BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION

IN THE MATTER OF THE APPLICATION OF PUBLIC SERVICE COMPANY OF NEW MEXICO FOR REVISION OF ITS RETAIL ELECTRIC RATES PURSUANT TO ADVICE NOTICE NO. 513	)	Case No. 15-00261-UT
PUBLIC SERVICE COMPANY OF NEW MEXICO, Applicant	)	

DIRECT TESTIMONY AND EXHIBITS

OF

AUBREY A. JOHNSON

August 27, 2015

NMPRC CASE NO. 15-00261-UT
INDEX TO THE DIRECT TESTIMONY OF AUBREY A. JOHNSON
WITNESS FOR
PUBLIC SERVICE COMPANY OF NEW MEXICO

DIRECT TESTIMONY OF
AUBREY A. JOHNSON
NMPRC CASE NO. 15-00261-UT

I. INTRODUCTION AND PURPOSE

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

A. My name is Aubrey A. Johnson. I am Vice President of New Mexico Operations for Public Service Company of New Mexico ("PNM" or the "Company"). My business address is 414 Silver Avenue, SW, Albuquerque, New Mexico 87102.

Q. PLEASE DESCRIBE YOUR RESPONSIBILITIES AS VICE PRESIDENT OF NEW MEXICO OPERATIONS.

A. As Vice President of New Mexico Operations, I am responsible for planning and directing the activities involved in delivering electric service to PNM's approximately 500,000 retail customers throughout New Mexico. The functions I oversee generally include system planning, operations, engineering, construction and maintenance. My resume, PNM Exhibit AAJ-1, lists my prior work experience.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. The purpose of my testimony is to describe PNM's Transmission and Distribution ("T&D") system which is necessary to provide safe and reliable electric service to PNM's customers. I also address and support PNM's T&D capital investment budget for the period from April 1, 2015, through the end of the Test Period (September 30, 2016)[1] and the construction work in progress ("CWIP") period

[1] The "Capital Investment Period" includes linkage data from April 1, 2015, through September 30, 2015, and continues through the Test Period ending September 30, 2016.

October 2016 through February 2017[2] and describe the operations and maintenance ("O&M") expenses for the Base Period (April 1, 2014 to March 31, 2015). I describe the factors driving the need for these investments and expenditures. Specifically, in the sections that follow, I will discuss:

- An overview of the PNM T&D systems;
- PNM's capital budgeting and prioritization process, including how priorities are established and how capital budgets are monitored;
- The capital investments required during the Capital Investment Period and why they are required for the safe, reliable and efficient operation of PNM's T&D systems;
- The capital costs and benefits associated with PNM's acquisition of the remaining 40% interest in the Eastern Interconnection Project;
- How T&D's O&M expenditures are budgeted and monitored;
- The T&D O&M expenditures that form the basis for the Base Period; and
- The estimated costs for upcoming rights-of-way renewals on Native American lands.

Q. ARE YOU SPONSORING ANY RULE 530 SCHEDULES?

A. Yes, I am sponsoring three Rule 530 schedules as follows:

- Rule 530 Schedule P-8 contains customer service interruption information for PNM's distribution system by occurrence, duration and location;

[2] The period from April 1, 2015, through February 28, 2017, encompassing the Capital Investment Period and CWIP period is referred to as the "Capital Clearing Period".

- Rule 530 Schedule P-9 (co-sponsored with PNM Witness Chan) contains transmission demand and energy line loss information by voltage level (this schedule is being provided in executable electronic format on a DVD-ROM, but is neither fully functional nor required to be filed as fully functional under the Future Test Year Rule); and
- Rule 530 Schedule P-10 contains historic reliability indices for the PNM T&D system.

Q. WHAT ROLE DOES T&D HAVE IN DETERMING THE LOSS FACTORS IN SCHEDULE P-9?

A. T&D's Planning Department calculates the historical transmission and distribution loss factors and provides this information to PNM's Pricing & Load Research Department in support of the development of the Schedule P-9.

Q. HOW DOES YOUR TESTIMONY RELATE TO THE TESTIMONY PRESENTED BY OTHER COMPANY WITNESSES?

A. PNM Witness Monroy addresses the jurisdictional allocation of PNM's T&D capital investments and O&M expenses for purposes of developing PNM's cost of service in this proceeding.

II. SUMMARY OF KEY CONCLUSIONS

Q. WHAT ARE YOUR KEY CONCLUSIONS?

A. Overall, I have concluded that:

- PNM's T&D capital investment clearings totaling $247,653,475 during the Capital Clearing Period are required for efficient system operation, regulatory compliance and to adequately maintain the T&D infrastructure so that it continues to reliably and safely serve PNM's customers.
- PNM uses a thorough, cost-conscious capital budgeting process to prioritize T&D capital projects, and the T&D capital investments during the Capital Investment Period are the result of this process.
- PNM's T&D O&M costs are prudent and reasonable based on planning and continuously monitored cost control. The Base Period O&M expenses represent costs incurred by PNM T&D operations to serve customers in a safe and reliable manner.

Q. HAVE YOU REACHED OTHER CONCLUSIONS?

A. Yes. I have reached a number of other conclusions, including the following:

- PNM has and continues to carefully manage the cost to our customers associated with the development and operation of its T&D facilities and equipment while providing reliable service.
- PNM undertakes and prioritizes capital investments and system expansion projects in a prudent manner.

- PNM's planning efforts have and will continue to focus on ensuring its system is robust enough to handle increasing peak demands while meeting applicable regulatory requirements.

III. TRANSMISSION AND DISTRIBUTION SYSTEMS OVERVIEW

Q. PLEASE DESCRIBE THE NEW MEXICO TRANSMISSION SYSTEM.

A. The New Mexico transmission system is shown in PNM Exhibit AAJ-2. As discussed later in my testimony, the system consists of transmission facilities owned solely by PNM and jointly owned by PNM and other transmission entities. The "backbone" of the system consists of several 345 kV lines and one 230 kV line that emanate from the Four Corners area in northwest New Mexico and run to the Southeast and South. Power flow on these lines is always from north to south due to the location of base load generation resources in Four Corners, New Mexico. Southern New Mexico is served by two 345 kV lines that run from eastern Arizona to the Southeast and East towards El Paso, Texas. Historically, power has flowed in an easterly direction on these two lines. However, with the significant addition of new generation resources in southern New Mexico over the past several years, flow patterns have changed and power flows can be very light into southern New Mexico when the generation in the south is on-line and running.

As a general matter, the New Mexico transmission system has been designed to transport electricity from base load coal and nuclear-fueled resources constructed in the 1960s, 1970s, and 1980s in and around Four Corners, eastern Arizona, and Phoenix, to the large load centers in central and south-central New Mexico – namely, the Albuquerque, Santa Fe, and El Paso metropolitan areas. The transmission system also serves to connect the large load centers together for emergency support purposes and interconnects to neighboring transmission systems for stability and economic interchange purposes.

Q. PLEASE DISCUSS THE NEW MEXICO TRANSMISSION SYSTEM INTERCONNECTIONS.

A. The New Mexico transmission system connects: 1) to the North, to those systems of Public Service Company of Colorado and the Western Area Power Administration ("WAPA") Colorado-Missouri Division; 2) to the West, to those systems of Tucson Electric Power Company ("TEP"), Arizona Public Service Company ("APS"), Salt River Project ("SRP"), and WAPA Lower Colorado Division; and 3) to the South, to the El Paso Electric Company ("EPE") system. In addition, two 200 MW (nominal rating) asynchronous high-voltage direct current ("HVDC") stations connect the New Mexico system, located within the Western Interconnection, to the transmission system of Southwestern Public Service ("SPS") located in the Eastern Interconnection. PNM is an owner in each of these HVDC stations – the Blackwater and Eddy County (a/k/a Artesia) ties. These interconnections allow interchange of power in either direction with SPS.

The Blackwater tie near Clovis, New Mexico, enables the import of power directly into the Albuquerque load area via the Blackwater-BA 345 kV line. This line presently has two wind farms connected to it and is the subject of additional interest for renewable energy resources. The Eddy County tie near Artesia, New Mexico, enables power imports by EPE and PNM's southern New Mexico load areas via the Eddy County-Amrad 345 kV line.

Q. ARE THERE OTHER MAJOR ELEMENTS TO THE NEW MEXICO TRANSMISSION SYSTEM?

A. Yes. Large autotransformers located at load centers are used to step the system voltages down to the 115 kV level. Substations located on 115 kV, 69 kV, and 46 kV lines further step the voltages down to distribution system voltages for delivery to end users.

Q. ARE THE TRANSMISSION FACILITIES YOU DESCRIBED SOLELY OWNED BY PNM OR JOINTLY OWNED?

A. The projects described above are solely owned. However, in New Mexico, as in much of the Southwest, there are many jointly-owned transmission projects, as well as many jointly-owned generation projects.

Q PLEASE DESCRIBE PNM'S JOINTLY-OWNED TRANSMISSION PROJECTS.

