

MEMORANDUM FOR THE RECORD**SUBJECT: 23BCL04 MFR DC Power Loss – Ramp Rate Deviation****Description of the problem:**

On the evening of August 30th, 2023, after the completion of the 5-year battery discharge testing at Detroit Dam, the main 125 VDC battery started undergoing a normal recharge. At 1659, the station battery circuit breaker tripped, but did not trigger an alarm. At 1704, the operator attempted to place the AC system back on the DC bus that had been bypassed for the battery discharge testing. The lack of battery buffer caused the entire DC system to fail, and automatic protection measures were triggered. Multiple 13.8kV breakers were tripped, resulting in the unplanned outage of Detroit Dam units 1 and 2 and Big Cliff Dam unit 1. The outage of Big Cliff unit 1 caused the auto-gate to open to sustain river flows. Between the hours of 1630 and 1730, WFOP hourly ramp rate limitation for flow rate increases in the North Santiam River below Big Cliff Dam were exceeded, with a gage increase of 0.45ft.

Type of event:

Turbine unit outage.

Impact on facility operations:

Flows temporally increased from approximately 1150cfs to peak at 1760cfs before returning to approximately 1500cfs. From 1630 to 1730 there was a .45ft ramp rate increase, above the WFOP limit of .3ft/hour.

Total dissolved gas (TDG's) also increased from 102% to 113%, above the ODEQ limit of 110%, before returning to approximately 102%.

Expected impacts to fish:

Impacts to ESA listed species are expected to be minimal. Adult fish held within the Minto Fish Facility and those within the Minto to Big Cliff reach could be affected by the increase in TDG's, however the limited duration of the increase should keep impacts at a minimum.

The ramp rate increase and subsequent decrease could strand a minimal number of adult fish. Due to the temporary nature of the increase, the timing prior to the primary spawning season, and return of the river above the gage height prior to the incident for the North Santiam River; it is unlikely that any redds were dewatered.

Corrective Actions:

The DC and preferred AC equipment are being inspected for any signs of damage and protective devices and battery charger settings are being verified. Battery charger settings are being lowered to reduce the charging current, and the preferred AC inverter is in bypass being fed from the normal station service AC to reduce the load on the DC system. The potential for a small cap or NREX project to address any potential design or condition issues is also being considered.

North Santiam River at Niagara, OR - 14181500

August 30, 2023 - September 1, 2023

Discharge, cubic feet per second

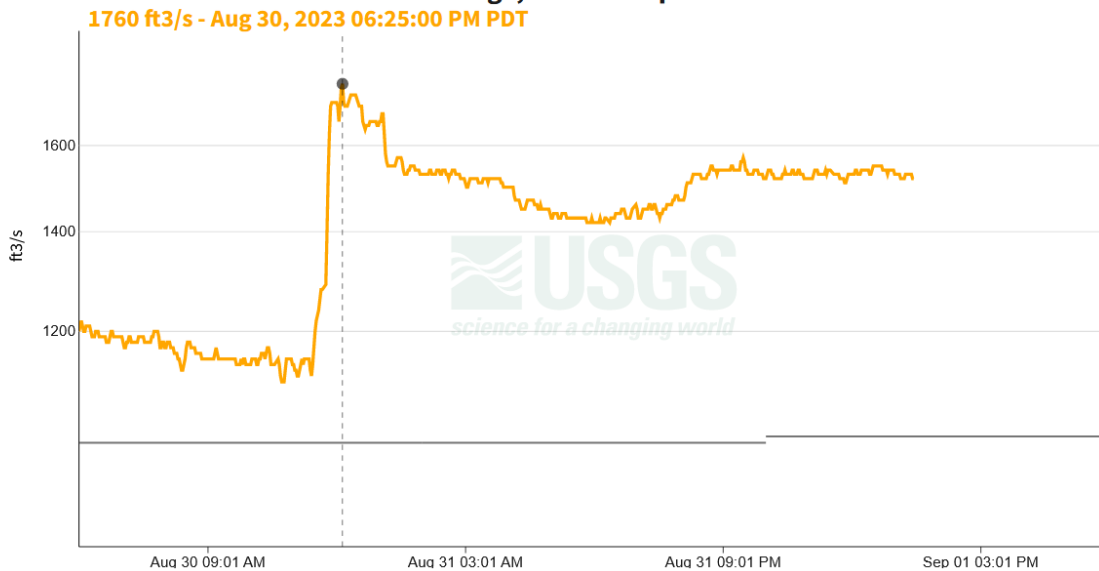


Fig 1. The increase in flow seen below Big Cliff project seen on 30 August.

North Santiam River at Niagara, OR - 14181500

August 30, 2023 - September 1, 2023

Total partial pressure of dissolved gases, water, unfiltered, percent of saturation

113 % - Aug 30, 2023 07:00:00 PM PDT

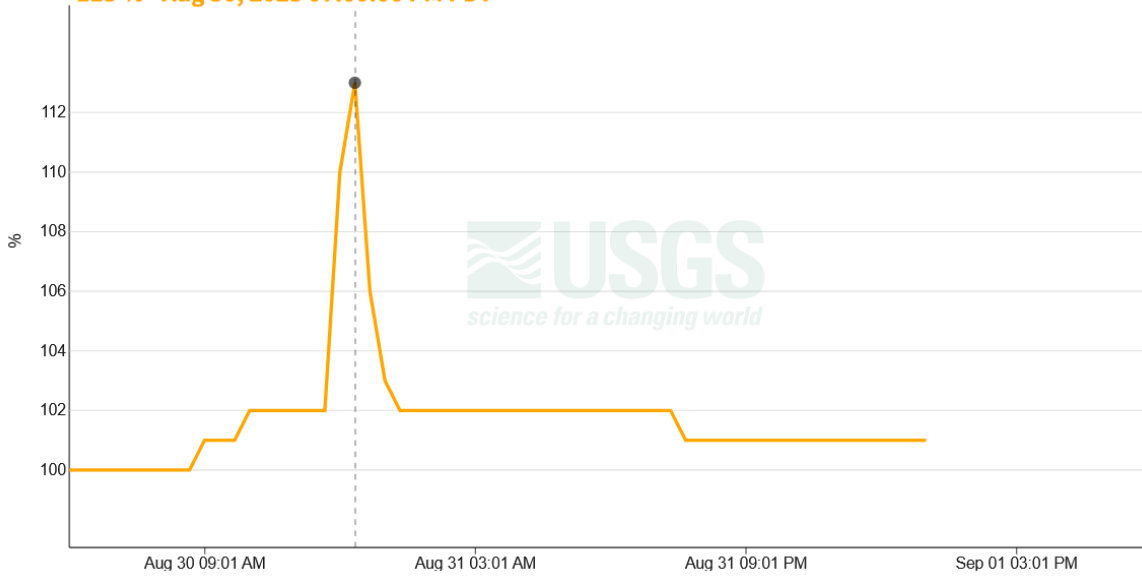


Fig 2. TDG's were temporally elevated above the 110% limit on Aug 30th.

North Santiam River at Niagara, OR - 14181500

August 29, 2023 - September 1, 2023

Gage height, feet

3.58 ft - Aug 30, 2023 06:20:00 PM PDT



Fig 3. Gage height for the North Santiam River at Niagara, after the temporary increase on August 30th, 2023.

Comments from agencies:

No comments

Please email with questions or concerns, thank you.

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