

FINAL - Meeting Summary Notes
Lewis River License Implementation
Engineering Subgroup
March 14, 2008
Fish Passage Meeting Notes

Subgroup Participants Present: (9)

Todd Olson, PacifiCorp
Arnold Adams, PacifiCorp
Bryan Nordlund, NOAA Fisheries (NMFS)
Jim Stow, USFWS
Dana Postlewait, R2 Resource Consultants
Ken Bates, Kozmo
Monty Nigus, Black & Veatch
Dennis Anderson, Black & Veatch (via conference call)
Kate Miller, Trout Unlimited (first half of the meeting)

ADMINISTRATIVE

Todd Olson updated the group on the status of the FERC license, based on his discussions with FERC personnel on March 13th. For planning purposes, the tentative license issuance date has been delayed until at least June 1st. FERC is making progress with the series of license applications they are processing, so the license issuance is likely to be sometime this summer at the latest if the June 1st date is delayed.

The meeting Agenda does not include discussion of the Swift Project. In the interest of time, the group will not review the Swift portion of last meeting's notes.

General Meeting Handouts:

Distributed via email on March 10, 2008 by Kim McCune:

- Meeting agenda for the March 14, 2008 subgroup meeting
- Copies of the draft December 19, 2007 subgroup meeting notes
- Copies of the draft January 30, 2008 subgroup meeting notes

Distributed at March 14th meeting (paper copies):

- Meeting agenda for the March 14, 2008 subgroup meeting
- Copies of the draft December 19, 2007 subgroup meeting notes
- Copies of the draft January 30, 2008 subgroup meeting notes

FUTURE MEETING DATES

Future meeting dates were planned as follows:

- **April 28, 2008 (note new date, moved from April 24th)**
- June 4, 2008
- July 16, 2008
- August 28, 2008

Curt Leigh did not attend, but noted at the last meeting that he will not be able to attend the June 4th meeting.

OTHER ADMINISTRATIVE ITEMS

- None.

MERWIN TRAP PROJECT

Handouts

- Sorting table revisions, showing revised dimensions and the Coded Wire Tag (CWT) V-detector installed behind the table.
- Model update handouts, numerous plots and graphs.
- Trap entrance weir summary sketch and flow graphs for Entrance 1 and 2.
- Model update CD, electronic versions of all handouts distributed to team members.

Presentations

- No formal 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
M78	WDFW (Kinne) Provide feedback on Sorting Table configurations presented in Design Report to R2.	Complete, via phone to R2. See agenda item.
M79	All (Subgroup) - Review and provide feedback on the 30% Design Report to R2 and Black and Veatch by the next Subgroup Meeting on March 14 2008.	Done, today's topic and 3/13/08 ACC meeting

M80	PacifiCorp (Adams) Provide a list of common powerhouse operation scenarios to help guide future model runs.	Complete – via email from Kim McCune on 2/13/08
-----	---	---

Additional Comments on the December 19, 2007 Meeting Notes:

- As reported at the last meeting (January 30, 2008), the Merwin portion of the meeting notes have been reviewed and can be published as final. Note that the Swift portion of the December 19th meeting notes has not yet been discussed; therefore these notes should not be finalized until the team reconvenes to address the Swift project.

Additional Comments on Last Meeting’s Notes (from the January 30th, 2008 meeting):

- Bryan Nordlund sent suggested edits to Kim McCune on February 15th, 2008. These edits were agreed to by all participants.
- There were no other comments, and the meeting notes can be made final with Bryan’s comments incorporated.

