

# Integrated Network Segmentation Analysis

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# Summary

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- BPA's Integrated Network Segment includes the costs of facilities that perform both Transmission and Distribution functions.
- Allocating Distribution (Non-Network) costs to Transmission (Network) customers is inconsistent with cost causation principles – which call for the cost of services and facilities to be paid for by customers who use them.
- Distribution facilities can be isolated from the Integrated Network Segment using a performance based filter consistent with FERC's 7-Factor test and the Bulk Electric System definition.
- Distribution costs separated from the Integrated Network Segment can be recovered in many different ways. Two alternatives are:
  - Direct assignment to individual utilities
  - Group assignment to PTP and NT customer classes

# Facilities Evaluation

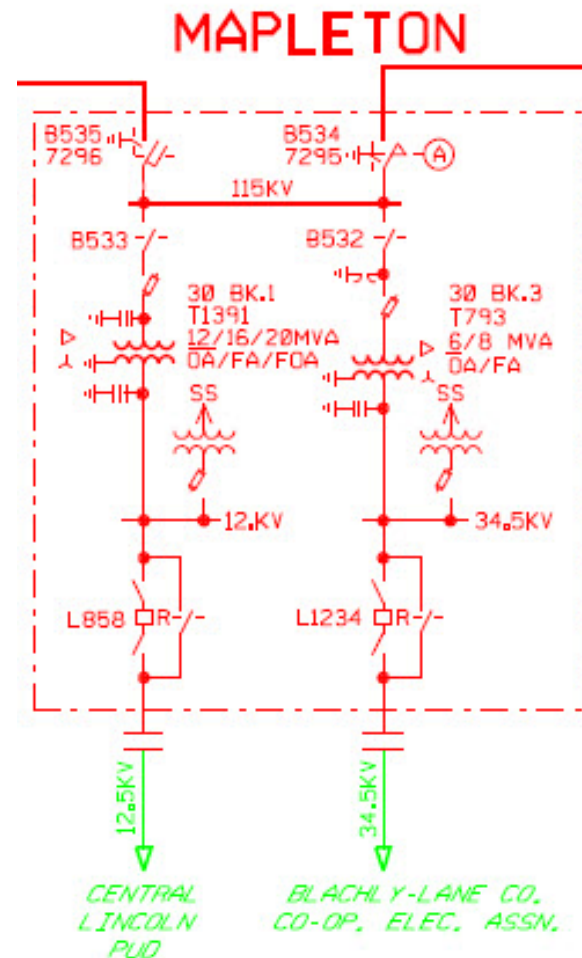
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- Objective:
  - Identify facilities currently included in the Integrated Network Segment that perform a distribution function.
- Approach:
  - Engineering review of BPA Dispatching Jurisdiction Diagram (“one-line diagrams”)
    - Removed all radial and open loop lines serving loads from the Integrated Network Segment.
    - Removed all Local Networks and Load Serving Networks serving loads from the Integrated Network Segment based on powerflow review.
    - Allocated a percentage of jointly used facilities to the distribution function based on breaker positions or voltage class.
  - Identified investment and O&M costs associated with removed facilities.



