

**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**

**CHRIS M. OLSON**

**August 27, 2015**

**NMPRC CASE NO. 15-00261-UT**  
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**WITNESS FOR**  
**PUBLIC SERVICE COMPANY OF NEW MEXICO**

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Tier 3 Generation Capital Projects

PNM EXHIBIT CMO-5

San Juan Urea Work Paper

PNM EXHIBIT CMO-6

La Luz Non-Labor O&M Work Paper

PNM EXHIBIT CMO-7

La Luz Labor O&M Work Paper

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Solar 40 MW Solar Project O&M Work Paper

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**I. INTRODUCTION AND PURPOSE**

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

**A.** My name is Chris M. Olson. I am Vice President, Generation, for Public Service Company of New Mexico (“PNM”). My business address is 2401 Aztec Road, NE, Albuquerque, New Mexico 87107.

**Q. PLEASE DESCRIBE YOUR RESPONSIBILITIES AS VICE PRESIDENT, GENERATION.**

**A.** As Vice President, Generation, I am responsible for the strategic direction and operation of PNM’s generating resources to ensure that they continue to provide safe, reliable and cost-effective electricity generation to customers within PNM’s service territory. The functions I oversee include generation operations, maintenance, engineering, construction, fuel and power procurement, wholesale power marketing and other services related to PNM’s generation fleet for PNM’s customers. I also have executive oversight responsibility for the operation of the San Juan Generating Station (“San Juan” or “SJGS”) on behalf of its various owners (“Participants”), in conformity with the San Juan Project Participation Agreement.

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1 **Q. HAVE YOU PREPARED A STATEMENT OF YOUR EXPERIENCE AND**  
2 **QUALIFICATIONS?**

3 **A.** Yes. My educational background and professional experience are outlined in  
4 PNM Exhibit CMO-1.

5

6 **Q. HAVE YOU PREVIOUSLY TESTIFIED IN ADMINISTRATIVE**  
7 **PROCEEDINGS?**

8 **A.** I testified as a witness for PNM at the September 5, 2013, proceeding before the  
9 New Mexico Environmental Improvement Board (“NMEIB”) where the revision  
10 to the New Mexico Regional Haze State Implementation Plan (“Revised SIP”)  
11 was adopted for purposes of New Mexico’s compliance with the U.S.  
12 Environmental Protection Agency’s (“EPA”) Regional Haze Rule. The Revised  
13 SIP includes a new determination of Best Available Retrofit Technology  
14 (“BART”) for San Juan which requires the retirement of Units 2 and 3 and the  
15 retrofit of selective non-catalytic reduction (“SNCR”) on San Juan Units 1 and 4.  
16 I testified as a witness for PNM in NMPRC Case No. 13-00390-UT where I  
17 submitted a series of pre-filed testimony relating to PNM’s proposed retirement of San  
18 Juan Units 2 and 3, the cost of necessary emissions controls equipment for San Juan to  
19 comply with the EPA’s Regional Haze Rule and other air quality requirements, and the  
20 suitability of additional capacity in San Juan Unit 4 and Unit 3 of the Palo Verde  
21 Nuclear Generating Station (“Palo Verde”) as replacement generation. I submitted pre-  
22 filed testimony in Case No. 14-00332-UT, which was the predecessor to this rate case. I  
23 also recently submitted pre-filed direct testimony in Case No 15-00205-UT in which

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1 PNM is seeking a certificate of public convenience and necessity for a gas peaking plant  
2 to be built at the San Juan site.

3

4 **Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?**

5 **A.** I detail and support certain generation-related cost elements of PNM's revenue  
6 requirements in this case. First, I discuss PNM's capital investments in  
7 generation facilities for the period from the end of the Base Period (the twelve  
8 months ending March 31, 2015) through the end of the Test Period (the twelve  
9 months ending September 30, 2016)<sup>1</sup> and the construction work in progress  
10 ("CWIP") five-month period following the Test Period, October 2016 through  
11 February 2017<sup>2</sup>. Second, I address the necessary non-fuel operations and  
12 maintenance ("O&M") expenditures relating to PNM's generation fleet utilized in  
13 developing the Base Period expenses. Third, I address the necessary costs related  
14 to coal cost assumptions and fuel transportation for PNM's natural gas generation  
15 facilities. Specifically, in the sections of my testimony that follow, I discuss:

- 16
- PNM's generation resources and their role in PNM's generation portfolio;
  - PNM's generation capital budgeting processes, including how priorities are
- 17
- 18 established and how capital budgets are monitored and controlled;

---

<sup>1</sup> 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.

