fish will empty out of the hopper into the flume, with a false weir

providing attraction flow to induce them to jump headfirst from the hopper, and high wingwalls to prevent fish from jumping out of the flume during the transfer. Group discussion generated the following key points and concerns:

- The "fish deflector ramp" shown on the front of the hopper gate to re-direct fish that may be attempting to swim against the flow might get in the way as it is being lowered into place. Eric Kinne voiced concerns that fish may injure themselves as it's being lowered into place. Dana noted he would look into means to resolve this issue as the design is carried forward.
- The group was asked to provide feedback on the flow requirements for the false weir. Currently, the design anticipates an attraction flow of 200 gpm at the false weir, based on the successful weirs at Minter Creek Hatchery and the Cowlitz Salmon Hatchery. The flow is shown moving into the entrance of the hopper, deflecting sideways, and draining out at each side of the false weir through perforated plate fillets in the corner. The screened area in the perforated plate will be designed for a very low velocity so that fish are not attracted to or impinged by the discharge flow.
- Through-flow to the hopper could be provided in a number of different ways, including pumping to the side or back of the hopper and draining out through perforated side panels. After much discussion, the group agreed that the concept shown with the corner perforated fillets would be best from both a biological standpoint and from a feasibility standpoint. Flow to the side weirs would be easier to get back into the flume with this arrangement.
- The group also needs to provide feedback on the initial flume width. Should it be 15" wide (to prevent fish from turning around) or 18" wide (to facilitate fish entering the flume)? The proposal to consider is 15", which will be developed for the next meeting.
- Because of the mechanical nature of the fish exit gate, some leakage is expected. As the design develops, thought needs to be given to ways of controlling leakage, through maintenance and design. Replacing the gate seals as part of a regular maintenance plan would act to minimize leakage. Design options include either adding water back into the hopper to compensate for the leakage or increasing the size of the hopper.
- The upper end of the conveyance flume will normally be unmanned. A video camera may be a good idea to provide remote monitoring.
- The lift will take 5 minutes to go from its full-down position to full-up. In that time, fish are inside the hopper. Given the density and stress level of the fish, some form of aeration is recommended. The discussion yielded the following aeration suggestions:
    1. Oxygen bubbler/aerator
    2. Install recirculation pump on the hopper itself that sprays onto the water surface.
    3. Spray water into the hopper from a fixed array adjacent to the hopper.
- A way needs to be devised to sink the empty hopper back into the trap at the end of its cycle, so it doesn't just float on the surface. A flap gate on the floor of the hopper

would achieve this, as would re-filling the hopper with water at the false weir, after the fish have been emptied. Adding weight to the hopper is another option.

Sorting Table

- Dana presented the sorting table layout as modified based on recent feedback from WDFW and PacifiCorp. The team discussed the dimensions and layout and then decided that this table configuration was acceptable to use as a basis for proceeding with the sorting building design. The basic overall dimensions of the table should not change in the future, and settling on the table dimensions is critical path for the 60% development of the building.
- The most recent changes to the table, accepted by the team today, were as follows:
  - Lengthening the slide distance from the electro-anesthesia basket to the R9500 Coded Wire Tag detector to allow two people to work side by side.
  - Added gates at the outlet of the R9500 CWT Detector to assist in sorting tagged fish.
  - The front wall of the slide has been lowered to allow for easier viewing. R2 will look into tapering this wall, from high near the hopper to low at the table.

250-Gal Transport Truck

- Feedback received at the last meeting has been incorporated into the bed layout for the fish truck to be used for transporting the 250 gallon fish tanks. A 15-in diameter fish release pipe has been added into the bed of the truck under each of the two rows of tanks. The tanks each discharge directly into the discharge pipes without needing to rotate or slide out. Any additional feedback on the fish truck design needs to be provided by the end of the coming week (January 23, 2009) in order to prevent delays in procurement for Pond 15.
- Feedback and discussion at today's meeting consisted of:
  - Add a retractable chute/ramp into the bed of the truck to help get the fish from the truck to the water. Stow the ramp in the bed of the truck, on rollers, similar to the ramps on rental moving trucks, and like the chute on Tacoma Power's Cowlitz Salmon Hatchery truck.
  - Each tank is currently shown with an individual oxygen tank. Some analysis needs to be done to determine if two single, large truck-mounted oxygen tanks would be a better option. R2 will look into how long it will take to transfer the tanks from the loading position at the Pond 15 and Merwin sorting facilities, to the truck.
  - John Johnson raised concerns about accessing the fish discharge pipes under the truck. If a fish got stuck, how would it be reached?
  - Input is needed on the lid of the tanks on how to prevent fish from jumping out. R2 will develop additional details for review.

