BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION

IN THE MATTER OF SOUTHWESTERN PUBLIC SERVICE COMPANY'S APPLICATION REQUESTING: (1) ISSUANCE OF A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY AUTHORIZING CONSTRUCTION AND OPERATION OF THE EDDY COUNTY TO KIOWA 345-KV TRANSMISSION LINE AND ASSOCIATED FACILITIES; (2) APPROVAL OF THE LOCATION OF THE 345-KV TRANSMISSION LINE AND ASSOCIATED FACILITIES; (3) DETERMINATION OF RIGHT-OF-WAY WIDTH FOR THE TRANSMISSION LINE; AND (4) AUTHORIZATION TO ACCRUE AN ALLOWANCE FOR FUNDS USED DURING CONSTRUCTION FOR THE TRANSMISSION LINE AND ASSOCIATED FACILITIES,	)	**CASE NO. 19-00157-UT**
SOUTHWESTERN PUBLIC SERVICE COMPANY,	)	
APPLICANT.	)	

DIRECT TESTIMONY

of

JARRED J. COOLEY

on behalf of

SOUTHWESTERN PUBLIC SERVICE COMPANY

TABLE OF CONTENTS

GLOSSARY OF ACRONYMS AND DEFINED TERMS

Acronym/Defined Term	Meaning
AFUDC	Allowance for Funds Used During Construction
BLM	Bureau of Land Management
Commission	New Mexico Public Regulation Commission
CCN	Certificate of Public Convenience and Necessity
Cunningham	Cunningham Generating Station
DPN Study	SPP's Delivery Point Network Study
EA	Environmental Assessment and Routing Analysis
FERC	Federal Energy Regulatory Commission
Hobbs Plant	Lea Power Partners-Hobbs Plant
kV	Kilovolt(s)
Maddox	Maddox Generating Station
MVA	Megavolt amperes
MW	Megawatt
NTC	Notification to Construct
Proposed Project	345-kV transmission line and associated facilities extending from SPS's Kiowa Substation to its Eddy County Substation located in Eddy County, New Mexico

Acronym/Defined Term	**Meaning**
PUA	New Mexico Public Utility Act (NMSA 1978, §§ 62-3-1 *et seq.*)
ROW	Right-of-Way
Rule 592	17.9.592 NMAC
SPP	Southwest Power Pool
SPS	Southwestern Public Service Company, a New Mexico corporation
Xcel Energy	Xcel Energy Inc.

LIST OF ATTACHMENTS

Case No. 19-____-UT
Direct Testimony
of
Jarred J. Cooley

I. WITNESS IDENTIFICATION AND QUALIFICATIONS

Q. Please state your name and business address.

A. My name is Jarred J. Cooley, and my business address is 790 S. Buchanan Street, Amarillo, Texas 79101.

Q. On whose behalf are you testifying?

A. I am filing testimony on behalf of Southwestern Public Service Company, a New Mexico corporation ("SPS") and wholly-owned subsidiary of Xcel Energy Inc. ("Xcel Energy").[1]

Q. By whom are you employed and in what position?

A. I am employed by Xcel Energy Services Inc. as Manager, Transmission Planning South.

[1] Xcel Energy is the parent company of four utility operating companies: Northern States Power Company, a Minnesota corporation; Northern States Power Company, a Wisconsin corporation; Public Service Company of Colorado, a Colorado corporation and SPS. Xcel Energy's natural gas pipeline company is WestGas Interstate, Inc. Through its subsidiary, Xcel Energy Transmission Holding Company, LLC, Xcel Energy also owns three transmission-only operating companies: Xcel Energy Southwest Transmission Company, LLC; Xcel Energy Transmission Development Company, LLC; and Xcel Energy West Transmission Company, LLC, all of which are either currently regulated by the Federal Energy Regulatory Commission ("FERC") or expected to be regulated by FERC.

Q. Please briefly outline your responsibilities as Manager, Transmission Planning South.

A. I provide overall management direction for the transmission planning staff in Amarillo, Texas. Their duties include planning new transmission facilities required for generation and customer additions. I also actively participate on behalf of SPS in the Southwest Power Pool's ("SPP") transmission planning activities. In addition, I participate in the preparation of the SPS transmission capital budget. Finally, I interact with retail and wholesale customers seeking new transmission service, as well as wind and solar developers working on interconnections with the SPS transmission system.

Q. Describe your educational background.

A. I received my Bachelor of Science degree in Electrical Engineering in 2010 from the University of Minnesota – Twin Cities in Minneapolis, Minnesota.

Q. Please describe your professional experience.

A. In 2010, I started as an engineer in the Transmission Planning department with Xcel Energy, based in Minneapolis, Minnesota. In 2014, I was promoted to Senior Engineer within the Transmission Planning department. I continued to

work in that department until 2018, when I became Manager, Transmission Planning South, and moved to Amarillo, Texas.

Q. Do you hold any professional licenses?

A. Yes. I am a registered Professional Engineer in the State of Minnesota.

Q. Have you filed testimony or testified before any regulatory authorities?

A. Yes. I filed written testimony with FERC regarding a filing by the SPP in Docket No. ER18-2358-000.

II. ASSIGNMENT, OVERVIEW OF THE FILING, AND IDENTIFICATION OF WITNESSES

Q. Please briefly describe the approvals requested in the Application.

A. SPS's Application requests that the Commission: (1) issue a Certificate of Public Convenience and Necessity ("CCN") to SPS to construct, operate, and maintain a proposed 345-kilovolt ("kV") transmission line and associated facilities to be located in Eddy County, New Mexico, which extends from SPS's Eddy County Interchange to its Kiowa Interchange ("Proposed Project"); (2) grant location approval of the 345-kV transmission line route and associated facilities; (3) determine that a 150-feet ROW width is necessary for SPS to construct, operate, and maintain the proposed transmission line; and (4) authorize SPS to accrue an allowance for funds used during construction ("AFUDC") of the proposed transmission line and associated facilities.

Q. What is the purpose of your testimony?

A. My testimony supports SPS's Application for issuance of a CCN for the Proposed Project. In this regard, my testimony: (1) provides an overview of SPS's transmission system and operations in the service area; (2) describes the proposed 345-kV transmission line and upgrades required to terminate the proposed line at

the existing Eddy County and Kiowa Interchanges; (3) demonstrates SPS's need for the Proposed Project to serve the public convenience and necessity and public interest of retail customers in New Mexico; (4) explains how SPS's filing satisfies the requirements of Sections 62-9-1 and 62-9-6 of the New Mexico Public Utility Act's (NMSA 1978, §§ 62-3-1 *et seq.* – "PUA") for New Mexico Public Regulation Commission ("Commission") approval and issuance of a CCN for the Proposed Project; (5) provides an estimate of the New Mexico retail jurisdictional allocation of the total cost of the Proposed Project, including SPS's request for Commission authorization of AFUDC; and (6) introduces SPS's witnesses and briefly summarizes the areas of their testimonies. Please refer to Attachment JJC-1 for an overview map showing the location of the Proposed Project.

Q. Please summarize your testimony.

A. The Proposed Project is needed to enhance SPS's transmission system stability and reliability due to increased customer requests for new service which primarily involves oil and natural gas well development, processing facilities and pipelines in the southeast New Mexico area. The need for the Proposed Project was evaluated by the SPP through its Delivery Point Network Study ("DPN Study") process in which SPS actively participated. The DPN Study is attached as

Attachment JJC-2. As a result of the SPP's evaluation and determinations in the DPN Study, the SPP issued a Notification to Construct ("NTC") to SPS to construct the Proposed Project. The NTC is Attachment JJC-3. For the reasons discussed in this testimony, the Proposed Project will address and support required system stability and reliability needs identified by the SPP in a cost effective manner. Therefore, the Proposed Project will serve the public convenience and necessity of retail customers in New Mexico and Texas and is in the public interest.

Q. Please identify the other SPS witnesses who will provide testimony in support of SPS's Application, and generally describe the subjects their testimony will address.

A. The other SPS witnesses and the subjects of their respective testimony in support of SPS's Application are as follows:

(1) Jerry G. Crawford's testimony: (i) discusses the statutory requirements for approval of right-of-way ("ROW") widths in excess of 100-feet, and supports the need for a ROW of at least 150-feet for the Proposed Project; (ii) describes the circuit design and construction of the Proposed Project; and (iii) discusses the estimated costs associated with the Proposed Project, including SPS's request for authorization to accrue AFUDC;

(2) Nisha P. Fleischman's testimony: (i) identifies and discusses the ROW permits/grants issued to SPS by the U.S. Bureau of Land

Management ("BLM") and the New Mexico State Land Office that establish the location of the proposed 345-kV transmisión line route and associated substation facilities on federal, state and private lands; (ii) describes SPS's compliance with the location and land use requirements of Section 62-9-3 of the PUA and Rule 592.10 (17.9.592 NMAC); and (iii) discusses SPS's compliance with the notice requirements under Section 62-9-3.2 of the PUA;

(3) David J. Brown's testimony: (i) discusses the location of the proposed 345-kV transmission line route and the process that SPS and the BLM conducted to finalize the location of the Proposed Project; (ii) describes the EAs prepared to evaluate the environmental impacts within the areas where the Proposed Project will be constructed and operated; (iii) discusses the BLM's environmental evaluations and actions that resulted in ROW grants for the Project facilities and the NMSLO's grant of a ROW permit for the Project; (iv) explains the BLM's findings that the Proposed Project will have no significant impact on the quality of the human environment; and (v) provides his evaluation of the potential environmental impacts of the Proposed Project, which are based on the EAs and supporting technical documents, and his conclusion that the Proposed Project will not unduly impair the important environmental values identified in Section 62-9-3(M) and Rule 592.10(H).

Q. Were Attachments JJC-1, JJC-4 and JJC-5 prepared by you or under your direct supervision and control?

A. Yes.

Q. Are Attachments JJC-2, JJC-3 and JJC-6 true and correct copies of the documents you represent them to be?

A. Yes.

III. DETAILED PROJECT DESCRIPTION OF SPS'S NEW MEXICO TRANSMISSION SYSTEM AND THE PROPOSED PROJECT

Q. Please describe SPS's southeastern New Mexico transmission system.

A. SPS's existing transmission system in Eddy and Lea Counties, New Mexico, consists of approximately 177 miles of 345-kV transmission line, 218 miles of 230-kV transmission line, 693 miles of 115-kV transmission line, and 131 miles of 69-kV transmission line, as well as numerous substations and interchanges where these lines connect. SPS's southeastern New Mexico service area, particularly Lea and Eddy Counties, includes the following major generating stations: (1) SPS's natural gas-fired Cunningham Generating Station ("Cunningham") that is served at 230-kV and 115-kV transmission levels; (2) Lea Power Partners' natural gas-fired Hobbs Plant ("Hobbs Plant") that is served at 345-kV, 230-kV and 115-kV transmission levels; and (3) SPS's natural gas-fired Maddox Generating Station ("Maddox") that is served at the 115-kV transmission level. The total nameplate generating capacity of the Cunningham and Maddox is approximately 650 megawatts ("MW") and the Hobbs Plant is approximately 532 MW. Attachment JJC-4 is a vicinity map that shows the location of SPS's current and proposed southeastern New Mexico transmission facilities. The solid colored

lines represent existing transmission lines, the red dashed line represents a 345-kV transmission line currently under construction and the alternating red and black dashed line represents the Proposed Project. Please refer to the vicinity map's legend for a complete description of the map symbols.

SPS's existing transmission facilities in the southeast New Mexico area consist of numerous stations used to interconnect the 69-kV, 115-kV, 230-kV and 345-kV transmission lines shown on the vicinity map. Recent CCNs issued to SPS in Eddy and Lea Counties resulted in the construction and operation of the following new transmission lines and facilities: (1) the Potash Junction Substation to the Roadrunner Substation 345-kV transmission line completed in October 2015 (initially energized at 230-kV and converted to 345-kV operation in April 2018); (2) the Hobbs Generating Substation to the China Draw Substation 345-kV transmission line completed in May 2018; and (3) the New Mexico/Texas State Line to the Hobbs Generating Substation 345-kV transmission line completed in

May 2019.[2] These three projects were identified and included in the NTC for the High Priority Incremental Load Study approved by the SPP in April 2014. As SPS's electrical load continues to grow, additional transmission lines will be needed by SPS to accommodate the new connections to the grid and reliably serve new and existing loads.

