BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION

IN THE MATTER OF PUBLIC SERVICE COMPANY OF NEW MEXICO'S APPLICATION FOR APPROVAL OF PURCHASED POWER AGREEMENTS, ENERGY STORAGE AGREEMENTS, AND CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY FOR SYSTEM RESOURCES IN 2026,	)	**Case No. 23-00xxx-UT**
PUBLIC SERVICE COMPANY OF NEW MEXICO,	)	
Applicant	)	

DIRECT TESTIMONY

OF

THOMAS P. DUANE

October 25, 2023

NMPRC CASE NO. 23-00___-UT
INDEX TO THE DIRECT TESTIMONY OF THOMAS P. DUANE
WITNESS FOR
PUBLIC SERVICE COMPANY OF NEW MEXICO

DIRECT TESTIMONY OF
THOMAS P. DUANE
NMPRC CASE NO. 23-00___-UT

I. INTRODUCTION AND PURPOSE

Q. PLEASE STATE YOUR NAME, POSITION AND BUSINESS ADDRESS.

A. My name is Thomas P. Duane. I am the Manager of Transmission Planning at Public Service Company of New Mexico ("PNM"). My business address is Public Service Company of New Mexico, 2401 Aztec Rd. NE, Albuquerque, NM 87107.

Q. PLEASE SUMMARIZE YOUR EDUCATION AND PROFESSIONAL QUALIFICATIONS AND DESCRIBE YOUR JOB DUTIES.

A. My education and professional qualifications are provided in PNM Exhibit TPD-1. As Manager, Transmission Planning, I am responsible for overseeing the evaluation of the existing transmission planning functions, analyzing transmission system deficiencies, and creating plans for the capital expansion of the transmission system.

Q. HAVE YOU PREVIOUSLY TESTIFIED IN REGULATORY PROCEEDINGS?

A. Yes. Cases in which I have testified are identified in PNM Exhibit TPD-1.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. The purpose of my testimony is to address 17.9.551.8(D)(3) NMAC, which requires a utility seeking approval of a long term purchased power agreement ("LTPPA") to describe "transmission costs the electric utility will incur or pay to receive the purchased power,

which may include the costs of third-party transmission wheeling, or construction of transmission to facilitate purchases under the LTPPA." I also provide an overview of the Federal Energy Regulatory Commission ("FERC") process that governs open-access transmission interconnections and how PNM used that process to identify the transmission facilities and cost responsibilities required to interconnect the Large Generating Facilities that are the subjects of the power purchase agreement ("PPA") and energy storage agreements ("ESA") PNM seeks approval for in this case.

Q. IS THERE AN ADDITIONAL PURPOSE TO YOUR TESTIMONY?

A. Yes - My testimony also addresses PNM's request for a certificate of public convenience and necessity ("CCN") pursuant to NMSA 1978, Section 62-9-1 and 17.1.2.9 NMAC, which requires a utility seeking approval of a new energy storage systems to file a CCN. My testimony describes the transmission costs the electric utility will incur for new energy storage systems included in this filing that will be owned by PNM. Any such systems are also subject to the FERC open access transmission interconnection process resulting in the same steps and information required for a PPA or ESA interconnection.

Q. PLEASE SUMMARIZE THE PPA, ESA AND NEW ASSETS THAT PNM IS SEEKING APPROVAL OF IN THIS CASE.

A. PNM seeks approval of:

- the 100 MW addition to the planned Quail Ranch solar facility.
- the 100 MW BESS project at the planned Sky Ranch solar facility.
- the 50 MW BESS project at the existing Route 66 solar facility.
- the 100 MW BESS project at the planned Quail Ranch solar facility.
- the 60 MW Sandia 4-hour energy storage project.

II. LGIP PROCESS AND INTERCONNECTION AGREEMENT STATUS

Q. ARE THERE ANY TERMS YOU WILL USE IN YOUR TESTIMONY THAT YOU WOULD LIKE TO DEFINE NOW?

A. Yes. It is necessary to identify PNM's Open Access Transmission Tariff ("OATT") which defines the terms established by FERC that govern the facilities necessary for interconnection and transmission service associated with generation facilities interconnected to PNM's transmission system. All FERC regulated utilities that own, control, or operate transmission are required to have an OATT. The OATT is approved by FERC and provides the rates and terms that determine how a utility runs its transmission business.

