Transmission Planning
Attachment K – Q5 Public Input Meeting

Local Area Studies Update - PACW

Kevin Putnam

March 23, 2017
Hermiston-Pendleton-Enterprise Study Finding Report

Jerry Vang
Hermiston-Pendleton System Overview

Study Covers:

Hermiston Area
- Hermiston
- Hinkle
- Umatilla

Pendleton Area
- Athena
- Buckaroo
- Pendleton
- Pilot Rock
- Weston
Enterprise System Overview

Study Covers:

Enterprise Area
- Enterprise
- Joseph
- Minam
- Pallette
- Wallowa
Herm/Pend/Ent System Overview

Primary Sources

- Hermiston Area
  - Tapped 230 kV line from McNary (BPA) to Wallula via 230-69 kV Cold Springs Substation
  - 115-69 kV McNary (BPA) Substation
- Pendleton Area
  - 230 kV line from McNary (BPA) to La Grande (BPA) via Roundup (BPA) Substation
- Enterprise Area
  - 230 kV line from Walla Walla to Hells Canyon (IPCO) via Hurricane Substation
  - Pallette served via 39.9 kV single phase from Pine Creek (IPCO)

Sub-transmission is mainly 69 kV

- N.O. tie between Hermiston and Pendleton
- N.O. tie between Pendleton and Walla Walla, Weston fed from Walla Walla source
- N.O. (out-of-phase) tie between Pacific Power and OTECC at Elgin
## Local Area Generation

<table>
<thead>
<tr>
<th>Area</th>
<th>Capacity</th>
<th>Type</th>
<th>Facility Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hermiston</td>
<td>64.55 MW</td>
<td>Wind</td>
<td>Echo</td>
</tr>
<tr>
<td>Hermiston</td>
<td>40 MW</td>
<td>Wind</td>
<td>Butter Creek (In-Service 2019)</td>
</tr>
<tr>
<td>Pendleton</td>
<td>18 MW</td>
<td>Wind</td>
<td>Chopin</td>
</tr>
<tr>
<td>Enterprise</td>
<td>1.1 MW</td>
<td>Hydro</td>
<td>Wallowa</td>
</tr>
</tbody>
</table>
## Area Load Growth

### Base System Load by Area

<table>
<thead>
<tr>
<th>Season (Non-Coincidental)</th>
<th>Hermiston</th>
<th>Pendleton</th>
<th>Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer 2017</td>
<td>25 MW</td>
<td>69 MW</td>
<td>17.8 MW</td>
</tr>
<tr>
<td>Winter 2017-2018</td>
<td>26 MW</td>
<td>67 MW</td>
<td>20.2 MW</td>
</tr>
</tbody>
</table>

### Growth Rate by Area

<table>
<thead>
<tr>
<th>Season</th>
<th>Hermiston</th>
<th>Pendleton</th>
<th>Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer</td>
<td>1.1%</td>
<td>1.2%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Winter</td>
<td>1.4%</td>
<td>0.7%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

### Projected Load Growth

<table>
<thead>
<tr>
<th>Season (Non-Coincidental)</th>
<th>Hermiston</th>
<th>Pendleton</th>
<th>Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer 2021</td>
<td>26 MW</td>
<td>73 MW</td>
<td>18.0 MW</td>
</tr>
<tr>
<td>Winter 2021-2022</td>
<td>28 MW</td>
<td>69 MW</td>
<td>20.3 MW</td>
</tr>
</tbody>
</table>
Proposed System Improvements Overview

Near-Term Planning Horizon (years 1 through 5):
- Pilot Rock Power Factor Correction

Long-Range Planning Horizon (beyond 5 years):
- Replace 230-69 kV Roundup transformers
- Reconduct 69 kV Roundup-Pendleton line
- Reconduct 69 kV McKay to Buckaroo line
- Install new 230-69 kV Hurricane transformer
Pilot Rock Power Factor Correction

Proposed Project:
- Install a two-stage 4.8 Mvar capacitor bank
- Install advance meters capable of 15 minute MW and Mvar reads
- Swap distribution feeders

Project Outcome:
- Correct low power factor in Pilot Rock Substation
- Perform accurate transformer or regulator loading analysis
- Defer possible regulator overload
Pendleton Transmission Reliability Projects

Proposed Project:
- Replace existing three 230-69 kV transformers at Roundup Substation with two larger capacity transformers (125 MVA)
- Reconductor 69 kV line from Roundup Substation to Pendleton Substation
- Reconductor 69 kV line from McKay Switching Station to Buckaroo Substation

Project Outcome:
- Mitigate N-1 contingency issues in Pendleton area
- Provide a regulated 69 kV sub-transmission voltage
Enterprise Transmission Reliability Project

Proposed Project:
- Install 230-69 kV, 25 MVA transformer at Hurricane Substation

Project Outcome:
- Mitigate N-1 contingency
Crescent City Area Study Finding Report

Adam Lint
Crescent City System Overview

Study Covers:

