# Fish Passage Plan (FPP) Change Form

**Change Form # & Title**: 22AppI001 – DWR Startup Procedure

**Date Submitted**: 23-March-2022

**Project**: BON

**Requester Name, Agency**: John Chatfield, COE DWR

**Final Action:**

**FPP Section**:

Appendix I – Dworshak Dam, section 4. Turbine Startup Procedure

**Justification for Change**:

Attached is the latest edition of Dworshak's startup procedure. We have eliminated three steps.

**Proposed Change**: *See next page.*

**Comments**:

**Record of Final Action**:

1. Dworshak Dam Turbine Unit Startup Procedure
2. **Mechanical Over‐speed Device (12 Device) Test:** With the unit shutdown, release gate lock & leave gates on squeeze. Pull flyballs out on 12 device (top of PMG) to activate the mechanical over‐speed. Do this test before raising headgate to avoid setting off the anti-creep.

Unit Actions: 86GX should roll, 65S should de‐energize (light should turn off on EHI connector).

Unit Alarms: Over‐speed, Unit Lockout, Emergency Shutdown, Regulator Trouble, Regulator Trip, Exciter Field Breaker Open on unit annunciator.

1. **Anti‐creep Test:** \*\*\*MAKE SURE ANTI‐CREEP IS ENABLED IN THE GOVERNOR HMI: Governor Tunables → Aux Tunable Controls. With the unit shutdown, leave gates on squeeze. Wiggle gear on top of the SSG.

Unit Actions: High Lift pump should start, Head Gate should close.

Unit Alarms: Unit Creeping Detected, Governor Trouble on unit annunciator. Creep detected on digital governor alarms.

1. **Incomplete Sequence Test:** Open terminal LL‐30 inside the digital governor cabinet. Start the unit depressed. The unit should trip after the incomplete sequence timer expires (3-minute timer for U1/U2; 5-minute timer for U3).

Unit Actions: 86GX should roll, 65S should de‐energize (light should turn off on EHI connector).

Unit Alarms: Unit Lockout, Emergency Shutdown, Incomplete Sequence, Regulator Trouble, Regulator Trip, and Exciter Field Breaker Open on unit annunciator. Incomplete Sequence on digital governor alarms.

1. **Auto Sync Test:** Start the unit depressed and let the governor bring the unit to SNL. Put the unit online with the auto synchronizer.

Unit Actions: Synchronizer should sync the unit to the line and close the XJ breaker in less than 60 sec.

Unit Alarms: None.

1. **86GX Trip Test:** With the unit online, load the unit to ~1MW forward power. Pulse Out 101 on SEL 300G.

Unit Actions: 86GX should roll, 65S should de‐energize (light should turn off on EHI connector), and unit should shut down.

Unit Alarms: Unit Lockout, Emergency Shutdown, Regulator Trouble, Regulator Trip, and Exciter Field Breaker Open on unit annunciator.

1. **Depression Test:** Start the unit depressed and put the unit online. Set gate limit to 0%. Once the gates are on squeeze, press the “Synchronous Condense Mode” button on the digital governor HMI to depress the unit. To get out of depression mode, press the “Speed Mode” button on the governor HMI. Re‐set the gate limit to 95% so the gates will come off squeeze.
2. **PSS Test:** With the unit running and online, increase load on unit to values shown below. Watch “PSS Active” indication on the exciter HMI operations screen. PSS should turn on and off close to the values shown below:

‐ **Unit 1/2:** PSS on at ~10MW; PSS off at ~5MW.

‐ **Unit 3:** PSS on at ~25MW; PSS off at ~12.5MW.

1. **AVR/Capability Curve Testing:** With unit online & the voltage regulator in auto, load unit with MW and +/‐ MVAR according to the test sheet. The regulator could swap to current mode, or the unit/GDACS will alarm, or regulator will limit as the MVARS are changed.

**Note 1:** The voltage in dam will increase/decrease due to MVAR changes. The ATS in dam may start dam diesel due to the voltage fluctuations.

**Note 2:** For U1 or U2, XJ7 should be open so that the units don’t fight each other on the MVAR swings.

1. **Maximum MVA Test:** Set the unit to the loading shown below and run for 1 hour. This is a WECC/NERC requirement. May need to depress another unit and pull VARS off the line to control the line voltage.

‐ **Unit 1/2:** 103.5 MW and +34.0 MVAR (this might not be possible due to GDACS alarms)

‐ **Unit 3:** 253.0 MW and +83.0 MVAR (this might not be possible due to GDACS alarms)

**Note on unit shutdown:** At 30% speed, the high lift pump should start and the 5-minute PLC brake timer should start. The brakes will engage after the 5-minute timer expires or when the unit speed reaches 20% ‐ whichever occurs first.