Decision Log

- Comments received from Ken Bates on the initial version of the Swift project Decision Log have been incorporated. A Decision Log has been developed for the Merwin project, as well, and the formatting updates were propagated into both logs.

	SUMMARY OF PENDING MERWIN ACTION ITEMS (remaining from previous Meetings)	**STATUS**
M103	All – Review the draft Phased-Approach Flow Diagram handed out by Arnold Adams and provide feedback at the next Subgroup Meeting.	Pending next meeting.
No.	**SUMMARY OF NEW MERWIN ACTION ITEMS (from January 15, 2009 Meeting)**	**STATUS**
M110	R2/WDFW (Dan Turner, Kinne) Produce a trip memo summarizing the results of the electrical interference testing done with the R9500 CWT Detector.	Pending
M111	Black & Veatch (Nigus) Report back to Subgroup on "closing the gap" on the Phase I operating scenario.	Pending
M112	Black & Veatch (Nigus) Compile information showing the conditions under which the trap entrance(s) could meet the 1.5 ft head drop target for presentation at the next subgroup meeting. Correlate those conditions with the phased design implementation steps.	Pending
M113	Black & Veatch (Nigus) Discuss possibly increasing the size of the penstock stubout with Arnold Adams before the next subgroup meeting.	Pending
M114	All – Review conceptual hopper design. Specifically, provide feedback on false weir flow rate, through flow requirements, initial conveyance flume width, and dealing with leakage flow at the gate.	Pending
M115	R2 – (Postlewait) add a retractable chute to the fish truck bed, decide on oxygen tank configuration, and gather input on modifying the lid of the 250-gal tanks to minimize the chance of fish jumping out.	Pending.
M116	PacifiCorp (McCune) Schedule future meetings	Done on 1/16/09

o SWIFT DOWNSTREAM PASSAGE PROJECT

Handouts

- None.

Presentations

- None.

Review of Previous Meetings' Swift Action Items: See status summary table below.

No.	SUMMARY OF PENDING SWIFT ACTION ITEMS (remaining from previous Meetings)	STATUS
S50	All (all) Review the schematic sampling and sorting conceptual diagram and provide feedback to the group.	Pending, use the updated diagram included in the report.
S57	Subgroup (All) Review 60% Design Report and provide comments. Agency comments are due within 45 days of the December 12th, Subgroup meeting.	Pending
S58	Subgroup (All) Provide comments on Table 4-4 on page 14 of the Criteria Document. The Criteria Document is located in Appendix G.1 acc of the 60% Design Report.	Pending
S59	ACC (Schrier) Confirm adult facilities proposed in the 60% report are acceptable to the ACC. Provisions to anesthetize adult fish are not in the current design.	Pending.

Additional Comments on Last Meeting's Swift Notes:

None. Meeting notes from the December 12th, 2008 meeting can all be finalized.

SWIFT DOWNSTREAM AGENDA TOPICS

- No comments on the 60% Design Report were received at this subgroup meeting. Comments are not due until next week.

No.	SUMMARY OF PENDING SWIFT ACTION ITEMS (remaining from previous Meetings)	STATUS
S50	All (all) Review the schematic sampling and sorting conceptual diagram and provide feedback to the group.	Pending, use the updated diagram included in the 60% report.
S57	Subgroup (All) Review 60% Design Report and provide comments. Agency comments are due within 45 days of the December 12th, Subgroup meeting.	Pending
S58	Subgroup (All) Provide comments on Table 4-4 on page 14 of the Criteria Document. The Criteria Document is located in Appendix G.1 acc of the 60% Design Report.	Pending
S59	ACC (Schrier) Confirm adult facilities proposed in the 60% report are acceptable to the ACC. Provisions to anesthetize adult fish are not in the current design.	Pending.
No.	**SUMMARY OF NEW SWIFT ACTION ITEMS (from January 16th, 2008 Meeting)**	**STATUS**
	None.	

Adjourn 12:30 PM.