A. PNM is a part owner in six jointly-owned transmission projects. First, the Palo Verde Valley Transmission System ("VTS") is comprised of three 500 kV lines that span from the Palo Verde Nuclear Generating Station ("Palo Verde") east to the Phoenix metropolitan area (two to the Westwing switchyard and one to the Kyrene switchyard) and various transformers at the Westwing and Kyrene switchyards. PNM owns a 12.1% undivided interest in this system, with APS, SRP, and EPE owning the balance. SRP operates and maintains the VTS.

Second, PNM and TEP jointly own the San Juan-Springerville-Vail Transmission system ("San Juan-Vail System") which consists of two 345 kV transmission lines that travel south from the San Juan switchyard along the New Mexico-Arizona border to the McKinley switchyard, then to the Springerville generating plant, and then to the Greenlee and Vail switchyards near the Tucson load center. The Springerville to Coronado 345 kV line is also a part of the project. TEP operates and maintains the San Juan-Vail System.

Third, PNM and EPE jointly own the Southwest New Mexico Transmission Project ("SWNMT"). This system includes the Greenlee to Hidalgo to Luna 345 kV transmission lines and switching stations. The SWNMT is operated and maintained by EPE.

Fourth, PNM and EPE jointly own the Amrad-Eddy County 345 kV line and the Eddy County HVDC converter station that interconnects with SPS, as described above. EPE operates and maintains the Amrad-Eddy County line and SPS operates and maintains the Eddy County converter station through contractual arrangements with PNM.

Fifth, PNM and the City of Farmington jointly own the San Juan-Shiprock transmission line, which PNM operates and maintains.

Lastly, PNM and Tri-State Generation and Transmission Association, Inc. ("Tri-State") jointly own the Alamogordo-Hollywood 115 kV transmission line. Both PNM and Tri-State operate and maintain this transmission line.

Q. DOES PNM MAKE ANY OPERATIONAL DISTINCTION BETWEEN ITS NORTHERN NEW MEXICO AND SOUTHERN NEW MEXICO TRANSMISSION SYSTEM?

A. No. PNM operates its transmission system as a single system. The northern and southern transmission systems are different from the perspective that, although PNM owns facilities connecting its systems, it does not operate these connecting facilities and therefore transactions between the northern and southern portions of PNM's system are coordinated with EPE and TEP. Also, because PNM lacks sufficient ownership rights in transmission to move power between the northern

and southern systems, it must purchase transmission service from EPE and TEP for deliveries between the northern and southern portions of PNM's system.

Q. HOW IS PNM'S TRANSMISSION SYSTEM USED?

A. PNM uses its transmission system to deliver generation and purchased power resources described by PNM Witness Olson to its retail and wholesale customers, and to deliver the generation resources of other entities to their own customers. As a Federal Energy Regulatory Commission ("FERC") jurisdictional transmission provider, PNM provides open access transmission service on its system for generator interconnection and transmission delivery services pursuant to the terms and conditions of its open-access transmission tariff ("OATT"). PNM provides significant amounts of transmission service to other entities as discussed below pursuant to its OATT, and PNM must plan its system to meet the needs of both its jurisdictional customers and its transmission customers.

Q. WHAT TYPES OF TRANSMISSION DELIVERY SERVICES DOES PNM PROVIDE FOR OTHER ENTITIES OVER ITS TRANSMISSION SYSTEM?

A. PNM provides Network Integration Transmission Service ("NITS") and Point-to-Point ("PTP") transmission service over its transmission system. PNM provided NITS to the following customers: 1) Tri-State ; 2) the Incorporated County of Los Alamos, New Mexico; 3) Jicarilla Apache Nation; 4) Navopache Electric Cooperative; 5) WAPA for Kirtland Air Force Base; 6) Navajo Tribal Utility

Authority; 7) PNM Merchant on behalf of City of Aztec, New Mexico; and 8) City of Gallup, New Mexico. PNM also provides long-term firm PTP transmission service as shown in Table AAJ-2 below:

Table AAJ-2

Name of Customer	Reserved Capacity
High Lonesome Mesa, LLC	100 MW
Tri-State	60 MW
Argonne Mesa, LLC	90 MW
El Paso Electric Company	124 MW

The revenues associated with these services are accounted for in the determination of revenue requirements as described in PNM Witness Monroy's testimony.

Q. PLEASE DESCRIBE THE PNM DISTRIBUTION SYSTEM.

A. By definition, PNM's distribution system begins at distribution substations, which are connected to either a 115 kV, 69 kV or a 46 kV sub-transmission line. Within the substations, transformers step the transmission voltage down to distribution system voltage levels for delivery to end users. PNM has approximately 177 distribution substation transformers that typically range in size from 42 MVA down to 1 MVA.

Q. WHAT GEOGRAPHIC AREA IS COVERED BY PNM'S DISTRIBUTION SYSTEM?

A. The distribution substations are spread out over a large geographic area of New Mexico which includes:

- Clayton
- Las Vegas
- Albuquerque
- East Mountain area of Bernalillo Co.
- Los Lunas, Belen and portions of Valencia Co.
- Santa Fe and portions of Santa Fe Co.
- Rio Rancho and portions of Sandoval Co.
- Portions of McKinley Co.
- Ruidoso, Tularosa, Alamogordo and portions of Otero Co.
- Deming and portions of Luna Co.
- Lordsburg, Silver City and portions of Grant Co.

Q. WHAT ARE THE GENERAL OPERATING PARAMETERS FOR PNM'S DISTRIBUTION SYSTEM?

A. The distribution system is typically a radial system arranged like branches on a tree such that customers have a single source of power. This is the most common system layout in suburban and rural areas. Nominal voltage levels for PNM's primary distribution system range from 23 kV to 4,160 V. The largest portion of PNM's primary distribution system utilizes a 12.47-7.2 kV design voltage. Distribution class transformers then further reduce the primary distribution system voltages to service voltages between 120 V to 480 V for delivery to end users.

The distribution system from the distribution class transformers to the end user is referred to as the secondary distribution system. PNM also utilizes a 480 V network system to serve portions of downtown Albuquerque. In the case of some larger customers, PNM directly connects customer-owned primary distribution facilities to PNM's primary distribution system at either the substation transformer or to the primary distribution feeder through a primary metered service.

IV. T&D CAPITAL INVESTMENT PROCESS

Q. HOW DOES PNM DETERMINE WHEN AND WHERE TO MAKE CAPITAL INVESTMENTS TO EXPAND OR REINFORCE ITS TRANSMISSION SYSTEM?

A. Transmission planners are continually analyzing the performance of the current system and the need for future systems to ensure electricity can be reliably delivered consistent with the North American Electric Reliability Corporation ("NERC"), the Western Electricity Coordinating Council ("WECC") requirements, and NMPRC Rule 560. PNM uses a ten-year horizon for transmission and distribution planning. Plans are updated annually in advance of the budgeting process.

Q. PLEASE EXPLAIN THE ROLE OF NERC WITH RESPECT TO PNM'S TRANSMISSION PLANNING AND OPERATIONS.

A. NERC is a not-for-profit international regulatory authority whose mission is to ensure the reliability of the bulk transmission system in North America. NERC develops and enforces system Reliability Standards under the authority of FERC, performs annual assessments of seasonal and long-term reliability, monitors the bulk power system through system awareness, and educates, trains, and certifies industry personnel. NERC's area of responsibility covers the bulk transmission systems in the continental United States, Canada, and the northern portion of Baja California, Mexico which serve more than 334 million people. NERC is the electric reliability organization for North America, subject to oversight by the FERC and governmental authorities in Canada. NERC's jurisdiction includes users, owners, and operators of the bulk transmission system.

Q. WHAT ROLE DOES WECC PLAY?

A. WECC is one of nine regional electric reliability councils under NERC authority and is the largest regional entity. The WECC region encompasses the entire Western Interconnection, which comprises the states of Washington, Oregon, California, Idaho, Nevada, Utah, Arizona, Colorado, Wyoming, portions of Montana, South Dakota, New Mexico and Texas in the United States, the Provinces of British Columbia and Alberta in Canada, and a portion of Mexico's *Comisión Federal de Electricidad* system in Baja California. The Western Interconnection is tied to the Eastern Interconnection through eight high-voltage

direct current transmission facilities. WECC develops and implements Regional Reliability Standards and WECC Regional Criteria for the Western Interconnection.

In addition, WECC formed a new not-for-profit entity called "Peak Reliability" that became effective January 1, 2014. Peak Reliability was formed to assume and carry out the NERC registered functions of Reliability Coordinator and Interchange Authority for the Western Interconnection.

PNM's transmission system is subject to NERC and WECC jurisdiction and PNM must make necessary capital investments and O&M expenditures to meet NERC and WECC standards, which in turn are subject to oversight by FERC.

