

## **Bakken Area Long Range Transmission Study**

### **Executive Summary**

The required facilities and approximate required in service dates are listed below. This scheduling is derived from the voltage stability results in Section 15 and Figure 15.2 in particular as well as the results in the steady state analysis. The analysis shows the need for sections of the 345kV additions to be placed in service prior to 2016. However the earliest the line or any section can be placed into service is likely 2016. Any transmission limitations will have to be made up by operating actions such as running generation, restricting transfers, or restricting load.

#### **2013:**

- Mandan-Dickinson-Belfield 230kV Line - increase rating to 398MVA conductor rating
- Bottineau area improvements are needed when area load exceeds 65MW (see Section 8.4)

#### **2015:**

- 2<sup>nd</sup> Dickinson 230/115kV transformer and eliminate 230kV bus outage issue

#### **2016:**

- AVS-Charlie Creek-Williston-Tioga 345kV Line
  - (also, address Williston 345kV breaker 292 failure outage)
  - The earliest the AVS-Williston-Tioga 345kV line can be placed in service is 2016
- Larson 230/115kV Substation
- Culbertson-Bainville 115kV Line (assumes Stateline-Bainville-Grenora 115kV in service)

#### **2017:**

- Williston 230kV bus capacitor addition, 3 x 80MVAR
- Reconductor Logan-Minot SW 115kV Line to increase rating to 180MVA
- Dawson 115kV bus, sectionalize main bus or implement UVLS

#### **2018:**

- Leland Olds-Logan-Tioga 345kV Line

**2020:**

- Addition of a 2<sup>nd</sup> Charlie Creek 345/115kV transformer or a 230/115kV transformer
- One of the following three options works well;
  - Additional Reactive Support, Dawson 115kV = 98MVAR, Maurine 115kV = 90MVAR, Hettinger 115kV = 75MVAR
  - Charlie Creek-Dawson 345kV Line
  - Or “230kV Build Out” which consists of upgrading the existing Williston-Fort Peck 115kV Line to 230kV operation, a new Williston-Richland-Dawson 230kV Line, and a new Charlie Creek-Richland 230kV Line.