# Radial Example 2

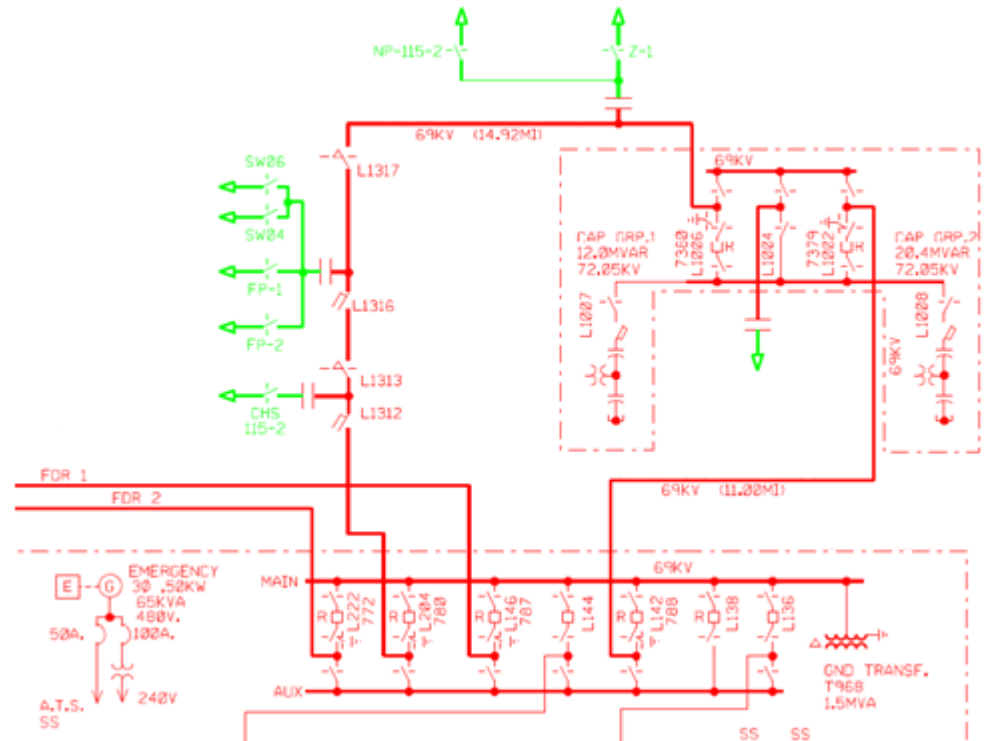
- Mapleton Substation provides service to loads
- Provides benefit only to local customers
- Central Lincoln assigned to Utility Delivery Segment
- Blachly-Lane Co. Coop Elec. Assn. assigned to Integrated Network Segment
  - Investment: \$387,996<sup>1</sup>
  - Operation and Maintenance: \$41,721<sup>1</sup>



1. Source: SegmentationDetail.xls, provided by BPA on May 23, 2012.  
NOTE: Shown one-line diagrams were made public in the BPA 1996 Rate Case.

# Local Network Example

- Provides service to loads on Local Network
- Provides benefit only to local customers
- Investment: \$5,317,806<sup>1</sup>
- Operation and maintenance: \$217,803<sup>1</sup>