Q. PLEASE ELABORATE ON PNM'S TRANSMISSION PLANNING PROCESS.

A. PNM transmission planners perform modeling and simulations of PNM's transmission system to determine its operating capabilities. The system limitations are then compared to the present and forecasted loads of PNM's retail and wholesale customers and its transmission customers. NERC reliability standards and other industry practices guide the analyses to ensure electricity can be delivered adequately and securely. As potential system deficiencies, such as over- or under-voltages or overloads of equipment, are identified, alternative solutions are identified. These alternative solutions may include the development

of new or different operating procedures, the addition of voltage supporting devices, upgrades to substation or line termination equipment, the reconductoring of lines, or the construction of new lines. Alternatives are prioritized in accordance with their ability to solve system issues, to be implemented in the timeframe needed and to provide the lowest lifecycle cost.

PNM also continually assesses the useful service life of significant components of its transmission system. In some cases the equipment (e.g., relays, breakers, transmission cross arms) may become functionally obsolete because it has reached the end of its useful life based on the number of operating cycles, higher than planned maintenance costs, the need to meet updated compliance obligations, or when repair parts are no longer viable. PNM's capital budget includes funding for replacing critical equipment that has reached the end of its useful service life.

Q. HOW DOES THE DISTRIBUTION PLANNING FUNCTION IDENTIFY SPECIFIC CAPITAL EXPANSION NEEDS?

A. Distribution planning evaluates the primary distribution system by comparing the present and forecasted customer loads of the different retail customer service areas against system limitations to determine the need for and timing of system improvement projects. The objectives of these projects are to ensure compliance with NMPRC Rule 560, American National Standards Institute, National Electrical Safety Code and, PNM's own distribution planning criteria. Project drivers are based on assuring that safe and reliable electric service to customers is

provided within established voltage and equipment loading criteria for normal and emergency conditions. Alternative solutions are evaluated with the lowest reasonable cost solution recommended for implementation in the capital budget. Recommendations typically consist of one or more of the following possible solutions (from lowest to highest potential cost):

- Reconfiguring the system service within an area by changing open points;
- Balancing connected load along the distribution feeder;
- Installing capacitors for voltage improvement and power factor correction;
- Installing voltage regulators to maintain voltage criteria;
- Upgrading existing overhead conductor/underground cable;
- Adding new overhead conductor/underground cable;
- Constructing a new feeder from a substation; and
- Adding a new substation and/or feeders within a service area.

Q. HOW ARE ALTERNATIVE SOLUTIONS EVALUATED?

A. The process starts with an evaluation of the feasibility of the planning alternatives for any "fatal flaws" such as known permitting/environmental restrictions. The options resulting from this evaluation are then assessed to identify issues that could affect project viability such as reviewing permitting and procurement lead times to ensure they can be accommodated and whether extensive public process or National Environmental Policy Act compliance issues may exist. Cost estimates used in the feasibility stage of planning, and for comparison between alternatives, are based upon standardized station designs, estimated line mileages,

PNM cost data that are periodically updated, and PNM distribution construction standards. For alternatives that are not typical installations on PNM's system, PNM may employ consultants, vendors, and contractors to assist in providing cost estimate information. For example, high-level rights-of-way costs are based on number of property owners, lot sizes and recent sales information. Estimates are then calibrated by comparing the cost of recent similar installations on the PNM system.

Final cost estimates used for project funding include project and site-specific considerations. These include the selection of a specific parcel of land or line route, identification of permitting and environmental restrictions, development of the design in terms of site layout, span lengths, and typical structure heights, and securing current vendor quotes for major equipment. In addition, a timeline for the project is prepared based upon time frames for permitting, right-of-way acquisition, engineering and design, lead times for material and equipment procurement, and construction schedules.

Q. DOES PNM HAVE A PROCESS FOR PRIORITIZING ITS CAPITAL INVESTMENTS?

A. Yes, PNM recognizes the challenges associated with delivering safe and reliable power as efficiently as possible and that it must therefore make decisions about which projects identified in the planning process it can fund. A prioritization

methodology has been developed to ensure that the most needed projects are funded first. The highest priority projects include those that:

- Are currently underway;
- Are being built to satisfy PNM's obligation to serve;
- Are being built to comply with regulatory/environmental/contractual requirements;
- Address safety concerns;
- Mitigate an unacceptable reliability risk; and
- Provide benefits that are clearly evident either operationally or economically (or both) and there is a notable downside risk if not completed.

Through this prioritization process, PNM develops a list of capital projects that is reviewed by senior business unit management and consolidated with projects from other business units. A final capital investment plan is prepared and submitted to senior management for consideration and approval.

Q. DOES PNM TYPICALLY MEET THE FORECASTED IN-SERVICE DATES FOR ITS CAPITAL PROJECTS?

A. Yes. PNM meets the planned in-service date for the vast majority of its projects. However, in some instances, unforeseen events have caused PNM to redirect manpower and capital toward other emergent projects. PNM's budgets for capital

expansion are based upon a portfolio of projects needed to maintain reliability and serve new customers.

Q. IS FLEXIBILITY SOMETIMES REQUIRED WITH RESPECT TO THE IMPLEMENTATION OF PROJECTS?

A. Flexibility in the specific projects to be completed is necessary to ensure the management of unforeseen events and necessary unbudgeted expenses that can arise during the year. For instance, equipment may fail, diverting the resources of the engineering and project management staff from on-going projects as well as requiring unbudgeted expenditures to ensure the supply of power to customers is not jeopardized. Projects and associated expenditures therefore cannot always be completed in the timeframe originally forecasted. A process is in place for managing mid-year changes, or "trade-offs" to ensure the funding of necessary, but unbudgeted, capital expenditures while not exceeding the approved capital target. The process requires documentation of the need for the new expenditure, the identification of a budgeted project expenditure that will be reduced to accommodate the new expenditure, and proper approvals. As a result of this process, some projects may be delayed while others are accelerated, but the total amount of capital invested during the budget period will not change.

Q. PLEASE DESCRIBE HOW TRANSMISSION CAPITAL PROJECTS ARE ESTIMATED.

A. Depending on the complexity of the project, PNM assembles data from a variety of sources to develop cost estimates for transmission line and station system improvements. Initially, various technical solutions and/or locations are evaluated at a high level for feasibility. Considerations include ability to permit, land rights acquisition, technical performance, ability to meet desired schedule, and total long-term ownership costs. Once the preferred solution is identified, more detailed estimates are developed. For many projects, PNM has significant information available from recent similar projects. As part of its ongoing project management practices, PNM reviews historical pricing for trends and potential efficiencies.

Q. DOES PNM USE INFORMATION OTHER THAN HISTORICAL DATA IN ITS CAPITAL COST ESTIMATES FOR TRANSMISSION PROJECTS?

A. Yes. PNM uses various reliable sources as bases for its transmission project estimates.

Q. WHAT ARE SOME OF THE SOURCES USED FOR ESTIMATED COSTS ASSOCIATED WITH NECESSARY LAND USE FOR GIVEN CAPITAL PROJECTS?

A. Every project that PNM constructs has a land right associated with it. Depending on the project and the land ownership, this right can take various forms such as licenses, permits, easements, leases and purchase of land in fee. With regard to projects on public lands, PNM's staff maintains relationships with local, state, and federal land-use agencies. When a project is developed that will involve land or land-use managed by these agencies, PNM can informally discuss the specific project to understand the requirements that must be met as well as the typical schedule for submission and approval of a permit. Costs for anticipated mitigation efforts are included in the project estimate. When acquisition of land is required, PNM staff will review comparable sales in an area, and when necessary, secure formal appraisals. Estimates also include any support costs associated with land rights acquisition such as surveys, re-platting, environmental studies, and contract reviews.

Q. HOW ARE COSTS FOR TYPICAL MAJOR EQUIPMENT ESTIMATED?

A. PNM has entered into several long-term purchasing agreements for equipment that is standard to the PNM system. These long-term agreements address medium voltage transformers (115kV/12.47kV), metal enclosed switchgear, power circuit breakers, tubular steel structures, wood poles, 115kV disconnect switches, and transmission class relays. The use of long-term agreements helps maintain a

standard design throughout the system, provides flexibility in securing production slots in timely manner, and pricing stability. Long-term agreements are reviewed on a regular basis and compared to market conditions. PNM stays abreast of factors that might affect pricing such as cost of fuel and changes in availability of raw metals. These agreements provide a resource used in cost estimation for typical equipment to be used in a project.

Q. WHAT RESOURCES DOES PNM USE FOR ESTIMATING THE COST OF NON-TYPICAL EQUIPMENT?

A. For specialty equipment that is not routinely purchased by PNM, as part of the estimating process we often contact vendors to secure budgetary costs and lead times. Other utilities with similar installations may be interviewed and knowledge is also secured through industry groups such as The Institute of Electrical and Electronics Engineers. As the project matures, formal Requests for Information ("RFIs") and/or Requests for Proposals ("RFPs") are issued. The responses to the RFI and RFP are used to select the most responsive vendor(s). Autotransformers are one of the items purchased through an RFP process. For some specialty equipment and construction projects, PNM will engage consultants to develop a detailed cost estimate. This approach was used on the Rio Puerco Static VAR Compensator project.