Q. IS PNM'S OATT PUBLICLY ACCESSIBLE?

A. Yes. The complete OATT is available on PNM's Open Access Same-Time Information System website, at http://www.oatioasis.com/pnm/index.html. Attachment N to the

OATT, Large Generator Interconnection Procedures ("LGIP") describes the procedures PNM must follow to interconnect Large Generating Facilities to its transmission system. Capitalized terms referenced in this testimony not defined herein are defined by the LGIP. The LGIP includes the standard Large Generator Interconnection Agreement ("LGIA"), which is the agreement that PNM enters into with Interconnection Customers that provides the terms, conditions, and costs applicable to the interconnection.

Q. WHICH OATT-DEFINED TERMS WILL YOU USE IN YOUR TESTIMONY?

A. An LGIA is the agreement between PNM and an Interconnection Customer for a generation or storage facility, with capacity of greater than 20 MW, to interconnect with PNM's transmission system which defines the terms, conditions, and costs applicable to the interconnection.

Throughout my testimony I refer to two types of transmission facilities: Network Upgrades and Interconnection Facilities. LGIAs include references to the Interconnection Customer's Interconnection Facilities (ICIF), the required Transmission Provider's Interconnection Facilities (TPIF), and Station Network Upgrades and Transmission System Network Upgrades.

Station Network Upgrades are facilities needed at the Point of Interconnection to physically connect the generation facility. Transmission System Network Upgrades are upgrades to the transmission system to move power and energy beyond the Point of Interconnection to PNM load.

Interconnection Facilities include all facilities and equipment between the generating facility and the Point of Interconnection to the transmission system. Most of the Interconnection Facilities are the Interconnection Customer's facility needed to reach the Point of Interconnection with PNM's transmission system. These typically include generator step-up transformers, generation tie lines, and a generation facility breaker. These facilities represent the ICIF mentioned above and remain assets that are part of the Interconnection Customer facility. All ICIF and associated costs are the responsibility of the Interconnection Customer, and such costs are determined by the Interconnection Customer. A portion of the facilities just beyond the point of interconnection are TPIF and owned by PNM. TPIF represents sole use facilities, which means their cost is recovered directly from the Interconnection Customer. For this testimony, TPIF is referred to as Interconnection Facilities.

Network Upgrades are modifications or additions to the PNM transmission system that are integrated with and support PNM's overall transmission system for the general benefit of

all users of the transmission system. Network Upgrades include any transmission system facilities at or beyond the Point of Interconnection where a generator connects its generation project to the PNM transmission system. Network Upgrade costs are shared by all transmission customers because they enable increased energy delivery to PNM's customers and generally the system as a whole. Thus, under FERC policy, generators initially pay the cost to construct required Network Upgrades to interconnect their generator but are eligible to have that cost reimbursed as a lump sum or receive transmission service credits once the generation facility is in-service. The costs are ultimately recovered from all users of the transmission system.

Q. HAS PNM EXECUTED LGIAS FOR THE QUAIL RANCH 100 MW SOLAR FACILITY?

A. Yes. An LGIA between PNM and Atrisco Solar LLC was completed on May 24, 2023, for a 400 MW solar generation and BESS facility. PNM submitted a request for approval of a PPA for 300 MW of solar generation and an ESA for 150 MW of BESS covered by this LGIA in Case No. 21-00083-UT; approval of these resources was bifurcated into Case No. 21-00215-UT, and the BESS was subsequently increased to 300 MW**.** The 100 MW Quail Ranch PPA will be utilizing the remaining capacity under the LGIA between PNM and Atrisco Solar LLC. An Amended & Restated LGIA was executed on 10/19/2023 by and among Atrisco Solar LLC, Atrisco Energy Storage LLC, Quail Ranch Solar LLC, and

Quail Ranch Energy Storage LLC, and Public Service Company of New Mexico to incorporate the changes needed to identify Quail Ranch Solar LLC and Quail Ranch Energy Storage LLC as Co-Tenants under the LGIA where Atrisco Solar LLC and Atrisco Energy Storage LLC retain 300 MW of capacity under the LGIA and Quail Ranch Solar LLC and Quail Ranch energy Storage LLC obtain the remaining 100 MW of capacity under the LGIA.

