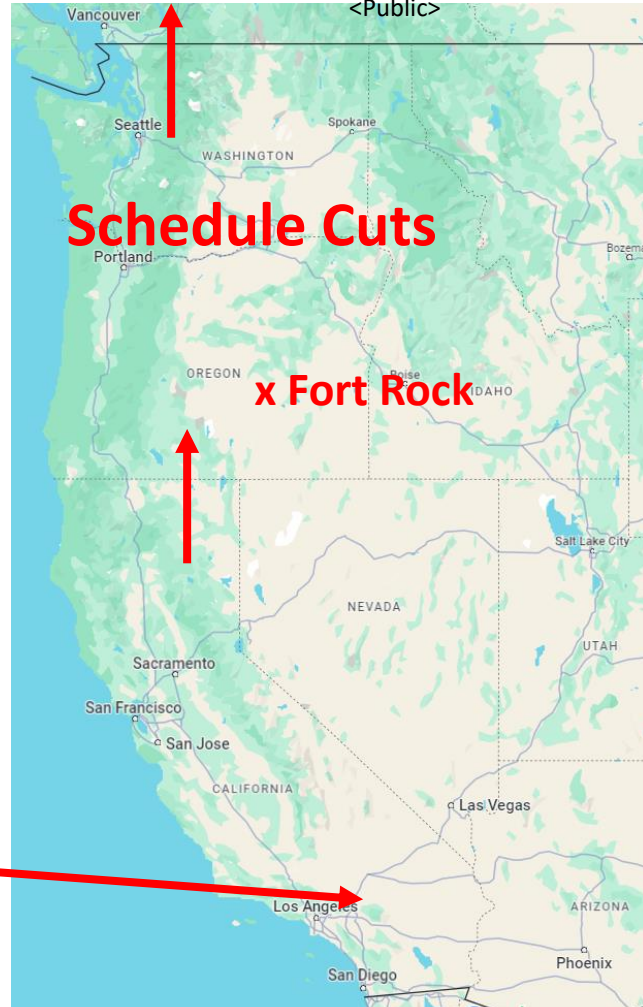




02/27/2024 Oscillation: April 30, 2024, OAWG

Daniel Goodrich, P.E.





