BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION

IN THE MATTER OF PUBLIC SERVICE COMPANY OF NEW MEXICO'S APPLICATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT, OWN AND OPERATE THE RIO PUERCO TO PAJARITO TO PROSPERITY 345 KV TRANSMISSION PROJECT	)	**Docket No. 25-00___-UT**
PUBLIC SERVICE COMPANY OF NEW MEXICO,	)	
Applicant	)	

DIRECT TESTIMONY

OF

ERFAN HAKIMIAN

December 30, 2025

NMPRC DOCKET NO. 25-00___-UT
INDEX TO THE DIRECT TESTIMONY OF
ERFAN HAKIMIAN

WITNESS FOR
PUBLIC SERVICE COMPANY OF NEW MEXICO

I. INTRODUCTION AND PURPOSE

Q. Please state your name, position, and business address.

A. My name is Erfan Hakimian. I am the Director of Transmission/Distribution Planning and Contracts for Public Service Company of New Mexico ("PNM" or "Company"). My business address is 2401 Aztec Road NE, Albuquerque, New Mexico 87107. I am testifying on behalf of PNM.

Q. Please summarize your educational background and professional qualifications.

A. My educational background and professional experience are summarized in PNM Exhibit EH-1.

Q. Have you previously testified in regulatory proceedings?

A. Yes. A list of cases in which I have testified before the New Mexico Public Regulation Commission ("NMPRC" or "Commission") are listed in PNM Exhibit EH-1.

Q. Please describe your responsibilities as the Director of Transmission/Distribution Planning and Contracts.

A. As Director of Transmission/Distribution Planning and Contracts, I am responsible for overseeing the evaluation of the existing transmission and distribution system planning functions, analyzing system deficiencies, and creating plans for the capital expansion of these systems. I manage the Distribution Energy Engineering department which oversees the interconnection of generator interconnections to the PNM system under 17.9.568

NMAC ("Rule 568"). Additionally, I am also responsible for overseeing the administration of the Federal Energy Regulatory Commission ("FERC") jurisdictional open-access transmission tariff ("OATT") which involves providing transmission delivery services, processing and conducting generation interconnection studies, and executing agreements for both generation interconnections and transmission service.

Q. Please state the purpose of your Direct Testimony.

A. The purpose of my testimony is to support approval of the Rio Puerco to Pajarito to Prosperity 345 kV transmission project (the "Project") from a systems and engineering planning perspective. I address the system and engineering planning process for the Project and its integration into PNM's existing electrical grid. More specifically I provide the following:

1) An overview of the Project and how it fits within PNM's long term transmission plan. Discuss how the Project will improve system reliability, facilitate maintenance of the grid in the metropolitan area, and enhance system resiliency.
2) Discuss project benefits, cost and outreach.
3) Discuss PNM system need and alternatives.
4) Discuss the right-of-way ("ROW") requirements for the Project.

II. OVERVIEW OF THE PROJECT

Q. Please describe the Project and its components.

A. PNM Exhibit EH-3 provides a graphical view of the approximate location of the proposed facilities that I am describing in this section. The Project consists of the following:

- Construction of a new 345 kV transmission line connecting PNM's Rio Puerco and Pajarito 345 kV stations (approximately 34 miles). The Rio Puerco station is located in northwest Rio Rancho. The Pajarito station is located southwest of Albuquerque.
- Expansion of the Rio Puerco and Pajarito 345 kV stations to accommodate the new 345 kV transmission line terminations.
- Within the existing Prosperity station boundaries, constructing a 345 kV station with a four (4) breaker ring configuration (expandable to breaker-and-a-half), which will include 345/115 kV transformation. Prosperity is located near I-25 and Rio Bravo Blvd. (southwest Albuquerque).
- A transmission line extension linking an existing 345 kV line from Pajarito to the new Prosperity 345 kV station (approximately 0.47 miles).
- Connecting the existing 345 kV Pajarito-Sandia line into Prosperity station (approximately 0.38 miles).

Q. How does the Project fit within PNM's Transmission System as a whole?

A. PNM completed its first ever 20-Year Transmission Planning Outlook in 2024 as detailed in PNM Exhibit EH-6. PNM's 20-Year Transmission Planning Outlook identifies the Project as a necessary first stage of transmission expansion, providing a strategic foundation for meeting long-term reliability, resilience, and resource integration needs. The Project is designed to:

- Strengthen system reliability: By addressing existing transmission constraints and ensuring compliance with Western Electricity Coordinating Council ("WECC") regional reliability standards.

- Enable renewable integration: Supporting the interconnection of renewables and storage resources consistent with New Mexico's clean energy goals.
- Lay groundwork for future expansion: Serving as the initial step in a phased build-out that will accommodate additional projects identified in the 20-Year Outlook.
- Support load growth: Addressing demand needs as they increase across PNM's service territory and ensuring adequate transmission capacity.

Taken together, the Project fits within PNM's transmission system as a cornerstone initiative that transitions the grid from incremental upgrades toward a long-term, forward-looking expansion strategy. The Project is a needed addition to PNM's system because it is both a near-term solution to pressing reliability needs and a scalable platform for future investments envisioned in the 20-Year Outlook.

Q. What are the major components of PNM's transmission system?

PNM's transmission system, detailed in PNM Exhibit EH-2, consists of backbone voltages of 230 kV (shown as green lines on the map) and backbone voltages of 345 kV (shown as red lines in the map). A portion of these lines are owned and operated by PNM, while others are jointly owned with other utilities and other transmission entities. PNM's major 345 kV transmission lines are connected from northwest New Mexico in the Four Corners area terminating near the Albuquerque metro area, where the majority of PNM's load is located. Additional 345 kV transmission lines are connected from Four Corners to the southern portion of New Mexico. There is also a 345 kV transmission line that begins in the eastern part of New Mexico and runs west towards Albuquerque. The eastern line forms two loops: one in the northern part of Albuquerque and another in the southern part. At Albuquerque and other major load centers, transformers step down voltage to 115 kV, and further reduced via substations operating at 115 kV, 69 kV, and 46 kV for customer delivery.

Q. Will the Project help with the efficient flow of power across PNM's grid?

A. Yes. The Project will help by providing greater system capacity and needed redundancy for PNM's primary load center. PNM interconnects with many transmission and wholesale generation entities and as more variable energy resources ("VERs") such as solar and wind are integrated, power flows on the PNM system are increasingly influenced by time of day and seasonal factors. In northern New Mexico, power typically flows into New Mexico during periods of low renewable generation, driven by baseload generation in the Four Corners area and in Arizona. During high renewable generation output the power flow is reversed with exports from eastern New Mexico non-PNM wind farms. The Project improves the efficient flow of power on the grid by increasing the overall available capacity and maintaining critical voltage support for the load center.

Q. How will the Project help meet the transmission service demands that are being placed on PNM's service territory?

A. The Project will enhance transmission capacity for the Albuquerque metropolitan area while allowing for essential maintenance and upgrades to aging infrastructure. Over the past 40 years, most of the transmission investments and reinforcements PNM has made in the Albuquerque metropolitan area have involved building underlying 115 kV transmission lines, implementing Grid-Enhancing Technologies ("GETs"), expanding substations to meet localized load growth, and implementing cost-effective system upgrades. Additionally, PNM has relied on load-side gas generation connected to the 115 kV system to alleviate transmission constraints.

As PNM transitions toward carbon-free generation, PNM needs to provide a path to reduce reliance on these gas units and identify alternate solutions to maintain system reliability. There are certain critical 115 kV transmission lines in the Albuquerque metro area built on wooden poles that need replacement. Some of these transmission lines are up to 60 years old. To replace these structures with higher capacity conductors is difficult due to current capacity limitations preventing the de-energizing of these transmission lines for reconstruction.

This Project will relieve these constraints, allowing PNM to replace aging infrastructure or replace the transmission lines with higher capacity lines that can allow more energy flow. In addition, the lack of sufficient transmission capacity in the Albuquerque metro and surrounding areas currently restricts PNM ability to interconnect new economic development loads. By expanding transmission capability, the Project will unlock opportunities for growth and ensure long-term reliability across the service territory.

Q. Will this project help PNM move towards limiting carbon emissions as required by the Renewable Energy Act and the Energy Transition Act?

A. Yes. PNM commissioned a study, completed in October 2025 and attached as PNM Exhibit EH-4, to evaluate the Project. One of the main findings of this study is that the Project will enable PNM to move toward limiting carbon emissions as required by the Renewable Energy Act and the Energy Transition Act. The Project will provide a path to reduce reliance on load-side gas generation resources in this part of the system while maintaining system reliability. Without this project, PNM would struggle to maintain system reliability in this part of the system during certain operating conditions, if the gas plant were to be retired.

Q. To what degree does the Project improve PNM's load serving capability?

A. The Project allows PNM to serve an estimated 400 to 900 MW of additional load (this can vary depending on the exact location of the line segment where the new load may be connected and generation dispatch scenario). The Project strengthens PNM's integrated network by adding a new transmission pathway, facilitating more energy transfers both across the system and within the metropolitan area and surrounding communities.

Q. What are the ramifications of any increase in the ability for PNM to wheel power into its service area as a result of the Project (OLE[1] Issue 2)?

A. As mentioned above, the Project allows PNM to serve between 400 to 900 MW of energy to this part of the system from a load serving capability. The Project does not directly

[1] All references to "OLE" throughout this testimony relate to requirements from Case No. 2382 (Ojo Line Extension), Final Order, p. 104 (November 20, 1995).

account for generation being wheeled into this area, but it provides a path for energy to transfer to the existing and future load in this part of the system.

Q. Please describe PNM's other current or planned transmission projects and how the Project integrates with those projects to improve system reliability and resiliency (OLE Issue 3).

A. Below is a summary of recently completed, current, and planned projects that PNM is undertaking in the ordinary course of business, and their relationship to the proposed Project:

1) Hidden Mountain: The recently completed Hidden Mountain 345 kV station in Valencia County is comprised of a 345 kV station, a 345/115 kV transformer, and two 115 kV transmission lines connecting to the existing Rattlesnake station as well as expansion of the Rattlesnake station. This project supports economic development in Los Lunas and does not impact the Project.

2) Mesa del Sol: This is a planned project to construct a second 115/12.47 kV transformer at the Studio station, constructing of a new 115 kV transmission line from Studio station to a new proposed station called "Sol" to the existing Sandia station. It complements the proposed Project by enhancing system capabilities and reliability in the region. It supports economic development under Senate Bill 170 (2025 Regular Session).[2]

[2] Senate Bill 170 (2025 Regular Session) was codified, in part, as NMSA 1978, Sections 62-6-26(E), (F) and (G), and also amended NMSA 1978, Section 62-9-1.

3) Westpointe 115 kV Substation: This is a planned project to construct a new station located near I-40 and 98th street NW in Albuquerque. It supports economic development under Senate Bill 170. There is no direct impact on the Project.

4) Richmond to Prager transmission line rebuild: This is a planned project to upgrade the existing 115 kV transmission line between PNM Prager and Richmond substation to a higher capacity advanced conductor. This line overloads in certain system conditions and the increased capacity will assist in keeping system reliability. The line is approximately 3.5 miles long. This project is estimated for completion in 2028 and does not affect the Project.

Q. Please describe the current status of any plans to change the ownership or operation of significant portions of the New Mexico transmission grid (e.g., connection of Plains' transmission system to Southwestern Public Service Company) and how such change would affect the current application (OLE Issue 4).

PNM has no current plans to change the ownership and operation of any portions of its New Mexico transmission grid.

Q. Please describe how PNM's transmission needs have been integrated with PNM generation/power purchase plans and needs, including how such transmission will affect or be affected by present or future generation configurations (OLE Issue 5).

A. The Project gives PNM a path to reduce reliance on load-side gas generation in this part of the system and move towards meeting future carbon emissions requirements. The 345 kV transmission line allows more carbon-free energy to flow to this part of the system. The generation resources will be evaluated and selected as part of the NMPRC integrated resource plan process and were not part of this study.

Q. Please describe how PNM determined the Project was necessary in light of any reasonable transmission project alternatives (OLE Issue 7).

A. PNM evaluated several alternatives, including maintaining the existing load-side gas generation (study included in PNM Exhibit EH-8), relying on lower voltage 115 kV transmission lines, and foregoing construction of the Project. However, none of these options provided the reliability, capacity, or long-term benefits offered by the Project. The solution presented in this Application provides the most technically sound approach to meet the identified transmission needs.

Q. Is it reasonable to defer the Project for some period of time by developing smaller scale projects for the Albuquerque metropolitan area and surrounding communities?

A. No. While PNM has implemented numerous smaller-scale transmission upgrades over the years to defer major infrastructure investments, the cumulative demand and system constraints now require a more robust solution. Deferring this project is no longer feasible, as the proposed transmission line is essential to support both existing load and future growth. It also complements and enhances the effectiveness of prior smaller projects, ensuring continued reliability and resiliency across the system.

Q. Are there any assumptions (generation, load growth, power purchase agreements [PPA] approval, etc.) that the proposed Project is particularly sensitive to (OLE Issue 8)?

A. No. The proposed Project is not contingent upon specific generation additions or PPA approvals. While the Project enhances PNM's ability to accommodate future load growth estimated to be between 400 MW and 900 MW in the region, it was developed independently of any generation or PPA assumptions.

III. PROJECT BENEFITS, COST AND OUTREACH

Q. Has PNM previously communicated the need for the Project to the Commission?

A. Yes. This project was included in PNM's informational response to the Commission's third bench request under Case No. 24-00257-UT.[3] PNM also presented the need for the Project at the NMPRC's open meeting on May 1, 2025.

Q. What is the estimated cost for the Project?

A. The cost estimate for the Project is approximately $247 million, which includes approximately $23 million of allowance for funds used during construction ("AFUDC"). Please see PNM Exhibit EH-7 for a more detailed cost breakdown of the Project.

Q. What is the projected in-service date for the Project?

A. The projected in-service date for the Project is Q1 of 2029.

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[3] Case No. 24-00257-UT, PNM's Responses to Third Bench Request at pp. 2-3 (August 1, 2025).

Q. Is the Project in the public interest, and will it result in a net public benefit?

A. Yes. The Project supports carbon emission reductions, enhances reliability, enables infrastructure upgrades, and promotes economic growth, all of which contribute to a substantial net public benefit for the reasons described above.

Q. Does the Project directly benefit PNM retail customers?

A. Yes. It improves reliability, supports load growth, and facilitates the transition to cleaner energy. Retail customers will benefit from enhanced service and infrastructure.

IV. SYSTEM NEEDS AND ALTERNATIVES

Q. What studies did PNM perform to determine how the Project could be integrated into PNM's current transmission system?

A. In 2024, PNM engaged Utility System Efficiencies, Inc. ("USE") to perform a technical study evaluating the requirements for the retirement of load-side gas generation resources. Please PNM Exhibit EH-8 for the initial technical study evaluating the requirements of retiring the load-side gas generation resources in this part of the system. The study recommended the Project as a key solution. In 2025, PNM and USE conducted further technical studies to assess the full range of benefits for this Project. The study is included as PNM Exhibit EH-4.

Q. Did PNM consider alternatives to the Project that would address the same transmission needs?

A. Yes. Alternatives such as continuing reliance on load-side gas generation and expanding lower-voltage 115 kV transmission lines were evaluated. However, none provided the comprehensive benefits of the Project. The Project emerged as the most feasible technical solution.

Q. Are there any alternatives other than expansion of the 345 kV transmission facilities that would be comparable?

A. No. The PNM system requires the expansion of the transmission facilities to meet capacity, reliability, and resiliency goals of the Company. Historically, PNM implemented smaller upgrades and GETs, but the system has reached a point where a higher voltage backbone transmission is necessary.

Q. Would construction of a lower voltage project be a feasible alternative to the Project?

A. No. Higher voltage transmission lines allow more energy to flow. The reason PNM requires this higher voltage 345 kV line is because the existing lower voltage lines cannot carry the energy required. To provide a path to reduce reliance on load-side gas generation that is connected to the 115 kV transmission line, bigger and higher capacity 345 kV transmission lines are required. The existing low voltage system cannot reliably continue to operate without the gas generation. The 345 kV transmission line allows for the retirement of those resources while maintaining acceptable power flow limits on the PNM transmission system.

Q. Could PNM expand the capacity of the existing 115 kV transmission lines?

A. No. PNM cannot expand the capacity of the existing 115 kV transmission lines without the construction of the Project. The Project enables PNM to rebuild or upgrade these transmission lines, which would otherwise require taking them out of service. In many cases, such outages would overload other segments of the 115 kV system, making upgrades infeasible without the additional infrastructure provided by the Project.

Q. What is your conclusion regarding any feasible alternative to the Project?

A. PNM evaluated several alternatives, including maintaining the existing load-side gas generation, relying on lower voltage 115 kV transmission lines, and foregoing construction of the Project. However, none of these options provided the reliability, capacity, or long-term benefits offered by the Project. The solution presented in this application is the most technically sound approach to meet the identified transmission needs.

V. DETERMINATION OF ROW WIDTH IN EXCESS OF 100 FEET

Q. What are the statutory requirements regarding ROW widths in relation to the proposed 345 kV transmission line?

A. The National Electrical Safety Code ("NESC")[4] requires utilities to maintain minimum clearance distances for power lines from objects and the ground. PNM must maintain all clearance requirements under various wire conditions, including during wind events and higher sag conditions. FERC also enforces reliability standards that require vegetation

[4] *See* https://standards.ieee.org/products-programs/nesc/.

management in and around transmission line ROW to prevent outages. PNM must be able to clear sufficient widths to comply with these requirements and help ensure reliability.

Q. Has PNM determined the width of ROW needed for the Project?

A. Yes, PNM standard ROW for a 345 kV line is 150 feet. This high-voltage transmission line will be built using H-frame structures which have a wider footprint compared to monopole structures. A 150 ft. wide ROW is in line with industry standard. PNM Exhibit EH-5 provides technical and visual specifications for this type of transmission structure.

Q. Please explain why a minimum 150 ft. ROW width is required for the Project?

A. A 150 ft. ROW width is required for the following reasons:

1) To ensure all NESC requirements are maintained at the time of initial energization and in the future as developments, businesses, and residential areas are constructed near the transmission line corridor. The proposed transmission line is in the outskirts of the Albuquerque area, making it a likely location for future development of the permanent structures mentioned above.
2) For vegetation maintenance purposes the 150 ft. width allows for sufficient vegetation clearing to prevent vegetation-related events which would result in outages and reliability concerns.
3) Inspection, maintenance and operation requirements. After the line is built, PNM will inspect the lines and may end up needing to perform maintenance activities, requiring large equipment. The equipment and all maintenance activities should be contained in the ROW to as not to impact developments, businesses, or residents

that may be in the area at that time. A 150 ft. wide ROW allows for the safe operation of equipment during maintenance activities.

Q. Are there other general construction considerations that require additional land use widths?

A. Yes, PNM will require temporary use areas of greater than 100 feet in width to set up wiring pulling sites. Wiring pulling sites will be found at the start and end of each dead transmission line structure.

VI. CONCLUSION

Q. Please summarize why it is in the public interest for the Commission to approve the Project.

A. PNM's transmission system is at a critical juncture where additional capacity and infrastructure upgrades are essential. This Project not only addresses the need for expanded transmission capability but also facilitates vital maintenance and modernization of aging assets. Over the past 40 years most of the transmission investments and reinforcement PNM has made in the Albuquerque metropolitan area have involved building underlying 115 kV transmission lines, implementing GETs, expanding substations to meet localized growth, and implementing cost effective system upgrades. However, the current demands on the grid require a more comprehensive solution. Approval of the Project will deliver substantial public benefits, including:

- **Improved Grid Reliability and Resilience:** By reinforcing the backbone of the transmission system, the Project will improve the grid's ability to withstand disruptions and ensure more reliable service for customers.
- **Support for Carbon-Free Generation:** The Project will facilitate the incorporation of additional renewable energy resources, helping meet state clean energy goals and providing a path to reduce reliance on load-side gas generation.
- **Economic Development Opportunities:** The Project will enable PNM to serve new commercial and industrial loads, attracting investment and fostering economic growth throughout the region.

Q. Does this conclude your testimony?

A. Yes.

GCG#534490

Erfan Hakimian Resume

PNM Exhibit EH-1

Is contained in the following 1 page.

Erfan Hakimian
Educational and Professional Summary

Name: Erfan Hakimian

Address: Public Service Company of New Mexico (PNM)
2401 Aztec Rd NE
MS Z220
Albuquerque, NM 87107

Position: Director, Transmission and Distribution Planning and Contracts

Education: Bachelor of Science in Electrical Engineering, University of New Mexico, 2013
Master of Business Administration, Grand Canyon University, 2018

Employment: Employed by PNM since 2013:
Positions held with the Company include:
- Director, Transmission and Distribution Planning and Contracts
- Manager, Strategic Asset Management Department
- Engineer III, Technical Maintenance Management Department
- Senior Key Account Manager, Key Accounts Team
- Engineer I, Distribution Engineering

Testimony:

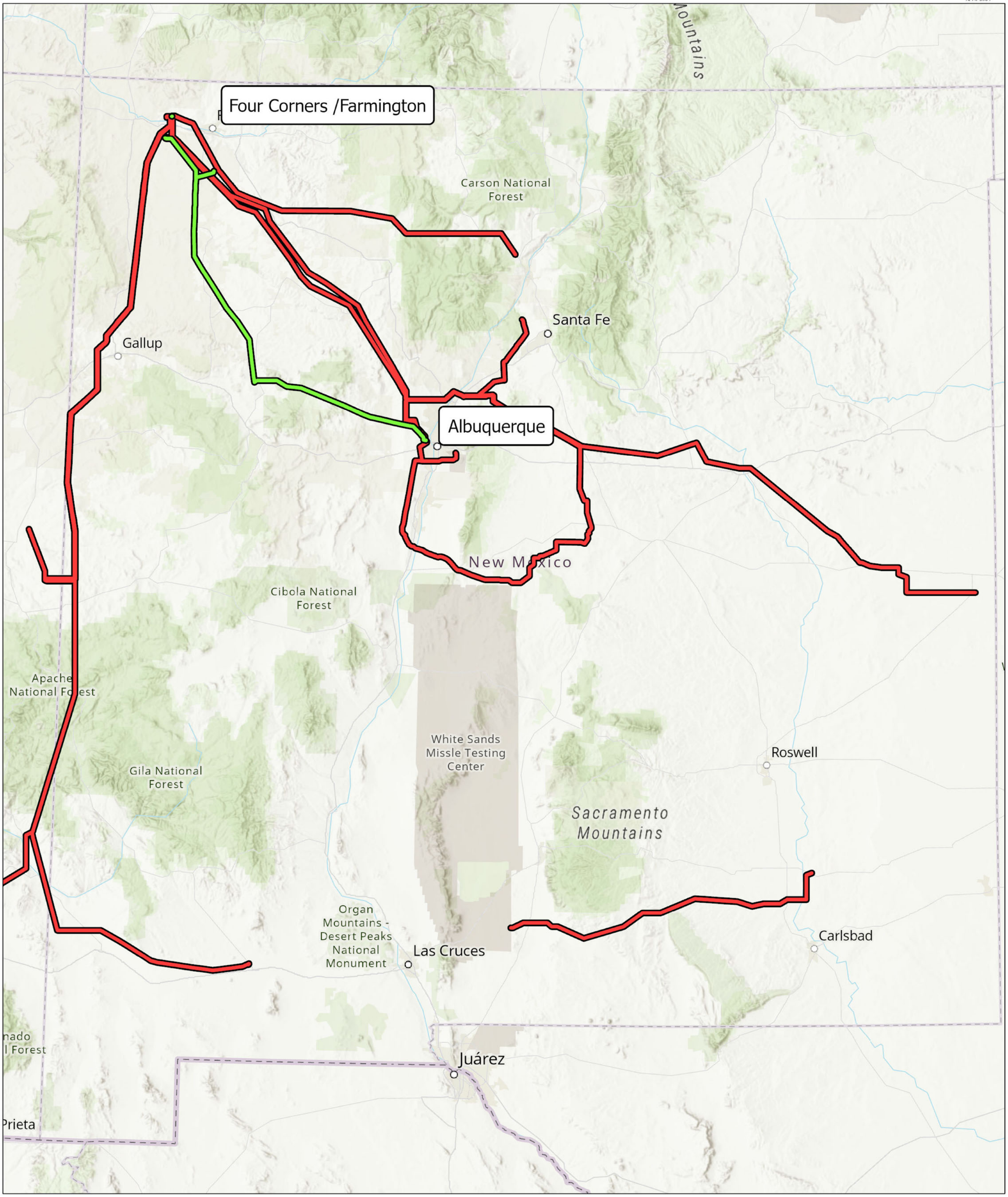
Before the New Mexico Public Regulation Commission	
25-00049-UT	PNM's First Annual Grid Modernization Review Filing
25-00055-UT	PNM's Application for a Certificate of Public Convenience and Necessity to Construct, Own, and Operate 30 Megawatts of Battery Energy Storage Facilities

GCG# 534451

Overview of the PNM Transmission System

PNM Exhibit EH-2

Is contained in the following 1 page.



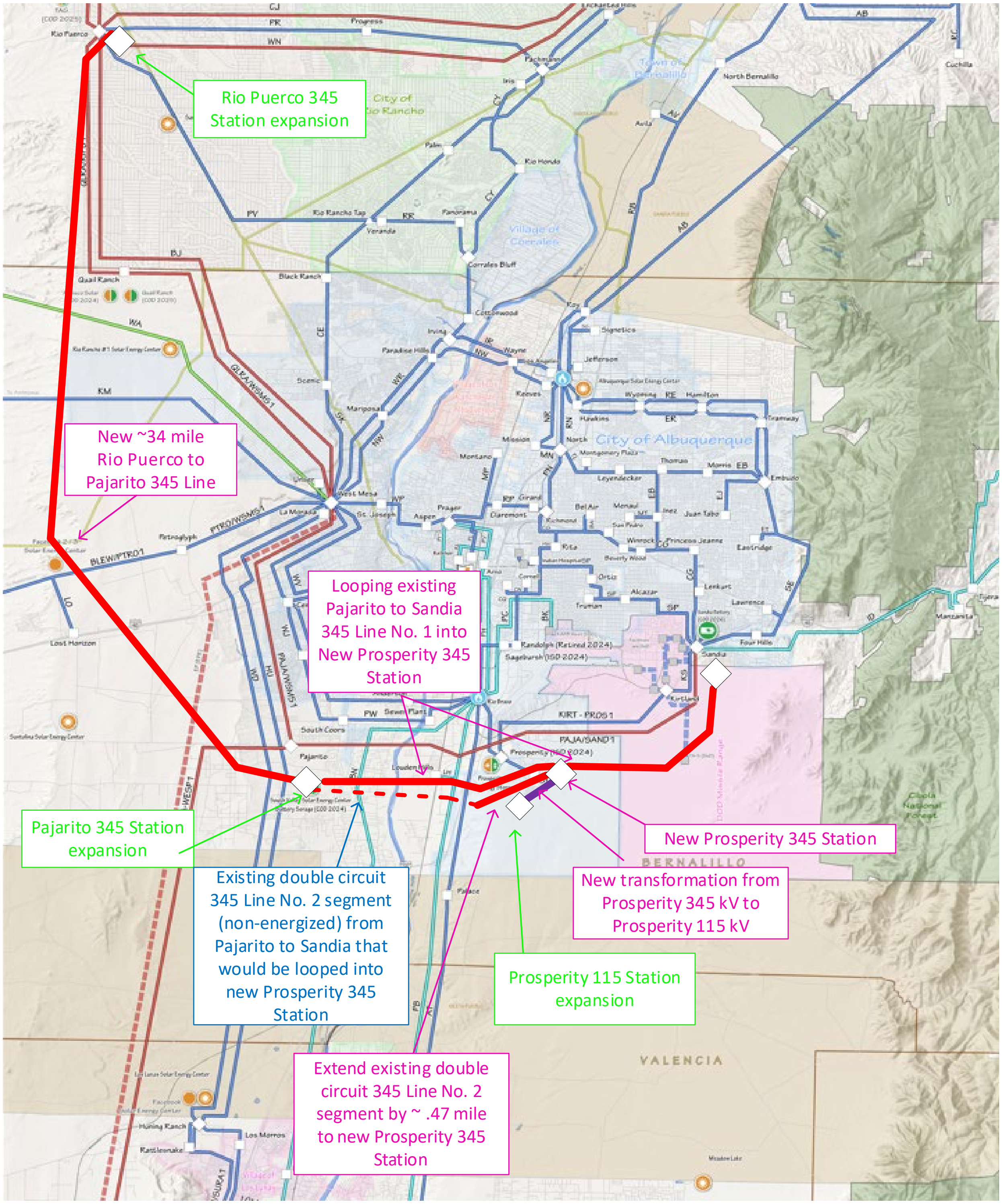
PNM Exhibit EH-2

Overview of the Project Infrastructure

PNM Exhibit EH-3

Is contained in the following 1 page.

Rio Puerco-Pajarito-Prosperity 345kV Transmission Project



Rio Puerco-Pajarito-Prosperity 345 kV Transmission Project Report

PNM Exhibit EH-4

Is contained in the following 35 pages.

Rio Puerco – Pajarito - Prosperity 345 kV Transmission Project

October 2025

Main Analysis Prepared by:
Utility System Efficiencies, Inc. (USE)

Under Contract with:
Public Service Company of New Mexico

Foreword

This technical report was prepared for Public Service Company of New Mexico (PNM). This study was performed by Utility System Efficiencies, Inc. (USE) pursuant to a consulting contract with PNM.

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Any correspondence concerning this document, including technical and commercial questions should be referred to:

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Public Service Company of New Mexico
2401 Aztec Road NE, MS-Z220
Albuquerque, NM 87107

Table of Contents

List of Figures

List of Tables

PNM

Executive Summary

This study evaluates the planned Rio Puerco-Pajarito-Prosperity 345 kV transmission project ("Project") previously identified in prior analyses[1] to support the Albuquerque metropolitan and surrounding communities. This project improves system reliability and resiliency, expands load serving capability, and enhances transition to facilitate the integration of renewable energy resources. The project is currently scheduled to be in service by the first quarter of 2029.

The transmission project's load-serving capability will be further enhanced with the subsequent addition of a 115 kV transmission line extension from PNM's existing Prosperity to the Sandia station.

The Project consists of the addition of the following electrical facilities:

- Construction of a new 345 kV transmission line connecting PNM's existing Rio Puerco and Pajarito 345 kV stations (approximately 28 miles). Expansion of the existing Rio Puerco and Pajarito substations to accommodate the new 345 kV transmission line terminations.
- Within the existing Prosperity station boundaries, construct a 345 kV, four (4) breaker ring (expandable to breaker-and-a-half), including a 345/115 kV transformer.
- Construction of a 0.5 mile line extension linking an existing (but currently unused) 345 kV line from Pajarito to the new Prosperity 345 kV station.
- Termination of the existing Pajarito-Sandia 345 kV line into the Prosperity 345 kV station (in and out).
- Convert the Prosperity 115 kV station from a ring bus configuration to breaker-and-a-half configuration with the addition of five (5) breakers.

The Project supporting facilities consist of the following[2]:

- Construction of new high capacity 115 kV line connecting Prosperity, the existing Studio substation, a new Sol 115 kV substation, and Sandia 115 kV (approximately 9 miles).
- Expansion of the Sandia 115 kV station with the addition of a four (4) breaker ring station with termination of lines from the existing Sandia station.

The Project is illustrated in Figure 1.

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[1] Los Lunas Expansion Phase 5, dated July 2025 and Reves and Valencia Generation Retirement Analysis, dated December 2024

[2] This project is being pursued independently of the 345 kV line additions, but will enhance the capability of the 345 kV line additions.

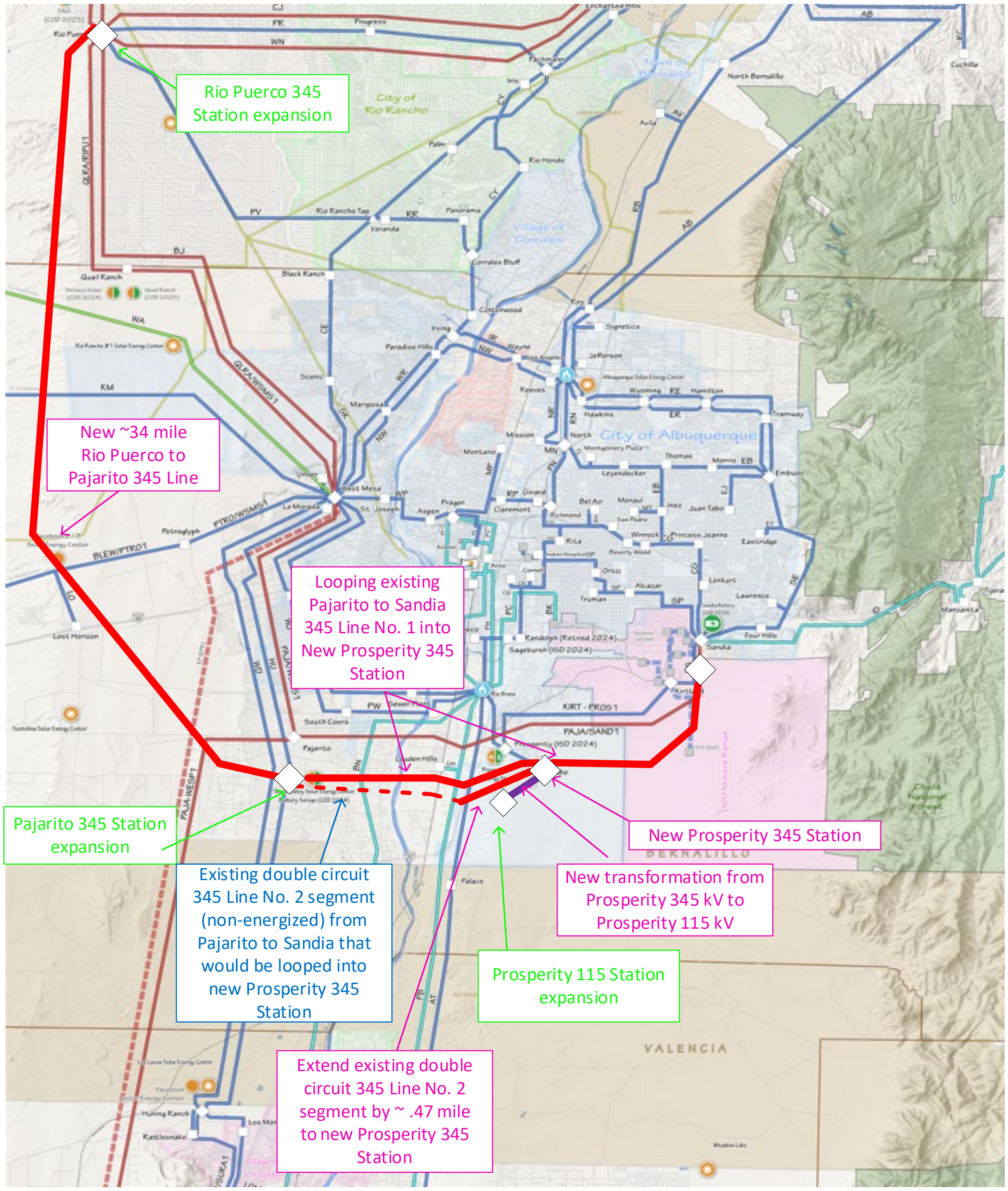


Figure 1 – Rio Puerco-Pajarito-Prosperity 345kV Transmission Project

The study evaluated the impact of PNM's planned Project on the PNM system.

Key Finds and Recommendations

1) **Steady-State Thermal Overloads**: The Project resolved many pre-existing system thermal overload conditions. The supporting 115 kV project, Prosperity-Sandia 115 kV with expansion of the Sandia 115 kV station further supported the reliability and resiliency of the transmission system for N-2 (breaker failures, common structures, etc.) contingencies.

   The Project enhances grid performance by redistributing power flows, alleviating congestion, and improving overall reliability. By establishing new transmission pathways, the system gains greater flexibility, resilience during disruptions, and improved capacity to serve additional customer loads and integrate renewable energy sources.

2) **Transition to Emissions-Free Generation:** Prepares the PNM system to be able to operate within required NERC performance criteria in preparation for the retirement of gas generation facilities while maintaining transmission system reliability. The new transmission reduces PNM's current reliance on redispatch of load-side gas generation resources to mitigate transmission system congestion.

3) **Additional Load Serving Capacity**: The Project increases the Albuquerque metropolitan area's load-serving capacity by up to 871 MW. The results vary based on the location of the new load and the generation dispatch.

Steady-State Performance, Thermal

The steady state thermal results show that most of the observed overloads are not attributable to the new additions.

Modeling PNM's Project mitigated many of the overloads identified in the results tables. Based on this analysis, most of the remaining issues will be addressed through a combination of planned mitigation measures as shown below.

Table 1 –Upgrades and Operating Actions

	Mitigation
	PNM Study Projects • New Rio Puerco-Pajarito-Prosperity 345 kV Transmission Project • New Prosperity-Sandia 115 kV and expansion of the Sandia 115 kV station (Supporting 115 kV)
	PNM Planned Transmission Projects • Deployment of redundant relays to mitigate P5 contingencies
	PNM Operating Actions • Use of post-contingency adjustments to the Belen 115 kV phase shifter transformer • Curtailment of eastern NM wind for the first N-1-1 outage[3] (Applies to specific P6 contingencies.)
	Los Alamos County/DOE Station Reconfiguration • Planned reconfiguration of the STA 115 kV station to mitigate P2 overloads impacting the Norton-Buckman 115 kV and Buckman-Whiterock-Eta 115 kV lines
	Load Shedding
	Load Shedding Requirements (P6 or N-1-1, or P7) 1. Hidden Mtn-Pajarito and Hidden Mtn-Western Spirit 345 kV 2. Hidden Mtn-Rattlesnake #1 & #2 115 kV (or any combination of two of the three lines) 3. Hidden Mtn-Pajarito and Clines-Corners-Western Spirit 345 kV 4. Delayed third Hidden Mountain transformer in-service date: Hidden Mtn-Pajarito 345 kV and Hidden Mtn 345/115 kV T1 or T2

Steady-State Performance, Voltage

Post-mitigation results were reviewed for voltage violations. No triggered voltage violations were identified for the updated cases, nor were any baseline voltage issues significantly worsened.

Transient Stability Performance

The system showed acceptable system performance for all contingencies studied.

Short Circuit Analysis

A short circuit screening analysis was performed using ASPEN OneLiner to evaluate whether projected fault currents warranted circuit breaker replacement. Breakers were flagged for replacement if the calculated short circuit current exceeded 95% of their minimum interrupting rating, and flagged for informational review if it exceeded 90%.

The results confirmed that all PNM circuit breakers have adequate interrupting capacity to safely accommodate the fault currents associated with the Project.

Introduction

PNM is pursuing new transmission to support the Albuquerque metropolitan and surrounding communities Rio Rancho and Los Lunas. This Project will deliver critical load-serving capacity to meet the demands of rapid regional growth and electrification.

Historically, transmission reinforcements over the past four decades have focused on building underlying 115 kV lines or implementing low-cost, small-capacity upgrades to utilize latent capacity within the existing system. Notable milestones include the 2010 and 2016 expansions of the Rio Puerco station, which looped in existing 345 kV lines and added 345/115 kV transformers to strengthen the 115 kV network.

In December 2021, the Western Spirit-Pajarito 345 kV line was energized, which connected Eastern New Mexico to the area just south of the Albuquerque metropolitan area, though no intra-metro transmission was built. In the third quarter of 2025, this line was looped into the new constructed 345/115 kV station referred to as "Hidden Mountain" resulting in new capacity supporting the 115 kV transmission system in the Albuquerque metropolitan area.

These upgrades significantly improve reliability and resilience for current and future load growth in southern Albuquerque and enable integration of new generation and storage resources.

Many of PNM's critical 115 kV lines in the Albuquerque area are nearly 60 years old and constructed with wood structures. Reconductoring these lines requires replacing wood with steel structures, which traditionally involves building parallel lines to maintain service continuity. This Project enables strategic rebuilding of aging infrastructure using existing rights-of-way, eliminating the need for parallel construction and improving flexibility for maintenance scheduling.

The Project improves the electrical infrastructure in the Albuquerque metropolitan and surrounding areas, supporting these key strategic initiatives:

Strategic Benefits:

Reliability and Resiliency

Enhances the reliability and resilience of the transmission system by increasing the system's capacity to withstand planned or unplanned outages. This reduces reliance on legacy or constrained infrastructure and enables significant rebuilding of area sub-transmission with advanced conductors to accommodate future load growth and generation resources.

Transition to Emissions-Free Generation

Prepares PNM for the retirement of gas generation facilities while maintaining transmission system reliability. The new transmission contained in the expansion reduces PNM's reliance on mitigation of transmission system congestion through dispatch of load-side gas generation resources planned for retirement.

Additional Load Serving Capability

The Project adds substantial transmission capacity to serve new and existing customers and support electrification. Depending on load location and generation dispatch scenarios, the benefit ranges from 400 MW to 900 MW.

Together, these improvements underscore the necessity and effectiveness of the transmission expansion in enabling PNM to continue delivering reliable, efficient, and forward-looking electric service.

Modeling Scenarios

- **Scenario A**: Baseline case representing pre-project conditions, including 640 MW of Los Lunas load.
- **Scenario B**: Post-project case incorporating the transmission expansion.
- **Scenario C**: Scenario B plus supporting 115 kV facilities.

Table 2 – Project

	Project Description
	• Construction of a new 345 kV transmission line connecting PNM's Rio Puerco and Pajarito 345 kV stations (approximately 28 miles). Expansion of Rio Puerco and Pajarito to accommodate the new 345 kV transmission line terminations. • Within existing Prosperity station boundaries, construct 345 kV station configured as four (4) breaker ring (expandable to breaker-and-a-half), which will include 345/115 kV transformation • A 0.5-mile extension linking an existing (but currently unused) 345 kV line from Pajarito to the new Prosperity 345 kV station • Terminate existing Pajarito-Sandia 345 into Prosperity 345 (in and out) • Convert Prosperity 115 kV station from a ring bus to breaker-and-a-half configuration with the addition of five (5) breakers.
	Supporting facilities to be filed under a NMPRC 440
	• Construction of new high capacity 115 kV line between Prosperity and Sandia 115 kV (approximately 9 miles) • Expansion of the Sandia 115 kV station with the addition of a four (4) breaker ring station with termination of lines from the existing Sandia station

Study Criteria

A system reliability evaluation consists of a comprehensive set of analyses designed to assess grid performance under both normal and contingency conditions. This evaluation was conducted in accordance with North American Electric Reliability Council ("NERC") Standard FAC-002-3 and includes the following components:

Power Flow Analysis:

- Identifies thermal overloads and voltages deviations (above or below criteria thresholds)
- Assesses system under steady-state normal operations and credible contingency conditions

Transient Stability Analysis:

- Verify that all generators remain in synchronism following disturbance
- Ensure voltage swings are damped and all oscillations show positive damping within 30-seconds of the initiating disturbance

Short Circuit Analysis:

- Confirm all fault currents remain within interruption capabilities of circuit breaker and switch capabilities
- Evaluates whether fault duty levels exceed the equipment ratings for protective devices

The analysis considers credible contingencies such as the loss of:

- Single or double circuit lines
- Transformer
- Generator
- Other devices such as station circuit breakers
- Relevant combinations of these transmission elements.

Performance of the transmission system is measured against the following planning criteria: the Western Electricity Coordinating Council ("WECC") Reliability Criteria, and the NERC Planning Standards. If reliability violations are identified, the study will identify the system facilities upgrades or operational mitigation measures needed to maintain the reliability to the transmission network.

This study evaluates whether the proposed alternative(s) results in any of the following reliability concerns:

- Equipment overloads on transmission lines, transformers, series compensation or other devices
- Voltage criteria violations
- Loss of synchronism among generators
- Voltage swings or oscillations that exceed acceptable limits
- Fault currents that exceed the interrupt rating of circuit breakers and switches

Power Flow Criteria

All power flow analysis was conducted with version 23.0.8 of General Electric's PSLF/PSDS/SCSC software. The analysis evaluated thermal and voltage performance of the transmission system under both normal and contingency conditions, consistent with the following reliability:

- Category P0 - All elements in service (base case)
- Category P1, P2 (N-1) - Single-element outages (e.g., line, transformer, or generator)
- Category P4, P5 and P7 (N-2) - Multiple-element outage scenarios

The performance criteria applied in the assessment are detailed in Table 3. These criteria are based on WECC/NERC performance requirements[4] with applicable additions and/or exceptions specific to the New Mexico transmission system.

