Nebraska Public Power District
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Washington, D.C. 20426

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Subject: 2016 FERC Form 715 - Annual Transmission Planning and Evaluation Report

Nebraska Public Power District (NPPD) submits the following response to Parts 1-6 of FERC Form 715. Enclosed you will find the signed version of this submittal provided in electronic format via FERC eFiling.

NPPD is a non-jurisdictional utility under the Federal Power Act, specifically reserves all its rights under the Federal Power Act and other federal law with respect to FERC jurisdiction notwithstanding compliance with 18 CFR 141.300 and Form 715.

Part 1: Identification and Certification

Transmitting Utility Name:	Nebraska Public Power District (NPPD)
Transmitting Utility Address:	P.O. Box 499 1414 15th Street Columbus, NE 68602-0499
Contact Person Name:	Randy R. Lindstrom
Contact Person Title:	Transmission Planning Supervisor
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Certification of Accuracy:

Certifying Official Signature:

Certifying Official Name: Randy R. Lindstrom

Certifying Official Title: Transmission Planning Supervisor

Part 2: Powerflow Base Cases

NPPD is a member of the Southwest Power Pool (SPP). NPPD has authorized SPP to submit regional powerflow data as required under Part 2.

Regional Organization Name:	SPP
Mailing Address:	Southwest Power Pool 201 Worthen Drive Little Rock, AR 72223-4936
Contact Person:	Chris Haley
Contact Person Title:	Engineering Associate III, Modeling
Contact Person Telephone No.:	(501) 614-3583
Contact E-mail Address:	chaley@spp.org

Part 3: Transmitting Utility Maps and Diagrams

NPPD has authorized SPP to submit a regional bulk transmission system map of the SPP region that includes NPPD's region on our behalf. NPPD submits its one-line powerflow diagrams for the NPPD region within the electronic FERC eFiling.

Part 4: Transmission Planning Reliability Criteria

NPPD follows Southwest Power Pool Criteria for planning and operation of the bulk transmission system. The SPP Criteria is posted on the publicly available www.spp.org site. NPPD does have stability limitations in western Nebraska, so it is important to establish our stability criteria in this document. NPPD employs the following stability criteria, which is also consistent with SPP Stability Criteria:

Transient Voltage Criteria :
Bus voltage excursions outside the band of 0.80 to 1.2 PU for a time period greater than 30 cycles or below 0.70 PU anytime after the fault was cleared are considered unacceptable.

Damping Criteria:
All machine rotor angle oscillations must be positively damped and meet the criteria below. The criteria does not apply to bus voltages. The Damping Factor will be calculated from the "Successive Positive Peak Ratio" (SPPR) of the peak-to-peak amplitude of the rotor oscillation. SPPR and the associated Damping Factor will be calculated as:

SPPR = Successive swing amplitude / Previous swing amplitude
Damping Factor = (1 - SPPR) * 100 (in %)

The Damping Criteria are as follows (with increased damping required for higher probability events):

For Disturbances with faults: SPPR (maximum) = 0.95
Damping Factor (minimum) = 5%

For Line Trips: SPPR (maximum) = 0.90
Damping Factor (minimum) = 10%

Post-Disturbance Loadflow Study Criteria Definitions:
Normal steady-state voltage levels are defined as 0.95 - 1.05 Per Unit. Emergency steady-state voltage levels are defined as 0.90 – 1.10 PU and may be utilized for time periods less than 30 minutes.

Normal thermal loading limits are defined as 100% of normal ratings for transformers, conductors and line/substation equipment. Emergency loading limits are 125% for transformers and 110% for line/substation equipment and apply for periods less than 30 minutes.

Following any disturbance, all NPPD facilities must be returned to within normal voltage criteria and below 100% of normal thermal loading limits within 30 minutes.

