

Speaker Information



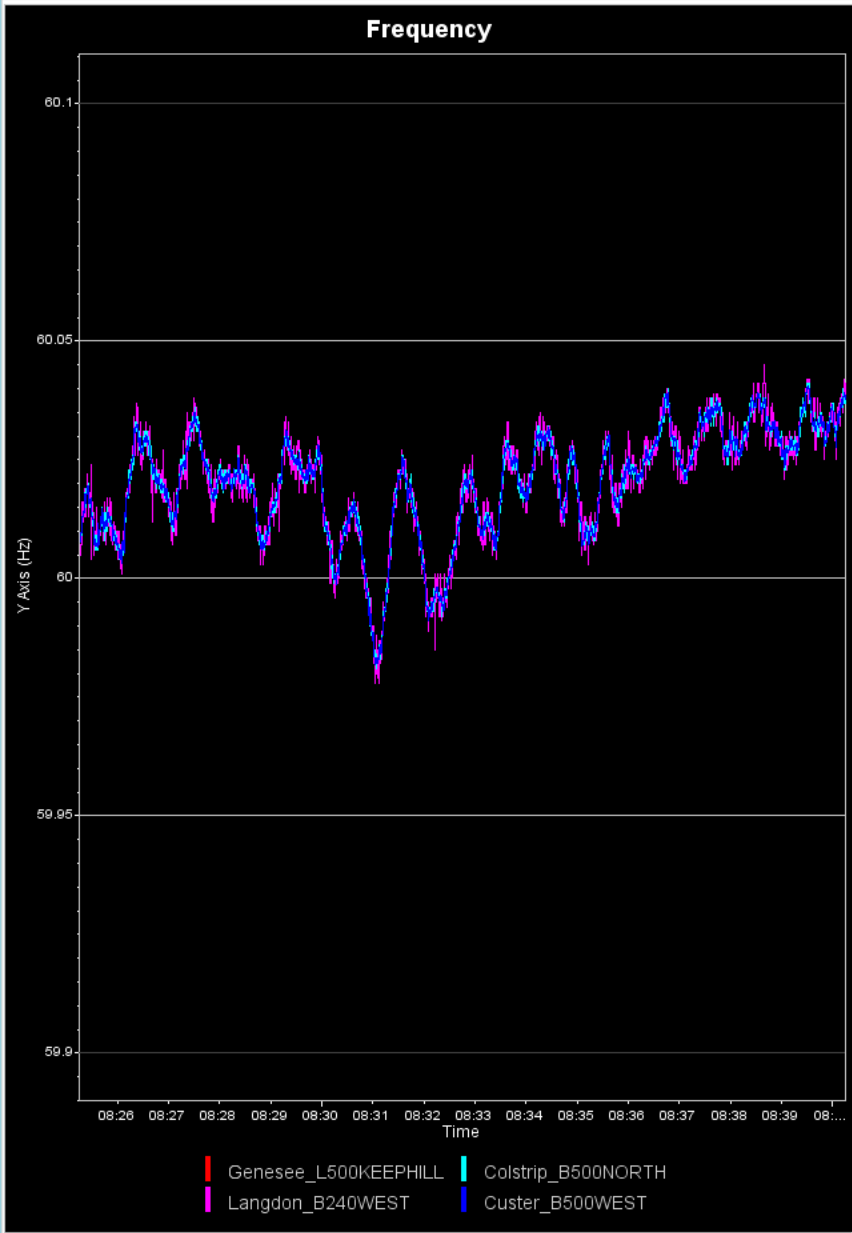
Murray Mueller is the Director of Operations Systems for the Alberta Electric Systems Operator (AESO). He has worked in the electrical industry over 30 years, primarily in the operations area. From the Field to the Control room, he learns something new every day

- Responsible for a 5-year plan which provides the direction of the investment needed to sustain and enhance our Energy Management System (EMS) and Market Systems
- This includes a 5-year rolling investment plan which will deliberately capture the investment required to sustain and enhance our existing systems, as well as explore new technologies to effectively meet AESO's mandate across the entire electricity value chain.
- PMU's Alberta is mandated across all renewable connections with only a limited number used by Operators