[4] WECC-CRT-3.2 Transmission System Planning Performance

Table 3 — Power Flow Disturbance/Performance Criteria

		Thermal Rating Applied			Acceptable Voltage Range (pu)			Voltage Deviation %	
AREA	**kV Range**	**P0 (ALIS)**	**P1**	**P2-P7**	**P0 (ALIS)**	**P1**	**P2-P7**	**P1**	**P2-P7**
PNM (Area 10)	0 - 499	Normal	Emergency	Emergency	0.95-1.05	0.90-1.10	0.90-1.10	8%	50%
EPEC (AREA 11)	100 - 499	Normal	Emergency	Emergency	0.95-1.05	0.90-1.10	0.90-1.10	8%	50%
Tri-State Zone (120-123)	100 - 499	Normal	Emergency	Emergency	0.95-1.05	0.90-1.10	0.90-1.10	8%	50%
14 – 17, 19	100 - 499	Normal	Emergency	Emergency	0.95-1.05	0.90-1.10	0.90-1.10	8%	50%
	500 - 500	Normal	Emergency	Emergency	1.00-1.10	0.95-1.15	0.95-1.15	8%	50%
70, 73	100 - 499	Normal	Emergency	Emergency	0.95-1.05	0.90-1.10	0.90-1.10	8%	50%
PNM Voltage Exceptions (P0)	Bus Name				P0				
	Taiban Mesa 345 kV bus				0.95-1.10				
	Guadalupe 345 kV bus				0.95-1.10				
	Clines Corners 345 kV bus				0.95-1.10				
	Jicarilla 345 kV bus				0.95-1.10				

- All equipment loadings must be below their normal ratings under normal conditions.
- All line loadings must be below their emergency ratings for both single and double contingencies.
- All transformers and equipment with emergency rating should be below their emergency rating.

Transient Stability Criteria

The NERC/WECC transient stability performance requirements for transmission contingencies are as follows:

- All machines will remain in synchronism.
- All voltage swings will be well damped.
- Following fault clearing, the voltage shall recover to 80% of the pre-contingency voltage within 20 seconds of the initiating event for all P1 through P7 events, for each applicable BES bus serving load.
- Following fault clearing and voltage recovery above 80%, voltage at each applicable BES bus serving load shall neither dip below 70% of pre-contingency voltage for more than 30 cycles nor remain below 80% of pre-contingency voltage for more than two seconds, for all P1 through P7 events.
- Ensure low voltage ride through on all faults.
- Fault clearing times are shown in Table 4below.

Table 4 — PNM Fault Clearing Times

Categories	Fault Type	Voltage (kV)	Clearing Time (near-far end breakers)
P1, P3, P6	3 Phase Normally Cleared	345	3–4 Cycles
		230	3–4 Cycles
		115	4–4 Cycles
Categories	**Fault Type**	**Voltage (kV)**	**Clearing Time (near-far end breakers)**
P2, P5, P7	1 Phase Normally Cleared	345	3-4 Cycles
		230	
		115	4-4 Cycles
Categories	**Fault Type**	**Voltage (kV)**	**Clearing Time (normally opened breaker both near and far end—breaker opened due to stuck breaker both near and far end**
P4, P5, P7	1 Phase Stuck Breaker	345	3-16 Cycles
		230	
		115	4-16 Cycles

Short Circuit Criteria

Breakers operating at or above 92% of their short-circuit fault duty rating are flagged for further evaluation to determine whether an upgrade is warranted. This assessment considers several factors, including:

- Breaker age
- Maintenance history
- System stress conditions

Breakers that exceed 95% of their fault duty rating are generally scheduled for replacement or upgrade, as they pose a higher risk of failure and may no longer reliably interrupt fault currents under severe contingency conditions.

Power Flow Base Case Development

PNM provided the 2028 Heavy Summer (HS) base case, derived from the WECC 28 HS2 base case, and appropriately updated to reflect the conditions of this assessment.

This study evaluated two project scenarios against five (5) NNM load and resource dispatch scenarios. The case structure consisted of:

- Pre-project cases (A cases)
- Post-project 345 kV cases (B cases)
- Post-project 345 kV cases with supporting Prosperity-Sandia 115 kV and Sandia 115 kV station expansion. (C cases)

A full summary of the study cases is presented in Table 5.

- Resource Scenario 1: 10% wind and 55% solar levels, 100% summer peak loading (Peak), 0% Battery Dispatch. **Represents high load demand with solar ramping down late afternoon (4-5 pm) and fossil generation ramp up production to match the energy demands. Batteries are being charged by solar to be used during periods of low solar output.**

- Resource Scenario 2: 10% wind, solar offline, 95% of summer peak loading (Net Peak), 75% battery dispatch. **Represents "net peak" period which typically occurs during the evening hours during or after sunset with no solar output and batteries being discharged.**
- Resource Scenario 3: 80% wind generation, solar offline, 95% of summer peak loading (High Wind Net Peak), 75% battery dispatch. **Same as Scenario 2 assuming high wind output levels.**
- Resource Scenario 4: 10% wind, solar offline, 75 % of summer peak loading, 0% battery dispatch. **Represents hours when the batteries are depleted, and the load is still high (11pm).**
- Resource Scenario 5: Spring or fall off-peak, 100% wind, curtailed solar[4] and no battery. **Represents early morning hours with no solar production.**

Table 5 — Table of Cases

Case #	Resource Scenario			
	Wind	Solar	Battery	Season
Pre Case				
A01	10%	55%	0%	100% Sum Peak (Peak)
A02	10%	Offline	75%	95% Sum Peak (Net Peak)
A03	80%	Offline	75%	95% Sum Peak (High Wind Net Peak)
A04	10%	Offline	0%	75% Sum Peak
A05	100%	TBD[5]	0%	Spring or Fall off- Peak
Post-project Case				
B01	10%	55%	0%	100% Sum Peak (Peak)
B02	10%	Offline	75%	95% Sum Peak (Net Peak)
B03	80%	Offline	75%	95% Sum Peak (High Wind Net Peak)
B04	10%	Offline	0%	75% Sum Peak
B05	100%	TBD[4]	0%	Spring or Fall off- Peak
Post-project cases with supporting 115 kV				
C01	10%	55%	0%	100% Sum Peak (Peak)
C02	10%	Offline	75%	95% Sum Peak (Net Peak)
C03	80%	Offline	75%	95% Sum Peak (High Wind Net Peak)
C04	10%	Offline	0%	75% Sum Peak
C05	100%	TBD[4]	0%	Spring or Fall off- Peak

Power Flow Case Attributes

Table 6 provides an overview of the facilities loading on key transmission elements (both PNM and non-PNM) based on the evaluated power flow cases.

Table 6 — Power Flow Case Attributes – Pre-project Scenario (A cases)

	GENERATION RESOURCE SCENARIO (MW)

[5] Solar output levels will be curtailed, used only to serve NNM load levels to avoid overloading 345 kV lines to SJ/FC for N-1 outages.

FACILITY	1 100% PEAK	2 95% PEAK	3 HIGH WIND	4 75% PEAK	5 WINTER PK
Area 10 Slack Generator	LEF S1	LEF S1	LEF S1	LEF S1	LEF S1
Four Corners – Moenkopi 500 kV	347	345	793	237	1497
Four Corners – Cholla 345 kV (Not	209	261	584	133	1177
Four Corners – San Juan 345 kV	345	356	179	395	-171
Four Corners – Pintado	558	458	-123	648	-611
San Juan – Cabezon 345 kV	616	489	-134	669	-633
San Juan – Jicarilla 345 kV	70	114	-19	168	-307
Rio Puerco – West Mesa 345 kV	358	269	143	315	-12
Cabezon – Rio Puerco 345 kV	596	473	-146	646	-661
Pintado – Rio Puerco 345 kV	725	563	-11	632	-527
West Mesa – WMesa1 345/115 kV	282	254	250	204	49
West Mesa – WMesa2 345/115 kV	282	254	250	204	49
Hidden Mountain 345/115 kV T1	168	157	180	168	149
Hidden Mountain 345/115 kV T2	168	157	180	174	156
Hidden Mountain 345/115 kV T3	168	157	180	174	156
Clines Corners – Diamond Tail 1 & 2 345 kV	168	198	1076	135	1298
Path 47: Southern New Mexico	-52	174	-59	78	-19
Path 48: Northern New Mexico	1571	1408	-169	1923	-1822
Blackwater Converter	18	18	17	18	8
Arroyo Phase-Shifter	9	4	13	11	117
Gladstone Phase-Shifter	99	82	100	116	126
Belen 115 kV Phase-Shifter	-2	20	47	4	64

Steady State Contingency Analysis

Power flow was simulated using the PSLF Contingency Processor (SSTOOLS/Proviso HD). Extensive contingency analysis was performed including single element, stuck breaker, and common structure. Multiple overlapping contingencies (N-1-1) were also studied.

This study evaluated the impact of the Project on the PNM system. It then evaluated the further impact of the associated Prosperity-Sandia 115 kV line and Sandia 115 kV substation expansion project.

- Pre-project cases (A cases)
- Post-project 345 kV cases (B cases)
- Post-project 345 kV cases with supporting Prosperity-Sandia 115 kV and Sandia 115 kV station expansion(C cases)

The study does not assess impacts beyond PNM's systems, although observations may be noted. In addition, several transmission facilities of the City of Farmington system were identified as overloaded. These overloads are attributed to inaccurate load profile assumptions and are independent of the scope of this study. As such, they are not included in the report.

Load Serving Capacity Assessment

This load serving capacity assessment evaluated the Project transmission system's ability to accommodate load growth at three key load center locations within Albuquerque metropolitan to quantify the incremental load serving capacity.

Generation was modeled at the Rio Puerco 345 kV station and the following load locations were tested for additional load serving capacity[6]:

- Mesa Del Sol 115 kV (pre case only)
- Prosperity 345 kV (post cases only)
- Hidden Mountain 345 kV (pre and post cases)
- Quail Ranch 345 kV (pre and post cases)

The results vary based on the location of the new load center locations and generation dispatch. This analysis excluded constraints for the Prosperity-Person 115 kV line (Implement short-term mitigation through redispatch of gas generation and deployment of Battery Energy Storage Systems, while pursuing long-term reinforcement via transmission line reconductoring).

Comparing different dispatch scenarios, the pre-Project's minimum load serving capacity (irrespective of the load center) varies from zero MW in Dispatch 1 up to 343 MW in Dispatch 5, while the post-Project's (B cases) minimum load serving capacity varies from 411 MW in Dispatch 4 to 972 MW in Dispatch 5. Table 7 shows the additional load serving capacity provided by the Project for each dispatch and each load center.

Of the tested load capacity assessment, the Prosperity 345 kV station provides the best overall load serving capacity when considering all five dispatch scenarios. Whereas the pre-Project cases show a highly variable transfer capability, and in peak conditions showed either zero capability or only 78 MW in two of the three load locations tested, the post-Project Prosperity location had a minimum transfer limit of 871 MW at peak and an average of 1019 MW when considering all modeled dispatch scenarios. The new Prosperity 345 kV station is part of the Project and provides a significant increase in the Albuquerque metropolitan load serving capability.

Table 7 –Minimum Transfer Limit Comparison

	Pre-Project	Post Project 345 kV		Post Project 345 kV + 115 kV	
Load Center	A	B	Delta B-A	C	Delta C-B
DISPATCH 1 (peak)					
Hidden Mtn 345 kV	78	907	829	905	-2
Quail Ranch 345 kV	389	811	422	810	-1
Mesa Del Sol 115 kV	-71				
Prosperity 345 kV		871		870	0
DISPATCH 2					
Hidden Mtn 345 kV	495	843	348	856	13
Quail Ranch 345 kV	679	1025	347	1025	-1
Mesa Del Sol 115 kV	96				
Prosperity 345 kV		961		961	0
DISPATCH 3					
Hidden Mtn 345 kV	980	945	-35	944	-1
Quail Ranch 345 kV	1041	1268	227	1267	-1
Mesa Del Sol 115 kV	133				
Prosperity 345 kV		945		946	1
DISPATCH 4					
Hidden Mtn 345 kV	571	442	-128	453	10
Quail Ranch 345 kV	389	754	365	753	-1
Mesa Del Sol 115 kV	153				
Prosperity 345 kV		1050		1050	0

[6] The results are based on the AC Transfer Limit calculation which considered Area 10 elements > 100 kV.

DISPATCH 5					
Hidden Mtn 345 kV	1004	1021	18[7]	1021	0
Quail Ranch 345 kV	1063	1062	0	1062	0
Mesa Del Sol 115 kV	357				
Prosperity 345 kV		1270		1271	1

Table 8 –Minimum Transfer Limit by Load Center (MW)

Case/Dispatch	Hidden Mountain 345 kV	Quail Ranch 345 kV	Mesa Del Sol 115 kV	Prosperity 345 kV
A01	77.6	388.5	-70.7[8]	
A02	495.3	678.7	95.9	
A03	979.5	1040.7	133.4	
A04	570.6	388.9	152.8	
A05	1003.8	1062.6	356.7	
B01	906.5	810.6		870.6
B02	843.1	1025.4		960.8
B03	945	1267.9		945.4
B04	442.4	753.5		1049.7
B05	1021.4	1062.3		1269.8
C01	904.7	809.5		870.4
C02	855.9	1024.5		960.6
C03	944.2	1267.1		945.9
C04	452.8	752.7		1050
C05	1021.3	1062.3		1270.7

Power Flow - Thermal Analysis Results

Thermal Results

The steady state thermal results comparing the post-project (Scenario B) and pre-project (Scenario A) are shown in Table 12 and Table 14. Table 12 provides a summary of the overloaded elements for single element, stuck breaker, non-redundant relay, and common structure (P1, P2, P4, P5, and P7) outages[9], comparing Scenario A (pre-expansion) to Scenario B (post-expansion). Table 14 summarizes the P6 (N-1-1) contingencies, using the results for the same scenarios.

Table 13 and Table 15 add Scenario C, which includes the supporting 115 kV project.

Element overloads resulting exclusively from P5 contingencies are not shown in the tables. However, all P5 contingency overloads will be addressed by PNM's plans for redundant relays. Note: for any breaker-

[7] The delta in Dispatch 5 is 0 because the case is not constrained in load serving. Case 5 is light load, high generation and so adding load is not an issue.

[8] Binding constraint is the West Mesa Person line which is mitigated by building the Rio Puerco Pajarito project in the long-term and can be mitigated by dispatching Rio Bravo generator at Person in the short term.

[9] P1 Outage: This refers to the loss of a single element, such as a generator, transmission circuit, transformer, or shunt device.
P2 Outage: This refers to the loss of a single element, such as a bus section, an internal breaker.
P4 Outage: This refers to the loss of two or more elements caused by a fault plus a stuck breaker, such as the simultaneous loss of a transmission circuit and a generator or two transmission circuits.
P5 Outage: This refers to the loss of two or more elements caused by a fault plus failure of non-redundant relay protection resulting in delayed fault clearing.
P7 Outage: This refers to the loss of two or more elements on a common structure, such as the loss of two adjacent transmission circuits.

to-breaker line composed of multiple segments, only the segment experiencing the highest loading is reported.

Study results indicate that the Project resolves many of the thermal overloads identified in the study as shown in Table 9.

Table 9 –Facilities Impacted by the 345 kV project (B vs A > 2%)

	Element	Contingency Category	Mitigation
	Resolved by Project		
	West Mesa/WM1 345/115 kV T1	P2/P4,P6	Project
	West Mesa/WM2 345/115 kV T1	P2/P4,P6	Project
	BELAIR T-HW-CG-CG1-RICHMOND_PNM 115 kV	P1,P2/P4,P6	Project
	WESTMS1-CENTRALP 115 kV Line 1	P1,P2/P4,P5,P6,P7	Project
	WESTMS1-WESTMS2 115 kV Line 1	P2/P4	Project
	WESTMS2-VOLCANOT 115 kV Line 1	P1,P2/P4,P5,P6,P7	Project
	QUAIL_RANCH-WESTMESA 345 kV Line 1	P6	Project
	B-A/B-A 345/115 kV T1	P6	Project
	B-A-NO_BERN-AVILA_T-ROY 115 kV Line 1	P6	Project
	BELAIR_T-SPEDRO_T-BEV_WOOD 115 kV Line 1	P6	Project
	PRINCESS-EB-HW-WINROCK 115 kV Line 1	P6	Project
	IRVING-WAYNE2 115 kV Line 1	P6	Project
	CENTRALP-SNOW_VISTA 115 kV Line 1	P6	Project
	New Overloads		
	Person-Prosper 115 kV	P5, P6, P7 (P2/P4 at 99%)	Short-term redispatch and long-term reconductor
	Tome-First St-Jarales t 115 kV	P6	Los Lunas load shedding
	Existing Overloads Increased > 2%		
	Sun Ranch-Belen	P6	Los Lunas load shedding

Thermal Results, Scenario C vs B cases

Scenario C cases model the Prosperity-Sandia 115 kV line and expansion of the Sandia 115 kV station project (supporting 115 kV project) in addition to the Project. This supporting project resolved multiple Sandia 115 kV contingencies that were overloading the NORTHPNM-MPLAZA 115 kV line. Table 10 summarizes the system facilities resolved by this project. Table 13 and Table 15 provide details of the contingency impacts.

Table 10 – Facilities Impacted by the supporting 115 kV project (C vs B > 2%)

	Element	Contingency Category	Mitigation
	NORTHPNM-MPLAZA_T 115 kV Line 1	P1, P2/P4	Prosperity-Sandia 115 kV line.

Table 11 provides a summary of the studied projects and the additional upgrades and operating actions identified in this study. The PNM transmission project mitigated many of the overloads identified in Table

12, Table 13, Table 14, and Table 15. Based on this analysis, most of the remaining issues will be addressed through a combination of planned mitigation measures as shown below.

Table 11 –Upgrades and Operating Actions

	Mitigation
	PNM Study Projects • New Rio Puerco-Pajarito-Prosperity 345 kV Transmission Project • New Prosperity-Sandia 115 kV and expansion of the Sandia 115 kV station (Supporting 115 kV)
	PNM Planned Transmission Projects • Person-Prosper 115 kV-Implement short-term mitigation through redispatch of gas generation and deployment of Battery Energy Storage Systems, while pursuing long-term reinforcement via transmission line reconductoring • Deployment of redundant relays to mitigate P5 contingencies from TPL-001 Corrective Action Plan
	PNM Operating Actions • Use of post-contingency adjustments to the Belen 115 kV phase shifter transformer • Curtailment of ENM wind for the first N-1-1 outage[10] (Applies to specific P6 contingencies.)
	Los Alamos County/DOE Station Reconfiguration • Planned reconfiguration of the STA 115 kV station to mitigate P2 overloads impacting the Norton-Buckman 115 kV and Buckman-Whiterock-Eta 115 kV lines
	Load Shedding
	Load Shedding Requirements (P6 or N-1-1, or P7) 5. Hidden Mtn-Pajarito and Hidden Mtn-Western Spirit 345 kV 6. Hidden Mtn-Rattlesnake #1 & #2 115 kV (or any two of three lines) 7. Hidden Mtn-Pajarito and Clines-Corners-Western Spirit 345 kV 8. (delay of the third Hidden Mountain transformer): Hidden Mtn-Pajarito 345 kV and Hidden Mtn 345/115 kV T1 or T2

The above is in addition to PNM's existing Remedial Action Scheme ("RAS") and load shedding schemes, including PNM's centralized load shedding scheme called Northern New Mexico Import Contingency Load Shedding Scheme ("ICLSS") that monitors several system conditions, including station voltages and transmission line status and current. When conditions indicate the system is in danger of a pending cascading outage, load is dropped in an orderly fashion. ICLSS addresses outages of 345 kV line segments between Four Corners/San Juan to Albuquerque.

[10] See NERC PRC -012-2 R1 [I] TD Exhibit G - NM Wind Corridor Curtailment Procedure Final Draft)

Table 12 —Overloads: P1, P2, P4, P5*, and P7 (B vs A)

28HS			P1, P2/P4, P5, P7 Contingencies			Scenario A = pre-Project					Scenario B = post-Project (345kV)					
Line ID	Element	AREA	CONTINGENCY IDENTIFIER	CONTINGENCY DESCRIPTION	RATING MVA	28HS_CCN_A01	28HS_CCN_A02	28HS_CCN_A03	28HS_CCN_A04	28HS_CCN_A05	28HS_CCN_B01	28HS_CCN_B02	28HS_CCN_B03	28HS_CCN_B04	28HS_CCN_B05	Comments & Mitigation
	Resolved by RP-Pajarito-Prosperity 345 kV project (Post-project < 101%)															
	WESTMESA/WESTMS_1 345/115 kV T1	10	P2P4_WMesa345_BF5	West Mesa-Pajarito 345 kV Line & West Mesa 345/115 kV Transformer #2(BF-22482)	448	1.466	1.223	0.884	1.096	0.095	1.	0.881	0.751	0.731	0.032	RP-Paj-Prosp-Sandia
	WESTMESA/WESTMS_2 345/115 kV T1	10	P2P4_WMesa345_BF1	West Mesa-Pajarito 345 kV Line and West Mesa 345/115 kV Transformer #1 (BF-23582)	448	1.478	1.233	0.891	1.105	0.096	1.01	0.889	0.758	0.738	0.032	RP-Paj-Prosp-Sandia
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P2P4_Paj345_BF4-24782	Pajarito-HM and Paj-Prosp1 345kV	154	1.024	0.769	0.739	0.667	0.134	0.101	0.016	0.053	0.042	0.122	
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P1_Pajarito-Prosp	Line Pajarito-Prosperity 345 kV	154	1.01	0.756	0.744	0.653	0.15	Not Run	Not Run	Not Run	Not Run	Not Run	
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P2P4_Pajarito345_OLD	Pajarito-RP 345kV And Pajarito-Prosperity BF-28062	154	1.01	0.756	0.744	0.653	0.15	0.217	0.084	0.023	0.133	0.115	
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P2P4_Prosperity345_BF3Cr	Prosperity-Pajarito AND Prosperity 345/115kV T1	154	1.01	0.756	0.744	0.653	0.15	0.157	0.042	0.014	0.092	0.115	
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P2P4_Prosperity345_BF1C	Prosperity-Sandia AND Prosperity-Pajarito1 345kV Ring	154	1.008	0.753	0.742	0.649	0.15	0.814	0.605	0.588	0.534	0.112	RP-Paj-Prosp-Sandia
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P1_Sandia-Prosp	Line Sandia-Prosperity 345 kV	154	1.008	0.753	0.742	0.649	0.15	0.81	0.601	0.585	0.532	0.111	
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P2P4_Prosperity345_BF2C	Prosperity-Sandia AND Prosperity 345/115kV T1	154	1.008	0.753	0.742	0.649	0.15	1.006	0.751	0.741	0.646	0.15	
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P2P4_Sandia345_BF1r	Sandia 345 kV Station (BF-31282, 30182)	154	1.008	0.753	0.742	0.649	0.15	0.81	0.601	0.585	0.532	0.111	
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P1_Sandia345/115	Transformer Sandia 345/115 kV	154	1.008	0.753	0.742	0.649	0.15	0.81	0.601	0.584	0.532	0.111	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P2P4_Paj345_BF4-24782	Pajarito-HM and Paj-Prosp1 345kV	154	1.024	0.769	0.739	0.667	0.134	0.101	0.016	0.053	0.042	0.122	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P1_Pajarito-Prosp	Line Pajarito-Prosperity 345 kV	154	1.01	0.756	0.744	0.653	0.15	Not Run	Not Run	Not Run	Not Run	Not Run	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P2P4_Pajarito345_OLD	Pajarito-RP 345kV And Pajarito-Prosperity BF-28062	154	1.01	0.756	0.744	0.653	0.15	0.217	0.084	0.023	0.133	0.115	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P2P4_Prosperity345_BF3Cr	Prosperity-Pajarito AND Prosperity 345/115kV T1	154	1.01	0.756	0.744	0.653	0.15	0.157	0.042	0.014	0.091	0.114	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P2P4_Prosperity345_BF1C	Prosperity-Sandia AND Prosperity-Pajarito1 345kV Ring	154	1.008	0.753	0.742	0.649	0.15	0.814	0.605	0.588	0.534	0.112	RP-Paj-Prosp-Sandia
CG	CG-1-HW-CG 115 kV Ckt 1	10	P1_Sandia-Prosp	Line Sandia-Prosperity 345 kV	154	1.008	0.753	0.742	0.649	0.15	0.81	0.601	0.585	0.532	0.111	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P2P4_Prosperity345_BF2C	Prosperity-Sandia AND Prosperity 345/115kV T1	154	1.008	0.753	0.742	0.649	0.15	1.006	0.751	0.741	0.646	0.15	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P2P4_Sandia345_BF1r	Sandia 345 kV Station (BF-31282, 30182)	154	1.008	0.753	0.742	0.649	0.15	0.81	0.601	0.585	0.532	0.111	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P1_Sandia345/115	Transformer Sandia 345/115 kV	154	1.008	0.753	0.742	0.649	0.15	0.81	0.601	0.584	0.532	0.111	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P2P4_Paj345_BF4-24782	Pajarito-HM and Paj-Prosp1 345kV	154	1.024	0.769	0.739	0.667	0.135	0.101	0.016	0.053	0.042	0.122	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P1_Pajarito-Prosp	Line Pajarito-Prosperity 345 kV	154	1.01	0.756	0.744	0.653	0.15	Not Run	Not Run	Not Run	Not Run	Not Run	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P2P4_Pajarito345_OLD	Pajarito-RP 345kV And Pajarito-Prosperity BF-28062	154	1.01	0.756	0.744	0.653	0.15	0.217	0.084	0.023	0.133	0.115	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P2P4_Prosperity345_BF3Cr	Prosperity-Pajarito AND Prosperity 345/115kV T1	154	1.01	0.756	0.744	0.653	0.15	0.157	0.042	0.014	0.091	0.114	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P2P4_Prosperity345_BF1C	Prosperity-Sandia AND Prosperity-Pajarito1 345kV Ring	154	1.008	0.754	0.742	0.649	0.15	0.815	0.605	0.588	0.535	0.112	RP-Paj-Prosp-Sandia
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P1_Sandia-Prosp	Line Sandia-Prosperity 345 kV	154	1.008	0.753	0.742	0.649	0.15	0.81	0.602	0.585	0.532	0.111	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P2P4_Prosperity345_BF2C	Prosperity-Sandia AND Prosperity 345/115kV T1	154	1.008	0.753	0.742	0.649	0.15	1.006	0.751	0.741	0.647	0.15	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P2P4_Sandia345_BF1r	Sandia 345 kV Station (BF-31282, 30182)	154	1.008	0.753	0.742	0.649	0.15	0.81	0.602	0.585	0.532	0.111	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P1_Sandia345/115	Transformer Sandia 345/115 kV	154	1.008	0.753	0.742	0.649	0.15	0.81	0.601	0.585	0.532	0.111	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P1_Volcano-WMesa2	Line Volcano-West Mesa 2 115 kV	156	1.094	0.534	0.465	0.588	0.065	0.586	0.283	0.255	0.289	0.041	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P2P4_WMesa2_BF3a	West Mesa 2-Volcano 115 kV Line and West Mesa 1-2 115 kV Bus Tie (BF-50662)	156	1.079	0.511	0.448	0.562	0.055	0.578	0.254	0.227	0.265	0.03	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P2P4_Person115_BF5a	El Cerro-Person-Volcano 115 kV Lines (BF-11962)	156	1.029	0.804	0.732	0.57	0.065	0.52	0.4	0.337	0.26	0.028	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P2P4_Volcano115_BF1	Volcano 115 kV Breaker (BF)	156	1.027	0.757	0.673	0.542	0.04	0.541	0.375	0.312	0.258	0.037	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P7_DoubleCk_7	Person-Volcano and West Mesa-Volcano 115 kV Lines (Common Structure)	156	1.027	0.757	0.673	0.542	0.04	0.541	0.375	0.312	0.258	0.037	RP-Paj-Prosp-Sandia
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P2P4_Person115_BF4a	Person-Volcano 115 kV Line and Person 115/46 kV Transformer (BF-10862)	156	1.026	0.77	0.682	0.536	0.036	0.514	0.38	0.311	0.238	0.045	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P1_Person-Volcano	Line Person-Volcano 115 kV	156	1.023	0.772	0.687	0.539	0.038	0.533	0.396	0.327	0.251	0.04	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P2P4_WMesa2_BF2a	West Mesa 2-Volcano 115 kV Line and West Mesa 345/115 kV Transformer #2(BF-5056:	156	1.02	0.466	0.402	0.533	0.059	0.47	0.208	0.218	0.205	0.061	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P5_WMesa115_2	P5 - West Mesa 1-2 115 kV Bus Tie (Relay 86LT LOR)	156	1.017	0.768	0.683	0.534	0.039	0.523	0.389	0.321	0.245	0.039	
West_Mesa	WESTMS_1-WESTMS_2 115 kV Ckt 1	10	P2P4_WMesa345_BF5	West Mesa-Pajarito 345 kV Line & West Mesa 345/115 kV Transformer #2(BF-22482)	355	1.077	0.68	0.559	0.672	0.07	0.769	0.453	0.432	0.445	0.086	RP-Paj-Prosp-Sandia
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P2P4_WMesa1_BF4	West Mesa 1-Snow Vista 115 kV Line and West Mesa 1-3 115 kV Bus Tie (BF-52662)	156	1.196	0.459	0.417	0.662	0.119	0.657	0.338	0.404	0.349	0.116	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P7_DoubleCk_30	West Mesa 1-Huning Ranch and West Mesa-Snow Vista 115 kV Line (CS < 1 mile)	156	1.187	0.43	0.391	0.65	0.117	0.635	0.333	0.416	0.328	0.104	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P1_WMesa1-SnowVista	Line West Mesa 1-Snow Vista 115 kV	156	1.169	0.421	0.389	0.626	0.116	0.614	0.341	0.415	0.302	0.107	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P2P4_SnowVista115BF4a	Snow Vista-West Mesa 115 kV Line and Unit 2 (BF)	156	1.118	0.382	0.358	0.594	0.112	0.583	0.346	0.425	0.282	0.107	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P2P4_SnowVista115BF3a	Snow Vista-West Mesa 115 kV Line and Unit 1 (BF)	156	1.11	0.385	0.364	0.59	0.113	0.579	0.355	0.433	0.281	0.109	RP-Paj-Prosp-Sandia
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P5_WMesa345_1a	P5 - West Mesa 345/115 kV transformer #1 (Relay LOR)	156	1.09	0.319	0.301	0.563	0.107	0.482	0.367	0.459	0.205	0.113	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P2P4_WMesa1_BF3	West Mesa 1-Snow Vista 115kV Line & West Mesa 345/115kV Transformer #1(BF-52562	156	1.086	0.349	0.333	0.565	0.115	0.485	0.384	0.473	0.214	0.121	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P2P4_Sandia1_BF3	Sandia-Richmond 115 kV Line and Sandia 115 kV Bus Tie (BF-23662)	156	1.041	0.38	0.364	0.554	0.117	0.442	0.388	0.459	0.218	0.114	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P2P4_Paj345_BF4-24782	Pajarito-HM and Paj-Prosp1 345kV	156	1.033	0.326	0.302	0.591	0.107	0.474	0.354	0.401	0.224	0.09	

Table continued: Overloads: P1, P2, P4, P5* and P7 (B vs A)

	28HS		P1, P2/P4, P5, P7 Contingencies			Scenario A = pre-Project					Scenario B = post-Project (345kV)					
Line ID	Element	AREA	CONTINGENCY IDENTIFIER	CONTINGENCY DESCRIPTION	RATING MVA	28HS_ CCN_ A01	28HS_ CCN_ A02	28HS_ CCN_ A03	28HS_ CCN_ A04	28HS_ CCN_ A05	28HS_ CCN_ B01	28HS_ CCN_ B02	28HS_ CCN_ B03	28HS_ CCN_ B04	28HS_ CCN_ B05	Comments & Mitigation
	Resolved by Sandia 115 kV bus expansion and Prosper-Sandia3 115 kV															
TL-EB_Tap	NORTHPNM-MPLAZA_T 115 kV Ckt 1	10	P2P4_Sandia1_BF3	Sandia-Richmond 115 kV Line and Sandia 115 kV Bus Tie (BF-23662)	156	1.033	0.822	0.82	0.668	0.156	1.034	0.824	0.821	0.671	0.156	Prosper-Sandia 115 kV and Sandia 115 kV bus expansion and
TL-EB_Tap	NORTHPNM-MPLAZA_T 115 kV Ckt 1	10	P2P4_Sandia1_BF2	Sandia 115 kV Bus Tie and KAFB Load (BF-22562)	156	1.014	0.806	0.804	0.656	0.153	1.025	0.816	0.814	0.666	0.156	
TL-EB_Tap	NORTHPNM-MPLAZA_T 115 kV Ckt 1	10	P1_SandiaBusTie	Bus Tie Sandia 115 kV	156	1.009	0.801	0.799	0.652	0.152	1.021	0.812	0.81	0.662	0.155	
TL-EB_Tap	NORTHPNM-MPLAZA_T 115 kV Ckt 1	10	P2P4_Sandia1_BF6	Sandia 115 kV Bus Tie and Sandia 345/115 kV Transformer (BF-34562)	156	1.009	0.801	0.799	0.652	0.152	1.021	0.812	0.81	0.662	0.155	
	Additional upgrades required															
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	P5_WMesa115_1b	P5 - West Mesa 1-2 115 kV Bus Tie (Relay 12SBD11)	156	0.557	0.123	0.155	0.209	0.065	1.308	0.499	0.442	0.673	0.15	P5 relay plan
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	P7_DoubleCk_8	Person-WMesa2& Snow Vista-WMesa1 115kV Lines(Common Structure less than 1 mil	156	0.527	0.336	0.295	0.19	0.022	1.105	0.789	0.721	0.523	0.092	Reconductor
	Addressed by operating actions and/or coordination with other entities															
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P5_SanJuan_1a	P5 - San Juan 345 kV Bus (relay)	74	0.158	0.163	0.659	0.25	1.137	0.263	0.177	0.682	0.231	1.142	P5 relay plan
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	74	0.11	0.281	0.687	0.098	1.035	0.099	0.307	0.71	0.108	1.037	Belen PST
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P2P4_SanJuan345_BF15	San Juan-Cabezon 345 kV Line and San Juan 345/69 kV Transformer (BF-18582)	74	0.265	0.179	0.639	0.188	0.999	0.236	0.196	0.661	0.172	1.003	Belen PST
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P2P4_Cabezon345_BF1	Cabezon 345 kV Station	74	0.266	0.179	0.64	0.189	0.999	0.237	0.196	0.662	0.172	1.003	Belen PST
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P1_Cabezon-SJuan	Line Cabezon-San Juan 345 kV	74	0.265	0.179	0.638	0.189	0.999	0.236	0.196	0.661	0.172	1.002	Belen PST
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P2P4_SanJuan345_BF16	San Juan-Cabezon 345 kV Line (BF-17482)	74	0.265	0.179	0.638	0.189	0.999	0.236	0.196	0.661	0.172	1.002	Belen PST
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P1_RioPuerco-Cabezon	Line Rio Puerco-Cabezon 345 kV	74	0.264	0.18	0.64	0.198	0.997	0.235	0.198	0.663	0.181	1.001	Belen PST
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P2P4_RioPuerc345_BF6	Rio Puerco-Cabezon 345 kV Line (BF-39582)	74	0.264	0.18	0.64	0.198	0.997	0.235	0.198	0.663	0.181	1.001	Belen PST
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P2P4_RioPuerc345_BF5	Cabezon-Rio Puerco-West Mesa #2 345 kV Line (BF-38482)	74	0.145	0.176	0.636	0.205	0.996	0.238	0.196	0.661	0.183	1.	Belen PST
	BERNARDO-SOCORROP 115 kV Ckt 1	10	P5_SanJuan_1a	P5 - San Juan 345 kV Bus (relay)	74	0.194	0.141	0.615	0.287	1.119	0.3	0.149	0.638	0.267	1.123	P5 relay plan
	BERNARDO-SOCORROP 115 kV Ckt 1	10	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	74	0.134	0.237	0.643	0.091	1.017	0.11	0.263	0.666	0.089	1.018	Belen PST
NL	NORTON_2-BUCKMAN 115 kV Ckt 1	10	P2P4_STA115_BF1a	BA-STA-Norton 115 kV Lines (LAC BF-66862)	116	1.145	1.191	1.189	1.193	1.014	1.141	1.188	1.186	1.19	1.011	
NL	NORTON_2-BUCKMAN 115 kV Ckt 1	10	P2P4_STA115_BF3a	WTA-STA-ETA (LAC BF-62462)	116	1.142	1.187	1.186	1.189	1.012	1.138	1.184	1.184	1.186	1.008	
	BUCKMAN-WHITEROK 115 kV Ckt 1	10	P2P4_STA115_BF1a	BA-STA-Norton 115 kV Lines (LAC BF-66862)	116	1.12	1.168	1.165	1.176	1.011	1.116	1.165	1.163	1.173	1.007	MIT: LAC/DOE planned station reconfiguration
	BUCKMAN-WHITEROK 115 kV Ckt 1	10	P2P4_STA115_BF3a	WTA-STA-ETA (LAC BF-62462)	116	1.117	1.164	1.162	1.173	1.008	1.113	1.161	1.16	1.169	1.005	
	ETA-WHITEROK 115 kV Ckt 1	10	P2P4_STA115_BF1a	BA-STA-Norton 115 kV Lines (LAC BF-66862)	116	1.085	1.133	1.13	1.142	0.996	1.081	1.13	1.128	1.138	0.992	
	ETA-WHITEROK 115 kV Ckt 1	10	P2P4_STA115_BF3a	WTA-STA-ETA (LAC BF-62462)	116	1.082	1.128	1.127	1.138	0.993	1.078	1.125	1.125	1.134	0.989	
	HIDDENMOUNT-RATTLESNKPNM 115 kV Ckt	10	P7_DoubleCk38a	Hidden Mountain-Rattlesnake 115 kV Line	350	1.236	1.156	1.346	1.264	1.169	1.19	1.121	1.289	1.245	1.138	MIT: Meta load shedding
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P5_SanJuan_1a	P5 - San Juan 345 kV Bus (relay)	59	0.686	0.388	0.399	0.801	1.242	0.82	0.357	0.424	0.774	1.248	P5 relay plan
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	59	0.597	0.172	0.432	0.496	1.115	0.549	0.145	0.458	0.464	1.117	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_SanJuan345_BF15	San Juan-Cabezon 345 kV Line and San Juan 345/69 kV Transformer (BF-18582)	59	0.826	0.346	0.374	0.715	1.071	0.783	0.314	0.399	0.688	1.076	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_Cabezon345_BF1	Cabezon 345 kV Station	59	0.827	0.346	0.375	0.716	1.071	0.785	0.314	0.4	0.689	1.076	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P1_Cabezon-SJuan	Line Cabezon-San Juan 345 kV	59	0.827	0.347	0.374	0.717	1.07	0.784	0.315	0.398	0.689	1.075	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_SanJuan345_BF16	San Juan-Cabezon 345 kV Line (BF-17482)	59	0.827	0.347	0.374	0.717	1.07	0.784	0.315	0.398	0.689	1.075	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P1_RioPuerco-Cabezon	Line Rio Puerco-Cabezon 345 kV	59	0.825	0.344	0.376	0.729	1.068	0.783	0.312	0.4	0.702	1.073	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_RioPuerc345_BF6	Rio Puerco-Cabezon 345 kV Line (BF-39582)	59	0.825	0.344	0.376	0.729	1.068	0.783	0.312	0.4	0.702	1.073	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_RioPuerc345_BF5	Cabezon-Rio Puerco-West Mesa #2 345 kV Line (BF-38482)	59	0.667	0.352	0.371	0.739	1.067	0.787	0.315	0.399	0.705	1.072	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P5_WMesa115_1b	P5 - West Mesa 1-2 115 kV Bus Tie (Relay 12SBD11)	59	1.069	0.614	0.254	1.016	1.037	0.78	0.272	0.367	0.632	0.934	P5 relay plan
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_WMesa345_BF3	Rio Puerco-West Mesa-Arroyo 345 kV Lines (BF-14682)	59	0.671	0.24	0.344	0.547	1.058	0.594	0.184	0.374	0.491	1.051	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P1_FourCorn-Pintado	Line Four Corners-Pintado 345 kV	59	0.786	0.331	0.369	0.704	1.054	0.742	0.299	0.393	0.676	1.058	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_FourCorn345_BF3	Four Corners-Pintado 345 kV Line (BF-932)	59	0.786	0.331	0.369	0.704	1.054	0.742	0.299	0.393	0.676	1.058	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P5_WMesa345_1a	P5 - West Mesa 345/115 kV transformer #1 (Relay LOR)	59	0.706	0.271	0.319	0.562	1.055	0.606	0.196	0.365	0.494	1.051	P5 relay plan
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P1_WMesa-Arroyo	Line West Mesa-Arroyo 345 kV	59	0.633	0.212	0.355	0.514	1.051	0.576	0.171	0.38	0.476	1.049	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_WMesa345_BF2	West Mesa-Arroyo 345 kV Line and West Mesa 345/115 kV Transformer #1 (BF-15782)	59	0.651	0.229	0.341	0.527	1.047	0.587	0.181	0.371	0.484	1.046	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P1_Pintado-RioPuerc	Line Pintado-Rio Puerco 345 kV	59	0.681	0.364	0.342	0.702	1.023	0.813	0.332	0.366	0.674	1.026	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_RioPuerc345_BF1	Rio Puerco-Pintado 345 kV Line (BF-34082)	59	0.681	0.364	0.342	0.702	1.023	0.813	0.332	0.366	0.674	1.026	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_RioPuerc345_BF2a	Pintado-Rio Puerco-Quail Ranch 345 kV Line (BF-35182)	59	0.687	0.368	0.341	0.713	1.022	0.815	0.333	0.366	0.678	1.026	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_Pintado345_BF1a	Pintado 345 kV Station	59	0.689	0.371	0.336	0.704	1.017	0.823	0.339	0.359	0.676	1.021	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_FourCorn345_BF2	Four Corners-Pintado 345 kV Line and Four Corners Unit 4 (BF-836)	59	0.827	0.374	0.329	0.748	1.005	0.784	0.342	0.353	0.721	1.009	Belen PST
	Independent of Study Area															
	FOURCORN-FC-CH SC1 345 kV Ckt 1	14	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	908	0.214	0.238	0.502	0.157	1.016	0.213	0.237	0.502	0.156	1.016	Independent of study area
	FOURCORN-FC-CH SC2 345 kV Ckt 2	14	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	908	0.215	0.24	0.506	0.157	1.024	0.214	0.239	0.506	0.156	1.024	

PNM

Table 13 —Overloads: P1, P2, P4, P5*, and P7 (C vs B vs A)