Schedule Cuts

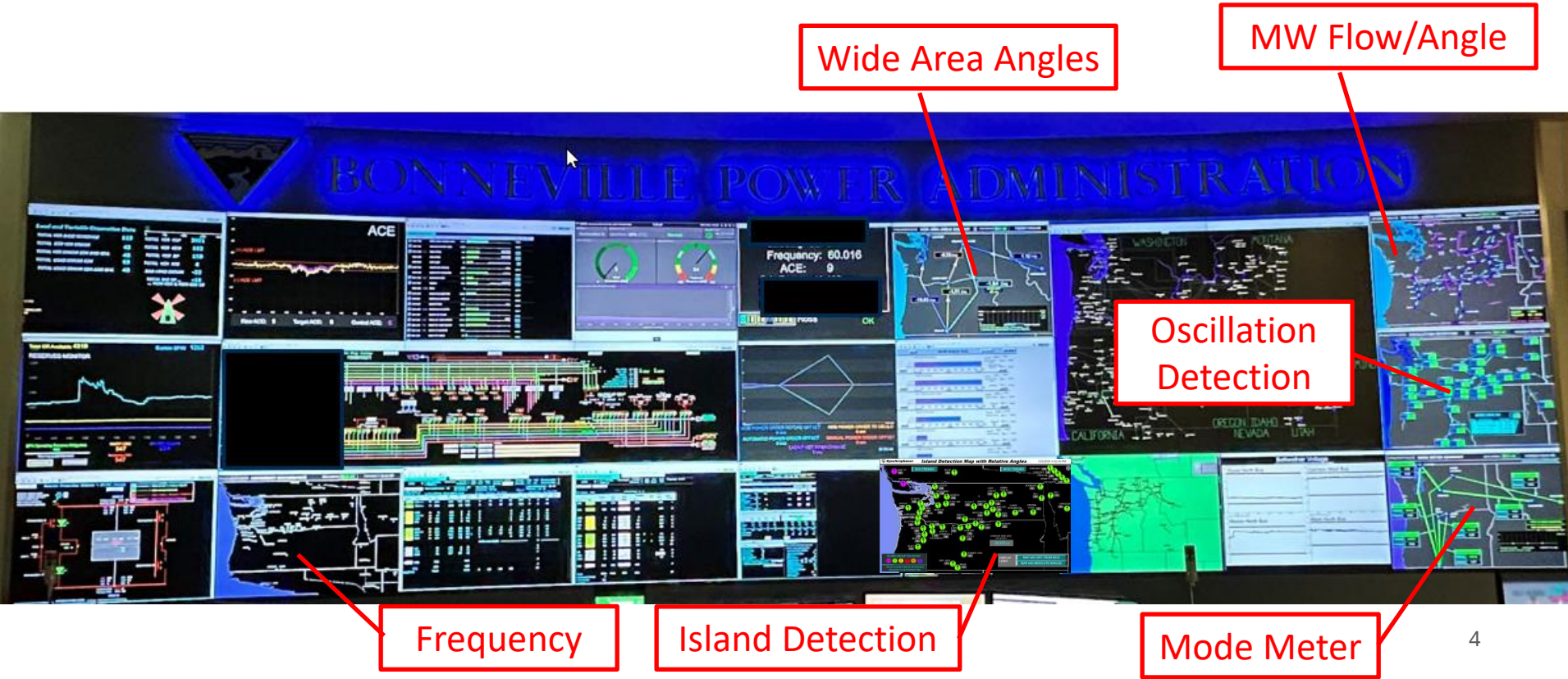
x Fort Rock

Source of Oscillation

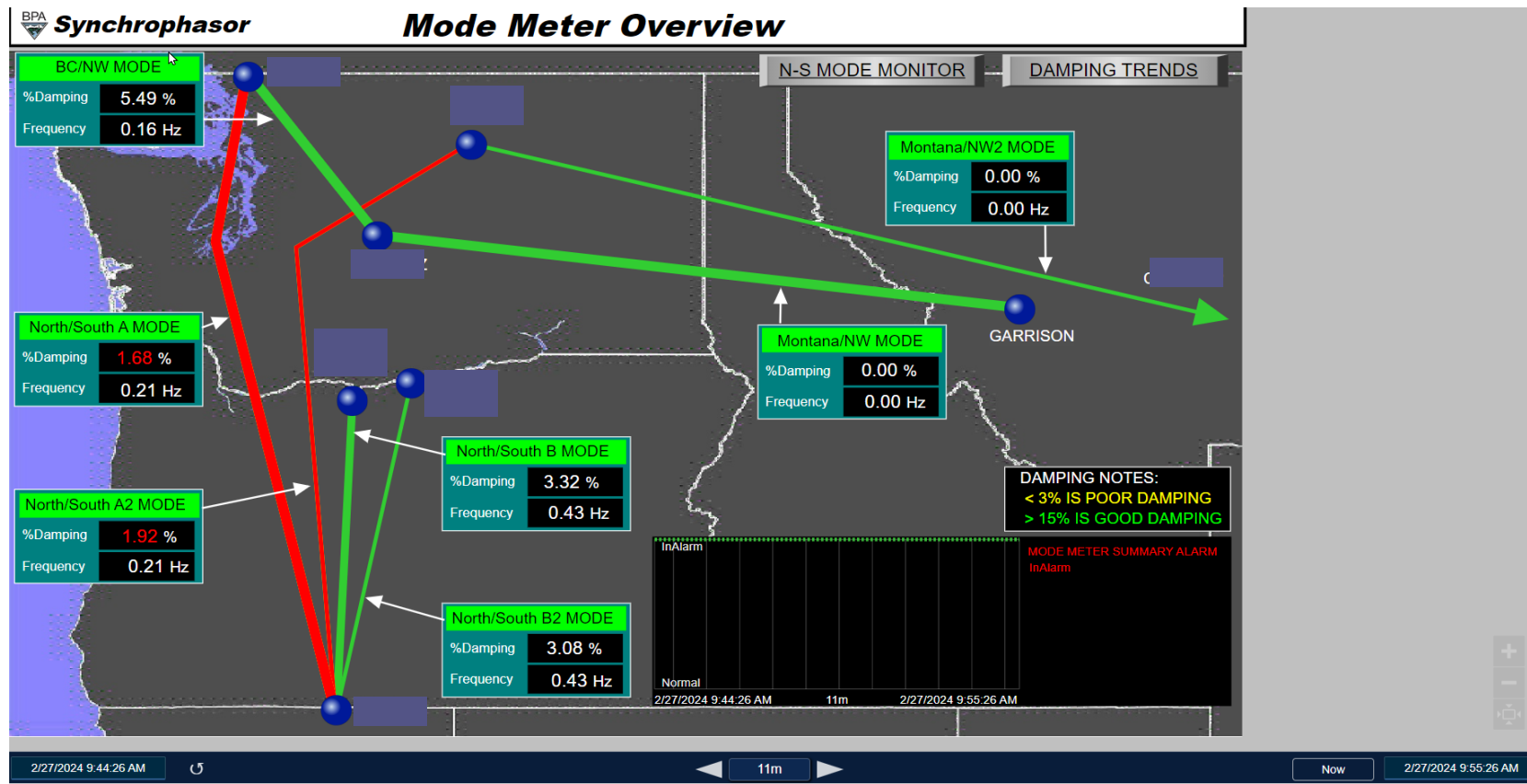
Timeline

1. 09:37:52 Oscillation Begins
2. 09:41:02 Oscillation Ends
3. 09:41:26, 31 and 33: Fort Rock Series Capacitors inserted
4. 09:45 (estimate) BPA calls CAISO, no oscillation reported
5. 10:35-12:35 South to North Flow limits executed for Northern Intertie and California-Oregon Intertie (NWACI)
6. February 28: CAISO preliminarily identifies source

