

**BAKER R. FISH PASSAGE FACILITIES DESIGN
FISH PASSAGE TECHNICAL DESIGN TEAM**

9:00 a.m. - 3:00 p.m.
January 20, 2004

AGENDA

Objective: Continue engineering design development of Upper Baker Guide Net and FSC system.

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| 9:00 - 9:10 | Review agenda and handouts (Verretto) |
| 9:10 - 9:15 | Review minutes & action items (Verretto) |
| | Downstream Passage |
| 9:15 - 10:30 | FSC design development (Eldridge) <ul style="list-style-type: none">• structure• hydraulics• naval architecture• pump station• controls• electrical |
| 10:30 - 10:40 | Break |
| 10:40 - 11:45 | FSC design development (Eldridge) |
| 11:45 - 12:15 | Lunch (provided) |
| 12:15 - 12:45 | Stress-relief ponds (Eldridge) |
| 12:45 - 2:45 | Guide net design development, schedule (Verretto) |
| 2:45 - 2:50 | Other Issues (Verretto) |
| 2:50 - 2:55 | Evaluate meeting & review assignments (Verretto) |
| 2:55 - 3:00 | Long-term schedule, agenda, facilitation (Verretto) |



**DRAFT MEETING MINUTES
BAKER RIVER FISH PASSAGE FACILITIES DESIGN
FISH PASSAGE DESIGN TEAM**

Mission Statement: To develop an efficient fish passage design for the Baker River Project.

Project: Baker River Project
FERC No. 2150

Written By: Nick Verretto, PSE

Meeting Date: January 20, 2004

Location: Red Lion SeaTac Hotel

Attendees:	Arnie Aspelund, PSE	Steve Fransen, NMFS
	Ken Bates, FPP&D	Frank Hella, PSE
	Ed Cassady, PSE	Gary Sprague, WDFW
	Ray Eldridge, MWH	Jim Stow, USFWS
	Cary Feldmann, PSE	Nick Verretto, PSE

Purpose: Continue engineering design development of Upper Baker FSC and guidance net system.

Future Meeting Dates:

Mar 8, 2004 9-3 technical design mtg at Baker Lodge.
Mar 9, 2004 9-3 passage design mtg at Baker Lodge.
Apr. 13, 2004 9-3 passage technical design mtg at Red Lion SeaTac Hotel.
Apr. 14, 2004 9-3 passage design mtg at Red Lion SeaTac Hotel.
June 01, 2004 9-3 passage technical design mtg at Red Lion SeaTac Hotel.
June 02, 2004 9-3 biological evaluation development mtg at Red Lion SeaTac Hotel.
July 13, 2004 9-3 passage technical design mtg at Red Lion SeaTac Hotel.
See handout for additional meeting dates.

New Action Items

Eldridge - Review pond design at Cowlitz, ODF&W, and Umatilla for methods of forcing fish out of the ponds without inducing jumping, injury or avoidance for incorporation into Baker stress-relief ponds.
No other new action items were noted. Design development will continue based on today's discussion.

Technical Memos/Reports Distributed

The items distributed and reviewed at the meeting were: 01/20/04 and 01/21/04 agendas (PSE), long-term planning schedule (PSE), updated team list (PSE), minutes of 12/03/03 and 12/04/03 meetings (PSE), FSC design drawings (MWH), FSC hydraulics & pumping plans for 500 and 1000 cfs units (MWH), guide net and transition structure designs (MWH), Baker River Draft Proposed Actions, Section 3.2 (Fish Passage Management Implementation Plan) and Appendix (PSE), decision matrix (PSE), evaluation matrix (PSE), stress-relief pond sizing technical memo (MWH).

Review Agenda, Minutes & Action Items

Verretto distributed handouts and reviewed general content of each. Team members noted that Gary, Lyn, Ed, Cary, Gene, Jim and Bruce would not be in attendance in tomorrow's meeting. Because the April 13 and 14



meetings are the last scheduled as two-day (back-to-back) meetings, and because the group assumes that passage settlement resolution will have eliminated the need for a June meeting, the team decided to reserve June 2 as a biological evaluation development day. Further development of the biological evaluation would occur the day after scheduled technical design meetings, as decided by the group at subsequent meetings.