<sup>2</sup> The period from April 1, 2015 through February 28, 2017, encompassing the Capital Investment Period and Construction Work in Progress ("CWIP") period (October 1, 2016 through February 28, 2017) is referred to as the "Capital Clearing Period".

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- 1       • Major capital investments required for the safe, reliable and efficient
- 2       operation of PNM's electric generating facilities while complying with all
- 3       federal and state regulations;
- 4       • The SNCR capital project at San Juan, including the necessity for the
- 5       conversion to "balanced draft" for San Juan Units 1 and 4;
- 6       • The necessity of the purchase and extension of the Palo Verde leases;
- 7       • How generation O&M expenditures are budgeted and monitored;
- 8       • The generation O&M expenditures included in the Base Period;
- 9       • The appropriate Base Period adjustments for generation O&M expenditures;
- 10      • Costs associated with power plant turbine major maintenance;
- 11      • Coal pricing assumptions at San Juan and Four Corners; and
- 12      • Costs associated with gas transportation for PNM's gas generation facilities.

**II. SUMMARY OF KEY CONCLUSIONS**

15   **Q. WHAT ARE THE KEY CONCLUSIONS OF YOUR TESTIMONY?**

16   **A.** I have reached a number of conclusions, including:

- 17      • PNM uses a thorough capital budgeting process to prioritize generation capital
- 18      projects and carefully monitors and controls capital expenditures. The
- 19      generation capital investments during the Capital Investment Period are the
- 20      result of this process and are reasonable and necessary for PNM to continue
- 21      meeting its customers' energy needs in a safe, reliable and cost-effective
- 22      manner.

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- 1           • PNM’s generation O&M costs are the product of prudent planning and  
2           reasonable cost controls. The Base Period O&M expenses represent costs  
3           actually and necessarily incurred by PNM to safely and reliably operate  
4           PNM’s generation facilities.
- 5           • PNM’s scheduled plant maintenance is necessary for cost-effective operation.  
6           No single year’s O&M expenses accurately represent the level of scheduled  
7           maintenance costs that will be incurred during the period that PNM’s  
8           proposed new rates will be in effect. Therefore, it is necessary to use a  
9           normalized approach to determine the appropriate amount of scheduled  
10          maintenance cost to include in the Test Period.
- 11          • It is appropriate to make certain adjustments in forecasting future O&M  
12          expenses as a result of planned additions and retirements in PNM’s generation  
13          resource portfolio.
- 14          • PNM will incur additional fuel-related expenses associated with the  
15          transportation of natural gas needed to fuel PNM’s gas generation facilities in  
16          the Test Period.
- 17          • It is necessary and reasonable to install SNCR and balanced draft on San Juan  
18          Units 1 and 4.

19



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1                   **III.    OVERVIEW OF PNM’S GENERATION RESOURCES**

2   **Q.    PLEASE DESCRIBE PNM’S PORTFOLIO OF GENERATION**  
 3           **RESOURCES CURRENTLY IN SERVICE AND ANTICIPATED TO BE**  
 4           **IN SERVICE THROUGH THE END OF THE TEST YEAR.**

5   **A.**    PNM’s diverse mix of generation resources includes coal, nuclear, natural gas and  
 6           renewable resources. While PNM owns most of its generation capacity, either  
 7           outright or in participation with other owners, some of PNM’s generation  
 8           resources are leased or are available through power purchase agreements  
 9           (“PPAs”) where PNM has a contractual entitlement to the full output of the  
 10          facility. PNM’s New Mexico jurisdictional generation resources that are  
 11          anticipated to be in service by September 30, 2016, are listed on Table CMO-1.