Q. Please describe the transmission line and the associated facilities that are included in the Proposed Project.

A. The Proposed Project will involve the location, construction, operation and maintenance of a 345-kV transmission line and associated facilities. The 345-kV

[2] *See generally In the Matter of Southwestern Public Service Company's Application for Expedited: (1) Issuance of a Certificate of Public Convenience and Necessity Authorizing Construction and Operation of a 345-kV Transmission Line and Associated Facilities in Eddy and Lea Counties, New Mexico; (2) Approval of the Location of the 345-kV Transmission Line;(3) Determination of Right of Way Width and (4) Authorizing Accrual of an Allowance for Funds Used During Construction for the Transmission Line and Associated Facilities,* Case No. 14-00114-UT, Order on Certification of Stipulation (Dec. 23, 2014); *In the Matter of Southwestern Public Service Company's Application Requesting: (1) Issuance of a Certificate of Public Convenience and Necessity Authorizing Construction and Operation of a 345-kV Transmission Line and Associated Facilities in Eddy and Lea Counties, New Mexico; (2) Approval of the Location of the 345-kV Transmission Line;(3) Determination of Right-of-Way Width and (4) Authorization to Accrue an Allowance for Funds Used During Construction for the Transmission Line and Associated Facilities,* Case No. 16-00126-UT, Final Order Adopting Recommended Decision (Nov. 30, 2016); and *In the Matter of Southwestern Public Service Company's Application Requesting: (1) Issuance of a Certificate of Public Convenience and Necessity Authorizing Construction and Operation of a 345-kV Transmission Line and Associated Facilities in Lea County, New Mexico; (2)Location Approval of the 345-kV Transmission Line;(3) Determination of Necessary Right-of-Way Width and (4) Authorizing Accrual of an Allowance for Funds Used During Construction of the Transmission Line and Associated Facilities,* Case No. 17-00143-UT, Final Order on Recommended Decision (Nov. 29, 2017).

transmission line will extend approximately 33.9 miles from SPS's existing Eddy County Interchange located approximately 9.5 miles east/southeast of Artesia, New Mexico, to SPS's existing Kiowa Interchange located approximately 19 miles northeast of Carlsbad, New Mexico. Please refer to Attachment JJC-1 for a map that shows the location for the 345-kV transmission line route and the location of the Eddy County and Kiowa Interchanges.[3] Also, please refer to Attachment JJC-4 for a vicinity map that shows SPS's transmission facilities in southeastern New Mexico.

In addition to construction of the proposed 345-kV transmission line, the Proposed Project includes the expansion of the facilities at SPS's Eddy County and Kiowa Interchanges. At the Eddy County Interchange, the yard would be enlarged to add a new 345-kV three-terminal ring bus with termination points for the existing 515 megavolt amperes ("MVA"), 345/230-kV autotransformer, one existing 345-kV transmission line, and the proposed 345-kV transmission line to the Kiowa Interchange.[4]

[3] *See* also the Direct Testimonies of David J. Brown and Nisha P. Fleischman that provide the legal descriptions for the location of the 345-kV transmission line route and the Eddy County and Kiowa substations on federal, state, and private lands.

[4] *See* Rule 592.10.A(4).

At the recently constructed Kiowa Interchange, the yard would be enlarged to reconfigure the existing 345-kV four-terminal ring bus into a five-terminal breaker and one-half configuration, with termination points for the existing 448 MVA, 345/115-kV autotransformer, the three existing 345-kV transmission lines, and the proposed 345-kV transmission line to Eddy County Interchange.[5] In accordance with Rule 592.10.A(6), please refer to Attachment JJC-5 for an electrical one-line diagram that shows the proposed electrical connection between Eddy County and Kiowa Interchanges created by the Proposed Project.

[5] *See* Rule 592.10.A(4).

IV. SPS'S NEED FOR THE PROPOSED PROJECT

Q. Please summarize the basis for the need for the Proposed Project.

A. The SPP's DPN Study, issued on May 23, 2018, identified the transmission grid upgrades needed to accommodate the addition of specific network loads in SPS's southeast New Mexico service area that had not been accounted for in previous planning efforts or in system computer models being used in planning efforts underway at the time. The DPN Study evaluated the Proposed Project and other transmission alternatives required to address and resolve potential transmission issues that could result from projected additional load in the Eddy County area anticipated in the near term. Based on the DPN Study evaluation, the SPP determined that the Proposed Project is the most appropriate and cost-effective alternative for addressing SPS's transmission system stability and reliability needs in the New Mexico/West Texas area, and that the Proposed Project is required to provide adequate service to the additional new load located in this area. The DPN Study is included as Attachment JJC-2.

Consequently, the SPP issued NTC-210507 to SPS on December 11, 2018, which provides for the construction of a 345-kV transmission line from the existing Eddy County Interchange to the existing Kiowa Interchange, both located

in Eddy County, New Mexico. The NTC specified a June 1, 2024 in-service date under Project ID 71347 and Network Upgrade ID number 102156. Please refer to Attachment JJC-3, which is a copy of the SPP NTC-210507 issued to SPS for the Proposed Project and Attachment JJC-6, which is a copy of SPS's acceptance of SPP NTC-210507 dated March 11, 2019.

Q. Please further describe the increase in load growth SPS is experiencing in its southeast New Mexico service territory.

A. In addition to the large electric load increase that was the basis for undertaking SPP's DPN Study, SPS has experienced and projects significant electric load growth in the Eddy and Lea County areas in southeast New Mexico. The electric load growth is primarily related to growth of the oil and gas industry. In addition, SPS also is experiencing load growth by other industrial customers as well as residential, small commercial and public authority sectors that support an overall robust economic activity of the region. In some cases, this increasing load on SPS's distribution substations has exceeded the available capacity, thus necessitating the installation of additional capacity at those substations as well as the addition of new substations.

Q. Does SPS expect additional load to come online in the future?

A. Yes. SPS expects above-average load growth to continue in the southeast New Mexico region for the foreseeable future. SPS expects additional large load requests, such as the one evaluated in the DNP Study that resulted in the Proposed Project, to continue into the future. Some of the large industrial customers have expressed to SPS their future expansion plans showing continued growth for the next ten years. In addition, SPS continues to receive many smaller load requests that will be served from new and existing distribution substations on the system.

Q. When does SPS expect the Proposed Project to be placed in service?

A. SPS plans to have the Proposed Project in service by November 15, 2020. Currently, both Kiowa and Eddy County Interchanges have only a single 345-kV source. The installation of the Proposed Project would install a second 345-kV source to these interchanges, providing a backup 345-kV source to the southeast New Mexico area in the event of the loss of the Hobbs Plant to Kiowa Interchange 345-kV transmission line. Additionally, other new loads are continuing to be added to SPS's systems that were not addressed in SPP's DPN Study. Consequently, it is prudent to accelerate the construction of the Proposed Project to proactively prevent potential voltage problems in the region. Therefore, SPS

proposes to complete the Proposed Project in November 2020 to enhance reliability and electric stability in the southeastern New Mexico region.

Q. In your opinion does SPS need the Proposed Project?

A. Yes. SPS agrees with the SPP's determination in its DPN Study that the Proposed Project is needed to serve the existing and projected new electric load growth in the southeast New Mexico region. The DPN Study provides a detailed explanation that establishes the need for the Proposed Project, specifically the need to mitigate "wide spread voltage collapse" that could or would result in the event of a major transmission disturbance, such as the loss of the Hobbs Plant to Kiowa 345-kV transmission line.[6] The DPN Study found that the existing 230-kV and 115-kV transmission lines feeding southeast New Mexico are not adequate to support the growing load demands in the region in the event of the loss of the Hobbs Plant to Kiowa 345-kV transmission line. The system voltages required to serve the loads are not sufficient under this contingency, dropping to low levels resulting in a voltage collapse and outages to customers in this area. The Proposed Project provides a direct tie to the 345-kV system at the Eddy County Interchange, which is directly connected to multiple generation sources on

[6] *See* Attachment JCC-2 at 12-13.

the SPS system. Thus, the Proposed Project provides an alternate, high-capacity and low impedance path for energy flow into the southeast New Mexico region, resulting in the needed system stability during a major system disturbance. The Proposed Project provides significant benefits for the existing and future customers in the region as well as for the single customer for which it was identified. Consequently, the Proposed Project will serve the public convenience and necessity and the public interest by providing necessary and proper transmission service required by businesses and industry within SPS's southeastern New Mexico service area and will not result in unnecessary duplication of service and economic waste in accordance with Sections 62-9-1 and 62-9-6 of the PUA.

V. ESTIMATED COSTS ASSOCIATED WITH PROPOSED PROJECT AND COST ALLOCATION TO NEW MEXICO RETAIL JURISDICTION

Q. What is total estimated cost of the Proposed Project?

A. The total estimated cost for the Proposed Project is approximately $60.8 million, which includes AFUDC. Of the approximately $60.8 million total estimated cost, approximately $2.14 million is AFUDC. Please refer to the Direct Testimony of Mr. Crawford, specifically Attachment JGC-3, for the Estimated Cost Table.

Q. Is SPS requesting a Commission determination of the rate making principles and treatment for the Proposed Project in this proceeding in accordance with Section 62-9-1(B) of the PUA?

A. No. SPS is providing, for informational purposes, a cost estimate for construction of the Proposed Project (including AFUDC), as well as an estimate of the potential jurisdictional allocation to SPS's New Mexico retail customers of the estimated total cost of the Proposed Project.

Q. Please explain SPS's request for AFUDC in this case.

A. SPS is requesting that the Commission authorize SPS to accrue AFUDC, which represents the carrying costs for funds spent during the construction phase of the project. The AFUDC rate will be based on SPS's annual weighted average cost

of capital during the construction period and will be calculated upon completion of the Proposed Project. AFUDC will be included in rate base as a part of a future rate case filing.

Q. How will the total cost of the Proposed Project be allocated to SPS's New Mexico retail customers?

A. First, the total cost of the Proposed Project will be allocated among the SPP members, and then among SPS's rate-setting jurisdictions (i.e., New Mexico retail, Texas retail, and FERC wholesale). As specified in SPP's NTC-210507 to SPS, the total cost of the Proposed Project will be Base Plan funded under SPP's Highway/Byway cost allocation.[7] Based on the Highway/Byway cost allocation and the 2018 peak levels within the SPP, SPP member customers will be allocated 88.71% of the costs and 11.29% of costs will be allocated to customers within the SPS zone.

Next, within the SPS zone, the 11.29% of costs would be jurisdictionally allocated among SPS's New Mexico retail, Texas retail, and wholesale loads.

[7] This allocation splits the funding into three different categories: (1) projects less than 100-kV; (2) projects at or above 100-kV but below 300- kV; and (3) projects 300-kV and higher. Projects below 100-kV are 100 percent funded by the zone in which they are built, projects between 100-kV and 300-kV are funded 1/3 regionally and 2/3 by the zone in which they are built, and projects over 300-kV are 100 percent regionally funded on a load ratio share basis.

For illustrative purposes, using the jurisdictional allocators filed in SPS's most recent New Mexico retail base rate case (Case No. 17-00255-UT), approximately 18% of SPS's total company costs would be allocated to New Mexico retail, 46% to Texas retail customers, and 36% to SPS's wholesale customers.

Under this illustrative projection, SPS's New Mexico retail customers would be responsible for approximately 2.03% of the estimated $60.8 million total cost (approximately $1.232.14 million) for the Proposed Project (i.e., 18% of 11.29% of the total estimated cost allocated to SPS). The actual allocated amount in future SPS New Mexico retail rate cases will differ from this estimated amount and will depend upon final actual costs for the Proposed Project, the SPP funding allocation, and the jurisdictional allocations used in a future rate case.

Q. Does this conclude your pre-filed testimony?

A. Yes.

Case No. 19-____-UT
Direct Testimony
of
Jarred J. Cooley

For illustrative purposes, using the jurisdictional allocators filed in SPS's most recent New Mexico retail base rate case (Case No. 17-00255-UT), approximately 18% of SPS's total company costs would be allocated to New Mexico retail, 46% to Texas retail customers, and 36% to SPS's wholesale customers.

Under this illustrative projection, SPS's New Mexico retail customers would be responsible for approximately 2.03% of the estimated $60.8 million total cost (approximately $1.23 million) for the Proposed Project (i.e., 18% of 11.29% of the total estimated cost allocated to SPS). The actual allocated amount in future SPS New Mexico retail rate cases will differ from this estimated amount and will depend upon final actual costs for the Proposed Project, the SPP funding allocation, and the jurisdictional allocations used in a future rate case.