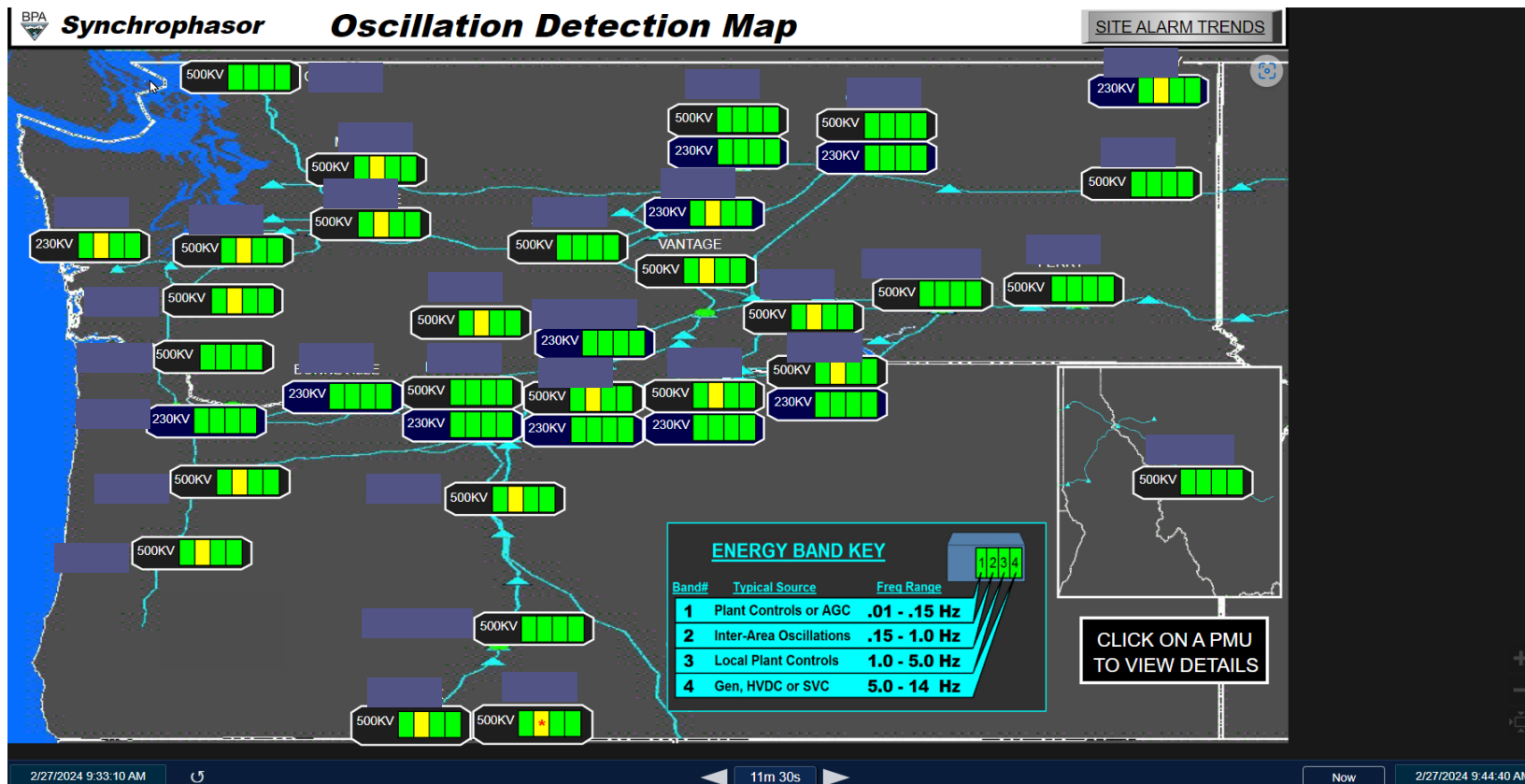
Video Board



Mode Meter



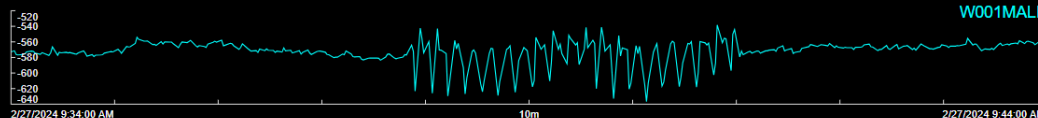
Oscillation Detection Monitor



MW from Southern end

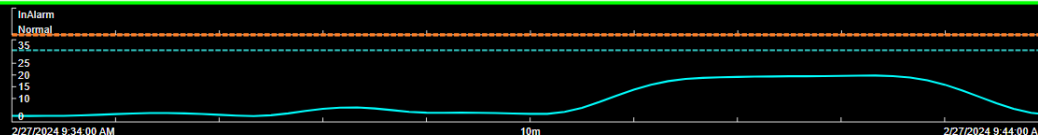
**Synchrophasor****Oscillation Detection Details**