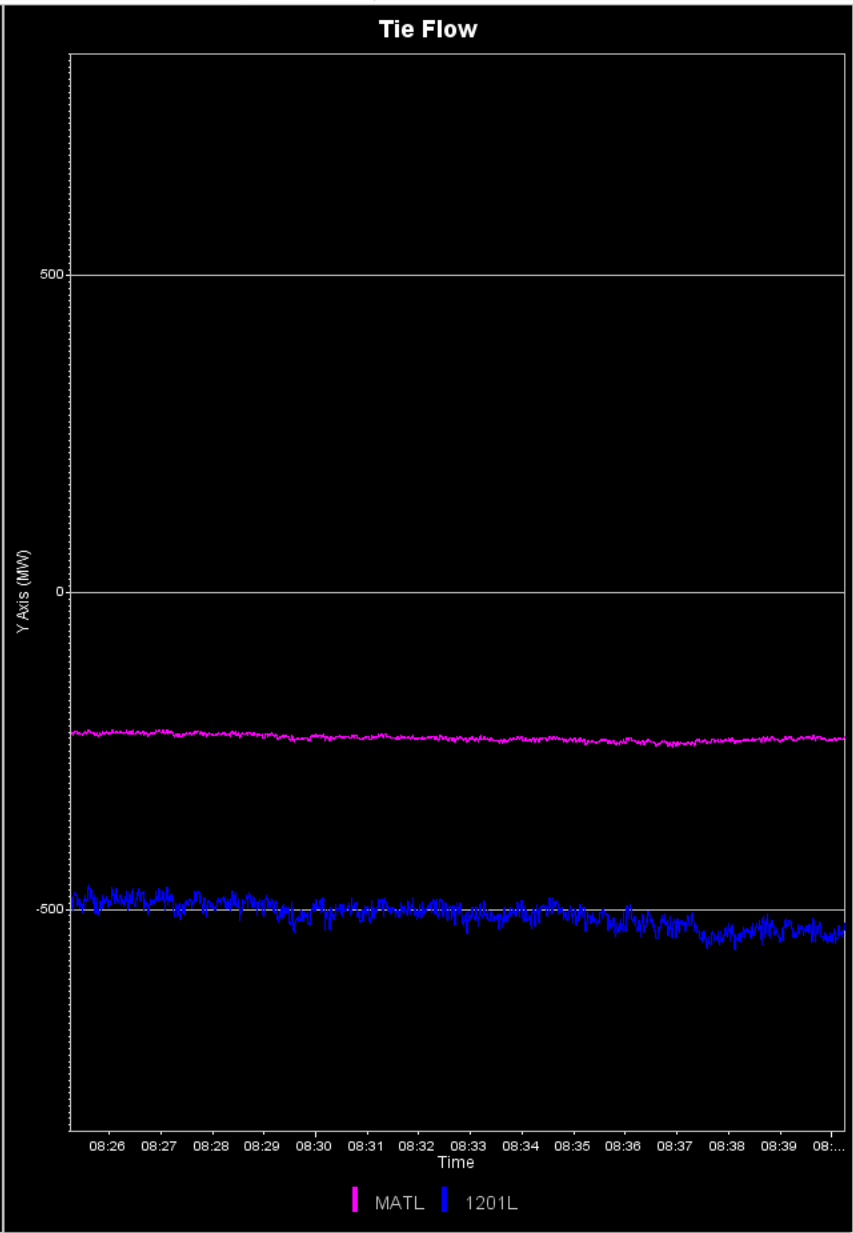
AESO PMU Information

Synchrophasor measurement data collection is required for net new generation connection projects. Where operational reliability criteria is met data is streamed directly to the AESO in addition to being locally stored.