28HS			P1, P2/P4, P5, P7 Contingencies			Scenario A = pre-Project					Scenario B = post-Project (345kV)					Scenario C post-Project (345kV + 115kV)					
Line ID	Element	AREA	CONTINGENCY IDENTIFIER	CONTINGENCY DESCRIPTION	RATING MVA	28HS_ CCN_ A01	28HS_ CCN_ A02	28HS_ CCN_ A03	28HS_ CCN_ A04	28HS_ CCN_ A05	28HS_ CCN_ B01	28HS_ CCN_ B02	28HS_ CCN_ B03	28HS_ CCN_ B04	28HS_ CCN_ B05	28HS_ CCN_ C01	28HS_ CCN_ C02	28HS_ CCN_ C03	28HS_ CCN_ C04	28HS_ CCN_ C05	Comments & Mitigation
	Resolved by RP-Pajarito-Prosperity 345 kV project (Post-project < 101%)																				
	WESTMESA/WESTMS_1 345/115 kV T1	10	P2P4_WMesa345_BF5	West Mesa-Pajarito 345 kV Line & West Mesa 345/115 kV Transformer #2(BF-22482)	448	1.466	1.223	0.884	1.096	0.095	1	0.881	0.751	0.731	0.032	1.001	0.882	0.752	0.732	0.032	RP-Paj-Prosp-Sandia
	WESTMESA/WESTMS_2 345/115 kV T1	10	P2P4_WMesa345_BF1	West Mesa-Pajarito 345 kV Line and West Mesa 345/115 kV Transformer #1 (BF-23582)	448	1.478	1.233	0.891	1.105	0.096	1.01	0.889	0.758	0.738	0.032	1.011	0.891	0.759	0.739	0.033	RP-Paj-Prosp-Sandia
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P2P4_Paj345_BF4-24782	Pajarito-HM and Paj-Prosp1 345kV	154	1.024	0.769	0.739	0.667	0.134	0.101	0.016	0.053	0.042	0.122	0.05	0.068	0.012	0.051	0.107	
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P1_Pajarito-Prosp	Line Pajarito-Prosperity 345 kV	154	1.01	0.756	0.744	0.653	0.15	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P2P4_Pajarito345_OLD	Pajarito-RP 345kV And Pajarito-Prosperity BF-28062	154	1.01	0.756	0.744	0.653	0.15	0.217	0.084	0.023	0.133	0.115	0.164	0.037	0.046	0.095	0.11	
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P2P4_Prosperity345_BF3Cr	Prosperity-Pajarito AND Prosperity 345/115kV T1	154	1.01	0.756	0.744	0.653	0.15	0.157	0.042	0.014	0.092	0.115	0.182	0.059	0.04	0.104	0.111	
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P2P4_Prosperity345_BF1C	Prosperity-Sandia AND Prosperity-Pajarito1 345kV Ring	154	1.008	0.753	0.742	0.649	0.15	0.814	0.605	0.588	0.534	0.112	0.503	0.325	0.299	0.308	0.06	RP-Paj-Prosp-Sandia
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P1_Sandia-Prosp	Line Sandia-Prosperity 345 kV	154	1.008	0.753	0.742	0.649	0.15	0.81	0.601	0.585	0.532	0.111	0.494	0.318	0.292	0.302	0.058	
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P2P4_Prosperity345_BF2C	Prosperity-Sandia AND Prosperity 345/115kV T1	154	1.008	0.753	0.742	0.649	0.15	1.006	0.751	0.741	0.646	0.15	0.873	0.62	0.606	0.536	0.13	
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P2P4_Sandia345_BF1r	Sandia 345 kV Station (BF-31282, 30182)	154	1.008	0.753	0.742	0.649	0.15	0.81	0.601	0.585	0.532	0.111	0.494	0.318	0.292	0.302	0.058	
CG	BELAIR_T-HW-CG 115 kV Ckt 1	10	P1_Sandia345/115	Transformer Sandia 345/115 kV	154	1.008	0.753	0.742	0.649	0.15	0.81	0.601	0.584	0.532	0.111	0.494	0.318	0.292	0.302	0.058	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P2P4_Paj345_BF4-24782	Pajarito-HM and Paj-Prosp1 345kV	154	1.024	0.769	0.739	0.667	0.134	0.101	0.016	0.053	0.042	0.122	0.05	0.068	0.011	0.05	0.106	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P1_Pajarito-Prosp	Line Pajarito-Prosperity 345 kV	154	1.01	0.756	0.744	0.653	0.15	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P2P4_Pajarito345_OLD	Pajarito-RP 345kV And Pajarito-Prosperity BF-28062	154	1.01	0.756	0.744	0.653	0.15	0.217	0.084	0.023	0.133	0.115	0.164	0.037	0.045	0.095	0.109	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P2P4_Prosperity345_BF3Cr	Prosperity-Pajarito AND Prosperity 345/115kV T1	154	1.01	0.756	0.744	0.653	0.15	0.157	0.042	0.014	0.091	0.114	0.182	0.058	0.04	0.104	0.11	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P2P4_Prosperity345_BF1C	Prosperity-Sandia AND Prosperity-Pajarito1 345kV Ring	154	1.008	0.753	0.742	0.649	0.15	0.814	0.605	0.588	0.534	0.112	0.503	0.325	0.299	0.308	0.059	RP-Paj-Prosp-Sandia
CG	CG-1-HW-CG 115 kV Ckt 1	10	P1_Sandia-Prosp	Line Sandia-Prosperity 345 kV	154	1.008	0.753	0.742	0.649	0.15	0.81	0.601	0.585	0.532	0.111	0.494	0.318	0.292	0.302	0.058	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P2P4_Prosperity345_BF2C	Prosperity-Sandia AND Prosperity 345/115kV T1	154	1.008	0.753	0.742	0.649	0.15	1.006	0.751	0.741	0.646	0.15	0.873	0.62	0.606	0.536	0.13	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P2P4_Sandia345_BF1r	Sandia 345 kV Station (BF-31282, 30182)	154	1.008	0.753	0.742	0.649	0.15	0.81	0.601	0.585	0.532	0.111	0.494	0.318	0.292	0.302	0.058	
CG	CG-1-HW-CG 115 kV Ckt 1	10	P1_Sandia345/115	Transformer Sandia 345/115 kV	154	1.008	0.753	0.742	0.649	0.15	0.81	0.601	0.584	0.532	0.111	0.494	0.318	0.292	0.302	0.058	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P2P4_Paj345_BF4-24782	Pajarito-HM and Paj-Prosp1 345kV	154	1.024	0.769	0.739	0.667	0.135	0.101	0.016	0.053	0.042	0.122	0.05	0.068	0.011	0.05	0.106	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P1_Pajarito-Prosp	Line Pajarito-Prosperity 345 kV	154	1.01	0.756	0.744	0.653	0.15	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	Not Run	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P2P4_Pajarito345_OLD	Pajarito-RP 345kV And Pajarito-Prosperity BF-28062	154	1.01	0.756	0.744	0.653	0.15	0.217	0.084	0.023	0.133	0.115	0.164	0.037	0.045	0.095	0.109	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P2P4_Prosperity345_BF3Cr	Prosperity-Pajarito AND Prosperity 345/115kV T1	154	1.01	0.756	0.744	0.653	0.15	0.157	0.042	0.014	0.091	0.114	0.182	0.058	0.04	0.104	0.11	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P2P4_Prosperity345_BF1C	Prosperity-Sandia AND Prosperity-Pajarito1 345kV Ring	154	1.008	0.754	0.742	0.649	0.15	0.815	0.605	0.588	0.535	0.112	0.503	0.325	0.3	0.308	0.059	RP-Paj-Prosp-Sandia
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P1_Sandia-Prosp	Line Sandia-Prosperity 345 kV	154	1.008	0.753	0.742	0.649	0.15	0.81	0.602	0.585	0.532	0.111	0.494	0.318	0.292	0.303	0.058	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P2P4_Prosperity345_BF2C	Prosperity-Sandia AND Prosperity 345/115kV T1	154	1.008	0.753	0.742	0.649	0.15	1.006	0.751	0.741	0.647	0.15	0.873	0.62	0.606	0.536	0.13	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P2P4_Sandia345_BF1r	Sandia 345 kV Station (BF-31282, 30182)	154	1.008	0.753	0.742	0.649	0.15	0.81	0.602	0.585	0.532	0.111	0.494	0.318	0.292	0.303	0.058	
CG	RICHMOND_PNM-CG-1 115 kV Ckt 1	10	P1_Sandia345/115	Transformer Sandia 345/115 kV	154	1.008	0.753	0.742	0.649	0.15	0.81	0.601	0.585	0.532	0.111	0.494	0.318	0.292	0.303	0.058	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P1_Volcano-WMesa2	Line Volcano-West Mesa 2 115 kV	156	1.094	0.534	0.465	0.588	0.065	0.586	0.283	0.255	0.289	0.041	0.618	0.308	0.264	0.321	0.037	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P2P4_WMesa2_BF3a	West Mesa 2-Volcano 115 kV Line and West Mesa 1-2 115 kV Bus Tie (BF-50662)	156	1.079	0.511	0.448	0.562	0.055	0.578	0.254	0.227	0.265	0.03	0.609	0.279	0.239	0.294	0.022	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P2P4_Person115_BF5a	El Cerro-Person-Volcano 115 kV Lines (BF-11962)	156	1.029	0.804	0.732	0.57	0.065	0.52	0.4	0.337	0.26	0.028	0.561	0.434	0.369	0.296	0.016	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P2P4_Volcano115_BF1	Volcano 115 kV Breaker (BF)	156	1.027	0.757	0.673	0.542	0.04	0.541	0.375	0.312	0.258	0.037	0.579	0.406	0.34	0.293	0.028	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P7_DoubleCk_7	Person-Volcano and West Mesa-Volcano 115 kV Lines (Common Structure)	156	1.027	0.757	0.673	0.542	0.04	0.541	0.375	0.312	0.258	0.037	0.579	0.406	0.34	0.293	0.028	RP-Paj-Prosp-Sandia
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P2P4_Person115_BF4a	Person-Volcano 115 kV Line and Person 115/46 kV Transformer (BF-10862)	156	1.026	0.77	0.682	0.536	0.036	0.514	0.38	0.311	0.238	0.045	0.556	0.416	0.344	0.277	0.032	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P1_Person-Volcano	Line Person-Volcano 115 kV	156	1.023	0.772	0.687	0.539	0.038	0.533	0.396	0.327	0.251	0.04	0.571	0.429	0.358	0.288	0.028	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P2P4_WMesa2_BF2a	West Mesa 2-Volcano 115 kV Line and West Mesa 345/115 kV Transformer #2(BF-5056:	156	1.02	0.466	0.402	0.533	0.059	0.47	0.208	0.218	0.205	0.061	0.505	0.217	0.201	0.237	0.055	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	P5_WMesa115_2	P5 - West Mesa 1-2 115 kV Bus Tie (Relay 86LT LOR)	156	1.017	0.768	0.683	0.534	0.039	0.523	0.389	0.321	0.245	0.039	0.561	0.422	0.352	0.281	0.027	
West_Mesa	WESTMS_1-WESTMS_2 115 kV Ckt 1	10	P2P4_WMesa345_BF5	West Mesa-Pajarito 345 kV Line & West Mesa 345/115 kV Transformer #2(BF-22482)	355	1.077	0.68	0.559	0.672	0.07	0.769	0.453	0.432	0.445	0.086	0.763	0.448	0.427	0.441	0.087	RP-Paj-Prosp-Sandia
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P2P4_WMesa1_BF4	West Mesa 1-Snow Vista 115 kV Line and West Mesa 1-3 115 kV Bus Tie (BF-52662)	156	1.196	0.459	0.417	0.662	0.119	0.657	0.338	0.404	0.349	0.116	0.689	0.306	0.362	0.38	0.118	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P7_DoubleCk_30	West Mesa 1-Huning Ranch and West Mesa-Snow Vista 115 kV Line (CS < 1 mile)	156	1.187	0.43	0.391	0.65	0.117	0.635	0.333	0.416	0.328	0.104	0.668	0.297	0.371	0.359	0.107	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P1_WMesa1-SnowVista	Line West Mesa 1-Snow Vista 115 kV	156	1.169	0.421	0.389	0.626	0.116	0.614	0.341	0.415	0.302	0.107	0.648	0.303	0.37	0.332	0.109	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P2P4_SnowVista115BF4a	Snow Vista-West Mesa 115 kV Line and Unit 2 (BF)	156	1.118	0.382	0.358	0.594	0.112	0.583	0.346	0.425	0.282	0.107	0.619	0.306	0.376	0.315	0.109	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P2P4_SnowVista115BF3a	Snow Vista-West Mesa 115 kV Line and Unit 1 (BF)	156	1.11	0.385	0.364	0.59	0.113	0.579	0.355	0.433	0.281	0.109	0.616	0.313	0.384	0.313	0.11	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P5_WMesa345_1a	P5 - West Mesa 345/115 kV transformer #1 (Relay LOR)	156	1.09	0.319	0.301	0.563	0.107	0.482	0.367	0.459	0.205	0.113	0.518	0.32	0.407	0.235	0.112	RP-Paj-Prosp-Sandia
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P2P4_WMesa1_BF3	West Mesa 1-Snow Vista 115kV Line & West Mesa 345/115kV Transformer #1(BF-5256:	156	1.086	0.349	0.333	0.565	0.115	0.485	0.384	0.473	0.214	0.121	0.52	0.337	0.422	0.243	0.121	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P2P4_Sandia1_BF3	Sandia-Richmond 115 kV Line and Sandia 115 kV Bus Tie (BF-23662)	156	1.041	0.38	0.364	0.554	0.117	0.442	0.388	0.459	0.218	0.114	Not Run	Not Run	Not Run	Not Run	Not Run	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	P2P4_Paj345_BF4-24782	Pajarito-HM and Paj-Prosp1 345kV	156	1.033	0.326	0.302	0.591	0.107	0.474	0.354	0.401	0.224	0.09	0.506	0.318	0.36	0.249	0.095	
	Resolved by Sandia 115 kV bus expansion and Prosper-Sandia3 115 kV																				
TL-EB_Tap	NORTHPNM-MPLAZA_T 115 kV Ckt 1	10	P2P4_Sandia1_BF3	Sandia-Richmond 115 kV Line and Sandia 115 kV Bus Tie (BF-23662)	156	1.033	0.822	0.82	0.668	0.156	1.034	0.824	0.821	0.671	0.156	Not Run	Not Run	Not Run	Not Run	Not Run	115kV project revised contingencies and resolved overloads
TL-EB_Tap	NORTHPNM-MPLAZA_T 115 kV Ckt 1	10	P2P4_Sandia1_BF2	Sandia 115 kV Bus Tie and KAFB Load (BF-22562)	156	1.014	0.806	0.804	0.656	0.153	1.025	0.816	0.814	0.666	0.156	Not Run	Not Run	Not Run	Not Run	Not Run	
TL-EB_Tap	NORTHPNM-MPLAZA_T 115 kV Ckt 1	10	P1_SandiaBusTie	Bus Tie Sandia 115 kV	156	1.009	0.801	0.799	0.652	0.152	1.021	0.812	0.81	0.662	0.155	Not Run	Not Run	Not Run	Not Run	Not Run	
TL-EB_Tap	NORTHPNM-MPLAZA_T 115 kV Ckt 1	10	P2P4_Sandia1_BF6	Sandia 115 kV Bus Tie and Sandia 345/115 kV Transformer (BF-34562)	156	1.009	0.801	0.799	0.652	0.152	1.021	0.812	0.81	0.662	0.155	Not Run	Not Run	Not Run	Not Run	Not Run	
	Additional upgrades required																				
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	P5_WMesa115_1b	P5 - West Mesa 1-2 115 kV Bus Tie (Relay 12SBD11)	156	0.557	0.123	0.155	0.209	0.065	1.308	0.499	0.442	0.673	0.15	1.273	0.476	0.424	0.644	0.14	P5 relay plan
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	P7_DoubleCk_8	Person-WMesa2& Snow Vista-WMesa1 115kV Lines(Common Structure < 1 mile)	156	0.527	0.336	0.295	0.19	0.022	1.105	0.789	0.721	0.523	0.092	1.09	0.773	0.703	0.503	0.082	Reconductor

Table continued: Overloads: P1, P2, P4, P5* and P7 (C vs B vs A)

	28HS		P1, P2/P4, P5, P7 Contingencies			Scenario A = pre-Project					Scenario B = post-Project (345kV)					Scenario C post-Project (345kV + 115kV)					
Line ID	Element	AREA	CONTINGENCY IDENTIFIER	CONTINGENCY DESCRIPTION	RATING MVA	28HS_CCN_A01	28HS_CCN_A02	28HS_CCN_A03	28HS_CCN_A04	28HS_CCN_A05	28HS_CCN_B01	28HS_CCN_B02	28HS_CCN_B03	28HS_CCN_B04	28HS_CCN_B05	28HS_CCN_C01	28HS_CCN_C02	28HS_CCN_C03	28HS_CCN_C04	28HS_CCN_C05	Comments & Mitigation
	Addressed by operating actions and/or coordination with other entities																				
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P5_SanJuan_1a	P5 - San Juan 345 kV Bus (relay)	74	0.158	0.163	0.659	0.25	1.137	0.263	0.177	0.682	0.231	1.142	0.265	0.176	0.679	0.233	1.141	P5 relay plan
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	74	0.11	0.281	0.687	0.098	1.035	0.099	0.307	0.71	0.108	1.037	0.1	0.305	0.708	0.108	1.036	Belen PST
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P2P4_SanJuan345_BF15	San Juan-Cabezon 345 kV Line and San Juan 345/69 kV Transformer (BF-18582)	74	0.265	0.179	0.639	0.188	0.999	0.236	0.196	0.661	0.172	1.003	0.238	0.195	0.659	0.173	1.003	Belen PST
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P2P4_Cabezon345_BF1	Cabezon 345 kV Station	74	0.266	0.179	0.64	0.189	0.999	0.237	0.196	0.662	0.172	1.003	0.239	0.195	0.66	0.174	1.003	Belen PST
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P1_Cabezon-SJuan	Line Cabezon-San Juan 345 kV	74	0.265	0.179	0.638	0.189	0.999	0.236	0.196	0.661	0.172	1.002	0.239	0.195	0.658	0.174	1.002	Belen PST
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P2P4_SanJuan345_BF16	San Juan-Cabezon 345 kV Line (BF-17482)	74	0.265	0.179	0.638	0.189	0.999	0.236	0.196	0.661	0.172	1.002	0.239	0.195	0.658	0.174	1.002	Belen PST
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P1_RioPuerco-Cabezon	Line Rio Puerco-Cabezon 345 kV	74	0.264	0.18	0.64	0.198	0.997	0.235	0.198	0.663	0.181	1.001	0.238	0.196	0.66	0.183	1.	Belen PST
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P2P4_RioPuerc345_BF6	Rio Puerco-Cabezon 345 kV Line (BF-39582)	74	0.264	0.18	0.64	0.198	0.997	0.235	0.198	0.663	0.181	1.001	0.238	0.196	0.66	0.183	1.	Belen PST
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	P2P4_RioPuerc345_BF5	Cabezon-Rio Puerco-West Mesa #2 345 kV Line (BF-38482)	74	0.145	0.176	0.636	0.205	0.996	0.238	0.196	0.661	0.183	1.	0.24	0.195	0.659	0.185	1.	Belen PST
	BERNARDO-SOCORROP 115 kV Ckt 1	10	P5_SanJuan_1a	P5 - San Juan 345 kV Bus (relay)	74	0.194	0.141	0.615	0.287	1.119	0.3	0.149	0.638	0.267	1.123	0.303	0.149	0.635	0.269	1.123	P5 relay plan
	BERNARDO-SOCORROP 115 kV Ckt 1	10	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	74	0.134	0.237	0.643	0.091	1.017	0.11	0.263	0.666	0.089	1.018	0.112	0.261	0.664	0.089	1.018	Belen PST
NL	NORTON_2-BUCKMAN 115 kV Ckt 1	10	P2P4_STA115_BF1a	BA-STA-Norton 115 kV Lines (LAC BF-66862)	116	1.145	1.191	1.189	1.193	1.014	1.141	1.188	1.186	1.19	1.011	1.141	1.188	1.186	1.19	1.011	
NL	NORTON_2-BUCKMAN 115 kV Ckt 1	10	P2P4_STA115_BF3a	WTA-STA-ETA (LAC BF-62462)	116	1.142	1.187	1.186	1.189	1.012	1.138	1.184	1.184	1.186	1.008	1.138	1.184	1.184	1.186	1.008	
	BUCKMAN-WHITEROK 115 kV Ckt 1	10	P2P4_STA115_BF1a	BA-STA-Norton 115 kV Lines (LAC BF-66862)	116	1.12	1.168	1.165	1.176	1.011	1.116	1.165	1.163	1.173	1.007	1.116	1.165	1.163	1.173	1.007	MIT: LAC/DOE planned station reconfiguration
	BUCKMAN-WHITEROK 115 kV Ckt 1	10	P2P4_STA115_BF3a	WTA-STA-ETA (LAC BF-62462)	116	1.117	1.164	1.162	1.173	1.008	1.113	1.161	1.16	1.169	1.005	1.113	1.16	1.16	1.169	1.005	
	ETA-WHITEROK 115 kV Ckt 1	10	P2P4_STA115_BF1a	BA-STA-Norton 115 kV Lines (LAC BF-66862)	116	1.085	1.133	1.13	1.142	0.996	1.081	1.13	1.128	1.138	0.992	1.081	1.129	1.128	1.138	0.992	
	ETA-WHITEROK 115 kV Ckt 1	10	P2P4_STA115_BF3a	WTA-STA-ETA (LAC BF-62462)	116	1.082	1.128	1.127	1.138	0.993	1.078	1.125	1.125	1.134	0.989	1.078	1.125	1.125	1.134	0.989	
	HIDDENMOUNT-RATTLESNKPNM 115 kV Ckt	10	P7_DoubleCk38a	Hidden Mountain-Rattlesnake 115 kV Line	350	1.236	1.156	1.346	1.264	1.169	1.19	1.121	1.289	1.245	1.138	1.193	1.124	1.292	1.248	1.138	MIT: Meta load sheddin
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P5_SanJuan_1a	P5 - San Juan 345 kV Bus (relay)	59	0.686	0.388	0.399	0.801	1.242	0.82	0.357	0.424	0.774	1.248	0.823	0.36	0.421	0.776	1.247	P5 relay plan
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	59	0.597	0.172	0.432	0.496	1.115	0.549	0.145	0.458	0.464	1.117	0.552	0.146	0.455	0.466	1.117	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_SanJuan345_BF15	San Juan-Cabezon 345 kV Line and San Juan 345/69 kV Transformer (BF-18582)	59	0.826	0.346	0.374	0.715	1.071	0.783	0.314	0.399	0.688	1.076	0.786	0.317	0.396	0.69	1.075	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_Cabezon345_BF1	Cabezon 345 kV Station	59	0.827	0.346	0.375	0.716	1.071	0.785	0.314	0.4	0.689	1.076	0.788	0.317	0.397	0.691	1.075	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P1_Cabezon-SJuan	Line Cabezon-San Juan 345 kV	59	0.827	0.347	0.374	0.717	1.07	0.784	0.315	0.398	0.689	1.075	0.787	0.318	0.395	0.691	1.075	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_SanJuan345_BF16	San Juan-Cabezon 345 kV Line (BF-17482)	59	0.827	0.347	0.374	0.717	1.07	0.784	0.315	0.398	0.689	1.075	0.787	0.318	0.395	0.691	1.075	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P1_RioPuerco-Cabezon	Line Rio Puerco-Cabezon 345 kV	59	0.825	0.344	0.376	0.729	1.068	0.783	0.312	0.4	0.702	1.073	0.786	0.315	0.397	0.704	1.072	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_RioPuerc345_BF6	Rio Puerco-Cabezon 345 kV Line (BF-39582)	59	0.825	0.344	0.376	0.729	1.068	0.783	0.312	0.4	0.702	1.073	0.786	0.315	0.397	0.704	1.072	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_RioPuerc345_BF5	Cabezon-Rio Puerco-West Mesa #2 345 kV Line (BF-38482)	59	0.667	0.352	0.371	0.739	1.067	0.787	0.315	0.399	0.705	1.072	0.79	0.318	0.396	0.707	1.072	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P5_WMesa115_1b	P5 - West Mesa 1-2 115 kV Bus Tie (Relay 12SBD11)	59	1.069	0.614	0.254	1.016	1.037	0.78	0.272	0.367	0.632	0.934	0.785	0.281	0.357	0.637	0.933	P5 relay plan
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_WMesa345_BF3	Rio Puerco-West Mesa-Arroyo 345 kV Lines (BF-14682)	59	0.671	0.24	0.344	0.547	1.058	0.594	0.184	0.374	0.491	1.051	0.597	0.187	0.371	0.493	1.051	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P1_FourCorn-Pintado	Line Four Corners-Pintado 345 kV	59	0.786	0.331	0.369	0.704	1.054	0.742	0.299	0.393	0.676	1.058	0.745	0.302	0.39	0.678	1.057	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_FourCorn345_BF3	Four Corners-Pintado 345 kV Line (BF-932)	59	0.786	0.331	0.369	0.704	1.054	0.742	0.299	0.393	0.676	1.058	0.745	0.302	0.39	0.678	1.057	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P5_WMesa345_1a	P5 - West Mesa 345/115 kV transformer #1 (Relay LOR)	59	0.706	0.271	0.319	0.562	1.055	0.606	0.196	0.365	0.494	1.051	0.609	0.199	0.361	0.497	1.051	P5 relay plan
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P1_WMesa-Arroyo	Line West Mesa-Arroyo 345 kV	59	0.633	0.212	0.355	0.514	1.051	0.576	0.171	0.38	0.476	1.049	0.579	0.174	0.377	0.478	1.048	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_WMesa345_BF2	West Mesa-Arroyo 345 kV Line and West Mesa 345/115 kV Transformer #1 (BF-15782)	59	0.651	0.229	0.341	0.527	1.047	0.587	0.181	0.371	0.484	1.046	0.59	0.184	0.368	0.486	1.046	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P1_Pintado-RioPuerc	Line Pintado-Rio Puerco 345 kV	59	0.681	0.364	0.342	0.702	1.023	0.813	0.332	0.366	0.674	1.026	0.816	0.335	0.363	0.677	1.026	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_RioPuerc345_BF1	Rio Puerco-Pintado 345 kV Line (BF-34082)	59	0.681	0.364	0.342	0.702	1.023	0.813	0.332	0.366	0.674	1.026	0.816	0.335	0.363	0.677	1.026	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_RioPuerc345_BF2a	Pintado-Rio Puerco-Quail Ranch 345 kV Line (BF-35182)	59	0.687	0.368	0.341	0.713	1.022	0.815	0.333	0.366	0.678	1.026	0.818	0.336	0.363	0.68	1.025	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_Pintado345_BF1a	Pintado 345 kV Station	59	0.689	0.371	0.336	0.704	1.017	0.823	0.339	0.359	0.676	1.021	0.658	0.342	0.356	0.678	1.02	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	P2P4_FourCorn345_BF2	Four Corners-Pintado 345 kV Line and Four Corners Unit 4 (BF-836)	59	0.827	0.374	0.329	0.748	1.005	0.784	0.342	0.353	0.721	1.009	0.787	0.344	0.35	0.723	1.008	Belen PST
	Independent of Study Area																				
	FOURCORN-FC-CH SC1 345 kV Ckt 1	14	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	908	0.214	0.238	0.502	0.157	1.016	0.213	0.237	0.502	0.156	1.016	0.213	0.237	0.502	0.156	1.016	Independent of study area
	FOURCORN-FC-CH SC2 345 kV Ckt 2	14	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	908	0.215	0.24	0.506	0.157	1.024	0.214	0.239	0.506	0.156	1.024	0.214	0.239	0.506	0.156	1.024	

* Overloaded elements triggered only by P5 contingencies are not shown. All P5 overloads will be addressed by PNM's plans for redundant relays.

Table 14 —Overloads: P6 (B vs A)

P6 contingencies were limited to:

- Loss of Hidden-Mountain-Pajarito 345 kV followed by a second P1 contingency
- Loss of Western Spirit-Hidden Mountain 345 kV followed by a second P1 contingency
- Loss of two Hidden Mountain-Rattlesnake 115 kV lines.

28HS				P6 Contingencies			Scenario A = pre-CCN					Scenario B = post-CCN (345 kV)					
Line ID	Element	AREA	P6 Ref	CONTINGENCY ID	CONTINGENCY DESCRIPTION	RATING MVA	28HS_CCN_A01	28HS_CCN_A02	28HS_CCN_A03	28HS_CCN_A04	28HS_CCN_A05	28HS_CCN_B01	28HS_CCN_B02	28HS_CCN_B03	28HS_CCN_B04	28HS_CCN_B05	Comments
NOTE: If an element is overloaded, only loadings over 0.995pu are shown.																	
	Resolved by RP-Pajarito-Prosperity 345 kV project (Post-project < 101%)																
	QUAIL_RANCH-WESTMESA 345 kV Ckt 1	10	WS-HM	P1_RioPuerco-WMesa2	Line Rio Puerco-West Mesa #2 345 kV	1076	1.112	0.908	0.9	0.885	0.504	0.71	0.603	0.6	0.544	0.316	RP-Paj-Prosp-Sandia
	B-A/B-A 345/115 kV T1	10	WS-HM	P1_DiamondT-Norton	Line BA-Norton 345 kV	516	0.776	0.749	1.049	0.618	0.648	0.7	0.69	0.991	0.558	0.616	RP-Paj-Prosp-Sandia
	WESTMESA/WESTMS_1 345/115 kV T1	10	HM-Paj	P1_WMesa345/115_#2	Transformer West Mesa 345/115 kV #2	448	1.104	1.001	0.767	0.833	0.053	0.925	0.855	0.66	0.712	0.043	RP-Paj-Prosp-Sandia
	WESTMESA/WESTMS_1 345/115 kV T1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	448	1.256	1.021	1.013	0.985	0.4	0.718	0.632	0.631	0.537	0.182	
	WESTMESA/WESTMS_2 345/115 kV T1	10	HM-Paj	P1_WMesa345/115_#1	Transformer West Mesa 345/115 kV #1	448	1.114	1.011	0.775	0.841	0.054	0.935	0.864	0.667	0.719	0.043	RP-Paj-Prosp-Sandia
	WESTMESA/WESTMS_2 345/115 kV T1	10	WS-HM	P1_HiddenMt-Pajarit	Line Hidden Mountain-Pajarito 345 kV	448	1.003	0.908	0.909	0.83	0.367	0.851	0.79	0.817	0.714	0.32	
	WESTMESA/WESTMS_2 345/115 kV T1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	448	1.28	1.041	1.033	1.004	0.407	0.731	0.644	0.643	0.547	0.186	
	WESTMESA/WESTMS_2 345/115 kV T1	10	HM-Paj	P1_HMtn-WSpirit	HiddenMtn-WSpirit 345.00	448	0.999	0.911	0.913	0.824	0.367	0.854	0.792	0.829	0.714	0.322	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_BA-RioPuerco2	Line BA-Rio Puerco 345 kV ck 2	155	0.813	0.671	1.059	0.605	0.835	0.705	0.588	0.983	0.523	0.799	RP-Paj-Prosp-Sandia
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_BA-RioPuerco1	Line BA-Rio Puerco 345 kV ck 1	155	0.813	0.671	1.056	0.603	0.831	0.705	0.588	0.98	0.521	0.795	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_SandiaBusTie	Bus Tie Sandia 115 kV	155	1.034	0.852	1.063	0.736	0.596	0.906	0.751	0.968	0.647	0.56	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_BA-Pachmann	Line BA-Pachmann 115 kV	155	0.922	0.782	1.054	0.701	0.677	0.795	0.684	0.959	0.603	0.629	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_Sandia-Prosp	Line Sandia-Prosperity 345 kV	155	1.01	0.838	1.054	0.727	0.595	0.868	0.728	0.949	0.629	0.557	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_Sandia345/115	Transformer Sandia 345/115 kV	155	1.01	0.838	1.053	0.727	0.595	0.868	0.728	0.949	0.629	0.557	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_BA-Reeves1	Line BA-Reeves 1 115 kV	155	0.925	0.764	1.025	0.686	0.671	0.793	0.662	0.926	0.584	0.62	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_QRanch-WMesa	Line Quail Ranch-WMesa 345 kV	155	0.995	0.825	1.048	0.732	0.653	0.791	0.664	0.891	0.577	0.573	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_RioPuerco-WMesa2	Line Rio Puerco-West Mesa #2 345 kV	155	0.966	0.789	1.011	0.73	0.652	0.773	0.642	0.868	0.576	0.573	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	155	1.211	0.962	1.174	0.937	0.75	0.749	0.623	0.849	0.553	0.557	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_Pajarito-Prosp1	Line Pajarito-Prosperity 345 kV	155	1.01	0.838	1.054	0.728	0.596	0.718	0.6	0.827	0.526	0.543	
RB	NO_BERN-AVILA_T 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	155	1.145	0.902	1.113	0.894	0.74	0.684	0.563	0.79	0.511	0.548	RP-Paj-Prosp-Sandia
RB	NO_BERN-AVILA_T 115 kV Ckt 1	10	WS-HM	P1_SandiaBusTie	Bus Tie Sandia 115 kV	155	0.967	0.791	1.002	0.693	0.587	0.84	0.691	0.907	0.604	0.55	
RB	NO_BERN-AVILA_T 115 kV Ckt 1	10	WS-HM	P1_BA-RioPuerco2	Line BA-Rio Puerco 345 kV ck 2	155	0.748	0.612	0.999	0.563	0.825	0.64	0.529	0.924	0.481	0.789	
RB	NO_BERN-AVILA_T 115 kV Ckt 1	10	WS-HM	P1_BA-RioPuerco1	Line BA-Rio Puerco 345 kV ck 1	155	0.748	0.612	0.997	0.561	0.821	0.64	0.529	0.921	0.478	0.785	
RB	REEVES_2-ROY 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	155	1.011	0.781	0.993	0.808	0.721	0.554	0.445	0.671	0.426	0.528	RP-Paj-Prosp-Sandia
RB	ROY-AVILA_T 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	155	1.064	0.829	1.041	0.842	0.729	0.605	0.492	0.718	0.46	0.536	RP-Paj-Prosp-Sandia
CG	SPEDRO_T-BEV_WOOD 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	154	1.16	0.756	0.756	0.972	0.572	0.19	0.043	0.065	0.138	0.147	RP-Paj-Prosp-Sandia
CG	BELAIR_T-SPEDRO_T 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	154	1.237	0.827	0.827	1.023	0.583	0.265	0.11	0.134	0.187	0.157	RP-Paj-Prosp-Sandia
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	WS-HM	P1_Sandia-Prosp	Line Sandia-Prosperity 345 kV	154	1.013	0.76	0.757	0.653	0.165	0.821	0.611	0.615	0.542	0.144	RP-Paj-Prosp-Sandia
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	WS-HM	P1_Sandia345/115	Transformer Sandia 345/115 kV	154	1.013	0.76	0.756	0.653	0.165	0.82	0.611	0.615	0.542	0.144	
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	HM-Paj	P1_Sandia-Prosp	Line Sandia-Prosperity 345 kV	154	1.023	0.766	0.734	0.661	0.132	0.796	0.587	0.593	0.516	0.133	
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	HM-Paj	P1_Sandia345/115	Transformer Sandia 345/115 kV	154	1.022	0.766	0.734	0.661	0.132	0.796	0.587	0.593	0.515	0.133	
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	154	1.315	0.898	0.898	1.075	0.595	0.341	0.18	0.205	0.238	0.168	
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	WS-HM	P1_Pajarito-Prosp1	Line Pajarito-Prosperity 345 kV	154	1.015	0.763	0.759	0.657	0.166	0.189	0.069	0.098	0.117	0.107	
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	HM-Paj	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	154	1.046	0.5	0.468	0.682	0.149	0.17	0.022	0.076	0.05	0.112	
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	HM-Paj	P1_Pajarito-Prosp1	Line Pajarito-Prosperity 345 kV	154	1.024	0.769	0.737	0.665	0.133	0.101	0.016	0.055	0.046	0.124	
CG	PRINCESS-EB-HW 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	154	1.037	0.644	0.645	0.891	0.554	0.092	0.086	0.062	0.055	0.129	RP-Paj-Prosp-Sandia
CG	EB-HW-WINROCK 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	154	1.037	0.644	0.645	0.891	0.554	0.092	0.086	0.062	0.055	0.129	RP-Paj-Prosp-Sandia
	BEV_WOOD-WINROCK 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	154	1.118	0.718	0.718	0.945	0.566	0.15	0.019	0.028	0.111	0.141	RP-Paj-Prosp-Sandia
IR	IRVING-WAYNE 2 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	156	1.047	0.782	0.717	0.741	0.278	0.603	0.465	0.409	0.378	0.151	RP-Paj-Prosp-Sandia
WJ	CENTRALP-SNOW_VISTA 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	156	1.026	0.706	0.67	0.662	0.228	0.519	0.34	0.313	0.302	0.095	RP-Paj-Prosp-Sandia
WJ	CENTRALP-SNOW_VISTA 115 kV Ckt 1	10	WS-HM	P1_Volcano-WMesa2	Line Volcano-West Mesa 2 115 kV	156	1.023	0.462	0.429	0.55	0.12	0.507	0.205	0.177	0.249	0.05	
WJ	CENTRALP-SNOW_VISTA 115 kV Ckt 1	10	HM-Paj	P1_Volcano-WMesa2	Line Volcano-West Mesa 2 115 kV	156	1.025	0.47	0.372	0.556	0.074	0.466	0.197	0.207	0.199	0.022	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	156	1.127	0.798	0.761	0.727	0.242	0.618	0.43	0.403	0.366	0.108	RP-Paj-Prosp-Sandia
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	WS-HM	P1_Volcano-WMesa2	Line Volcano-West Mesa 2 115 kV	156	1.123	0.551	0.517	0.614	0.133	0.606	0.282	0.251	0.313	0.063	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	HM-Paj	P1_Volcano-WMesa2	Line Volcano-West Mesa 2 115 kV	156	1.125	0.558	0.453	0.621	0.071	0.565	0.264	0.259	0.262	0.021	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	WS-HM	P1_Person-Volcano	Line Person-Volcano 115 kV	156	1.052	0.797	0.755	0.566	0.126	0.555	0.411	0.377	0.277	0.067	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	HM-Paj	P1_Person-Volcano	Line Person-Volcano 115 kV	156	1.053	0.802	0.664	0.572	0.04	0.513	0.373	0.341	0.224	0.017	

(Table continued: Overloads: P6 (B vs A)

28HS				P6 Contingencies			Scenario A = pre-CCN					Scenario B = post-CCN (345 kV)					
Line ID	Element	AREA	P6 Ref	CONTINGENCY ID	CONTINGENCY DESCRIPTION	RATING MVA	28HS_ CCN_ A01	28HS_ CCN_ A02	28HS_ CCN_ A03	28HS_ CCN_ A04	28HS_ CCN_ A05	28HS_ CCN_ B01	28HS_ CCN_ B02	28HS_ CCN_ B03	28HS_ CCN_ B04	28HS_ CCN_ B05	Comments
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	156	1.231	0.372	0.343	0.783	0.276	0.636	0.242	0.25	0.365	0.121	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	WS-HM	P1_WMesa1-SnowVista	Line West Mesa 1-Snow Vista 115 kV	156	1.2	0.419	0.402	0.655	0.157	0.633	0.3	0.304	0.324	0.078	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	HM-Paj	P1_WMesa1-SnowVista	Line West Mesa 1-Snow Vista 115 kV	156	1.201	0.433	0.403	0.661	0.14	0.591	0.347	0.401	0.274	0.095	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	HM-Paj	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	156	1.033	0.28	0.288	0.589	0.097	0.522	0.327	0.377	0.24	0.083	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	WS-HM	P1_Person-SnVista_a	Line Person-Snow Vista 115 kV	156	1.007	0.286	0.289	0.517	0.133	0.504	0.354	0.372	0.235	0.065	RP-Paj-Prosp-Sandia
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	HM-Paj	P1_Pajarito-Prosp1	Line Pajarito-Prosperity 345 kV	156	1.033	0.327	0.309	0.589	0.111	0.474	0.356	0.404	0.227	0.094	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	HM-Paj	P1_Person-SnVista_a	Line Person-Snow Vista 115 kV	156	1.008	0.299	0.347	0.522	0.147	0.462	0.408	0.466	0.19	0.098	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	HM-Paj	P1_Sandia-Prosp	Line Sandia-Prosperity 345 kV	156	1.034	0.328	0.31	0.59	0.113	0.456	0.369	0.416	0.224	0.1	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	HM-Paj	P1_Sandia345/115	Transformer Sandia 345/115 kV	156	1.034	0.329	0.311	0.59	0.114	0.456	0.369	0.416	0.224	0.1	
	Addressed with Prospererity-Sandia 115 kV and Sandia 115 kV bus expansion																
TL-EB_Tap	NORTHPNM-MPLAZA_T 115 kV Ckt 1	10	HM-Paj	P1_SandiaBusTie	Bus Tie Sandia 115 kV	156	1.01	0.801	0.798	0.652	0.154	1.024	0.813	0.808	0.664	0.153	115kV project revised
TL-EB_Tap	NORTHPNM-MPLAZA_T 115 kV Ckt 1	10	WS-HM	P1_SandiaBusTie	Bus Tie Sandia 115 kV	156	1.005	0.799	0.788	0.648	0.136	1.019	0.81	0.8	0.66	0.14	contingencies & resolved
	Additional upgrades required																
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	WS-HM	P1_HiddenMt-Pajarit	Line Hidden Mountain-Pajarito 345 kV	156	0.103	0.068	0.065	0.109	0.15	1.233	0.977	1.037	0.967	0.522	
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	HM-Paj	P1_HMtn-WSpirit	HiddenMtn-WSpirit 345.00	156	0.104	0.068	0.063	0.108	0.148	1.224	0.966	1.021	0.967	0.519	
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	HM-Paj	P1_Clines-WSpirit	Line Clines Corners-Western Spirit 345 kV	156	0.075	0.049	0.218	0.068	0.161	1.143	0.876	0.348	0.865	0.314	Reconductor
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	HM-Paj	P1_WMesa345/115_#2	Transformer West Mesa 345/115 kV #2	156	0.062	0.073	0.169	0.042	0.106	1.066	0.812	0.513	0.728	0.178	
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	HM-Paj	P1_WMesa345/115_#1	Transformer West Mesa 345/115 kV #1	156	0.062	0.074	0.17	0.042	0.106	1.059	0.807	0.509	0.723	0.177	
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	HM-Paj	P1_WMesa1-SnowVista	Line West Mesa 1-Snow Vista 115 kV	156	0.134	0.093	0.164	0.061	0.108	1.006	0.702	0.453	0.625	0.17	
	Addressed with Operating Actions																
BA-DMND1	B-A-DIAMOND_TAIL 345 kV Ckt 1	10	WS-HM	P1_BA-DiamondTail_2	Line BA-Diamond Tail 345 kV circuit #2	1113	0.254	0.235	1.315	0.244	1.741	0.255	0.235	1.318	0.244	1.741	Curtailment ENM wind
BA-DMND1	B-A-DIAMOND_TAIL 345 kV Ckt 1	10	HM-Paj	P1_BA-DiamondTail_2	Line BA-Diamond Tail 345 kV circuit #2	1113	0.18	0.158	0.771	0.181	1.159	0.161	0.144	0.785	0.166	1.158	Curtailment ENM wind
	B-A-DIAMOND_TAIL 345 kV Ckt 2	10	WS-HM	P1_BA-DiamondTail_1	Line BA-Diamond Tail 345 kV circuit #1	1113	0.254	0.235	1.315	0.244	1.741	0.255	0.235	1.318	0.245	1.741	Curtailment ENM wind
	B-A-DIAMOND_TAIL 345 kV Ckt 2	10	HM-Paj	P1_BA-DiamondTail_1	Line BA-Diamond Tail 345 kV circuit #1	1113	0.18	0.158	0.771	0.181	1.159	0.161	0.144	0.785	0.166	1.159	Curtailment ENM wind
	B-A-RIOPUERC 345 kV Ckt 1	10	WS-HM	P1_BA-RioPuerco2	Line BA-Rio Puerco 345 kV ck 2	1076	0.149	0.134	0.919	0.146	1.466	0.131	0.122	0.943	0.137	1.475	Curtailment ENM wind
	RIOPUERC-B-A 345 kV Ckt 2	10	WS-HM	P1_BA-RioPuerco1	Line BA-Rio Puerco 345 kV ck 1	1195	0.135	0.122	0.829	0.12	1.322	0.119	0.11	0.85	0.111	1.33	Curtailment ENM wind
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_Clines-DiamondT2ras	Line Clines Corners-DTail 345kV #2 RAS LaJoya-CLNCRN	1113	Not Run	Not Run	Not Run	Not Run	Not Run	0.334	0.334	1.205	0.292	1.503	Curtailment ENM wind
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_Clines-DiamondT2	Line Clines Corners-Diamond Tail 345 kV circuit #2	1113	0.36	0.359	1.206	0.318	1.391	0.359	0.359	1.205	0.317	ot Solved	Curtailment ENM wind
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_GuadalupeSVC	SVC Guadalupe	1113	0.185	0.184	0.821	0.163	1.013	0.184	0.183	0.82	0.163	1.01	
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_BA-RioPuerco2	Line BA-Rio Puerco 345 kV ck 2	1113	0.183	0.183	0.817	0.162	1.002	0.183	0.182	0.817	0.162	1.	
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_BA-RioPuerco1	Line BA-Rio Puerco 345 kV ck 1	1113	0.183	0.183	0.817	0.16	1.002	0.183	0.182	0.817	0.16	1.	
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_DiamondT-Norton	Line BA-Norton 345 kV	1113	0.188	0.186	0.818	0.166	1.	0.187	0.185	0.817	0.165	0.997	
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_RioPuercoSVC	SVC Rio Puerco	1113	0.189	0.185	0.818	0.167	1.	0.187	0.184	0.817	0.165	0.997	
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_BA-DiamondTail_2	Line BA-Diamond Tail 345 kV circuit #2	1113	0.184	0.183	0.816	0.163	0.997	0.184	0.183	0.815	0.162	0.996	
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_BA-DiamondTail_1	Line BA-Diamond Tail 345 kV circuit #1	1113	0.184	0.183	0.816	0.163	0.997	0.184	0.183	0.815	0.162	0.996	
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 2	10	WS-HM	P1_Clines-DiamondT1ras	Line Clines Corners-DTail 345kV #1 RAS LaJoya-CLNCRN	1113	Not Run	Not Run	Not Run	Not Run	Not Run	0.334	0.334	1.207	0.292	1.507	Curtailment ENM wind
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 2	10	WS-HM	P1_Clines-DiamondT1	Line Clines Corners-Diamond Tail 345 kV circuit #1	1113	0.36	0.359	1.207	0.318	ot Solved	0.359	0.359	1.207	0.317	ot Solved	Curtailment ENM wind
TJ	TOME-FIRST_ST 115 kV Ckt 1	10	WS-HM	P1_HiddenMt-Pajarit	Line Hidden Mountain-Pajarito 345 kV	154	0.305	0.752	0.685	0.93	0.444	0.453	0.888	0.909	1.053	0.498	MIT: META load shedding
TJ	TOME-FIRST_ST 115 kV Ckt 1	10	HM-Paj	P1_HMtn-WSpirit	HiddenMtn-WSpirit 345.00	154	0.314	0.756	0.693	0.932	0.435	0.454	0.887	0.91	1.052	0.487	MIT: META load shedding
	HIDDENMOUNT-RATTLESNKPNM 115 kV Ckt 3	10	N-2 HM-Rat	P7_DoubleCk38a	Hidden Mountain-Rattlesnake 115 kV Line	350	1.236	1.156	1.346	1.264	1.169	1.19	1.121	1.289	1.245	1.138	MIT: META load shedding
BELN-SUNRA1	SUNRANCH-BELEN_PG 115 kV Ckt 1	10	HM-Paj	P1_HMtn-WSpirit	HiddenMtn-WSpirit 345.00	141	0.749	0.91	0.985	1.282	0.831	0.853	1.	1.205	1.364	0.864	MIT: META load shedding
BELN-SUNRA1	SUNRANCH-BELEN_PG 115 kV Ckt 1	10	WS-HM	P1_HiddenMt-Pajarit	Line Hidden Mountain-Pajarito 345 kV	141	0.753	0.914	0.988	1.278	0.815	0.853	1.001	1.206	1.363	0.851	MIT: META load shedding
BELN-SUNRA1	SUNRANCH-BELEN_PG 115 kV Ckt 1	10	HM-Paj	P1_Clines-WSpirit	Line Clines Corners-Western Spirit 345 kV	141	0.631	0.78	0.068	1.124	0.501	0.722	0.865	0.015	1.202	0.516	MIT: META load shedding
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	HM-Paj	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	59	0.641	0.217	0.468	0.547	1.088	0.593	0.179	0.495	0.515	1.087	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	HM-Paj	P1_Cabezon-SJuan	Line Cabezon-San Juan 345 kV	59	0.696	0.391	0.409	0.766	1.04	0.827	0.358	0.434	0.739	1.041	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	HM-Paj	P1_RioPuerco-Cabezon	Line Rio Puerco-Cabezon 345 kV	59	0.695	0.388	0.411	0.78	1.038	0.825	0.354	0.436	0.752	1.038	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	HM-Paj	P1_FourCorn-Pintado	Line Four Corners-Pintado 345 kV	59	0.829	0.376	0.404	0.754	1.024	0.785	0.342	0.429	0.726	1.024	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	HM-Paj	P1_WMesa-Arroyo	Line West Mesa-Arroyo 345 kV	59	0.673	0.254	0.386	0.561	1.016	0.619	0.213	0.413	0.526	1.014	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	WS-HM	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	59	0.652	0.223	0.323	0.524	0.982	0.571	0.159	0.384	0.484	0.998	
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	HM-Paj	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	74	0.135	0.25	0.717	0.102	1.013	0.114	0.276	0.74	0.101	1.012	<1%
TJ	FIRST_ST-FRST_STT 115 kV Ckt 1	10	WS-HM	P1_HiddenMt-Pajarit	Line Hidden Mountain-Pajarito 345 kV	154	0.246	0.682	0.615	0.88	0.434	0.384	0.818	0.838	1.002	0.488	<1%
TJ	FIRST_ST-FRST_STT 115 kV Ckt 1	10	HM-Paj	P1_HMtn-WSpirit	HiddenMtn-WSpirit 345.00	154	0.256	0.686	0.622	0.882	0.424	0.385	0.817	0.839	1.002	0.476	<1%
TJ	FRST_STT-JARALEST 115 kV Ckt 1	10	WS-HM	P1_HiddenMt-Pajarit	Line Hidden Mountain-Pajarito 345 kV	154	0.246	0.682	0.615	0.88	0.434	0.384	0.818	0.838	1.002	0.488	<1%
TJ	FRST_STT-JARALEST 115 kV Ckt 1	10	HM-Paj	P1_HMtn-WSpirit	HiddenMtn-WSpirit 345.00	154	0.256	0.686	0.622	0.882	0.424	0.385	0.817	0.839	1.002	0.476	<1%
	Independent of Study Area																
	FOURCORN-FC-CH SC1 345 kV Ckt 1	14	HM-Paj	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	908	0.213	0.238	0.502	0.156	1.016	0.213	0.237	0.502	0.155	1.016	Independent of study area.
	FOURCORN-FC-CH SC1 345 kV Ckt 1	14	WS-HM	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	908	0.212	0.236	0.5	0.158	1.012	0.213	0.238	0.501	0.156	1.011	Independent of study area.
	FOURCORN-FC-CH SC2 345 kV Ckt 2	14	HM-Paj	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	908	0.215	0.239	0.506	0.157	1.025	0.214	0.238	0.506	0.156	1.024	Independent of study area.
	FOURCORN-FC-CH SC2 345 kV Ckt 2	14	WS-HM	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	908	0.213	0.238	0.504	0.158	1.02	0.215	0.239	0.506	0.157	1.019	Independent of study area.