Q. Does this conclude your pre-filed testimony?

A. Yes.

VERIFICATION

STATE OF TEXAS)
) **ss.**
COUNTY OF POTTER)

Jarred J. Cooley, first being sworn on his oath, states:

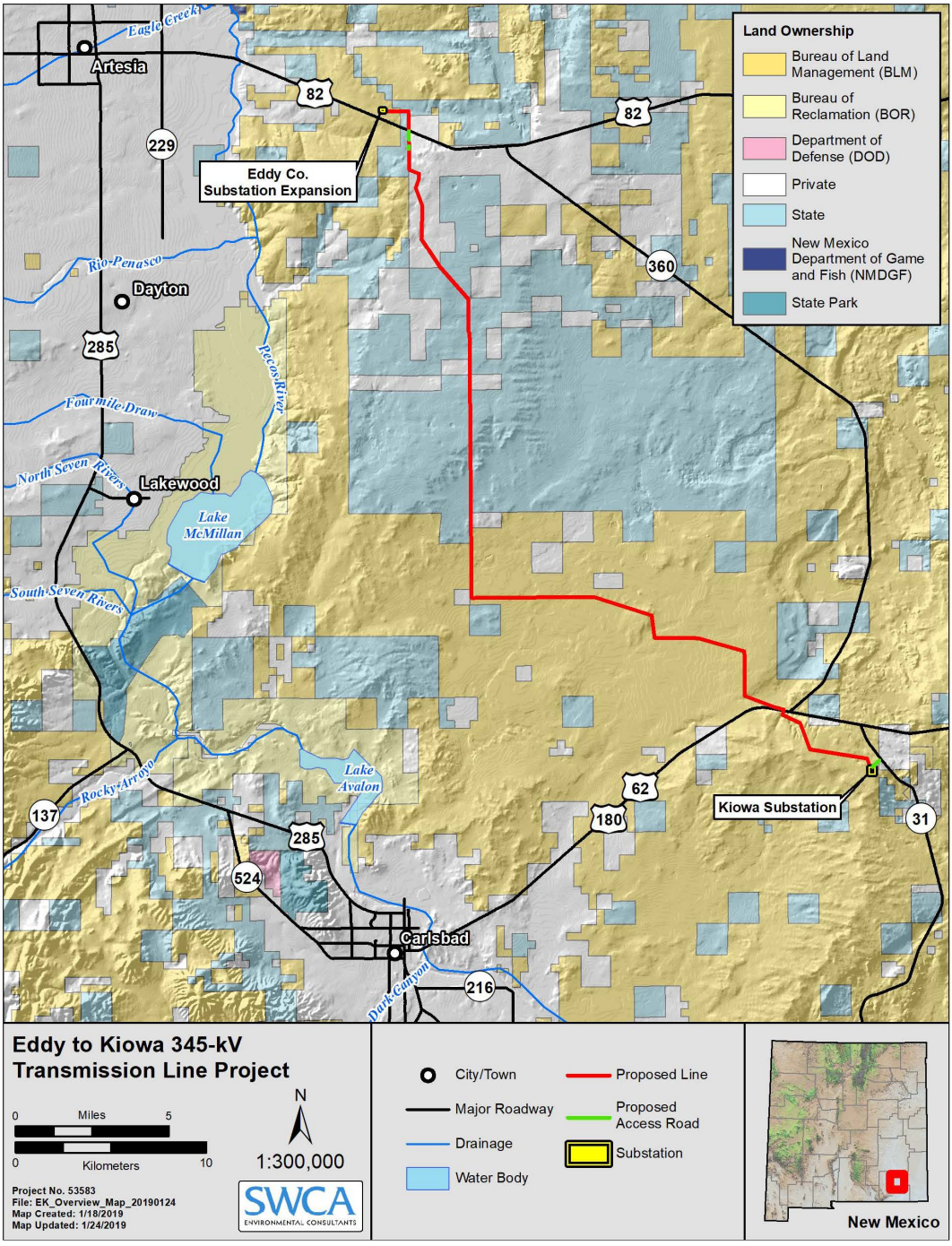
I am the witness identified in the preceding testimony. I have read the testimony and the accompanying attachments and am familiar with their contents. Based upon my personal knowledge, the facts stated in the direct testimony are true. In addition, in my judgment and based upon my professional experience, the opinions and conclusions stated in the testimony are true, valid, and accurate.

DONNA M. ANDERSON
Notary Public, State of Texas
Notary ID #853163-5
My Commission Expires 06-17-2020

Jarred Cooley
JARRED J. COOLEY

SUBSCRIBED AND SWORN TO before me this 23 day of May, 2019.

Donna M Anderson
Notary Public, State of Texas
My Commission Expires: 6/17/2020


Land Ownership
Bureau of Land Management (BLM)
Bureau of Reclamation (BOR)
Department of Defense (DOD)
Private
State
New Mexico Department of Game and Fish (NMDGF)
State Park
Eddy Co. Substation Expansion
Kiowa Substation
Artesia
Dayton
Lakewood
Carlsbad
Lake McMillan
Lake Avalon
Eagle Creek
Rio Penasco
Pecos River
Fourmile Draw
North Seven Rivers
South Seven Rivers
Rocky Arroyo
Dark Canyon
82
229
285
360
62
180
31
137
524
216
Eddy to Kiowa 345-kV Transmission Line Project
0 Miles 5
0 Kilometers 10
N
1:300,000
Project No. 53583
File: EK_Overview_Map_20190124
Map Created: 1/18/2019
Map Updated: 1/24/2019
SWCA ENVIRONMENTAL CONSULTANTS
City/Town
Major Roadway
Drainage
Water Body
Proposed Line
Proposed Access Road
Substation
New Mexico

DPA-2017-NOVEMBER-808

Delivery Point Network Study

Published on 05/23/2018

By SPP Engineering, Transmission Services

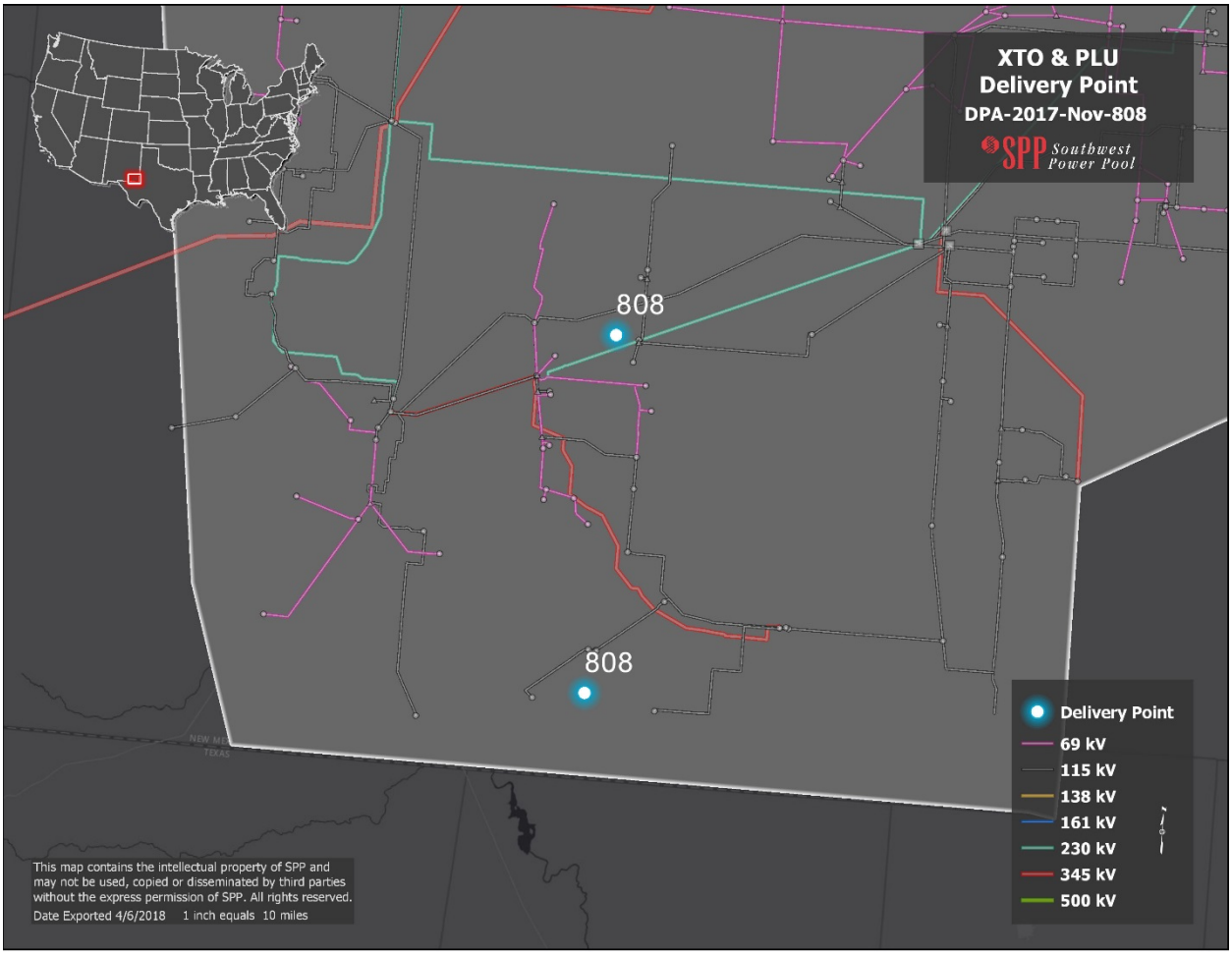
REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION	COMMENTS
04/27/2018	SPP	Original	
05/23/2018	SPP	Corrected cost estimates, adjusted methodology for staging of Eddy – Kiowa 345 kV line, added stability analysis results	No change in staging date for Eddy – Kiowa 345 kV line

CONTENTS

SECTION 1: INTRODUCTION

This report outlines the results of an evaluation of regional transmission impacts from delivery point request DPA-2017-November-808. The requesting entity plans to add four new delivery points; three of the delivery points are added to the Bobco 115kV bus (PLU load) and the remaining delivery point on a new tap on the PCA to Quahada 115kV line (Big Eddy load). The new delivery points are in the Southwest Public Service Company (SPS) transmission system.



The load flow models used for the evaluation were 2018 ITPNT models. SPP performed an AC contingency analysis on these models using PSS®E.

SECTION 2: STUDY METHODOLOGY

OBJECTIVE

The purpose of this study was to determine the regional transmission system impacts within the SPP footprint due to the load additions in SPS. SPP performed a Delivery Point Network Study ("DPNS") with the load amounts shown in Table 2-1 below. The proposed in-service date for the load additions ranges from 11/1/2018 to 02/01/2019. All loads were modeled starting with winter of 2018.

STUDY PROCESS

- Model Assumptions
  - 2018 ITPNT models
    - Model years 2018, 2019, 2022, and 2027
    - Summer Peak (2019S, 2022S, and 2027S), Winter Peak (2018W, 2019W, 2022W, and 2027W), and Light Load (2022L)
    - Scenarios for projected transactions, all firm transactions, Base Reliability, and Balancing Authority (0, 5, BR, and BA)
    - Total of 26 models
  - The models include the load additions at the Bopco 115 kV bus and at the Big Eddy Tap along the PCA – Quahada 115 kV line. SPP compared results from study models both with and without the load additions to determine the impact of the load additions to the transmission system.

