

**OFFICIAL COORDINATION REQUEST FOR  
NON-ROUTINE OPERATIONS AND MAINTENANCE**

**COORDINATION TITLE** - 17 LMN 13 - Lower Monumental Unit 4 Blade Position

**COORDINATION DATE** – 13 December 2017

**PROJECT**- Lower Monumental Dam

**RESPONSE DATE**- 18 December 2017

**Description of the problem** -Main Unit 4 was removed from service on December 6, 2017 due to suspected blade packing leakage. The actual source of oil remains undetermined but it is believed to originate from the trailing edge of the turbine blades as a result of failed blade packing on unit 4. The Project has drained the oil from the hub, and has blocked the ports on the shaft which introduces oil to the hub, and will be hydraulically blocking the governor blade servo to speed the units' return to service. This type of failure requires placing unit 4 blades in a fixed position prior to operation. The temporary repair of unit 4 for the 2018 fish passage season will include hydraulically locking the unit at an estimated 25 degree angle of pitch as recommended by the Hydroelectric Design Center. The 25 degree blade angle was calculated using generation curves and is anticipated to be at the upper end of 1% peak efficiency. The commissioning contractor will be on site Monday, December 18 to perform the locking procedure. Index testing of units 2, 3 and 4 is scheduled for the week of January 29 to confirm that the temporarily fixed units are operating within the 1% efficiency as defined in the Fish Passage Plan.

Prior hydraulic blade blocking of Unit 3 at the upper end of 1% has caused some issues during the startup of the unit. BPA has been receiving alarm signals indicating unstable readings during this time that may be associated with the inability of the blade angle to slowly increase as the wicket gates open up. Therefore, the blades may be fixed at too high of an angle to allow for the unit to start up without causing disruption/damage to the system. If this issue is also experienced with unit 4, there may be a need to flatten the blade angle closer to middle of peak efficiency.

**Type of outage required** - Unit 4 is presently out of service and will remain in this condition until the governor blade servos are hydraulically locked.

**Impact on facility operation** (Fish Passage Plan deviations) – This change is not expected to cause deviation from the FPP as the blade angle which was chosen is anticipated to be within 1% peak efficiency.

**Impact on unit priority** - This change may affect unit priority starting in March 2018. Units 2, 3, and 4 will have fixed blade angles for the beginning of the 2018 season. Unit 2 will remain operating as priority unit for adult passage and units 3 and 4 are scheduled to have new blade seals installed during the passage season; one unit at time. Whether unit 3

or 4 is repaired first is dependent on procurement of new blade seals and corresponding lead times for each turbine family.

**Impact on spill - NA**

**Dates of impacts/repairs – December 18, 2017**

**Length of time for repairs -** Temporary repair of unit 4 is expected to take approximately 1 day.

**Analysis of potential impacts to fish**

1. Adult Fish counts ended at Lower Monumental Dam 31 October, 2017 and minimal adult passage is expected to occur through the winter. The juvenile collection channel is being dewatered for winter maintenance 18 December and will not be operable again until late March 2018.
2. Adult fish are not counted at Lower Monumental from 1 November to 31 March.
3. No direct impacts expected on juvenile or adult fish migration.

**Summary statement - expected impacts on:**

**Downstream migrants:** Minimal impact based on current information available.

**Upstream migrants (including Bull Trout):** N/A

**Lamprey:** N/A

**Comments from agencies**

**Final coordination results**

MOC Approved

**After Action update**

Please email or call with questions or concerns.  
Thank you,

Chuck Barnes

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