Table 15 – Overloads: P6 (C vs B vs A)

28HS				P6 Contingencies			Scenario A = pre-CCN					Scenario B = post-CCN (345 kV)					Scenario C = CCN + 115kV					
Line ID	Element	AREA	P6 Ref	CONTINGENCY ID	CONTINGENCY DESCRIPTION	RATING MVA	28HS_CCN_A01	28HS_CCN_A02	28HS_CCN_A03	28HS_CCN_A04	28HS_CCN_A05	28HS_CCN_B01	28HS_CCN_B02	28HS_CCN_B03	28HS_CCN_B04	28HS_CCN_B05	28HS_CCN_C01	28HS_CCN_C02	28HS_CCN_C03	28HS_CCN_C04	28HS_CCN_C05	Comments
NOTE: If an element is overloaded, only loadings over 0.995pu are shown.																						
	Resolved by RP-Pajarito-Prosperity 345 kV project (Post-project < 101%)																					
	QUAIL_RANCH-WESTMESA 345 kV Ckt 1	10	WS-HM	P1_RioPuerco-WMesa2	Line Rio Puerco-West Mesa #2 345 kV	1076	1.112	0.908	0.9	0.885	0.504	0.71	0.603	0.6	0.544	0.316	0.711	0.604	0.6	0.545	0.316	RP-Paj-Prosp-Sandia
	B-A/B-A 345/115 kV T1	10	WS-HM	P1_DiamondT-Norton	Line BA-Norton 345 kV	516	0.776	0.749	1.049	0.618	0.648	0.7	0.69	0.991	0.558	0.616	0.696	0.687	0.988	0.555	0.616	RP-Paj-Prosp-Sandia
	WESTMESA/WESTMS_1 345/115 kV T1	10	HM-Paj	P1_WMesa345/115_#2	Transformer West Mesa 345/115 kV #2	448	1.104	1.001	0.767	0.833	0.053	0.925	0.855	0.66	0.712	0.043	0.927	0.856	0.659	0.713	0.042	RP-Paj-Prosp-Sandia
	WESTMESA/WESTMS_1 345/115 kV T1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	448	1.256	1.021	1.013	0.985	0.4	0.718	0.632	0.631	0.537	0.182	0.718	0.633	0.632	0.537	0.182	
	WESTMESA/WESTMS_2 345/115 kV T1	10	HM-Paj	P1_WMesa345/115_#1	Transformer West Mesa 345/115 kV #1	448	1.114	1.011	0.775	0.841	0.054	0.935	0.864	0.667	0.719	0.043	0.936	0.865	0.666	0.721	0.043	RP-Paj-Prosp-Sandia
	WESTMESA/WESTMS_2 345/115 kV T1	10	WS-HM	P1_HiddenMt-Pajarit	Line Hidden Mountain-Pajarito 345 kV	448	1.003	0.908	0.909	0.83	0.367	0.851	0.79	0.817	0.714	0.32	0.852	0.793	0.818	0.715	0.32	
	WESTMESA/WESTMS_2 345/115 kV T1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	448	1.28	1.041	1.033	1.004	0.407	0.731	0.644	0.643	0.547	0.186	0.732	0.645	0.644	0.548	0.186	
	WESTMESA/WESTMS_2 345/115 kV T1	10	HM-Paj	P1_HMtn-WSpirit	HiddenMtn-WSpirit 345.00	448	0.999	0.911	0.913	0.824	0.367	0.854	0.792	0.829	0.714	0.322	0.855	0.793	0.828	0.715	0.322	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_BA-RioPuerco2	Line BA-Rio Puerco 345 kV ck 2	155	0.813	0.671	1.059	0.605	0.835	0.705	0.588	0.983	0.523	0.799	0.697	0.581	0.976	0.516	0.8	RP-Paj-Prosp-Sandia
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_BA-RioPuerco1	Line BA-Rio Puerco 345 kV ck 1	155	0.813	0.671	1.056	0.603	0.831	0.705	0.588	0.98	0.521	0.795	0.697	0.581	0.973	0.514	0.796	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_SandiaBusTie	Bus Tie Sandia 115 kV	155	1.034	0.852	1.063	0.736	0.596	0.906	0.751	0.968	0.647	0.56	Not Run	Not Run	Not Run	Not Run	Not Run	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_BA-Pachmann	Line BA-Pachmann 115 kV	155	0.922	0.782	1.054	0.701	0.677	0.795	0.684	0.959	0.603	0.629	0.787	0.676	0.951	0.597	0.629	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_Sandia-Prosp	Line Sandia-Prosperity 345 kV	155	1.01	0.838	1.054	0.727	0.595	0.868	0.728	0.949	0.629	0.557	0.806	0.673	0.897	0.585	0.553	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_Sandia345/115	Transformer Sandia 345/115 kV	155	1.01	0.838	1.053	0.727	0.595	0.868	0.728	0.949	0.629	0.557	0.806	0.673	0.897	0.585	0.553	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_BA-Reeves1	Line BA-Reeves 1 115 kV	155	0.925	0.764	1.025	0.686	0.671	0.793	0.662	0.926	0.584	0.62	0.783	0.652	0.917	0.576	0.62	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_QRanch-WMesa	Line Quail Ranch-WMesa 345 kV	155	0.995	0.825	1.048	0.732	0.653	0.791	0.664	0.891	0.577	0.573	0.782	0.656	0.884	0.57	0.574	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_RioPuerco-WMesa2	Line Rio Puerco-West Mesa #2 345 kV	155	0.966	0.789	1.011	0.73	0.652	0.773	0.642	0.868	0.576	0.573	0.765	0.634	0.861	0.57	0.573	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	155	1.211	0.962	1.174	0.937	0.75	0.749	0.623	0.849	0.553	0.557	0.741	0.615	0.841	0.547	0.557	
RB	B-A-NO_BERN 115 kV Ckt 1	10	WS-HM	P1_Pajarito-Prosp1	Line Pajarito-Prosperity 345 kV	155	1.01	0.838	1.054	0.728	0.596	0.718	0.6	0.827	0.526	0.543	0.709	0.592	0.819	0.52	0.543	
RB	NO_BERN-AVILA_T 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	155	1.145	0.902	1.113	0.894	0.74	0.684	0.563	0.79	0.511	0.548	0.676	0.555	0.782	0.505	0.548	RP-Paj-Prosp-Sandia
RB	NO_BERN-AVILA_T 115 kV Ckt 1	10	WS-HM	P1_SandiaBusTie	Bus Tie Sandia 115 kV	155	0.967	0.791	1.002	0.693	0.587	0.84	0.691	0.907	0.604	0.55	Not Run	Not Run	Not Run	Not Run	Not Run	
RB	NO_BERN-AVILA_T 115 kV Ckt 1	10	WS-HM	P1_BA-RioPuerco2	Line BA-Rio Puerco 345 kV ck 2	155	0.748	0.612	0.999	0.563	0.825	0.64	0.529	0.924	0.481	0.789	0.632	0.521	0.917	0.474	0.79	
RB	NO_BERN-AVILA_T 115 kV Ckt 1	10	WS-HM	P1_BA-RioPuerco1	Line BA-Rio Puerco 345 kV ck 1	155	0.748	0.612	0.997	0.561	0.821	0.64	0.529	0.921	0.478	0.785	0.632	0.521	0.914	0.472	0.786	
RB	REEVES_2-ROY 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	155	1.011	0.781	0.993	0.808	0.721	0.554	0.445	0.671	0.426	0.528	0.545	0.436	0.663	0.42	0.528	RP-Paj-Prosp-Sandia
RB	ROY-AVILA_T 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	155	1.064	0.829	1.041	0.842	0.729	0.605	0.492	0.718	0.46	0.536	0.597	0.484	0.711	0.454	0.536	RP-Paj-Prosp-Sandia
CG	SPEDRO_T-BEV_WOOD 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	154	1.16	0.756	0.756	0.972	0.572	0.19	0.043	0.065	0.138	0.147	0.14	0.011	0.019	0.101	0.145	RP-Paj-Prosp-Sandia
CG	BELAIR_T-SPEDRO_T 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	154	1.237	0.827	0.827	1.023	0.583	0.265	0.11	0.134	0.187	0.157	0.215	0.059	0.088	0.149	0.155	RP-Paj-Prosp-Sandia
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	WS-HM	P1_Sandia-Prosp	Line Sandia-Prosperity 345 kV	154	1.013	0.76	0.757	0.653	0.165	0.821	0.611	0.615	0.542	0.144	0.515	0.337	0.357	0.322	0.125	RP-Paj-Prosp-Sandia
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	WS-HM	P1_Sandia345/115	Transformer Sandia 345/115 kV	154	1.013	0.76	0.756	0.653	0.165	0.82	0.611	0.615	0.542	0.144	0.515	0.337	0.357	0.322	0.125	
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	HM-Paj	P1_Sandia-Prosp	Line Sandia-Prosperity 345 kV	154	1.023	0.766	0.734	0.661	0.132	0.796	0.587	0.593	0.516	0.133	0.468	0.292	0.31	0.275	0.094	
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	HM-Paj	P1_Sandia345/115	Transformer Sandia 345/115 kV	154	1.022	0.766	0.734	0.661	0.132	0.796	0.587	0.593	0.515	0.133	0.467	0.292	0.31	0.275	0.094	
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	154	1.315	0.898	0.898	1.075	0.595	0.341	0.18	0.205	0.238	0.168	0.292	0.13	0.159	0.199	0.166	
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	WS-HM	P1_Pajarito-Prosp1	Line Pajarito-Prosperity 345 kV	154	1.015	0.763	0.759	0.657	0.166	0.189	0.069	0.098	0.117	0.107	0.138	0.027	0.051	0.083	0.104	
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	HM-Paj	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	154	1.046	0.5	0.468	0.682	0.149	0.17	0.022	0.076	0.05	0.112	0.118	0.04	0.02	0.022	0.096	
CG	BELAIR_T-HW-CG-CG-1-RICHMOND_PNM 115kV	10	HM-Paj	P1_Pajarito-Prosp1	Line Pajarito-Prosperity 345 kV	154	1.024	0.769	0.737	0.665	0.133	0.101	0.016	0.055	0.046	0.124	0.05	0.068	0.014	0.053	0.108	
CG	PRINCESS-EB-HW 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	154	1.037	0.644	0.645	0.891	0.554	0.092	0.086	0.062	0.055	0.129	0.06	0.128	0.102	0.025	0.127	RP-Paj-Prosp-Sandia
CG	EB-HW-WINROCK 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	154	1.037	0.644	0.645	0.891	0.554	0.092	0.086	0.062	0.055	0.129	0.06	0.128	0.102	0.024	0.127	RP-Paj-Prosp-Sandia
	BEV_WOOD-WINROCK 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	154	1.118	0.718	0.718	0.945	0.566	0.15	0.019	0.028	0.111	0.141	0.1	0.049	0.023	0.076	0.139	RP-Paj-Prosp-Sandia
IR	IRVING-WAYNE 2 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	156	1.047	0.782	0.717	0.741	0.278	0.603	0.465	0.409	0.378	0.151	0.582	0.443	0.39	0.362	0.152	RP-Paj-Prosp-Sandia
WJ	CENTRALP-SNOW_VISTA 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	156	1.026	0.706	0.67	0.662	0.228	0.519	0.34	0.313	0.302	0.095	0.551	0.372	0.34	0.328	0.094	RP-Paj-Prosp-Sandia
WJ	CENTRALP-SNOW_VISTA 115 kV Ckt 1	10	WS-HM	P1_Volcano-WMesa2	Line Volcano-West Mesa 2 115 kV	156	1.023	0.462	0.429	0.55	0.12	0.507	0.205	0.177	0.249	0.05	0.54	0.239	0.197	0.279	0.049	
WJ	CENTRALP-SNOW_VISTA 115 kV Ckt 1	10	HM-Paj	P1_Volcano-WMesa2	Line Volcano-West Mesa 2 115 kV	156	1.025	0.47	0.372	0.556	0.074	0.466	0.197	0.207	0.199	0.022	0.497	0.207	0.204	0.228	0.023	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	156	1.127	0.798	0.761	0.727	0.242	0.618	0.43	0.403	0.366	0.108	0.649	0.463	0.431	0.392	0.108	RP-Paj-Prosp-Sandia
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	WS-HM	P1_Volcano-WMesa2	Line Volcano-West Mesa 2 115 kV	156	1.123	0.551	0.517	0.614	0.133	0.606	0.282	0.251	0.313	0.063	0.639	0.323	0.28	0.343	0.063	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	HM-Paj	P1_Volcano-WMesa2	Line Volcano-West Mesa 2 115 kV	156	1.125	0.558	0.453	0.621	0.071	0.565	0.264	0.259	0.262	0.021	0.596	0.286	0.274	0.292	0.029	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	WS-HM	P1_Person-Volcano	Line Person-Volcano 115 kV	156	1.052	0.797	0.755	0.566	0.126	0.555	0.411	0.377	0.277	0.067	0.592	0.451	0.41	0.311	0.066	
WJ	WESTMS_1-CENTRALP 115 kV Ckt 1	10	HM-Paj	P1_Person-Volcano	Line Person-Volcano 115 kV	156	1.053	0.802	0.664	0.572	0.04	0.513	0.373	0.341	0.224	0.017	0.549	0.405	0.375	0.259	0.014	

(Table continued: Overloads: P6 (C vs B vs A)

28HS			P6 Contingencies				Scenario A = pre-CCN					Scenario B = post-CCN (345 kV)					Scenario C = CCN + 115kV					
Line ID	Element	AREA	P6 Ref	CONTINGENCY ID	CONTINGENCY DESCRIPTION	RATING MVA	28HS_ CCN_ A01	28HS_ CCN_ A02	28HS_ CCN_ A03	28HS_ CCN_ A04	28HS_ CCN_ A05	28HS_ CCN_ B01	28HS_ CCN_ B02	28HS_ CCN_ B03	28HS_ CCN_ B04	28HS_ CCN_ B05	28HS_ CCN_ C01	28HS_ CCN_ C02	28HS_ CCN_ C03	28HS_ CCN_ C04	28HS_ CCN_ C05	Comments
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	WS-HM	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	156	1.231	0.372	0.343	0.783	0.276	0.636	0.242	0.25	0.365	0.121	0.672	0.226	0.221	0.394	0.122	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	WS-HM	P1_WMesa1-SnowVista	Line West Mesa 1-Snow Vista 115 kV	156	1.2	0.419	0.402	0.655	0.157	0.633	0.3	0.304	0.324	0.078	0.667	0.281	0.271	0.353	0.08	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	HM-Paj	P1_WMesa1-SnowVista	Line West Mesa 1-Snow Vista 115 kV	156	1.201	0.433	0.403	0.661	0.14	0.591	0.347	0.401	0.274	0.095	0.622	0.309	0.357	0.301	0.101	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	HM-Paj	P1_Pajarito-WMesa	Line Pajarito-West Mesa 345 kV	156	1.033	0.28	0.288	0.589	0.097	0.522	0.327	0.377	0.24	0.083	0.556	0.292	0.338	0.267	0.088	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	WS-HM	P1_Person-SnVista_a	Line Person-Snow Vista 115 kV	156	1.007	0.286	0.289	0.517	0.133	0.504	0.354	0.372	0.235	0.065	0.549	0.316	0.323	0.27	0.068	RP-Paj-Prosp-Sandia
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	HM-Paj	P1_Pajarito-Prosp1	Line Pajarito-Prosperity 345 kV	156	1.033	0.327	0.309	0.589	0.111	0.474	0.356	0.404	0.227	0.094	0.506	0.32	0.365	0.251	0.099	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	HM-Paj	P1_Person-SnVista_a	Line Person-Snow Vista 115 kV	156	1.008	0.299	0.347	0.522	0.147	0.462	0.408	0.466	0.19	0.098	0.504	0.356	0.408	0.22	0.101	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	HM-Paj	P1_Sandia-Prosp	Line Sandia-Prosperity 345 kV	156	1.034	0.328	0.31	0.59	0.113	0.456	0.369	0.416	0.224	0.1	0.568	0.28	0.327	0.287	0.094	
PM/WV	WESTMS_2-VOLCANOT 115 kV Ckt 1	10	HM-Paj	P1_Sandia345/115	Transformer Sandia 345/115 kV	156	1.034	0.329	0.311	0.59	0.114	0.456	0.369	0.416	0.224	0.1	0.568	0.28	0.327	0.287	0.094	
	Addressed with Prospererity-Sandia 115 kV and Sandia 115 kV bus expansion																					
TL-EB_Tap	NORTHPNM-MPLAZA_T 115 kV Ckt 1	10	HM-Paj	P1_SandiaBusTie	Bus Tie Sandia 115 kV	156	1.01	0.801	0.798	0.652	0.154	1.024	0.813	0.808	0.664	0.153	Not Run	Not Run	Not Run	Not Run	Not Run	115kV project revised
TL-EB_Tap	NORTHPNM-MPLAZA_T 115 kV Ckt 1	10	WS-HM	P1_SandiaBusTie	Bus Tie Sandia 115 kV	156	1.005	0.799	0.788	0.648	0.136	1.019	0.81	0.8	0.66	0.14	Not Run	Not Run	Not Run	Not Run	Not Run	contingencies & resolved
	Additional upgrades required																					
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	WS-HM	P1_HiddenMt-Pajarit	Line Hidden Mountain-Pajarito 345 kV	156	0.103	0.068	0.065	0.109	0.15	1.233	0.977	1.037	0.967	0.522	1.172	0.907	0.985	0.924	0.539	
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	HM-Paj	P1_HMtn-WSpirit	HiddenMtn-WSpirit 345.00	156	0.104	0.068	0.063	0.108	0.148	1.224	0.966	1.021	0.967	0.519	1.163	0.907	0.969	0.924	0.533	
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	HM-Paj	P1_Clines-WSpirit	Line Clines Corners-Western Spirit 345 kV	156	0.075	0.049	0.218	0.068	0.161	1.143	0.876	0.348	0.865	0.314	1.077	0.811	0.294	0.817	0.343	Reconductor
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	HM-Paj	P1_WMesa345/115_#2	Transformer West Mesa 345/115 kV #2	156	0.062	0.073	0.169	0.042	0.106	1.066	0.812	0.513	0.728	0.178	0.985	0.735	0.443	0.663	0.193	
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	HM-Paj	P1_WMesa345/115_#1	Transformer West Mesa 345/115 kV #1	156	0.062	0.074	0.17	0.042	0.106	1.059	0.807	0.509	0.723	0.177	0.978	0.729	0.439	0.658	0.192	
PERS-PROS1	PERSON-PROSPER 115 kV Ckt 1	10	HM-Paj	P1_WMesa1-SnowVista	Line West Mesa 1-Snow Vista 115 kV	156	0.134	0.093	0.164	0.061	0.108	1.006	0.702	0.453	0.625	0.17	0.956	0.653	0.417	0.579	0.183	
	Addressed with Operating Actions																					
BA-DMND1	B-A-DIAMOND_TAIL 345 kV Ckt 1	10	WS-HM	P1_BA-DiamondTail_2	Line BA-Diamond Tail 345 kV circuit #2	1113	0.254	0.235	1.315	0.244	1.741	0.255	0.235	1.318	0.244	1.741	0.255	0.235	1.318	0.244	1.741	Curtailment ENM wind
BA-DMND1	B-A-DIAMOND_TAIL 345 kV Ckt 1	10	HM-Paj	P1_BA-DiamondTail_2	Line BA-Diamond Tail 345 kV circuit #2	1113	0.18	0.158	0.771	0.181	1.159	0.161	0.144	0.785	0.166	1.158	0.161	0.144	0.784	0.166	1.158	Curtailment ENM wind
	B-A-DIAMOND_TAIL 345 kV Ckt 2	10	WS-HM	P1_BA-DiamondTail_1	Line BA-Diamond Tail 345 kV circuit #1	1113	0.254	0.235	1.315	0.244	1.741	0.255	0.235	1.318	0.245	1.741	0.255	0.235	1.318	0.245	1.741	Curtailment ENM wind
	B-A-DIAMOND_TAIL 345 kV Ckt 2	10	HM-Paj	P1_BA-DiamondTail_1	Line BA-Diamond Tail 345 kV circuit #1	1113	0.18	0.158	0.771	0.181	1.159	0.161	0.144	0.785	0.166	1.159	0.161	0.144	0.784	0.167	1.159	Curtailment ENM wind
	B-A-RIOPUERC 345 kV Ckt 1	10	WS-HM	P1_BA-RioPuerco2	Line BA-Rio Puerco 345 kV ck 2	1076	0.149	0.134	0.919	0.146	1.466	0.131	0.122	0.943	0.137	1.475	0.131	0.121	0.944	0.137	1.475	Curtailment ENM wind
	RIOPUERC-B-A 345 kV Ckt 2	10	WS-HM	P1_BA-RioPuerco1	Line BA-Rio Puerco 345 kV ck 1	1195	0.135	0.122	0.829	0.12	1.322	0.119	0.11	0.85	0.111	1.33	0.118	0.109	0.852	0.111	1.33	Curtailment ENM wind
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_Clines-DiamondT2ras	Line Clines Corners-DTail 345kV #2 RAS LaJoya-CLNCRN	1113	Not Run	Not Run	Not Run	Not Run	Not Run	0.334	0.334	1.205	0.292	1.503	0.334	0.334	1.205	0.292	1.503	Curtailment ENM wind
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_Clines-DiamondT2	Line Clines Corners-Diamond Tail 345 kV circuit #2	1113	0.36	0.359	1.206	0.318	1.391	0.359	0.359	1.205	0.317	ot Solved	0.359	0.359	1.205	0.317	ot Solved	Curtailment ENM wind
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_GuadalupeSVC	SVC Guadalupe	1113	0.185	0.184	0.821	0.163	1.013	0.184	0.183	0.82	0.163	1.01	0.184	0.183	0.82	0.163	1.01	
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_BA-RioPuerco2	Line BA-Rio Puerco 345 kV ck 2	1113	0.183	0.183	0.817	0.162	1.002	0.183	0.182	0.817	0.162	1.	0.183	0.182	0.817	0.162	1.	
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_BA-RioPuerco1	Line BA-Rio Puerco 345 kV ck 1	1113	0.183	0.183	0.817	0.16	1.002	0.183	0.182	0.817	0.16	1.	0.183	0.182	0.817	0.16	1.	
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_DiamondT-Norton	Line BA-Norton 345 kV	1113	0.188	0.186	0.818	0.166	1.	0.187	0.185	0.817	0.165	0.997	0.187	0.185	0.817	0.165	0.997	
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_RioPuercoSVC	SVC Rio Puerco	1113	0.189	0.185	0.818	0.167	1.	0.187	0.184	0.817	0.165	0.997	0.187	0.184	0.816	0.165	0.997	
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_BA-DiamondTail_2	Line BA-Diamond Tail 345 kV circuit #2	1113	0.184	0.183	0.816	0.163	0.997	0.184	0.183	0.815	0.162	0.996	0.184	0.183	0.815	0.162	0.996	
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 1	10	WS-HM	P1_BA-DiamondTail_1	Line BA-Diamond Tail 345 kV circuit #1	1113	0.184	0.183	0.816	0.163	0.997	0.184	0.183	0.815	0.162	0.996	0.184	0.183	0.815	0.162	0.996	
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 2	10	WS-HM	P1_Clines-DiamondT1ras	Line Clines Corners-DTail 345kV #1 RAS LaJoya-CLNCRN	1113	Not Run	Not Run	Not Run	Not Run	Not Run	0.334	0.334	1.207	0.292	1.507	0.334	0.334	1.207	0.292	1.507	Curtailment ENM wind
	DIAMOND_TAIL-CLINECORNER 345 kV Ckt 2	10	WS-HM	P1_Clines-DiamondT1	Line Clines Corners-Diamond Tail 345 kV circuit #1	1113	0.36	0.359	1.207	0.318	ot Solved	0.359	0.359	1.207	0.317	ot Solved	0.359	0.359	1.207	0.317	ot Solved	Curtailment ENM wind
TJ	TOME-FIRST_ST 115 kV Ckt 1	10	WS-HM	P1_HiddenMt-Pajarit	Line Hidden Mountain-Pajarito 345 kV	154	0.305	0.752	0.685	0.93	0.444	0.453	0.888	0.909	1.053	0.498	0.444	0.879	0.901	1.047	0.501	MIT: META load shedding
TJ	TOME-FIRST_ST 115 kV Ckt 1	10	HM-Paj	P1_HMtn-WSpirit	HiddenMtn-WSpirit 345.00	154	0.314	0.756	0.693	0.932	0.435	0.454	0.887	0.91	1.052	0.487	0.445	0.879	0.902	1.047	0.489	MIT: META load shedding
	HIDDENMOUNT-RATTLESNKPNM 115 kV Ckt 3	10	N-2 HM-Rat	P7_DoubleCk38a	Hidden Mountain-Rattlesnake 115 kV Line	350	1.236	1.156	1.346	1.264	1.169	1.19	1.121	1.289	1.245	1.138	1.193	1.124	1.292	1.248	1.138	MIT: META load shedding
BELN-SUNRA1	SUNRANCH-BELEN_PG 115 kV Ckt 1	10	HM-Paj	P1_HMtn-WSpirit	HiddenMtn-WSpirit 345.00	141	0.749	0.91	0.985	1.282	0.831	0.853	1.	1.205	1.364	0.864	0.846	0.994	1.199	1.359	0.866	MIT: META load shedding
BELN-SUNRA1	SUNRANCH-BELEN_PG 115 kV Ckt 1	10	WS-HM	P1_HiddenMt-Pajarit	Line Hidden Mountain-Pajarito 345 kV	141	0.753	0.914	0.988	1.278	0.815	0.853	1.001	1.206	1.363	0.851	0.846	0.994	1.2	1.359	0.853	MIT: META load shedding
BELN-SUNRA1	SUNRANCH-BELEN_PG 115 kV Ckt 1	10	HM-Paj	P1_Clines-WSpirit	Line Clines Corners-Western Spirit 345 kV	141	0.631	0.78	0.068	1.124	0.501	0.722	0.865	0.015	1.202	0.516	0.715	0.858	0.024	1.197	0.52	MIT: META load shedding
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	HM-Paj	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	59	0.641	0.217	0.468	0.547	1.088	0.593	0.179	0.495	0.515	1.087	0.596	0.182	0.491	0.518	1.086	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	HM-Paj	P1_Cabezon-SJuan	Line Cabezon-San Juan 345 kV	59	0.696	0.391	0.409	0.766	1.04	0.827	0.358	0.434	0.739	1.041	0.83	0.36	0.43	0.741	1.04	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	HM-Paj	P1_RioPuerco-Cabezon	Line Rio Puerco-Cabezon 345 kV	59	0.695	0.388	0.411	0.78	1.038	0.825	0.354	0.436	0.752	1.038	0.828	0.357	0.432	0.754	1.038	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	HM-Paj	P1_FourCorn-Pintado	Line Four Corners-Pintado 345 kV	59	0.829	0.376	0.404	0.754	1.024	0.785	0.342	0.429	0.726	1.024	0.788	0.345	0.425	0.728	1.023	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	HM-Paj	P1_WMesa-Arroyo	Line West Mesa-Arroyo 345 kV	59	0.673	0.254	0.386	0.561	1.016	0.619	0.213	0.413	0.526	1.014	0.621	0.216	0.41	0.528	1.013	Belen PST
	SOCORROP-EL_BUTTE 115 kV Ckt 1	10	WS-HM	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	59	0.652	0.223	0.323	0.524	0.982	0.571	0.159	0.384	0.484	0.998	0.574	0.161	0.382	0.486	0.998	
	BERNARDO-BELEN_PST 115 kV Ckt 1	10	HM-Paj	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	74	0.135	0.25	0.717	0.102	1.013	0.114	0.276	0.74	0.101	1.012	0.116	0.274	0.737	0.1	1.011	<1%
TJ	FIRST_ST-FRST_STT 115 kV Ckt 1	10	WS-HM	P1_HiddenMt-Pajarit	Line Hidden Mountain-Pajarito 345 kV	154	0.246	0.682	0.615	0.88	0.434	0.384	0.818	0.838	1.002	0.488	0.375	0.809	0.831	0.996	0.49	<1%
TJ	FIRST_ST-FRST_STT 115 kV Ckt 1	10	HM-Paj	P1_HMtn-WSpirit	HiddenMtn-WSpirit 345.00	154	0.256	0.686	0.622	0.882	0.424	0.385	0.817	0.839	1.002	0.476	0.376	0.809	0.832	0.996	0.478	<1%
TJ	FRST_STT-JARALEST 115 kV Ckt 1	10	WS-HM	P1_HiddenMt-Pajarit	Line Hidden Mountain-Pajarito 345 kV	154	0.246	0.682	0.615	0.88	0.434	0.384	0.818	0.838	1.002	0.488	0.374	0.809	0.831	0.996	0.49	<1%
TJ	FRST_STT-JARALEST 115 kV Ckt 1	10	HM-Paj	P1_HMtn-WSpirit	HiddenMtn-WSpirit 345.00	154	0.256	0.686	0.622	0.882	0.424	0.385	0.817	0.839	1.002	0.476	0.376	0.809	0.832	0.996	0.478	<1%
	Independent of Study Area																					
	FOURCORN-FC-CH SC1 345 kV Ckt 1	14	HM-Paj	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	908	0.213	0.238	0.502	0.156	1.016	0.213	0.237	0.502	0.155	1.016	0.213	0.237	0.502	0.155	1.016	Independent of study area.
	FOURCORN-FC-CH SC1 345 kV Ckt 1	14	WS-HM	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	908	0.212	0.236	0.5	0.158	1.012	0.213	0.238	0.501	0.156	1.011	0.213	0.238	0.502	0.156	1.011	Independent of study area.
	FOURCORN-FC-CH SC2 345 kV Ckt 2	14	HM-Paj	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	908	0.215	0.239	0.506	0.157	1.025	0.214	0.238	0.506	0.156	1.024	0.214	0.238	0.506	0.156	1.024	Independent of study area.
	FOURCORN-FC-CH SC2 345 kV Ckt 2	14	WS-HM	P1_FourCorn-Moen	Line Four Corners-Moenkopi 500 kV	908	0.213	0.238	0.504	0.158	1.02	0.215	0.239	0.506	0.157	1.019	0.215	0.239	0.506	0.157	1.019	Independent of study area.

Power Flow – Voltage Performance Results

- Post-mitigation results showed no project-triggered voltage violations. Voltage issues shown in Table 16, Table 17, and Table 18 can be managed through existing equipment and operational controls, including: Transformer tap adjustments
- Use of Static Var Devices (SVDs)
- Other installed voltage regulation equipment

These measures are sufficient to maintain voltage performance within acceptable limits across all applicable contingency scenarios.

Table 16 —Voltage Violations for P1, P2, P4, P5* and P7 Outages, (A vs B vs C)

28HS				P1, P2/P4, P5, P7 Contingencies	Scenario A = pre-CCN					Scenario B = post-CCN (345 kV)					Scenario C = CCN + 115kV					
NUMBER	NAME	KV	AREA	CONTINGENCY IDENTIFIER	28HS_ CCN_ A01	28HS_ CCN_ A02	28HS_ CCN_ A03	28HS_ CCN_ A04	28HS_ CCN_ A05	28HS_ CCN_ B01	28HS_ CCN_ B02	28HS_ CCN_ B03	28HS_ CCN_ B04	28HS_ CCN_ B05	28HS_ CCN_ C01	28HS_ CCN_ C02	28HS_ CCN_ C03	28HS_ CCN_ C04	28HS_ CCN_ C05	Comments
Base Case, P0																				
13402	BLACKWTR	345	10	base	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	Voltage impact < 1%
13601	BV_POI_3-T~1	345	10	base	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	Voltage impact < 1%
13602	SUB_BEJN	345	10	base	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	Voltage impact < 1%
13613	GRADYNM	345	10	base	1.054	1.054	1.055	1.054	1.055	1.054	1.054	1.055	1.054	1.055	1.054	1.054	1.055	1.054	1.055	Voltage impact < 1%
13402	BLACKWTR	345	10	base	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	Voltage impact < 1%
13601	BV_POI_3-T~1	345	10	base	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	Voltage impact < 1%
13602	SUB_BEJN	345	10	base	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	Voltage impact < 1%
13613	GRADYNM	345	10	base	1.054	1.054	1.055	1.054	1.055	1.054	1.054	1.055	1.054	1.055	1.054	1.054	1.055	1.054	1.055	Voltage impact < 1%
10109	BELEN_PST	115	10	base	1.015	1.027	1.033	1.026	1.049	1.022	1.03	1.036	1.029	1.05	1.022	1.03	1.036	1.029	1.05	Voltage impact < 1%
10844	DULCE	115	10	base	1.039	1.049	1.034	1.058	1.039	1.039	1.05	1.034	1.058	1.039	1.039	1.05	1.034	1.058	1.039	Voltage impact < 1%
10109	BELEN_PST	115	10	base	1.015	1.027	1.033	1.026	1.049	1.022	1.03	1.036	1.029	1.05	1.022	1.03	1.036	1.029	1.05	Voltage impact < 1%
10844	DULCE	115	10	base	1.039	1.049	1.034	1.058	1.039	1.039	1.05	1.034	1.058	1.039	1.039	1.05	1.034	1.058	1.039	Voltage impact < 1%
Pre-Project, Post-Contingency																				
10291	SAN_JUAN	230	10	P2P4_SanJuan345_BF4	Not Rec	Not Rec	Not Rec	Not Rec	0.86	Not Rec	Not Rec	Not Rec	Not Rec	0.86	Not Rec	Not Rec	Not Rec	Not Rec	0.86	1-Hogback taps
10291	SAN_JUAN	230	10	P2P4_SanJuan345_BF3a	Not Rec	Not Rec	Not Rec	Not Rec	0.862	Not Rec	Not Rec	Not Rec	Not Rec	0.862	Not Rec	Not Rec	Not Rec	Not Rec	0.862	1-Hogback taps
10291	SAN_JUAN	230	10	P1_SanJuan-ShipRock	0.925	0.921	0.922	0.913	0.862	0.926	0.922	0.922	0.913	0.862	0.926	0.922	0.922	0.913	0.862	1-Hogback taps
10111	GALLEGOS	230	10	P2P4_Pillar230_BF1	0.898	Not Rec	Not Rec	0.896	0.88	0.898	Not Rec	Not Rec	0.896	0.88	0.898	Not Rec	Not Rec	0.896	0.88	2-Gallegos taps
10111	GALLEGOS	230	10	P1_Gallegos-Pillar	0.903	0.906	0.905	0.9	0.882	0.903	0.906	0.905	0.9	0.882	0.903	0.906	0.905	0.9	0.882	2-Gallegos taps
10072	WNDWROCK	115	10	P2P4_McKinley345_BF2	0.899	0.892	0.9	0.893	Not Rec	Not Rec	0.895	0.899	0.896	Not Rec	Not Rec	0.895	0.899	0.896	Not Rec	3-Turn on Gallup SVD
10342	TOME	46	10	P2P4_Tome115_BF2a	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	1.109	Not Rec	Not Rec	Not Rec	Not Rec	1.109	Not Rec	4-Los Chavez caps
10342	TOME	46	10	P2P4_Tome115_BF1	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	1.109	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	4-Los Chavez caps
10342	TOME	46	10	P1_Tome115/46	1.068	1.079	1.079	1.1	Not Rec	1.083	1.089	1.088	1.109	Not Rec	1.084	1.09	1.089	1.109	Not Rec	4-Los Chavez caps
10177	LOS_CHAV	46	10	P5_Tome115_2a	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	4-Los Chavez caps
10177	LOS_CHAV	46	10	P2P4_Tome115_BF2a	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	1.109	Not Rec	Not Rec	Not Rec	Not Rec	1.109	Not Rec	4-Los Chavez caps
10177	LOS_CHAV	46	10	P2P4_Tome115_BF1	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	1.109	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	4-Los Chavez caps
10177	LOS_CHAV	46	10	P1_Tome115/46	Not Rec	Not Rec	Not Rec	1.1	Not Rec	Not Rec	Not Rec	Not Rec	1.109	Not Rec	Not Rec	Not Rec	Not Rec	1.109	Not Rec	4-Los Chavez caps
Impacts Dispatch 5 cases only. Includes loss of Gladstone-Springer 115 kV																				
12091	YORKCANY	115	10	P2P4_Springer115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.142	Not Rec	Not Rec	Not Rec	Not Rec	1.143	Not Rec	Not Rec	Not Rec	Not Rec	1.143	5-Yorkcany SVD
12091	YORKCANY	115	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.253	Not Rec	Not Rec	Not Rec	Not Rec	1.255	Not Rec	Not Rec	Not Rec	Not Rec	1.255	5-Yorkcany SVD
12091	YORKCANY	115	10	P2P4_Gladstone115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.132	Not Rec	Not Rec	Not Rec	Not Rec	1.133	Not Rec	Not Rec	Not Rec	Not Rec	1.133	5-Yorkcany SVD
12091	YORKCANY	115	10	P2P4_Gladstone115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.132	Not Rec	Not Rec	Not Rec	Not Rec	1.133	Not Rec	Not Rec	Not Rec	Not Rec	1.133	5-Yorkcany SVD
12091	YORKCANY	115	10	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.132	Not Rec	Not Rec	Not Rec	Not Rec	1.133	Not Rec	Not Rec	Not Rec	Not Rec	1.133	5-Yorkcany SVD
12157	VANBREMR	115	10	P2P4_Springer115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.139	Not Rec	Not Rec	Not Rec	Not Rec	1.139	Not Rec	Not Rec	Not Rec	Not Rec	1.139	5-Yorkcany SVD
12157	VANBREMR	115	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.25	Not Rec	Not Rec	Not Rec	Not Rec	1.251	Not Rec	Not Rec	Not Rec	Not Rec	1.251	5-Yorkcany SVD
12157	VANBREMR	115	10	P2P4_Gladstone115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.129	Not Rec	Not Rec	Not Rec	Not Rec	1.129	Not Rec	Not Rec	Not Rec	Not Rec	1.129	5-Yorkcany SVD
12157	VANBREMR	115	10	P2P4_Gladstone115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.129	Not Rec	Not Rec	Not Rec	Not Rec	1.129	Not Rec	Not Rec	Not Rec	Not Rec	1.129	5-Yorkcany SVD
12157	VANBREMR	115	10	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.129	Not Rec	Not Rec	Not Rec	Not Rec	1.129	Not Rec	Not Rec	Not Rec	Not Rec	1.129	5-Yorkcany SVD
10357	VALENCIA	115	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.156	Not Rec	Not Rec	Not Rec	Not Rec	1.157	Not Rec	Not Rec	Not Rec	Not Rec	1.157	5-Yorkcany SVD
12079	STORRIE	115	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.165	Not Rec	Not Rec	Not Rec	Not Rec	1.166	Not Rec	Not Rec	Not Rec	Not Rec	1.166	5-Yorkcany SVD
12079	STORRIE	115	10	P2P4_Gladstone115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.1	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	5-Yorkcany SVD
12079	STORRIE	115	10	P2P4_Gladstone115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.1	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	5-Yorkcany SVD
12079	STORRIE	115	10	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.1	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	5-Yorkcany SVD
12077	SPRINGER	115	10	P2P4_Springer115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.123	Not Rec	Not Rec	Not Rec	Not Rec	1.123	Not Rec	Not Rec	Not Rec	Not Rec	1.123	5-Yorkcany SVD
12077	SPRINGER	115	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.231	Not Rec	Not Rec	Not Rec	Not Rec	1.232	Not Rec	Not Rec	Not Rec	Not Rec	1.232	5-Yorkcany SVD
12077	SPRINGER	115	10	P2P4_Gladstone115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.112	Not Rec	Not Rec	Not Rec	Not Rec	1.113	Not Rec	Not Rec	Not Rec	Not Rec	1.113	5-Yorkcany SVD
12077	SPRINGER	115	10	P2P4_Gladstone115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.112	Not Rec	Not Rec	Not Rec	Not Rec	1.113	Not Rec	Not Rec	Not Rec	Not Rec	1.113	5-Yorkcany SVD
12077	SPRINGER	115	10	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.112	Not Rec	Not Rec	Not Rec	Not Rec	1.113	Not Rec	Not Rec	Not Rec	Not Rec	1.113	5-Yorkcany SVD