Q. HAS PNM EXECUTED LGIAS FOR THE PLANNED 100 MW QUAIL RANCH BESS FACILITY?

A. Yes. The May 24, 2023, LGIA between PNM and Atrisco Solar LLC fully covers BESS storage up to 400 MW provided the total output at the Point of Interconnection with PNM does not exceed 400 MW. As noted in the previous question, approval for a 150 MW BESS under the LGIA was requested in Case No. 21-00083-UT, and the 300 MW BESS was ultimately approved in Case No, 21-00215-UT**.** The cases provide the full details of the interconnection and transmission costs for the facility. This request seeks approval of the remaining 100 MW of BESS covered by the LGIA. As stated in the previous question, an Amended & Restated LGIA was executed on 10/19/2023 to incorporate the changes needed to support the resources subject to this filing.

Q. HAS PNM EXECUTED LGIAS FOR THE 100 MW BESS PROJECT AT THE PLANNED SKY RANCH SOLAR FACILITY?

A. Yes. PNM executed an LGIA for the 120 MW Sky Ranch Solar generation facility on 12/30/2019 with NextEra Energy Resources Interconnections Holding, LLC. PNM also executed an LGIA for the 70 MW Sky Ranch Solar 2 generation and BESS facility with NextEra Energy Resources Interconnections Holding, LLC on January 28, 2021. The New Mexico Public Regulation Commission ("NMPRC") previously approved PPA's and an ESA between NextEra and PNM for the output of these facilities in Case No. 21-00031-UT. That case provides the full details of the interconnection and transmission costs for the facilities. The NMPRC decision modified the total BESS to 50 MW for Sky Ranch Solar 2. The 100 MWs of additional BESS being included in this filing will be co-located with the 120 MW Sky Ranch Solar facility. As long as the maximum output from the combined solar/BESS facility stays within the capacity recognized within the LGIA, the addition of BESS can be incorporated through a modification to the existing LGIA and is not subject to additional processing associated with the Cluster studies. A draft First Revised Sky Ranch Solar LGIA that will combine the Sky Ranch 1 & 2 LGIAs is expected to be executed in the next couple of months. The revisions also address the outcome of Case No. 21-00031-UT on the size of the BESS and the additional BESS being requested in this filing.

Q. HAS PNM EXECUTED LGIAS FOR THE 50 MW BESS PROJECT AT THE EXISTING ROUTE 66 SOLAR FACILITY?

A. Yes. An LGIA between PNM and Route 66 Solar Energy Center, LLC was completed February 13, 2017, and later revised December 4, 2020. The NMPRC previously approved a PPA between NextEra and PNM for the output of this facility in Case No. 18-00009-UT. That case provides full details of the interconnection and transmission costs for the facility. NextEra submitted a request to seek addition of the BESS under the existing LGIA for the Route 66 Solar Energy Center. As long as the maximum output from the combined solar/BESS facility stays within the capacity recognized within the LGIA, the addition of BESS can be incorporated through a modification to the existing LGIA and is not subject to additional processing associated with the Cluster studies.

Q. HAS PNM EXECUTED LGIAS FOR THE 60 MW SANDIA 4-HOUR ENERGY STORAGE PROJECT?

A. No. The Sandia Storage is being processed in Definitive Interconnection Cluster 11. The Cluster process is close to completion with final LGIA's near the end of negotiation. Completion of the Sandia Storage LGIA is expected within the next month. The interconnection costs that are incorporated into the LGIA have been defined through the study process and are discussed later in this testimony.

Q. DOES PNM'S CONSTRUCTION OF THE TRANSMISSION FACILITIES YOU DESCRIBE BELOW DEPEND ON COMMISSION APPROVAL OF THE PPA AND ESA?

