Northwest **Power** and **Conservation** Council

March 7, 2017

MEMORANDUM

TO: **Council members**

FROM: **Ben Kujala**

SUBJECT: **Presentation by the Bonneville Power Administration on Cold Weather Operations**

BACKGROUND:

Presenter: Salah Kitali, Internal Operations Manager, and John Lahti, Construction and Maintenance Service Manager in Transmission at the Bonneville Power Administration

Summary: As a follow up to the cold weather presentation at the February meeting of the Council, Bonneville will discuss the cold weather impacts on its transmission system.

Relevance: Events similar to the cold weather experienced this winter help illustrate the challenges faced in maintaining the reliability of the power system. Understanding the operational impacts during these events helps put into context analysis done on the reliability of the future power system.

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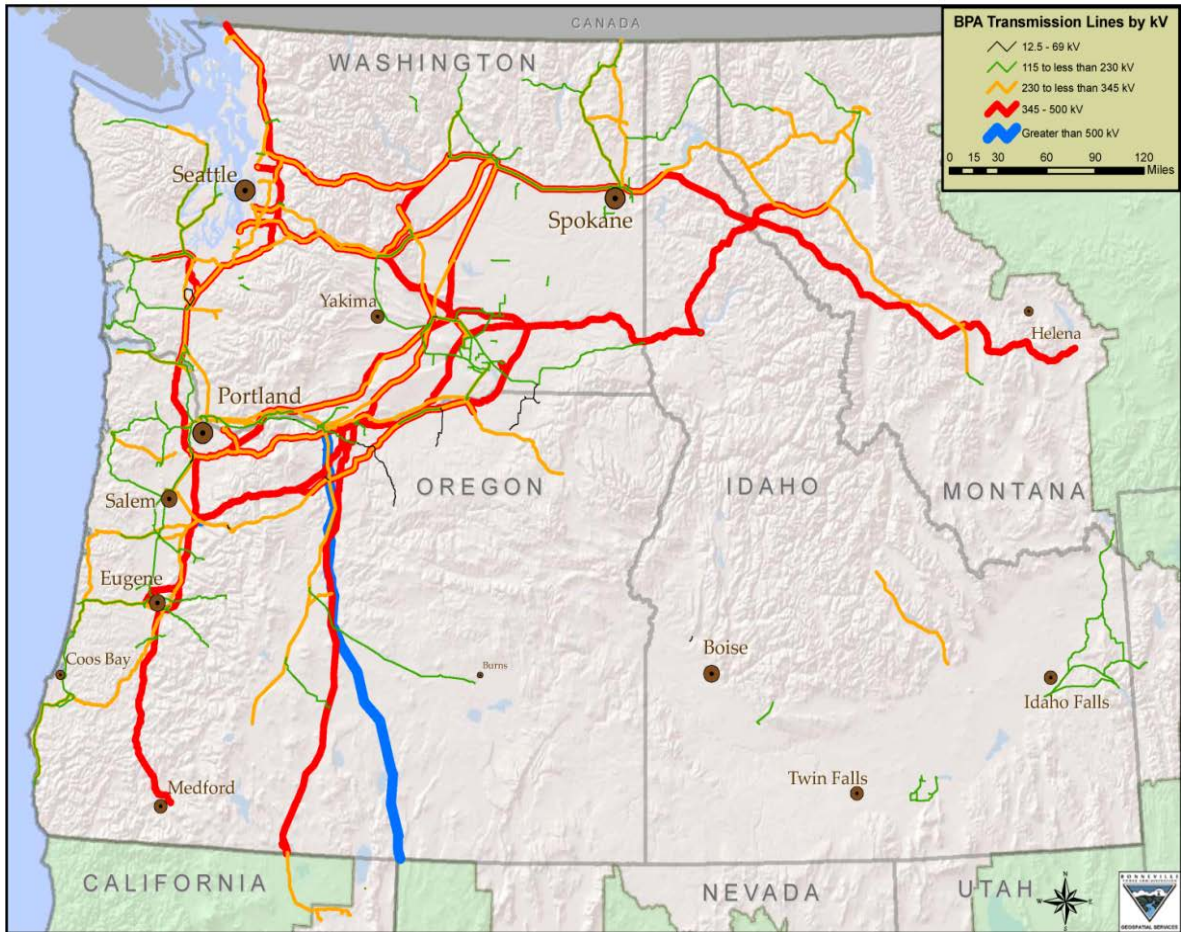
— The Northwest Power and Conservation Council —