(Table continued – Voltage Violations)

28HS				P1, P2/P4, P5, P7 Contingencies	Scenario A = pre-CCN					Scenario B = post-CCN (345 kV)					Scenario C = CCN + 115kV					
NUMBER	NAME	KV	AREA	CONTINGENCY IDENTIFIER	28HS_ CCN_ A01	28HS_ CCN_ A02	28HS_ CCN_ A03	28HS_ CCN_ A04	28HS_ CCN_ A05	28HS_ CCN_ B01	28HS_ CCN_ B02	28HS_ CCN_ B03	28HS_ CCN_ B04	28HS_ CCN_ B05	28HS_ CCN_ C01	28HS_ CCN_ C02	28HS_ CCN_ C03	28HS_ CCN_ C04	28HS_ CCN_ C05	Comments
12065	ROWE_TAP	115	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.109	Not Rec	Not Rec	Not Rec	Not Rec	1.109	5-Yorkcany SVD
12129	RAINVL1	115	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.194	Not Rec	Not Rec	Not Rec	Not Rec	1.195	Not Rec	Not Rec	Not Rec	Not Rec	1.195	5-Yorkcany SVD
12129	RAINVL1	115	10	P2P4_Gladstone115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.108	5-Yorkcany SVD
12129	RAINVL1	115	10	P2P4_Gladstone115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.108	5-Yorkcany SVD
12129	RAINVL1	115	10	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.108	5-Yorkcany SVD
12130	RAINVL_T	115	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.194	Not Rec	Not Rec	Not Rec	Not Rec	1.195	Not Rec	Not Rec	Not Rec	Not Rec	1.195	5-Yorkcany SVD
12130	RAINVL_T	115	10	P2P4_Gladstone115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.108	5-Yorkcany SVD
12130	RAINVL_T	115	10	P2P4_Gladstone115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.108	5-Yorkcany SVD
12130	RAINVL_T	115	10	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.108	5-Yorkcany SVD
10484	GALLINAT	115	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.163	Not Rec	Not Rec	Not Rec	Not Rec	1.164	Not Rec	Not Rec	Not Rec	Not Rec	1.164	5-Yorkcany SVD
10484	GALLINAT	115	10	P2P4_Gladstone115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	5-Yorkcany SVD
10484	GALLINAT	115	10	P2P4_Gladstone115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	5-Yorkcany SVD
10484	GALLINAT	115	10	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	5-Yorkcany SVD
12159	CIMARRON	115	10	P2P4_Springer115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.125	Not Rec	Not Rec	Not Rec	Not Rec	1.126	Not Rec	Not Rec	Not Rec	Not Rec	1.126	5-Yorkcany SVD
12159	CIMARRON	115	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.234	Not Rec	Not Rec	Not Rec	Not Rec	1.235	Not Rec	Not Rec	Not Rec	Not Rec	1.235	5-Yorkcany SVD
12159	CIMARRON	115	10	P2P4_Gladstone115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.115	Not Rec	Not Rec	Not Rec	Not Rec	1.116	Not Rec	Not Rec	Not Rec	Not Rec	1.116	5-Yorkcany SVD
12159	CIMARRON	115	10	P2P4_Gladstone115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.115	Not Rec	Not Rec	Not Rec	Not Rec	1.116	Not Rec	Not Rec	Not Rec	Not Rec	1.116	5-Yorkcany SVD
12159	CIMARRON	115	10	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.115	Not Rec	Not Rec	Not Rec	Not Rec	1.116	Not Rec	Not Rec	Not Rec	Not Rec	1.116	5-Yorkcany SVD
12148	BISON	115	10	P2P4_Springer115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.125	Not Rec	Not Rec	Not Rec	Not Rec	1.126	Not Rec	Not Rec	Not Rec	Not Rec	1.126	5-Yorkcany SVD
12148	BISON	115	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.234	Not Rec	Not Rec	Not Rec	Not Rec	1.235	Not Rec	Not Rec	Not Rec	Not Rec	1.235	5-Yorkcany SVD
12148	BISON	115	10	P2P4_Gladstone115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.115	Not Rec	Not Rec	Not Rec	Not Rec	1.116	Not Rec	Not Rec	Not Rec	Not Rec	1.116	5-Yorkcany SVD
12148	BISON	115	10	P2P4_Gladstone115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.115	Not Rec	Not Rec	Not Rec	Not Rec	1.116	Not Rec	Not Rec	Not Rec	Not Rec	1.116	5-Yorkcany SVD
12148	BISON	115	10	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.115	Not Rec	Not Rec	Not Rec	Not Rec	1.116	Not Rec	Not Rec	Not Rec	Not Rec	1.116	5-Yorkcany SVD
10018	ARRIBA_T	115	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.162	Not Rec	Not Rec	Not Rec	Not Rec	1.164	Not Rec	Not Rec	Not Rec	Not Rec	1.164	5-Yorkcany SVD
10018	ARRIBA_T	115	10	P2P4_Gladstone115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	5-Yorkcany SVD
10018	ARRIBA_T	115	10	P2P4_Gladstone115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	5-Yorkcany SVD
10018	ARRIBA_T	115	10	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	5-Yorkcany SVD
10016	ARRIBA	115	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.163	Not Rec	Not Rec	Not Rec	Not Rec	1.164	Not Rec	Not Rec	Not Rec	Not Rec	1.164	5-Yorkcany SVD
10016	ARRIBA	115	10	P2P4_Gladstone115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.1	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	5-Yorkcany SVD
10016	ARRIBA	115	10	P2P4_Gladstone115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.1	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	5-Yorkcany SVD
10016	ARRIBA	115	10	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.1	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	5-Yorkcany SVD
12090	YORKCANY	69	10	P2P4_Springer115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.133	Not Rec	Not Rec	Not Rec	Not Rec	1.133	Not Rec	Not Rec	Not Rec	Not Rec	1.133	5-Yorkcany SVD
12090	YORKCANY	69	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.243	Not Rec	Not Rec	Not Rec	Not Rec	1.244	Not Rec	Not Rec	Not Rec	Not Rec	1.244	5-Yorkcany SVD
12090	YORKCANY	69	10	P2P4_Gladstone115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.122	Not Rec	Not Rec	Not Rec	Not Rec	1.123	Not Rec	Not Rec	Not Rec	Not Rec	1.123	5-Yorkcany SVD
12090	YORKCANY	69	10	P2P4_Gladstone115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.122	Not Rec	Not Rec	Not Rec	Not Rec	1.123	Not Rec	Not Rec	Not Rec	Not Rec	1.123	5-Yorkcany SVD
12090	YORKCANY	69	10	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.122	Not Rec	Not Rec	Not Rec	Not Rec	1.123	Not Rec	Not Rec	Not Rec	Not Rec	1.123	5-Yorkcany SVD
12010	BLACKLAK	69	10	P2P4_Springer115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.102	Not Rec	Not Rec	Not Rec	Not Rec	1.103	Not Rec	Not Rec	Not Rec	Not Rec	1.103	5-Yorkcany SVD
Impacts Dispatch 5 cases only																				
12076	SPRINGER	69	10	P5_SanJuan_1a	Not Rec	Not Rec	Not Rec	Not Rec	1.105	Not Rec	Not Rec	Not Rec	Not Rec	1.105	Not Rec	Not Rec	Not Rec	Not Rec	1.105	
12076	SPRINGER	69	10	P2P4_Springer115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.153	Not Rec	Not Rec	Not Rec	Not Rec	1.154	Not Rec	Not Rec	Not Rec	Not Rec	1.154	
12076	SPRINGER	69	10	P2P4_Springer115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.264	Not Rec	Not Rec	Not Rec	Not Rec	1.265	Not Rec	Not Rec	Not Rec	Not Rec	1.265	
12076	SPRINGER	69	10	P2P4_Springer115_BF1	Not Rec	Not Rec	Not Rec	Not Rec	1.11	Not Rec	Not Rec	Not Rec	Not Rec	1.111	Not Rec	Not Rec	Not Rec	Not Rec	1.111	
12076	SPRINGER	69	10	P2P4_Gladstone230BF1a	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.102	Not Rec	Not Rec	Not Rec	Not Rec	1.102	5-Yorkcany SVD, 6-Springer taps
12076	SPRINGER	69	10	P2P4_Gladstone115_BF5	Not Rec	Not Rec	Not Rec	Not Rec	1.143	Not Rec	Not Rec	Not Rec	Not Rec	1.143	Not Rec	Not Rec	Not Rec	Not Rec	1.143	
12076	SPRINGER	69	10	P2P4_Gladstone115_BF4	Not Rec	Not Rec	Not Rec	Not Rec	1.143	Not Rec	Not Rec	Not Rec	Not Rec	1.143	Not Rec	Not Rec	Not Rec	Not Rec	1.143	
12076	SPRINGER	69	10	P1_Valent-Walsenburg	Not Rec	Not Rec	Not Rec	Not Rec	1.104	Not Rec	Not Rec	Not Rec	Not Rec	1.105	Not Rec	Not Rec	Not Rec	Not Rec	1.105	
12076	SPRINGER	69	10	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.143	Not Rec	Not Rec	Not Rec	Not Rec	1.143	Not Rec	Not Rec	Not Rec	Not Rec	1.143	
12076	SPRINGER	69	10	P1_Gladsto-Valent	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.102	Not Rec	Not Rec	Not Rec	Not Rec	1.102	

1-Hogback taps: 230/115 tap trying to control 115 kV voltage. Disable tap change and have it control 1 pu solves this issue
2-Gallegos taps: Gallegos 230/115 tap trying to control 115 kV voltage. Disable tap change and have it control 1 pu solves this issue
3-Gallup SVD: Turn on Gallup SVD
4-Los Chavez caps: Los Chavez 46 kV capacitors on in the base case and should have been off
5-Yorkcany SVD: Turn off Yorkcany SVD
6-Springer taps: adjust Springer transformer taps

Table 17 —Voltage Deviation Violations, P1 (A vs B vs C)

28HS			Voltage Deviation			Scenario A = pre-CCN					Scenario B = post-CCN (345 kV)					Scenario C = CCN + 115kV					
NUMBER	NAME	KV	AREA	ZONE	CONT ID	28HS_CCN_A01	28HS_CCN_A02	28HS_CCN_A03	28HS_CCN_A04	28HS_CCN_A05	28HS_CCN_B01	28HS_CCN_B02	28HS_CCN_B03	28HS_CCN_B04	28HS_CCN_B05	28HS_CCN_C01	28HS_CCN_C02	28HS_CCN_C03	28HS_CCN_C04	28HS_CCN_C05	Comments
Pre-Project																					
10111	GALLEGOS	230	10	108	P1_Gallegos-Pillar	-0.087	-0.089	-0.092	-0.09	-0.084	-0.088	-0.089	-0.093	-0.09	-0.084	-0.088	-0.089	-0.093	-0.09	-0.084	2-Gallegos taps
10445	LOSTHRZN	115	10	101	P1_Petro-WMesa3	Not Rec	-0.098	-0.091	-0.07	Not Rec	Not Rec	-0.099	-0.094	-0.071	Not Rec	Not Rec	-0.099	-0.094	-0.071	Not Rec	
10568	PETROGLYPH	115	10	101	P1_Petro-WMesa3	Not Rec	-0.101	-0.094	-0.073	Not Rec	Not Rec	-0.102	-0.097	-0.073	Not Rec	Not Rec	-0.102	-0.097	-0.073	Not Rec	
12073	SOCORROP	115	10	123	P1_Belen-Socorro-SR	Not Rec	-0.073	-0.081	Not Rec	Not Rec	Not Rec	-0.076	-0.083	Not Rec	Not Rec	Not Rec	-0.076	-0.083	Not Rec	Not Rec	7-Socorro SVD
12073	SOCORROP	115	10	123	P1_Belen-Socorro_a	Not Rec	-0.073	-0.081	Not Rec	Not Rec	Not Rec	-0.076	-0.083	Not Rec	Not Rec	Not Rec	-0.076	-0.083	Not Rec	Not Rec	7-Socorro SVD

2-Gallegos taps: Gallegos 230/115 tap trying to control 115 kV voltage. Disable tap change and have it control 1 pu solves this issue
7-Socorro SVD: Engage Socorro SVD

Table 18 —Voltage Violations for P6 Outages (A vs B vs C)

28HS	P6 Contingency Results					Scenario A = pre-CCN					Scenario B = post-CCN (345 kV)					Scenario C = CCN + 115kV					
NUMBER	NAME	KV	AREA	P6 Ref	CONTINGENCY ID	28HS_CCN_A01	28HS_CCN_A02	28HS_CCN_A03	28HS_CCN_A04	28HS_CCN_A05	28HS_CCN_B01	28HS_CCN_B02	28HS_CCN_B03	28HS_CCN_B04	28HS_CCN_B05	28HS_CCN_C01	28HS_CCN_C02	28HS_CCN_C03	28HS_CCN_C04	28HS_CCN_C05	Comments
Voltage > 40 kV																					
10111	GALLEGOS	230	10	HM-Paj	P1_Gallegos-Pillar	Not Rec	Not Rec	Not Rec	0.9	0.882	Not Rec	Not Rec	Not Rec	0.9	0.882	Not Rec	Not Rec	Not Rec	0.9	0.882	2-Gallegos taps
10111	GALLEGOS	230	10	WS-HM	P1_Gallegos-Pillar	Not Rec	Not Rec	Not Rec	0.9	0.882	Not Rec	Not Rec	Not Rec	0.9	0.882	Not Rec	Not Rec	Not Rec	0.9	0.882	2-Gallegos taps
10291	SAN_JUAN	230	10	HM-Paj	P1_SanJuan-ShipRock	Not Rec	Not Rec	Not Rec	Not Rec	0.862	Not Rec	Not Rec	Not Rec	Not Rec	0.862	Not Rec	Not Rec	Not Rec	Not Rec	0.862	1-Hogback taps
10291	SAN_JUAN	230	10	WS-HM	P1_SanJuan-ShipRock	Not Rec	Not Rec	Not Rec	Not Rec	0.862	Not Rec	Not Rec	Not Rec	Not Rec	0.862	Not Rec	Not Rec	Not Rec	Not Rec	0.862	1-Hogback taps
12148	BISON	115	10	HM-Paj	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.113	Not Rec	Not Rec	Not Rec	Not Rec	1.114	Not Rec	Not Rec	Not Rec	Not Rec	1.114	5-Yorkcany SVD
12148	BISON	115	10	WS-HM	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.107	Not Rec	Not Rec	Not Rec	Not Rec	1.107	5-Yorkcany SVD
12159	CIMARRON	115	10	HM-Paj	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.113	Not Rec	Not Rec	Not Rec	Not Rec	1.114	Not Rec	Not Rec	Not Rec	Not Rec	1.114	5-Yorkcany SVD
12159	CIMARRON	115	10	WS-HM	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.108	Not Rec	Not Rec	Not Rec	Not Rec	1.107	Not Rec	Not Rec	Not Rec	Not Rec	1.107	5-Yorkcany SVD
12130	RAINVL_T	115	10	HM-Paj	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.106	Not Rec	Not Rec	Not Rec	Not Rec	1.107	Not Rec	Not Rec	Not Rec	Not Rec	1.107	5-Yorkcany SVD
12130	RAINVL_T	115	10	WS-HM	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.1	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	5-Yorkcany SVD
12129	RAINVL1	115	10	HM-Paj	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.106	Not Rec	Not Rec	Not Rec	Not Rec	1.107	Not Rec	Not Rec	Not Rec	Not Rec	1.107	5-Yorkcany SVD
12077	SPRINGER	115	10	HM-Paj	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.111	Not Rec	Not Rec	Not Rec	Not Rec	1.111	Not Rec	Not Rec	Not Rec	Not Rec	1.111	5-Yorkcany SVD
12077	SPRINGER	115	10	WS-HM	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.105	Not Rec	Not Rec	Not Rec	Not Rec	1.104	Not Rec	Not Rec	Not Rec	Not Rec	1.105	5-Yorkcany SVD
12157	VANBREMR	115	10	HM-Paj	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.127	Not Rec	Not Rec	Not Rec	Not Rec	1.128	Not Rec	Not Rec	Not Rec	Not Rec	1.128	5-Yorkcany SVD
12157	VANBREMR	115	10	WS-HM	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.121	Not Rec	Not Rec	Not Rec	Not Rec	1.121	Not Rec	Not Rec	Not Rec	Not Rec	1.121	5-Yorkcany SVD
12091	YORKCANY	115	10	HM-Paj	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.13	Not Rec	Not Rec	Not Rec	Not Rec	1.131	Not Rec	Not Rec	Not Rec	Not Rec	1.131	5-Yorkcany SVD
12091	YORKCANY	115	10	WS-HM	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.125	Not Rec	Not Rec	Not Rec	Not Rec	1.124	Not Rec	Not Rec	Not Rec	Not Rec	1.124	5-Yorkcany SVD
12090	YORKCANY	69	10	HM-Paj	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.121	Not Rec	Not Rec	Not Rec	Not Rec	1.122	Not Rec	Not Rec	Not Rec	Not Rec	1.122	5-Yorkcany SVD
12090	YORKCANY	69	10	WS-HM	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.115	Not Rec	Not Rec	Not Rec	Not Rec	1.115	Not Rec	Not Rec	Not Rec	Not Rec	1.115	5-Yorkcany SVD
12076	SPRINGER	69	10	HM-Paj	P1_Gladsto-Valent	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	5-Yorkcany SVD, 6-Springer taps
12076	SPRINGER	69	10	HM-Paj	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.141	Not Rec	Not Rec	Not Rec	Not Rec	1.142	Not Rec	Not Rec	Not Rec	Not Rec	1.142	5-Yorkcany SVD, 6-Springer taps
12076	SPRINGER	69	10	WS-HM	P1_Springer-Gladsto	Not Rec	Not Rec	Not Rec	Not Rec	1.135	Not Rec	Not Rec	Not Rec	Not Rec	1.135	Not Rec	Not Rec	Not Rec	Not Rec	1.135	5-Yorkcany SVD, 6-Springer taps
12076	SPRINGER	69	10	HM-Paj	P1_Valent-Walsenburg	Not Rec	Not Rec	Not Rec	Not Rec	1.104	Not Rec	Not Rec	Not Rec	Not Rec	1.104	Not Rec	Not Rec	Not Rec	Not Rec	1.104	5-Yorkcany SVD, 6-Springer taps
12076	SPRINGER	69	10	WS-HM	P1_Valent-Walsenburg	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.101	5-Yorkcany SVD, 6-Springer taps
10177	LOS_CHAV	46	10	HM-Paj	P1_Tome115/46	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.111	Not Rec	Not Rec	Not Rec	Not Rec	1.11	Not Rec	4-Los Chavez caps
10177	LOS_CHAV	46	10	WS-HM	P1_Tome115/46	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	Not Rec	1.106	Not Rec	Not Rec	Not Rec	Not Rec	1.106	Not Rec	4-Los Chavez caps
10342	TOME	46	10	HM-Paj	P1_Tome115/46	Not Rec	Not Rec	Not Rec	1.101	Not Rec	Not Rec	Not Rec	Not Rec	1.111	Not Rec	Not Rec	Not Rec	Not Rec	1.11	Not Rec	4-Los Chavez caps
10342	TOME	46	10	WS-HM	P1_Tome115/46	Not Rec	Not Rec	Not Rec	1.1	Not Rec	Not Rec	Not Rec	Not Rec	1.106	Not Rec	Not Rec	Not Rec	Not Rec	1.106	Not Rec	4-Los Chavez caps

1-Hogback taps: 230/115 tap trying to control 115 kV voltage. Disable tap change and have it control 1 pu solves this issue
4-Los Chavez caps: Los Chavez 46 kV capacitors on in the base case and should have been off
5-Yorkcany SVD: Turn off Yorkcany SVD
6-Springer taps: adjust Springer transformer taps

Short-Circuit Analysis Results

A short circuit screening analysis was conducted to assess whether the Project would increase the short circuit current to a level necessitating breaker replacement. This analysis was performed using ASPEN OneLiner. Breakers are flagged for replacement if they exceed 95% of their minimum interrupting capability and flagged for informational purposes if they exceed 90%. Table 19 shows the short circuit results for key breaker stations. Based on these results there was no breaker issues.

Table 19 — Short Circuit Results

Station	kV	SLG (A)	3LG (A)	Breaker Rating	Breaker %
Rio Puerco	345	17659	16884	50000	35.3%
Pajarito	345	14973	15396	50000	30.8%
Prosperity	345	11093	12588	50000	25.2%
Prosperity	115	25603	24506	63000	40.6%
Sandia	115	25671	23446	63000	40.7%

Transient Stability Analysis Results

The analysis simulated ten (10) contingencies for baseline (pre) and updated (post) cases as shown in Table 20.

Table 20 — List of Transient Stability Contingencies

#	EVENT DESCRIPTION	EVENT CATEGORY	PRE - A	POST-B	POST-C
0	Flat Run	P0	X	X	X
1	Amrad 345/115 kV Transformer	P1	X	X	X
2	Diamond Tail – Clines Corners 345 kV Line	P1	X	X	X
3	Four Corners – Pintado 345 kV Line[2]	P1	X	X	X
4	Luna – Afton 345 kV Line	P1	X	X	X
5	PEGS PV	P1	X	X	X
6	San Juan – Cabezon 345 kV Line[2]	P1	X	X	X
7	San Juan - Jicarilla 345 kV Line[2,3]	P1	X	X	X
8	Valent – Gladstone 345 kV Line[1]	P1	X	X	X
9	Pajarito – West Mesa 345 kV Line	P1	X	X	X
10	West Mesa – Arroyo 345 kV Line	P1	X	X	X

1-Valent-Gladstone originally showed localized voltage violations. Resolved by netting the HESSBDW models.
2-Updated JEC dynamic plant control models: invocation buses
3- Updated 5 "WINDYPVCOLL " 34.50 plant control model: controlled generator bus numbers to match case and Kw and Kz.

The industry has recognized that the Tstall parameter in the composite load model can lead to extreme delayed voltage recovery that will not meet the current system performance criteria. Discussions are ongoing to address this issue. PNM believes delayed voltage recovery caused by motor stalling is unreasonable and has disabled the Tstall portion of the composite load model. As a result, the .DYD file has been modified to effectively disable this parameter by setting Tstall=9999 for every model.

The system showed acceptable system performance for all studied contingencies with the modified Tstall parameter. Transient stability plots for all simulations are provided in Appendix C.

Additional transient stability notes:

The following generators either tripped or were flagged for violations (reported with violations but not tripped) for either voltage or frequency relays in at least one contingency. The applicable relay models should be reviewed.

Table 21 —Transient Stability LHFRT and LHVRT impacts

LHFRT: Generator Bus	Comments	LHVRT: Generator Bus	Comments
10856 RC2 0.69	frequency violation	10743 TAG_BESS1 0.48	unit tripped
10859 DM 2.3 0.69	frequency violation	10744 TAG_BESS2 0.48	unit tripped
10860 TC1 2.3 0.69	frequency violation	10750 TAG_BESS4 0.48	unit tripped
10861 RC1 0.69	frequency violation	10751 TAG_BESS3 0.48	unit tripped
10884 TC1 0.69	frequency violation	10972 EL_CABO_1 0.69	unit tripped
10873 LAJOY_GE1_WG 0.69	unit tripped	10975 EL_CABO_2 0.69	unit tripped
10874 LAJOY_SE1_WG 0.69	unit tripped	10976 SANDIA_BESS 0.60	unit tripped
10878 LAJOY_GE2_WG 0.69	unit tripped	12154 CIM_GEN 0.30	unit tripped
10879 LAJOY_SE2_WG 0.69	unit tripped		
10889 CC2 0.69	frequency violation		
10892 CC2 2.3 0.69	frequency violation		
10894 CC1 2.3 0.69	frequency violation		
10895 CC1 0.69	frequency violation		
10898 TC2 2.3 0.69	frequency violation		
10909 REDMESA4 0.69	unit tripped		
10920 DM 0.69	frequency violation		
10967 TC2 0.69	frequency violation		
10972 EL_CABO_1 0.69	unit tripped		
10975 EL_CABO_2 0.69	unit tripped		
160935 OSO_G12 0.69	unit tripped		
160936 OSO_G21 0.69	unit tripped		

Conclusions/Recommendations

The Project represents a critical infrastructure investment to support the Albuquerque metropolitan area and surrounding communities. The project significantly enhances system reliability, resiliency, and load-serving capability while enabling the integration of renewable energy resources and facilitating the transition away from fossil-fueled generation.

Key Benefits:

- **Mitigation of Thermal Overloads**

Resolves pre-existing thermal constraints—particularly under N-2 contingency conditions—through enhancements to both the 345 kV transmission backbone and supporting 115 kV infrastructure.

- **Support for Emissions-Free Generation**
  Reduces dependence on dispatchable gas resources and prepares the grid for future retirements, aligning with PNM's clean energy goals.

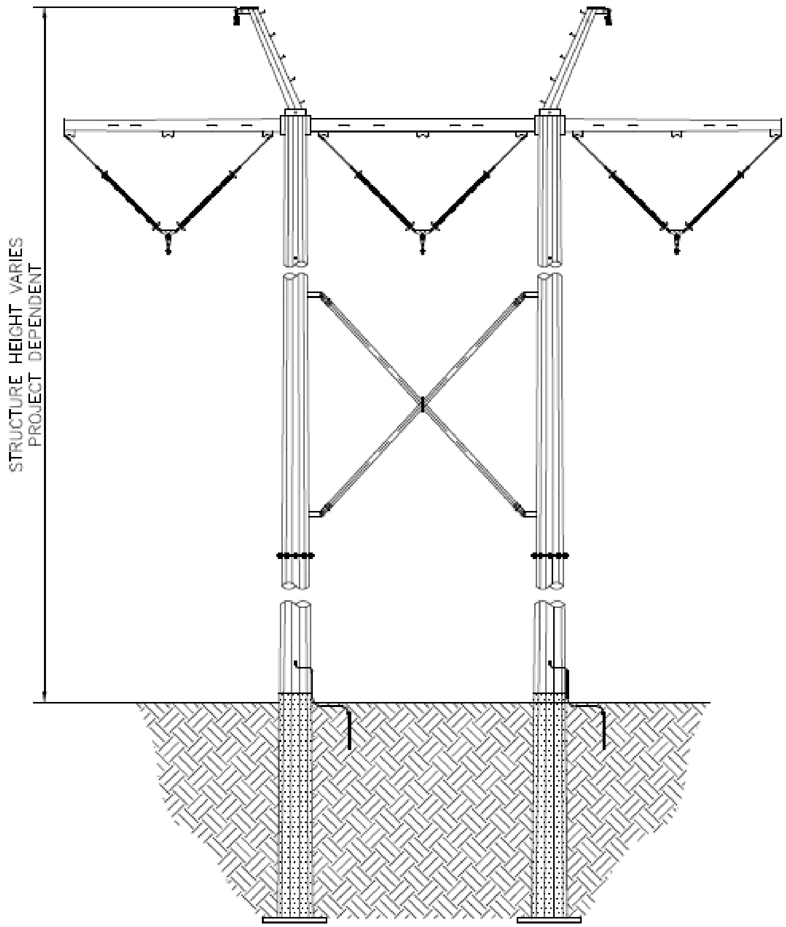
- **Expanded Load-Serving Capacity**
  Adds approximately 900 MW of new capacity, depending on generation dispatch and load location, to accommodate regional growth and electrification.

- **Phased Development for Long-Term Impact**
  The staged implementation including the initial 345 kV facilities and the subsequent Prosperity–Sandia 115 kV extension ensures both immediate and sustained system performance improvements. The Prosperity 345 kV station is positioned as a strategic hub for future load and generation interconnections.

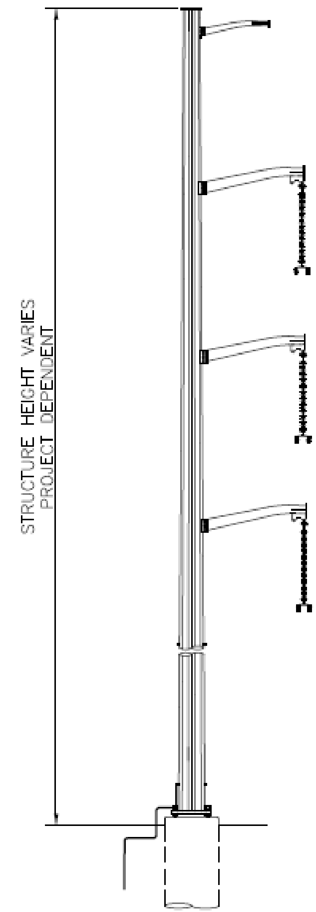
Tangent 345 kV Transmission Structure

PNM Exhibit EH-5

Is contained in the following 1 page.



SAMPLE 345kV H-FRAME TANGENT



SAMPLE 345kV VERTICAL MONOPOLE TANGENT

PNM REVISIONS

NO.	DATE	DESCRIPTION	BY	CHK'D	CKD	APP'D

PNM — PUBLIC SERVICE COMPANY OF NEW MEXICO

GENERAL EXHIBIT
SAMPLE 345kV TANGENT STRUCTURES

DR:	DATE:	345kV SAMPLES
ACAD: SAMPLE STRUCTURES	APP:	

LAST SAVED BY: JSEYMOU

PLOT DATE: 10/9/2023 12:02:58 PM

PNM 20-Year Transmission Planning Outlook

PNM Exhibit EH-6

Is contained in the following 21 pages.

20-Year Transmission Planning Outlook

PNM INTEGRATED PLANNING

PNM®

NOVEMBER 12, 2024

OVERVIEW & PURPOSE

PNM presents its first ever 20-year transmission outlook offering a strategic overview of the transmission infrastructure to reliably achieve PNM's goal of 100% carbon-free energy by 2040. **This outlook marks the initial step in identifying potential transmission concepts for the next two decades based on decarbonizing aligned with PNM's 2023 Integrated Resource Plan.**

The purpose of this outlook is to initiate a conversation with a broad group of stakeholders, PNM recognizes collaboration is essential to achieve significant transmission expansion in New Mexico. PNM has not committed to building any of the projects or infrastructure identified herein. Additional studies and/or detailed evaluations are required to prioritize transmission expansion investment.

Disclaimer: The information contained in this outlook is based on the information known to PNM at the time it was created. PNM makes no representation or warranty of any kind as to the completeness, accuracy, reliability, suitability or availability as to the information contained herein. It is intended for illustrative or discussion purposes only and should not be relied upon or construed as a proposal, counterproposal, offer, contract, commitment, or any other form of legally binding document.

NOVEMBER STAKEHOLDER MEETING

AGENDA

- Standards of Conduct
- Study Objectives
- Methodology
- Modeling Assumptions
- Benefits of Transmission
- Study Results
- Cost and Schedule Estimates
- Next Steps
- Stakeholder Engagement

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OBJECTIVE

The 20-year transmission outlook serves as a foundational stage for future planning activities. It aims to:

Investigate Transmission for IRP Resources*:

- Support IRP-identified resources such as wind energy, long-duration storage, and hydrogen generation.
- Address potential service needs based on PNM's updated load forecast.

Alleviate Local Area Constraints:

- Develop transmission solutions to mitigate constraints resulting from gas power plant retirements.

Expand Beyond Traditional Planning:

- Provide information typically outside the scope of traditional utility transmission planning processes.
- Extend considerations beyond the Integrated Resource Plan (IRP) for retail and the 10-Year Transmission Planning Study for PNM's Balancing Authority Area.
- Generate potential market interest in joint transmission development outside of the utility's Large Generator Interconnection Queue.

Future Regional Planning:

- Develop concepts for evaluation future regional planning processes, extending beyond those identified in the IRP.

**Current Trends and Policies and High Economic Growth per 2023 IRP Material Event update*

METHODOLOGY

Three Point-in-Time Study Years
- 2028 (near-term)
- 2033 (mid-term)
- 2040 (long-term)

Two Load Scenarios
- Current Trends and Policies
- High Economic Growth

Two Generation Scenarios
- Net Peak
- Maximum Renewable

The analysis was conducted using the following methodology:

- **Methodology**: Conducted studies using single contingency power flow (N-1) analysis
    - Study did not identify additional solutions for underlying system overloads, etc.
- Utilized the 2040 High Economic (HE) Net Peak and Maximum Renewable scenarios as the initial benchmarks, representing potential system conditions at the end of the 20-year planning horizon
- Each Project was assessed based on its effectiveness in reducing or eliminating thermal loading concerns

Notes: *Prior to pursuing any investment, remaining planning analyses beyond this study including N-1-1, transient stability, short circuit analyses should be completed (and potentially electromagnetic transient or "EMT"). Additionally, PNM utilizes significant Grid Enhancing Technology (GETS) today and have extracted most latent capacity from system - Additional role for advanced conductor is possible but was outside the scope of this study*

STUDY ASSUMPTIONS

See April 2024 20-Year Plan Stakeholder presentation for additional details on study assumptions: *https://www.pnm.com/planning-for-the-future*

Initial Study Assumptions were adjusted to:

- Incorporate PNM's updated load forecast including expected economic development potential (May 2024)
- Simulate stressed generation scenarios on PNM's system
- Modified candidate project list –
    - Deferred to future study: Sun Zia Interconnection due to modeling complexity required, and Southline, Vista Trails, Second Greenlee-Hidalgo-Luna 345 kV Line, and the Third Springerville-Greenlee 345 kV Line due to time constraints

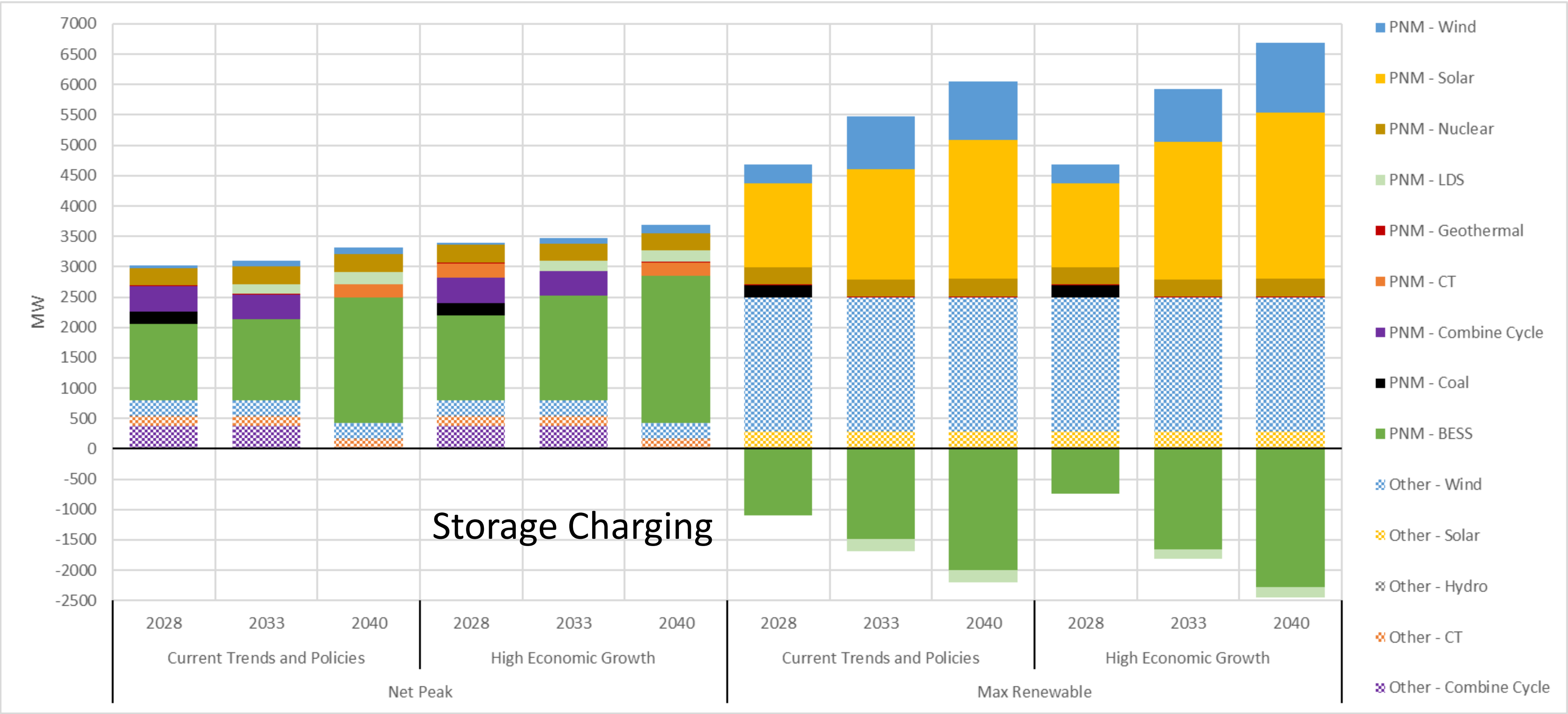
STUDY ASSUMPTIONS - BALANCING AREA LOAD

Load Scenario	2024 Historical	2028		2033		2040	
		CTP	Growth	CTP	Growth	CTP	Growth
Peak	2,758	3,161	403	3,285	527	3,585	827
Net Peak	2,620	3,003	383	3,121	501	3,406	786
Max Renewable	1,103	1,300	197	1,347	244	1,467	364

Future iterations of this study will seek to expand beyond these scenarios (e.g., gross peak case)

CTP = Current Tends and Policies
HEG = CTP + 370 MW by 2040

STUDY ASSUMPTIONS - BALANCING AREA GENERATION



PNM System 20 Year Transmission Outlook

PNM 20 Year Plan

Station

- Expanded Station
- New Station

Transmission

- Merchant
- New Line
- Rebuild
- PNM Planning Zones 3
- PNM Planning Zones

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CONCEPTUAL TRANSMISSION PROJECTS

Load Serving: Helps i*ntegrate new load: Ensuring the infrastructure can handle additional demand*
Loadside Gas Retirement(s): Transitioning smoothly from loadside gas to alternative energy sources
Market Access: *Enhance Market Opportunities: Expand opportunities for buying/selling in regional market(s)*
Resilience: Increase supply resilience in extreme events

- *Rio Puerco to* Pajarito *345 kV Line*
- Pajarito to Prosperity 345 kV Line
- Ojo to Norton 345 kV Line
- Four Corners-Rio Puerco 345 kV Line #2
- Western Spirit-Hidden Mountain-Pajarito 345 kV Line
- Rio Sol Interconnection Transmission Project
- Sun Zia Merchant Transmission Project
- West Mesa-Ambrosia 230 kV Conversion to 345 kV
- Ambrosia-Coronado (AZ) 345 kV Line
- Union County-Springer 345 kV Line
- Union County-Comanche (CO) 345 kV Line
- Union County-Taiban Mesa 345 kV Line
- Taiban Mesa-Western Spirit 345 kV Line
- Chaves County-Western Spirit 345 kV Line

Deferred: Southline Merchant Transmission, Vista Trails Merchant Transmission, Second Greenlee-Hidalgo-Luna 345 kV Line, Third Springerville-Greenlee 345 kV Line

RESULTS

Net Peak

Meeting Future Loads:

- Enabled PNM to deliver IRP resources effectively to meet projected future loads, including the High Economic Growth scenario.

Identified Overloads:

- During certain contingencies, overloads were identified on the underlying 115 kV system in Albuquerque. Improvements will need to be identified to address these overloads.

Max Renewable

Increased Export Capacity:

- Conceptual transmission projects allowed for the export of resources totaling twice the PNM Balancing Authority (BA) load.

Current Export Capacity:

- Currently, the system’s export capacity is fully committed with existing resources.

2040 IRP CONCEPTUAL TRANSMISSION PORTFOLIO

Conceptual Project	Additional Load serving*	Additional Market Access*	Enables IRP LDES-Compressed Air Storage and/or Geothermal	Enables IRP Wind Delivery	Enables Loadside Gas Generation Retirement	Addresses Underlying System Issues	Conceptual IRP Role***
Rio Puerco-Pajarito 345 kV Line	300-600 MW	0 MW	No	No	Yes	Yes	Serve additional IRP load forecasted demand including High Economic Growth
Pajarito-Prosperity 345 kV Line	300-600 MW	0 MW	No	No	Yes	Yes	Serve additional IRP load forecasted demand including High Economic Growth
Rio Sol Interconnection to PNM	300-600 MW	0 MW**	No**	Yes	No	No	Potential Wind Access and Load Serving Capability
SunZia Interconnection to PNM	0 MW	Yes	No**	No**	No	No	Potential Wind and Market Access
Western Spirit-Hidden Mountain-Pajarito 345 kV Line #2	300-600 MW	0 MW**	No	Yes	Yes	No	Potential Wind and Load Serving Capability
Chaves County-Western Spirit 345 kV Line	0 MW	600-1000 MW	Yes	Yes	No	No	Potential CAES/Geothermal or Other Storage Access
Four Corners-Rio Puerco 345 kV Line #2 (could substitute w Ojo-Norton)	600-1000 MW	600-1000 MW	No	No	Yes	No	Potential Hydrogen or Storage Access and Market Access

Legend: Complimentary additions

**Further study needed to validate maximum values beyond IRP forecasts*
***When paired with certain other transmission solutions could create additional benefits*
**** Enable additional carbon free energy*

ADDITIONAL RESULTS

Other Conceptual Project Results	Additional Load serving	Additional Market Access	Enables IRP LDES-Compressed Air Storage and/or Geothermal	Enables IRP Wind Delivery	Enables Loadside Gas Generation Retirement	Addresses Underlying System Issues
West Mesa-Ambrosia 230 kV Line Conversion to 345 kV	300-600 MW	0 MW**	No	No	No	No
Ambrosia-Coronado (AZ) 345 kV Line	300-600 MW	600-1000 MW	No	No	No	No
Taiban Mesa-Western Spirit 345 kV Line (could pair well with HVDC expansion and WST Line #2)	0 MW**	0 MW**	No**	Yes**	No	No
Taiban Mesa-Union County-Comanche (CO) 345 kV Line	600-1000 MW	Yes*	No**	Yes**	No	No
Ojo-Norton 345 kV Line	300-600 MW	200-500 MW	No	No	Yes	No
Union County-Springer 345 kV Line	0 MW**	200-500 MW	No	Yes**	No	No

Legend: Complimentary additions

**Further study needed to validate maximum values beyond IRP forecasts*
***When paired with certain other transmission solutions could create additional benefits*

BENEFITS OF NEW TRANSMISSION

Supports Additional Load Growth:

- Facilitates service to new load growth, including economic development opportunities.

Increases Market Access:

- Enhances access to regional markets, promoting efficient use of clean energy resources across a wide geographic area and improving resilience during extreme weather events.