Additionally, in the analysis of certain specific transmission interfaces, NPPD employs criteria and analysis requirements which are supplemental to those employed by SPP. Such cases, interfaces, and criteria are described in more detail under Part 5 of this submittal.

Part 5: Transmission Planning Assessment Practices

In general, NPPD employs SPP transmission planning assessment practices. NPPD follows SPP guidelines for testing the reliability of our system through the use of NERC Reliability Standards and SPP Criteria. Although these standards do not spell out specific worst-case contingencies for testing any specific member's transmission system, they do describe the type or components of those contingencies. As the transmission system configuration, load distribution, and operational characteristics of NPPD's system change over time, the specific worst-case contingencies for assessing system adequacy / security will also change. Therefore, NPPD must determine at the particular time, the specific worst-case contingencies to test NPPD's transmission system reliability under any base case powerflow condition.

NPPD has performed extensive detailed dynamic simulation studies that establish transmission system stability limits to meet the NERC Reliability Standards and to provide for the stable operation of western Nebraska generating facilities. However, NPPD recognizes the existence of certain situations for which regional criteria and assessment practices may not adequately protect

our transmission system and our ability to reliably serve our firm transmission service customers. The following provides details for these situations:

1. Western Nebraska Stability Limitations

The NPPD system is currently constrained due to transient stability limitations associated with the western Nebraska generation and transmission system. The western Nebraska region is characterized by low local area load levels, high baseload generation and no synchronous ties to the Western Interconnected system. These characteristics result in high power transfers out of this region with a predominant transmission system bias from western Nebraska to the east and south. Transmission contingencies involving the 345 kV and 230 kV systems in the western and central Nebraska area can lead to instability for the generating units in the western Nebraska region. To meet the NERC Reliability Standards and SPP Criteria, NPPD has installed a Remedial Action Scheme (RAS) at our Gerald Gentleman Station (GGS). The GGS RAS system continuously monitors power transfer conditions, the status of critical lines and breakers, and fault occurrences. For power transfer and contingency combinations that would cause instability, a system of logic sends signals to initiate unit tripping at GGS. The GGS RAS is a registered Special Protection System (SPS) and falls under compliance requirements for all NERC Reliability Standards associated with SPS.

Further, the GGS RAS has stability limitations integrated with other existing western Nebraska area resources. SPP does not set specific criteria for arming levels associated with the GGS RAS. To protect the integrity of the transmission system, NPPD has established RAS arming levels which meet the NERC Standards and regional reliability criteria. NPPD closely monitors the frequency and duration of times we are operating in an armed mode for GGS RAS. NPPD views any increased frequency of arming or increased duration of armed modes, due to incremental utilization of our transmission system, as a degradation of our current reliability margins. NPPD will assess the transient stability impacts expected to result from providing incremental transmission service. NPPD does not provide transmission service for incremental transactions which would cause NPPD to modify the arming levels of our GGS RAS. NPPD does not provide transmission service which will decrease the present reliability of the regional transmission network or increase the risk of unreliable service to firm transmission service customers.

GGS is a registered NERC Flowgate (ID # 6006) and posted stability interface on OASIS. The PTDF Flowgate definition is consistent with the monitored elements for system intact operation of the GGS Stability Interface. The current system intact Total Transfer Capability (TTC) for this interface is 1850 MW and this stability limit is fully subscribed. The 1850 MW maximum system intact stability limit has been approved by MAPP and accommodates all of the current firm capacity rights associated with the following western Nebraska stability limited resources:

Gerald Gentlemen Station Unit # 1 = 678 MW (NET)
Gerald Gentleman Station Unit # 2 = 700 MW (NET)
Kingsley Hydro Unit # 1 = 50 MW (NET)
Laramie River Station Unit # 1 = 570 MW (NET)

Stegall DC Tie = 110 MW West-East
Sidney DC Tie = 200 MW West-East
Rapid City DC Tie = 200 MW West-East