Case Name	Study Year	Season	Scenario	Comments
2018ITPNTP6-18W0.sav	2018	Winter Peak	Scenario 0	Base Case
2018ITPNTP6-18W5.sav	2018	Winter Peak	Scenario 5	Base Case
2018ITPNTP6-19S0.sav	2019	Summer Peak	Scenario 0	Base Case
2018ITPNTP6-19S5.sav	2019	Summer Peak	Scenario 5	Base Case
2018ITPNTP7-19SBR.sav	2019	Summer Peak	Base Reliability	Base Case
2018ITPNT-BA_Final-19S.sav	2019	Summer Peak	BA	Base Case
2018ITPNTP6-19W0.sav	2019	Winter Peak	Scenario 0	Base Case
2018ITPNTP6-19W5.sav	2019	Winter Peak	Scenario 5	Base Case
2018ITPNT-BA_Final-19W.sav	2019	Winter Peak	BA	Base Case
2018ITPNTP6-22L0.sav	2022	Light Load	Scenario 0	Base Case
2018ITPNTP6-22L5.sav	2022	Light Load	Scenario 5	Base Case
2018ITPNT-BA_Final-22L.sav	2022	Light Load	BA	Base Case
2018ITPNTP6-22S0.sav	2022	Summer Peak	Scenario 0	Base Case
2018ITPNTP6-22S5.sav	2022	Summer Peak	Scenario 5	Base Case
2018ITPNTP7-22SBR.sav	2022	Summer Peak	Base Reliability	Base Case

Case Name	Study Year	Season	Scenario	Comments
2018ITPNT-BA_Final-22S.sav	2022	Summer Peak	BA	Base Case
2018ITPNTP6-22W0.sav	2022	Winter Peak	Scenario 0	Base Case
2018ITPNTP6-22W5.sav	2022	Winter Peak	Scenario 5	Base Case
2018ITPNT-BA_Final-22W.sav	2022	Winter Peak	BA	Base Case
2018ITPNTP6-27S0.sav	2027	Summer Peak	Scenario 0	Base Case
2018ITPNTP6-27S5.sav	2027	Summer Peak	Scenario 5	Base Case
2018ITPNTP6-27SBR.sav	2027	Summer Peak	Base Reliability	Base Case
2018ITPNT-BA_Final-27S.sav	2027	Summer Peak	BA	Base Case
2018ITPNTP6-27W0.sav	2027	Winter Peak	Scenario 0	Base Case
2018ITPNTP6-27W5.sav	2027	Winter Peak	Scenario 5	Base Case
2018ITPNT-BA_Final-27W.sav	2027	Winter Peak	BA	Base Case
2018ITPNTP6-18W0_808.sav	2018	Winter Peak	Scenario 0	Load Addition: PLU = 52.0 MW/6.73 MVAR Big Eddy = 10.0 MW/1.99 MVAR
2018ITPNTP6-18W5_808.sav	2018	Winter Peak	Scenario 5	Load Addition: PLU = 52.0 MW/6.73 MVAR Big Eddy = 10.0 MW/1.99 MVAR
2018ITPNTP6-19S0_808.sav	2019	Summer Peak	Scenario 0	Load Addition: PLU = 50.5 MW/6.13 MVAR Big Eddy = 10.0 MW/1.99 MVAR
2018ITPNTP6-19S5_808.sav	2019	Summer Peak	Scenario 5	Load Addition: PLU = 50.5 MW/6.13 MVAR Big Eddy = 10.0 MW/1.99 MVAR
2018ITPNTP7-19SBR_808.sav	2019	Summer Peak	Base Reliability	Load Addition: PLU = 50.5 MW/6.13 MVAR Big Eddy = 10.0 MW/1.99 MVAR
2018ITPNT-BA_Final-19S_808.sav	2019	Summer Peak	BA	Load Addition: PLU = 50.5 MW/6.13 MVAR Big Eddy = 10.0 MW/1.99 MVAR
2018ITPNTP6-19W0_808.sav	2019	Winter Peak	Scenario 0	Load Addition: PLU = 102 MW/16.65 MVAR Big Eddy = 20.0 MW/3.98 MVAR
2018ITPNTP6-19W5_808.sav	2019	Winter Peak	Scenario 5	Load Addition: PLU = 102 MW/16.65 MVAR Big Eddy = 20.0 MW/3.98 MVAR
2018ITPNT-BA_Final-19W_808.sav	2019	Winter Peak	BA	Load Addition: PLU = 102 MW/16.65 MVAR Big Eddy = 20.0 MW/3.98 MVAR
2018ITPNTP6-22L0_808.sav	2022	Light Load	Scenario 0	Load Addition: PLU = 202 MW/36.58 MVAR Big Eddy = 40.0 MW/7.0 MVAR
2018ITPNTP6-22L5_808.sav	2022	Light Load	Scenario 5	Load Addition: PLU = 202 MW/36.58 MVAR Big Eddy = 40.0 MW/7.0 MVAR
2018ITPNT-BA_Final-22L_808.sav	2022	Light Load	BA	Load Addition: PLU = 202 MW/36.58 MVAR Big Eddy = 40.0 MW/7.0 MVAR
2018ITPNTP6-22S0_808.sav	2022	Summer Peak	Scenario 0	Load Addition: PLU = 200.5 MW/35.98 MVAR Big Eddy = 40.0 MW/7.96 MVAR
2018ITPNTP6-22S5_808.sav	2022	Summer Peak	Scenario 5	Load Addition: PLU = 200.5 MW/35.98 MVAR Big Eddy = 40.0 MW/7.96 MVAR
2018ITPNTP7-22SBR_808.sav	2022	Summer Peak	Base Reliability	Load Addition: PLU = 200.5 MW/35.98 MVAR

Case Name	Study Year	Season	Scenario	Comments
				Big Eddy = 40.0 MW/7.96 MVAR
2018ITPNT-BA_Final-22S_808.sav	2022	Summer Peak	BA	Load Addition: PLU = 200.5 MW/35.98 MVAR Big Eddy = 40.0 MW/7.96 MVAR
2018ITPNTP6-22W0_808.sav	2022	Winter Peak	Scenario 0	Load Addition: PLU = 250.5 MW/45.928 MVAR Big Eddy = 50.0 MW/9.95 MVAR
2018ITPNTP6-22W5_808.sav	2022	Winter Peak	Scenario 5	Load Addition: PLU = 250.5 MW/45.928 MVAR Big Eddy = 50.0 MW/9.95 MVAR
2018ITPNT-BA_Final-22W_808.sav	2022	Winter Peak	BA	Load Addition: PLU = 250.5 MW/45.928 MVAR Big Eddy = 50.0 MW/9.95 MVAR
2018ITPNTP6-27S0_808.sav	2027	Summer Peak	Scenario 0	Load Addition: PLU = 280.5 MW/51.897 MVAR Big Eddy = 50.0 MW/9.95 MVAR
2018ITPNTP6-27S5_808.sav	2027	Summer Peak	Scenario 5	Load Addition: PLU = 280.5 MW/51.897 MVAR Big Eddy = 50.0 MW/9.95 MVAR
2018ITPNTP6-27SBR_808.sav	2027	Summer Peak	Base Reliability	Load Addition: PLU = 280.5 MW/51.897 MVAR Big Eddy = 50.0 MW/9.95 MVAR
2018ITPNT-BA_Final-27S_808.sav	2027	Summer Peak	BA	Load Addition: PLU = 280.5 MW/51.897 MVAR Big Eddy = 50.0 MW/9.95 MVAR
2018ITPNTP6-27W0_808.sav	2027	Winter Peak	Scenario 0	Load Addition: PLU = 280.5 MW/51.897 MVAR Big Eddy = 50.0 MW/9.95 MVAR
2018ITPNTP6-27W5_808.sav	2027	Winter Peak	Scenario 5	Load Addition: PLU = 280.5 MW/51.897 MVAR Big Eddy = 50.0 MW/9.95 MVAR
2018ITPNT-BA_Final-27W_808.sav	2027	Winter Peak	BA	Load Addition: PLU = 280.5 MW/51.897 MVAR Big Eddy = 50.0 MW/9.95 MVAR

Table 2-1: Study Cases

- Reliability Analysis
  - Assumptions (consistent with the 2018 ITPNT analysis)
    - AC contingency analysis on all load flow models using PSS®E
    - Monitored Elements
      - SPP facilities 69 kV and above
      - First-tier companies 100 kV and above
    - Contingencies
      - P1, P2, P4, P5 events for 22S0 and 22L0
      - P1, P2.1 events for all other models
      - Includes all events in these categories as provided for the 2018 ITPNT by SPP members and first-tier companies
    - Apply SPP Criteria, NERC reliability standards and Transmission Owner local planning criteria
  - Compared thermal overloads and voltage violations that occur with and without the load additions included in the models to determine thermal overloads and voltage violations resulting from the load additions
- Short Circuit Analysis
  - Assumptions

- Used 2016 Final MDWG Short Circuit models (Max Fault)
  - Placed all available facilities in service
    - Generation
    - Transmission lines
    - Transformers
    - Buses
  - Short Circuit Output
    - Physical
  - Short Circuit Coordinates
    - Polar
  - Short Circuit Parameters
    - 3 Phase
  - FLAT – classical fault analysis conditions
- Analyses
  - Three-phase fault

SECTION 3: RESULTS OF ANALYSIS

POTENTIAL THERMAL OVERLOADS AND VOLTAGE VIOLATIONS

The analysis identified potential thermal and voltage violations in the area of the delivery point additions. Table 3-1 details the thermal violations, which occurred across multiple seasons and scenarios.

Season	Scenario	Facility Name	Contingency Name	RATE A (MVA)	RATE B (MVA)	Max Flow (MVA)	Max Loading %
22L	0	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	5618	160.0	160.0	170.9	106.8
22L	0	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	RDRUNNER 3 - PNDEROSATP 3 - 1	160.0	160.0	170.9	106.8
22L	0	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	5469	160.0	160.0	170.9	106.8
22L	BA	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	CUNNINHAM 3 - MONUMNT_TP 3 - 1	160.0	160.0	170.9	106.8
22L	BA	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	MONUMNT_TP 3 - BYRD_TP 3 - 1	160.0	160.0	170.9	106.8
22W	5	BOPCO_PKRLK3 - WOLFCAMP_TP3 - 1	TEAGUE 3 - CARDINAL 3 - 1	177.0	177.0	189.0	106.8
22W	5	BOPCO_PKRLK3 - WOLFCAMP_TP3 - 1	5623	177.0	177.0	189.0	106.8
27S	BA	RED_BLUFF 3 - RDRUNNER 3 - 1	5613	140.2	154.4	164.9	106.8
27S	BA	RED_BLUFF 3 - RDRUNNER 3 - 1	LIVSTNRIDGE3 - SAGE_BRUSH 3 - 1	140.2	154.4	164.9	106.8
27S	BA	RED_BLUFF 3 - RDRUNNER 3 - 1	5608	140.2	154.4	164.9	106.8
27S	BA	RED_BLUFF 3 - RDRUNNER 3 - 1	RDRUNNER 3 - BATTLE_AXE 3 - 1	140.2	154.4	164.9	106.8
27S	0	RED_BLUFF 3 - RDRUNNER 3 - 1	BASE CASE	140.2	154.4	149.8	106.8
27S	BA	BOPCO_PKRLK3 - WOOD_DRAW 3 - 1	LIVSTNRIDGE3 - WIPP 3 - 1	158.9	174.9	186.8	106.8
27S	BA	BOPCO_PKRLK3 - WOOD_DRAW 3 - 1	5428	158.9	174.9	186.8	106.8
22L	5	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	NA_ENRICH 3 - TARGA 3 - 1	160.0	160.0	169.1	105.7
22S	5	RED_BLUFF 3 - RDRUNNER 3 - 1	KIOWA 7 - N_LOVING 7 - 1	140.2	154.4	163.2	105.7
22W	0	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	RDRUNNER 3 - RDRUNNER 7 - 1	177.0	177.0	185.7	104.9
22W	0	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	KIOWA 7 - RDRUNNER 7 - 1	177.0	177.0	185.7	104.9
22W	BA	BOPCO_PKRLK3 - WOLFCAMP_TP3 - 1	ANDREWS 3 - NA_ENRICH 3 - 1	177.0	177.0	185.7	104.9
22W	BA	BOPCO_PKRLK3 - WOLFCAMP_TP3 - 1	5611	177.0	177.0	185.7	104.9
22W	BA	BOPCO_PKRLK3 - WOLFCAMP_TP3 - 1	ANDREWS 6 - GAINESGENTP6 - 1	177.0	177.0	185.7	104.9
22W	0	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	5616	177.0	177.0	185.1	104.6
22W	0	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	RED_BLUFF 3 - RDRUNNER 3 - 1	177.0	177.0	185.1	104.6