12

**Table CMO-1  
PNM’s Generation Resources**

<u>Generating Plant</u>	<u>Fuel Type</u>	<u>PNM Share</u>	<u>PNM Share of Capacity (MW)</u>	<u>In-Service Date</u>	<u>Operating Agent</u>
San Juan	Coal	47 %	783	1973-1982	PNM
Palo Verde 1 & 2	Nuclear	10.2 % (owned or leased)	268	1985-1986	APS
Afton	Natural Gas	100 %	230	2007	PNM
Four Corners 4 & 5	Coal	13.0 %	200	1969-1970	APS
New Mexico Wind Energy Center (PPA)	Wind	N/A	200	2003	FPL

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Luna Energy Facility	Natural Gas	33.3 %	185	2006	PNM
Reeves	Natural Gas	100 %	154	1958-1962	PNM
Valencia (PPA)	Natural Gas	N/A	145	2008	SWG Valencia Power LLC
Rio Bravo (formerly Delta)	Natural Gas	100%	138	2001	PNM in 2014
Lordsburg	Natural Gas	100%	80	2002	PNM
44 MW Utility Scale Solar Project	Solar	100%	44	2011-2013	PNM
Dale Burgett Geothermal (PPA)	Geothermal	N/A	8	2014	Cyrq Energy
Red Mesa Wind Energy Center (PPA)	Wind	N/A	102	2015	NextEra Energy
23 MW Utility Scale Solar Project	Solar	100%	23	2014	PNM
40 MW Utility Scale Solar Project	Solar	100%	40	2015	PNM
La Luz Energy Center	Natural Gas	100%	40	2015	PNM
<b>TOTAL MW</b>			<b>2495</b>		

1 **Q. WHICH OF THE RESOURCES LISTED IN TABLE CMO-1 ARE**  
2 **PRESENTLY SERVING PNM CUSTOMERS?**

3 **A.** All of the facilities listed in Table CMO-1 currently serve PNM's customers with  
4 the exception of the La Luz Energy Center ("La Luz") and the 40 MW Utility

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1 Scale Solar Project (“40 MW Solar Project”), both of which will begin serving  
2 customers later in 2015.

3  
4 **Q. EXCLUDING FOR THE MOMENT THE FACILITIES THAT HAVE NOT**  
5 **YET BEEN PLACED IN SERVICE, ARE ALL OF THE GENERATION**  
6 **RESOURCES LISTED ON TABLE CMO-1 NECESSARY TO PROVIDE**  
7 **RELIABLE SERVICE TO PNM’S CUSTOMERS?**

8 **A.** Yes. Of course, the utilization rates of these facilities vary through the year  
9 depending on the type of resource. Most of the energy supplied to PNM’s  
10 customers is generated at the base load facilities. San Juan, the Four Corners  
11 Power Plant (“Four Corners”) and the Palo Verde are base load facilities and  
12 typically operate at close to full capacity all year. The Dale Burgett Geothermal  
13 resource compares favorably with the base load facilities due to its high capacity  
14 factor and low variability. San Juan is used for load following and is also used to  
15 supplement renewable generation resources when gas resources are not operating  
16 or adequate. Although Palo Verde Unit 3 is currently a New Mexico non-  
17 jurisdictional resource, PNM’s customers have still benefited from its low cost  
18 operation because it is used for “hazard sharing” to assure adequate supplies to  
19 New Mexico retail customers when either Palo Verde Units 1 or 2 is off-line for  
20 maintenance. The New Mexico Wind Energy Center (“NMWEC”), the Red Mesa  
21 Wind Energy Center (“Red Mesa”), and the existing 44 MW of utility scale solar  
22 generation are intermittent generation resources. The electricity from these  
23 facilities must be used as it is generated.

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1 The gas-fired resources, consisting of the Afton Generating Station (“Afton”), the  
2 Luna Energy Facility (“Luna”), the Reeves Generating Station (“Reeves”), the  
3 Lordsburg Generating Station (“Lordsburg”), the Rio Bravo Generating Station<sup>3</sup>  
4 (“Rio Bravo”) and the Valencia Energy Facility (“Valencia”), are operated on an  
5 as-needed basis when load and market conditions dictate, or when transmission  
6 constraints require load-side generation. These resources may be used for load  
7 following and to balance generation to load when load and intermittent resource  
8 generation fluctuate. During on peak hours, the combined cycle gas plants (Afton  
9 and Luna) are also the primary resources used to regulate intermittent generation  
10 from the NMWEC and Red Mesa. During off peak hours, PNM uses base load  
11 plants to regulate its wind resources.

12  
13 **Q. HOW IS ENERGY DELIVERED TO PNM’S CUSTOMERS FROM**  
14 **THESE FACILITIES?**

15 **A.** All of PNM’s generation resources utilize the bulk transmission system for  
16 delivery to PNM’s load centers as described by PNM Witness Johnson.

