John Hart Generating Station Replacement Project

April 2015
Community Construction Update
Report #22

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Project Update And Schedule

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Project Status:

- The main access tunnel length is currently about 110 metres;
- Adit B, off the service tunnel, continues and is currently just over 90 metres in;
- Powerhouse excavation underway and the powerhouse cavern centre line is now 65 metres in;
- There are up to three drill and blast cycles per day;
- Brewster Lake Road is closed. There was a daily traffic flagger redirecting traffic for the one month transition period. Road signage installed;
- Brewster Lake Road construction traffic realigned to go over new steel construction bridge. The old bridge is converted to worker pedestrian traffic;
- Fraser River Pile and Dredge mobilized to the dam site, including the assembly of two cranes, installation of generators and preparation of laydown areas;
- Laydown area 4 on Powerhouse Road now mobilized; and
- Silt curtain installed as part of drinking water protection in the reservoir in preparation for the in-water work for the cofferdam.

Project Update And Schedule

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Project Schedule to December 2015:

- February-August: Main service tunnel excavation
- Three year road closure underway: Full public closure – no vehicle or foot traffic – along Brewster Lake Road near the John Hart dam;
- April: Mobilization of work and equipment at intake site;
- April-December: Powerhouse blasting and excavation;
- Mid-April-December: Construction of cofferdam; and
- July-October: Concrete supporting work on existing dam blocks.

99 vendors from Vancouver Island have been used on the project to date, with 63 from Campbell River and another 24 from north of Nanaimo.

Tunnel rockbolt work.

Construction Pictures Within The South Portal Entrance

South service tunnel entrance and also the location of Adit B. Temporary ventilation is the yellow duct, with the permanent steel ventilation shown at the top of the tunnel entrance.

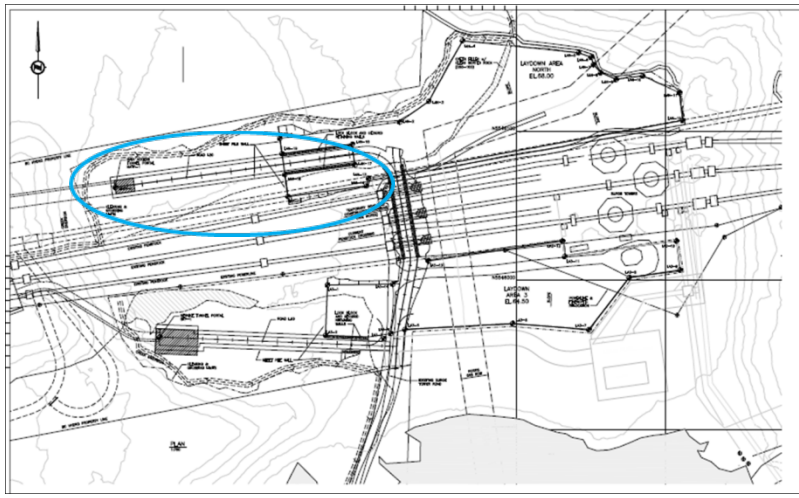
Construction Pictures Within The South Portal Entrance

Mine truck entering and then, with a full load, preparing to leave the service tunnel.

Construction Pictures – Powerhouse Cavern

Drilling into the rock face. Section of the cavern ceiling.

Construction Pictures Around the North Portal Entrance



Tunnel blasting face, and at right, tunnel rockbolt grouting.

Construction Pictures Around the North Portal Entrance

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Construction Pictures Around the North Portal Entrance

Construction Pictures Of Temporary Bridge

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Final work in early April on the new Brewster Lake Road bridge for construction traffic.

Site Safety

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Top picture shows safety sign-in and safety notification boards. The old Brewster Road Lake Road bridge is being used as a worker pedestrian crossing. The top right picture provides worker awareness of a process known as mucking, which is the removal of rock (bottom right picture) from the tunnel after each blast.