A. No. PNM has an obligation to construct the transmission facilities under the LGIA given the obligations between PNM, as a FERC-regulated Transmission Provider and Transmission Owner, and the Interconnection Customer, provided the Interconnection Customer has given Notice to Proceed and provided a proper form of financial security to PNM. This process is governed by FERC and independent of whether the NMPRC approves the PPA and ESA. It is unlikely that an Interconnection Customer would request that PNM proceed with construction of the Interconnection Facilities without an approved PPA or ESA, however. All PPAs and ESAs in this filing are utilizing already approved project interconnections where almost no new costs will be incurred to integrate the PPA and ESA facilities into the transmission system. These costs are discussed later in the testimony.

III. RULE 551 REQUIREMENTS

Q. PLEASE DESCRIBE THE NETWORK UPGRADE COSTS PNM WILL INCUR OR PAY TO RECEIVE THE PURCHASED POWER PURSUANT TO 17.9.551.8(D)(3) NMAC?

A. The PPA and ESAs in this filing are all associated with interconnection requests that are completed or planned to be completed pursuant to previous filings with the NMPRC. These previous filings were identified earlier in this testimony. Additions under this filing remain within existing LGIA capacity at the Point of Interconnection with PNM's transmission system. As a result, there are no additional PNM facilities needed for interconnection or network upgrades to accommodate the PPA and ESAs. PNM anticipates that a small cost will be incurred for metering and protection setting changes to incorporate the additions into the existing or planned facilities. The additions are expected to be Interconnection Facilities where the cost is the responsibility of the Interconnection Customer.

A diagram showing where the PPA and ESAs are connected to the transmission system is included as PNM Exhibit TPD-2.

IV. DESCRIPTION AND COST OF THE INTERCONNECTION FACILITIES AND NETWORK UPGRADES

Q. DOES INTERCONNECTION OF THE PPA AND ESAS REQUIRE CONSTRUCTION OF NEW TRANSMISSION FACILITIES?

A. No. As discussed earlier, the addition of the PPA and ESA's in this filing will utilize the interconnection facilities of in-service or planned interconnection facilities addressed in earlier filings with the NMPRC with some modifications to metering and protection settings required for operations and accounting of the additional solar and battery.

Q. ARE NETWORK UPGRADES REQUIRED FOR THE 60 MW SANDIA BATTERY?

A. Yes. PNM Generation submitted a 150 MW battery storage project in Definitive Interconnection Cluster 11. Studies defining the necessary system upgrades have been completed for this cluster. It is expected that the LGIAs for Cluster 11 requests will be completed in the next month allowing for the interconnection work to proceed in sufficient time for a 2026 in-service date. The identified upgrades include expansion of the Sandia 115 kV Switching Station in southeast Albuquerque where a new breaker is being added to the existing 5 breaker ring bus. A short generation tie-line will be constructed from the BESS facility to the Sandia switching station. The generation tie-line represents ICIF and is treated as part of the generation facilities. A diagram of the Network Upgrades is shown as PNM Exhibit TPD-3.

Q. ARE THE NETWORK UPGRADES SOLELY FOR THE SANDIA BESS?

A. No. A portion of the Network Upgrades are considered integral to the overall function of the transmission system and included as transmission assets.

Q. WHAT IS THE COST IDENTIFIED TO INTERCONNECT THE PPA AND ESA FACILITIES?

A. As stated previously, the PPA and ESAs will not require new interconnection facilities or transmission network upgrades. These sites will require the integration of additional metering and possible changes to protection settings. The cost is estimated to be around $500,000 to $1,000,000 each for metering and protection modifications. These costs are expected to be a combination of ICIF and TPIF and will be the responsibility of the Interconnection Customer. As a result, no Network Upgrade costs that would be included in the transmission rate base are expected for the PPA and ESA additions.

Q. WHAT IS THE COST IDENTIFIED TO INTERCONNECT THE SANDIA BESS?

A. The Definitive Interconnection Cluster 11 Facilities Study identified a total cost of $5.2 million for transmission upgrades to accommodate the Sandia BESS. This total cost includes $4.5 million of Station Network Upgrades at the Sandia Switching Station. The Interconnection Facilities (TPIF) portion of this cost is $0.7 million.