Any new Generator Interconnection or Transmission Service Request which impacts this stability limited region must be studied such that the existing approved firm capacity rights, as documented here, are preserved. The GGS Flowgate posting is considered a proxy flowgate posting for the GGS Stability Interface. Any new resources which impact this proxy flowgate must be studied through a detailed stability study process to determine the actual impacts on western Nebraska stability. The western Nebraska stability region has been studied in this incremental fashion since its inception and there are critical coordination requirements with the existing GGS RAS that must be adhered to. Failure to follow these procedures during new generator interconnection studies will result in an unreliable situation that could lead to instability, cascading, and loss of load to the entire western Nebraska area.

2. Grand Island / Lincoln Transmission Interface:

The Grand Island / Lincoln area transmission network is constrained due to first contingency steady state powerflow limitations associated with high simultaneous west-east and north-south network powerflows. This constrained interface is defined based on the pre-contingent powerflows on the Grand Island - McCool 345 kV, Pauline-Moore 345 kV and Grand Island - West Columbus 230 kV transmission lines. The interface is limited due to first contingency overloads on the parallel 345 kV and 115 kV transmission network. The GRIS_LNC is a registered NERC Flowgate (ID # 6008) and is posted on OASIS. NPPD does not provide transmission service for incremental transactions which would exceed the limitations associated with this interface.

3. Cooper South Transmission Interface:

There are limitations to steady state powerflows south of NPPD's Cooper 345 kV substation. There is a steady state powerflow limit based on the Cooper - Fairport and Cooper - St. Joe 345 kV transmission line flows. This is a first contingency operating limit on the amount of north - south transfer capability across this MISO/SPP boundary. The interface is limited by first contingency overloads on the parallel facility. The COOPER_S is a registered NERC Flowgate (ID # 6009) and is posted on OASIS. NPPD does not provide transmission service for any incremental transactions which exceed the Cooper South Flowgate transfer limitations.

4. Western Nebraska / Western Kansas Transmission Interface:

There are limitations to powerflows from the western Nebraska region into the western Kansas region. This interface is constrained due to first contingency voltage and thermal limits on the underlying 115 kV transmission system. In addition to the voltage and thermal constraints, generation patterns and powerflow conditions across this interface can affect the angular

displacement between the NPPD / Sunflower Electric Cooperative transmission systems and the ability to re-synchronize the two systems following an outage of the Red Willow - Mingo 345 kV interconnection. The GENTLMN_REDWILO is a registered NERC Flowgate (ID # 6007) and is posted on OASIS. NPPD does not provide transmission service for any incremental transactions which may exceed the western Nebraska to western Kansas transfer limitations.

Part 6: Evaluation of Transmission System Performance

As a member of SPP, the performance of NPPD's transmission system conforms to SPP Criteria and assessment practices. In 2015, NPPD participated in the SPP reliability assessment and the results of that long term assessment are contained in the SPP 2015 TPL Compliance Report. Also in 2015, NPPD performed a 2015 System Performance Assessment of the NPPD transmission system to document the evaluation of transmission system performance and document compliance with the TPL standards. System performance data from those Long Term Reliability Assessments are submitted to the appropriate Regional Entity and Planning Coordinator. These documents provide a summary of the performance of the NPPD transmission system for the various study horizons as it pertains to the regional transmission systems. NPPD also references the four specific areas identified in Part 5 of this FERC 715 submittal as the most prominent areas of existing and future transmission constraints in the NPPD area.

NPPD requests that all of the information submitted under Parts 2-6 of Form 715 constitute critical energy infrastructure information (CEII) and are exempt from public disclosure.

This concludes NPPD's FERC Form 715 data submittal. If you have any questions regarding this information or any further requirements, you may contact me at (402) 563-5240.

Sincerely,

Randy R. Lindstrom
Transmission Planning Supervisor

Cc: T.J. Kent
P.J. Malone
H.L. Hadland
Chris Haley - SPP