Access to Renewable Resources:

- Provides increased access to New Mexico's abundant wind, solar, and other renewable energy resources.

Improves System Reliability and Resilience:

- Strengthens the system's ability to withstand planned or unplanned outages and extreme weather conditions.

BENEFITS AND ENHANCEMENTS OF NEW TRANSMISSION

Enables Fossil Generation Retirement:

- Supports the future retirement of existing fossil fuel generation, particularly in load-concentrated areas.
- Enables loadside gas retirements while maintaining system performance criteria under certain conditions.

Facilitates Advanced Conductor Rebuilds:

- Enables future deployment of advanced conductor rebuilds in ABQ metro area load center by sufficiently offloading existing lines, allowing for necessary outages during construction. Similar potential also exists elsewhere on system.

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RESULTS - PRELIMINARY COST AND SCHEDULE ESTIMATES

High level estimate provided to show the magnitude of the cost and time required to implement needed transmission.

Based on standard assumption and does not factor in project specific details like ROW procurement, permitting, and outages for construction.

Estimates are provided for evaluated projects excluding merchant transmission projects

Does not account for rapidly change long lead item procurement time frames.

RESULTS - PRELIMINARY COST AND SCHEDULE ESTIMATES

Conceptual Transmission Project	Total ($M) in '24$	Estimated Schedule (Years)
Rio Puerco-Pajarito 345 kV Line	120-132	4-5
Pajarito-Prosperity 345 kV Line	65-72	3.5-4.5
Rio Sol Interconnection to PNM	170-185	4-6
Western Spirit-Hidden Mountain-Pajarito 345 kV Line	445-480	5-7.5
SunZia Interconnection to PNM	47-55*	4-6
Chaves County-Western Spirit 345 kV Line	510-540	7-10
Four Corners-Rio Puerco 345 kV Line #2	375-410	8-10
Ojo-Norton 345 kV Line	150-218	5-7.5
West Mesa-Ambrosia 230 kV Line Conversion to 345 kV	310-340	7-8.5
Ambrosia-Coronado (AZ) 345 kV Line	430-460	7-9
Taiban Mesa-Western Spirit 345 kV Line	325-350	6-8.5
Union County-Taiban Mesa 345 kV Line	400-430	6-10
Union County-Comanche (CO) 345 kV Line	415-460	8-10
Union County-Springer 345 kV Line	160-180	6-8.5

**Unknown required equipment/materials*

Please note these are high-level estimates in 2024$ based on indicative line routes. Detailed costs and schedules unknown until specific routes selected, permitting, ROW and easement, and engineering, procurement and construction bids obtained and contracted. These are subject to change based on permitting, easement, equipment, material, etc. cost escalations. As noted on previous slides some of these projects are compliments of each other.

CONCEPTUAL PNM DECARBONIZATION ROAD MAP

2024-27
Resource Additions: 1,100 MW carbon-free, 1,100 MW of dynamic balancing, and 40 MW of firm

Add Transmission to meet load growth and enable loadside gas retirement

2028-32
Resource Additions: 1,000 MW carbon-free, 300 MW dynamic balancing, and 400 MW firm

Add Transmission to access NM wind resources to deliver to load and expand potential market access

2030
Reeves Gas End Useful Life

2031
Four Corners Retirement

Add Transmission to access southern NM renewables and long duration storage to deliver to load

2033-42
Resource Additions: 2,100 MW carbon-free, 600 MW dynamic balancing, and 500 MW firm

2035
Red Mesa Wind PPA Expiration

Add Transmission to Arizona and/or Colorado and/or SPP to access markets, additional renewables/storage and hydrogen resources

2040
Retirements: Afton Combine Cycle, Luna Energy Facility, Lordsburg, La Luz, and Rio Bravo, and expiration of Valencia PPA

All resources must be procured through a competitive RFP resource solicitation

NEXT STEPS

Publish Final Report – Q1 2025 - https://www.pnm.com/planning-for-the-future

Future Study Work

- **Continuous Improvement:** Continue to refine 20-year Planning Approaches for future studies and perform evaluations on a periodicity to support the IRP including, nodal modeling
- **Incorporate insights from related studies**: Evaluate the project in the context of findings from other relevant studies
- **Examine alternative scenarios**: Analyze additional scenarios to test projects against a wider range of probable system conditions
- **Expand analysis**: Quantify the maximum possible increased load-serving and export capacity resulting from the projects beyond IRP portfolio levels under all scenarios
- **Evaluate Project Combinations:** Assess combinations of projects to identify additional potential benefits

Options for Developers

- PNM welcomes developers to utilize the non-tariff wires-wires or FERC Large Generator Interconnection Processes to evaluate the project

STAKEHOLDER FEEDBACK AND QUESTIONS

Send feedback and questions to pnm20yeartransmissionstudy@pnmresources.com

Feedback will help guide future study work and refine approaches

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Detailed Cost Estimate for the Project

PNM Exhibit EH-7

Is contained in the following 2 pages.

345 KV LINE FROM Rio Puerco to Pajarito	
PROJECT COST BREAKDOWN	
New 345 kV Line: 795 ACSR conductor, 2-wire bundle, 2 x OPGW/shield wire 7/8" x 144 fibers, Steel Pole structure.	
Item	**Loaded Cost**
Exploratory Costs	$ 3,048,908.22
Transmission Lines	
T-line PNM Internal Support	$ 1,630,730.34
T-line ROW Acquisition	$ 26,514,243.95
T-Line Environmental Remediation	$ 266,907.55
T-line Material	$ 42,695,567.05
T-line Outside Services	$ 30,592,406.59
T-line OPGW	$ 980,006.21
T-line Access Development	$ 2,167,188.23
T-Line Construction Management	$ 1,463,405.29
Station Expansions	
Station PNM Internal Support	$ 1,358,876.34
Station ROW Acquisition	$ 669,899.90
Station Environmental Remediation	$ 7,336.81
Station Material - PAJA	$ 5,508,803.31
Station Outside Svs - PAJA	$ 4,708,704.30
Station Material - RIPU	$ 4,270,960.14
Station Outside Svs - RIPU	$ 9,947,980.59
Berm Relocation - RIPU	$ 3,135,868.48
Station Construction Management	$ 1,358,876.34
AFUDC	$ 15,383,490.00
TOTAL PROJECT COST	**$ 155,711,000**

345 KV LINE FROM Rio Puerco to Pajarito	
PROJECT COST BREAKDOWN	
New 345 kV Line: 795 ACSR conductor, 2-wire bundle, 2 x OPGW/shield wire 7/8" x 144 fibers, Steel Pole structure. New Prosperity 345kV Station.	
Item	**Laoded Cost**
Exploratory Costs	$ 1,524,554.42
Transmission Lines	
T-line PNM Support	$ 1,630,837.64
T-line ROW	$ 910,760.10
T-Line ENV Total	$ 66,193.77
T-line Material	$ 7,158,717.13
T-line Outside Services	$ 5,945,983.08
T-line Access Development	$ 431,838.95
T-Line CM	$ 235,216.97
Station Expansions	
Station PNM Support	$ 1,359,031.37
Station ROW	$ -
Station ENV Total	$ 7,337.65
Station Material - PAJA	$ 2,930,622.16
Station Outside Svs - PAJA	$ 1,946,672.82
Station Material - PROS	$ 39,394,091.96
Station Outside Svs - PROS	$ 12,530,824.46
Grading & Drainage	$ 7,188,195.03
Station CM	$ 679,515.68
AFUDC	$ 7,487,257.00
TOTAL PROJECT COST	**$ 91,428,000**

Reeves and Valencia Generation Retirement Report

PNM Exhibit EH-8

Is contained in the following 38 pages.

Reeves and Valencia Generation Retirement Analysis

System Impact Study

December 2024

Main Analysis Prepared by:
Utility System Efficiencies, Inc. (USE)

Under Contract with:
Public Service Company of New Mexico

Foreword

This technical report was prepared for Public Service Company of New Mexico (PNM). This study was performed by Utility System Efficiencies, Inc. (USE) pursuant to a consulting contract with PNM.

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Public Service Company of New Mexico
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Albuquerque, NM 87107

Table of Contents

List of Figures

List of Tables

Executive Summary

New Mexico is undergoing a significant transformation, shifting towards renewable energy sources and the retirement of fossil generation resources. This transition presents both challenges and opportunities, particularly in the realm of transmission infrastructure. This report explores the prudence of Public Service Company of New Mexico ("PNM") continuing operation of the Reeves Generating Station (Reeves) ,152 MW, and the Valencia Energy Facility (VEF) ,158 MW, plants for loadside generation service in New Mexico.

Reeves is located in northeast Albuquerque and consists of three steam turbine units that operate on natural gas. The first two small turbines became operational in 1958 followed by the large turbine in 1962. Reeves end of depreciable life is targeted for year 2030. PNM is evaluating the cost of extending the operation of Reeves beyond that date. In addition to providing resources to serve PNM load, the plant plays a role in maintaining the reliability of the transmission system within limits under high load and transmission outage conditions.

VEF is located south of Belen, New Mexico and is connected by the PNM transmission system to the Albuquerque area load pocket. VEF began commercial operations in 2008. It consists of a heavy-frame GE 7FA gas turbine. PNM has a 20-year power purchase agreement (PPA) with Southwest Generation, LLC that expires in 2028. Like Reeves, the facility also plays a role in managing PNM transmission system loading under high load and transmission outage conditions.

PNM provides firm transmission service on its northern New Mexico (NNM) path either through pre-FERC Order 888 firm transmission contracts or through PNM's Open Access Transmission Tariff. The NNM path is also recognized in Western Electricity Coordination Council (WECC) as Path 48. The combination of PNM's native load requirements and PNM's firm transmission service commitments (network customers and firm point-to-point transmission service) result in PNM requiring the commitment of load-side generating resources to serve load when NNM transmission capability is insufficient to serve the entire load from remotely located resources.

Both VEF and Reeves along with Rio Bravo (155 MW) and La Luz (40 MW) generation resources are dispatched at times to reduce the dependance on the NNM transmission when the transmission system reaches its limits as a result of serving load in the northern New Mexico load centers. The facilities are also dispatched for more local constraints associated with 115kV transmission outages and 345/115kV transformer outages in and around the Albuquerque metro load center. It was assumed for this study that the Rio Bravo generation was off-line to maintain non-spinning reserves.

Operating the transmission system with a negative operating margin subjects the system to violation of WECC and North American Electric Reliability Corporation (NERC) operating and planning criteria and potential risk of loss of load for outage conditions.

The three most critical issues that PNM faces today, related to its transmission system are the following:

- Operating and maintaining an aging transmission system
- Generation versus transmission buildout
- Approaching system capacity constraints

PNM has not constructed any backbone 345kV transmission lines in the Albuquerque metro area between 1984 and 2021. Over the past 40 years, most transmission reinforcements have involved building underlying 115kV lines or implementing low-cost, small-capacity upgrades to exploit latent capacity in the existing system. In both 2010 and 2016 the Rio Puerco station was expanded to include looping in of existing 345 kV lines and/or adding 345/115kV transformers to support the underlying 115 kV system, but no new metro transmission lines were built. In December of 2021 the Western Spirit-Pajarito 345 kV line was energized, which connected Eastern New Mexico to just south of the Albuquerque metro area, though no intra-metro transmission was built. In the third quarter of 2025, the Western Spirit-Pajarito 345kV line will be looped into a new 345/115kV station referred to as “Hidden Mountain” resulting in new capacity supporting the 115 kV transmission system in the Albuquerque metropolitan area. The improvements provide increased reliability and resilience for existing, new, and future load growth in the southern Albuquerque metro area and accommodate future renewable generation sources.

This study considers the upgrades associated with the Hidden Mountain station and evaluates the transmission needs to retire the VEF and Reeves generation resources, both individually and collectively, based on retirement dates of 2028 and 2030, respectively. The analysis examines the impacts on the transmission system and addresses the technical issues related to the retirement of these generation resources, as well as the potential need for transmission system reinforcements.

The study utilized the latest load forecast provided by PNM’s load forecasting department in the second quarter of 2024, reflecting the study’s target year of 2028. Additionally, PNM has received a steady number of inquiries from existing and potential new customers exploring opportunities related to economic development. The following large loads were represented in the study.

- Load at Rio Rancho set to 102 MW.
- Addition of load at Mesa Del Sol load of 60 MW interconnected to the Person-Prosperity 115kV line.
- Increased load at Los Lunas load from 280 MW to 400 MW. System reinforcements included looping the nearby Western Spirit-Pajarito 345kV line into a new 345/115kV station referred to as Hidden Mountain and building two high-capacity 115kV lines approximately 2.5 miles in length to integrate the new Hidden Mountain station into the existing metropolitan area 115 kV transmission system.

This study evaluated the following five (5) load and resource dispatch scenarios in NNM as shown in Table 1 below. The detailed generation resource dispatch for each scenario is shown in Appendix B.

Table 1 – Load and resource dispatch scenarios

Scenario	Load	Solar output %	Battery output %	Wind output %	Comments
1	100% summer peak	55	0	10	Represents demand for energy is high with solar ramping down late afternoon (4-5 pm) and conventional power plants ramp up production to match the energy demands. Batteries are being charged by solar to be used during periods of low solar output.
2	95% of summer peak loading (Net Peak)	0	75	10	Represents “net peak” period which typically occurs during the evening hours during or after sunset with no solar output and batteries being discharged.
3	95% of summer peak loading (Net Peak)	0	75	80	Same as above assuming high wind output levels.
4	75% of summer peak loading	0	0	10	Represents hours when the batteries are depleted, and the load is still high (11pm).
5	Winter morning peak	0	0	10	Represents early morning hours with no solar production.

Steady-State Performance, Thermal

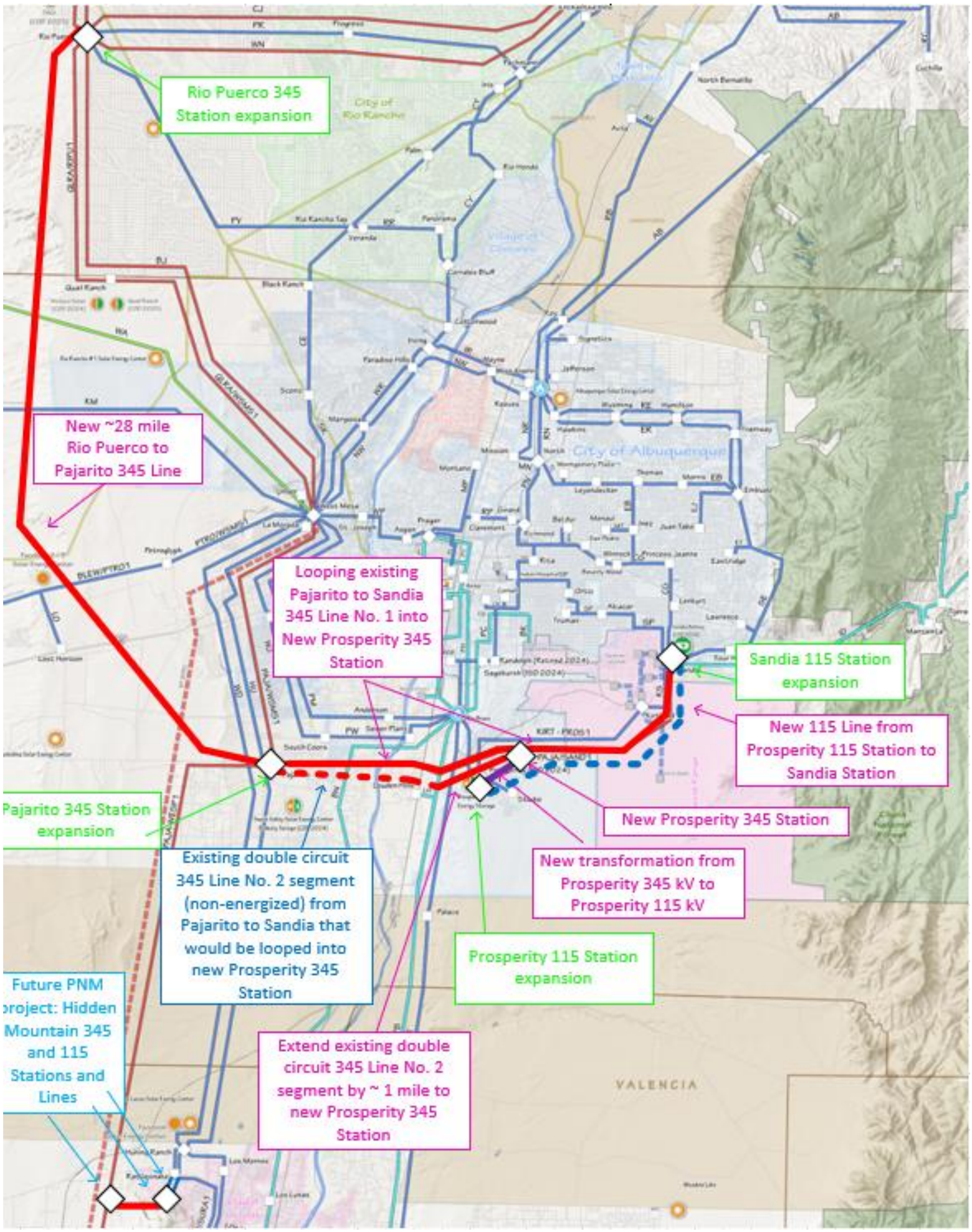
Extensive contingency analysis was performed including single element, stuck breaker, and common structure. Multiple overlapping contingencies (N-1-1) were also studied.

The steady state thermal results identified overloaded elements triggered by retirement of either Reeves, VEF, or both. The study evaluated two options for system reinforcements: Option 1 which focuses on 345kV and 115 kV system reinforcements, while Option 2 focuses on reconductoring or rebuilding 115 kV lines.

Option 1: 345kV and 115 kV system reinforcements as shown in Figure 1.

1. Construct a new 345kV six (6) breaker-and-a-half switching station to be named Prosperity 345kV switching station and the installation of a 345/115kV transformer.
2. Construct a new 115kV five (5) breaker ring bus expandable to a breaker-and-a-half configuration switching station to be named Prosperity 115kV switching station.
3. Construct a new Rio Puerco – Pajarito 345kV line (approximately 28 miles).
4. Expand the Rio Puerco and Pajarito 345kV switching stations.
5. Loop in the Pajarito–Sandia 345kV line No.1 into Prosperity 345 kV switching station.
6. Loop in the Pajarito–Sandia No.2 345kV line into Pajarito and Prosperity 345 kV switching station that is currently part of the double circuit line between the Pajarito–Sandia 345 kV that is not energized.
7. Loop in the Prosperity-Studio and Prosperity-KAFB 115kV lines into Prosperity 115kV switching station.
8. Construct a new high-capacity Prosperity–Sandia 115kV line and looping it into the Sandia bus #2 115kV station. (This line eliminates overloads associated with Sandia 115/345 kV transformer and/or Sandia bustie outages).

Figure 1 - Option 1 System Reinforcements



Option 2 Reconductoring of three 115kV lines using advanced conductors and rebuilding two 115 kV lines using high capacity ACSR conductor. Shown in Figure 2 below.

Rebuild:

1. West Mesa-Person (WV line) 15 miles – increase MVA capacity from 156 to 350.
2. West Mesa-Person (WJ line) 12.8 miles – increase MVA capacity from 154 to 350.

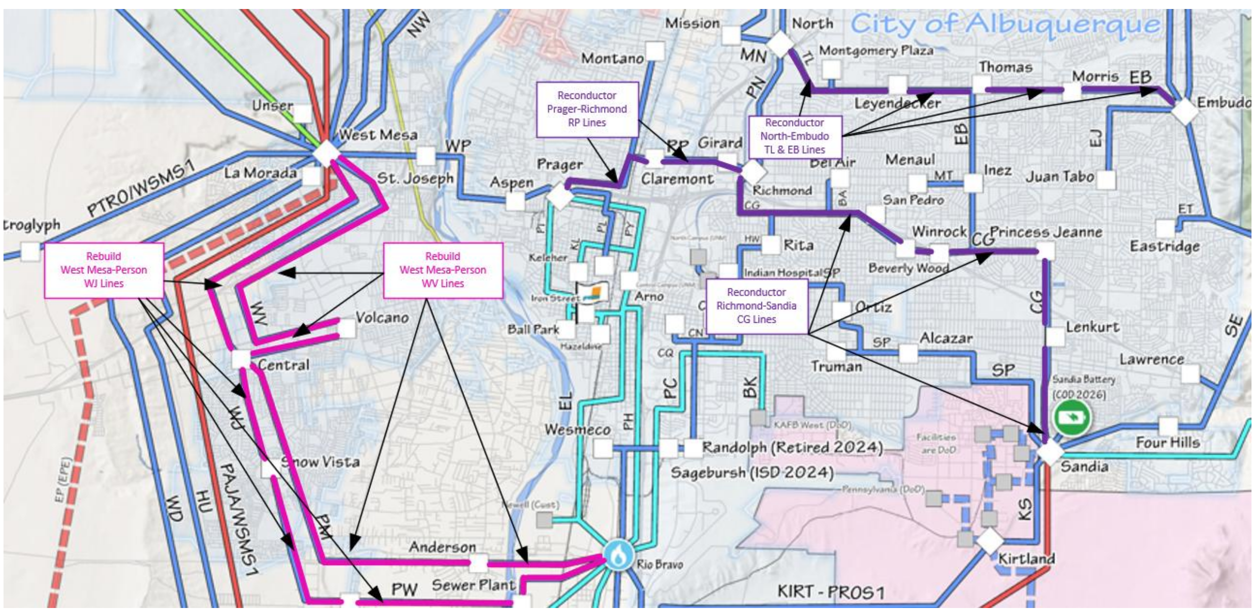
These lines are nearly sixty years old, and the structures are made of wood. To reconductor this line, PNM would need to replace the wooden structures with steel ones. This process would require constructing parallel lines to keep the existing lines operational, followed by retiring the old lines. Essentially the entire line would be rebuilt. Additionally, the new lines will be constructed to a capacity of 350 MVA, ensuring maximum capacity and future flexibility. Given these extensive requirements, rebuilding these lines may not be the most feasible option due to the impacts of acquiring new right-of-way. Therefore, Option 1 could be a more suitable alternative if new lines need to be constructed.

Reconductor:

1. North to Embudo (TL+EB line) 7.2 miles – increase MVA capacity from 154 to 250.
2. Richmond-Sandia (CG Line) 9.27 miles – increase MVA capacity from 154 to 250.
3. Prager- Richmond (RP Line) 3.42 miles – increase MVA capacity from 156* to 357.
   *Basecase had a rating of 250 MVA assuming it will be upgraded in 2027.

Further evaluation of thermal results determined that both studied options required additional mitigation depending on location, type and characteristics of future resources and storage.

Figure 2 - Option 2 System Reinforcements



For Option 1 there were <u>additional identified system reinforcements</u> that are listed below and will be referred to as **Option 1+**.

Option 1+

1. All upgrades mentioned for Option 1 above as depicted in Figure 1.
2. Rebuild the Hernandez- Ojo (HO) 20.51 miles by increasing the MVA capacity from 186 to 250. This is depicted in Figure 3 below.
3. Replace the smaller McKinley 345/115 kV transformer with a larger transformer. This is depicted in Figure 4 below.

Figure 3 - Option 1+ System Reinforcements HO Line

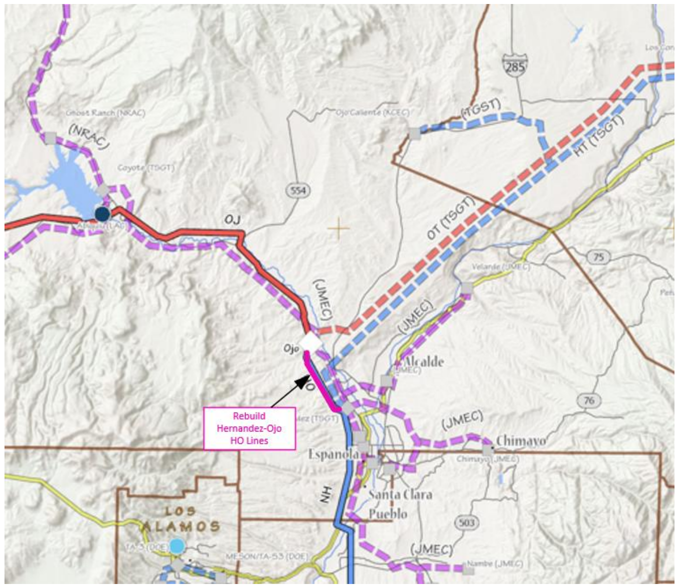
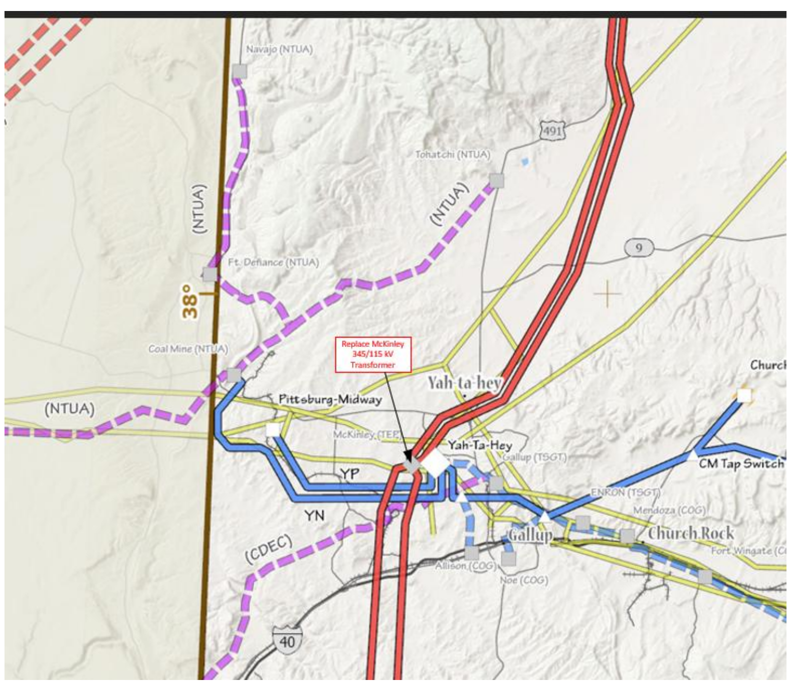


Figure 4 - Option 1+ System Reinforcements McKinley transformer



For Option 2 there were <u>additional identified system reinforcements</u> that are listed below and will be referred to as **Option 2+**.

Option 2+

This includes all upgrades mentioned for Option 2 above as depicted in Figure 2 plus the following rebuilds, reconductor, and additions.

Rebuild:

1. BA-Reeves (RB) 14.18 miles – increase MVA capacity from 156 to 350. This is depicted in Figure 5 below.
2. Reeves-North (RN) 2.19 miles – increase MVA capacity from 156 to 350. This is depicted in Figure 5 below.
3. West Mesa-Prager (WP) 4.075 miles – increase MVA capacity from 322 to 350. This is depicted in Figure 5 below.
4. Person-Prosperity 2.49 miles – increase MVA from 156 to 350. This is depicted in Figure 5 below.
5. Hernandez- Ojo (HO) 20.51 miles increase MVA capacity from 186 to 250. This is depicted in Figure 3 above.

Reconductor:

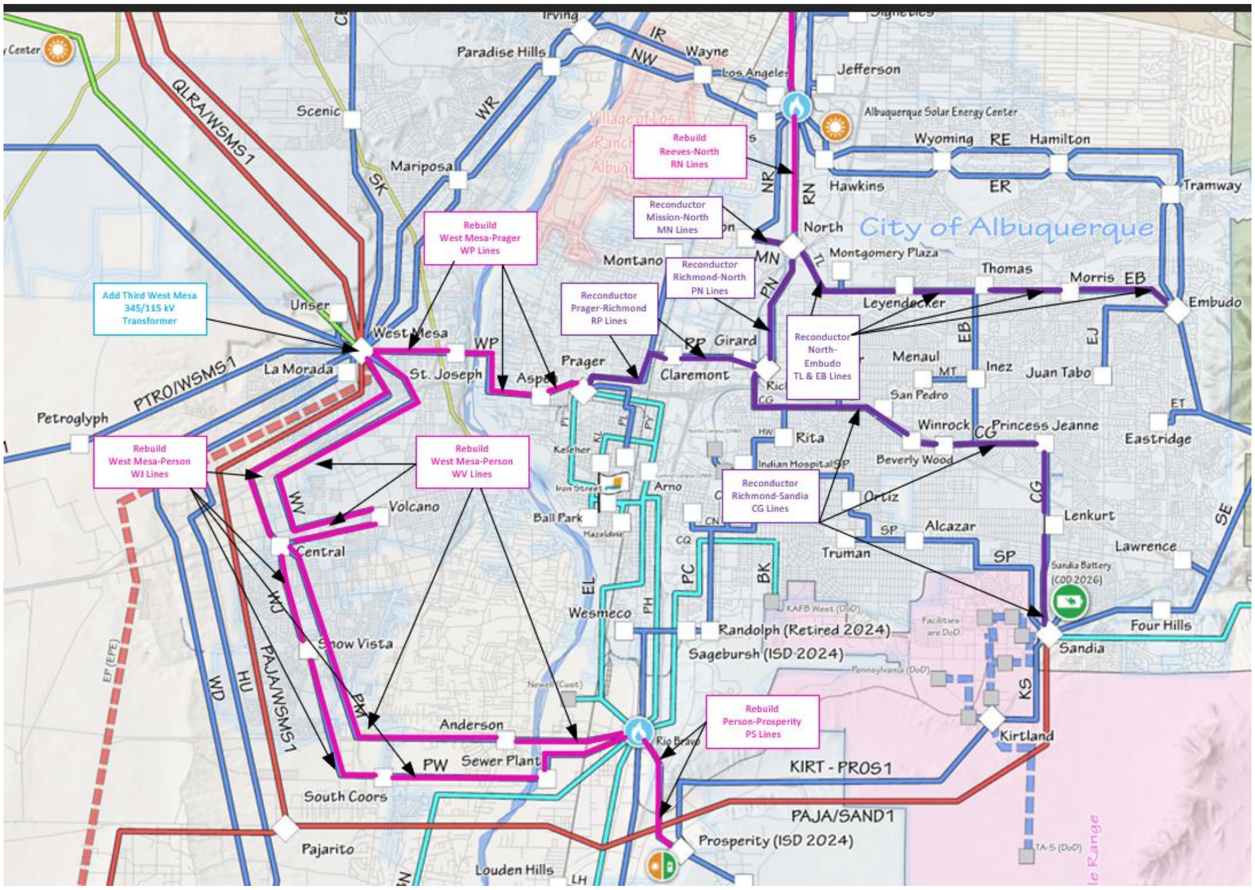
1. Mission-North (MN) 0.62 miles – increase MVA capacity from 135 to 250. This is depicted in Figure 5 below.
2. Richmond-North (PN) 2.29 miles – increase MVA capacity from 156 to 250. This is depicted in Figure 5 below.

Add: A third West Mesa 345/115 kV transformer. This is depicted in

Figure 5 below.

Replace: The smaller McKinley 345/115 kV transformer with a larger MVA transformer. This is depicted in Figure 4 above.

Figure 5 - Option 2+ System Reinforcements

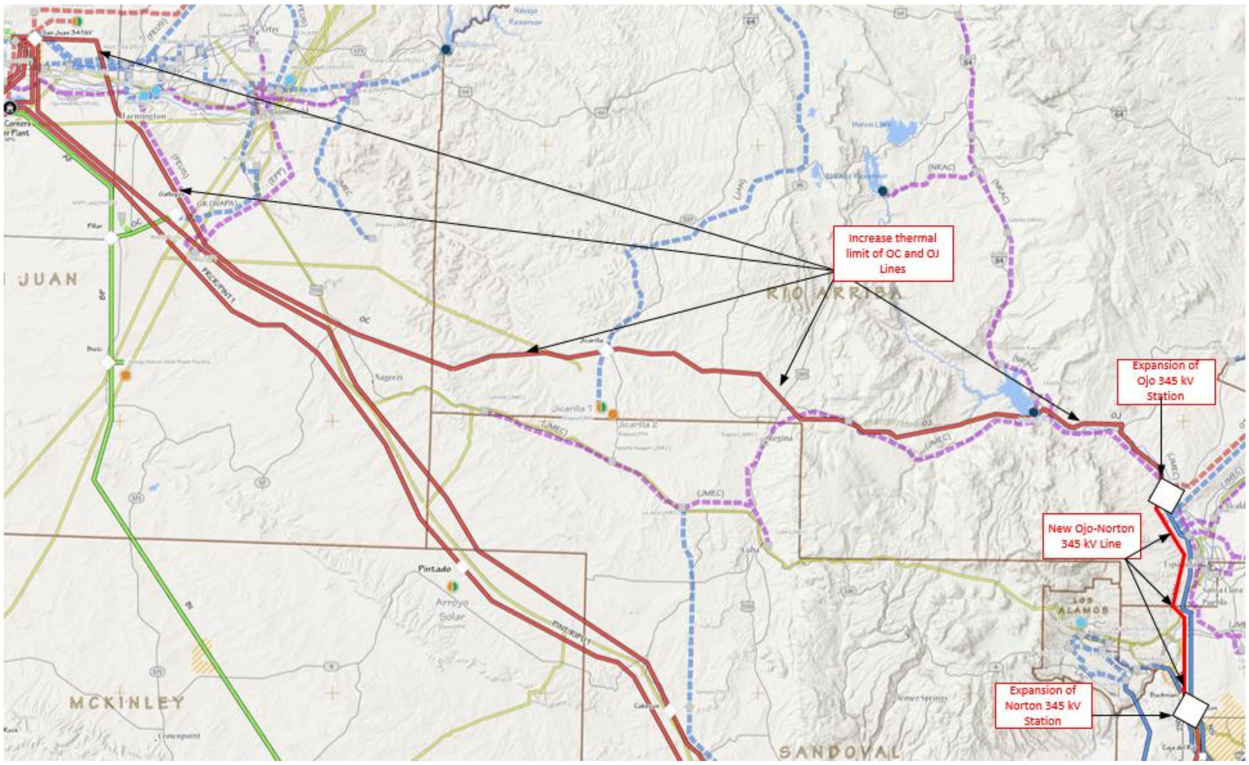


For both options, Path 48 (345 kV lines from Four Corner/San Juan to Albuquerque) is beyond its transfer capability even with Rio Bravo generation dispatched. The construction of the Norton-Ojo 345kV line facilities detailed below will mitigate these 345 kV line overloads. These are also depictured in below in Figure 6.

(Either Option) Path 48 Transfer Capability mitigation

1. Construct a new Ojo–Norton 345kV line (approximately 26 miles).
2. Expansion of Ojo and Norton 345 kV switching stations.
3. Increase the San Juan-Jicarilla-Ojo 345kV line conductor thermal limit to 1004 MVA by increasing the structure height to create additional clearance between the line conductor and the ground.

Figure 6– Path 48 Transfer Capability mitigation



Alternatively, future firm dispatchable resources could potentially be located to manage transmission congestion without these upgrades. It is not expected that this is cost effective, however, additional studies are underway to provide more information.

The retirement of Reeves and VEF generation facilities present a critical juncture for the PNM transmission system. To ensure a reliable system, it is essential to invest in the expansion of transmission infrastructure. This will allow a more resilient transmission system and the ability to serve future emerging load growth. Additionally, enhancing transmission capacity will facilitate greater integration of renewable resources.

Construction of the Option 1 reinforcements, as shown in Figure 1, more effectively serves existing, new, and future emerging load growth compared to Option 2. Additionally, Option 1 enhances PNM's ability to accommodate additional load growth. The expanded 345kV transmission improves reliability and resilience by increasing the system's capacity to withstand planned or unplanned outages. This reduces reliance on legacy or constrained infrastructure and enables the potential for significant rebuilding of area sub-transmission lines.

Reconductoring lines as an alternative for Option 2, shown in Figure 2, assumes that 115kV lines can be taken out of service for either reconductoring or rebuilding. This approach impacts reliability which is problematic. Option 2 requires numerous extended outages of existing lines, requires substantially longer lead-times, and has much greater construction impacts since many miles of line are involved with significant portions in heavily developed areas. This option does allow PNM the opportunity to upgrade existing Albuquerque transmission lines at a future date without having the expense of reconductoring or rebuilding. Option 2+ complicates this further with extensive rebuilding, reconductoring, and line replacement in the Albuquerque region as seen in Figures 2 and 5.

The construction of Option 1+ system reinforcements, captured in Figure 1, 3, and 4, coupled with the Path 48 transfer capability mitigation, is identified as the best means for addressing the existing limitations within the Albuquerque network over the ten-year planning horizon that supports the retirement of VEF and Reeves.

Steady-State Performance, Voltage

No Project-triggered voltage violations were identified, nor were any pre-Project voltage violations worsened by > 1%.

Transient Stability Performance

The system showed acceptable system performance for all studied contingencies.

Short Circuit Analysis

A short circuit screening analysis was conducted to assess whether any transmission options would increase the short circuit current to a level necessitating breaker replacement. This analysis was performed using ASPEN OneLiner. Breakers are flagged for replacement if they exceed 95% of their minimum interrupting capability and flagged for informational purposes if they exceed 90%.

The analysis revealed that a few existing circuit breakers will need to be replaced regardless of the transmission options considered.

Cost and Schedule Estimates

The cost estimates and schedules for the different transmission system reinforcements options are shown in Tables 2 and 3 below.

Table 2 — Transmission Upgrades For P1, P2, P4, and P7 Outages

Transmission Upgrades	Cost ($M)	Construction Time
Reeves or VEF retired or both units retired		
Option 1	241.1	45 months
Option 2	76.5	36 months

Table 3 — Transmission Upgrades For N-1-1 (P-6) Outages

Transmission Interconnection Upgrades	Cost ($M)	Construction Time
Reeves or VEF retired or both units retired		
Option 1+	273.8	45 months
Option 2+	234.6	48 months
Norton-Ojo 345kV line facilities for either Option 1+ or 2+		
	215.1	72 months

Introduction

The Public Service Company of New Mexico ("PNM") is studying the prudence of continuing operation of the Reeves Generating Station (Reeves), 152 MW, and the Valencia Energy Facility (VEF) ,158 MW, plants for load-side generation service in New Mexico. New Mexico is undergoing a significant transformation, shifting towards renewable energy sources and the retirement of fossil generation resources. This transition presents both challenges and opportunities, particularly in the realm of transmission infrastructure.

Reeves is located in northeast Albuquerque and consists of three steam turbine units that operate on natural gas. The first two small turbines became operational in 1958 followed by the large turbine in 1962. Reeves end of depreciable life is targeted for year 2030. PNM is evaluating the cost of extending the operation of Reeves beyond that date. In addition to providing resources to serve PNM load, the plant plays a role in maintaining the reliability of the transmission system within limits under high load and transmission outage conditions.

VEF is located south of Belen, New Mexico and is connected by the PNM transmission system to the Albuquerque area load pocket. VEF began commercial operations in 2008. It consists of a heavy-frame GE 7FA gas turbine. PNM has a 20-year power purchase agreement (PPA) with Southwest Generation, LLC that expires in 2028. Like Reeves, the facility also plays a role in managing PNM transmission system loading under high load and transmission outage conditions.

PNM provides firm transmission service on its northern New Mexico (NNM) path either through pre-FERC Order 888 firm transmission contracts or through PNM's Open Access Transmission Tariff. The NNM path is also recognized in Western Electricity Coordination Council (WECC) as Path 48. The combination of PNM's native load requirements and PNM's firm transmission service commitments (network customers and firm point-to-point transmission service) result in PNM requiring the commitment of load-side generating resources to serve load when NNM transmission capability is insufficient to serve the entire load from remotely located resources.

Both VEF and Reeves along with Rio Bravo (155 MW) and La Luz (40 MW) generation resources are dispatched at times to reduce the dependance on the NNM transmission when the transmission system reaches its limits as a result of serving load in the northern New Mexico load centers. The facilities are also dispatched for more local constraints associated with 115kV transmission outages and 345/115kV transformer outages in and around the Albuquerque metro load center. It was assumed for this study that the Rio Bravo generation was off-line to maintain non-spinning reserves.

Operating the transmission system with a negative operating margin subjects the system to violation of WECC and North American Electric Reliability Corporation (NERC) operating and planning criteria and potential risk of loss of load for outage conditions.

The three most critical issues that PNM faces today, related to its' transmission system are the following:

- Operating and maintaining an aging transmission system
- Generation versus transmission buildout
- Approaching system capacity constraints

PNM has not constructed any backbone 345kV transmission lines in the Albuquerque metro area between 1984 and 2021. Over the past 40 years, most transmission reinforcements have involved building underlying 115kV lines or implementing low-cost, small-capacity upgrades to exploit latent capacity in the existing system. In both 2010 and 2016 the Rio Puerco station was expanded to include looping in of existing 345 kV lines and/or adding 345/115kV transformers to support the underlying 115 kV system, but no new metro transmission lines were built. In December of 2021 the Western Spirit-Pajarito 345 kV line was energized, which connected Eastern New Mexico to just south of the Albuquerque metro area, though no intra-metro transmission was built. In the third quarter of 2025, the Western Spirit-Pajarito 345kV line will be looped into a new 345/115kV station referred to as "Hidden Mountain" resulting in new capacity supporting the 115 kV transmission system in the Albuquerque metropolitan area. The improvements provide increased reliability and resilience for existing, new, and future load growth in the southern Albuquerque metro area and accommodate future renewable generation sources.

The study evaluated the potential retirement of the VEF and Reeves generation resources individually and collectively since their expiration are 2028 and 2030, respectively. The analysis addresses the system impacts and technical issues associated with the retirement of these generation resources and potential transmission system reinforcements.

Coordination/Affected Systems

This study focused on impacts to the PNM system.

Study Criteria

A system reliability evaluation consists of power flow analysis for identifying thermal overloads or voltages outside criteria (too high or low) under normal and contingency conditions. Transient stability analysis is performed to ensure all machines remain in synchronism, all voltage swings are damped within acceptable limits, and all oscillations show positive damping within 30-seconds after the start of the studied event. A short circuit analysis is performed to ensure all fault currents remain within acceptable circuit breaker and switch capabilities. Each evaluation is conducted for credible contingencies that the system might sustain, such as the loss of a single or double circuit line, a transformer, a generator, or a combination of these facilities. This study was completed in accordance with NERC Standard FAC-002-3.

Performance of the transmission system is measured against the following planning criteria: the Western Electricity Coordinating Council ("WECC") Reliability Criteria, and the North American Electric Reliability Council ("NERC") Planning Standards. If system reliability problems resulting from the interconnection of a project are discovered, the study will identify the system facilities or operational measure that will be necessary to mitigate reliability criteria violations. Addition of these new facilities would maintain the reliability to the transmission network.

This study investigates whether the alternative(s) results in:

- Equipment overloads on transmission lines, transformers, series compensation or other devices
- Voltage criteria violations
- All machines remain synchronized to the transmission system
- Voltage and swings exceed acceptable limits
- Fault duty increases that result in short circuit current that exceeds the interrupt rating of circuit breakers and switches

Power Flow Criteria

All power flow analysis was conducted with version 23.0.8 of General Electric's PSLF/PSDS/SCSC software. Traditional power flow analysis is used to evaluate thermal and voltage performance of the system under Category P0 (all elements in service), Category P1, P2 (N-1) and P4, P5 and P7 (N-2) conditions.[1]

The power flow performance criteria used to assess the impact of the Project(s) are shown in Table 4. The criteria are WECC/NERC performance requirements[2] with applicable additions and/or exceptions for the New Mexico transmission system.