Q. WILL PNM NOTIFY THE COMMISSION PRIOR TO PROCEEDING WITH THE TRANSMISSION FACILITIES FOR THE SANDIA BESS PROJECT?

A. Yes. Notice of the construction of the transmission facilities is required under 17.5.440.8 NMAC. PNM will submit the required filing in a timely manner.

V. OTHER MATTERS

Q. ARE THERE OTHER TRANSMISSION CONSIDERATIONS WITH THE BESS FACILITIES?

A. BESS charging from the grid will be possible at all locations but may be restricted during peak load hours when the highest transmission system loadings occur on portions of the system. Charging from the grid will be a requirement for the Sandia battery since the site does not have co-located resources. Studies do not assess transmission enhancements for charging, and PNM assumes charging from the transmission grid will be on an as available basis. Since batteries will be primarily used to serve load during peak load hours, charging during these hours is not expected to be necessary. It is anticipated that most currently planned BESS facilities will charge from the co-located solar facilities under normal operations.

Q. ARE THERE BENEFITS TO THE LOCATION OF THE SANDIA BESS OVER OTHER LOCATIONS?

A. The Sandia BESS location is well within PNM's largest load center. Outages of transmission facilities within the Albuquerque network can require redispatch of existing "load-side" gas resources to maintain the system within required operating limits. This is also true of outages of the major transmission lines serving northern New Mexico. The Sandia BESS will add a new load-side resource at an optimal location for management of

transmission loadings under forced or planned outages of numerous transmission lines and transformers. This will reduce the reliance on load-side gas generation and ultimately contribute to reducing transmission enhancements to retire the existing gas fleet or accommodate load growth in the southeast area of Albuquerque.

Q. WHAT ARE THE ESTIMATED COSTS OF ON-GOING OPERATIONS AND MAINTENANCE OF THE TRANSMISSION FACILITIES OUTLINED HEREIN?

A. Since the PPA and ESAs are utilizing existing facilities, there is no additional on-going transmission O&M anticipated from these additions. The operations and maintenance costs for the Sandia BESS transmission facilities are estimated to be $5,000 annually when applying a 0.1% rule-of-thumb multiplier to the capital cost of the interconnection facilities.

Q. ARE THE COSTS OF THE TRANSMISSION FACILITIES REQUIRED TO INTERCONNECT THE LARGE GENERATING FACILITIES THAT ARE THE SUBJECT OF THE PPA, ESAs AND SANDIA BESS REASONABLE?

A. Yes. The PPA and ESAs are only incurring a small cost to integrate the additional facilities into the overall system and the costs are expected to be the responsibility of the Interconnection Customer. These costs are established through an engineering review associated with a request from the Interconnection Customer to add additional resources or

energy storage system at the existing sites. The engineering reviews are pending and will be included in a modification to the LGIAs with each Interconnection Customer. The Sandia BESS transmission costs were determined through the various Interconnection Studies in accordance with PNM's FERC-approved OATT. The cost is based on recently completed estimates for Definitive Interconnection Cluster 11.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

GCG#531691

Résumé of Thomas Duane

PNM Exhibit TPD-1

Is contained in the following 2 pages.

PNM EXHIBIT TPD-1

Name: Thomas P. Duane

Address: Public Service Company of New Mexico
414 Silver Ave SW
Albuquerque, New Mexico 87102

Position: Manager, Transmission Planning

Education: Bachelor of Science in Electrical Engineering,
University of Colorado, Boulder, Colorado 1980

Master of Science in Electrical Engineering,
Electric Utility Management Program,
New Mexico State University, Las Cruces, New Mexico 1998

Employment: Public Service Company of New Mexico, Albuquerque, New Mexico

Transmission Planning Engineer, Manager Transmission Planning (12 Years) 1984-1996, 2006-Present

Manager, Production Modeling 1996-2005

Operations Engineer, Wholesale Power Marketing Analyst
1981-1984, 2005

Licensure: Licensed Professional Engineer in the State of New Mexico

Professional Affiliations: Member of Institute of Electrical and Electronic Engineers ("IEEE") Power Engineering Society and Computer Society

Experience:

- Power System Analysis and Operations – Steady State, Dynamic Stability, Transient, Short Circuit, Power Operations, Production Costs, Generation Dispatch
- Committee Representation – over 25 years in inter-utility coordination groups, WECC and ERCOT reliability committees, RTO Tariff negotiations, stakeholder groups and industry organizations.