Q. HOW ARE CONSTRUCTION COSTS FOR CAPITAL PROJECTS ESTIMATED?

A. Construction may be performed with either in-house personnel or with experienced contractors. As part of the estimating process, an assumption is made about who will perform the various construction activities. For in-house work, costs are estimated by the number of days the job is expected to take, size of crew, and job skills needed. For contracted work, PNM may discuss the project with contractors familiar with utility construction, or engage consultants as cited above. Considerations in the cost of construction include local versus out-of-town work, new construction versus system upgrades, availability of specialty contractors in the time frame needed, and the potential need to work long hours or weekends to accommodate system conditions.

Q. HOW ARE ENGINEERING AND CONSTRUCTION MANAGEMENT COSTS ESTIMATED?

A. Engineering and construction management may be performed by either PNM personnel or outside consultants. Typically consultants are used to supplement PNM's staff during periods of high workload or for very specialized projects when unique knowledge is required. For in-house support, the engineering and construction management are estimated as a percentage of the equipment and construction costs. For external support, consultants may be contacted for high-level estimates, or existing unit rates and an estimate of hours and skills is applied.

Q. DOES PNM INCLUDE COST LOADS IN ITS CAPITAL COST ESTIMATES?

A. Yes. Project estimates include applicable utility loads and overhead. The load applied to capital projects are discussed by PNM Witness Peters.

Q. PLEASE DESCRIBE THE ESTIMATING PROCESS FOR DISTRIBUTION CAPITAL PROJECTS.

A. Similar to larger transmission and substation projects, distribution line construction projects begin by determining the routing of a project considering the overall project objective. Once the route is determined, an engineer or designer prepares a map of the proposed route. From the PNM designer's conceptual design, the necessary equipment, structures and material required to meet the objectives of the project are determined. Most distribution structure and equipment configurations are fairly common and standard drawings and material lists have been developed. The materials and standard construction configurations used are vetted by PNM's Distribution Standards Department to ensure facilities are constructed to meet current National Electrical Safety Code requirements and the designs are in line with industry norms. From these standard drawings "Compatible Units" have been created in our work management system. The designer uses the Compatible Units to construct the design map for the project. The work management system generates a complete material list and an estimate of the construction man-hours necessary to construct

the project. The system will apply the current material costs, and apply specific labor rates to determine the PNM labor cost to construct the project.

Q. HOW ARE OUTSIDE CONTRACTOR COSTS ESTIMATED?

A. The designer will also identify the tasks that will be performed by a contractor if necessary. Contractor work mostly includes the trenching or boring for underground distribution projects, as well as traffic control, removal and replacement of landscaping, asphalt and sidewalks, and tree trimming. The designer arranges to receive quotes for these tasks from approved PNM contractors.

Q. HOW ARE FINAL ESTIMATED COSTS FOR DISTRIBUTION CAPITAL PROJECTS DETERMINED AND REVIEWED?

A. Costs for contractor work along with labor, material, right-of-way acquisition, and any necessary environmental surveys or permitting work are entered into the work management system. The work management system compiles all the direct costs, applies labor rates and applicable loadings to calculate a final cost estimate. PNM employs a peer review process for distribution construction estimates. Most often the review is conducted by principal or senior level engineer. In addition, the work is reviewed by the appropriate level manager prior to authorization for construction.

Q. DOES PNM TAKE STEPS TO ENSURE THAT ITS MATERIAL COSTS ARE REASONABLE?

A. Material costs are kept low by PNM having an agreement with a wholesale material supplier that provides the bulk of materials for distribution construction. PNM uses this supplier because it also supplies materials to many other utilities and consequently has much greater buying power than PNM, helping to keep costs low. The agreement with this supplier also enables PNM to reduce its on-site stock, which is primarily used for responding to emergency work. The supplier has a local warehouse in Albuquerque and is required to keep minimum stock on hand to achieve a prerequisite availability rate of materials for PNM based upon PNM's historical usage. PNM notifies the supplier in advance of major orders pending to help keep lead times to a minimum. As construction work orders are approved and scheduled for construction, purchase orders are created by PNM's Procurement Department for the wholesale supplier who delivers the materials to PNM's local warehouse in a kit to meet PNM's construction schedule. The agreement with the supplier has certain dynamic elements, namely the markup PNM pays the supplier. The markup is a function of our purchase volume but remains within the percentage range as stated in our contract with that supplier; the greater the volume the lower the markup, the lesser the volume the greater the markup. PNM performs a random quarterly audit of the supplier's pricing to verify their acquisition cost and mark ups are appropriate. In addition, PNM reviews purchase volumes on a quarterly basis and, if appropriate based on shifts in total purchases, mark-ups are adjusted. When price

trends move significantly, PNM will also survey the market to benchmark the supplier's pricing.

Q. WHAT ARE SOME OF THE COST TYPES THAT ARE USED IN THE BUDGETING FOR CAPTIAL PROJECTS?

A. The cost types used in PNM budgeting are addressed in the testimony of PNM Witness Peters. Some of the common cost types used for budgeting T&D capital projects include:

110 and 120; Internal labor: This includes all labor performed by PNM employees from permitting through project commissioning. As mentioned above, an assumption is made during the estimating process as to who will perform the work (internal or external). As the project gets closer in time, this assumption is reviewed based on current staff availability.

350; Materials and Equipment: This cost type includes all minor materials and equipment which are typically purchased as a stock item from a vendor or material provider. It includes items that PNM or its materials provider routinely stock or can acquire quickly. Examples include aluminum bus and fittings, disconnect switches, wood poles, insulators, conductor, distribution transformers, relays, control cable, and grounding materials.

370; Outside Services: This cost type includes all professional services as well as construction services. Professional services may include surveying, appraisal

support, engineering, materials testing, and construction monitoring. This cost type also includes the purchase of specialty engineered equipment or site specific items such as autotransformers, medium voltage transformers, metal enclosed switchgear, and transmission class tubular steel poles.

805; Land Rights: This cost type includes the purchase and/or fees for land, easements, leases, permits, and licenses.

V. T&D CAPITAL PROJECTS DURING THE CAPITAL CLEARING PERIOD AND COST DRIVERS

Q. WHAT TOPICS DO YOU ADDRESS IN THIS SECTION OF YOUR DIRECT TESTIMONY?

A. In this section of my direct testimony, I address PNM's most significant capital investments for T&D facilities during the Capital Investment Period and the 5 month period thereafter for CWIP and provide the justification for making these investments. Specifically, I address the Tier 1 specific and blanket capital projects below. A list of all T&D projects is attached to my testimony as PNM Exhibit AAJ-3 to AAJ-8. The Eastern Interconnection Project is one of the larger Tier 1 capital projects and is described separately in Section V.A. of my testimony due to its uniqueness. PNM has undertaken a capital investment program focused on addressing the key needs of regulatory compliance, safety and security, reliability, operational efficiency and aging infrastructure.

Q. WHAT IS THE TOTAL PNM T&D CAPITAL BUDGET THROUGH THE END OF THE TEST PERIOD?

A. PNM's total T&D capital budget through the end of the test period, inclusive of CWIP, is $247,653,475. PNM T&D's capital investment clearings during the Capital Clearing Period are summarized on Table AAJ-2. Included in the totals presented is PNM's share of jointly owned projects.

TABLE AAJ-2

Business Segment	Distribution			Transmission			
Linkage and Test	Specific projects	Blankets	Total by Tier	Specific projects	Blankets	Total by Tier	Grand Total by Tier
Tier 1	27,433,394	42,818,430	70,251,824	116,669,588	4,374,621	121,044,209	191,296,033
Tier 2	7,422,390	11,333,050	18,755,440	7,495,480	886,829	8,382,309	27,137,748
Tier 3	(56,125)	1,315,394	1,259,269	410,273	240,940	651,212	1,910,481
Total	34,799,659	55,466,874	90,266,533	124,575,340	5,502,390	130,077,730	220,344,262
CWIP							
Tier 1	1,078,445	3,313,185	4,391,630	17,465,755	649,031	18,114,785	22,506,415
Tier 2	1,809,088	1,519,991	3,329,079	1,063,277	176,647	1,239,924	4,569,003
Tier 3	-	203,173	203,173	-	30,621	30,621	233,794
Total	2,887,532	5,036,349	7,923,881	18,529,032	856,299	19,385,331	27,309,212
Linkage and Test + CWIP = Grand Total							
Tier 1	28,511,839	46,131,615	74,643,454	134,135,342	5,023,651	139,158,994	213,802,448
Tier 2	9,231,477	12,853,041	22,084,518	8,558,757	1,063,476	9,622,233	31,706,752
Tier 3	(56,125)	1,518,567	1,462,442	410,273	271,561	681,834	2,144,275
Business Segment Total	37,687,191	60,503,223	98,190,414	143,104,372	6,358,688	149,463,061	247,653,475

The above figures represent the total of PNM's transmission and distribution capital expenditures for the Capital Investment Period including CWIP estimated clearings from October 2016 through February 2017. The jurisdictional allocations of these expenditures are discussed by PNM Witness Monroy.