FSC Design Development

Ray distributed the floating surface collector design, pumps and hydraulic information and reviewed it with the group. The FSC technical design memo, scheduled for completion mid-March, will contain the following sections: biological and hydraulics, floatation, structural, mechanical, and electrical. Some of the major design decisions required in the near-term include: construction and launch method, pumps system identification and modeling, and structure size reduction.

- **Structure**

Ray reviewed the structural designs and the suggested launch method, which is a graving dock. The structure 's size is 490 tons dead load plus 500 tons live load (to Whatcom Co. standards), or total 1,000 tons. The extreme live loads reflect the large structural footprint and consequent snow and ice loads. Although the 'Normal migration period' is defined as March 1 to August 15, the facility has to be capable of operating outside of the normal migration window. The facility has to be designed to operate during all seasons, although year-round operation is not intended. Details such as mechanical and structural handling of snow and ice loads must be factored into the design, and push the structure to an enormous size. The design is now focusing on methods to reduce the size, and cost, of the structure while maintaining the hydraulic aspects of the design.

- **Hydraulics**

Ray reviewed hydraulic design information through the screening structure. The bypass design challenge of limited head was again noted. The bypass design alternatives, in order of preference, are: 1) open channel flow with 18" minimum width, 2) non-pressurized pipe of 2' minimum diameter, and 3) pressurized pipe of 2' minimum diameter. Head differential should trip pumps, rather than lift or fail screens.

- **Naval Architecture**

Glosten Associates is the marine engineering firm employed to develop the floatation structure and ensure stability under all operating conditions. It appears that pre-fabricated modular steel barges will not suit the design, so custom units will have to be designed and fabricated.

- **Pump Station**

Flow criteria was clarified for the phased installation as 500 cfs for the phase one FSC and 1000 cfs for the phase two installation. These flows include the bypass flow of 25 cfs, so should be considered the total attraction flow. Screened flows – or pumped flows - would therefore be 475 and 975 cfs for the two phases. Three pump types were reviewed and the preferred one presented. Modeling is being coordinated with the pump manufacturer and ENSR to confirm design assumptions before final selection is made.

- **Controls & Electrical**

A half-day meeting will be held at the MWH office in the near future to define and begin developing the controls and analysis system.

Stress Relief Pond Design / Acclimation Pond Proposal by WDFW

Eldridge led a discussion of the draft TM for the stress relief ponds that would be located near the confluence of the Baker and Skagit Rivers. The facility would consist of three raceways, be sized for 118,000 fish/day, and accommodate holding times of between 48 – 72 hours. Raceways are the recommended containment structure, with accommodation of future expansion as the run exceeds initial capacity. Calculated numbers per the design



team's recommendations produced a maximum of 97,000 sockeye and 20,000 coho per day. At 30 fish/lb., 5,000 lbs. of fish would be loaded into one of three raceways for 48 – 72 hours holding time before being released into the Baker River. Using a Flow Index (F) of 1.5 and a Density Index (DI) of 0.3 (loading density of 0.3 lbs./cu. ft.), each of the three raceways would require a flow of 0.55 cfs and have a volume of 1,200 cu. ft. (approximately 8'W x 50'L x 3'D). The water supply would be configured for ultimate of 3.3 cfs.

The design will identify methods of forcing fish out of the ponds without inducing jumping, injury or avoidance. Facilities to consider include Cowlitz, ODF&W, and Umatilla. Pond operation during high river flows will be considered. Release modes to be considered include backing trucks into pond, release hoses and chutes to avoid free-fall truck release into ponds.