Previous Testimony:

New Mexico Public Regulation Commission (2023): Provided testimony on behalf of Public Service Company of New Mexico regarding transmission system impacts associated with TAG solar facility interconnection. Case No Case No. 23-00251-UT.

New Mexico Public Regulation Commission (2021): Provided testimony on behalf of Public Service Company of New Mexico regarding transmission system impacts associated with replacement resources for 114 MW of Palo Verde Nuclear generation. Case No Case No. 21-00215-UT.

New Mexico Public Regulation Commission (2020): Provided rebuttal testimony on behalf of Public Service Company of New Mexico regarding transmission system impacts associated with replacement resources for San Juan Generation Station Units 1 and 4. Case No 19-00195-UT.

County of Torrance, Seventh Judicial District Court (2020) – Application for Order of Immediate Possession, State of New Mexico, Case D-722-CV-2020-00083, Provided affidavit regarding the need for immediate possession of right-of-way to maintain an existing transmission line.

Federal Energy Regulatory Commission (2010): Provide affidavit on the PNM Balancing Authority Area System Import Limit (SIL) calculations used in the Triennial Market Power Update. Docket Nos. ER96-1551, ER01-615 and ER09-746.

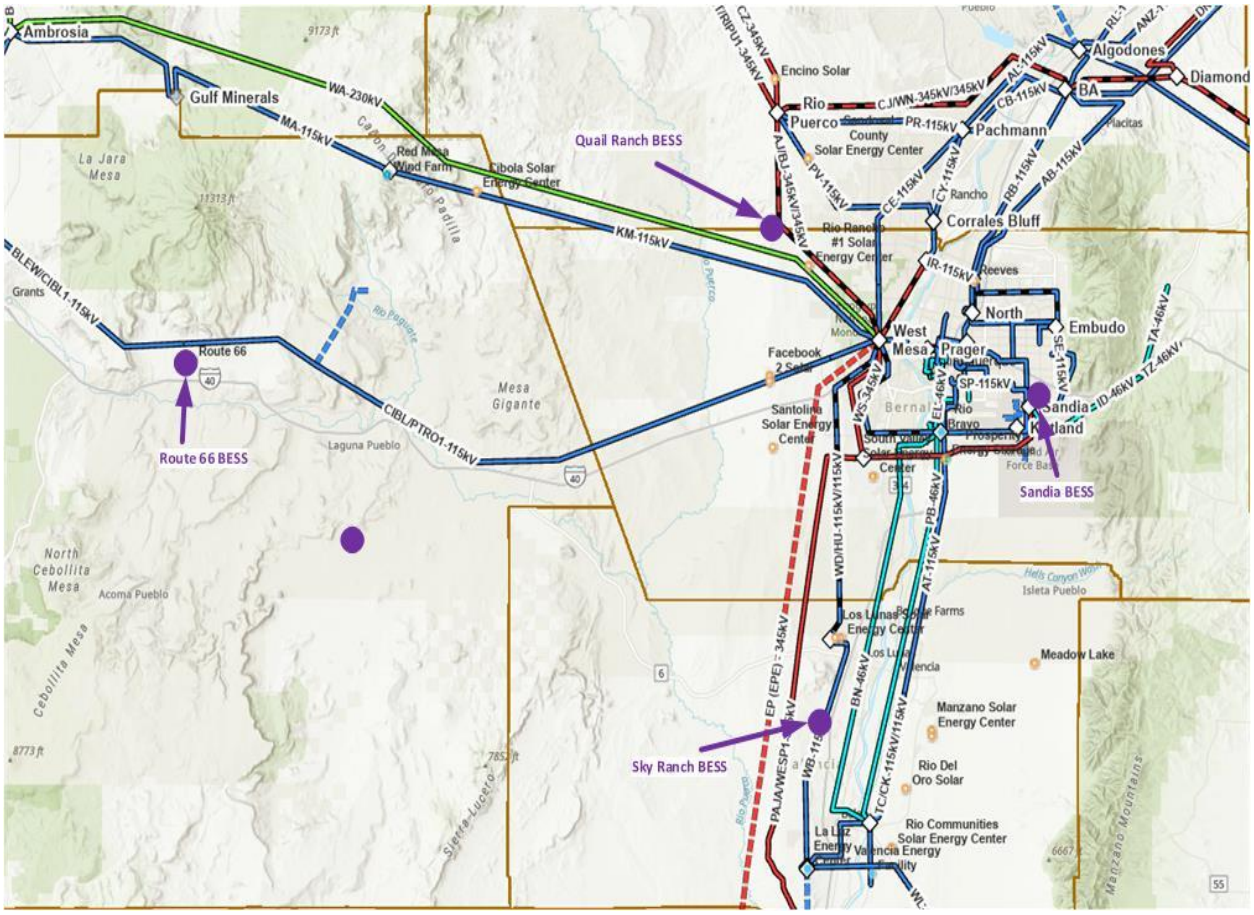
Facility Locations on Transmission System