MERWIN TRAP AGENDA TOPICS

Action Item M78 – Sorting Table Layout

- Dana Postlewait reported that Eric Kinne had called him and provided comments on the table layout. The table will be modified to:
 - Make the sloped area leading from the baskets to the table adjustable, so the table can be sloped from 1-foot to flat.
 - Add another foot between the sloped ramp and the 1st tube.
 - They also discussed the Coded Wire Tag (CWT) detector, and how it should be placed.
- Subsequent to the call, Dana noted that R2 is designing a similar sorting table for the Baker Adult Fish Trap. Dana presented and handed out sketches showing the revised table dimensions, and the CWT V-Detector installed behind the table, laid on its side. Frank Postlewaite of R2 constructed a mock-up of this installation for the Baker design and tested its performance. The CWT detector should be mounted on a separate foundation to reduce vibration from work on the table, and must be kept about 5 feet away from electric motors (such as the basket hoist, control panels, etc.).
- Dana also noted that Eric Kinne had revised his thinking for the CWT detector for the Pond 15 design at the Lewis River Hatchery, and wants to confirm his intent for the Merwin Trap sorting facility.
- Dana will follow up with Eric Kinne to resolve the final details for the CWT detector installation, and finalize the table design. USFWS and NMFS stated they will defer to WDFW on this issue.

Agency Review of the 30% Design Report

- Feedback on the 30% Design Report was provided at the ACC meeting on March 13th, 2008. The ACC generally accepted the report as good documentation of this point in time, none of the representatives noted they were going to provide any written comments.
- Bryan Nordlund provided verbal comments on three areas of the report. In order to capture the content accurately, Bryan noted he will send written comments following the meeting. In brief, these have to do with the following issues:
 - The report is written such that it supports PacifiCorp's phased trap development proposal. The agencies have not yet agreed to this specific phased approach, or to a design entrance configuration or recommended attraction flow amount. Rather, they requested the construction of the tailrace physical hydraulic model, and a draft of the tailrace evaluation plan including ATE definition as additional information necessary to evaluate any phased proposal, and the proper entrance configuration (flow and geometry). The agencies do not plan on acting regarding their review of the phased trap proposal until the hydraulic modeling effort is completed.

It was agreed that the report can be reviewed relative to the design content, and that further direction on the phased trap implementation can be addressed during the 60% design phase, and at ongoing Engineering Subgroup meetings leading up to the 60% design.

- Bryan questioned use of the conveyance flume criteria, presented in Table 10, starting on page 14 of Appendix A.1. His concern is the design depth of 9 inches, or 40% of the pipe diameter depth, as this is based on juvenile transport criteria and may not be the most applicable for adult fish conveyance to the sorting facility.

All of the team agreed that the conveyance flume is a unique feature of the facility, and that there are no good examples of this type of adult fish conveyance flume to the length necessary at Merwin. Dana Postlewait stated that he is concerned with the details of this system also, and is still looking for good examples to review. The team agreed to amend this criterion during the 60% phase to "provide flexibility in flows from a mist or shallow film of water, up to the 9 inches or 40% depth". The slope of the pipe is also an area of concern that will be developed further during the 60% design phase, possibly requiring some research with the use of existing facilities.

Ken Bates noted that WDFW's McAllister Creek Hatchery had a similar transport flume that was about 100 feet long that may be worth examining even though the hatchery has been decommissioned. Dana Postlewait noted that the fish return tubes at the USFWS Makah National Fish Hatchery are also an example of a longer adult transport pipe, and other hatchery facilities could have similar fish return tubes from their adult sorting facilities.

- Appendix A.2, Hydrology Memo dated January 18, 2007, and Appendix B.1, Implementation Plan Memo dated May 31, 2007. Bryan noted that the references to the 5% flow in this memo should reflect the 5% to 10% of the fish passage design flow. The intent with this section is to reference the Fish Passage Design Flow, referenced as the 5% exceedance flow. This concern will be clarified with Bryan's email.
- Based on the last meeting discussion, Bryan also handed out photographs of the Priest Rapids fixed entrance weir shape, as an example of what the team can examine for trap entrance geometry alternatives.

Physical Hydraulic Model Update

NHC has completed data collection runs for the initial corner entrance configurations, and has performed initial runs for the PB2 and PB3 entrances. Dana Postlewait and Monty Nigus presented a summary of the data, and distributed a CD with all model data runs, photographs, video, and hand sketches of flow patterns to the team. Paper copies of most of the data were also distributed.