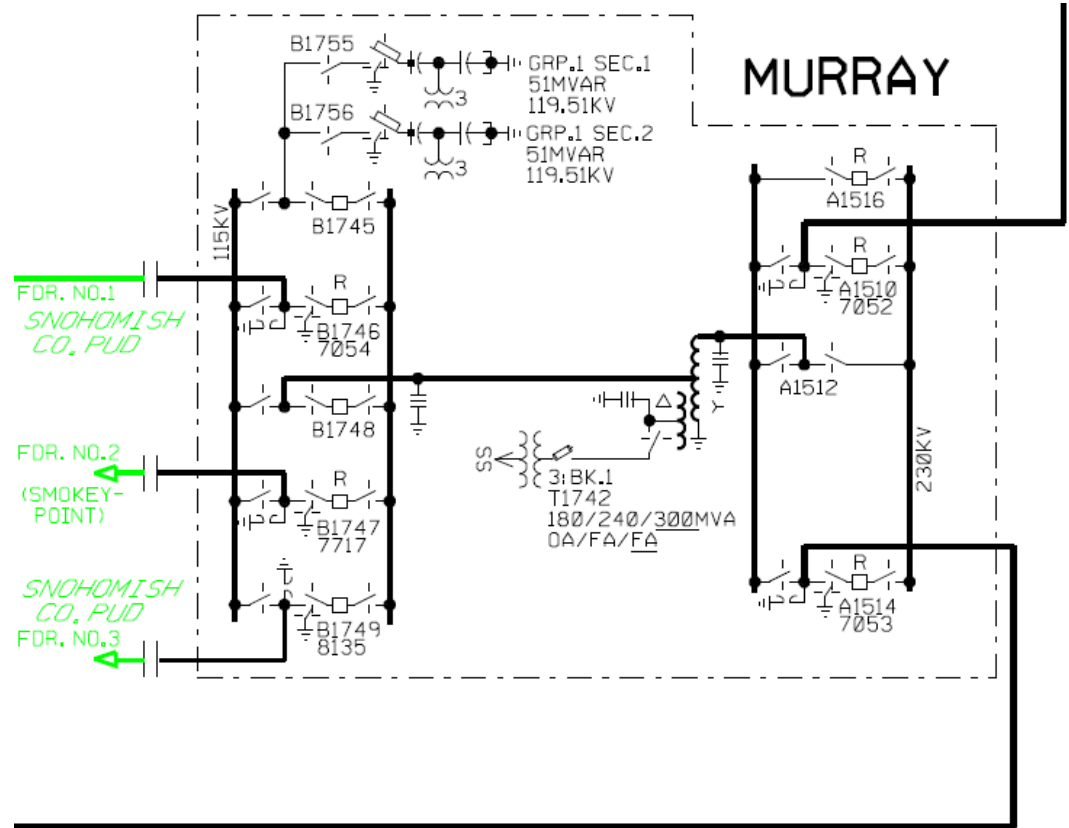


1. Source: SegmentationDetail.xls, provided by BPA on May 23, 2012. Value includes Centralia Substation, Chehalis-Centralia Tx Line No. 1 & No.2, and 10% of Chehalis Substation.

NOTE: Shown one-line diagrams were made public in the BPA 1996 Rate Case.

# Joint Facility Example

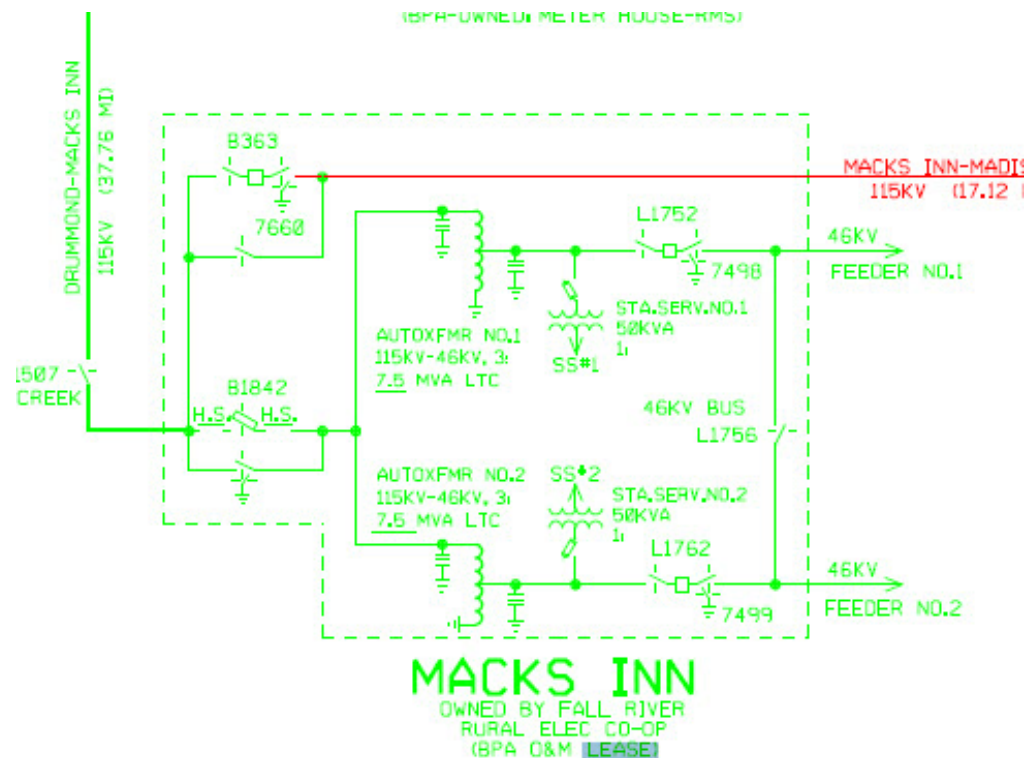
- Provides service to loads on Feeder No. 1, No.2 and No. 3
- Provides benefit to local utility and network grid
- Investment: \$9,164,934<sup>1</sup>
- Operation and Maintenance: \$730,362<sup>1</sup>
- Allocated 50% to Transmission Network and 50% to Non-Network Distribution



1. Source: SegmentationDetail.xls, provided by BPA on May 23, 2012.  
NOTE: Shown one-line diagrams were made public in the BPA 1996 Rate Case.

# Leased Facility Example

- Provides service to loads on Feeder No. 1 and No. 2
- Provides benefit only to local customers
- Investment: \$429,291<sup>1</sup>
- Operation and Maintenance: \$84,531<sup>1</sup>
- It appears that BPA paid some part of the initial investment and annual O&M; and BPA leases the station from the local utility to serve the local load.



1. Source: SegmentationDetail.xls, provided by BPA on May 23, 2012.  
NOTE: Shown one-line diagrams were made public in the BPA 1996 Rate Case.