Table 4 — Power Flow Disturbance/Performance Criteria

		Thermal Rating Applied			Acceptable Voltage Range (pu)			Voltage Deviation %	
AREA	kV Range	P0 (ALIS)	P1	P2-P7	P0 (ALIS)	P1	P2-P7	P1	P2-P7
PNM (Area 10)	0 - 499	Normal	Emergency	Emergency	0.95-1.05	0.90-1.10	0.90-1.10	8%	50%
EPEC (AREA 11)	100 - 499	Normal	Emergency	Emergency	0.95-1.05	0.90-1.10	0.90-1.10	8%	50%
Tri-State Zone (120-123)	100 - 499	Normal	Emergency	Emergency	0.95-1.05	0.90-1.10	0.90-1.10	8%	50%
14 – 17, 19	100 - 499	Normal	Emergency	Emergency	0.95-1.05	0.90-1.10	0.90-1.10	8%	50%
	500 - 500	Normal	Emergency	Emergency	1.00-1.10	0.95-1.15	0.95-1.15	8%	50%
70, 73	100 - 499	Normal	Emergency	Emergency	0.95-1.05	0.90-1.10	0.90-1.10	8%	50%
PNM Voltage Exceptions (P0)	Bus Name				P0				
	Taiban Mesa 345 kV bus				0.95-1.10				
	Guadalupe 345 kV bus				0.95-1.10				
	Clines Corners 345 kV bus				0.95-1.10				
	Jicarilla 345 kV bus				0.95-1.10				

- All equipment loadings must be below their normal ratings under normal conditions.
- All line loadings must be below their emergency ratings for both single and double contingencies.
- All transformers and equipment with emergency rating should be below their emergency rating.

Transient Stability Criteria

The NERC/WECC transient stability performance requirements for transmission contingencies are as follows:

- All machines will remain in synchronism.
- All voltage swings will be well damped.
- Following fault clearing, the voltage shall recover to 80% of the pre-contingency voltage within 20 seconds of the initiating event for all P1 through P7 events, for each applicable BES bus serving load.
- Following fault clearing and voltage recovery above 80%, voltage at each applicable BES bus serving load shall neither dip below 70% of pre-contingency voltage for more than 30 cycles nor remain below 80% of pre-contingency voltage for more than two seconds, for all P1 through P7 events.
- Ensure low voltage ride through on all faults.
- Fault clearing times are shown in the Table 5 below.

Table 5 — PNM Fault Clearing Times

Categories	Fault Type	Voltage (kV)	Clearing Time (near-far end breakers)

[1] For TPL-001-5.1 see NERC website http://www.nerc.com
[2] WECC-CRT-3.2 Transmission System Planning Performance

P1, P3, P6	3 Phase Normally Cleared	345	3–4 Cycles
		230	3–4 Cycles
		115	4–4 Cycles
Categories	**Fault Type**	**Voltage (kV)**	**Clearing Time (near-far end breakers)**
P2, P5, P7	1 Phase Normally Cleared	345	3-4 Cycles
		230	
		115	4-4 Cycles
Categories	**Fault Type**	**Voltage (kV)**	**Clearing Time (normally opened breaker both near and far end—breaker opened due to stuck breaker both near and far end**
P4, P5, P7	1 Phase Stuck Breaker	345	3-16 Cycles
		230	
		115	4-16 Cycles

Short Circuit Criteria

Breakers loaded in excess of 92% of short-circuit fault duty rating are flagged for determination as to when the breaker should be considered for upgrading. Generally based on age and maintenance related issues those in excess 95% are to be scheduled for upgrade.

Power Flow Base Case Development

PNM provided the 2028 Heavy Summer (HS) case (from the WECC 28 HS2 case), appropriately adjusted and updated to reflect the study conditions for this assessment.

This study evaluated the following five (5) resource dispatch scenarios in Northern New Mexico as shown in Tables 6 and 7:

Table 6 —Generation Resources Dispatch Scenarios

Scenario	Load	Solar output %	Battery output %	Wind output %	Comments
1	100% summer peak	55	0	10	Represents demand for energy is high with solar ramping down late afternoon (4-5 pm) and conventional power plants ramp up production to match the energy demands. Batteries are being charged by solar to be used during periods of low solar output.
2	95% of summer peak loading (Net Peak)	0	75	10	Represents “net peak” period which typically occurs during the evening hours during or after sunset with no solar output and batteries being discharged.
3	95% of summer peak loading (Net Peak)	0	75	80	Same as above assuming high wind output levels.
4	75% of summer peak loading	0	0	10	Represents hours when the batteries are depleted, and the load is still high (11pm).
5	Winter morning peak	0	0	10	Represents early morning hours with no solar production.

Table 7 — Base Cases with the various Generation Resources

Case #	Resource Scenario				Reeves Status	VEF Status
	Wind	Solar	Battery	Season		

Pre Case – Both online						
1	10%	55%	0%	100% Sum Peak (Peak)	On	On
2	10%	Offline	75%	95% Sum Peak (Net Peak)	On	On
3	80%	Offline	75%	95% Sum Peak (High Wind Net Peak)	On	On
4	10%	Offline	0%	75% Sum Peak	On	On
5	10%	Offline	0%	Winter Morning Peak	On	On
Reeves Offline						
6	10%	55%	0%	100% Sum Peak (Peak)	Off	On
7	10%	Offline	75%	95% Sum Peak (Net Peak)	Off	On
8	80%	Offline	75%	95% Sum Peak (High Wind Net Peak)	Off	On
9	10%	Offline	0%	75% Sum Peak	Off	On
10	10%	Offline	0%	Winter Morning Peak	Off	On
VEF Offline						
11	10%	55%	0%	100% Sum Peak (Peak)	On	Off
12	10%	Offline	75%	95% Sum Peak (Net Peak)	On	Off
13	80%	Offline	75%	95% Sum Peak (High Wind Net Peak)	On	Off
14	10%	Offline	0%	75% Sum Peak	On	Off
15	10%	Offline	0%	Winter Morning Peak	On	Off
Reeves & VEF Offline						
16	10%	55%	0%	100% Sum Peak (Peak)	Off	Off
17	10%	Offline	75%	95% Sum Peak (Net Peak)	Off	Off
18	80%	Offline	75%	95% Sum Peak (High Wind Net Peak)	Off	Off
19	10%	Offline	0%	75% Sum Peak	Off	Off
20	10%	Offline	0%	Winter Morning Peak	Off	Off

Generation Dispatch

Generation dispatch modeled for generation plants and for nearby existing and planned facilities are shown in Table 8 below. Appendix B provides detailed dispatch information.

Table 8 — Generation Dispatch

		GENERATION RESOURCE SCENARIO (MW)				
UNIT	NAMEPLATE RATING (S/W)	1 100% PEAK	2 95% PEAK	3 HIGH WIND	4 75% PEAK	5 WINTER PK
Four Corners Unit 4	818	664	664	624	664	624
Four Corners Unit 5	818	818	818	818	818	818
Springerville Unit 1	420	394	396	297	394	396
Springerville Unit 2	420	400	400	400	400	400
Springerville Unit 3	430	419	419	419	419	419
Springerville Unit 4	430	420	420	420	420	420
Reeves Unit G1	44	44	44	44	44	44
Reeves Unit G2	44	44	44	44	44	44
Reeves Unit G3	66	66	66	66	66	66
Valencia	143	140	140	140	140	100
Generation Aggregates						
Wind Resources		251	251	2010	251	251
Solar Resources		929	0	0	0	0
Battery Energy Storage		0	740	741	0	0

Power Flow Case Attributes

Table 9 provides an overview of the power flow cases.

Table 9 — Power Flow Case Attributes – Base Scenario

UNIT	GENERATION RESOURCE SCENARIO (MW)				
	1 100% PEAK	2 95% PEAK	3 HIGH WIND	4 75% PEAK	5 WINTER PK
Area 10 Slack Generator	LEF S1	LEF S1	LEF S1	LEF S1	LEF S1
Four Corners – Moenkopi 500 kV	308	237	734	231	354
Four Corners – Cholla 345 kV	183	167	542	129	235
Four Corners – San Juan 345 kV	338	355	162	357	306
Four Corners – Pintado	493	509	-142	581	407
San Juan – Cabezon 345 kV	544	544	-153	597	410
San Juan – Jicarilla 345 kV	122	156	7	155	117
Rio Puerco – West Mesa 345 kV	382	373	162	354	256
Rio Puerco – Cabezon 345 kV	526	526	-165	576	397
Rio Puerco – Pintado 345 kV	662	612	-30	568	400
West Mesa – WMesa1 345/115 kV	261	273	279	204	139
West Mesa – WMesa2 345/115 kV	261	273	279	204	139
Hidden Mountain 345/115 kV	218	236	300	256	243
Clines Corners – Diamond Tail 1 & 2 345 kV	41	42	1067	39	57
Path 47: Southern New Mexico	44	358	89	86	288
Path 48: Northern New Mexico	1468	1580	-177	1752	1244
Blackwater Converter	18	17	18	18	18
Arroyo Phase-Shifter	1	10	6	9	17
Gladstone Phase-Shifter	104	91	105	117	103
Belen Phase-Shifter	8	19	51	6	27

Project Mitigation - Options

This study evaluates the following system improvement Options for mitigating thermal and voltage violations with the Reeves and/or Valencia generation off-line:

Option 1: Rio Puerco-Pajarito-Prosperity 345 kV and new high-capacity Prosperity–Sandia 115kV line

1. Construct a new 345kV six (6) breaker-and-a-half switching station to be named Prosperity 345kV switching station and the installation of a 345/115kV transformer.
2. Construct a new 115kV five (5) breaker ring bus expandable to a breaker-and-a-half configuration switching station to be named Prosperity 115kV switching station.
3. Construct a new Rio Puerco – Pajarito 345kV line (approximately 28 miles).
4. Expand the Rio Puerco and Pajarito 345kV switching stations.
5. Loop in the Pajarito–Sandia 345kV line No.1 into Prosperity 345 kV switching station.
6. Loop in the Pajarito–Sandia No.2 345kV line into Pajarito and Prosperity 345 kV switching station that is currently part of the double circuit line between the Pajarito–Sandia 345 kV that is not energized.
7. Loop in the Prosperity-Studio and Prosperity-KAFB 115kV lines into Prosperity 115kV switching station.
8. Construct a new high-capacity Prosperity–Sandia 115kV line and looping it into the Sandia bus #2 115kV station.

Option 2: Reconductoring of three 115kV lines using advanced conductors and rebuilding two 115 kV lines using high capacity ACSR conductor.

1. REBUILD: West Mesa-Person (WV line) 15 miles – increase MVA capacity from 156 to 350.
2. REBUILD: West Mesa-Person (WJ line) 12.8 miles – increase MVA capacity from 154 to 350.
3. RECONDUCTOR: North to Embudo (TL+EB line) 7.2 miles – increase MVA capacity from 154 to 250.
4. RECONDUCTOR: Richmond-Sandia (CG Line) 9.27 miles – increase MVA capacity from 154 to 250.
5. RECONDUCTOR: Prager- Richmond (RP Line) 3.42 miles – increase MVA capacity from 156* to 357.

**Basecase had a rating of 250 MVA assuming it will be upgraded in 2027.*

Steady State Contingency Analysis

Power flow was simulated using the PSLF Contingency Processor (SSTOOLS/Proviso HD).

Twenty pre-mitigation cases are studied. The twenty cases consist of five resource scenarios modeled against four retirement scenarios. The retirement scenarios are:

1. "Both ON": Both the Reeves and Valencia generation is dispatched at full output (pre-retirement).
2. "REEV OFF": The Reeves generation is turned off. The Valencia generation is on.
3. "VEF OFF": The Valencia generation is turned off. The Reeves generation is on.
4. "Both OFF": Both he Reeves and Valencia generation is turned off.

The study does not assess impacts beyond PNM's systems, although observations may be noted. In addition, several elements of the City of Farmington ("COF") system were found to be overloaded, independent of this study. Since the COF overloaded elements are outside the PNM Planning Coordinator area, they are not included in the report.

Power Flow - Thermal Analysis Results

The steady state thermal results identified overloaded elements triggered by retiring either Reeves or VEF or both. P5 contingency overloads will be addressed by PNM's plans for redundant relays (see Appendix C) and are not included in the report tables.

The results are organized to show the summary tables first, starting with the pre-mitigation results and followed by results after applying system reinforcement improvement Option 1 and Option 2.

Summary Results by Count (# of times overloaded)

Tables 10-12 provide a summary of the worst overloaded elements for single element, stuck breaker, and common structure (P1, P2, P4, and P7) outages[3] based on the most limited of the five (5) resource scenarios studied. Only the line segment of the highest loading is shown for any breaker-to-breaker line that has multiple segments. The "ID" of the line is also shown. In addition, the most limiting contingency for the overloaded element is listed and the column labeled "# of times overloaded" shows number of times this element is overloaded for different contingencies.

Table 10 — Overloaded Elements For P1, P2, P4, and P7 Outages, pre-Mitigation

Pre-Mitigation				Includes NERC Categories: P1, P2, P4, P7		Overload %			
Overloaded Element	ID	*# of times OVLD*	Resource Scenario	CONTINGENCY DESCRIPTION	Rating MVA	Both On	Reeves Off	VEF Off	Both Off
BALLP T 46-PRAGER461	46	1	2	Person-WMesa2& SnowVista-WMesa1115kV Lines(Common Structure < 1 mile)	41	77.6	75.7	108.1	105.5
IRON STR46-BALLP T 461	46	1	2	Person-WMesa2& SnowVista-WMesa1115kV Lines(Common Structure < 1 mile)	41	73.1	71.2	103.6	101.0
CABEZON 345-RIOPUERC 3451	345	7	1	Line Pintado-Rio Puerco 345 kV	1195	81.6	92.4	90.3	105.0
FOURCORN 345-PINTADO3451	345	7	4	Cabezon 345 kV Station	1099	86.9	97.2	96.1	109.3
PINTADO 345-RIOPUERC3451	345	7	1	Cabezon 345 kV Station	1195	82.5	92.4	90.5	103.5
SAN JUAN345-CABEZON 3451	345	7	1	Line Pintado-Rio Puerco 345 kV	1195	82.1	93.0	90.9	105.3

[3] P1 Outage: This refers to the loss of a single element, such as a generator, transmission circuit, transformer, or shunt device.
P2 Outage: This refers to the loss of a single element, such as a bus section, an internal breaker.
P4 Outage: This refers to the loss of two or more elements caused by a fault plus a stuck breaker, such as the simultaneous loss of a transmission circuit and a generator or two transmission circuits.
P5 Outage: This refers to the loss of two or more elements caused by a fault plus failure of non-redundant relay protection resulting in delayed fault clearing.
P7 Outage: This refers to the loss of two or more elements on a common structure, such as the loss of two adjacent transmission circuits.

RICHMOND PNM115-CG-11151	CG	4	1	Pajarito 345 kV Station (BF 21482 22582 24762)	154	103.3	104.0	108.0	109.1
HIDDENMOUNT345-/ 1151	HMXFR	1	3	Line Hidden Mountain-Pajarito 345 kV	450	100.4	101.6	85.4	86.3
NORTON 2115- BUCKMAN 1151	NL	2	2	BA-STA-Norton 115 kV Lines (LAC BF-66862)	116	116.4	116.5	116.4	116.7
PERSON 115- PROSPER1151	PERS-PROS	1	1	Sandia-Richmond 115 kV Line and Sandia 115 kV Bus Tie (BF-23662)	156	104.4	105.2	105.1	106.0
VOLCANOT 115-ANDERSON 1151	PM	3	1	West Mesa 1-SnowVista 115 kV Line and West Mesa 1-3115 kV Bus Tie (BF-52662)	156	82.2	82.6	109.1	109.0
B-A 115- NO BERN1151	RB	2	3	Pajarito 345 kV Station (BF 21482 2258224762)	155	84.4	98.4	89.0	103.0
FOURHILL 115-SANDIA 21151	SE	1	3	Sandia 115 kV Bus Tie and Sandia 115/46 kVTransformer#2 (BF-26962)	156	92.8	106.2	95.4	108 9
NORTHPNM 115-MPLAZA T1151	TL	4	1	Sandia-Richmond 115 kV Line and Sandia 115 kV Bus Tie (BF-23662)	156	102.1	106.1	102.1	106.3
WESTMS 1115- CENTRALP 1151	WJ	22	1	Line Volcano-West Mesa2115 kV	156	96.2	96.9	120.6	121.3
WESTMS 1115-WESTMS 21151	WMBUSTIE	1	1	West Mesa-Pajarito 345 kV Line & West Mesa 345/115 kV Transformer #2(BF-22482)	355	89.4	101.6	96.4	108.8
WESTMESA345-WESTMS 1 1151	WM3XFR	12	2	West Mesa-Pajarito 345 kV Line and West Mesa 345/115 kV Transformer #2 (BF-22482)	448	125.3	136.1	135.8	146.7
WESTMESA345-WESTMS 2 1151	WM3XFR	12	2	West Mesa-Pajarito 345 kV Line and West Mesa 345/115 kV Transformer #1 (BF-23582)	448	126.3	137.2	136.9	147.9
WESTMS 2115- VOLCANOT 1151	WV	36	1	West Mesa 1-SnowVista 115 kV Line and West Mesa 1-3115 kV Bus Tie (BF-52662)	156	104.6	105.1	131.3	131.8
WESTMS_1-PARADIS2 115 kV (WR)	WR	4	1	Line Aspen-West Mesa 2 115 kV	156	86.5	103.9	85.1	102.5

Applying the Option 1 system upgrades reduces the number of overloaded elements, resulting in Table 10.

Table 11 — Overloaded Elements For P1, P2, P4, and P7 Outages, Option 1

Option 1				Includes NERC Categories: P1, P2, P4, P7		Overload %			
Overloaded Element	**ID**	***# of times OVLD***	**Resource Scenario**	**CONTINGENCY DESCRIPTION**	**Rating MVA**	**Both On**	**Reeves Off**	**VEF Off**	**Both Off**
SAN JUAN345-CABEZON3451	345	7	2	Line Pintado-Rio Puerco 345kV	1195	82.8	93.7	91.6	105.9
CABEZON345·RIOPUERC3451	345	7	4	Line Pintado-Rio Puerco 345kV	1195	87.5	97.8	96.7	109.8
FOURCORN345·PINTADO3451	345	7	I	Cabezon 345kVStation	1099	82.2	93.2	91.0	105.6
PINTAD0345-RIOPUERC3451	345	7	4	Cabezon 345kVStation	1195	82.6	92.5	91.4	101.3
BUCKMAN 115-WHITEROK1151	NL	2	4	BA-STA-Norton 115 kV Lines (LAC BF-66862)	116	87.5	97.9	96.8	110.0
PERSON115-PROSPER1151	PERS-PROS	9	I	Person-WMesa2& SnowVista-WMesa1 115kVLines{Common Structure less than 1 mite	156	82.7	95.3	90.8	103.8
WESTMESA.345-WESTMS 21151	WM3XFR	2	2	West Mesa-Paiarito 345kV line and West Mesa 3451115 kVTranslormer#1 (BF-23582)	448	90.7	99.9	97.9	106.8
WESTMS 1115-PARADIS21151	WR	11	I	Line Aspen-West Mesa 2 115 kV	156	86.5	103.9	85.1	102.5

Option 1 Observations (excluding P6):

- The 345kV line overloads are the result of Path 48 beyond its transfer capability. These overloads are due to insufficient load side generation. The dispatching of Rio Bravo generation will mitigate these 345kV line overloads.
- Table 12 shows that most of the 115kV line overloads from Table 11 are mitigated with the Option 1 system reinforcements mentioned above. The remaining overloads can be mitigated with the dispatching of Rio Bravo generation. The exception is the West Mesa-Irving 115kV line (WR). This overload is a function of the high load at Rio Rancho of 102 MW. The latest load forecasting information projects this load being reduced to 90 MW which will help mitigate this overload. In addition, in the past, this line had an emergency rating of 200 MVA and reestablishing this emergency rating should be pursued.

Alternately, applying the Option 2 system upgrades results in Table 12.

Table 12 — Overloaded Elements For P1, P2, P4, and P7 Outages, Option 2

Option 2				Includes NERC Categories: P1, P2, P4, P7		Overload %			
Overloaded Element	**ID**	***# of times OVLD***	**Resource Scenario**	**CONTINGENCY DESCRIPTION**	**Rating MVA**	**Both On**	**Reeves Off**	**VEF Off**	**Both Off**

BALLP _T 46 - PRAGER 46 1	46	1	1	Person-VVMesa2& SnowVista-WMesa1 115kV Uses(Common Structure less than 1 mil	41	77.4	75.3	107.7	105.0
IRON STR 46 - BALLP_T 461	46	1	1	Person-VVMesa2& SnowVista-WMesa1115kV uses(Common Structure less than 1 mil	41	73.0	70.8	103.1	100.4
CABEZON 345 - RIOPUERC 345 1	345	7	1	Line Pintado-Rio Puerco 345 kV	1195	81.5	92.4	90.2	104.8
FOURCORN 345- PINTADO 345 1	345	7	4	Cabezon 345 kV Station	1099	86.8	97.2	96.0	109.3
PINTADO 345- RIOPUERC 3451	345	7	1	Cabezon 345 kV Station	1195	82.5	92.4	90.4	103.4
SAN JUAN 345 - CABEZON 345 1	345	7	1	Line Pintado-Rio Puerco 345 kV	1195	82.1	92.9	90.8	105.2
HIDDENMOUNT 345-/115	HMXFR	1	3	Line Hidden Mountain-Pajarito 345 kV	450	100.3	101.5	85.3	86.2
NORTON 2115-BUCKMAN 1151	NL	2	2	BA-STA-Norton 115 kV Lines (LAC Bf-66862)	116	116.4	116.5	116.4	116.7
PERSON 115-PROSPER 1151	PERS-PROS	1	1	Sandia-Richmond 115 kV Line and Sandia 115 kV Bus Tie (BF-23662)	156	103.7	104.4	104.1	105.0
8--A115-NO BERN 1151	RB	2	3	Pajarito 345 kV Station (BF 21482 2258224762)	155	84.0	97.8	88.5	102.3
FOURHILL 115-SANDIA 21151	SE	1	3	Sandia 115 kV Bus Tie and Sandia 115/46 kVTransformer#2 (BF-26962)	156	92.6	105.9	95.1	108.5
WESTMESA 345- WESTMS 2 1151	VVM3XFR	12	2	West Mesa-Pajarito 345 kV Line and West Mesa 345/115 kVTransformer#1 (BF-23582)	448	126.6	137.5	137.2	148.2

Option 2 Observations (excluding P6):

- The 46 kV line overloads are associated with VEF generation being offline for the outage of both West Mesa-Person 115 kV lines (common structure less than 1 mile). The dispatching of Rio Bravo generation will mitigate this overload.
- The 345kV line overloads are the result of Path 48 beyond its transfer capability. These overloads are due to insufficient load side generation. The dispatching of Rio Bravo generation will mitigate these 345kV line overloads.
- Hidden Mtn 345/115kV transformer, BA-Reeves 115kV line (RB), and Embudo-Sandia 115kV line (SE) overloads are caused by the high wind resource scenario #3. Curtailing these wind resources will mitigate these overloads.
- The West Mesa 115/345kV transformer (1 or 2) and West Mesa bus-tie have the highest overload levels for the outage of the West Mesa-Pajarito and one of the West Mesa 115/345kV transformers. PNM’s ten-year plan has recommended that the West Mesa 345kV station be reconfigured to eliminate this outage. With the West Mesa 345kV station reconfigured, the outage of the West Mesa 115/345kV transformers will overload the remaining West Mesa 115/345kV transformer. The dispatching of Rio Bravo generation will mitigate this overload.
- The pre-existing overloads associated with the NL line will need to be addressed by Los Alamos County and LANL since they are a result of a breaker failure outage internal to the LANL system.
- Most of the 115kV line overloads are mitigated in Table 12 with Option 2 system reinforcements mentioned above. The remaining overloads can be mitigated with the dispatching of Rio Bravo generation. The exception is the West Mesa-Irving 115kV line (WR). This overload is a function of the high load at Rio Rancho of 102 MW. The latest load forecasting information projects this load being reduced to 90 MW which will help mitigate this overload. In addition, in the past, this line had an emergency rating of 200 MVA and reestablishing this emergency rating should be pursued.

Summary Results by Count (# of times overloaded), P6

This study evaluated the impact of P6 outages (N-1-1) without any proposed system reinforcements. For the N-1-1 outages, no system adjustments were made between the two outages to provide a worst-case scenario. Normally a P6 analysis allows for system adjustments including generator redispatch, switched shunt adjustments, and transformer tap adjustments between the first (N-1-0) and second (N-1-1) contingency.

Table 14 provide a summary of the worst overloaded elements for P6 outages based on the most limited of the five (5) resource scenarios and the two (2) retirement scenarios studied. (The P6 analysis studied the retirement of both VEF and Reeves, and the retirement of only Reeves, but did not include the scenario of only VEF retirement.) Only the line segment of the highest loading is shown for any breaker-to-breaker line that has multiple segments. The "ID" of the line is also shown. In addition, the most limiting contingency for the overloaded element is listed and the column labeled "# of times overloaded" shows number of times this element is overloaded for different contingencies.

In addition, several elements listed below were found to be overloaded and are not shown in the table, as they can be mitigated as described.

- PNM has implemented a centralized load shedding scheme called Northern New Mexico Import Contingency Load Shedding Scheme ("ICLSS") that monitors several system conditions, including substation voltages and transmission line status and current. When conditions indicate the system is in danger of a pending cascading outage, load is dropped in an orderly fashion. ICLSS addresses outages of 345 kV line segments between Four Corners/San Juan to Albuquerque.
- The 46kV line overloads associated with the 115 kV line outage of Aspen-West Mesa and Prager-Richmond are not shown, as this outage results in the underlying 46 kV back feeding the 115 kV load. For this N-1-1 scenario, a remedial action scheme will need to be installed to tripped the Prager 115/46 kV transformer.
- The Socorro-Elephant Butte, Elephant Butte-Frontier, and Picacho-Frontier 115 kV line overloads can be mitigated with adjustments to the Belen phase shifter transformer.

Table 13 — Overloaded Elements for P6, pre-Mitigation

Pre-Mitigation				Includes NERC Categories: P6		Overload %		
Overloaded Element	ID	*# of times OVLD*	Resource Scenario	CONTINGENCY DESCRIPTION	Rating MVA	Both On	Reeves Off	Both Off
BALLP T 46 - PRAGER 461	46	5	1	Line Volcano-West Mesa2115kV LineWestMesa1-Snow Vista115kV	41	83.0	85.0	113.3
IRON_STR 46 - BALLP T 46 1	46	5	1	Line Volcano-WestMesa2115kV LineWestMesa1-Snow Vista115kV	41	78.0	80.0	108.3
CABEZON345 – RIOPUERC 3451	345	133	4	Line Four Corners-Pintado345 kV Line Pillar-Four Corners230 kV	1195	92.3	107.0	119.7
FOURCORN345-PINTADO3451	345	184	4	Line Cabezon-San Juan345kV Line Pillar-Four Corners 230kV	1099	99.3	114.9	128.0
FOURCORN345 - SAN_JUAN3451	345	4	4	Line Four Corners-Pintado345 kV Line SanJuan-Ship Rock 345kVandSanJuan3451230kVTian	1195	90.1	101.6	110.8
PINTADO345- RIOPUERC345 1	345	184	1	Line Cabezon-San Juan345kV Line Pillar-Four Corners 230kV	1195	92.4	106.0	116.6
SAN_JUAN345- CABEZON345 1	345	135	4	Line Four Corners-Pintado 345 kV Line Pillar-Four Corners230 kV	1195	92.8	107.2	120.0
YAHTAHEY115-ALLISONT1151	**AY**	**24**	**4**	Line Four Comers-Pintado 345 kV Line Pillar-Four Corners230 kV	133	97.2	107.1	117.7
8-A 345 - B-A 1151	BAXFR	1	3	LineBA-Norton345kV LineHiddenMoun1ain-WesternSpirit345kV	516	100.4	105.6	107.6
RICHMOND PNM115 - CG-11151	CG	86	1	Transformer Sandia345/115kV LineVolcano-WestMesa2115 kV	154	112.8	113.5	120.4
GALLUPPG115-YAHTAHEY 1151	**GYTH**	70	4	LineFourCorners-Pintado345 kV LinePillar-FourCorners230 kV	112	103.3	115.1	127.8
HIODENMOUNT115- RATTLESNKPNM11	HID-RAT	2	3	Line Hidden Mountain-Pajarito 345kV Line Hidden Mtn-Rattlesnake115 kV#2	350	120.0	98.7	103.6
HIOOENMOUNT 345/115	HMXFR	**17**	**3**	Line Pajarito-WestMesa345kV Transforme1Sandia345/115 kV	**450**	103.0	104.4	108.8
OJO115- HERNANDZ1151	HO	**12**	2	LineOjo-Taos345 kV LinePintado-RioPuerco345kV	186	106.6	115.7	123.6
COTTONWT115- IRVING1151	IC	**11**	1	LineCorralesBluff-Pachmann115kV Line Rio Puerco-Veranda 115kV	156	135.3	137.1	137.6
IRVING115-\.IAYNE21151	IR	**48**	1	LineAspen-WestMesa2115kV Bus Tie Sandia 115kV	156	116.2	155.3	158.8
MCKINLEY 345-YAHTAHEY1151	MCXFR	**19**	**4**	Line Cabezon-San Juan345kV Transformer Yah- Ta-Hey 3451115kV	207	112.0	121.8	132.3
MSSIONT 115- NORTHPNM1151	**MN**	**24**	**1**	Transformer Sandia 3451115kV Line Aspen-West Mesa2115kV	135	133.5	135.3	139.1
NORTON_2115 - BUCKMAN1151	**NL**	**5**	**1**	TransformerBA345l115 kV LineNo1ton-STA115 kV	116	105.1	111.2	113.4
WESTMS 2115- MARIPOSA1151	**NW**	31	1	Line Aspen-West Mesa 2115kV Bus *Tie* Sandia 115kV	156	123.0	152.2	153.3
OJO345-OJO1151	OJOXFR	**8**	**2**	LineOjo-Taos345 kV Line Pintado-Rio Puerco 345kV	207	97.2	105.2	111.8
PERSON115- PROSPER1151	ERS-PRO	20	1	Transformer Sandia3451115kV Line Aspen-\.lest Mesa2115kV	**156**	108.8	118.3	110.4
VOLCANOT115- ANDERSON1151	**PM**	**98**	**2**	Line KAFB-Sandia115kV Line West Mesa1-Snow Vista115kV	**156**	111.2	110.6	146.8
RICHMOND PNM115 - NORTHPNM1151	**PN**	**23**	**1**	TransformerSandia345l115kV Line Aspen-West Mesa2115kV	**156**	147.3	143.8	150.3
SEWER_PL115- S. COORS1151	PW	18	**2**	LineKAFB-Sandia115kV Line Volcano-West Mesa2115kV	156	86.9	86.3	120.5
B-A 115- NO BEAN1151	RB	**84**	1	LineAspen-WestMesa2115kV Bus Tie Sandia 115kV	155	95.5	114.8	120.6
REEVES 1115- NORTHPNM1151	**RN**	**20**	1	Transformer Sandia3451115 kV Line Aspen-\.lest Mesa2115 kV	156	126.9	122.1	126.3
PRAGER 115-MONTANOT 1151	RP	5	1	TransformerBA3451115kV Bus Tie Sandia115kV	356.8	86.7	104.2	105.5
SANDIA345-SANDIA._21151	SANDXFR	7	3	Transformer West Mesa 3451115kV #1 Transformer WM 3451115 kV #2	**436**	100.5	109.9	115.6
EMBUDO115-EAST TAP1151	SE	3	1	LineAspen-WestMesa2115kV Bus Tie Sandia 115kV	**156**	96.1	100.5	101.6
WESTMS 3115- SCENICNM1151	SK	2	2	Transformer BA 3451115 kV Transfo1merRioPuerco3451115kV	**120**	98.3	105.2	105.4
NORTHPNM115- MPLA2A_T 1151	TL	40	1	Transformer BA3451115 kV BusTieSandia115kV	156	102.5	108.5	108.5
WESTMS 1115- CENTRALP1151	WJ	647	2	LineKAFB-Sandia115kV Line Volcano-West Mesa2115kV	**156**	126.1	125.6	160.1
WESTMS 1115-WESTMS 21151	WMBUSTIE	16	1	Transformer West Mesa 3451115kV#2._BusTie Sandia115kV	355	111.2	128.1	136.0

WESTMESA 345-WESTMS 21151	WM3XFR	154	3	Transformer Hidden Mountain3451115 kV Transformer WM 3451115 kV #1	**448**	130.4	139.4	150.5
WESTMS 2115- S.JOSEPH1151	WP	5	1	Transformer BA 3451115 kV Bus *Tie* Sandia115kV	322	92.1	104.4	106.8
WESTMS 1115-PARADIS21151	WR	126	1	Line Aspen-West Mesa 2115kV Bus Tie Sandia 115kV	156	119.6	145.2	144.6
MENDOZAT115- GALLUPPG1151	WTG	11	4	Line Four Corners-Pintado 345 kV Line Pillar-Four Corners 230 kV	114	86.8	88.3	110.5
WESTMS 2115 - VOLCANOT1151	WV	636	2	LineKAFB-Sandia115kV Line West Mesa1-Snow Vista115kV	**156**	132.1	131.6	167.9

P6 Observations pre-mitigation:

- The 46kV line overloads are associated with VEF generation being offline for the outage of both West Mesa-Person 115kV lines (common structure less than 1 mile). The dispatching of Rio Bravo generation will mitigate these overloads.
- The AY, OJO XFR, WTG, and 345kV lines shown in Table 13 are overloaded due to Path 48 exceeding its transfer capability. These overloads result from insufficient load-side generation. Dispatching Rio Bravo generation will mitigate these line overloads when Reeves generation is off. However, with both Reeves and VEF generation off, Path 48 remains beyond its transfer capability even with Rio Bravo generation dispatched. This situation necessitates either the construction of the Norton-Ojo 345kV line or the addition of load side generation.
- The WR and IC lines in the past had an established emergency rating. Reestablishing these emergency ratings should be pursued to resolve the overloads. The IC overload is independent of Reeves and VEF retirement.
- Both West Mesa-Person 115kV lines (WV and WJ) have the highest number of contingencies (647 and 636) overloading these lines. These lines also consist of the PM and PW lines. These overloads are mostly associated with the outage of one of the West Mesa-Person 115kV lines, insufficient transmission capacity into and out of the Southeast Albuquerque area, and outages associated with serving the Hidden Mtn load. Construction of the 345 kV reinforcements and a new Prosperity–Sandia 115kV line into Sandia bus #2 115kV station will mitigate these overloads.
- The NL line overload is associated with the BA 115/345kV transformer and Norton-STA 115kV line outage. This results in less flow on the BA-STA 115kV line (RL) resulting in the NL being overloaded. Los Alamos County will need to either dispatch loadside generation or curtail load.
- The line overloads for the CG, MN, PN, RB, RP, RN, SE, TL, WP, PERS-PROS1 lines are mainly due to insufficient transmission capacity into and out of the Southeast Albuquerque area, particularly during outages involving the Sandia 115kV lines and/or the Sandia 115/345kV transformer. Construction of the 345kV reinforcements and a new Prosperity–Sandia 115kV line into Sandia bus #2 115 kV will mitigate these overloads.
- The line overloads of the NW and IR lines are mainly due to insufficient transmission capacity into and out of the Southeast Albuquerque area and/or the outage of the WP line for the most part due to Reeves generation retirement. Possible mitigation solutions can include establishing emergency rating for these lines or reconductoring the lines. Interim load shedding can be used to temporarily mitigate these line overloads.
- The SK line overload is associated with both the Rio Puerco and BA 115/345kV transformer outage. Possible solutions can include establishing an emergency rating for this line or reconductoring the line. Interim load shedding can be used to temporarily mitigate this line overload.
- The SE line overload is less than 1% which is an acceptable risk.
- The overloads of BA 115/345kV transformer, Hidden Mtn 115/345kV transformer, and Hidden Mtn-Rattlesnake 115kV line (#1 or #2) are the result of high wind resources from eastern New Mexico. Curtailing these wind resources will mitigate these overloads.

- The overloads of Hidden Mtn 115/345kV transformer and Hidden Mtn-Rattlesnake 115kV line (#1 or #2) are the result of high wind resources from eastern New Mexico. Curtailing these wind resources will mitigate these overloads.
- The highest overloads of Sandia 115/345kV transformer, West Mesa 115/345kV transformer, and West Mesa 115kV bus tie are preexisting overloads. These overloads are the result of the outage of two bulk transformers (i.e., one transformer out for maintenance and preparing for the second transformer outage) in the Albuquerque metro area. Construction of the 345 kV reinforcements, new Prosperity–Sandia 115kV line into Sandia bus #2 115kV, and additional Hidden Mtn transformation will mitigate most of these overloads.
- The overloads of GYTH, Mckinley 115/345kV transformer, and HO are preexisting overloads.
    - The Mckinley 115/345kV transformer overload is due to outage of larger MVA Mckinley 115/345kV transformer outage and one of the 345 kV line segments between Four Corner/San Juan to Albuquerque. Replacing this transformer with 300 MVA (same size as second transformer) will mitigate this overload.
    - GYTH line is associated with the 230 KV line outage and one of the 345 kV line segments between Four Corner/San Juan to Albuquerque. Dispatching of Rio Bravo generation will mitigate this overload for Reeves being off-line. If both VEF and Reeves are off-line this line will be slightly overloaded. Possible solution can include Tri-State Generation and Transmission Association, Inc (Tri-State) establishing emergency rating for this line.
    - HO line overload is associated with Ojo-Taos 345 kV line and one of the 345 kV line segments between Four Corner/San Juan to Albuquerque. Inserting the Norton-Hernandez 115 kV series reactor and dispatching Rio Bravo generation will mitigate this overload for Reeves being off-line. If both VEF and Reeves are off-line this line will need to be reconductor.

Applying the Option 1 system upgrades reduces the number of overloaded elements, resulting in Table 14.

Table 14 — Overloaded Elements For P6, Option 1

Option 1				Includes NERC Categories: P6		Overload %		
Overloaded Element	**ID**	***# of times OVLD***	**Resource Scenario**	**CONTINGENCY DESCRIPTION**	**Rating MVA**	**Both On**	**Reeves Off**	**Both Off**
CABEZON 34S - RIOPUERC34S1	345	144	4	Line Four Corners - Pintado 34S kV line Pillar-Four Corners 230 kV	1195	93.0	107.6	120.3
FOURCORN 34S - SAN JUAN 34S1	345	4	4	Line Four Corners-Pintado 34S kV line San Juan·Ship Rock 34S kV and San Juan 34S/230 kVTra	1195	90.5	102.0	111.2
FOURCORN 34S - PINTADO 34S l	345	193	4	Line Pillar-Four Corners 230 kV Line Rio Puerco--Cabezon 34S kV	1099	93.7	108.1	120.0
PINTADO 34S - RIOPUERC 34S l	345	192	1	Line Cabezon-San Juan 34S kV Line Pillar-Four Corners 230 kV	1195	92.1	106.6	116.2
SAN JUAN 34S - CABEZON 34S1	345	146	4	Line Four Corners-Pintado 34S kV line Pillar-Four Corners 230 kV	1195	93.4	107.8	120.6
YAHTAHEY 115 - ALLISONT 1151	AY	6	4	Line Four Corners-Pintado 34S kV Line Pillar-Four Corners 230 kV	133	9S.9	105.6	115.7
B·A 34S - B·A 115 1	BAXFER	l	3	Line BA-Norton 345 kV Line Hidden Mountain-Western Spirit 345 kV	516	94.7	99.5	100.8
GALLUPPG115 - YAHTAHEY 1151	GYTH	56	4	line Four Corners-Pintado 345 kV Line Pillar-Four Corners 230 kV	112	101.7	113.4	125.3
BELAIR T 115 - HW-CG 1151	CG	3	1	Transformer Sandia 345/115 kV Line KAFB-Sandia 115 kV	156	112.3	115.8	115.8
HIDDENMOUNT 115 - RATTLESNKPNM 115	HID-RAT	l	3	Line Hidden Mountain-Pajarito 345 kV line Hidden Mountain-Rattlesnake 115kV#2	350	116.1	117.4	99.6
HIDOENMOUNT 345 - HIDOENMOUNT 115	HMXFR	3	3	Line Hidden Mountain-Pajarito 345 kV Transformer West Mesa 345/115 kV #2	450	99.9	101.2	85.5
OJO 115 - HERNANDZ 1151	HO	12	2	Line Ojo--Taos 345 kV Line Pintado--Rio Puerco 345 kV	186	106.1	115.7	123.5
CORRALS 115 - COTTONWT 1151	IC	9	1	line Corrales Bluff-Pachmann 115 kV Line Rio Puerco--Veranda 115 kV	156	114.2	115.0	115.3
IRVING 115 - WAYNE 2 1151	IR	2S	1	line Aspen - West Mesa 2115 kV Bus Tie Sandia 115 kV	156	74.0	108.7	108.9
MCKINLEY 345 - YAHTAHEY 1151	MCXFR	14	4	line Cabezon-San Juan 345 kV Transformer Yah-Ta-Hey 345/115 kV	207	110.0	120.5	130.6
MSSIONT 115 - NORTHPNM 115 l	MN	16	1	line Prosperity-Sandia 345 kV Line Aspen-West Mesa 2 115kV	135	119.0	119.2	121.5
BUCKMAN 115 - WHITEROK1151	NL	4	1	Transformer BA 345/115 kV Line Norton-STA 115 kV	116	100.0	105.2	107.5
LOSANGEL115 - REEVES 11151	NW	16	1	Transformer BA 345/115 kV_Line Aspen-West Mesa 2 115 kV	156	96.9	119.3	119.3
OJO 345 - OJO115 l	OJOXFR	9	2	line Ojo--Taos 345 kV line Pintado-Rio Puerco 345 kV	207	97.0	104.9	111.3
PERSON 115 - PROSPER 1151	PERS-PROSI	109	3	Transformer West Mesa 345/115 kV #1 Transformer West Mesa 345/115 kV #2	156	117.3	125.5	153.3
RICHMONO PNM 115 - NORTHPNM 115 1	PN	8	1	Line Prosperity-Sandia 34S kV Line Aspen - West Mesa 2 115 kV	156	124.1	118.2	122.1
REEVES l US· NORTHPNM 115 l	RN	5	1	Transformer Sandia 345/115 kV Line Aspen-West Mesa 2 115kV	156	111.7	105.4	107.8
WESTMS 3 115 - SCENICNM 1151	SK	3	2	Transformer BA345/115 kV Transformer Rio Puerco 345/115 kV	120	99.9	106.8	107.2
WESTMS 1115 - CENTRAL? 115 1	WJ	2	1	line Prosperity-Sandia 345 kV Transformer Prosperity 345/115 kV #1	156	82.6	84.6	100.8
WESTMS 1115 - WESTMS 2 115 1	WM BUSTIE	2	3	Transformer Hidden Mountain 345/115 kV Transformer West Mesa 345/115 kV #1	355	92.3	93.0	100.9
WESTMESA 345 - WESTMS 1115 1	WM3XFR	45	3	Transformer Hidden Mountain 345/115 kV Transformer West Mesa 345/115 kV #2	448	104.2	113.3	120.6
PARADIS2 115 - IRVING 1151	WR	66	1	Transformer BA 345/115 kV Transformer Rio Puerco 345/115 kV	156	102.6	122.3	122.5
MENDOZAT 115 - GALLUPPG1151	WTG	3	4	Line Four Comers-Pintado 345 kV line Pillar-Four Corners 230 kV	114	85.3	96.7	108.1
WESTMS 2 115 - VOLCANOT 115 1	*WV*	6	1	Line Prosperity-Sandia 345 kV Transformer Prosperity 345/115 kV #1	156	87.8	90.0	109.3

Option 1 P6 Observations:

- The 46kV line overloads are associated with VEF generation being offline for the outage of both West Mesa-Person 115kV lines (common structure less than 1 mile). The dispatching of Rio Bravo generation will mitigate this overload.
- The AY, BA XFR, NL, OJO XFR, WTG, WM bus tie, and 345kV lines shown in Table 14 are overloaded due to Path 48 exceeding its transfer capability. These overloads result from insufficient load-side generation. Dispatching Rio Bravo generation will mitigate these line overloads when Reeves generation is off. However, with both Reeves and VEF generation off, Path 48 remains beyond its transfer capability even with Rio Bravo generation dispatched. This situation necessitates either the construction of the Norton-Ojo 345kV line or the addition of load side generation.
- The WR and IC lines in the past had an emergency rating. Reestablishing these emergency ratings should be pursued to resolve the overloads. The IC overload is independent of the Reeves and VEF retirement.
- The line overloads of the NW and IR lines are mainly due to insufficient transmission capacity into and out of the Southeast Albuquerque area and/or the outage of the WP line for the most part due to Reeves generation retirement. Possible solutions can include establishing emergency rating for these lines or reconductoring the lines. Meanwhile, interim load shedding can be used to mitigate these line overloads.
- The SK line overload is associated with both the Rio Puerco and BA 115/345kV transformer outage. Possible solutions can include establishing emergency rating for this line or reconductoring the lines. Meanwhile, interim load shedding can be used to mitigate this line overload.
- The overloads of GYTH, Mckinley 115/345kV transformer, and HO are preexisting overloads.