Season	Scenario	Facility Name	Contingency Name	RATE A (MVA)	RATE B (MVA)	Max Flow (MVA)	Max Loading %
22W	0	BOPCO_PKRLK3 - WOLFCAMP_TP3 - 1	CARDINAL 3 - TARGA 3 - 1	177.0	177.0	185.1	104.6
22W	0	BOPCO_PKRLK3 - WOLFCAMP_TP3 - 1	5622	177.0	177.0	185.1	104.6
22W	0	BOPCO_PKRLK3 - WOLFCAMP_TP3 - 1	5469	177.0	177.0	185.1	104.6
22W	5	BOPCO_PKRLK3 - WOLFCAMP_TP3 - 1	5618	177.0	177.0	185.1	104.6
22W	5	BOPCO_PKRLK3 - WOLFCAMP_TP3 - 1	RDRUNNER 3 - PNDEROSATP 3 - 1	177.0	177.0	185.1	104.6
22W	BA	BOPCO_PKRLK3 - WOLFCAMP_TP3 - 1	5618	177.0	177.0	185.1	104.6
22W	BA	BOPCO_PKRLK3 - WOLFCAMP_TP3 - 1	RDRUNNER 3 - PNDEROSATP 3 - 1	177.0	177.0	185.1	104.6
27S	5	RED_BLUFF 3 - RDRUNNER 3 - 1	RDRUNNER 3 - AGAVE_RHILL3 - 1	140.2	154.4	161.5	104.6
27S	5	RED_BLUFF 3 - RDRUNNER 3 - 1	5617	140.2	154.4	161.5	104.6
22S	BR	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	5427	160.0	160.0	166.6	104.1
22S	BR	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	LIVSTNRIDGE3 - IMC_#1_TP 3 - 1	160.0	160.0	166.6	104.1
27S	BR	LIVSTNRIDGE3 - WIPP 3 - 1	5618	159.0	159.0	165.5	104.1
27S	BR	LIVSTNRIDGE3 - WIPP 3 - 1	RDRUNNER 3 - PNDEROSATP 3 - 1	159.0	159.0	165.5	104.1
22W	0	RED_BLUFF 3 - RDRUNNER 3 - 1	POTASH_JCT 3 - INTREPDW_TP3 - 1	155.6	171.1	178.1	104.1
27W	0	BOPCO_PKRLK3 - WOOD_DRAW 3 - 1	RDRUNNER 3 - RDRUNNER 7 - 1	176.1	193.6	201.5	104.1
22S	BA	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	LIVSTNRIDGE3 - IMC_#1_TP 3 - 1	160.0	160.0	166.4	104.0
22S	BA	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	5427	160.0	160.0	166.4	104.0
22W	5	LIVSTNRIDGE3 - WIPP 3 - 1	RDRUNNER 3 - RDRUNNER 7 - 1	159.0	159.0	163.3	102.7
22W	5	BOPCO_PKRLK3 - WOOD_DRAW 3 - 1	5616	176.1	193.6	198.8	102.7
22W	5	BOPCO_PKRLK3 - WOOD_DRAW 3 - 1	RED_BLUFF 3 - RDRUNNER 3 - 1	176.1	193.6	198.8	102.7
27S	BA	RED_BLUFF 3 - RDRUNNER 3 - 1	SWITCHED_SHUNT-528018	140.2	154.4	158.2	102.5
22S	BA	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	POTASH_JCT 3 - INTREPDW_TP3 - 1	160.0	160.0	163.7	102.3
27S	BR	RED_BLUFF 3 - RDRUNNER 3 - 1	SWITCHED_SHUNT-528018	140.2	154.4	157.8	102.2
27W	BA	WIPP 3 - SAND_DUNES 3 - 1	N_LOVING 7 - CHINA_DRAW 7 - 1	159.4	159.4	162.9	102.2
22S	0	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	POTASH_JCT 3 - INTREPDW_TP3 - 1	160.0	160.0	163.4	102.1
22S	5	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	LIVSTNRIDGE3 - IMC_#1_TP 3 - 1	160.0	160.0	162.9	101.8
27W	5	CHINA_DRAW 3 - WOOD_DRAW 3 - 1	RED_BLUFF 3 - RDRUNNER 3 - 1	286.0	315.0	320.7	101.8
27W	5	CHINA_DRAW 3 - WOOD_DRAW 3 - 1	5616	286.0	315.0	320.7	101.8
22S	5	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	5427	160.0	160.0	162.7	101.7

Season	Scenario	Facility Name	Contingency Name	RATE A (MVA)	RATE B (MVA)	Max Flow (MVA)	Max Loading %
27W	5	LIVSTNRIDGE3 - WIPP 3 - 1	RDRUNNER 3 - PNDEROSATP 3 - 1	159.0	159.0	161.4	101.5
27W	5	LIVSTNRIDGE3 - WIPP 3 - 1	5618	159.0	159.0	161.4	101.5
27W	0	LIVSTNRIDGE3 - WIPP 3 - 1	CHINA_DRAW 3 - CHINA_DRAW 7 - 1	159.0	159.0	161.4	101.5
27W	BA	DENVER_N 3 - XTO_RUSSEL 3 - 1	YOAKUM_345 - HOBBS_INT 7 - 1	119.5	119.5	121.3	101.5
27S	0	RED_BLUFF 3 - RDRUNNER 3 - 1	HOBBS_INT 6 - HOBBS_INT 7 - 1	140.2	154.4	156.5	101.4
27S	5	WIPP 3 - SAND_DUNES 3 - 1	5618	158.9	159.4	161.6	101.4
27S	5	WIPP 3 - SAND_DUNES 3 - 1	RDRUNNER 3 - PNDEROSATP 3 - 1	158.9	159.4	161.6	101.4
22S	BA	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	SAND_DUNES 3 - RED_BLUFF 3 - 1	160.0	160.0	161.9	101.2
22S	BA	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	5569	160.0	160.0	161.9	101.2
22S	5	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	INTREPDW_TP3 - IMC_#1_TP 3 - 1	160.0	160.0	161.9	101.2
27S	0	RED_BLUFF 3 - RDRUNNER 3 - 1	SWITCHED_SHUNT-528018	140.2	154.4	156.2	101.2
27S	0	BOPCO_PKRLK3 - WOOD_DRAW 3 - 1	5569	158.9	174.9	177.0	101.2
27S	BR	RED_BLUFF 3 - RDRUNNER 3 - 1	CUNNIGHM_N 6 - CUNNIGHM_S 6 - *1	140.2	154.4	156.1	101.1
27S	BA	WIPP 3 - SAND_DUNES 3 - 1	5618	158.9	159.4	161.1	101.1
27S	BA	WIPP 3 - SAND_DUNES 3 - 1	RDRUNNER 3 - PNDEROSATP 3 - 1	158.9	159.4	161.1	101.1
27W	0	LIVSTNRIDGE3 - WIPP 3 - 1	N_LOVING 7 - CHINA_DRAW 7 - 1	159.0	159.0	160.7	101.1
22L	BA	CARLSBAD 3 - PECOS 3 - 1	HOBBS_INT 7 - KIOWA 7 - 1	119.5	119.5	120.8	101.1
22S	0	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	5569	160.0	160.0	161.6	101.0
22S	0	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	SAND_DUNES 3 - RED_BLUFF 3 - 1	160.0	160.0	161.6	101.0
22S	BA	LIVSTNRIDGE3 - WIPP 3 - 1	5616	159.0	159.0	160.6	101.0
22S	BA	LIVSTNRIDGE3 - WIPP 3 - 1	RED_BLUFF 3 - RDRUNNER 3 - 1	159.0	159.0	160.6	101.0
22L	0	BOPCO_PKRLK3 - WOLFCAMP_TP3 - 1	HOBBS_INT 7 - KIOWA 7 - 1	160.0	160.0	161.4	100.9
22W	0	RED_BLUFF 3 - RDRUNNER 3 - 1	INTREPDW_TP3 - IMC_#1_TP 3 - 1	155.6	171.1	172.6	100.9
22L	0	RED_BLUFF 3 - RDRUNNER 3 - 1	LIVSTNRIDGE3 - WIPP 3 - 1	140.2	154.4	155.8	100.9
22L	0	RED_BLUFF 3 - RDRUNNER 3 - 1	5428	140.2	154.4	155.8	100.9
27S	BA	RED_BLUFF 3 - RDRUNNER 3 - 1	NORTH_LOVNG3 - CHINA_DRAW 3 - 1	140.2	154.4	155.6	100.8
27S	BA	RED_BLUFF 3 - RDRUNNER 3 - 1	5601	140.2	154.4	155.6	100.8
27S	5	LIVSTNRIDGE3 - WIPP 3 - 1	HOBBS_INT 6 - HOBBS_INT 7 - 1	159.0	159.0	160.1	100.7
22S	BR	RED_BLUFF 3 - RDRUNNER 3 - 1	SAND_DUNES 3 -	140.2	154.4	155.5	100.7

Season	Scenario	Facility Name	Contingency Name	RATE A (MVA)	RATE B (MVA)	Max Flow (MVA)	Max Loading %
			RED_BLUFF 3 - 1				
22S	BR	RED_BLUFF 3 - RDRUNNER 3 - 1	5569	140.2	154.4	155.5	100.7
22L	5	CARLSBAD 3 - PECOS 3 - 1	HOBBS_INT 7 - KIOWA 7 - 1	119.5	119.5	120.3	100.7
22S	0	LIVSTNRIDGE3 - WIPP 3 - 1	RED_BLUFF 3 - RDRUNNER 3 - 1	159.0	159.0	160.1	100.7
22S	0	LIVSTNRIDGE3 - WIPP 3 - 1	5616	159.0	159.0	160.1	100.7
27S	BR	RED_BLUFF 3 - RDRUNNER 3 - 1	NORTH_LOVNG3 - N_LOVING 7 - 1	140.2	154.4	155.3	100.6
22S	BA	RED_BLUFF 3 - RDRUNNER 3 - 1	SAND_DUNES 3 - RED_BLUFF 3 - 1	140.2	154.4	155.3	100.6
22S	BA	RED_BLUFF 3 - RDRUNNER 3 - 1	5569	140.2	154.4	155.3	100.6
22L	0	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	83676	160.0	160.0	160.8	100.5
27S	BA	RED_BLUFF 3 - RDRUNNER 3 - 1	NORTH_LOVNG3 - N_LOVING 7 - 1	140.2	154.4	155.1	100.5
27S	BR	WIPP 3 - SAND_DUNES 3 - 1	5618	158.9	159.4	160.1	100.5
27S	BR	WIPP 3 - SAND_DUNES 3 - 1	RDRUNNER 3 - PNDEROSATP 3 - 1	158.9	159.4	160.1	100.5
22W	5	RED_BLUFF 3 - RDRUNNER 3 - 1	INTREPDW_TP3 - IMC_#1_TP 3 - 1	155.6	171.1	172.0	100.5
22S	BR	LIVSTNRIDGE3 - WIPP 3 - 1	RED_BLUFF 3 - RDRUNNER 3 - 1	159.0	159.0	159.8	100.5
22S	BR	LIVSTNRIDGE3 - WIPP 3 - 1	5616	159.0	159.0	159.8	100.5
27S	BA	CARLSBAD 3 - PECOS 3 - 1	POTASH_JCT 3 - POTASH_JCT 6 - 1	119.5	119.5	120.1	100.5
27S	0	RED_BLUFF 3 - RDRUNNER 3 - 1	5601	140.2	154.4	155.0	100.4
27S	0	RED_BLUFF 3 - RDRUNNER 3 - 1	NORTH_LOVNG3 - CHINA_DRAW 3 - 1	140.2	154.4	155.0	100.4
22S	0	RED_BLUFF 3 - RDRUNNER 3 - 1	5569	140.2	154.4	155.0	100.4
22L	5	CARLSBAD 3 - PECOS 3 - 1	POTASH_JCT 3 - POTASH_JCT 6 - 1	119.5	119.5	120.0	100.4
22L	0	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	LIVSTNRIDGE3 - IMC_#1_TP 3 - 1	160.0	160.0	160.5	100.3
22L	0	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	5427	160.0	160.0	160.5	100.3
27S	0	RED_BLUFF 3 - RDRUNNER 3 - 1	NORTH_LOVNG3 - N_LOVING 7 - 1	140.2	154.4	154.8	100.3
22S	0	RED_BLUFF 3 - RDRUNNER 3 - 1	SAND_DUNES 3 - RED_BLUFF 3 - 1	140.2	154.4	154.8	100.3
22L	0	RED_BLUFF 3 - RDRUNNER 3 - 1	WIPP 3 - SAND_DUNES 3 - 1	140.2	154.4	154.8	100.3
27S	BR	RED_BLUFF 3 - RDRUNNER 3 - 1	RDRUNNER 3 - AGAVE_RHIL23 - 1	140.2	154.4	154.7	100.2
27S	BA	RED_BLUFF 3 - RDRUNNER 3 - 1	SWITCHED_SHUNT-528009	140.2	154.4	154.7	100.2
27S	BA	RED_BLUFF 3 - RDRUNNER 3 - 1	CUNNIGHM_N 6 - CUNNIGHM_S 6 - *1	140.2	154.4	154.7	100.2
27S	0	RED_BLUFF 3 - RDRUNNER 3 - 1	CUNNIGHM_N 6 - CUNNIGHM_S 6 - *1	140.2	154.4	154.7	100.2

