

## **APPENDIX A**

# **DESIGN DATA REPORT**

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## DESIGN DATA REPORT

### North Dakota Facility

- Approximately 9-11 mile-long 345-kV Single Circuit transmission line
- Final layout and structure types to be completed after design is finalized
- One new substation – Ellendale 345-kV Substation
- Existing substation modification – Ellendale 230-kV Substation
- Approximately 0.3 mile long 230-kV tie line

TRANSMISSION LINE GENERAL SPECIFICATIONS	
345 kV Transmission Line	Details
Voltage (kV)	345
Average Height Range (feet)	120-155
Maximum Operating Capacity	1,195 MVA (~2,000 Amps)
Average Span Length (feet)	1,000 Range between 700 and 1,200 feet
Structure Types	Self-Supporting Monopoles
Conductor Size	Two conductor bundle (2x), TP (twisted pair) 477 kcmil (thousand circular mils), 26/7, Hawk, ACSR (aluminum conductor steel reinforced)
Shield Wire	Optical Ground Wire (OPGW) and 0.375 inch Extra High Strength (EHS)
Right-of-Way (feet)	150-foot-wide
Average Footing Depth (feet)	25-50
Average Footing Diameter (feet)	6 - 11
Foundation Type	Drilled Pier

ASSOCIATED FACILITIES GENERAL SPECIFICATIONS	
<b>Ellendale 345-kV Substation</b>	
Equipment	This will involve the installation of two 345-kV circuit breakers, one 345-kV line termination structure, five 345-kV disconnect switches, one 345-kV/230-kV 300/400/500 MVA Auto-Transformer, 345 kV Shunt Reactor, eight 230-kV circuit breakers, twenty-one 230-kV disconnect switches, four 230-kV line termination structures, associated arresters, Capacitive Voltage Transformers (CVTs), bus work, and protective relaying and controls required to support the circuit breakers, 50 MVAR line reactor
Right-of-Way to be Acquired	Montana-Dakota will acquire property.
<b>New 230-kV Tie Line</b>	
Equipment	An approximately 1,500-foot-long 230 kV Tie Line to connect the existing Ellendale Junction 230 kV Substation to the new Ellendale 345 KV Substation will be built within existing Montana-Dakota easement. It is anticipated that the tie line will utilize 954 MCM ACSR, Rail conductor supported on round wood poles using single pole structures.
Right-of-Way to be Acquired	N/A. Activity completed on existing Montana-Dakota easement.

ASSOCIATED FACILITIES GENERAL SPECIFICATIONS	
Ellendale 230-kV Substation Modifications	
Equipment	Modify buswork to accept the 230kV tie line.
Right-of-Way to be Acquired	N/A. Activity completed within existing substation footprint.