Overview of Cofferdam and Intake Works

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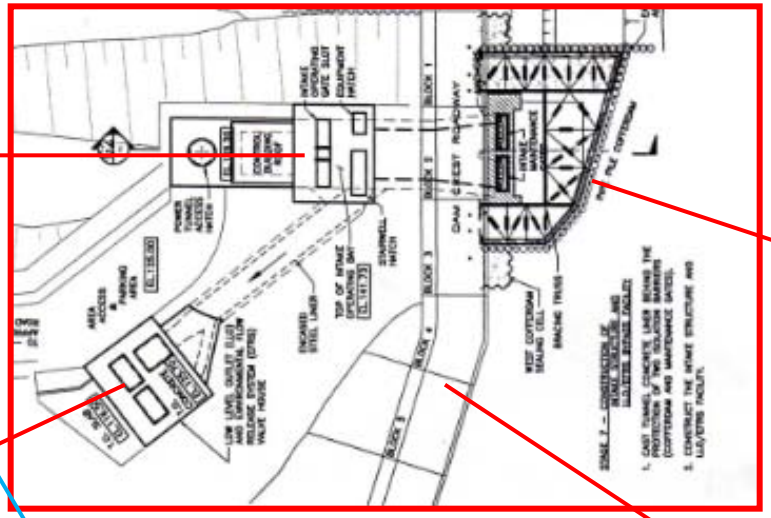
Water passage to tunnel

Water release valve – flow down Elk Falls Canyon



Cofferdam

John Hart dam

Time Lapse Camera – John Hart Dam

Tremain Media Inc., through a subcontract with BC Hydro, have installed a time lapse camera on the John Hart spillway dam infrastructure. The camera will provide excellent views of the work over the next three years. The camera vantages will change over time to focus on key pieces of work. For this year, it will generally take pictures of the general work site for the water intake structure.

Construction Pictures – Cofferdam

There will also be a weekly photo of the cofferdam installation. This is not being done under time lapse feature but a weekly adjustment to the camera, to zoom in a bit, and get a picture once per week. Over the three years, this option may be utilised to get key or unique project construction process captured.

Construction Pictures – Pile Installation

Installing the first piles for the trestle – required for construction of the cofferdam.

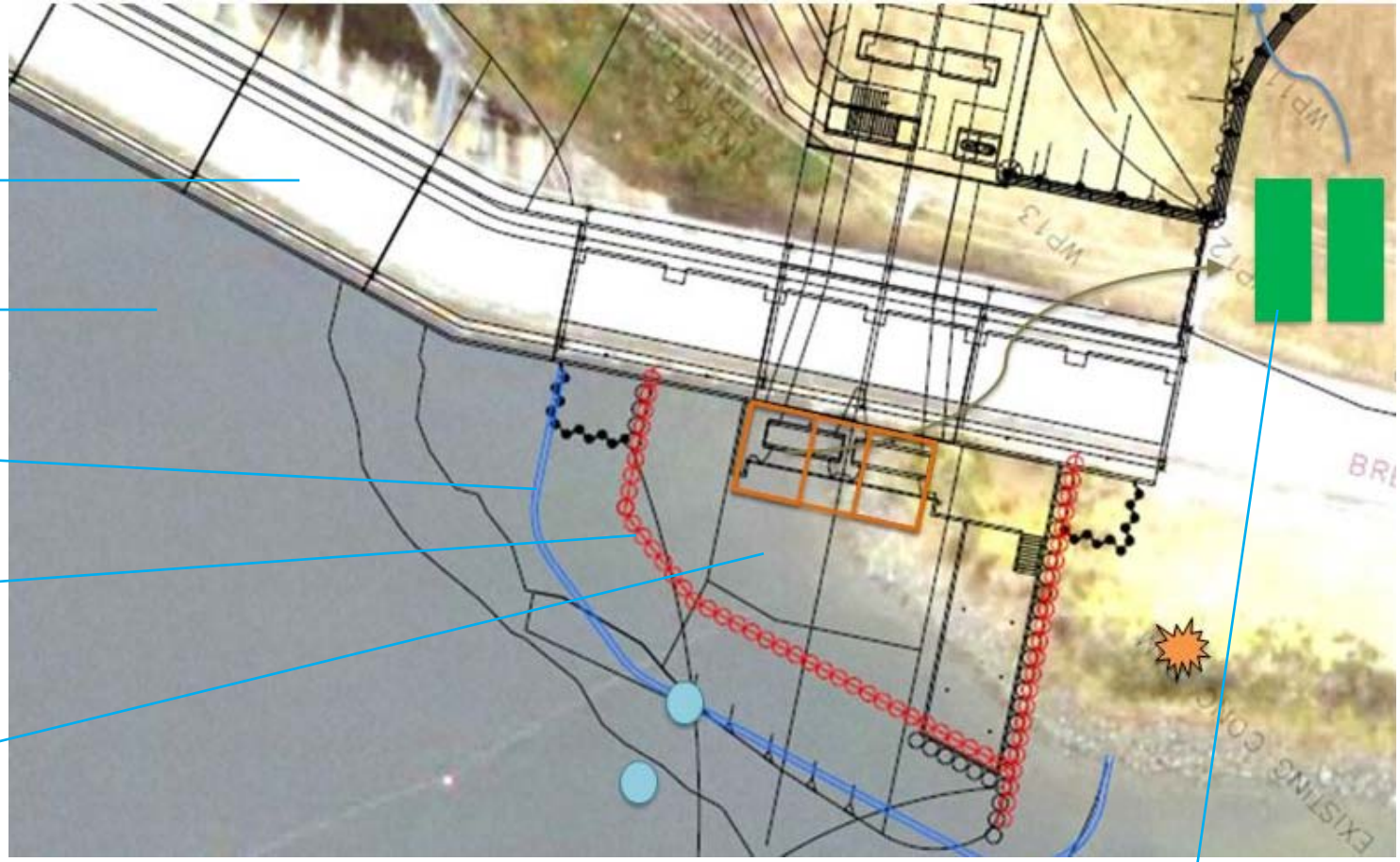
Construction Pictures – Pile Installation