# Results

BPA Facilities	Gross Plant Investment	O&M
Current Integrated Network Segment Value <sup>1</sup>	\$4,310,878,614	\$100,865,319
Radials & Open Loops <sup>2</sup>	(\$307,688,528)	(\$10,452,515)
Local Networks & Load Serving Networks <sup>2</sup>	<u>(\$406,367,246)</u>	<u>(\$13,545,498)</u>
<b>Adjusted Integrated Network</b>	\$3,596,822,840	\$76,867,306
<b>% Change</b>	16.6%	23.8%

1. Source: SegmentationDetail.xls, provided by BPA on May 23, 2012
2. See Appendix A

# Transmission and Distribution Cost Segmentation

	Integrated Network Segment	Distribution
Current Gross Plant <sup>1</sup>	\$4,310,878,614	-
Distribution Facilities <sup>2</sup>	<u>(\$714,055,774)</u>	<u>\$714,055,774</u>
Adjusted Gross Plant	\$3,596,822,840	\$714,055,774
Approx. % Depreciation <sup>3</sup>	37.5%	37.5%
<b>Net Investment</b>	<b>\$2,248,014,275</b>	<b>\$446,284,859</b>
O&M <sup>1</sup>	\$100,865,319	-
Distribution O&M	<u>(\$23,998,013)</u>	<u>\$23,998,013</u>
<b>Adjusted O&amp;M</b>	<b>\$76,867,306</b>	<b>\$23,998,013</b>

1. Source: SegmentationDetail.xls, provided by BPA on May 23, 2012

2. See Appendix A

3. Ratio between Net Plant (source: TR-12-Final\_Rate\_Study\_Tables\_Update.xls, Apr. 12,2012) and Gross Plant (source: SegmentationDetail.xls, May 23, 2012)

# Cost Recovery of Distribution Facilities

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- Option 1: Directly assign costs to those utilities served by specific distribution facilities.
- Option 2: Identify facilities as serving a PTP or NT customer and assign investment and O&M costs to the PTP and NT classes.

# Option 2

	Integrated Network Segment	PTP Distribution Segment <sup>4</sup> 20%	NT Distribution Segment <sup>4</sup> 80%
Current Gross Plant <sup>1</sup>	\$4,310,878,614	-	-
Distribution Facilities <sup>2</sup>	<u>(\$714,055,774)</u>	<u>\$142,811,155</u>	<u>\$571,244,619</u>
Adjusted Gross Plant	\$3,596,822,840	\$142,811,155	\$571,244,619
Approx. % Depreciation <sup>3</sup>	37.5%	37.5%	37.5%
<b>Net Investment</b>	<b>\$2,248,014,275</b>	<b>\$89,256,972</b>	<b>\$357,027,887</b>
O&M <sup>1</sup>	\$100,865,319	-	-
Distribution O&M	<u>(\$23,998,013)</u>	<u>\$4,799,603</u>	<u>\$19,198,410</u>
<b>Adjusted O&amp;M</b>	<b>\$76,867,306</b>	<b>\$4,799,603</b>	<b>\$19,198,410</b>

1. Source: SegmentationDetail.xls, provided by BPA on May 23, 2012

2. See Appendix A

3. Ratio between Net Plant (source: TR-12-Final\_Rate\_Study\_Tables\_Update.xls, Apr. 12,2012) and Gross Plant (source: SegmentationDetail.xls, May 23, 2012)

4. PTP and NT allocation determined by engineering study. See Appendix A.

# Assessment Issues

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- Substations represented on BPA one-line diagrams were not always in WECC powerflow cases.
- WECC powerflow base case topology and load information did not always agree with BPA one-line diagrams.
- Facilities directly serving load and generation or just generation were identified as network facilities in BPA's existing Segmentation Study.
- Knowledge of Remedial Action Schemes ("RAS")/Special Protection Schemes ("SPS") are not known for contingency reviews. Assessment looked at flows under All-Lines-in-Service ("ALIS") conditions.
- Details of BPA customer and foreign utility interconnection systems were not always available.
- Operation and maintenance lease agreements were not always identified on one-line diagrams.
- New information from BPA staff on Aug. 15th means analysis is likely a conservative view.

# Conclusion & Recommendations

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- The Integrated Network Segment should be updated for the 2014-2015 Rate Case.
- BPA should adopt one of the suggested cost recovery methods to set rates.