Integrated Transmission System Assessment

Eastern Montana and Western/Central North Dakota – Unexpected Load Evaluation (2012-2021)

December 2011

Developed For:

FERC Order 890 and NERC Standards TPL-001 through TPL-003

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CRITICAL ENERGY INFRASTRUCTURE INFORMATION

NOTICE

Materials contained in the complete study document include Critical Energy Infrastructure Information (CEII). All materials designated as CEII must be handled and protected in accordance with the CEII Policy of Western Area Power Administration (WAPA) and the CEII Policy of any affected Transmission Owner (TO) identified in this document or attached materials.

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The direct link to the pdf file is http://www.oatioasis.com/woa/docs/WAPA/WAPAdocs/Western-OATT-BP-CEII-Policy-Version-2010-0812.pdf.

If the request for CEII can be granted, a Non-Disclosure and Confidentiality Agreement (NDA) will be offered you. A template of the NDA is also posted in Western's Effective Business Practices Folder. The direct link to the pdf file is http://www.oatioasis.com/woa/docs/WAPA/WAPAdocs/Western-OATT-Confidentiality-NDA-Agreement-Form-Version-2010-0812.pdf.

0.0 Executive Summary

The purpose of this study is to evaluate and identify system additions needed in the Western, Basin, and Heartland Integrated System (IS). This report reviews the unexpected network load growth due to increasing oil load development in western Montana and eastern/central North Dakota. This effort will identify limiting transmission element(s) and potential problem areas as the load in this area increases due to this unexpected rapidly changing network load demand in this region. The goal is to maintain system reliability and customer load serving capability by identifying possible short term solutions that will provide solutions prior to major transmission being constructed.

This report covers only the mitigation plans for identified N-1 deficiencies in Eastern Montana and Western/Central North Dakota for years one to five to accommodate this unexpected network load growth in the region. Mitigation plans associated with the historical base load in the area is discussed in "Integrated Transmission System Assessment, Eastern Montana and Western/Central North Dakota Base Line Study Report December 2011" [1]. Although there are a few similarly identified facility improvements needed in the region prior to the addition of the oil load, it is important to reference this load serving study because there are substantial facility additions planned in the area to support this unexpected rapidly changing network load demand in the region.

Brief Summary of Results

Area loads are growing and load forecasts are constantly updated. The following is a list of improvements for Eastern Montana and Western/Central North Dakota that are required to serve the unexpected rapidly changing network load demand in the area based on load forecasts received in mid-2011. The following facility improvements and additions are necessary to meet the projected load as per this load forecast.

- 2012/2013: Addition of capacitors

Location	Total Size	Notes:
Blaisdell 115	30 MVAR	2 x 15 MVAR*
Belden 115	15 MVAR	1 x 15 MVAR*
Dickinson 115	30 MVAR	2 x 15MVAR
Kenaston 115	20 MVAR	2 x 10 MVAR
Logan 115	30MVAR	2 x 15 MVAR
New Town 115	10 MVAR	1 x 10 MVAR
Parshall 115	10 MVAR	1 x 10 MVAR
State Line 115	15 MVAR	1 x 15 MVAR
SW Minot 115	10 MVAR	1 x 10MVAR
Watford City 115	30 MVAR	2 x 15MVAR *

*Capacitors design and installation in progress.

- Spring 2013: Add a clutch to enable synchronous condenser operation to the proposed Pioneer Generation Station located at State Line Substation near Williston ND to increase the voltage stability limit, improve voltage regulation, and improve power quality.

- Fall 2013: Construct a 115 kV connection between the Garrison 115 kV substation and the Tioga/Nest 115 kV substation with an additional connection to the Blaisdell 115/230 kV substation to serve additional unexpected network load growth in the Williston, ND area. This project will incorporate some of the area cooperative's existing 115 kV facilities to expedite the completion of the required transmission path. The connection will extend as noted below:

    - Western's Snake Creek 115 kV to Coop's Parshall-New Town-Belden 115 kV
    - Coop's Belden 115 to Neset 115 kV
    - Coop's Belden 115 to Blaisdell 115 kV

- Fall 2013: Add a 2nd Williston 230/115kV 200MVA transformer to mitigate criteria violations for loss of the existing transformer.

- 2016 or as soon as possible: Add a 345kV line connecting AVS to Charlie Creek to Williston to Tioga. These additions will accommodate forecasted load growth through 2020 during system intact conditions. Continued study of this build out is needed.