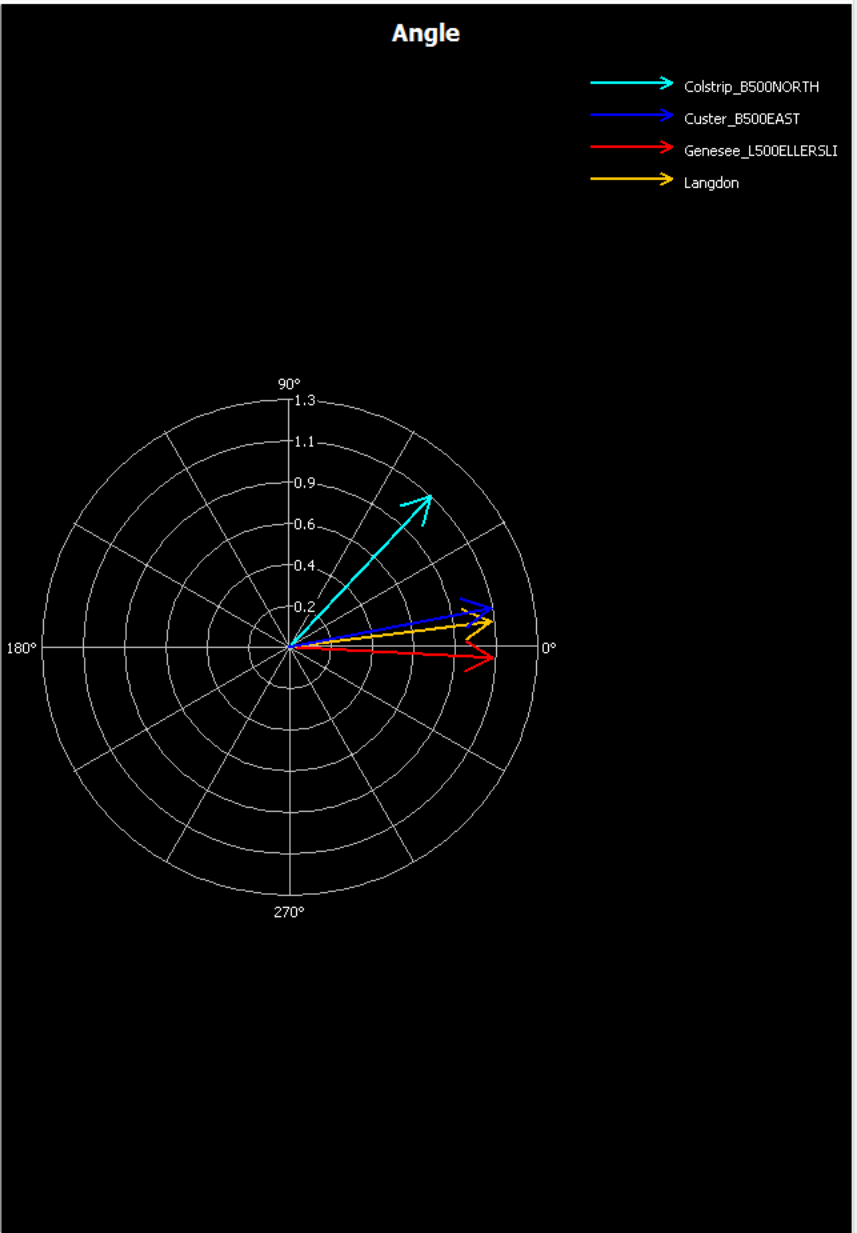
- Utilizes the GE's Phasorpoint Wide Area Monitoring System (WAMS) software suite
- Collecting streaming data from 104 PMUs via Alberta Grid Operations WAN and WISP WAN networks
- Currently PMU data is not integrated into our EMS power system network applications, Phasor analytics in the 2023
- PMU data is integrated as additional information on our Vision Geographic display
- System controller console access for Phasorpoint awareness tools
- Dedicated display for System controllers on islanding awareness
- PMU servers fall under CIP V5