Environment – Protecting Drinking Water

With work beginning in the John Hart reservoir, water quality protection is a key focus:

- The project has four barriers for protecting drinking water: two silt curtains, a piled cofferdam to restrict work area from rest of reservoir, and a pump that will remove turbid water from the restricted area and treat it before releasing back to the river.
- Monitoring will occur at the silt curtain and 10 metres out from the silt curtain. If turbidity of 1 NTU is found, work will be slowed/stopped to remove/minimize the impact.
- Water quality sondes have also been installed 100 m from the city's two drinking water intakes. They measure five parameters every 15 minutes and send that information to a website accessible by all environmental staff: including the project's environmental team, BC Hydro and independent monitors. If 0.7 NTU is registered at either of these sondes, all three of the project's environment team are paged and notified immediately;
- An environmental coordinator has been brought in by ASL-JV to specifically manage the work at the intake; and
- Extra environmental training was provided to the crews that will be working in the area before work began in water at the intake.

Environment – Protecting Drinking Water



Diagram

Environment Pictures – Silt Curtain

Two cranes installed large silt curtains, shown in red, within the reservoir to isolate the work area to ensure domestic water supply remains within the drinking water standard and to separate the work area from fish. There are two curtains with each placed on either side of the wooden walkway. The cofferdam construction will begin soon and the silt curtains are to maintain fish and domestic water supply water quality guidelines.

Environment Pictures – Water Treatment

The power intake construction site has a water treatment facility (green containers) to handle water run-off and equipment that requires water, such as for drilling. Once the water is treated to a high standard to meet aquatic water quality guidelines, the water is piped downstream and discharged below the John Hart spillway dam. In early April, the water release below the dam was 40 m3/s versus the base fish habitat flow of 4 m3/s. The spill was a result of storm inflows into upper reservoirs.