Transmission Substation:
- Del Norte

115 kV Distribution Substations:
- Patrick’s Creek
- Gasquet

69 kV Distribution Substations:
- Morrison Creek
- Smith River
- Lake Earl
- Belmont
- Northcrest
- Redwood
- Miller Redwood
- Yurok
Crescent City System Overview

Transmission Source

- Two radial 115 kV lines from Grants Pass, Oregon
- 25 miles in common corridor

69 kV Transmission Open Loop (Line 86 and 87)

- Looped from Del Norte to Belmont, Northcrest, Redwood, and Lake Earl
- N.O. Switch between Northcrest and Redwood

69 kV Radial

- State Line Tap (between Del Norte and Belmont) feeds Smith River and Morrison Creek via Line 85
- Redwood Tap (between Northcrest and Redwood) feeds Miller Redwood and Yurok via Line 87.

No Local Generation
Crescent City System Overview
## Area Load Growth

### Base System Load

<table>
<thead>
<tr>
<th>Season (Non-Coincidental)</th>
<th>System Load</th>
<th>Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer 2017</td>
<td>38.8 MW</td>
<td>39.8%</td>
</tr>
<tr>
<td>Winter 2017-2018</td>
<td>58.5 MW</td>
<td>47.9%</td>
</tr>
</tbody>
</table>

### Growth Rate

<table>
<thead>
<tr>
<th>Season</th>
<th>Crescent City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer</td>
<td>0.5%</td>
</tr>
<tr>
<td>Winter</td>
<td>0.6%</td>
</tr>
</tbody>
</table>

### Projected Load Growth

<table>
<thead>
<tr>
<th>Season (Non-Coincidental)</th>
<th>System Load</th>
<th>Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer 2021</td>
<td>39.5 MW</td>
<td>40.6%</td>
</tr>
<tr>
<td>Winter 2021-2022</td>
<td>59.9 MW</td>
<td>49.0%</td>
</tr>
</tbody>
</table>
Proposed System Improvements Overview

Near-Term Planning Horizon (years 1 through 5):
- New Circuit from Del Norte to State Line Tap (0.26 mi.)
- Replace Del Norte 69 kV Get-Away and Breaker Leads
- Replace Del Norte 69 kV Bus Tie Switch with a Tie Breaker and Update Relaying.
- Replace Undersized Regulator at Northcrest Substation
- Yurok Substation Rebuild

Long-Range Planning Horizon (beyond 5 years):
- Del Norte Dynamic Voltage Support (STATCOM)
- Coos –Curry Tie
New Circuit from Del Norte to State Line Tap

Proposed Project:

- Construct a new circuit from Del Norte to State Line Tap, taking Smith River and Morrison Creek substations off of Line 86 and the 69 kV loop.

Project Outcome:

- Resolve all 69 kV outage deficiencies and eliminate load shedding exposure due to outages between Del Norte – State Line Tap and Del Norte – Lake Earl Tap.
- Resolve switching complications for Line 86 at State Line tap.
- Makes a significant advance toward a future 115 kV tie with Coos-Curry.
Replace Del Norte 69 kV Get-Away and Breaker Leads

Proposed Project:
- Reconductor both 69 kV line breaker leads and get-away cable at Del Norte with 397.5 ACSR to match the other existing substation conductor.

Project Outcome:
- Mitigate possible conductor overloads during breaker outage
Del Norte Bus Tie Breaker

Proposed Project:
- Replace the 69 kV bus tie switch at Del Norte with a tie breaker. Upgrade Relaying.

Project Outcome:
- Increase Reliability by allowing the two transformers at Del Norte to be operated in Parallel. (Currently if the bus tie switch is closed, a low side bus fault or failure of one 69 kV circuit breaker clears both transformers).
Northcrest Regulator

Proposed Project:
- Replace Regulator R-917 at Northcrest with a new 3 phase unit that matches the size of the transformer (10.5 MVA).

Project Outcome:
- Mitigates possible overloads of existing 750 KVA regulator. (Loading projected to reach 105% by the end of the study period.)

Replace undersized Regulator R-917 with 10.5MVA 3-phase unit.
Yurok Substation Rebuild

Proposed Project:
– Rebuild Yurok substation on a new elevated platform with oil containment, or build a replacement substation on higher elevation property to the North.

Project Outcome:
– Eliminates flooding susceptibility.
Long-Range Planning: Dynamic Voltage Support

Proposed Project:
- Install a dynamic reactive power source such as a STATCOM at Del Norte Substation.

Project Outcome:
- Resolves voltage instability problems in the Crescent City Area due to loss of one of the 115 kV lines from Grants Pass.

Interim Solution:
- 14 MW of Load transfer capability after the addition of a bypass switch at Applegate (Covered in the Grants Pass Study).
Long-Range Planning: Coos-Curry Tie

Proposed Project:
- Construct a normally open 115 kV tie from Morrison Creek Substation to Coos-Curry’s Harbor Substation (approx. 11 mi.)

Project Outcome:
- The New 115 kV line would serve as a backup source for Crescent City in the event that the 115 kV Corridor from Grants Pass is lost.