Q. PLEASE DESCRIBE WHAT IS MEANT BY "BLANKET" CAPITAL INVESTMENT.

A. Blanket capital investments include labor for design and installation, materials, permitting and right-of-way acquisition for new, upgrade, replacement and relocation of electric transmission and distribution facilities to enable continued and new service to residential and non-residential customers. The blanket capital expenditures include many items too numerous to list individually, but generally include: transformers, primary and secondary wires and cables, meters, poles and supporting structures, trenches, overhead and underground switches and duct systems.

Distribution Blanket projects include line extensions for new and upgraded services, removal and replacement of failing equipment, relocation of facilities for road widening projects, minor system improvements, transformer purchases, meter purchases, installations and replacements, cable and pole replacements and streetlights.

Transmission Blanket projects include PNM's share of investments in jointly-owned transmission projects identified earlier in my testimony. The transmission blankets also include funding for smaller projects with a value of less than $100,000 per project. The typical need for these projects is updating, replacement, or rehabilitation of failing, outdated or obsolete equipment and structures. Examples of this work include transmission structures, relays and other control devices, system communications devices, instrument transformers, disconnect switches, and grounding replacement.

Q. PLEASE DESCRIBE WHAT IS MEANT BY "SPECIFIC" CAPITAL PROJECTS.

A. Specific capital projects generally are valued at over $100,000 and are unique in nature and therefore do not fall into a blanket category. They include labor for design and installation, materials, permitting and right-of-way acquisition for new and upgraded distribution or transmission facilities and/or equipment. Examples of specific capital projects include transmission lines, substations, switchyards, large distribution feeder extensions and larger equipment replacements or upgrade projects.

Q. PLEASE DESCRIBE WHAT IS MEANT BY THE PROJECT TIERS.

A. For purposes of this rate case, capital projects are categorized into three groups or "tiers" based on dollar value for the Capital Clearing Period. Tier 1 projects include those individual capital projects whose Capital Clearing Period value is

equal to or greater than $750,000. The T&D Tier 1 capital projects (Specific and Blankets) represent 86.3% of the total capital T&D investment clearings during the Capital Clearing Period. Tier 2 projects include those individual capital projects whose Capital Clearing Period value is between $100,000 and $750,000. Tier 3 projects include those individual capital projects whose Capital Clearing Period value is less than or equal to $100,000.

Q. PLEASE DESCRIBE WHAT INFORMATION IS PRESENTED TO SUPPORT THE T&D CAPITAL PROJECTS.

A. A description, Linkage, Test Period and CWIP clearings by project identification number for all Tier 1, Tier 2 and Tier 3 T&D capital projects (specific and blanket) can be found respectively in PNM Exhibits AAJ-3 to AAJ-8. These exhibits are filed in hardcopy within this testimony and are also provided in electronic format. Detailed project information including project justifications, estimated completion dates, alternatives reviewed and budget figures by cost type are hyperlinked from the project identification numbers in the electronic versions of PNM Exhibit AAJ-3 through PNM Exhibit AAJ-8.

Q. PLEASE DESCRIBE SOME OF THE LARGEST T&D CAPITAL PROJECTS.

A. The ten largest specific Tier 1 T&D capital projects are described as follows:

1. Rio Puerco Static VAR Compensator (SVC) (ID# 65009313); Clearings: $30.2 million – This project provides the flexible voltage support needed to maximize the utilization of existing transmission assets by: 1) improving voltage support during forced or planned transmission outages, 2) eliminating the need to maintain a number of complex tools and procedures to address voltage limits, and 3) reducing the need to commit Albuquerque-based (load-side) generation for voltage support. The SVC will enhance reliability by automating the system's response to outage events, thereby enabling PNM to meet more stringent reliability requirements.

The SVC project will maximize the import capability over PNM's Northern New Mexico transmission import path and WECC Path 48. The SVC will be located in the Central Rio Grande Valley area load center, where approximately 80% of PNM's peak summer load resides, to provide flexible voltage support that will enable the full utilization of existing transmission assets. The SVC will also provide voltage support on the bulk power system during non-peak load periods, when, due to increases in loads, there is need for reliability improvements. PNM performs needed maintenance on substation equipment, transmission lines and load-side generation facilities during shoulder months when loads are not at either summer or winter peaks. When equipment is taken out of service for maintenance and the system is not at full capability, the rest of the

system must be able to withstand an additional outage. This project will improve PNM's ability to maintain compliance with mandatory NERC and WECC planning and operating standards and will allow WECC Path 48 to be operated up to thermal limits and will significantly improve voltage control during planned and unexpected outages.

2. Rio Puerco Station Expansion (ID# 65009012); Clearings: $24.5 million - This project is to mitigate overloads of transmission facilities serving the Albuquerque metropolitan area related to the outage of a transmission line(s) or other critical equipment. The project consists of: 1) expanding the existing Rio Puerco 345 kV station from a three breaker ring bus to a "breaker and a half" bus design; 2) looping in the existing Four Corners-West Mesa 345 kV and San Juan-BA 345 kV lines; and 3) performing protection modifications for the existing Rio Puerco series capacitor banks.

This project will tie in existing 345 kV lines at the Rio Puerco site resulting in two 345 kV paths between BA and Rio Puerco and two 345 kV paths between West Mesa and Rio Puerco. The creation of parallel 345 kV paths allows the higher capacity 345 kV lines to carry the load for outages of the existing BA-Rio Puerco and Rio Puerco-West Mesa 345 kV lines, thereby preventing overloads of the BA transformer and BA-Reeves

115 kV lines. This project maintains PNM's compliance with mandatory NERC and WECC planning and operating standards.

3. Second Transformer at Yah-Ta-Hey (ID# 65009014); Clearings: $17.7 million – The addition of a second transformer has been planned as a result of planning studies which show that the loss of a single contingency outage of major 345 kV or 230 kV transmission facility or existing Yah-Ta-Hey transformer would violate NERC reliability criteria for equipment loading and low voltages. This project also includes expansion of the existing McKinley 345 kV station (jointly owned by PNM and TEP and operated by TEP) and a rebuild of the Yah-Ta-Hey 115 kV station to interconnect the transformer. The transformers provide a connection between the McKinley 345 kV switching station and the adjacent Yah-Ta-Hey 115 kV switching station. TEP will be responsible for the construction activities in the McKinley Switchyard at PNM's cost. This project maintains PNM's compliance with mandatory NERC and WECC planning and operating standards.

4. EIP Purchase (ID# 65007115); Clearings: $7.7 million – This project reflects the purchase of the 40% interest in the Eastern Interconnection Project ("EIP") facilities from Tortoise Capital Resources Corporation ("Tortoise") allowing PNM full control of the 216 mile 345 kV transmission line and associated HVDC converter station. This important

bidirectional connection to the Southwest Power Pool is the most active transmission line for renewable energy interconnection requests. Because of the unique nature of this project, I address this project in detail in a separate section of my testimony.

5. Richmond Switching Station (ID# 65009013); Clearings: $6.2 million - This project is to provide additional transmission support to the Albuquerque area 115 kV transmission network in order to mitigate overloads on several 115 kV lines during single and double contingencies by adding an additional 115 kV looped source into the Sandia station. The project includes the construction of a new three-breaker ring switching station that loops in the Prager-North 115 kV line to the Sandia-North/Prager 115 kV line. This project addresses capacity limits and low voltages in the southeast Albuquerque area under contingency conditions necessary to maintain PNM's compliance with mandatory NERC and WECC planning and operating standards.

6. Rio Puerco Series Comp (ID# 65008515); Clearings: $5.8 million - This project extends the life expectancy of the existing Rio Puerco capacitors. The series capacitors are installed on the FW and WW lines at the Rio Puerco Station.

7. Sandia 345/115 kV Spare Transformer (ID# 65009214); Clearings: $4.4 million – This undertaking involves the purchase and installation of a system spare 345/115 kV autotransformer to be located at the Sandia 345 kV station. The transformer will be installed in a manner that allows it to be relocated in the event of a failure of one of PNM's aging fleet of ten other 345/115 kV system transformers, some of which are over 40 years old. This will also allow PNM to maintain compliance with mandatory NERC and WECC planning and operating standards due to the lead time for ordering and delivering of a new unit which can take from 18 to 24 months.

8. La Morada Substation (ID# 60001814); Clearings: $4.3 million – This project will provide new substation capacity in order to serve existing load, expected new growth and provide backup support under contingency situations for three existing substations serving customers in Northwest Albuquerque. Approximately 4 MW of load growth is anticipated in the near future including a new water pumping station, high school, middle school and grade schools.

9. NERC CIP Station Improvements (ID# 65007515); Clearings: $4.0 million – This project addresses NERC reliability standards. NERC has issued a new version of an applicable Critical Infrastructure Protection ("CIP") standard, (CIP V5), that address both physical and cyber security

for critical infrastructure. CIP V5 brings more infrastructure into scope and also has increased requirements over previous versions. As a result, improvements are needed on the PNM system to meet these and other new NERC standards. Examples of projects included in the NERC compliance program include firewalls, cyber and physical access and user identification enhancements, physical security improvements and testing facilities to evaluate new equipment before it is placed into service.