Environment – General

- Owl survey: The annual owl survey was completed in April this year. Two owls were heard: 1 Pygmy and 1 Saw-Whet. These surveys are required annually to track the activities and locations of any owls in the area of construction;
- DFO Authorization: After reviewing the project plan, related environmental plans and mitigation measures, as well as looking at modelling of the expected outflow from the tailrace to assess potential impact on First Island in the Campbell River, the Fisheries and Oceans Canada indicate that as long as plans are met, the work will not seriously harm fish. This means no formal approval process was required by DFO, and work in water was allowed to begin. Mitigation measures include the protection of fish when blasting in or near water and working within fish variance windows;
- Another 15 Pacific sideband snails were found along Brewster Road. These snails are blue-listed and project crews are required to do a search for snails to relocate before starting work in the area; and

Environment – General

- A cattleguard has been installed at the entrance to the Surge Towers Road construction site. This will reduce the tracking out of mud or debris from trucks leaving site as well as help manage water runoff and protect the neighbouring wetlands in Elk Falls Provincial Park.

Cattleguard installation.

Road Closure To Brewster Lake Road

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Examples of some of the road signage, as part of the Traffic Management Plan, in the vicinity of the John Hart dam.

Millennium Trail Open

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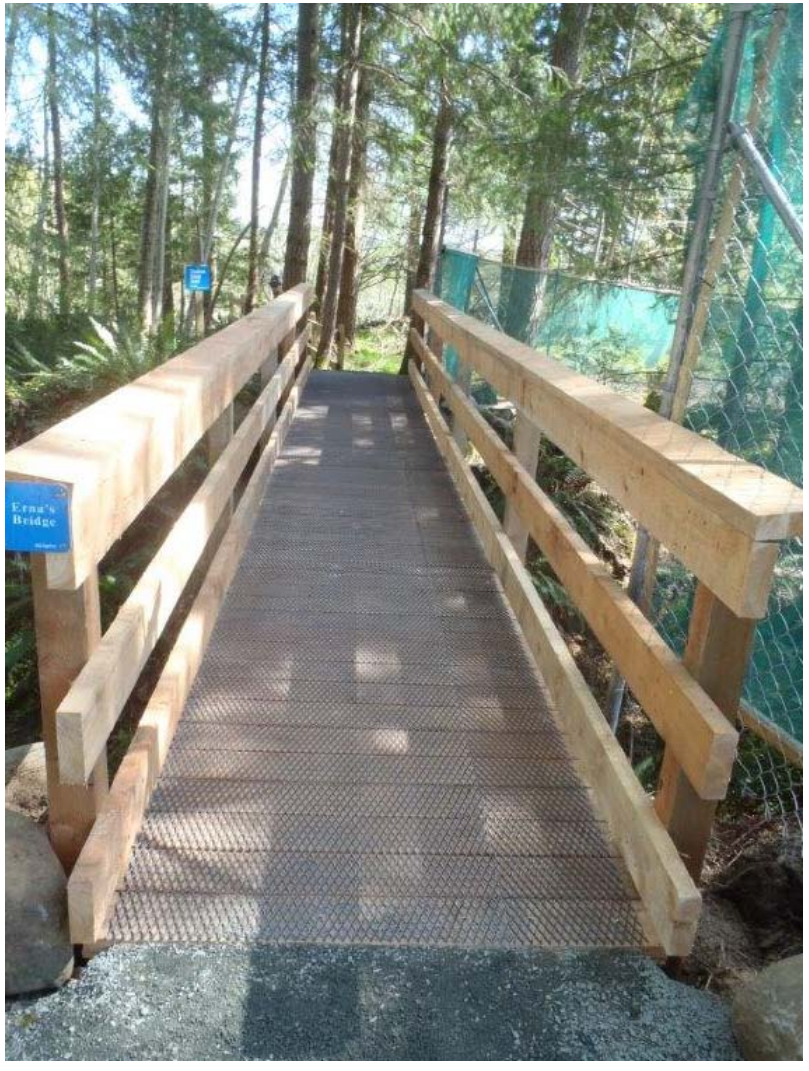
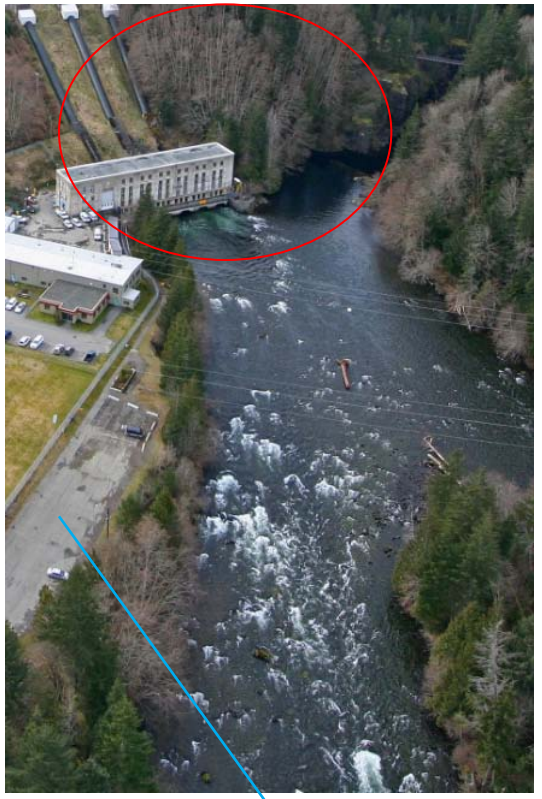
The Erna and Jim's bridges were successfully replaced along the trail system.