500 KV

Monitored
Process

-561.01 MW

2/27/2024 9:44:00 AM

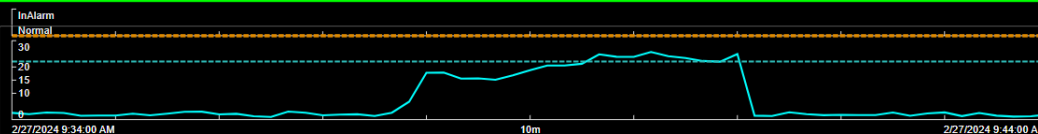
BAND 10.01 Hz
to
0.15 Hz

Alarm State: Normal

Hi Limit: 30.50

Max Energy: 19.78

Energy: 3.09

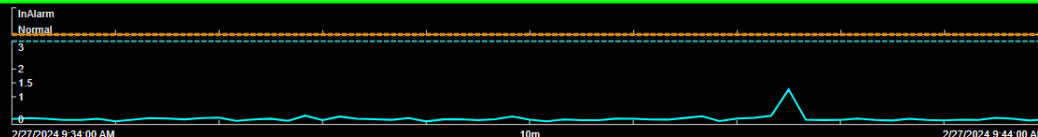
BAND 20.15 Hz
to
1.0 Hz

Alarm State: Normal

Hi Limit: 22.10

Max Energy: 25.70

Energy: 1.94

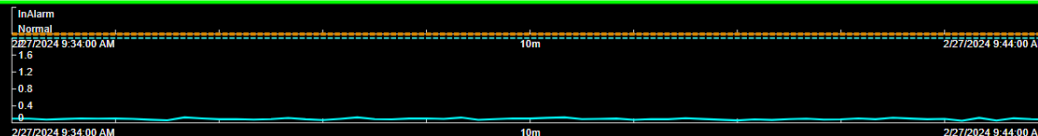
BAND 31.0 Hz
to
5.0 Hz

Alarm State: Normal

Hi Limit: 3.00

Max Energy: 1.26

Energy: 0.20

BAND 45.0 Hz
to
14 Hz

Alarm State: Normal

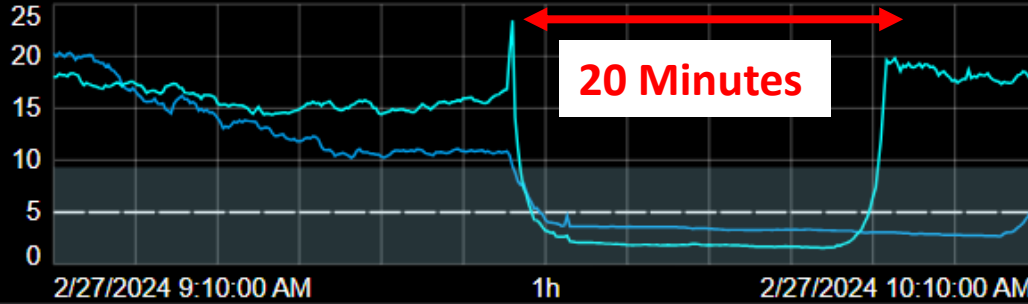
Hi Limit: 2.00

Max Energy: 0.13

Energy: 0.08

Damping and Oscillation

N-S MODE DAMPING



Damping NS-A
17.48 %
Damping NS-B
8.31 %
Damping Limit
5.00 %

% DAMPING

A

17.5 %

B

8.3 %

LOW LIMIT

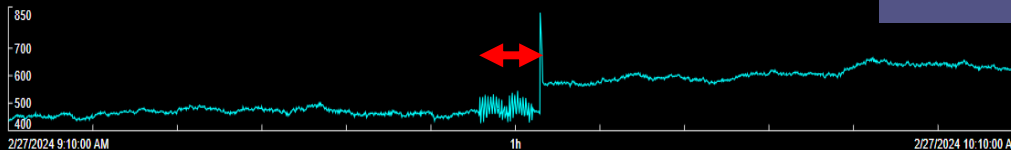
5.0 %



Synchrophasor

Oscillation Detection Details

Monitored
Process

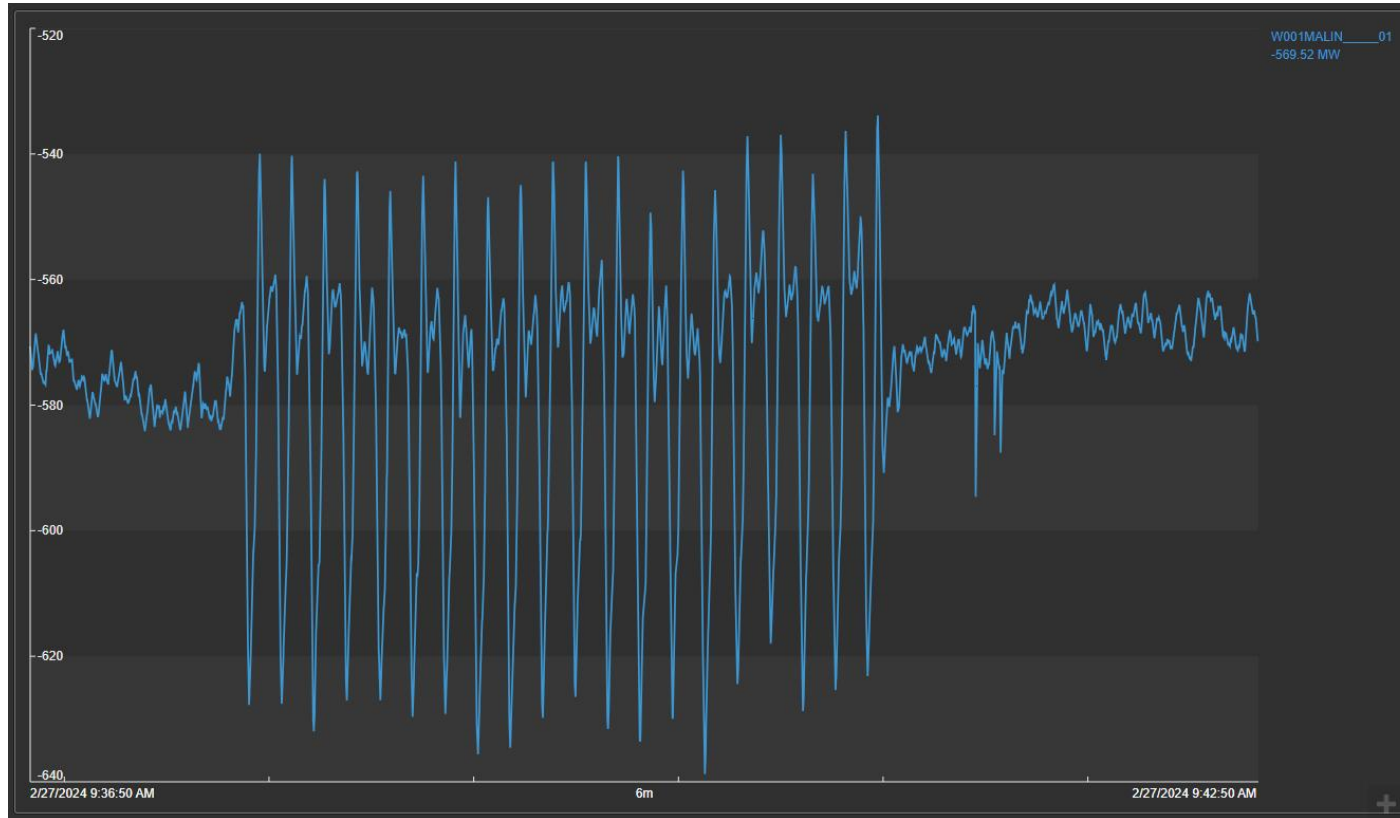


606.13 MW

2/27/2024 10:10:00 AM

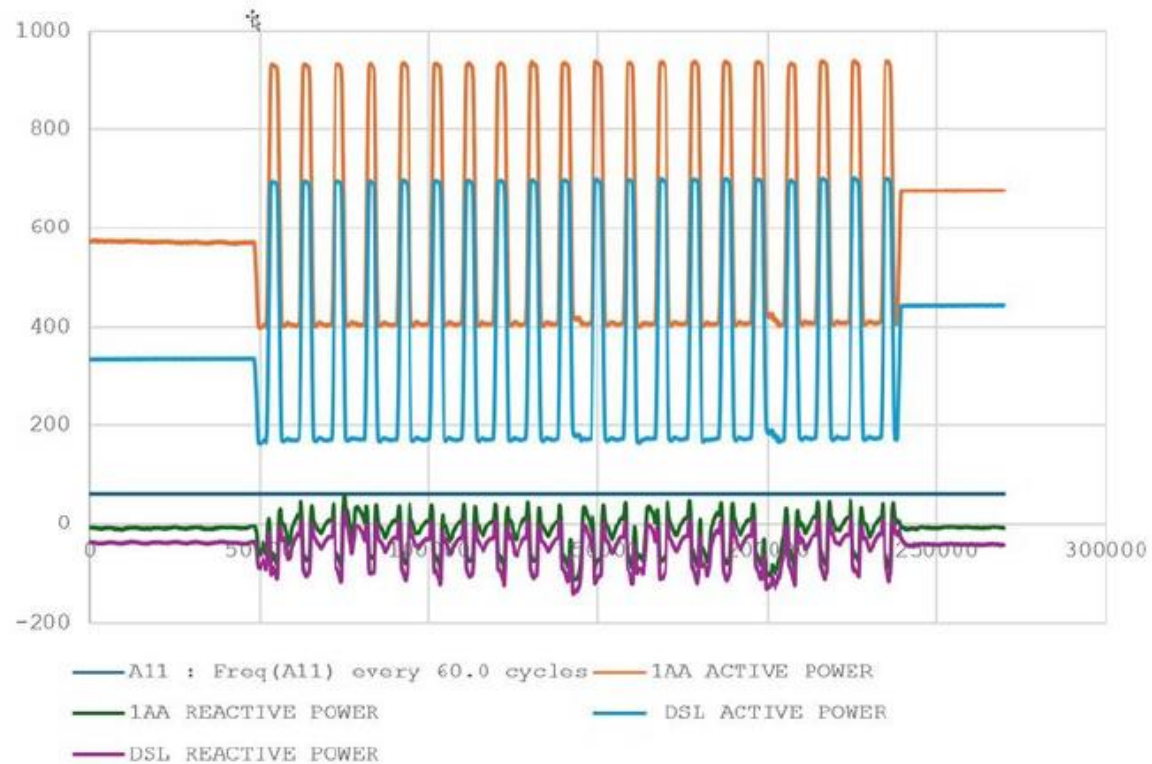
<Public>

Southern path 500 kV Line



Fault Recording

<Public>



Preliminary Root Cause

- 300 MW Solar site East of Los Angeles
- Rebooting of Remote intelligence Gateway (RIG) software at the site
- Incorrect controls logic configuration was a factor

BPA Actions

- Monitor PNNL research on forced oscillations
- Adjust Operating Procedures for South to North flows
- Adjusted some thresholds up
- Get/Give 2 Second ICCP Data from CAISO (and others in the future)
- Submitted this as a risk to WECC

WECC Risk Register Form



WECC Reliability Risk Committee Risk Register Initiation Form

This Form is used to start the registration process for an identified risk. Information provided will be used to help determine the next steps needed to address the risk. Please return the form or submit any questions to the WECC Risk Analysis Department (risk@wecc.org).

Risk Submittal

“As more IBRs are added to the Western Interconnection, the industry is seeing them generate oscillations, some that resonate at or near the known natural modes of the system. If the system is stressed, a forced oscillation could cause instability of the grid.”