Season	Scenario	Facility Name	Contingency Name	RATE A (MVA)	RATE B (MVA)	Max Flow (MVA)	Max Loading %
22W	5	CARLSBAD 3 - PECOS 3 - 1	HOBBS_INT 7 - KIOWA 7 - 1	119.5	119.5	119.7	100.2
27S	BA	WARD 3 - WHITTEN 3 - 1	RDRUNNER 3 - RDRUNNER 7 - 1	143.0	157.4	157.7	100.2
22S	5	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	5569	160.0	160.0	160.2	100.1
22S	5	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	SAND_DUNES 3 - RED_BLUFF 3 - 1	160.0	160.0	160.2	100.1
22S	5	RED_BLUFF 3 - WOLFCAMP_TP3 - 1	POTASH_JCT 3 - INTREPDW_TP3 - 1	160.0	160.0	160.2	100.1
27S	5	RED_BLUFF 3 - RDRUNNER 3 - 1	5601	140.2	154.4	154.5	100.1
27S	5	RED_BLUFF 3 - RDRUNNER 3 - 1	NORTH_LOVNG3 - CHINA_DRAW 3 - 1	140.2	154.4	154.5	100.1
22L	5	BOPCO_PKRLK3 - WOLFCAMP_TP3 - 1	HOBBS_INT 7 - KIOWA 7 - 1	160.0	160.0	160.2	100.1
27S	0	WIPP 3 - SAND_DUNES 3 - 1	RDRUNNER 3 - PNDEROSATP 3 - 1	158.9	159.4	159.5	100.1
27S	0	WIPP 3 - SAND_DUNES 3 - 1	HOBBS_INT 6 - HOBBS_INT 7 - 1	158.9	159.4	159.5	100.1
27S	0	WIPP 3 - SAND_DUNES 3 - 1	5618	158.9	159.4	159.5	100.1
27W	BA	WIPP 3 - SAND_DUNES 3 - 1	5619	159.4	159.4	159.5	100.1
27W	BA	WIPP 3 - SAND_DUNES 3 - 1	PNDEROSATP 3 - WHITTEN 3 - 1	159.4	159.4	159.5	100.1

Table 3-1: Thermal Violations

The analysis identified potential voltage violations in the area of the delivery point additions. Table 3-2 details the voltage violations, which occurred across multiple seasons and scenarios.

Season & Scenario	Facility Name	Contingency Name	Number of occurances	Voltage Maximum (pu)	Volttage Minimum (pu)	Base Case Voltage Min (pu)	Contingency Voltage Min (pu)
2027 All scenarios	KIOWA 7	HOBBS_INT 7 - KIOWA 7 - 1	7	Collapse	Collapse	0.95	0.9
various	BATTLE_AXE 3	various	74	0.948	0.511	0.95	0.9
various	RR_SVC_DMY 3	various	55	0.947	0.549	0.95	0.9
various	AGAVE_RHILL3	various	49	0.887	0.594	0.95	0.9
various	AGAVE_RHIL23	various	49	0.887	0.595	0.95	0.9
various	RDRUNNER 3	various	49	0.888	0.597	0.95	0.9
various	PNDEROSATP 3	various	44	0.900	0.639	0.95	0.9
various	AGAVE_PDURO3	various	31	0.898	0.649	0.95	0.9
various	SOUTH_LOVNG3	various	28	0.894	0.653	0.95	0.9
various	NORTH_LOVNG3	various	28	0.896	0.655	0.95	0.9
various	WHITTEN 3	various	41	0.894	0.668	0.95	0.9
various	LIVSTNRIDGE3	various	84	0.900	0.692	0.95	0.9

Season & Scenario	Facility Name	Contingency Name	Number of occurances	Voltage Maximum (pu)	Volttage Minimum (pu)	Base Case Voltage Min (pu)	Contingency Voltage Min (pu)
various	WARD 3	various	32	0.900	0.719	0.95	0.9
various	S_JAL 3	various	31	0.899	0.721	0.95	0.9
various	HOPI_SUB 3	various	16	0.894	0.750	0.95	0.9
various	KIOWA 7	various	95	0.948	0.760	0.95	0.9
various	LEA_ROAD 3	various	18	0.895	0.766	0.95	0.9
various	SAGE_BRUSH 3	various	48	0.895	0.776	0.95	0.9
various	OIL_CENTER 3	various	19	0.900	0.784	0.95	0.9
various	TEAGUE 3	various	15	0.893	0.793	0.95	0.9
various	IMC_#1 3	various	51	0.900	0.797	0.95	0.9
various	IMC_#1_TP 3	various	51	0.900	0.797	0.95	0.9
various	COOPER_RNCH3	various	20	0.900	0.806	0.95	0.9
various	MALJMAR1&2 3	various	22	0.895	0.823	0.95	0.9
various	INTREPIDWST3	various	19	0.888	0.829	0.95	0.9
various	POTASH_JCT 6	various	23	0.897	0.829	0.95	0.9
various	INTREPDW_TP3	various	19	0.888	0.829	0.95	0.9
various	CV-MALJAMAR3	various	18	0.897	0.835	0.95	0.9
various	CV-SKELLY 3	various	18	0.898	0.836	0.95	0.9
various	BYRD 3	various	16	0.898	0.837	0.95	0.9
various	ANDREWS 6	various	8	0.893	0.837	0.95	0.9
various	HOBBS_INT 7	various	20	0.900	0.838	0.95	0.9
various	BYRD_TP 3	various	16	0.899	0.838	0.95	0.9
various	CV-LUSK 3	various	15	0.892	0.838	0.95	0.9
various	ZIA 3	various	18	0.898	0.839	0.95	0.9
various	CV-LUSK_TP 3	various	15	0.893	0.840	0.95	0.9
various	PECOS 6	various	13	0.892	0.840	0.95	0.9
various	XTO_LOAD#4	various	15	0.896	0.842	0.95	0.9
various	LEA_NATIONL3	various	15	0.900	0.843	0.95	0.9
various	QUAHADA 3	various	15	0.899	0.843	0.95	0.9
various	CARDINAL 3	various	5	0.895	0.847	0.95	0.9
various	PCA 3	various	11	0.881	0.850	0.95	0.9
various	PEARLE 3	various	13	0.889	0.850	0.95	0.9
various	GAINESGENTP6	various	4	0.874	0.852	0.95	0.9
various	GAINES_GEN 6	various	4	0.874	0.852	0.95	0.9
various	POTASH_JCT 3	various	11	0.888	0.854	0.95	0.9
various	CUNNIGHM_N 6	various	4	0.893	0.869	0.95	0.9
various	CUNNIGHM_S 6	various	4	0.893	0.869	0.95	0.9
various	7-RIVERS 6	various	11	0.900	0.870	0.95	0.9

Season & Scenario	Facility Name	Contingency Name	Number of occurances	Voltage Maximum (pu)	Volttage Minimum (pu)	Base Case Voltage Min (pu)	Contingency Voltage Min (pu)
various	HOBBS_INT 6	various	4	0.895	0.870	0.95	0.9
various	BUCKEYE 3	various	2	0.897	0.884	0.95	0.9
various	BUCKEYE_TP 3	various	2	0.898	0.884	0.95	0.9
various	IMC_#4 2	various	3	0.888	0.886	0.95	0.9
various	IMC_#3 2	various	3	0.890	0.887	0.95	0.9
various	FIESTA 3	various	6	0.899	0.887	0.95	0.9
various	STRATA 2	various	3	0.890	0.888	0.95	0.9
various	CARLSBAD 3	various	5	0.896	0.889	0.95	0.9
various	CUNNINHAM 3	various	1	0.891	0.891	0.95	0.9
various	OCOTILLO 3	various	6	0.899	0.892	0.95	0.9
various	N_CANAL 3	various	3	0.895	0.893	0.95	0.9
various	PECOS 3	various	3	0.897	0.895	0.95	0.9
various	MADDOX 3	various	1	0.896	0.896	0.95	0.9
various	MADDOXG23 3	various	1	0.896	0.896	0.95	0.9
various	UNITEDSALT 2	various	2	0.899	0.899	0.95	0.9
various	NMPOTASH 2	various	2	0.900	0.900	0.95	0.9

Table 3-2: Voltage Violations

TRANSMISSION SOLUTIONS

The thermal and voltage violations are significant and numerous. The overall upgrades needed are listed in Table 3-3: Recommended Upgrades.

The violations start when the PLU load at Bobco is connected in 2018 winter cases. The issues in 2018 winter, 2019 summer, and 2019 winter cases can be mitigated by one segment of 345 kV line from Road Runner to Bobco with one 345/115 kV transformer. Starting in 2022 summer, the second segment of the 345 kV line from China Draw to Bobco with the second 345/115 kV transformer is needed. The second transformer is needed to provide reliability if the first transformer is out of service due to a contingency. Under this scenario, the underlying 115 kV system cannot handle the load. To upgrade the 115 kV system would cost significantly more than the second transformer and would still struggle to reliably serve the PLU load. Upgrading the system to 345 kV is necessary due to the existing voltage support issues in south SPS that are exacerbated by the large load addition.

In the 2027 summer and winter seasons, there were wide spread voltage collapse in all scenarios due to the loss of Hobbs to Kiowa 345 kV line. The 345 kV line from Eddy to Kiowa is needed to provide system stability. To stage this upgrade, the 2027 summer load additions were ramped up with the loss of Hobbs to Kiowa 345 kV until voltage collapse occurred. An interface was defined based on facilities connecting to the load pocket south of Eddy and Hobbs. The maximum MW power transfer across this interface before voltage collapse occurred was identified, and a 5% MW

margin[1] was applied to this to determine an approximate single-contingency, voltage stability limit to use for staging purposes. Prior to voltage collapse, the slope of the increased load at the new delivery points vs. the resulting MW power transfer were used to extrapolate a theoretical 2027 summer full load power transfer across the interface, had voltage collapse not occurred. Using the 2022 summer MW power transfer across the interface, and the theoretical 2027 summer full load power transfer across the interface, interpolation was performed to determine the year at which the MW power transfer exceeds the voltage stability limit. This staging date was determined to be summer of 2024.

New Upgrade Description	Mileage	MVAR	Date Needed	Estimated Cost*
Build new 345 kV line from ROAD RUNNER to new BOPCO (includes two new breakers at ROAD RUNNER)	21	-	12/1/2018	$29,874,944
Build new 345/115 kV transformer (circuit 1) at BOPCO	-	-	12/1/2018	$9,413,718
Build new 345 kV line from CHINA DRAW to new BOPCO	18.71	-	12/1/2021	$26,972,900
Build new 345/115 kV transformers (circuit 2) at BOPCO	-	-	12/1/2021	$9,413,718
Build new 345 kV line from EDDY_CNTY to KIOWA	34	-	6/1/2024	$49,015,426
TOTAL NEW UPGRADE COST				**$124,690,707**

Table 3-3: Recommended Upgrades

*Note the estimated new upgrade costs provided in this report are Conceptual Cost Estimates only; these are preliminary, and more refined Study Cost Estimates will be developed after issuance of this report through a Standardized Cost Estimate Report Template (SCERT).

All upgrades listed in Table 3-3 require a financial commitment within the next four years in order to meet the need dates listed in the table, and are eligible to receive a Notification to Construct (NTC). Before issuance of an NTC for the recommended upgrades, the Network Integration Transmission Service (NITS) agreement must be updated to reflect the changes in delivery points and the Network Upgrades. If the project need date specified in this study cannot be met, the Transmission Owner will be required to submit mitigations pursuant to the SPP Project Tracking process. All upgrades or mitigations must be in place prior to the dates shown in Table 3-3.

SHORT CIRCUIT

SPP performed short circuit analysis for the 2021 Summer Peak with the load. The short circuit fault was applied at the Bopco 115 kV bus, and the analysis identified the currents as listed in Table 3-4.

Season	Model	Fault	Bus	Current(Amps)
21SP	Max Fault	Three Phase	BOPCO_PKRLK 3 115.00	5,057
21SP	Max Fault	Three Phase	WOOD_DRAW 3 115.00	4,714
21SP	Max Fault	Three Phase	WOLFCAMP_TP 3 115.00	5,194
21SP	Max Fault	Three Phase	RED_BLUFF 3 115.00	6,729

[1] This is consistent with SPP Operating Criteria, Appendix OP-1, Section 2.c.