Canyon View Trail Section Across Generating Station To Be closed Off

- On June 1, the section of the Canyon View Trail that goes across the generating station and up to the intersection of the Millennium Trail/Canyon View Trail, will be closed off for construction (see ellipse area to right that shows the closure area);
- The trail closure allows for the tailrace construction work and will be in place for the duration of the project. Signage and flaggers will advise people of the work area;
- The public parking lot by the river off Powerhouse Road will remain open to the public and can be used to access the trail downstream;
- The Station View Trail, constructed in 2013, was intended to become an extension of the Canyon View Trail to provide the wider loop along the Campbell River during the construction period; and
- Once the John Hart project is complete, the section of trail being closed off will be re-established somewhere near or along the Campbell River.



Powerhouse Road Laydown Area

- New laydown area on Powerhouse Road now in use;
- Rock crush has been laid on the site and fencing and vehicle gates are being installed;
- This laydown area will act as a storage and mobilizing site, along with some office and parking space;
- The property was cleared in January this year – protecting three historic oak trees planted in the area by the first superintendent of the John Hart facility, Philip Wolstenholm; and
- Members of the public using the parking lot nearest the existing generating station, or crossing the road as part of Station View trail are reminded that there will be increased traffic in the area.

Operations – April 23 Unplanned River Flow Reduction

- A lightning strike is one of the worst case scenarios for BC Hydro to deal with given the existing configuration of the 68 year-old John Hart facilities. Such close vicinity electrical static cause protection control measures to initiate and can lead to multiple intake gate closures at the John Hart dam. This is what happened on April 23 at 4:30 pm, where the intake gates that pass water from the John Hart reservoir down two of the three penstocks closed, prohibiting water flow to the generating station. This resulted in four of the six turbines and generators to go off-line;
- BC Hydro immediately responded to recover river flows and by going out to key areas of the river to determine potential fish habitat impacts; and
- Protecting downstream fish habitat is one of the three project drivers for the John Hart Generating Station Replacement Project. The recovery of downstream river flows will basically go from about an hour or more to seconds once the project is complete in 2018 – this improvement will create a near seamless continuity of river flows for fish habitat. As part of the project, a water bypass facility is being built within the generating station to quickly divert the water around the turbines if needed and provide the required flows downstream.

People Profile – Jennifer McGowan

About Jennifer:

Background:

From a very long history in restaurant management, in 2004, she left the industry to pursue Office Administration. Since graduating, Jennifer has worked as an Office Administrator, Credit Manager and Special Project Manager within the Explosives and Fuel industries.

Home:

Being born and raised in Campbell River, she is proud to call Campbell River home. Jennifer is very excited for the community to have such a large scale project that will see the John Hart facility become safer, more environmentally friendly and one that will increase the power output for generations to come.

Hobbies:

Jennifer loves to garden, hike, roller blade and play on a recreational slopitch team. She spends much of her free time collecting beach glass with her 14-year old daughter on the many beautiful beaches in and around Campbell River. Camping is one of her favourite pastimes and she also enjoys traveling.

