

CENTRAL OREGON AREA  
TRANSMISSION SYSTEM STUDY  
2013-2017

## **Executive Summary**

The focus of this study is the 69 kV and 115 kV transmission systems including transmission switching stations and distribution substations in the Central Oregon 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 2013 to the winter of 2017-18.

The PacifiCorp system in Central Oregon has a combined distribution capacity of 613/742 MVA (summer/winter). The projected loads for the area are 331/466 MW (summer/winter), which is a utilization of 54% for summer and 63% for winter. Based on historical load trends the average growth rate in the Central Oregon area is estimated to be 1.1% for summer and 1.0% for winter. Using this rate the horizon year peak loads are projected to reach 350/491 MW (summer/winter) for the area.

Foreign utility loads are served at 69 kV from Pilot Butte and Warm Springs with normal open point of connection at 69 kV near Madras and Neff Rd. The combined foreign utility load is projected to peak at 41 MW for the summer of 2017 and 69 MW for the winter of 2017-18.

Construction projects to correct system deficiencies include the following:

### *Bend Loop Reinforcement*

Several outages result in overloads on the central Bend Loop: Cleveland Avenue Tap to Bond Street, Bond Street to Shevlin Park and Overpass to Pilot Butte. The worst example occurs in the summer of 2017 for an outage of Cleveland Avenue Tap to Bond Street, which results in a 122% overload of the Pilot Butte to Overpass line's thermal rating.

To correct these deficiencies, the source ends of the Bend loop need to be reconductored with 1272 ACSR or equivalent. The specific segments to be reconductored are from Cleveland Avenue Tap to Bond Street and from Pilot Butte to Overpass.

A temporary substation was put in place at Hunters Circle to take load off Overpass Substation. To complete the Hunters Circle project the permanent substation needs to be constructed and the temporary substation removed. The line supplying Hunters Circle from Pilot Butte Tap will also need to be reconductored with 795 ACSR.

Along with the Hunters Circle reinforcement, the Pilot Butte to Pilot Butte Tap line will be rebuilt as a double circuit of 1272 ACSR. This line will supply both the Bend Loop and the Tumalo Line.

While load growth has declined in the last few years due to economic conditions, the study outlines a long-term plan for future reinforcements, should load growth pick up. The most notable part of the plan is a project to convert the 69 kV PAC Redmond to Pilot Butte 'Tumalo' Line to 115 kV. The above projects are intended to integrate with the future voltage conversion.

#### Prineville Distribution Capacity

Prineville Substation loading is approaching the capacity of the individual transformers. As a temporary measure, the transformers can be placed in parallel operation mode, which will yield enough capacity through the study horizon year. At some point thereafter, it will be necessary to construct the new 25 MVA Barnes Butte Substation 1.3 miles east of Prineville to serve a portion of the load.

#### Cove to Madras Outage

An outage of the Cove to Madras line will require serving Cherry Lane and Madras via Warm Springs. This configuration significantly overloads the 69 kV line between Warm Springs and Cherry Lane. The line also has excessive voltage drop during winter peaks due to its high impedance. The recommended solution is to reconductor 4.5 miles from the Warm Spring to Cherry Lane with 4/0 ACSR or equivalent.

#### New Capacitor at Culver

An outage between Cove and Culver requires serving Culver radially out of PAC Redmond. This configuration causes excessive voltage drop at Culver. A 3.0 Mvar capacitor is needed at Culver to support the voltage during this contingency.

#### NERC TPL-003 compliance issue at Pilot Butte

A fault on the 230 kV bus at Pilot Butte with a failure of breaker 1D1 to operate will cause a loss of two of Pilot Butte's three 230-69 kV transformers. There are significant overloads on the remaining transformer during both summer and winter peaks and a possible voltage collapse during winter peak. To correct this deficiency, it is recommended to install an additional breaker in the 230 kV ring bus at Pilot Butte.

#### Opal Springs Tap Switch 3D87

The 69 kV switches between Opal Springs Tap and Crooked River do not have loop opening attachments, and the arc reach is too long for opening the loop with a standard switch. It is recommended to add vacuum bottle attachments to switch 3D87 at Opal Springs Tap.