Season	Model	Fault	Bus	Current(Amps)
21SP	Max Fault	Three Phase	CHINA_DRAW 3 115.00	7,392
21SP	Max Fault	Three Phase	WOLFCAMP 3 115.00	5,017
21SP	Max Fault	Three Phase	SAND_DUNES 3 115.00	6,191
21SP	Max Fault	Three Phase	RDRUNNER 3 115.00	8,723
21SP	Max Fault	Three Phase	NORTH_LOVNG 3 115.00	8,358
21SP	Max Fault	Three Phase	CHINA_DRAW 1 13.200	29,696
21SP	Max Fault	Three Phase	CHDRAW_SVC 1 15.000	21,933
21SP	Max Fault	Three Phase	CHINA_DRAW 7 345.00	3,657
21SP	Max Fault	Three Phase	YESO_HILLS 3 115.00	2,693
21SP	Max Fault	Three Phase	WIPP 3 115.00	6,693
21SP	Max Fault	Three Phase	RDRUNNR_SVC 1 15.000	23,318
21SP	Max Fault	Three Phase	RDRNNER_TR1 1 13.200	32,134
21SP	Max Fault	Three Phase	RDRUNNER 7 345.00	3,845
21SP	Max Fault	Three Phase	BATTLE_AXE 3 115.00	2,828
21SP	Max Fault	Three Phase	N_LOVING 7 345.00	4,489
21SP	Max Fault	Three Phase	N_LOVING TR 1 13.200	31,380
21SP	Max Fault	Three Phase	SOUTH_LOVNG 3 115.00	6,455
21SP	Max Fault	Three Phase	HOPI_SUB 3 115.00	6,359
21SP	Max Fault	Three Phase	AGAVE_RHILL 3 115.00	8,454
21SP	Max Fault	Three Phase	LIVSTNRIDGE 3 115.00	7,305
21SP	Max Fault	Three Phase	KIOWA 7 345.00	5,695
21SP	Max Fault	Three Phase	PECOS 3 115.00	11,438
21SP	Max Fault	Three Phase	HOPI_SUB 1 12.470	8,387
21SP	Max Fault	Three Phase	OCHOA 3 115.00	8,336

Table 3-4: Short Circuit Results

STABILITY

SPP performed a Fast Fault Screening (FFS) for the base case and change case models. The change case models include the delivery point additions at Bopco and between PCA to Quahada. The FFS was performed for 2019 Summer Peak, 2022 Summer Peak, and 2027 Summer Peak. There were no significant differences in the fault bus ranking indices between the two cases. Therefore, a transient stability analysis is not required.

SECTION 4: CONCLUSION

The AC analysis revealed potential thermal violations associated with the PLU and Eddy County delivery points additions on the SPS system. SPP recommends the upgrades listed in Table 3-3 to address the reliability issues. The projects provide a robust network solution to the thermal violations documented in Table 3-1 and voltage violations in Table 3-2.

SPP-NTC-210507

SPP
Notification to Construct

December 11, 2018

Mr. Jarred Cooley
Southwestern Public Service Company
790 S Buchanan Street
Amarillo, TX 79101

RE: Notification to Construct Approved Reliability Network Upgrades

Dear Mr. Cooley,

Pursuant to Section 3.3 of the Southwest Power Pool, Inc. ("SPP") Membership Agreement and Attachments O and Y of the SPP Open Access Transmission Tariff ("OATT"), SPP provides this Notification to Construct ("NTC") directing Southwestern Public Service Company ("SPS"), as the Designated Transmission Owner, to construct the Network Upgrade(s).

On May 23, 2018, SPP concluded that the Network Upgrade(s) below are required on the SPS system to fulfill delivery point request(s) as detailed in the Delivery Point Network Study for delivery point request DPA-2017-November-808. On August 21, 2018, SPP received all executed Transmission Service Agreements associated with DPA-2017-November-808.

On December 5, 2018, SPP received SPS's NTC-C Project Estimates ("CPE") for the Network Upgrades specified in the NTC-C No. 210504. SPP has reviewed the CPEs and determined that the requirements of Condition No. 1 of the NTC-C have been met.

New Network Upgrades

Project ID: 61347
Project Name: Multi - China Draw - Road Runner 345 kV
Estimated Cost for Project: $89,647,302

Network Upgrade ID: 92153
Network Upgrade Name: Bopco - Road Runner 345 kV Ckt 1 New Line
Network Upgrade Description: Build new 21 mile 345 kV line from Bopco to Road

Runner.
Network Upgrade Owner: SPS
MOPC Representative(s): William Grant
TWG Representative: N/A
Categorization: Regional Reliability
Network Upgrade Specification: All elements and conductor must have at least an emergency rating of 1792 MVA.
Network Upgrade Justification: DPA-2017-November-808
Need Date for Network Upgrade: 12/1/2018
Estimated Cost for Network Upgrade (current day dollars): $29,927,758
Cost Allocation of the Network Upgrade: Base Plan
Estimated Cost Source: SPS
Date of Estimated Cost: 8/23/2018

Network Upgrade ID: 92154
Network Upgrade Name: Bopco - China Draw 345 kV Ckt 1 New Line
Network Upgrade Description: Build new 19 mile 345 kV line from Bopco to China Draw.
Network Upgrade Owner: SPS
MOPC Representative(s): William Grant
TWG Representative: N/A
Categorization: Regional Reliability
Network Upgrade Specification: All elements and conductor must have at least an emergency rating of 1792 MVA.
Network Upgrade Justification: DPA-2017-November-808
Need Date for Network Upgrade: 12/1/2021
Estimated Cost for Network Upgrade (current day dollars): $30,496,976
Cost Allocation of the Network Upgrade: Base Plan
Estimated Cost Source: SPS
Date of Estimated Cost: 8/23/2018

Network Upgrade ID: 102153
Network Upgrade Name: Bopco 345/115 kV Ckt 1 Transformer
Network Upgrade Description: Construct 345/115 kV transformer at Bopco substation.
Network Upgrade Owner: SPS
MOPC Representative(s): William Grant
TWG Representative: N/A
Categorization: Regional Reliability
Network Upgrade Specification: All elements and conductor must have at least an emergency rating of 435 MVA.
Network Upgrade Justification: DPA-2017-November-808
Need Date for Network Upgrade: 12/1/2018
Estimated Cost for Network Upgrade (current day dollars): $6,205,015

Cost Allocation of the Network Upgrade: Base Plan
Estimated Cost Source: SPS
Date of Estimated Cost: 8/23/2018

Network Upgrade ID: 102154
Network Upgrade Name: Bopco 345/115 kV Ckt 2 Transformer
Network Upgrade Description: Construct second 345/115 kV transformer at Bopco substation.
Network Upgrade Owner: SPS
MOPC Representative(s): William Grant
TWG Representative: N/A
Categorization: Regional Reliability
Network Upgrade Specification: All elements and conductor must have at least an emergency rating of 435 MVA.
Network Upgrade Justification: DPA-2017-November-808
Need Date for Network Upgrade: 12/1/2021
Estimated Cost for Network Upgrade (current day dollars): $6,122,043
Cost Allocation of the Network Upgrade: Base Plan
Estimated Cost Source: SPS
Date of Estimated Cost: 8/23/2018

Network Upgrade ID: 102157
Network Upgrade Name: Bopco 345 kV Substation
Network Upgrade Description: Build 345 kV portion of new 345/115 kV Bopco substation.
Network Upgrade Owner: SPS
MOPC Representative(s): William Grant
TWG Representative: N/A
Categorization: Regional Reliability
Network Upgrade Specification: All elements and conductor must have at least an emergency rating of 1792 MVA.
Network Upgrade Justification: DPA-2017-November-808
Need Date for Network Upgrade: 12/1/2018
Estimated Cost for Network Upgrade (current day dollars): $5,153,574
Cost Allocation of the Network Upgrade: Base Plan
Estimated Cost Source: SPS
Date of Estimated Cost: 8/23/2018

Network Upgrade ID: 102158
Network Upgrade Name: Bopco 115 kV Substation
Network Upgrade Description: Build 115 kV portion of new 345/115 kV Bopco substation. This includes work to reterminate the Wood Draw - Red Bluff 115 kV line into the new substation.

Network Upgrade Owner: SPS
MOPC Representative(s): William Grant
TWG Representative: N/A
Categorization: Regional Reliability
Network Upgrade Specification: All elements and conductor must have at least an emergency rating of 174 MVA.
Network Upgrade Justification: DPA-2017-November-808
Need Date for Network Upgrade: 12/1/2018
Estimated Cost for Network Upgrade (current day dollars): $11,741,936
Cost Allocation of the Network Upgrade: Base Plan
Estimated Cost Source: SPS
Date of Estimated Cost: 8/23/2018

Project ID: 71347
Project Name: Line - Eddy County - Kiowa 345 kV New Line
Need Date for Project: 6/1/2024
Estimated Cost for Project: $67,428,932

Network Upgrade ID: 102156
Network Upgrade Name: Eddy County - Kiowa 345 kV Ckt 1 New Line
Network Upgrade Description: Build new 34 mile 345 kV line from Eddy County to Kiowa.
Network Upgrade Owner: SPS
MOPC Representative(s): William Grant
TWG Representative: N/A
Categorization: Regional Reliability
Network Upgrade Specification: All elements and conductor must have at least an emergency rating of 1792 MVA.
Network Upgrade Justification: DPA-2017-November-808
Estimated Cost for Network Upgrade (current day dollars): $67,428,932
Cost Allocation of the Network Upgrade: Base Plan
Estimated Cost Source: SPS
Date of Estimated Cost: 8/23/2018

Commitment to Construct

Please provide to SPP a written commitment to construct the Network Upgrade(s) within 90 days of the date of this NTC, in addition to providing a construction schedule and an updated ±20% cost estimate, NTC Project Estimate, in the Standardized Cost Estimate Reporting Template for the Network Upgrade(s). Failure to provide a sufficient written commitment to construct as required by the SPP OATT could result in the Network Upgrade(s) being assigned to another entity.

Mitigation Plan
The Need Date represents the timing required for the Network Upgrade(s) to address the identified need. Your prompt attention is required for formulation and approval of any necessary mitigation plans for the Network Upgrade(s) included in the Network Upgrade(s) if the Need Date is not feasible. Additionally, if it is anticipated that the completion of any Network Upgrade will be delayed past the Need Date, SPP requires a mitigation plan be filed within 60 days of the determination of expected delays.

Notification of Commercial Operation
Please submit a notification of commercial operation for each listed Network Upgrade to SPP as soon as the Network Upgrade is complete and in-service. Please provide SPP with the actual costs of these Network Upgrades as soon as possible after completion of construction. This will facilitate the timely billing by SPP based on actual costs.

Notification of Progress
On an ongoing basis, please keep SPP advised of any inability on SPS's part to complete the approved Network Upgrade(s). For project tracking, SPP requires SPS to submit status updates of the Network Upgrade(s) quarterly in conjunction with the SPP Board of Directors meetings. However, SPS shall also advise SPP of any inability to comply with the Project Schedule as soon as the inability becomes apparent.