Given the large amount of information developed, the design team's intent with this meeting was to confirm that all members understood the methods, how the information was reported, and gained concurrence that the methodology was acceptable. The next steps will be for all team members to review the data, and a second meeting will be held to discuss results, and help to direct the next steps to complete the modeling effort.

Data Distributed for the Corner Entrance included:

- o Copy of the test plan. The trap was documented for two runs, both with full generation and the corresponding high tailwater:
 - Crest Elev 38, Constant weir width = 4', Flow = 400 cfs.
 - Crest Elev 38, Constant weir width = 6', Flow = 600 cfs.
 - ADV 3-Dimensional velocity data was taken at two depths for these runs, 5' and 12' deep.
- o Photographs of the test and instrumentation set up.
- o ADV Time Average data, plotting the time-average used for the meter, and showing the sensitivity and repeatability of the tests. Five individual readings were taken with the ADF for 5, 10, 20, 30, 20, 50, and 60 seconds. NHC recommended using a 30-second time average, based on the preliminary tests documented with this handout, and based on previous experience with their meter. The tailrace is a turbulent environment, but NHC feels the 30s time average gives sufficiently repeatable data for our needs.
- o Sketches of flow patterns. Dana noted that for final documentation, the design team recommends recording the flow patterns at three depths, as the model work clearly demonstrates that there are three distinct zones in the tailrace:
 - surface patterns

- draft tube level patterns
- below the draft tubes
- o Video clips of dye releases for each run
- o Time lapse photographs for each run
- o ADV Data Plots, showing velocity vector magnitude, x-y angle, and z angle. These are color plots, and an interactive PDF file is provided on the CD that allows the user to mix-and-match runs by turning on and off layers to facilitate comparison. The team worked with this presentation using the projector screen.
- o Weir centerline velocities versus depth, presenting tabular data of the centerline weir velocity measurements using the lab's propeller meter (Nixon Meter).
- o Monty Nigus presented an initial analysis of what it would theoretically take to maintain a constant 1.5 foot head drop across a fixed geometry weir for attraction flows equal to 10% of the river flow up to a maximum attraction flow of 600 and 330 cfs for the corner and pump bay entrances, respectively. The design team presented sketches of the weir shape, which required widths greater than space available at the corner and pump bay entrance locations. Therefore, Monty also presented a graphical analysis showing what type of design head, relative to attraction flow, tailwater condition, and weir widths could be accommodated using 4', 6', and 8' constant width weirs at the corner entrance and 4' and 6' constant width weirs at the pump bay.

Data Distributed for the Pump Bay Entrances included:

- o Copy of the test plan. The trap was documented for two runs, both with full generation and the corresponding high tailwater:
 - Crest Elev 40.7, Constant weir width = 4', Flow = 330 cfs.
 - Crest Elev 46.2, Constant weir width = 4', Flow = 170 cfs.
 - ADV 3-Dimensional velocity data was taken at two depths for these runs, 5' (and 10' deep for the deeper slot configuration only).
- o Photographs of the test and instrumentation set up.
- o Sketches of flow patterns. Again, Dana noted that there are three distinct flow zones that will be documented further.
- o Video clips of dye releases for each run

Discussion of Corner Entrance Data

The team spent about 1.5 hours reviewing the data, and working with the interactive file showing the velocity plots. The general methods seemed acceptable to all ES members. Jim and Bryan would like some time to study and interpret the results, but initial indications on the methods were positive.