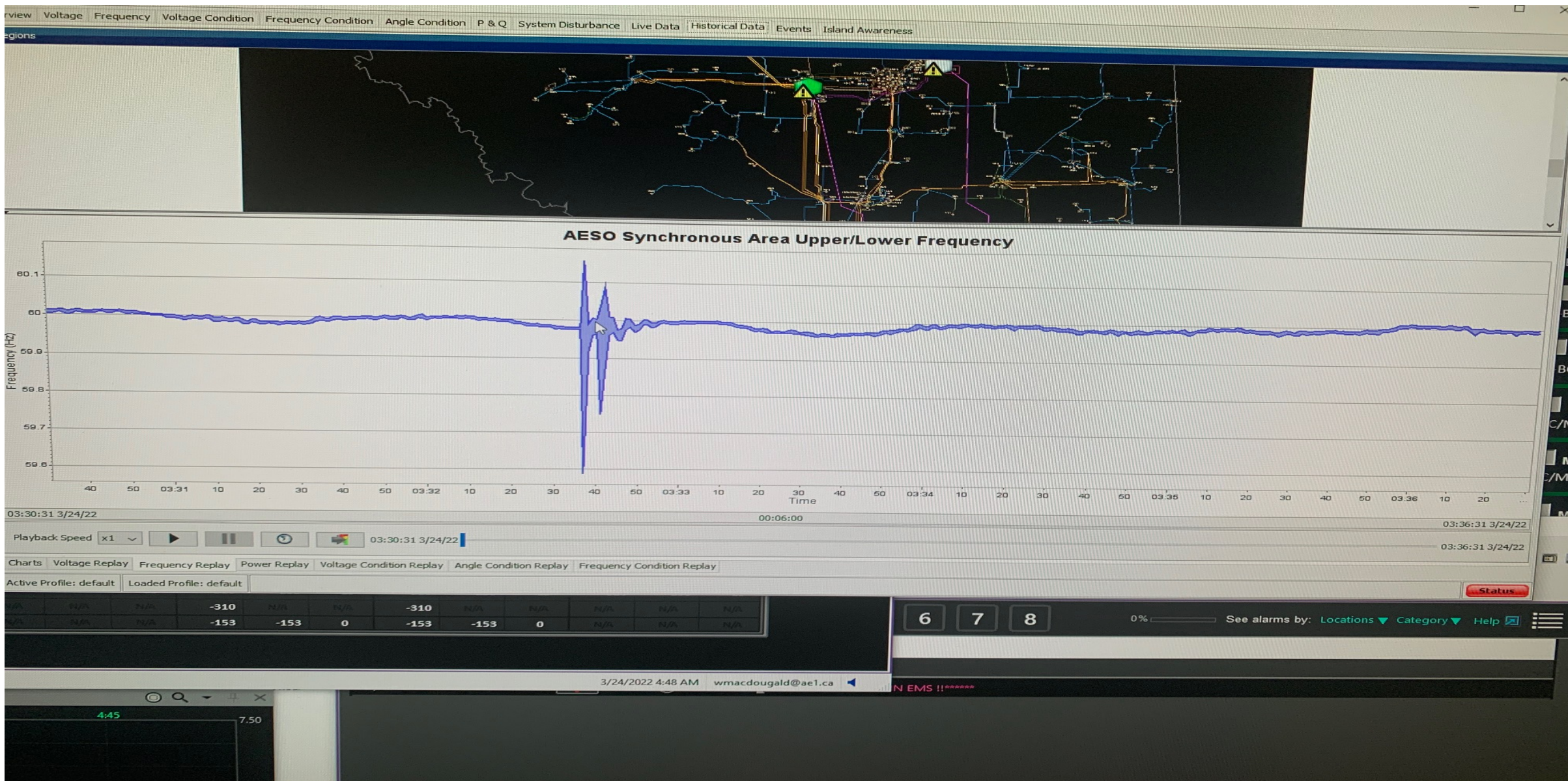
08:25:15 4/5/22 00:14:59 08:40:14 4/5/22



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Filter:

Modeled Angle Difference (4)

(EATL) Heartland - Newell $\Delta = ---$

35031 (W106SUNNYB...) 34712 (W106PICK_BU...)

-15.35° 23.40°

(WATL) Sunnybrook - Crossings $\Delta = ---$

35031 (W106SUNNYB...) 34713 (W106BENNETT...)