  - The Mckinley 115/345kV transformer overload is due to outage of larger MVA Mckinley 115/345kV transformer outage and one of the 345 kV line segments between Four Corner/San Juan to Albuquerque. Replacing this transformer with 300 MVA (same size as second transformer) will mitigate this overload.
  - GYTH line is associated with the 230 KV line outage and one of the 345 kV line segments between Four Corner/San Juan to Albuquerque. Dispatching of Rio Bravo generation will mitigate this overload for Reeves being off-line. If both VEF and Reeves are off-line this line will be slightly overloaded. Possible solution can include Tri-State establishing emergency rating for this line.
  - HO line overload is associated with Ojo-Taos 345 kV line and one of the 345 kV line segments between Four Corner/San Juan to Albuquerque. Inserting the Norton-Hernandez 115 kV series and dispatching Rio Bravo generation will mitigate this overload for Reeves being off-line. If both VEF and Reeves are off-line this line will need to be reconductor.
- The overloads of Hidden Mtn 115/345kV transformer and Hidden Mtn-Rattlesnake 115kV line (#1 or #2) are the result of high wind resources from eastern New Mexico. Curtailing these wind resources will mitigate these overloads.
- The highest overloads of Sandia 115/345kV transformer, West Mesa 115/345kV transformer, and West Mesa 115kV bus tie are preexisting overloads. These overloads are the result of outage of two bulk transformers (i.e., one transformer out for maintenance and preparing for the second transformer outage) in the Albuquerque metro area. Constructing of the 345kV reinforcements, new Prosperity–Sandia 115kV line into Sandia bus #2 115kV, and additional Hidden Mtn transformation will mitigate most of these overloads. The remaining overloads are associated with West Mesa transformer that result in the transformer being overload by 10% with both Reeves and VEF offline. The dispatching of Rio Bravo generation will mitigate this overload should help reduce this overload to less than 5% which is an acceptable risk.
- The Person-Prosperity 115kV line is overloaded and to mitigate this overload it will require the line to be reconductored.

Option 2 P6 Observations:

The N-1 analysis for Option 2, which involves replacing existing conductors with advanced conductors, does not significantly change the power flow loading on the lines. Therefore, an N-1-1 analysis was not conducted for Option 2 and results are likely to be similar to that pre-mitigation.

Summary Results by Retirement Category

Tables 15 and 16 focus on two retirement scenarios: 1) Both VEF and Reeves generation retired, and 2) Only Reeves retired. It then compares the two system improvement options (1 and 3) for the two retirement scenarios and provides a summary of the overloaded elements that remain after the system improvement options are modeled.

Table 15 —Summary Retirement Scenario Comparison, P1, P2, P4, P7

Overloaded Element (P1,P2,P4,P7)		Option 1	Option 2	Option 1	Option 2
Includes Dispatch Scenarios 1-5	ID	Both VEF and Reeves retired		Reeves retired and VEF active	
P1, P2,P4 and P7 Outages					
CABEZON-RIOPUERC 345 kV Ckt 1	345	P1, P2	P1, P2	-------	-------
FOURCORN-PINTADO 345 kV Ckt 1	345	P1, P2	P1, P2	-------	-------
PINTADO-RIOPUERC 345 kV Ckt 1	345	P1, P2	P1, P2	-------	-------
SAN_JUAN-CABEZON 345 kV Ckt 1	345	P1, P2	P1, P2	-------	-------
WESTMESA/WESTMS_1 345/115 kV T1	WM3XFR	P2	P1, P2	-------	P1, P2
WESTMESA/WESTMS_2 345/115 kV T2	WM3XFR	P2	P1, P2	-------	P1, P2
PERSON-PROSPER 115kV	PERS-PROSI	P1,P2, P7		-------	

WESTMS_1-PARADIS2 115 kV	WR	P1, P2, P7	-------	P1, P2, P7	-------
NORTON-BUCKMAN 115 and/or- WHITEROK 115 1 (NL)	NL	P2	P2	P2	P2

Loadings < 100.2% are not shown.

Table 16 —Summary Retirement Scenario Comparison, P6

Overloaded Element (P6)		Option 1	Option 1
Includes Dispatch Scenarios 1-5	ID	Both VEF and Reeves retired	Reeves retired and VEF active
P6 Outages			
CABEZON 345 - RIOPUERC3451	345	P6	P6
FOURCORN 345 - SAN JUAN 3451	345	P6	P6
FOURCORN 345 - PINTADO 345 l	345	P6	P6
PINTADO 345 - RIOPUERC 345 l	345	P6	P6
SAN JUAN 345 - CABEZON 3451	345	P6	P6
B·A 345 - B·A 115 1	BAXFER	P6	< 100%
HIDDENMOUNT 345 - HIDDENMOUNT 115	HMXFR	< 100%	P6
MCKINLEY 345 - YAHTAHEY 1151	MCXFR	P6	P6
OJO 345 - OJO115 1	OJOXFR	P6	P6
WESTMESA 345 - WESTMS1 115 1	WM3XFR	P6	P6
WESTMESA 345 - WESTMS2 115 1	WM3XFR	P6	P6
BELAIR T 115 - HW-CG 1151	CG	P6	P6
BUCKMAN 115 - WHITEROK1151	NL	P6	P6
CORRALS 115 - COTTONWT 1151	IC	P6	P6
GALLUPPG115 - YAHTAHEY 1151	GYTH	P6	P6
HIDDENMOUNT 115 - RATTLESNKPNM 115	HID-RAT	< 100%	P6
IRVING 115 - WAYNE 2 1151	IR	P6	P6
LOSANGEL115 - REEVES 11151	**NW**	P6	P6
MENDOZAT 115 - GALLUPPG1151	WTG	P6	<101%
MSSIONT 115 - NORTHPNM 115 l	MN	P6	P6
OJO 115 - HERNANDZ 1151	HO	P6	P6
PARADIS2 115 - IRVING 1151	WR	P6	P6
PERSON 115 - PROSPER 1151	PERS-PROSl	P6	P6
REEVES1 115 - NORTHPNM 115 l	RN	P6	P6
RICHMOND PNM 115 - NORTHPNM 115 1	PN	P6	P6
WESTMS 2 115 - VOLCANOT 115 1	***WV***	P6	< 100%
WESTMS 3 115 - SCENICNM 1151	SK	P6	P6
WESTMS 1 115 - CENTRAL? 115 1	WJ	P6	< 100%
WESTMS 1 115 - WESTMS 2 115 1	WM BUSTIE	< 101%	< 100%
YAHTAHEY 115 - ALLISONT 1151	**AY**	P6	P6
REEVES_2 115 - MSSIONT 115 1	**NR**	P6	P6
PERSON 115/46		P6	P6

The P6 power flow results had five (5) contingencies that did not solve (diverged) for the pre-retirement cases and the post-retirement with Option 1 or Option 2 system upgrades. The diverged P6 contingencies are:

1. Aspen-West Mesa 2 115 kV (Prager-Richmond 115 kV).
2. Cabezon-San Juan 345 kV (Four Corners-Pintado 345 kV).
3. Cabezon-San Juan 345 kV (Pintado-Rio Puerco 345 kV).

4. Four Corners-Pintado 345 kV (Rio Puerco-Cabezon 345 kV).
5. Pintado-Rio Puerco 345 kV (Rio Puerco-Cabezon 345 kV).

The outage of Aspen-West Mesa and Prager-Richmond outage results in the underlying 46 kV back feeding the 115 kV load. For this N-1-1 the Prager 115/46 kV should be tripped as part of a local remedial action scheme.

PNM has implemented a centralized load shedding scheme called Northern New Mexico Import Contingency Load Shedding Scheme ("ICLSS") that monitors several system conditions, including substation voltages and transmission line status and current. When conditions indicate the system is in danger of a pending cascading outage, load is dropped in an orderly fashion. ICLSS addresses outages of above 345 kV line segments between Four Corners/San Juan to Albuquerque.

Detailed Results for Scenario 1 (100% Summer Peak)

Tables 17, 18 and 19 for Scenario 1 (100% summer peak) provide contingency details (excluding the P6 contingencies) for dispatch scenario 1 and compares the retirement scenarios against the mitigation options.

Table 17 — 100% Summer Peak Overloads, P1

P1 Results				Scenario 1: 100% Peak BOTH ON			Reeves OFF			BOTH OFF		
Element	kV	CONTINGENCY DESCRIPTION	RATING MVA	Pre	OPT 1	OPT 3	Pre	OPT 1	OPT 3	Pre	OPT 1	OPT 3
CABEZON-RIOPUERC 345 kV Ckt 1	345	Line Pintado-Rio Puerco 345 kV	1195	0.816	0.822	0.815	0.924	0.932	0.924	1.05	1.056	1.048
FOURCORN-PINTADO 345 kV Ckt 1	345	Line Cabezon-San Juan 345 kV	1099	0.754	0.761	0.753	0.864	0.872	0.864	0.986	0.994	0.985
FOURCORN-PINTADO 345 kV Ckt 1	345	Line Rio Puerco-Cabezon 345 kV	1099	0.748	0.756	0.748	0.887	0.895	0.887	0.983	0.991	0.982
PINTADO-RIOPUERC 345 kV Ckt 1	345	Line Cabezon-San Juan 345 kV	1195	0.825	0.832	0.825	0.924	0.931	0.924	1.033	1.04	1.032
PINTADO-RIOPUERC 345 kV Ckt 1	345	Line Rio Puerco-Cabezon 345 kV	1195	0.821	0.827	0.82	0.945	0.953	0.945	1.031	1.038	1.03
SAN_JUAN-CABEZON 345 kV Ckt 1	345	Line Pintado-Rio Puerco 345 kV	1195	0.821	0.828	0.821	0.93	0.937	0.929	1.053	1.059	1.052
WESTMESA/WESTMS_1 345/115 kV T1	345	Transformer West Mesa 345/115 kV #2	448	0.891	0.743	0.899	0.97	0.823	0.974	1.043	0.871	1.048
WESTMESA/WESTMS_2 345/115 kV T1	345	Transformer West Mesa 345/115 kV #1	448	0.9	0.751	0.907	0.979	0.832	0.984	1.053	0.88	1.059
GALLEGOS/GALLEGOS 230/115 kV T1	230	Transformer San Juan-Hogback 230 kV	100	0.977	0.966	0.977	0.967	0.972	0.967	0.957	0.963	0.957
BELAIR_T-HW-CG 115 kV Ckt 1	115	Line Pajarito-Sandia 345 kV	250.2	1.026	Not Run	0.631	1.032	Not Run	0.634	1.08	Not Run	0.662
BELAIR_T-SPEDRO_T 115 kV Ckt 1	115	Line Pajarito-Sandia 345 kV	250.2	0.949	Not Run	0.583	0.954	Not Run	0.586	1.002	Not Run	0.614
CENTRALP-SNOW_VISTA 115 kV Ckt 1	115	Line Volcano-West Mesa 2 115 kV	250.2	0.865	0.394	0.641	0.871	0.385	0.644	1.115	0.52	0.822
CENTRALP-SNOW_VISTA 115 kV Ckt 1	115	Line Person-Volcano 115 kV	250.2	0.794	0.349	0.59	0.8	0.34	0.593	1.043	0.474	0.77
CG-1-HW-CG 115 kV Ckt 1	115	Line Pajarito-Sandia 345 kV	250.2	1.026	Not Run	0.631	1.032	Not Run	0.634	1.08	Not Run	0.662
PERSON-ANDERSON 115 kV Ckt 1	115	Line West Mesa 1-Snow Vista 115 kV	250.2	0.745	0.224	0.415	0.75	0.214	0.417	1.016	0.365	0.569
RICHMOND_PNM-CG-1 115 kV Ckt 1	115	Line Pajarito-Sandia 345 kV	250.2	1.026	Not Run	0.631	1.032	Not Run	0.634	1.08	Not Run	0.662
VOLCANOT-ANDERSON 115 kV Ckt 1	115	Line West Mesa 1-Snow Vista 115 kV	250.2	0.79	0.269	0.443	0.796	0.258	0.445	1.061	0.41	0.597
WESTMS_1-CENTRALP 115 kV Ckt 1	115	Line Volcano-West Mesa 2 115 kV	250.2	0.962	0.493	0.702	0.969	0.484	0.705	1.213	0.619	0.883
WESTMS_1-CENTRALP 115 kV Ckt 1	115	Line Person-Volcano 115 kV	250.2	0.892	0.448	0.651	0.898	0.439	0.654	1.141	0.572	0.831
WESTMS_1-CENTRALP 115 kV Ckt 1	115	Line Pajarito-Sandia 345 kV	250.2	0.827	Not Run	0.665	0.847	Not Run	0.681	1.01	Not Run	0.814
WESTMS_1-PARADIS2 115 kV Ckt 1	115	Line Aspen-West Mesa 2 115 kV	156	0.817	0.865	0.811	0.99	1.039	0.98	0.97	1.025	0.958
WESTMS_1-PARADIS2 115 kV Ckt 1	115	Transformer Rio Puerco 345/115 kV	156	0.801	0.832	0.794	0.959	0.991	0.948	0.946	0.983	0.934
WESTMS_1-PARADIS2 115 kV Ckt 1	115	Line Aspen-Prager 115 kV	156	0.78	0.829	0.774	0.952	1.002	0.943	0.932	0.988	0.921
WESTMS_2-VOLCANOT 115 kV Ckt 1	115	Line West Mesa 1-Snow Vista 115 kV	250.2	1.017	0.497	0.586	1.024	0.485	0.588	1.29	0.638	0.741
WESTMS_2-VOLCANOT 115 kV Ckt 1	115	Line Person-Snow Vista 115 kV	250.2	0.832	0.369	0.479	0.838	0.356	0.482	1.104	0.51	0.634
WESTMS_2-VOLCANOT 115 kV Ckt 1	115	Line Pajarito-Sandia 345 kV	250.2	0.878	Not Run	0.427	0.902	Not Run	0.438	1.095	Not Run	0.533
WESTMS_2-VOLCANOT 115 kV Ckt 1	115	Line KAFB-Sandia 115 kV	250.2	0.818	0.369	0.393	0.813	0.356	0.391	1.043	0.481	0.502
WESTMS_2-VOLCANOT 115 kV Ckt 1	115	Line Pajarito-West Mesa 345 kV	250.2	0.818	0.447	0.399	0.832	0.439	0.405	1.027	0.568	0.501
WESTMS_2-VOLCANOT 115 kV Ckt 1	115	Line Belen-Tome 115 kV	250.2	0.65	0.315	0.314	0.664	0.311	0.32	1.006	0.522	0.486
WESTMS_2-VOLCANOT 115 kV Ckt 1	115	Line Aspen-West Mesa 2 115 kV	250.2	0.787	0.455	0.384	0.804	0.456	0.392	0.988	0.576	0.483

Table 18 — 100% Summer Peak Overloads, P2

P2-P4 Results			Scenario 1: 100% Peak								
			BOTH ON			Reeves OFF			BOTH OFF		
Element	CONTINGENCY DESCRIPTION	RATING MVA	Pre	OPT 1	OPT 3	Pre	OPT 1	OPT 3	Pre	OPT 1	OPT 3
CABEZON-RIOPUERC 345 kV Ckt 1	Rio Puerco-Pintado 345 kV Line (BF-34082)	1195	0.816	0.822	0.815	0.924	0.932	0.924	1.05	1.056	1.048
CABEZON-RIOPUERC 345 kV Ckt 1	Pintado 345 kV Station	1195	0.812	0.819	0.812	0.921	0.929	0.92	1.047	1.053	1.046
CABEZON-RIOPUERC 345 kV Ckt 1	Pintado-Rio Puerco-Quail Ranch 345 kV Line (BF-35182)	1195	0.808	0.819	0.808	0.916	0.928	0.915	1.04	1.052	1.039
FOURCORN-PINTADO 345 kV Ckt 1	Cabezon 345 kV Station	1099	0.754	0.761	0.753	0.864	0.872	0.864	0.988	0.996	0.987
FOURCORN-PINTADO 345 kV Ckt 1	San Juan-Cabezon 345 kV Line (BF-17482)	1099	0.754	0.761	0.753	0.864	0.872	0.864	0.986	0.994	0.985
FOURCORN-PINTADO 345 kV Ckt 1	San Juan-Cabezon 345 kV Line and San Juan 345/69 kV Transformer (BF-18582)	1099	0.754	0.761	0.753	0.864	0.872	0.863	0.986	0.993	0.985
FOURCORN-PINTADO 345 kV Ckt 1	Rio Puerco-Cabezon 345 kV Line (BF-39582)	1099	0.748	0.756	0.748	0.887	0.895	0.887	0.983	0.991	0.982
FOURCORN-PINTADO 345 kV Ckt 1	Cabezon-Rio Puerco-West Mesa #1 345 kV Line (BF-38482)	1099	0.737	0.75	0.737	0.875	0.889	0.874	0.97	0.984	0.969
PINTADO-RIOPUERC 345 kV Ckt 1	Cabezon 345 kV Station	1195	0.825	0.832	0.825	0.924	0.932	0.924	1.035	1.042	1.034
PINTADO-RIOPUERC 345 kV Ckt 1	San Juan-Cabezon 345 kV Line (BF-17482)	1195	0.825	0.832	0.825	0.924	0.931	0.924	1.033	1.04	1.032
PINTADO-RIOPUERC 345 kV Ckt 1	San Juan-Cabezon 345 kV Line and San Juan 345/69 kV Transformer (BF-18582)	1195	0.825	0.832	0.825	0.924	0.931	0.924	1.033	1.04	1.032
PINTADO-RIOPUERC 345 kV Ckt 1	Rio Puerco-Cabezon 345 kV Line (BF-39582)	1195	0.821	0.827	0.82	0.945	0.953	0.945	1.031	1.038	1.03
PINTADO-RIOPUERC 345 kV Ckt 1	Cabezon-Rio Puerco-West Mesa #1 345 kV Line (BF-38482)	1195	0.81	0.822	0.81	0.934	0.946	0.934	1.019	1.031	1.018
SAN_JUAN-CABEZON 345 kV Ckt 1	Rio Puerco-Pintado 345 kV Line (BF-34082)	1195	0.821	0.828	0.821	0.93	0.937	0.929	1.053	1.059	1.052
SAN_JUAN-CABEZON 345 kV Ckt 1	Pintado 345 kV Station	1195	0.818	0.825	0.818	0.927	0.934	0.926	1.05	1.057	1.049
SAN_JUAN-CABEZON 345 kV Ckt 1	Pintado-Rio Puerco-Quail Ranch 345 kV Line (BF-35182)	1195	0.814	0.825	0.814	0.922	0.934	0.921	1.044	1.055	1.043
WESTMESA/WESTMS_1 345/115 kV T1	West Mesa-Pajarito 345 kV Line & West Mesa 345/115 kV Transformer #2(BF-22482)	448	1.23	0.871	1.234	1.333	0.957	1.337	1.44	1.019	1.443
WESTMESA/WESTMS_1 345/115 kV T1	West Mesa 2-Volcano 115 kV Line and West Mesa 345/115 kV Transformer #2(BF-50562)	448	0.849	0.712	0.865	0.927	0.794	0.941	0.993	0.831	1.01
WESTMESA/WESTMS_2 345/115 kV T1	West Mesa-Pajarito 345 kV Line and West Mesa 345/115 kV Transformer #1 (BF-23582)	448	1.24	0.879	1.244	1.344	0.966	1.347	1.451	1.029	1.454
WESTMESA/WESTMS_2 345/115 kV T1	West Mesa-Arroyo 345 kV Line and West Mesa 345/115 kV Transformer #1 (BF-15782)	448	0.893	0.746	0.901	0.977	0.83	0.982	1.05	0.878	1.056
WESTMESA/WESTMS_2 345/115 kV T1	West Mesa 1-Huning Ranch 115 kV Line and West Mesa 345/115 kV Transformer (BF-52462)	448	0.887	0.738	0.895	0.97	0.822	0.975	1.04	0.865	1.046
WESTMESA/WESTMS_2 345/115 kV T1	West Mesa 1-Snow Vista 115kV Line & West Mesa 345/115kV Transformer #1(BF-52562)	448	0.863	0.719	0.86	0.943	0.801	0.937	1.011	0.841	1.003
WESTMESA/WESTMS_2 345/115 kV T1	Pajarito 345 kV Station (BF 21482 22582 24762)	448	0.842	0.587	0.843	0.915	0.644	0.916	0.983	0.687	0.984
BELAIR_T-HW-CG 115 kV Ckt 1	Pajarito 345 kV Station (BF 21482 22582 24762)	250.2	1.032	0.291	0.634	1.04	0.225	0.639	1.091	0.234	0.668
BELAIR_T-HW-CG 115 kV Ckt 1	Sandia 345 kV Station (BF-31282, 30182)	250.2	1.026	0.838	0.631	1.032	0.826	0.634	1.08	0.846	0.662
BELAIR_T-SPEDRO_T 115 kV Ckt 1	Pajarito 345 kV Station (BF 21482 22582 24762)	250.2	0.955	0.214	0.587	0.961	0.151	0.591	1.011	0.159	0.619
BELAIR_T-SPEDRO_T 115 kV Ckt 1	Sandia 345 kV Station (BF-31282, 30182)	250.2	0.949	0.762	0.583	0.954	0.75	0.586	1.001	0.769	0.613
CENTRALP-SNOW_VISTA 115 kV Ckt 1	West Mesa 2-Volcano 115 kV Line and West Mesa 1-2 115 kV Bus Tie (BF-50662)	250.2	0.846	0.383	0.625	0.86	0.382	0.634	1.097	0.513	0.805
CENTRALP-SNOW_VISTA 115 kV Ckt 1	El Cerro-Person-Volcano 115 kV Lines (BF-11962)	250.2	0.857	0.371	0.63	0.867	0.362	0.636	1.055	0.462	0.772
CENTRALP-SNOW_VISTA 115 kV Ckt 1	Person-Volcano 115 kV Line and Person 115/46 kV Transformer (BF-10862)	250.2	0.797	0.332	0.585	0.801	0.322	0.586	1.054	0.457	0.769
CENTRALP-SNOW_VISTA 115 kV Ckt 1	Volcano 115 kV Breaker (BF)	250.2	0.798	0.356	0.592	0.803	0.347	0.595	1.047	0.48	0.773
CENTRALP-SNOW_VISTA 115 kV Ckt 1	West Mesa 2-Volcano 115 kV Line and West Mesa 345/115 kV Transformer #2(BF-50562)	250.2	0.799	0.288	0.593	0.799	0.268	0.592	1.04	0.396	0.767
CG-1-HW-CG 115 kV Ckt 1	Pajarito 345 kV Station (BF 21482 22582 24762)	250.2	1.032	0.291	0.634	1.04	0.225	0.639	1.091	0.234	0.668
CG-1-HW-CG 115 kV Ckt 1	Sandia 345 kV Station (BF-31282, 30182)	250.2	1.026	0.838	0.631	1.032	0.826	0.634	1.08	0.846	0.662
NORTHPNM-MPLAZA_T 115 kV Ckt 1	Sandia-Richmond 115 kV Line and Sandia 115 kV Bus Tie (BF-23662)	250.2	1.021	1.026	0.64	1.061	1.061	0.665	1.063	1.062	0.666
NORTHPNM-MPLAZA_T 115 kV Ckt 1	Sandia 115 kV Bus Tie and KAFB Load (BF-22562)	250.2	0.998	1.014	0.626	1.041	1.051	0.653	1.041	1.052	0.653
NORTHPNM-MPLAZA_T 115 kV Ckt 1	Sandia 115 kV Bus Tie and Sandia 345/115 kV Transformer (BF-34562)	250.2	0.994	1.009	0.623	1.039	1.049	0.651	1.04	1.049	0.652
PERSON-ANDERSON 115 kV Ckt 1	West Mesa 1-Snow Vista 115 kV Line and West Mesa 1-3 115 kV Bus Tie (BF-52662)	250.2	0.775	0.265	0.433	0.778	0.254	0.433	1.044	0.406	0.586
PERSON-PROSPER 115 kV Ckt 1	Sandia-Richmond 115 kV Line and Sandia 115 kV Bus Tie (BF-23662)	156	1.044	0.38	1.037	1.052	0.427	1.044	1.06	0.643	1.05
RICHMOND_PNM-CG-1 115 kV Ckt 1	Pajarito 345 kV Station (BF 21482 22582 24762)	250.2	1.033	0.291	0.634	1.04	0.225	0.639	1.091	0.234	0.668
RICHMOND_PNM-CG-1 115 kV Ckt 1	Sandia 345 kV Station (BF-31282, 30182)	250.2	1.026	0.838	0.631	1.032	0.827	0.634	1.08	0.847	0.662
VOLCANOT-ANDERSON 115 kV Ckt 1	West Mesa 1-Snow Vista 115 kV Line and West Mesa 1-3 115 kV Bus Tie (BF-52662)	250.2	0.82	0.31	0.461	0.823	0.298	0.462	1.09	0.451	0.614
VOLCANOT-ANDERSON 115 kV Ckt 1	Snow Vista-West Mesa 115 kV Line and Unit 2 (BF)	250.2	0.743	0.238	0.416	0.749	0.227	0.418	1.014	0.38	0.57
VOLCANOT-ANDERSON 115 kV Ckt 1	Snow Vista-West Mesa 115 kV Line and Unit 1 (BF)	250.2	0.733	0.233	0.41	0.738	0.223	0.412	1.003	0.375	0.564
VOLCANOT-ANDERSON 115 kV Ckt 1	West Mesa 1-Snow Vista 115kV Line & West Mesa 345/115kV Transformer #1(BF-52562)	250.2	0.72	0.153	0.403	0.72	0.13	0.402	0.981	0.275	0.552
WESTMS_1-CENTRALP 115 kV Ckt 1	West Mesa 2-Volcano 115 kV Line and West Mesa 1-2 115 kV Bus Tie (BF-50662)	250.2	0.944	0.482	0.686	0.958	0.481	0.695	1.195	0.611	0.866
WESTMS_1-CENTRALP 115 kV Ckt 1	El Cerro-Person-Volcano 115 kV Lines (BF-11962)	250.2	0.955	0.469	0.691	0.965	0.461	0.697	1.153	0.561	0.833
WESTMS_1-CENTRALP 115 kV Ckt 1	Person-Volcano 115 kV Line and Person 115/46 kV Transformer (BF-10862)	250.2	0.895	0.431	0.646	0.899	0.421	0.647	1.152	0.555	0.83
WESTMS_1-CENTRALP 115 kV Ckt 1	Volcano 115 kV Breaker (BF)	250.2	0.895	0.454	0.653	0.901	0.445	0.656	1.144	0.579	0.834

P2-P4 Results			Scenario 1: 100% Peak								
			BOTH ON			Reeves OFF			BOTH OFF		
Element	CONTINGENCY DESCRIPTION	RATING MVA	Pre	OPT 1	OPT 3	Pre	OPT 1	OPT 3	Pre	OPT 1	OPT 3
WESTMS_1-CENTRALP 115 kV Ckt 1	West Mesa 2-Volcano 115 kV Line and West Mesa 345/115 kV Transformer #2(BF-50562)	250.2	0.897	0.388	0.654	0.898	0.367	0.654	1.138	0.495	0.829
WESTMS_1-PARADIS2 115 kV Ckt 1	Rio Puerco-BA 345 kV Line #2 and Rio Puerco 345/115 kV Transformer(BF-45082)	156	0.83	0.858	0.823	0.991	1.02	0.98	0.98	1.013	0.968
WESTMS_1-PARADIS2 115 kV Ckt 1	West Mesa 2-Aspen 115 kV Line and West Mesa 230/115 kV Transformer #2(BF-50362)	156	0.813	0.862	0.807	0.986	1.036	0.976	0.965	1.021	0.954
WESTMS_1-PARADIS2 115 kV Ckt 1	Sandia 115 kV Bus Tie and Sandia 345/115 kV Transformer (BF-34562)	156	0.8	0.836	0.786	0.98	1.017	0.962	0.963	1.004	0.944
WESTMS_1-PARADIS2 115 kV Ckt 1	Rio Puerco-Veranda 115 kV Line and Rio Puerco 345/115 kV Transformer (BF-58762)	156	0.803	0.834	0.797	0.965	0.996	0.954	0.953	0.988	0.941
WESTMS_1-PARADIS2 115 kV Ckt 1	Aspen-West Mesa 2 115 kV Line and Aspen Sub (Bkr 62262)	156	0.798	0.846	0.792	0.97	1.019	0.961	0.949	1.004	0.938
WESTMS_1-PARADIS2 115 kV Ckt 1	Sandia 115 kV Bus Tie and KAFB Load (BF-22562)	156	0.788	0.822	0.775	0.965	1.002	0.949	0.947	0.988	0.929
WESTMS_1-PARADIS2 115 kV Ckt 1	Rio Puerco 345/115 kV Transformer(BF-46182)	156	0.801	0.832	0.794	0.959	0.991	0.948	0.946	0.983	0.934
WESTMS_1-PARADIS2 115 kV Ckt 1	Aspen-Prager 115 kV Line and Aspen Sub (Bkr 62262)	156	0.792	0.84	0.786	0.964	1.013	0.954	0.943	0.999	0.932
WESTMS_1-PARADIS2 115 kV Ckt 1	BA-Rio Puerco 345 kV Line and BA 345/115 kV Transformer (BF-11482)	156	0.778	0.817	0.77	0.943	0.982	0.93	0.928	0.972	0.914
WESTMS_1-PARADIS2 115 kV Ckt 1	Prager-Aspen 115 kV Line and Prager 115/46 kV Transformer (BF-12462)	156	0.774	0.829	0.769	0.953	1.011	0.945	0.928	0.993	0.918
WESTMS_1-WESTMS_2 115 kV Ckt 1	West Mesa-Pajarito 345 kV Line & West Mesa 345/115 kV Transformer #2(BF-22482)	355	0.894	0.644	0.814	1.016	0.746	0.937	1.088	0.783	0.989
WESTMS_2-VOLCANOT 115 kV Ckt 1	West Mesa 1-Snow Vista 115 kV Line and West Mesa 1-3 115 kV Bus Tie (BF-52662)	250.2	1.046	0.536	0.603	1.051	0.523	0.604	1.318	0.678	0.757
WESTMS_2-VOLCANOT 115 kV Ckt 1	Snow Vista-West Mesa 115 kV Line and Unit 2 (BF)	250.2	0.969	0.466	0.558	0.975	0.453	0.561	1.241	0.608	0.713
WESTMS_2-VOLCANOT 115 kV Ckt 1	Snow Vista-West Mesa 115 kV Line and Unit 1 (BF)	250.2	0.959	0.461	0.552	0.965	0.449	0.555	1.231	0.602	0.707
WESTMS_2-VOLCANOT 115 kV Ckt 1	West Mesa 1-Snow Vista 115kV Line & West Mesa 345/115kV Transformer #1(BF-52562)	250.2	0.948	0.382	0.547	0.949	0.358	0.546	1.211	0.505	0.696
WESTMS_2-VOLCANOT 115 kV Ckt 1	Sandia-Richmond 115 kV Line and Sandia 115 kV Bus Tie (BF-23662)	250.2	0.968	0.367	0.465	0.966	0.339	0.464	1.199	0.465	0.576

Table 19 — 100% Summer Peak Overloads, P7

P7 Results			Scenario 1: 100% Peak								
			BOTH ON			Reeves OFF			BOTH OFF		
Element	Rating MVA	CONTINGENCY DESCRIPTION	Pre	OPT 1	OPT 3	Pre	OPT 1	OPT 3	Pre	OPT 1	OPT 3
CENTRALP-SNOW_VISTA 115 kV Ckt 1	250.2	Person-Volcano and West Mesa-Volcano 115 kV Lines (CS)	0.798	0.356	0.592	0.803	0.347	0.595	1.047	0.48	0.773
PERSON-ANDERSON 115 kV Ckt 1	250.2	West Mesa 1-Huning Ranch and West Mesa-Snow Vista 115 kV Line (CS < 1 mile)	0.765	0.243	0.427	0.769	0.231	0.428	1.041	0.389	0.583
PERSON-PROSPER 115 kV Ckt 1	156	Person-WMesa2& Snow Vista-WMesa1 115kV Lines(CS < 1 mile)	0.322	0.694	0.318	0.31	0.687	0.317	0.458	1.072	0.463
VOLCANOT-ANDERSON 115 kV Ckt 1	250.2	West Mesa 1-Huning Ranch and West Mesa-Snow Vista 115 kV Line (CS < 1 mile)	0.81	0.288	0.455	0.815	0.275	0.456	1.086	0.434	0.612
WESTMS_1-CENTRALP 115 kV Ckt 1	250.2	Person-Volcano and West Mesa-Volcano 115 kV Lines (CS)	0.895	0.454	0.653	0.901	0.445	0.656	1.144	0.579	0.834
WESTMS_1-PARADIS2 115 kV Ckt 1	156	Rio Puerco-Veranda and Pachmann-Rio Puerco 115 kV Lines (CS)	0.831	0.863	0.825	0.994	1.026	0.983	0.983	1.018	0.971
WESTMS_2-VOLCANOT 115 kV Ckt 1	250.2	West Mesa 1-Huning Ranch and West Mesa-Snow Vista 115 kV Line (CS < 1 mile)	1.038	0.516	0.598	1.043	0.502	0.599	1.315	0.662	0.755
WESTMS_2-VOLCANOT 115 kV Ckt 1	250.2	Person-Snow Vista 115 kV Line & Person-Tome 46 kV Line(CS)	0.806	0.355	0.465	0.812	0.343	0.467	1.076	0.495	0.618
WESTMS_2-VOLCANOT 115 kV Ckt 1	250.2	Tome-Belen and Belen-Willard 115 kV Lines (CS)	0.65	0.315	0.314	0.664	0.311	0.32	1.006	0.522	0.486
BALLP_T-PRAGER 46 kV Ckt 1	41	Person-WMesa2& Snow Vista-WMesa1 115kV Lines(CS < 1 mile)	0.773	0.183	0.769	0.753	0.153	0.747	1.054	0.291	1.047
IRON_STR-BALLP_T 46 kV Ckt 1	41	Person-WMesa2& Snow Vista-WMesa1 115kV Lines(CS < 1 mile)	0.724	0.136	0.72	0.704	0.108	0.697	1.004	0.243	0.998

CS = Common Structure

The full set of detailed contingency data for the P1, P2, P4, and P7 contingencies for all dispatch scenarios can be found in Appendix C. The detailed P6 contingency results are not included in the appendices due to the many thousands of lines of results; however, the data is available on request.

Additional Mitigation required

Based on thermal results, the Option 1 and Option 2 system reinforcements will require additional mitigations.

For Option 1 the additional system reinforcements that will be required are listed below and this will be referred to as **Option 1+**. This option is shown in the figures back in the executive summary.

Option 1+= Option 1 with the following additions:

1. Rebuild the Hernandez- Ojo (HO) 20.51 miles by increasing the rating from 186 MVA to 250 MVA. This is depicted in Figure 3 above in the executive summary.
2. Replace the smaller McKinley 115/345 kV transformer with a larger transformer. This is depicted in Figure 4 above in the executive summary.

For Option 2 the additional system reinforcements that will be required are listed below and this will be referred to as **Option 2+**.

Option 2+ = Option 2 with the following additions:

Rebuild:

1. BA-Reeves (RB) 14.18 miles – increase MVA capacity from 156 to 350. This is depicted in Figure 5 above in the executive summary.
2. Reeves-North (RN) 2.19 miles – increase MVA capacity from 156 to 350. This is depicted in Figure 5 above in the executive summary.
3. West Mesa-Prager (WP) 4.075 miles – increase MVA capacity from 322 to 350. This is depicted in Figure 5 above in the executive summary.
4. Person-Prosperity 2.49 miles – increase MVA capacity from 156 to 350. This is depicted in Figure 5 above in the executive summary.
5. Hernandez- Ojo (HO) 20.51 miles increase MVA capacity from 186 to 250. This is depicted in Figure 3 above in the executive summary.

Reconductor:

1. Mission-North (MN) 0.62 miles – increase MVA capacity from 135 to 250. This is depicted in Figure 5 above in the executive summary.
2. Richmond-North (PN) 2.29 miles – increase MVA capacity from 156 to 250. This is depicted in Figure 5 above in the executive summary.

In addition, a third West Mesa 115/345 kV transformer and replacing the smaller McKinley 115/345 kV transformer with a larger MVA transformer will be required. This is depicted in Figure 4 above in the executive summary.

(Either Option) Path 48 Transfer Capability mitigation

For both options, Path 48 (345 kV lines from Four Corner/San Juan to Albuquerque) is beyond its transfer capability even with Rio Bravo generation dispatched. The construction of the Norton-Ojo 345kV line facilities shown below will mitigate these 345 kV line overloads as depictured in Figure 6 above in the executive summary.

4. Construct a new Ojo–Norton 345kV line (approximately 26 miles).
5. Expansion of Ojo and Norton 345 kV switching stations.
6. Increase the San Juan-Jicarilla-Ojo 345kV line conductor thermal limit to 1004 MVA by increasing the structure height to create additional clearance between the line conductor and the ground.

Power Flow – Voltage Performance Results

No voltage violations were worsened by > 1% from the pre-project case(s).

Short-Circuit Analysis Results

A short circuit screening analysis was conducted to assess whether any transmission options would increase the short circuit current to a level necessitating breaker replacement. This analysis was performed using ASPEN OneLiner. Breakers are flagged for replacement if they exceed 95% of their minimum interrupting capability and flagged for informational purposes if they exceed 90%.

The analysis revealed that a few existing circuit breakers will need to be replaced regardless of the transmission options considered.

Transient Stability Analysis Results

The analysis simulated thirteen (13) contingencies for both Option 1 and Option 2 as shown in Table 20.

Table 20 — List of Transient Stability Contingencies

#	EVENT DESCRIPTION	EVENT CATEGORY	OPTION 1	OPTION 3
0	Flat Run	P0	X	X
1	Diamond Tail – Clines Corner 345 kV Line	P1	X	X
2	Hidden Mountain – Rattlesnake 345 kV Line	P1	X	X
3	Pajarito – Prosperity No.1 345 kV Line	P1	X	X
4	Pajarito – West Mesa 345 kV Line	P1	X	X
5	Pintado – Rio Puerco 345 kV Line	P1	X	X
6	Prosperity – Sandia 345 kV Line	P1	X	X
7	Rio Puerco – West Mesa #2 345 kV Line	P1	X	X
8	Sun Ranch – Rattlesnake 115 kV Line	P1	X	X
9	Sun Ranch – St Cecilia 115 kV Line	P1	X	X
10	West Mesa – Arroyo 345 kV Line	P1	X	X
11	West Mesa1 – Huning Ranch 115 kV Line	P1	X	X
Extreme Events				
12	BA-Diamond Tail 345 kV ckts 1 & 2 (RAS)	P7	X	X
13	Diamond Tail-Clines Corners 345 kV ckts 1 and 2 (Common Corridor)	P7	X	X

The industry has recognized that the Tstall in the composite load model can lead to extreme delayed voltage recovery that will not meet the current system performance criteria. Discussions are ongoing to address this issue. PNM believes delayed voltage recovery caused by motor stalling is unreasonable and has disabled the Tstall portion of the composite load model. As a result, the .DYD file has been modified to effectively disable this parameter by setting Tstall=9999 for every model.

The system showed acceptable system performance for all studied contingencies with the modified Tstall parameter. Transient stability plots for all simulations are provided in Appendix E.

Cost and Construction Time Estimates

The cost estimates and schedules for the different transmission system reinforcements options are shown in Table 21 and 22 below.

Table 71 — Transmission Upgrades For P1, P2, P4, and P7 Outages

Transmission Upgrades	Cost ($M)	Construction Time
Reeves or VEF retired or both units retired		
Option 1	241.1	45 months
Option 2	76.5	36 months

Table 22 — Transmission Upgrades For N-1-1 (P-6) Outages

Transmission Interconnection Upgrades	Cost ($M)	Construction Time
Reeves or VEF retired or both units retired		
Option 1+	273.8	45 months
Option 2+	234.6	48 months
Norton-Ojo 345kV line facilities for either Option 1+ or 2+		
	215.1	72 months

Conclusions/Recommendations

The retirement of Reeves and VEF generation facilities present a critical juncture for the PNM transmission system. To ensure a reliable system, it is essential to invest in the expansion of transmission infrastructure. This will allow a more resilient transmission system and the ability to serve future emerging load growth. In addition, improving the transmission capacity allows for greater integration of renewable resources.

Construction of the Option 1+ reinforcements effectively serve existing, new, and future emerging load growth versus Option 2+. In addition, Option 1+ enhances PNM's ability to accommodate additional load growth, the expanded 345kV transmission improves reliability and resilience by bolstering the system's capacity to withstand planned or unplanned outages. This reduces reliance on legacy or constrained infrastructure, further enabling the potential for significant rebuilding of area sub-transmission lines.

Reconductoring lines as an alternative for Option 2 assumes that 115kV lines can be taken out of service for either reconductoring or rebuilding, which impacts reliability. Option 2 will require numerous extended outages of existing lines, requires substantially longer lead-times, and has much greater construction impacts since many miles of line are involved with significant portions in heavily developed areas. This will also allow PNM the opportunity to upgrade existing Albuquerque transmission lines at a future date without having the expense of reconductoring or rebuilding.

Therefore, the construction of Option 1+ system reinforcements coupled with the Path 48 transfer capability mitigation is identified as the best means for addressing the existing limitations within the Albuquerque network for the retirement of VEF and Reeves.

Option 1: 345kV and 115 kV system reinforcements as shown in Figure 1.

1. Construct a new 345kV six (6) breaker-and-a-half switching station to be named Prosperity 345kV switching station and the installation of a 345/115kV transformer.
2. Construct a new 115kV five (5) breaker ring bus expandable to a breaker-and-a-half configuration switching station to be named Prosperity 115kV switching station.
3. Construction of a new Rio Puerco – Pajarito 345kV line (approximately 28 miles).
4. Expansion of Rio Puerco and Pajarito 345kV switching stations.
5. Looping in the Pajarito–Sandia 345kV line No.1 into Prosperity 345 kV switching station.
6. Looping in the Pajarito–Sandia No.2 345kV line into Pajarito and Prosperity 345 kV switching station that is currently part of the double circuit line between the Pajarito–Sandia 345 kV that is not energized.
7. Looping in the Prosperity-Studio and Prosperity-KAFB 115kV lines into Prosperity 115kV switching station.
8. Construction of a new high capacity Prosperity–Sandia 115kV line and looping it into the Sandia bus #2 115kV station. (This line eliminates overloads associated with Sandia 115/345 kV transformer and/or Sandia bustie outages).

Option 1+ = Option 1 with the following additions

9. Rebuild the Hernandez- Ojo (HO) 20.51 miles by increasing the MVA capacity from 186 to 250 as depicted in Figure 3 above in the executive summary.
10. Replacing the smaller McKinley 115/345 kV transformer with a larger MVA transformer as depicted in Figure 4 above in the executive summary.

Path 48 Transfer Capability mitigation as depicted in Figure 6 above.

11. Construct a new Ojo–Norton 345kV line (approximately 26 miles).
12. Expansion of Ojo and Norton 345 kV switching stations.
13. Increase the San Juan-Jicarilla-Ojo 345kV line conductor thermal limit to 1004 MVA by increasing the structure height to create additional clearance between the line conductor and the ground.

A method of reducing the necessary system reinforcements may be a staggered retirement scenario, such as retiring Reeves while leaving VEF in operation. In either case, further study is recommended as construction details and costs become more refined.

BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION

IN THE MATTER OF PUBLIC SERVICE COMPANY OF NEW MEXICO'S APPLICATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT, OWN AND OPERATE THE RIO PUERCO TO PAJARITO TO PROSPERITY 345 KV TRANSMISSION PROJECT	)	**Docket No. 25-00___-UT**
PUBLIC SERVICE COMPANY OF NEW MEXICO,	)	
Applicant	)	

AFFIDAVIT

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

ERFAN HAKIMIAN, Director of Transmission/Distribution Planning and Contracts, for Public Service Company of New Mexico, upon being duly sworn according to law, under oath, deposes and states: I have read the foregoing **Direct Testimony of Erfan Hakimian,** and it is true and accurate based on my own personal knowledge and belief.

Dated this 30th day of December, 2025.

/s/ *Erfan Hakimian*
ERFAN HAKIMIAN

GCG # 534423