Preliminary observations and group discussion:

- It was noted that the flow on the 1st arc showed some reverse flows along the edge of the trap jet at the 400 cfs that seemed to change directions and point downstream for the 600 cfs test. Dana will look into the variability and exact measurements for these points, as similar observations of the video clips viewed side-by-side did not seem to indicate this flow pattern. It appears that there is some swirling going on in this zone at both flows, and that flow is all moving downstream at about the same rate. This makes sense as the velocities from the weirs are nearly the same for both flows by design.
- The group agreed that documentation of tailrace flow patterns at three depths would be useful to record for the final configuration. Hand sketches with a few spot velocities would be an acceptable method.
- The fixed geometry weir was discussed. Providing flow greater than 10% of the generation flow is acceptable for fish passage at the lower flows. The design team will revise the weir plots to illustrate a band of operational range to maintain from 1.0 to 1.5 feet across the weir. The head drop across the weir, and flexibility to maintain or adjust this head is the key criteria.
- The bottom elevation of the corner trap structure was discussed. The team agreed that Elevation 38.0 was a good lower limit, based on the hydraulic influence of the turbine draft tubes, and the inability of the trap jet to penetrate this flow. It was agreed that it would be worth modeling the flows with the bottom of the trap structure raised to a level that would allow more flow to pass under the structure (about elevation 36.0 +/-, rather than the 29.4 with the current weir box). This arrangement may possibly minimize or eliminate the small eddy that is present immediately downstream of the entrance.
- The use of the model to design for the worst case conditions is appropriate, using the full generation flows. The team discussed the ability to look at other flows, more often seen during the fish passage season. Based on previous discussion, we believe the plant will be operating from 5,000 to 7,500 cfs for most of the adult fish migration season. PacifiCorp will take another look at quantifying the mean operational flows, and variance, during the fall fish migration season.
- Using the above data, it would be desirable to examine hydraulic flow patterns that coincide with how the turbines would likely be operated during the fish passage seasons. Arnold Adams noted that PacifiCorp was not obligated to alter generating operations for the benefit of the fish trap. However, PacifiCorp has in the past and may be willing in the future to consider operational procedures favorable to the fish trap that could easily be accommodated within their standard operating procedures. This analysis could help in preparing initial operational guidelines for the fish trap.
- The design team will have NHC shade the water surface line on the velocity plots, so the edge of water is more apparent.

Discussion of Pump Bay Entrance Data

The team spent another half-hour reviewing the pump bay data. The approach seemed appropriate to the group, and currently there was no desire to take velocity measurements to evaluate these alternatives.

Preliminary observations and group discussion:

- The strong eddy near Pump Bay 3 influenced the discharge out of the PB3 trap, pushing it towards the left looking downstream.
- There does not appear to be any negative interaction between the pump intakes and the PB3 entrance that would require a divider wall.
- The flow out of PB3 dissipates more quickly than PB2, based on the eddy influence. The lower flow amount from the PB2 entrance seemed to propagate the same as the higher flow alternative, as the flow from the trap entrance seemed to be reinforced by the turbine discharge (at full generation).

Based on the needs of the corner entrance, the group agreed to study the Pump Bay alternatives more later, once the design issues were resolved for the corner entrance.

Next Steps

Based on the quantity and complexity of data, the team discussed use of an interim meeting to discuss the interpretation of the results, and to guide the next modeling efforts. PacifiCorp will look into scheduling an interim meeting at the model lab.

No.	SUMMARY OF PENDING MERWIN ACTION ITEMS (remaining from previous Meetings)	STATUS
	None.	
No.	SUMMARY OF NEW MERWIN ACTION ITEMS (from March 14th, 2008 Meeting)	STATUS
M81	R2 (Postlewait) – Coordinate review of sorting table revisions with Eric Kinne.	Pending
M82	Agencies (Nordlund, Stow, Kinne) – review model data and be prepared to discuss observations.	Pending
M83	R2 (Postlewait) – Work with NHC to shade the water line on the 3-D plots, so the edge of water is more apparent.	Pending
M84	Design Team – schedule an interim model meeting to discuss observations and next steps with the model analysis.	Pending

Meeting was adjourned at 1:30 PM.

