

United States Government

Department of Energy  
Bonneville Power Administration

# memorandum

DATE: April 23, 2021

REPLY TO  
ATTN OF: TPP/OPP-3

SUBJECT: PDCI Probing and Chief Joseph Brake Test Plan for the 2021 Operating Season

TO: Ricky Bustamante – TPP/OPP3  
Margaret Albright – TOO/DITT2

Brent Kingsford – TORD/DITT1  
Steve Felker – TORM/MEAD

## 1. Summary and Objectives

This is a continuation of system tests conducted in the period 1999 – 2019. Note that no test was performed in 2020 due to an SVC facility being under construction in May, as well as fires in the region in September. The tests included operations of Chief Joseph braking resistor and injection of PDCI probing signals.

We will perform system tests:

- During Spring runoff with high hydro generation
- During late summer with low hydro and predominant thermal generation

## 2. Test Dates

PDCI probing and Chief Joseph brake tests will be done on

- **May 11, 2021** with an alternate day of May 12<sup>th</sup>.
- The exact date for late summer season will be determined after the first test.

## 3. Operating Conditions Required For Tests

Operating Conditions for Chief Joseph brake insertion tests

- Power system operation is normal, the system is within System Operating Limits
- BPA Oscillation Detection Application shows no oscillations, all PMUs and all boxes are “green”-lit
- If BC-Alberta tie is in service, North-South Mode A is above 9%
- If BC-Alberta tie is out of service, North-South Mode B is above 5%
- Chief Joseph 500/230-kV transformer is in service
- Keeler 230-kV Static Var Compensator is in service
- Keeler 500/230-kV transformer is in service
- Grand Coulee – Malin phasor angle is less than 55 degrees
- PDCI power is above 1,000 MW

## 4. Test Precautions and Termination Procedure

If at any time the Test Observers, security coordinators or system operators identify conditions under which the tests should not continue, then the Test Director will suspend the test sequence until those conditions are no longer present and the Test Coordinator will have Dispatch send out a message on the GMS (Grid Messaging System).

Reasons for suspending, modifying, or terminating the test sequence include but are not limited to the following:

- System emergency exists within the Western Interconnection
- Interconnections operating outside normal limits (NWACI, PDCI or Northern Intertie)
- Undamped or unacceptable levels of system oscillations
- The Celilo facility operator deems that the facility is unsafe for test, or that the test procedure is interfering with proper operation of that facility
- Test procedure is conflicting with a peak in operator workload
- A disturbance just occurred resulting in system frequency below 59.90 Hz

**If a disturbance occurs during a probing test, the test must be terminated immediately.**

### **Additional Notification Procedure**

If any AVR/PSS/PDCI Controller problems are observed, notify the Transmission Operator immediately so that information can be communicated to the Generator Operator for their action.

## 5. Sequence of Test Events

### Test Series A: Calibration Checks on PDCI Probing Signals

- Step A0 [9:10] Celilo instrumentation check using +20MW waveform (10 seconds) and -20 MW (10 seconds). Check proper function of PSG using Celilo/Sylmar DC metering.
- Step A1 [9:15] Calibration check on MSF-1/5/2/100 for  $\pm 20$  MW noise probing for a duration of one period (100 seconds). Adjust PSG scaling if needed.
- Step A4 [9:30] Apply MSF-0.1/4x for  $\pm 20$  MW single frequency sine wave for four cycles. (1 period)
- Step A5 [9:35] Apply MSF-0.3/4x for  $\pm 20$  MW single frequency sine wave for four cycles. (1 period)
- Step A6 [9:40] Apply MSF-0.7/4x for  $\pm 20$  MW single frequency sine wave for four cycles. (1 period)
- Step A7 [9:45] Apply MSF-1.0/4x for  $\pm 20$  MW single frequency sine wave for four cycles. (1 period)

### Test Series B: Noise Probing

- Step B1 [10:10] Measurement of ambient noise conditions
- Step B2 [10:30] Apply a  $\pm 20$  MW MSF-1/5/2/100 for a duration of 12 periods (20 minutes).

### Test Series C: Chief Joseph brake insertion (Afternoon)

- Step C1 [15:14] Apply Chief Joseph braking resistor
- Step C2 [15:20] Apply a  $\pm 20$  MW MSF-1/5/2/100 for a duration of 12 periods (20 minutes).
- Step C3 [19:36] Apply a  $\pm 20$  MW MSF-1/5/2/100 for a duration of 12 periods (20 minutes).
- Step C4 [20:00] Apply Chief Joseph braking resistor

## 6. Test Coordinator and Responsibilities

Test coordination will be as follows:

1. Test Director will schedule the tests through the BPA outage dispatcher.
2. Test Director (Transmission Operations Control) will post the proposed test dates on the BPA external Web page at <https://transmission.bpa.gov/Business/Operations/SystemNews/default.aspx>
3. The day before each test, BPA will send a message on the GMS notifying of the tests.
4. If there are concerns about abnormal system conditions, a BPA dispatcher should be contacted as early as possible to cancel a test. The test will be resumed the next hour after the system returns to normal.
5. The probing signal will be injected by an operator at Celilo converter station. The operator will clear with the BPA dispatcher and Test Director before the signal injection.

A phone bridge will be available on the day of the test: 509-822-4485 or 503-230-4000, code 671-608-328#

## TEST APPROVALS

This test plan submitted by:

Dmitry Kosterev – TPP  
Andreas Schmitt – TPP  
Marcos Ayala Zelaya – TPP  
Elliott Mitchell-Colgan – TPP

Dan Goodrich – TOOC  
Nick Haggerty – TOOP

Michael Overeem – TFDI - Celilo

Approved: \_\_\_\_\_ Date: \_\_\_\_\_  
Manager – Ricky Bustamante, Trans. Planning TPP

Approved: \_\_\_\_\_ Date: \_\_\_\_\_  
Manager – Margaret Albright, Technical Operations TOO

Approved: \_\_\_\_\_ Date: \_\_\_\_\_  
Manager – Brent Kingsford, Dittmer Dispatch TORD

Approved: \_\_\_\_\_ Date: \_\_\_\_\_  
Manager – Steve Felker, Munro Dispatch TORM