PNM Exhibit TPD-2

Is contained in the following 1 page.

PNM EXHIBIT TPD-2

Facility Locations on Transmission System



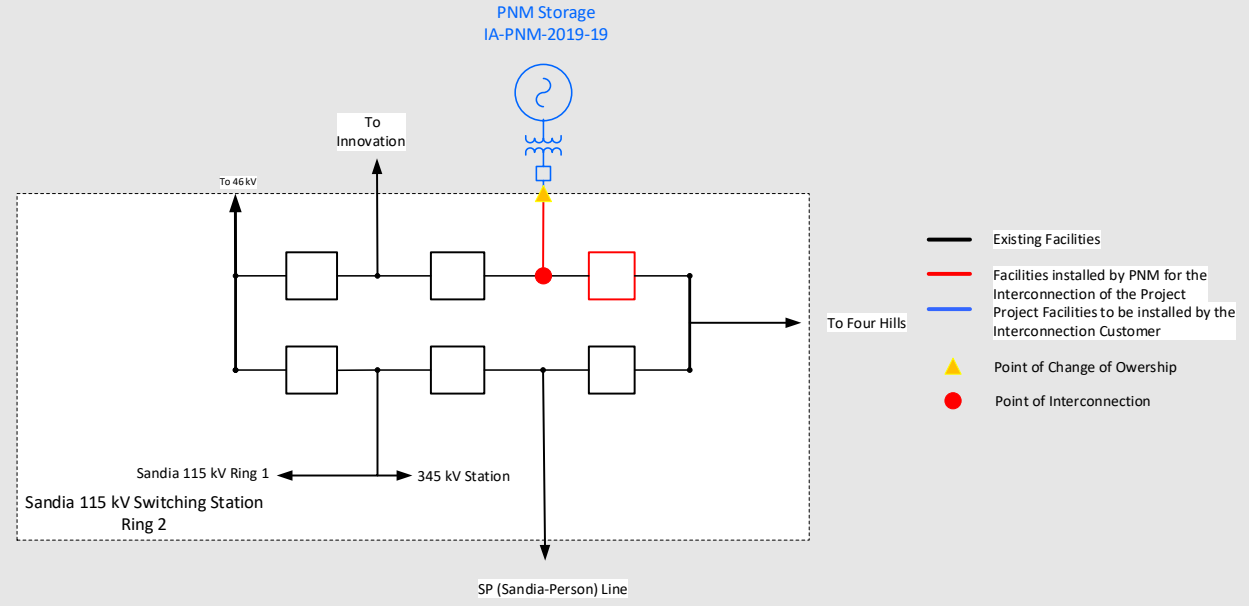
Sandia BESS Interconnection Facilities

PNM Exhibit TPD-3

Is contained in the following 1 page.

PNM EXHIBIT TPD-3

Sandia BESS Interconnection Facilities



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PUBLIC SERVICE COMPANY OF NEW MEXICO,	)	
Applicant	)	

SELF AFFIRMATION

THOMAS P. DUANE, Manager/Distribution Planning and Contracts Department at 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 Thomas P. Duane** and it is true and accurate based on my own personal knowledge and belief.

Dated this 25th day of October, 2023.

/s/ Thomas P. Duane
THOMAS P. DUANE