-15.35° -6.04°

Limit	High	Low
Alert	57.296°	-57.296°
Alarm	114.592°	-114.592°

Landon - MATL $\Delta = ---$

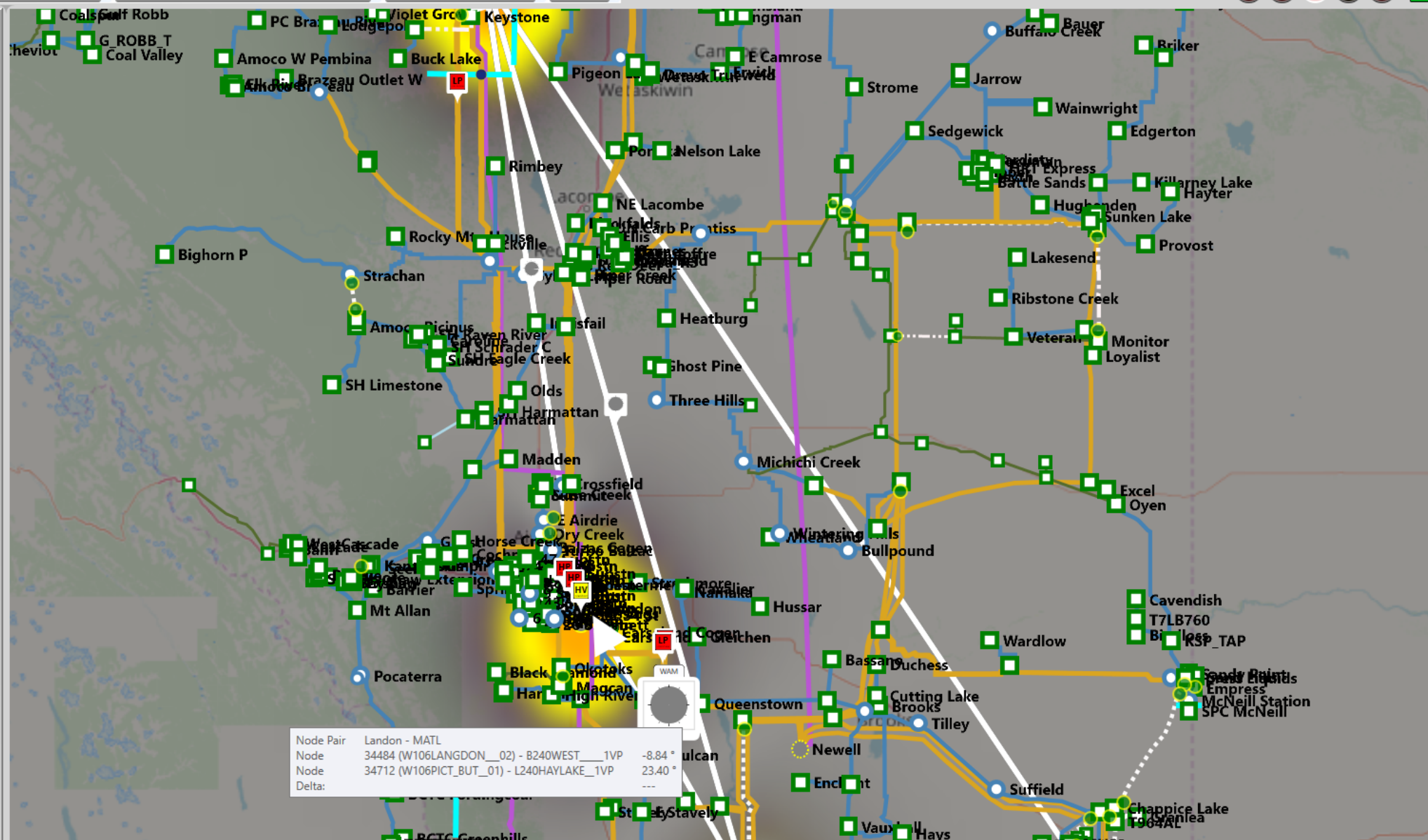
34484 (W106LANGDO...) 34712 (W106PICK_BU...)

-8.84° 23.40°

Sundance - NWE Colstrip $\Delta = ---$

34494 (W106SUNDAN...) 34275 (W036COLSTRI...)

-26.87° 52.93°



Control Panel

Substations

Lines

Interfaces

Displays Directory

Events

Areas

Measurements

Angle Differences

Islands

Overlays

Filter:

Modeled Angle Difference (4)

(EATL) Heartland - Newell

35031 (W106SUNNYBRK_... 34712 (W106PICT_BUT_0...

-10.95 ° 26.07 °

(WATL) Sunnybrook - Crossings

35031 (W106SUNNYBRK_... 34713 (W106BENNETT_...

-10.95 ° -4.39 °

Landon - MATL

34484 (W106LANGDON_... 34712 (W106PICT_BUT_0...

-6.97 ° 26.07 °

Sundance - NWE Colstrip

34494 (W106SUNDANCE_... 34275 (W036COLSTRIP_0...

-21.93 ° 57.16 °

Device ID	Angle	Frequency	Magnitude	df/dt	PMU ID	Voltage Deviation	Frequency Deviation
34712 (W106PICT_BUT_01) - L240HAYLAKE__1VP	26.07 °	60.04 Hz	223.17 kV	0.002768 Hz/s	34712	-16.83 kV	0.04 Hz
34712 (W106PICT_BUT_01) - B240EAST__1VP	6.88 °	---	249.13 kV	---	34712	9.13 kV	--- Hz

The map displays a power grid with various substations marked by green squares. Key substations include E Stavely, Blacksprings, Travers, Picture Butte, Little Bow, Coaldale, Lethbridge, Leth McDonald, Leth Lakeview, Leth Bowron, Coalbanks, Chinook, Monarch, T180AL, T1005AL, and Fort Macleod. Power lines are shown in blue and orange, with some lines highlighted in yellow. A dashed white line indicates a specific path or boundary. The map also shows geographical features like rivers and lakes.