10. Right-of-Way Clearing Project-Light Detection and Ranging (LiDAR) (ID# 64807414); Clearings: $3.9 million – This project collects mapping data via LiDAR and imagery data to be uploaded to PNM's existing Clearion Software. Work management plans will then be developed using Integrated Vegetation Management techniques based on this data to clear transmission rights-of-way of all non-compatible vegetation to the full legal width on NERC lines and those lines deemed critical by PNM. The Integrated Vegetation Management consultant will assist in the development of a strategy and act as a liaison with Federal agencies and tribal entities for the clearing effort.

Q. PLEASE GENERALLY DESCRIBE THE OTHER SPECIFIC T&D TIER 1 CAPITAL PROJECTS.

A. All of the T&D Tier 1 capital projects are fully described and justified in PNM Exhibit AAJ-3 and PNM Exhibit AAJ-4. For purposes of my testimony, I have

categorized the remaining T&D Tier 1 capital projects by subgroups based on their similar attributes and identified them by project name and number as described below:

Unit Substations: The need for new or upgraded unit substations is driven by planning criteria as discussed earlier in my testimony. Replacement of substations is also driven by PNM's ability to meet performance criteria; however, given the age of some transformers, replacement of failed units is another driver. PNM's system is generally designed such that if one substation is out of service (planned or unplanned), the customer load can be supported by adjacent substations. Tier 1 Unit Substation Projects include: Tularosa/Alamo Transformer (ID# 15001715), College Substation (ID# 60001514 and 65007814), Zamora Substation Upgrade (ID# 60002315) and Prager Substation (ID# 60003114).

Distribution Feeders: The need for new, upgraded, or extensions of distribution feeders is driven by distribution planning criteria discussed earlier in my testimony. Tier 1 Distribution Feeder Projects include: Wayne Feeder 23 (ID# 10001912), Mejia 14 Estrada Calabasa Line Extension (ID# 41001915) and Downtown Manhattan Feeder Phase 1 (ID# 41002113).

Compliance and Security: Increasing requirements by governmental agencies has resulted in the need to invest in system improvements that enhance stability of

the transmission grid and provide both physical and cyber security at several PNM facilities. In addition, PNM has experienced vandalism, equipment damage and metal theft at key substation sites. For these reasons, a pilot project followed by a formal program to detect and deter unauthorized activities has been undertaken. Tier 1 projects that are included in this group are: Station Hardening Pilot for Transmission Stations (ID# 64807013), Substation Remote Access (ID# 64828113) and Station Hardening (ID# 65007514).

Replacement of Aging Infrastructure and Emergency Equipment Programs: PNM routinely maintains, inspects, and tests its facilities to assure the system can perform as originally planned as well as supporting current system requirements. Over time, equipment and structures can become functionally obsolete, require significant on-going maintenance, may lack current compliance or power quality requirements, or fail to perform. PNM reviews the need and timing for replacement of this equipment through its field inspection programs, technical expertise and industry knowledge. PNM then develops prioritized programs for the replacement of this equipment. Recent programs include breaker replacements, distribution underground cable life extensions and system communications upgrades. In response to long lead times and the need to replace failed equipment quickly, PNM has developed an emergency equipment inventory program with certain key equipment. Typical equipment purchased and staged through this program includes a unit substation transformer, 115kV disconnect switches, surge arrestors, and relays. Tier 1 distribution projects that are related

to aging infrastructure and emergency equipment include: Albuquerque Feeder Testing and Replacement (ID# 10002314), Santa Fe Switchgear Replacements (ID# 60001713), Emergency and Aging Equipment Distribution (ID# 60002313), 12.47 kV Breaker Replacement (ID# 60002715) and Distribution Cable Testing and Replacement 2015 (ID# 60003115). Tier 1 transmission projects that are related to aging infrastructure and emergency equipment include: 69 kV Breaker Replacements (ID# 22007214), Alamogordo Replacement Capacitor Installation (ID# 22007514), 345 kV Wood Structure Replacement (ID# 64807113), Transmission Emergency and Aging Equipment (ID# 64807413), Transmission Breaker Replacement (ID# 64807513), 115 kV Breaker Replacement for Fault Current (ID# 64807713), San Juan Shunt Reactor Circuit Breaker (ID# 65007220), WW Line Reactor Replacement at BA (ID# 65007315), FW Reactor Replacement (ID# 65007625) and Northern Microwave Communications Upgrade (ID# 65008614).

Projects Due to Other Causes: PNM needs to relocate certain distribution facilities located in public rights-of-way to accommodate the proposed City of Albuquerque Rapid Transit Project. This Tier 1 project is identified as COA ART (ID# 10001715). Another project is the replacement of 16 miles of the Amrad-Eddy 345 kV transmission line. This line is part of a jointly–owned project with EPE. The line failed in late 2013 as a result of two separate and highly unusual ice storms. Due to lead times for permits and structures and the need to develop

access, the project was completed in early 2015. The project number is ID# 22007314.

Q. PLEASE DESCRIBE THE SIGNIFICANT TIER 1 DISTRIBUTION BLANKETS TO BE COMPLETED THROUGH THE END OF THE CAPITAL CLEARING PERIOD AND THE FACTORS DRIVING THE NEED FOR EACH.

A. The top four blanket projects, representing 8.6% of the total T&D capital investment during the Capital Clearing Period are further detailed in PNM Exhibit AAJ-4:

1. Transformers (ID# 10000907) Blanket; Clearings: $8.6 million - This blanket includes the purchase of transformers for new customer line extensions, customer upgrades, and replacement of failed or damaged transformers.

2. Services (ID# 10000807) Blanket; Clearings: $5.6 million - This blanket includes the costs of engineering, inspections, materials, and installation of service wires and equipment to provide service to residential and non-residential customers.

3. Meter Equipment (ID# 10001007) Blanket; Clearings: $2.7 million - This blanket includes meter purchases for new service, and replacement of meters, both planned (due to the vintage of the meter and/or results of

periodic testing as required under NMPRC Rule 560) and unplanned due to vandalism or damage.

4. Distribution Remove & Replace (ID# 10000607) Blanket; Clearings: $4.4 million - This blanket includes removal and replacement of existing electric distribution facilities that have failed or been damaged. Generally this is replacement of like for like. This also includes relocations of facilities in road rights of way for road re-alignments or widening projects. Project drivers include equipment failure and public improvement projects.

Q. PLEASE SUMMARIZE THE REMAINING BLANKET PROJECTS IN TIER 1.

A. The following categories contain the remaining Tier 1 T&D blanket projects as further described in PNM Exhibit AAJ-3 and PNM Exhibit AAJ-4:

Line Extension Blankets: These blankets projects provide for the installation cost of electric line extensions for new residential and commercial customers within the various regions of PNM's service territory. Projects include ID# 10000107, 10000207 and 41000207.

System Improvement Blankets: These blanket projects provide for numerous small miscellaneous distribution facility improvements to improve service and

operation by providing voltage support, enhancing system protection, and maintaining or improving system reliability. Projects include ID# 10000707, 15500707, 41000707, 50000707 and 89900707.

Remove and Replace Blankets: These blanket projects include relocations of electric distribution facilities in road rights-of-way for road re-alignments or widening projects. The projects also include the removal and replacement of existing electric distribution facilities that have been damaged during storms or deteriorated through normal aging. Projects include ID# 15500607, 41000607 and 89900607.

Service Blanket: This project (ID# 41000807) provides for the electrical connection of residential and non-residential customers' facilities to PNM's distribution system primarily within Santa Fe County.

Pole Replacement Blanket: This project (ID# 10001207) is necessary to ensure the integrity of wood poles on PNM's distribution system in the Albuquerque area which support structures for overhead wires, transformers, and other equipment.

Albuquerque PURE Blanket: This project (ID# 10001707) scope is identified through the Automated Line Patrols ("ALPS") process and provides funding for repairing and replacing aging overhead distribution construction components. There is a substantial quantity of work identified from past ALPS inspections and

on-going inspections. This work is necessary to maintain reliable service and reduce hazards to the public and PNM line crews.

Distribution Removal & Replace Blanket: This blanket project (ID# 20000607) includes removal and replacement of existing electric distribution facilities that have failed or been damaged in Southern New Mexico.

Cable Replacement Blanket: This project (ID# 41001307) provides for the replacement of failing underground distribution cable in the Santa Fe area. Emergent cable replacements address those cables which experience failures of their insulation causing multiple outages over a short period of time and/or impacting a large number of customers.

Misc. Substation Improvements Blankets: This includes projects ID# 22007010 and ID# 65007010 for capital replacements or betterments at transmission stations. Typical work might include improved equipment clearances, switch operator ground mats, adding surge arrestors and replacement instrument transformers. Various tasks are undertaken to improve reliability, maintainability or enhance safety.

Substation Equipment Replacement IA Blankets: This includes projects ID# 60005910 and ID# 65007710 to replace or upgrade ageing or obsolete transmission substation equipment on PNM's electric system. Some examples

include replacing or upgrading substation transformer components such as primary bushings, load tap changer upgrades or replacements, replacing ageing transmission circuit breakers, or upgrading ageing equipment such as station arrestors, capacitor switching equipment, bus insulators, station capacitors, capacitive voltage transformers, and station battery replacements in transmission and distribution substations.