Bonneville Power Administration

Cold Weather Operations

March 15, 2017

Federal Columbia River Transmission System



Transmission System

Operating voltage	Circuit miles
1,000 kV	264*
500 kV	4,803
345 kV	570
287 kV	229
230 kV	5,327
161 kV	119
138 kV	53
115 kV	3,509
below 115 kV	382
Total	15,156

BPA SUBSTATIONS 259

*BPA's portion of the PNW/PSW direct-current intertie. The total length of this line from The Dalles, Ore., to Los Angeles, Calif., is 846 miles.

BPA's transmission system contains more than 15,000 miles of high voltage transmission lines.

Makes up about 75 percent of the high-voltage grid in the Pacific Northwest.

BPA service area is approximately 300,000 square miles.

Winter Preparedness

In the Pacific Northwest, inclement weather is a normal yearly occurrence. . .

- BPA's Transmission system encompasses a four-state region, with transmission elements covering mountain passes, high and low elevation areas, and treacherous access areas;
- This kind of terrain adds to unpredictable Northwest winter weather patterns, as well as to BPA’s winter loading; and
- This unique geography creates a background for challenging winter conditions.

BPA's Winter Preparedness Activities

Over the years, inclement weather has provided BPA opportunities for improvement. . .

- Reviews previous winter-event issues;
- Performs winter system studies;
- Performs equipment maintenance, checks, and tests, for example:
  - Breaker tests;
  - Routine inspection of all Transmission substation equipment; and
  - Ambient temperatures and fire-protection systems.
- Ensures that equipment temperature requirements are met during operations;
- Ensures that not too much responsibility is placed on a single system operator or on other key personnel during an emergency;
- Ensures emergency, single points of contact exist;
- Provides load-shedding training:
  - Dispatcher Standing Orders (DSOs) are regularly reviewed and updated; and
- Reviews communication protocols and notifications during cold-weather events.

BPA's Extreme Weather Preparedness Activities

- BPA does not have any generation assets; however,
- BPA works in close collaboration with the generators within the Balancing Authority footprint to ensure reliability of the system.

A Bonneville Power Administration transmission tower over Steven's Pass.

Crew Winter Preparedness Activities

- Monitor and prepare for extreme winter systems and storms:
  - Fuel vehicles and equipment;
  - Maximize transmission facilities ready for service;
  - Prep vehicles with materials for field repairs; and
  - Multi-use spares stored throughout system.

Crew Response

- Respond as quickly and safely as possible:
  - Communication with System Dispatcher:
    - Materials for minor repairs with initial response; and
    - Major repairs may require materials from District HQ or Vancouver.

Transmission Facilities

- Transmission facilities and equipment:
  - Designed to function in extreme conditions:
    - Still have failures; and
    - Learn from events:
      - Freezing valves, ice loading, system hardening, etc.

Incident Management Teams

- Case-by-case depending on the event:
  - Widespread events or severity of the event; and
  - Sometimes proactive, sometimes reactive.
- Most events managed within the region/district.

Mutual Assistance

- Put in place through Transmission account executives;
- Respond right away if agreements are in place;
- Agreements implemented in as little as 24 hours:
  - Lower Valley Energy (Jackson Hole).

- BPA does not typically request mutual aid:
  - Adjacent crews.

Questions?