The WDFW's Grandy Creek or Baker River acclimation ponds proposal was presented to the team, as discussed 0114/04 at the MWH office. The WDFW proposes to acclimate up to 334,000 winter steelhead at the refurbished Grandy Creek facility, or at the Baker River (on PSE property) if the Grandy Creek site is ruled unsuitable during EIS review, for release into the lower Skagit River defined as the mainstem downstream of the Baker River confluence). The fish would be raised at the Marblemount hatchery, then placed in the acclimation ponds from October – June 1. January – April is the anticipated adult return period, and 400 fish is the escapement estimate – which would be seen at the Baker adult trap. The proposed facility would consist of two ponds 20'W x 140'L (requiring 10-12 cfs flow), a work trailer and clarification pond, intake and pipeline, and bypass pipeline. The schedule for installation would be within two years, if permits and funding were issued. The screened weir intake would have to be resized, as would the stress-reduction ponds bypass pipeline.

The group had reservations about the proposal, related to impacts to the Baker relicensing schedule and basin management, but were not opposed to it. The group felt that the proposal did not fit within any of the settlement articles, and that it may present some conflicts with some of the directions taken in the basin. Possible conflicts include: adult trap numbers increase, implementation schedule, conflicts with intervenors opposed to hatchery programs, no real Project benefit other than shared intake and outlet, scheduling conflicts regarding outmigrants and coinciding steelhead migration, and construction sequencing and logistics. Fish culture concerns include water temperature, IHN, Lake Shannon turbidity and effluent treatment. The targeted release of 334,000 is over 50% of basin production. Further discussion will have to follow once the EIS is submitted and if it appears that the likely site will be at the Baker River.

Guide Net Design Development, Schedule

Nick reviewed the new guide net and transition structure designs. The system is under construction for installation March 2004, and incorporates much of the hydraulic controls discussed during the ongoing FSC design process. Entrance velocity, acceleration and flow continuity will be greatly controlled with the new net transition structure (NTS), which is an aluminum-framed, HDPE-lined inclined channel. The entrance width of the NTS was reduced from 75' to 50' to prevent deceleration as fish encounter the entrance from either side of the guide net panel. This decision was taken after review by MWH of last spring's forebay velocity data. The net design incorporates a huge number of innovations developed over several iterations of the system, as well as continuous design development which began last fall.

Considerations for a future net were discussed. One of these, mentioned briefly in the past and discussed here at length, was making the entire panel inclined to guide fish to the surface and increase the distance from the false attraction of the intake. The entire group decided to remove this for consideration due to the immense complexity, and, therefore, of its likelihood of failure. Design efforts should be toward making the net both simple and "bullet-proof".

Two other areas needing attention are in reducing mesh size of the upper 30' of the net to capture fry. Mesh size should be 3/32" in this area, and may require a double-walled construction for strength because of the loads



placed on the upper portions of the net. The 3/32" criteria is one of the preliminary terms and conditions submitted by NMFS to the FERC. The other criteria to focus on is narrowing the vee by moving the anchors upstream. This will move fish away from the confusing attraction flow of the intakes and discharge pumps, reduce the area of searching and milling seen in the 2002 behavioral studies, move the nets away from the spill gates, remove potential for cul-de-sacs, place the nets more in tension (and therefore strengthen them) relative to spill and intake flows, and have a number of other potential benefits. The nets cannot be moved upstream far enough to prevent access to streams or coho rearing areas.

Other Issues

None identified.

Evaluate Meeting

Did not conduct meeting evaluation.

Long-Term Schedule, Agenda, Facilitation

Mar 8, 2004 9-3 technical design mtg at Baker Lodge.
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June 02, 2004 9-3 biological evaluation development mtg at Red Lion SeaTac Hotel.
July 13, 2004 9-3 passage technical design mtg at Red Lion SeaTac Hotel.
See handout for additional meeting dates.

Monday, Mar. 08, 2004, 9-5 passage technical design mtg at Baker Lodge.

Review agenda and handouts (Verretto)
Review minutes & action items (Verretto)
Guide net design review (Verretto)
Guide net & NTS slide show (Verretto)
Guide net & NTS site visit (Verretto)
Overall passage system development schedule (Brink)
FSC design memo review (Dorratcague)

- Structure
- Hydraulics
- Naval architecture
- Pump station
- Controls
- Electrical

Other Issues (Verretto)
Evaluate meeting & review assignments (Verretto)
Long-term schedule, agenda, facilitation (Verretto)

Facilitation: Will be provided for future passage meetings (not technical design meetings), unless otherwise noted.