

MEMORANDUM FOR THE RECORD**SUBJECT: 21BON077 Powerhouse 2 PLC Failure and Entrance Gate Closure****Discussion:**

On the morning of 16 August, Powerhouse 2 (PH2) underwent bus line switching around 1000 hours causing a short duration power loss to parts of PH2 including the fish units and the programmable logic controller (PLC) system. Operations notified fisheries of the work being done as it occurred. The PH2 fishway entrances were checked during normal fishway inspections by fisheries around 1200 hours. All PLC indications were typical readings and physical readings were normal (see table below for physical readings).

Table 1: PH2 Monolith Visual Readings (at 1200 hours)

	South Upstream Entrance (SUE)	South Downstream Entrance (SDE)	North Upstream Entrance (NUE)	North Downstream Entrance (NDE)
Collection Channel Elevation (Feet)	12.5	12.4	13.1	13.0
Mechanical Gate Position (Feet)	1	1	1	1

At 1315 hours fisheries personnel were contacted by maintenance crews that noticed extremely high levels of head at the fishway entrances at the PH2 55' deck monoliths. When fisheries personnel arrived, all entrance gates were being operated automatically by the PLC and were all closed with the mechanical gate position reading over 20 ft, causing a rapid increase in water levels in the collection channel. Water had risen from 12.5 ft to 24 ft in the collection channel and water was overtopping the closed entrance gates as well as the floating orifice gates (FOGs).

The control room operators alerted personnel they had no readable indications on their PLC screens and no way to see the mechanical entrance gate levels or true water levels. All entrance gates were then switched into manual, and the fish units were turned down momentarily to lower their discharge of water into the collection channel. Within an hour, water had lowered to normal levels and entrance gates had been manually opened back to the correct position.

After fixing the fishway water level issues, it was determined that sometime during the short power loss to the PH2 PLC system, the PLC's calibration scaling failed. The erroneous scaling caused the PLC to automatically raise the fishway elevation to what it thought was correct.

- A. through F. Cause and Time of Death** – No fish mortalities have been discovered. Monitoring will continue through the day including a previously planned ROV inspection.

G. Future preventative measures – This was a unique occurrence and has not happened in recent memory. Operators suggest not completely shutting down the PLC system so it remains stable. Other preventative measures are being investigated as more is learned about the cause.

Sincerely,

Bonneville Project Fisheries