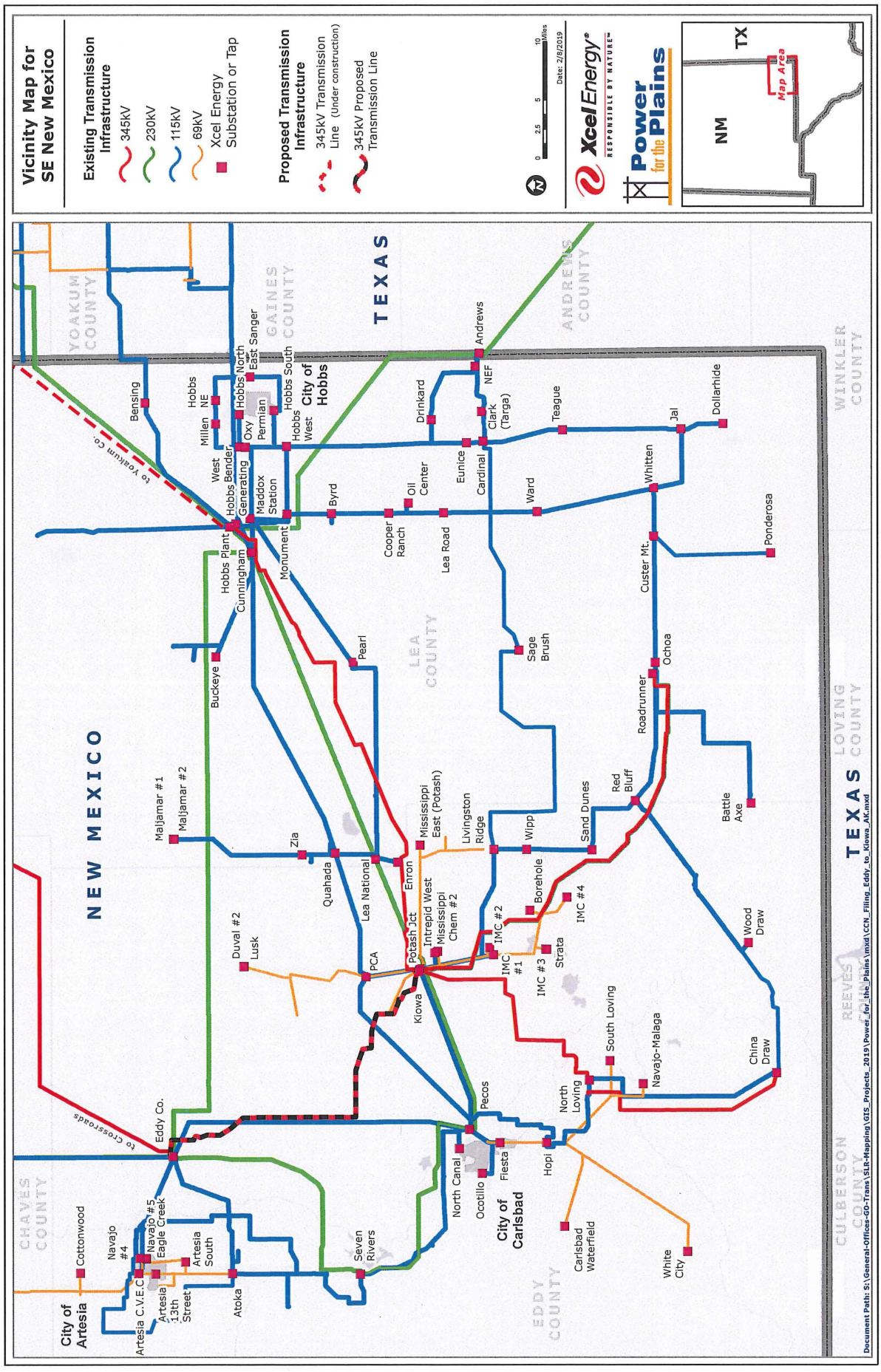
All terms and conditions of the SPP OATT and the SPP Membership Agreement shall apply to this Project, and nothing in this NTC shall vary such terms and conditions.

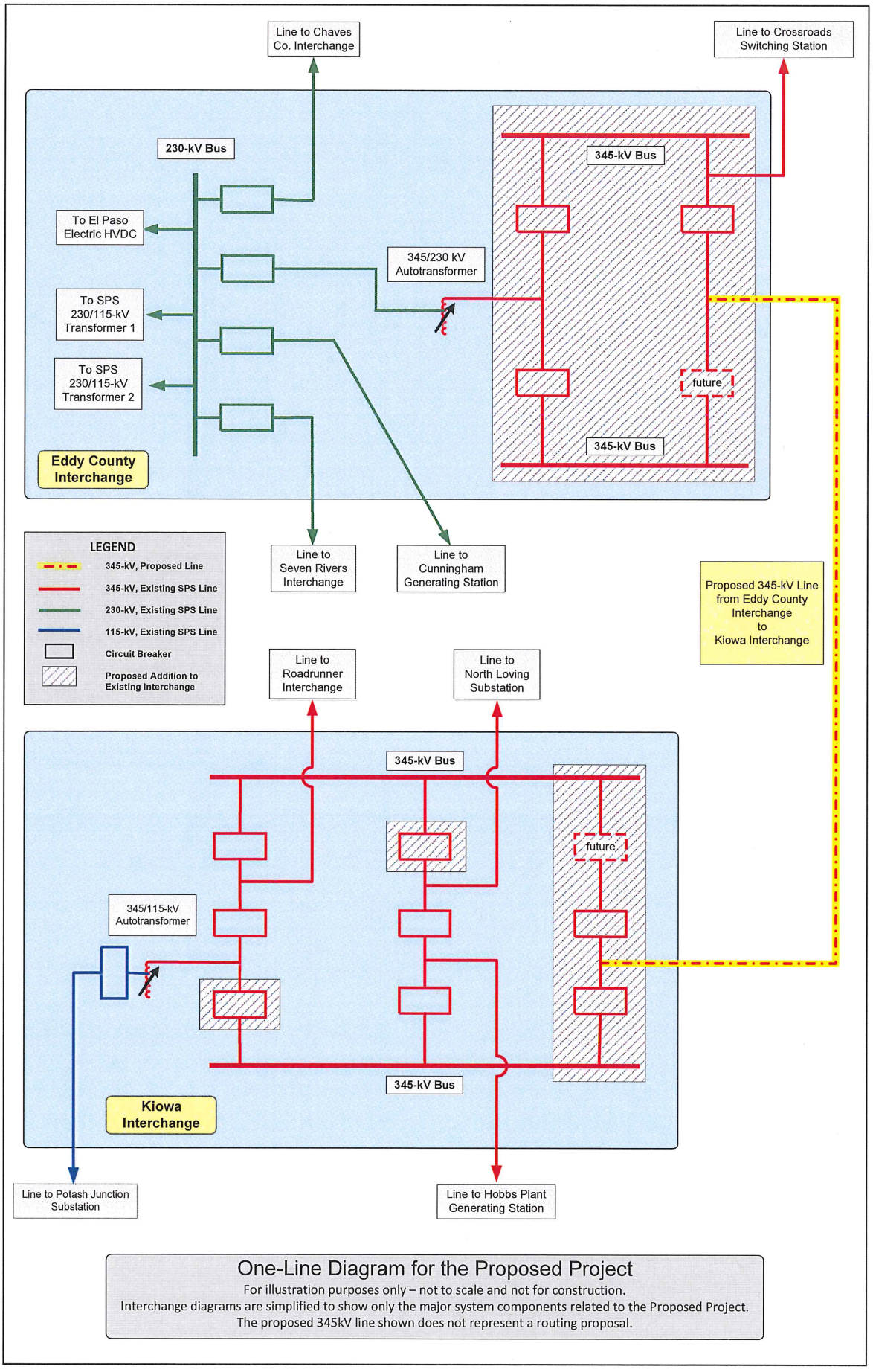
Don't hesitate to contact me if you have questions or comments regarding these instructions. Thank you for the important role that you play in maintaining the reliability of our electric grid.

Sincerely,

Lanny Nickell
Vice President, Engineering
Phone: (501) 614-3232 • Fax: (501) 482-2022 • lnickell@spp.org

cc: Carl Monroe - SPP
Antoine Lucas - SPP
Jay Caspary - SPP
William Grant - SPS


Vicinity Map for SE New Mexico
Existing Transmission Infrastructure
345kV
230kV
115kV
69kV
Xcel Energy Substation or Tap
Proposed Transmission Infrastructure
345kV Transmission Line (Under construction)
345kV Proposed Transmission Line
0 2.5 5 10 Miles
Date: 2/8/2019
Xcel Energy® RESPONSIBLE BY NATURE™
Power for the Plains
NM
TX
Map Area
NEW MEXICO
TEXAS
CHAVES COUNTY
EDDY COUNTY
LEA COUNTY
GAINES COUNTY
YOAKUM COUNTY
ANDREWS COUNTY
WINKLER COUNTY
LOVING COUNTY
REEVES COUNTY
CULBERSON COUNTY
City of Artesia
City of Carlsbad
City of Hobbs
Cottonwood
Navajo #4
Artesia C.V.E.C.
Navajo #5 Eagle Creek
Artesia 13th Street
Artesia South
Atoka
Seven Rivers
Eddy Co.
to Crossroads
to Yoakum Co.
Bensing
Hobbs Millen NE
Hobbs West
Hobbs Bender
Hobbs Generating
Hobbs Oxy Permian
Hobbs North
Hobbs South
East Sanger
Hobbs Plant
Cunningham
Maddox Station
Monument
Byrd
Buckeye
Maljamar #1
Maljamar #2
Duval #2
Lusk
Zia
Quahada
Lea National
Pearl
PCA
Potash Jct
Enron
Intrepid West
Mississippi Chem #2
Mississippi East (Potash)
Livingston Ridge
Kiowa
IMC #1
IMC #2
IMC #3
Strata
Borehole
IMC #4
Wipp
Sage Brush
Cooper Ranch
Oil Center
Lea Road
Eunice
Cardinal
Drinkard
Clark (Targa)
NEF
Andrews
Ward
Teague
Jal
Dollarhide
Whitten
Custer Mt.
Ponderosa
Ochoa
Roadrunner
Sand Dunes
Red Bluff
Battle Axe
Wood Draw
China Draw
Navajo-Malaga
South Loving
North Loving
Hopi
Fiesta
Pecos
North Canal
Ocotillo
Carlsbad Waterfield
White City
Document Path: S:\General-Offices-GO-Trans\SLR-Mapping\GIS_Projects_2019\Power_for_the_Plains\mxd\CCN_Filing_Eddy_to_Kiowa_AK.mxd



One-Line Diagram for the Proposed Project

For illustration purposes only – not to scale and not for construction.
Interchange diagrams are simplified to show only the major system components related to the Proposed Project.
The proposed 345kV line shown does not represent a routing proposal.

David Hudson
President,
Southwestern Public Service Company

790 S Buchanan St
Amarillo, TX 79101
David.hudson@xcelenergy.com
Phone: 806.378.2824

Mr. Lanny Nickell, Vice President
201 Worthen Drive
Little Rock, AR 72223-4936

March 11, 2019

RE: SPP-NTC-210507, dated December 11, 2018

Dear Mr. Nickell:

Southwestern Public Service Company ("SPS") hereby responds to the Southwest Power Pool ("SPP") Notification to Construct ("NTC") dated December 11, 2018, referred to as SPP-NTC-210507. The NTC seeks a commitment from SPS to construct 2 new projects and 7 new network upgrades that have been assigned to SPS. As detailed below, this response will constitute SPS's commitment, under Attachment O, Section VI of the SPP Open Access Transmission Tariff, to construct the projects identified in SPP-NTC-C-210507.

The SCERT estimates will be provided separately through TAGIT by the date required in the NTC letter.

As SPS completes its detailed design and engineering and internal capital budgeting processes for the upgrades, updated project scheduling information will be provided to the SPP through the Quarterly Tracking reports.

As with any Transmission Owner receiving an SPP NTC for new transmission projects, SPS's commitment to construct the SPP-NTC-C-210507 projects listed below also include its intent to work with SPP to review the scope and configuration of any project should the subsequent development of a future contingency or change in circumstance affect the design, scope, or need for a project as currently planned. Such contingencies could include, but would not be limited to, SPS's obtaining all necessary local, state, and federal governmental approvals, the necessary corporate governance approvals within Xcel Energy for the related capital expenditures, adequate regulatory treatment that ensure cost recovery, or the option to assign the construction of a project(s) to an SPS affiliate, with SPP's approval. Also, wholesale customers on the SPS system are changing their system resource and operation plans, which may drive additional SPS work with SPP to address any relevant changes in circumstance which may affect certain associated projects.

The projects identified in SPP-NTC-210507 are:

Network Upgrades:

Network Upgrade ID: 92153
Network Upgrade Description: Build new 21 mile 345 kV line from Bopco to Road Runner.

Network Upgrade ID: 92154
Network Upgrade Description: Build new 19 mile 345 kV line from Bopco to China Draw.

Network Upgrade ID: 102153
Network Upgrade Description: Construct 345/115 kV Transformer transformer at Bopco substation.

Network Upgrade ID: 102154
Network Upgrade Description: Construct second 345/115 kV transformer at Bopco substation.

Network Upgrade ID: 102157
Network Upgrade Description: Build 345 kV portion of new 345/115 kV Bopco substation.

Network Upgrade ID: 102158
Network Upgrade Description: Build 115 kV portion of new 345/115 kV Bopco substation. This includes work to reterminate the Wood Draw - Red Bluff 115 kV line into the new substation.

Network Upgrade ID: 102156
Network Upgrade Description: Build new 34 mile 345 kV line from Eddy County to Kiowa.

Finally, SPS would note that, to the extent that any significant changes in future loads or load forecasts occur that may affect the planned configurations or need for new upgrade project numbers 92153, 92154, 102153, 102154, 102157, 102158, and 102156, SPS will work with SPP to re-evaluate these projects. Additionally, for any project where SPS shows an in-service date beyond the desired Need Date reflected in the NTC, SPS will provide mitigations within 60 days of the date of this letter.

Should there be any questions, please feel free to contact Mr. Jarred Cooley of SPS.

Sincerely,

David Hudson

David Hudson
President, SPS

Cc: Ellen Bailey – SPP
Ian Benson, Bill Grant, David Hudson, Tony Jandro, Amanda King-Huffman, Michael Lamb, Jordan Schmick – Xcel Energy