Misc. Transmission Blanket: This project (ID# 65007110) includes multiple tasks which improve reliability, maintainability or enhance safe operation of transmission lines. The key betterments include replacement of damaged porcelain insulators with more robust non-ceramic insulators, installation of modular steel truss top to replace failed wood cross-arms and braces, replacement of structures to provide enhanced clearances, and installation of new line sectionalizing switches to provide more reliable and safe switching operations.

San Juan Vail Blanket: This project (ID# 65006010) is for PNM's share of annual capital improvements or replacements associated with the San Juan-Vail Joint Transmission project. This work is performed to ensure continued reliable and safe performance of the transmission facility. PNM has a contractual obligation to TEP, the operating agent, to pay for the prorated costs of PNM's percent ownership. While specific replacements are not defined, typical work includes replacement of failed or functionally obsolete equipment such as breakers, capacitors, switches, and relays. Work might also include capital

improvements to the lines such as vegetation management, access improvements to facilitate planned work as well as routine inspection, or structure replacements. Also, this would include capital improvements required to meet emerging NERC security requirements.

Q. PLEASE CITE EXAMPLES OF HOW ESTIMATES WERE DERIVED FOR TIER 1 PROJECTS.

A. The Sandia Spare Transformer and La Morada substation projects will be used as examples. The Sandia 345/115 kV Spare Transformer involves the installation of a second 345/115 kV 450MVA autotransformer at the Sandia Switchyard and includes added controls and 345 kV breakers. Initial layout and site review confirmed the project could be constructed within PNM's existing switchyard footprint. This reduced two key items, permitting and land rights acquisition. A general overall specification was developed for the autotransformer and an RFI was issued to several vendors. From the RFI response and a recent similar autotransformer purchase, enough information was available to estimate the price of the new transformer and to confirm lead times. PNM has a long-term purchase agreement in place for transmission relays and 345 kV breakers. Existing yard equipment was reviewed for condition and some items identified as needing replacement. Using a predetermined price under normal conditions, PNM is able to identify costs for these items. PNM has recent internal information on foundation work, grounding and 345 kV mechanical construction to be able to estimate the yard upgrades. The 345 kV control house at the switchyard was

originally sized to accommodate additional relay and control panels. The cost of assembled relay panels is typically consistent over last few years. A project of this size requires significant support. External resources were assumed for construction as well as other specialty services.

Q. PLEASE DISCUSS THE LA MORADA UNIT SUBSTATION PROJECT.

A. The La Morada Unit Substation is an example of PNM's standard unit substation design. Use of a standard substation layout reduces design time and use of standard equipment across the system helps in maintenance and limits the need for a wide variety of critical spare equipment. Several sites were reviewed for the location of this substation. Construction and material costs can be greatly affected by the site conditions. A site was selected in an industrial park and adjacent to a 115 kV transmission line. This site, which minimizes the length of the 115 kV line tap that must be built to the station, reduces overall costs. Substations are a compatible use in an industrial area. Pricing for the land was expected to be reasonable based on other recent sales. Permitting costs and timeline were also expected to be reasonable. PNM has long-term purchase agreements in-place for the medium voltage transformer, the metal enclosed switchgear and 115 kV disconnect switches. Much of the other smaller equipment is industry standard and made by several manufacturers allowing for competitive pricing. Pricing is known from recent projects and vendor contacts. PNM has good knowledge of construction costs for unit substations based on

recent installations. External resources were assumed for construction as well as other specialty services.

Q. RETURNING TO THE SUBJECT OF THE EASTERN INTERCONNECTION PROJECT (EIP), CAN YOU PLEASE PROVIDE FURTHER DETAIL ON THIS CAPITAL INVESTMENT?

A. In 1985, PNM completed construction of the EIP consisting of 216 miles of 345 kV transmission line, a HVDC converter station, and related facilities connecting PNM's transmission system with SPS that permit bidirectional flows of power between the Southwest Power Pool and WECC grids, located in New Mexico. Upon commercialization of the transmission line and converter station, PNM entered into two 30-year sale/leaseback financing arrangements with two financing entities - one for a 60% ownership interest and one for a 40% ownership interest. In 2002, PNM repurchased the 60% ownership interest from the lessor. The lease of the remaining 40% ownership interest, owned by Tortoise, had an April 1, 2015 expiration date.

Q. DID DIVIDED OWNERSHIP OF THE EIP FACILITIES CREATE ANY PROBLEMS?

A. Yes. The divided ownership created delays in the processing of transmission service requests because of the joint ownership structure and questions concerning ownership after the expiration of the leases. This created issues between PNM and its transmission customers regarding the management of the transmission

service associated with the 40% ownership rights in the facility that PNM did not own. On July 5, 2012, FERC issued an order in response to a complaint filed by one of these customers against PNM and Tortoise that directed PNM and Tortoise to identify the party responsible for immediately providing long-term transmission service over the 40% of the capacity owned by Tortoise.

Q. HOW DID THE PARTIES RESPOND TO THE FERC ORDER?

A. On September 5, 2012, PNM informed FERC that PNM and Tortoise had reached an agreement under which PNM would purchase Tortoise's 40% interest on April 1, 2015, and take responsibility for providing long-term transmission service on the entire EIP. Under the agreement, PNM purchased the 40% interest for $7.7 million.

Q. PLEASE DESCRIBE THE BENEFITS OF PNM'S FULL OWNERSHIP OF THE EIP FACILITIES.

A. Full ownership will give PNM control over the use of the EIP facilities as well as day-to-day operations and maintenance decisions. PNM will therefore be obligated to manage 100% of the FERC directed transmission service for this facility. It will remove the existing cumbersome and time-consuming joint ownership issues I described. PNM's full ownership will also provide positive benefits to PNM, the state, and the region by ensuring that the EIP can be fully integrated with the "bigger picture" plans being considered for the regional

delivery of renewable energy. It also resolves the uncertainty over how the transmission capacity will be made available.

Q. WHERE ARE THE T&D CAPITAL PROJECTS CLASSIFIED AS TIER 2 AND TIER 3 ADDRESSED.

A. The Tier 2 and Tier 3 blanket and specific T&D projects are described and justified in PNM Exhibits AAJ-5 through PNM Exhibit AAJ-8. These projects make up approximately 13.6% of the T&D capital projects in the Capital Clearing Period. The Tier 2 and Tier 3 capital blanket and specific projects are developed in the same manner as previously described for the purpose of addressing the key needs of regulatory compliance, safety and security, reliability, operational efficiency and aging infrastructure to serve PNM customers.

Q. HAVE YOU CONCLUDED THAT THE CAPITAL PROJECTS DESCRIBED IN YOUR TESTIMONY ARE NEEDED TO MEET PNM'S SERVICE OBLIGATION?

A. Yes. These projects and their associated costs are necessary for PNM to continue to provide safe and reliable electric service to its New Mexico customers. In addition, many of these projects are required for regulatory compliance purposes. These projects have been carefully vetted and prioritized and the associated costs are reasonable.

VI. O&M EXPENSES FOR T&D

Q. WHAT ARE THE TYPICAL O&M EXPENDITURES ASSOCIATED WITH PNM'S T&D FACILITIES?

A. O&M expenses for T&D include the labor expenses of PNM employees and contract workers that directly support the functions that monitor and control the power system, schedule the outages and maintain and repair the stations, lines and equipment, trim the trees and brush, and perform system reliability, interconnection and engineering cost studies. In addition, O&M expenses also include the amortization of T&D right-of-way acquisition costs, regulatory assessment fees and the cost of transmission of electricity by others (third-party transmission expenses). Third-party transmission costs are provided by PNM Witness Monroy.

Q. WHAT IS THE PROCESS THAT PNM T&D USES TO ESTABLISH ITS O&M BUDGET?

A. PNM's O&M budget development is a multi-step process. Each department within PNM T&D reviews data from the previous years and evaluates known changes. Each department then adjusts the projection based on historical data for known variances, that typically includes items such as scheduled maintenance work, additional contract studies, and inputs this back into PNM's budgeting system and projects forward 5 years using standard escalation rates for these components. As discussed in the testimony of PNM Witness Vavruska-Marcum, the escalation rate for non-union labor, excluding right of way authorizations, is 2.5% and

2.0% for union labor. All non-labor costs are escalated at 1.5% based on the 2015 Annual Operating Plan for 2016. Examples of categories that are reviewed are staffing levels, payroll (both straight time and overtime), outside services, employee expenses, equipment and materials, etc. Senior management must review and approve the final O&M budget.

Q. WHAT IS THE BUDGETING PROCESS FOR JOINTLY OWNED TRANSMISSION FACILITIES?

A. For the jointly-owned transmission facilities previously mentioned, the operating agent for each facility prepares the annual O&M budget. PNM budgets for these projects based upon the annual projected O&M budgets prepared by the operating agent. The operating agents are responsible for the necessary maintenance and repairs to the transmission facilities and invoice the other joint owners for their respective share of O&M costs.

