

NORTH OREGON COAST AREA TRANSMISSION SYSTEM STUDY  
2012-2016

**Executive Summary**

The focus of this study is the 115 kV transmission system including transmission switch stations and distribution substations in the north Oregon coast area. The purpose of this study is to identify system constraints and local reinforcements needed to meet area load growth for the period from the summer of 2012 to the winter of 2016-17.

The PacifiCorp system in the Clatsop area has an installed capacity of 135/165 MVA (summer/winter) and 50/60 MVA (summer/winter) in the Lincoln City area. Load is expected to peak near 91 MW the summer of 2012 (representing 52% utilization) in the Clatsop area and 24 MW (49% utilization) in the Lincoln City region. The winter 2012-13 loads are expected to peak near 125 MW (55% utilization) and 38.3 MW (63% utilization) for the respective regions.

Based on historical load trends the growth rate in the Clatsop area is estimated to be 1.0% for summer and 0.4% for winter. The Lincoln City area has a growth rate of 0.9% and 2% for summer and winter respectively. Using these growth rates the horizon year peak loads are projected to reach 78/105 MW (summer/winter) for the Clatsop area and 28/46 MW (summer/winter) for Lincoln City.

Non-PacifiCorp load served by the 115 kV Sugarloaf line is projected to peak at 21 MW for the summer of 2016 and 35 MW for the winter of 2016-17.

Construction projects to correct system deficiencies identified in the study include the following:

*Reliability concerns in Clatsop area*

Construction of a four-breaker ring bus at Lewis and Clark Substation is recommended to address reliability concerns in the Clatsop area. Presently, an outage anywhere between Tillamook and Astoria will cause the loss of all loads served off the Sugarloaf Line plus Warrenton, and the area is prone to frequent outages resulting from winter storms. This project includes the construction of a second line between Warrenton Tap and Lewis and Clark Substation.

*Ring bus at Boyer switch station*

To correct protective relaying issues between Boyer switch station and PGE's Grand Ronde Substation and improve reliability of service to Lincoln City, it is recommended to complete the planned four-breaker ring bus at Boyer switch station.

#### Tap change at Knappa Svensen

There were several instances in the outage summary where low voltages only occur at Knappa Svensen. This low voltage problem can be resolved by changing the no-load tap on transformer T-2069 to tap 4 (113 kV). This tap change will require the use of a mobile transformer.

#### Tap Changes at Seaside and Devil's Lake

Transformers at both Devil's Lake and Seaside have been bucking voltage consistently and not passing through their tap changers' neutral positions. This can be corrected by changing the transformers' no-load taps one position. Both substations have two transformers operated independently, so a mobile would not be necessary.

#### Voltage control on Astoria capacitor

The 115 kV capacitor at Astoria is manually controlled via SCADA. Engaging this capacitor corrects voltage problems in several contingencies. There is already a relay with voltage control for this capacitor, but it has not been configured for automatic switching. Setting this control would correct the voltage following a system disturbance if the capacitor is switched off.

#### Under-voltage load shedding at Young's Bay

Several multiple-contingency outages resulted in unacceptable voltages in the Astoria region. While these all involved BPA sources, it is important to ensure voltages on the PacifiCorp system remain within ANSI ranges. To prevent violations, under-voltage load shedding should be added at Young's Bay Substation.

#### Motor operators at Mohler

The Sugarloaf Line is subject to frequent line faults between Tillamook and Nehalem tap because of the strong winter coastal storms. Mohler substation would be an ideal place to have SCADA-controlled motor operated switches to reduce outage duration from travel time. The substation already has a fiber optic communication link to BPA-Tillamook. There may need to be upgrades to the steel structures that hold the switches. Because this reliability construction primarily benefits Tillamook PUD, it is suggested that they share a portion of the cost.