McCune, Kimberly

To: Dana Postlewait

Subject: RE: Meeting Notes - draft of comments

From: Dana Postlewait [mailto:Dpostlewait@r2usa.com]
Sent: Tuesday, March 18, 2008 4:13 PM
To: Olson, Todd; Shrier, Frank; Adams, Arnold; McCune, Kimberly
Cc: 'Bryan Nordlund'; 'Nigus, Lamont A. (Monty)'; 'Anderson, Dennis'; 'Kozmo Ken Bates'
Subject: FW: Meeting Notes - draft of comments

Hi Kim,

When you are ready to distribute this month's subgroup meeting notes, can you please attach this email from Bryan as a follow-on addendum to the notes. This was an action item Bryan agreed to and has already completed.

Thanks,

Dana

-----Original Message-----

From: Bryan Nordlund [mailto:Bryan.Nordlund@noaa.gov]
Sent: Tuesday, March 18, 2008 11:04 AM
To: Dana Postlewait
Cc: Michelle Day; Jim Stow
Subject: Re: Meeting Notes - draft of comments

Thanks Dana.

Here are a few stray comments that I didn't concisely provide last meeting, that I mentioned I would provide via email. You can put these as an addendum to the minutes, as we discussed.

- 1) Regarding references to AQU-5 (the first is on page 8) - this is not a document specified in the Settlement Agreement (SA) for use as design criteria for passage facilities. The SA default design criteria for the adult trap is the NMFS design document (SA section 4.1.4c), and it should be referenced for the design value unless alternative criteria has been agreed to by the engineering subgroup, or the ACC defines ATE.
- 2) The "source" reference #8 (Settlement) (page 8) is not intuitive. What does this mean in context of locating #8 in the SA?
- 3) Table 7 under the criteria "current facility operations - maximum holding time". This is listed as 72 hours for the current trap, and it's not clear if this is also proposed for a new trap. If so, it violates the "timely" aspect of passage, as agreed to in SA 4.1.4c.
- 4) Appendix B1 contains a phased implementation approach memo that does not reflect feedback received from the agencies from when it was released originally. For example, ATE has not yet been defined (although a proposal by NMFS has been supported by WDFW and USFWS), but B1 refers to 95%. The attraction flow amounts are also not yet determined. NMFS supports a phased approach

design with sufficient flexibility to make design adjustments and modifications to achieve ATE standards based on initial biological testing, but neither the initial attraction flow amounts or the ATE have yet been determined.

5) To reiterate NMFS comments on the B1 memo:

- Pacificorp attempts to provide justification of fishway attraction flows lower than called for by NMFS design standards. However, evidence of supporting a previous successful H&S plan, or collection of hatchery broodstock does not require the same level of safe, timely and efficient passage as with supporting a reintroduction effort. A reintroduction effort will not produce as many smolt per adult fish as a hatchery program, and adult fish are subjected to many additional rigors (transport distance, passage post-release, poaching, angling, predation, spawning competition and others) compared to a hatchery spawning operation. As such, greater care should be taken in the design of adult facilities to assure safe timely and efficient passage.
- NMFS design standards call for 5% to 10% of the 5% exceedence flow, during periods when fish are expected to be present and migrating. As such, for example, providing 6% of the 5% exceedence flow as fishway attraction does not exceed NMFS standards - it only meets them.
- NMFS notes that the higher attraction flow amounts are the most important for passage when river flows are high. As such, comments in the memo regarding how well the existing 35 cfs trap flow works for collection, can not be extrapolated to predict equal success at high river flow. NMFS goal is safe timely and efficient passage for at least 90% of each migration period (i.e. between the 5% and 95% exceedence flows). Since anadromous fish require passage virtually year round in the Lewis system we have agreed to use the 5% annual exceedence flow (11,400 cfs) as the basis for the high fishway design flow. Based on NMFS design standards, maximum fishway attraction flow design should be between 570 and 1,140 cfs for all anadromous species. From a practical sense, it may be more efficient and is acceptable to NMFS to operate with higher than 10% of river flow during lower flow periods.

6) I expect to be reaching some conclusions shortly regarding my recommended attraction flow and phased implementation plan, based on my view of the model and analysis of the 30% design information. I expect that this will generate engineering discussion, the result of which will better inform the 60% design as to these aspects.