Q. HOW DOES PNM MONITOR AND CONTROL ITS O&M COSTS?

A. PNM manages its O&M expenditures by reviewing all aspects of its operations for savings. I conduct reviews of the O&M budget with department heads on a monthly and quarterly basis. Appropriate efforts are made to help ensure that the budgets remain on target.

Q. PLEASE DESCRIBE PNM'S O&M EXPENDITURES IN THE BASE PERIOD.

A. The Base Period O&M expenditures are the actual O&M expenditures related to T&D functions during the twelve months ending March 31, 2015. These expenditures are the product of the rigorous budgeting and cost control measures as I described. PNM's methodology for forecasting O&M costs in the Test Period are discussed by PNM Witness Monroy.

Q. ARE THERE ANY SIGNIFICANT RIGHTS-OF-WAY RENEWALS ACROSS LANDS BEING HELD IN TRUST BY THE UNITED STATES PROJECTED DURING THE TEST PERIOD?

A. Yes, there are nine different rights-of-way renewals across sovereign pueblo and tribal lands expiring that will need to be renewed. In addition to these nine, PNM is currently amortizing twenty-nine separate rights-of-way accounts crossing fourteen different entities which expire at varying times between 2015 and 2051. Twelve of these fourteen entities are Native American rights-of-way.

Q. WHY ARE THE FORECASTED RIGHTS-OF-WAY RENEWALS INCLUDED IN THIS CASE?

A. PNM's system is situated across a significant amount of sovereign tribal and Pueblo lands. In accordance with federal regulations pertaining to rights-of-way across sovereign tribal lands, many of PNM's rights-of-way are restricted to a term of years and expire at varying times throughout the life of those system

facilities. All of these rights-of-way are necessary in order to maintain and operate those facilities situated on native lands. Each facility serves an integral role in the continued operation of pnm's transmission and distribution system to serve its customers.

Q. IS PNM FORECASTING THESE RIGHTS-OF-WAY RENEWAL COSTS IN THIS RATE CASE?

A. Yes. The forecasted costs accrued for rights-of-way renewals in this rate case are reasonable and included in the testimony provided by PNM Witness Monroy (See PNM Exhibit WP OM-6 and WP OM-17). PNM forecasts estimated rights-of-way costs based on recent rights-of-way settlement agreements, including current market and economic conditions. PNM's right-of-way renewals are prescribed by federal regulations and are administered through the United States Department of the Interior and the Office of the Special Trustee. Due to the unique circumstances associated with sovereign tribal and Pueblo lands, renewal costs are not necessarily uniform and future costs must be estimated. PNM has identified those rights-of-way that are set to expire during the test period and analyzed the cost-basis of each renewal based upon market conditions in addition to an analysis of recent rights-of-way renewals.

Q. PLEASE DESCRIBE PNM'S ANNUAL RIGHT-OF-WAY PAYMENT TO THE NAVAJO NATION.

A. In 2010, PNM reached an agreement with the Navajo Nation for the extension and renewal of twenty-one segments of various rights-of-ways on 2,100 acres across Tribal Trust Lands for transmission, distribution, communications, stations, and communications facilities. The agreement extended the term of each right-of-way until 2030. As part of the stipulated agreement and in consideration for these extensions, PNM agreed to pay the Navajo Nation $120,000,000. The agreement further stipulates that the total amount would be annuitized for the duration of the agreement in the amount of $6,000,000 annually subject to annual adjustment based upon increase in the Consumer Price Index.

Q. PLEASE DESCRIBE THE THIRD-PARTY TRANSMISSION SERVICES PNM PURCHASES FROM OTHER TRANSMISSION PROVIDERS TO SERVE LOAD.

A. PNM purchases transmission service to serve load from APS, Tri-State, EPE and TEP. The rates to PNM for transmission service purchased from these transmission service providers are fixed and approved by FERC. These costs are discussed by PNM Witness Monroy. PNM also has transmission exchange agreements with WAPA under which PNM and WAPA provide transmission service to each other under a single contract.

Q. PLEASE DESCRIBE THE TRANSMISSION SERVICES PNM PURCHASES FROM APS.

A. PNM has two transmission service agreements with APS for delivery of PNM's Palo Verde resources to New Mexico. The first is a non-OATT bilateral contract for a 130 MW path utilizing the Westwing to Four Corners path. PNM uses this transmission path to deliver 130 MW of its Palo Verde generation entitlement to its New Mexico transmission system as a network resource for service to PNM's native load customers. As the Palo Verde owners have undertaken certain upgrades to the generating units, the net generation capacity related to PNM's ownership share has increased by 10 MW. Hence, PNM has purchased an additional 10 MW of transmission service from APS under APS's OATT on the Kyrene to Four Corners path. PNM is not asking for recovery of this amount of transmission service purchased from APS in this rate case as discussed by PNM Witness Monroy.

In addition, PNM has entered into PTP transmission service agreements under the APS OATT for transmission service from the Palo Verde to Four Corners, for a total of 135 MW of transmission capacity. This transmission will be utilized for delivery of Palo Verde Unit 3 if a certificate of public convenience and necessity for that capacity is granted in NMPRC Case No. 13-00390-UT. PNM has deferred the commencement of the transmission service for 2014 and 2015 by paying APS a one-month reservation fee for each of these years.

Q. PLEASE DESCRIBE THE TRANSMISSION SERVICES PNM PURCHASES FROM TRI-STATE.

A. PNM purchases network integration transmission service from Tri-State OATT to serve PNM's retail load in Clayton, New Mexico. PNM has interconnections with Tri-State at Ojo Station north of Santa Fe, New Mexico and at Storrie Lake, north of Las Vegas, New Mexico. PNM delivers power and energy to Tri-State at these interconnections for service to Clayton on Tri-State's transmission system.

Q. PLEASE DESCRIBE THE TRANSMISSION SERVICES PNM PURCHASES FROM EPE.

A. PNM purchases firm PTP transmission service under EPE's OATT as shown in Table AAJ-3 below:

Table AAJ-3

Transmission Services Provided to PNM by EPE		
Receipt	**Delivery**	**Reservation**
West Mesa 345 kV	Amrad 115 kV	25 MW
Afton Generating Station	West Mesa 345 kV	30 MW
Afton Generating Station	Springerville 345 kV	94 MW
Afton Generating Station	West Mesa 345 kV	111 MW
Luna Generating Station	Springerville 345 kV	60 MW

PNM purchases 25 MW of firm PTP transmission service from EPE to deliver PNM network resources from PNM's interconnection with EPE at West Mesa

345 kV to the Amrad station 115 kV interconnection to serve PNM's southeastern New Mexico retail loads. PNM purchases 141 MW of firm PTP transmission service from EPE to deliver a portion of Afton Generating Station from the EPE system to PNM's system at West Mesa. PNM also purchases an additional 154 MW of transmission service from EPE to deliver the remaining portion of the 111 MW of Afton Generating Station and 60 MW of Luna Generating Station to Springerville.

PNM also makes short-term firm purchases under EPE's OATT during the summer months to support system deliveries to Amrad from PNM's southern New Mexico system.

Q. PLEASE DESCRIBE THE TRANSMISSION SERVICES PNM PURCHASES FROM TEP.

A. PNM purchases 14 MW of firm PTP transmission service under TEP's OATT from San Juan to Greenlee to support system deliveries in southern New Mexico.

Q. PLEASE DESCRIBE THE TRANSMISSION SERVICE EXCHANGE AGREEMENTS BETWEEN PNM AND WAPA.

A. The transmission service exchange agreements are Contract 2425 and Contract P0695. Under Contract 2425, PNM provides WAPA 140 MW of transmission service from Four Corners to West Mesa. In exchange, PNM receives from WAPA 84 MW of transmission service from Westwing to Four Corners. Under

Contract P0695, PNM provides WAPA up to 107 MW of transmission service between Four Corners and various points of delivery on PNM's transmission system. In return, WAPA provides PNM 50 MW of transmission service from Westwing to Four Corners. The net effect of the two contracts is that PNM provides WAPA up to 247 MW of transmission service and receives 134 MW of transmission service from WAPA on the Westwing to Four Corners transmission path. PNM uses this transmission path to deliver 134 MW of its Palo Verde generation entitlement to its New Mexico transmission system as a network resource for service to PNM's native load customers.

VII. CONCLUSIONS

Q. DO YOU HAVE ANY CONCLUDING OBSERVATIONS?

A. Yes. PNM strives to minimize customer costs while providing a high degree of reliability in the delivery of electric service. PNM continues to maintain a good reliability track record. The PNM T&D capital investments are prudent and necessary to provide electric service that is adequate to the needs of PNM's customers. These investments permit PNM to maintain its reliability performance by ensuring all appropriate industry reliability standards are met. PNM has a rigorous and structured process for identifying and prioritizing capital investment in advance of its need. PNM's reliability track record demonstrates the Company's ability to plan, build and operate T&D systems capably. Therefore,

the Capital Clearing Period costs are reasonable and necessary for safe and reliable service.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

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