Project responsibility:

As the Site Office Administrative Assistant, Jennifer supports several different departments such as Quality and Safety. It is a very diverse and challenging environment. She is looking forward to expanding her horizons in the construction industry given the experience gleaned with such a large contractor like SNC-Lavalin.

“I am very fortunate to be involved in a project that will have such a positive impact on the City of Campbell River and am very impressed with SNC-Lavalin’s ongoing commitment to safety and quality.”

Construction – Point of Interest

Each month, BC Hydro and InPower BC will provide a construction fact, occurrence, or situation.

- Physical hydraulic model – 1:20 scale intake operating conditions:
  - SNC-Lavalin created a model (shown on the next page) of the new water intake works at the John Hart dam. The model was created at Utah State University;
  - The primary objectives of the model are to:
    - Assess flow patterns and submersion levels (depth of water at various reservoir operating levels) upstream of the power intake;
    - Determine if any unacceptable vortices (circular swirl in the reservoir) would form upstream of the power intake;
    - Determine and minimize head (elevation) loss from the trash rack and intake structure; and
    - Determine and minimize the velocities (water pull) approaching the trash racks and intake structure.
  - The nature of flowing water is difficult to accurately predict;
  - This 1:20 model of the dam and water intake can provide some important answers – it will address design, construction, and data collection for the actual water intake works at the John Hart dam.

Construction – Point of Interest

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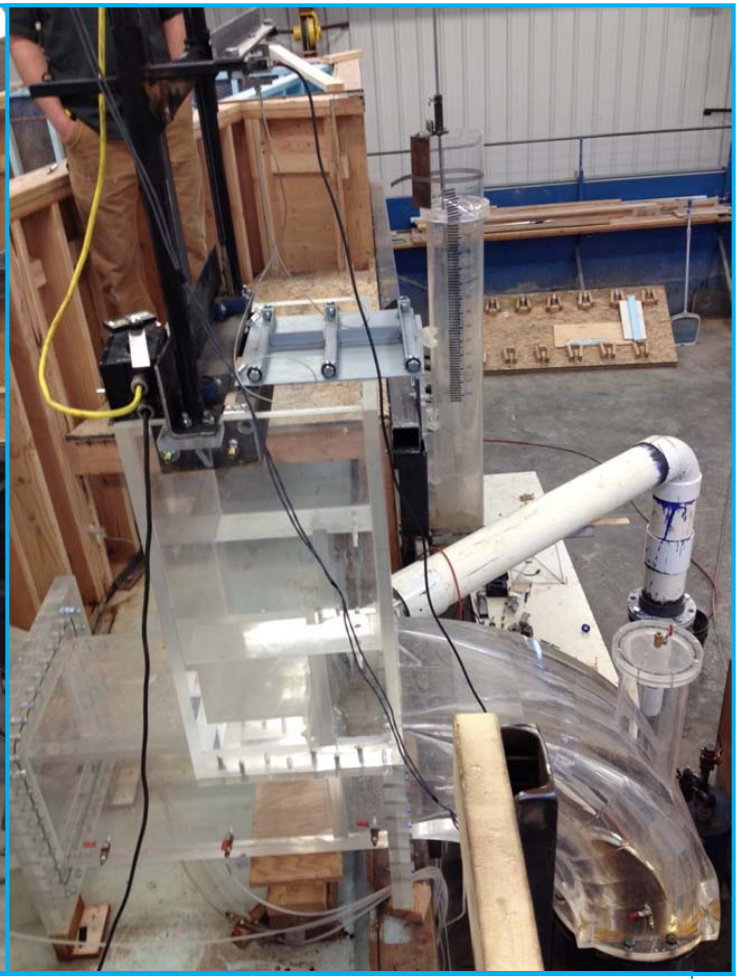

The model is constructed on an elevated platform allowing for analysis of the flow through the water intake, operating gates, power tunnel drop shaft, and low level outlet release (down Elk Falls Canyon). It's a clear material so that water flow patterns (on right) can be observed and studied.