Swift Downstream Passage (SA 4.4.1)
ACC Meeting

March 8, 2007
Lewis River Re-introduction Program

- Merwin Trap
- Swift Downstream Collection and Sorting
- Swift Release Point
- To release site (~10 miles)
Settlement Agreement Requirements

4.4.1 Modular Surface Collector. By six months after the fourth anniversary of the Issuance of the New License for the Swift No. 1 Project or the Swift No. 2 Project, whichever is later, PacifiCorp shall construct and provide for the operation of a passage facility at the Swift No. 1 Dam, including a modular surface collector, to collect, sort, tag, and transport downstream migrating Transported Species.
Key Questions

1. Where can we catch the fish?
2. How do we catch them?
3. How do we sort and transfer them?
4. How do we moor and service the facility?
Design Efforts to Address Key Questions

1. Collection Location
2. Collector Design
3. Fish Sorting & Transfer
4. Facility Mooring & Access
Swift Reservoir
Swift Reservoir Forebay Area

Intake and Spillway Area

Dam
Collector Location

Location 1
Intake Channel Characteristics

Reservoir Level ~910
Collector Location Factors

- Fish Behavior
  - Relicensing studies show fish find the intake area
- Flood Passage/Dam Safety
  - Must maintain existing spillway capacity
- Reservoir Fluctuation
  - Operational for 100-ft reservoir fluctuations
- Reservoir Flow Patterns
  - Use Computational Fluid Dynamic (CFD) modeling to simulate reservoir flow characteristics under different powerhouse flows and reservoir levels
  - Modeling is an indicator – does not simulate: Non-steady flow, Temperature stratification, Wind, Etc.
Full Reservoir, Maximum PH Flow, No Collector

Streamlines Illustrating Flow Pattern
(Reservoir Elevation: 1,000 ft, Q=9,400 cfs, 5% Flow through Swift Creek)
Full Reservoir, Maximum PH Flow, No Collector

Baseline No. 1
WSL=1,000 ft
P/H Q=9,400 cfs

Velocity Contours and Streamlines at 10 ft Depth
Full Reservoir, Maximum PH Flow, Collector with North and Back Discharge Gates

Run 1a-NB
WSL=1,000 ft
PSC Q=600 cfs
P/H Q=9,400 cfs
PSC Location #1
PSC Discharge: North and Back Gates

Streamlines Illustrating Flow Pattern
Full Reservoir, Maximum PH Flow, Collector with North and Back Discharge Gates

 Velocity (ft/s)

0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00

Run 1a-NB
WSL=1,000 ft
FSC Q=600 cfs
P/H Q=9,400 cfs
FSC Location #1
FSC Discharge: North and Back Gates

Velocity Vectors and Contours at 11.25 ft Depth
Full Reservoir, No PH Flow, Collector with Back Discharge Gates

Streamlines Illustrating Flow Pattern
Full Reservoir, No PH Flow, Collector with Back Discharge Gates

Run 1b-N
WSL=1,000 ft
FSC Q=600 cfs
P/H Q=0 cfs
FSC Location #1
FSC Discharge: North Gates

Velocity Vectors and Contours at 11.25 ft Depth
Wind Analysis - 7.3 mph applied from east to west

No Wind

7.3 mph Wind
<table>
<thead>
<tr>
<th>Collector Location Status</th>
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<tr>
<td>- Location at channel entrance</td>
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<td>- Discharge to reinforce existing reservoir patterns</td>
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<tr>
<td>- Modeling is just an indicator of reservoir conditions.</td>
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<td>- Discharge design will be flexible to avoid flow pattern that deter fish collection</td>
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Collector Design Factors

- Hydraulic Conditions
  - Favorable for fish collection
  - Gradual increase in velocity until fish are captured

- Floatation
  - Facility must stay level to achieve the design velocities
Collection Hydraulics
Collection Hydraulics

Collection Enhancement Structure

Primary Attraction Water Pumps

Secondary Dewatering Pumps

Sorting Area

600 cfs → 200 cfs → 7 cfs
Collection Hydraulics
Collector Design Status

- Fish channel hydraulics well understood
- Next Steps:
  - Hydraulics inside collector
  - Discharge configuration
  - Collector structural design and marine architecture
Fish Sorting & Transfer Factors

- **Wetted Separator**
  - Sort by size class
  - Prevent injury
- **Storage Capacity**
  - Sized to hold anticipated runs with efficient offloading
- **Subsampling**
- **Limited handling**
Sorter at Cowlitz Falls
Fish Sorting & Transfer Status

- Wetted Separator system is proven technology and can be installed on the collector.
- Refining configuration
- Transfer system is dependent on which mooring is selected
Mooring and Access Factors

- Constructability
- Safety
- Efficiency of operations
Mooring & Access: Trestle

Alternative Dock and Trestle Location
Trestle Example
Mooring & Access: Marine Railway
Mooring & Access: Marine Railway

![Diagram of marine railway profile]

- **Existing Road**: 1012'
- **Winch House & Abutment**
- **Normal High Water**: 1000'
- **12”Ø Pile W/ 5’ Embed (Typ.)**
- **Abutment**
- **Design Low Water**: 900’

**Railroad Trestle Profile**

**On Grade Profile**
Mooring & Access: Marine Railway
Mooring and Access Status

- Performing constructability evaluation
- Evaluating safety and operations processes
Next Steps

- Begin preparation of 30% design package
- 60% Design Effort
  - Sorting design to incorporate mooring approach
  - Structural design of collector
  - Evaluation of measures that would be phased in based on collector performance