17  
18 **Q. ARE THERE ANY PROPOSED CHANGES TO PNM’S EXISTING**  
19 **GENERATION FLEET IN THE NEAR FUTURE?**

20 **A.** Yes. As noted earlier in my testimony, PNM is seeking to retire San Juan Units 2  
21 and 3 effective December 31, 2017, in order to comply with the Revised SIP.

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<sup>3</sup> Rio Bravo was formerly known as the Delta-Person Station. The Delta-Person Station previously provided energy to PNM’s customers pursuant to a PPA. PNM has acquired the Delta-Person Station and it has been renamed.

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1 This retirement represents a significant amount of base load generation for PNM  
2 and replacement resources will be required. To that end, PNM is seeking  
3 certificates of public convenience and necessity (“CCNs”) from the New Mexico  
4 Public Regulation Commission (“NMPRC” or Commission”) for an additional  
5 132 MW in San Juan Unit 4 as well as 134 MW in Palo Verde Unit 3 which  
6 represents PNM’s 10.2% interest in that unit. PNM’s application for approval of  
7 the retirement of San Juan Units 2 and 3 and the referenced CCNs is currently  
8 pending before the Commission in NMPRC Case No. 13-00390-UT. If approved,  
9 these changes will not take effect until after the Capital Investment Period and,  
10 therefore, they do not impact the capital investments included in PNM’s cost of  
11 service in this case. A separate CCN application has been filed with Commission  
12 in NMPRC Case No. 15-00205-UT for the addition of the San Juan Gas Plant  
13 which, if approved, will become operational after the Capital Investment Period.  
14

15 **Q. PNM HAS PURCHASED CERTAIN LEASES REPRESENTING 64 MW**  
16 **OF PALO VERDE UNIT 2 AND IS THIS CAPACITY NEEDED TO**  
17 **SERVE PNM’S CUSTOMERS?**

18 **A.** Yes. As I discussed earlier, Palo Verde serves as an important source of base load  
19 generation for PNM’s customers that is needed now and in the foreseeable future.  
20 In the face of the expiration of these leases in the near future, it was prudent for  
21 PNM to purchase these leases to assure that important base load generation was  
22 not lost or interrupted. PNM Witness Eden discusses the appropriateness of the  
23 purchase costs of these leases.

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1 **Q. PLEASE DESCRIBE THE ADDITIONAL GENERATION RESOURCES**  
2 **THAT PNM PLANS TO PLACE IN SERVICE DURING THE CAPITAL**  
3 **INVESTMENT PERIOD.**

4 **A.** The following additional generation resources will be placed in service during the  
5 Capital Investment Period:

6

7 **La Luz.** La Luz is a 40 MW gas peaking plant that was approved in NMPRC  
8 Case No. 13-00175-UT. This facility is needed for voltage regulation and to meet  
9 summer peak demand starting in 2016 and is forecasted to be in service by  
10 December 2015.

11

12 **40 MW Solar Project.** PNM received Commission approval for a 40 MW Solar  
13 Project in its Renewable Energy Portfolio Procurement Plan filing in NMPRC  
14 Case No. 14-00158-UT. The 40 MW Solar Project is expected to be fully in  
15 service by the fourth quarter of 2015.

16

17 **Q. ARE ALL OF THESE ADDITIONAL GENERATION RESOURCES**  
18 **NECESSARY TO SERVE PNM'S NEW MEXICO CUSTOMERS?**

19 **A.** They are. This is addressed in the PNM 2014 Integrated Resource Plan ("IRP").  
20 There is a current and future need for all of PNM's existing and proposed  
21 generation resources. The blend of resource types – coal and nuclear base load,  
22 gas intermediate and peaking, renewable generation and energy efficiency  
23 programs – are required to reliably and cost-effectively provide electricity to

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1 PNM's customers. Most of the energy supplied to PNM's customers is generated  
2 by the low cost, base load resources. PNM must continue to invest capital and  
3 incur O&M expenses for its existing and planned generation resources to maintain  
4 reliability and cost-effectiveness.

5  
6 **IV. PNM'S GENERATION CAPITAL INVESTMENT PROCESS**

7 **Q. HOW DOES PNM SELECT CAPITAL PROJECTS FOR EXISTING**  
8 **GENERATION FACILITIES?**

9 **A.** There are two processes for capital budgeting for existing generation facilities.  
10 First, there is the process PNM uses for the generation facilities that PNM owns  
11 or for which PNM is the operating agent. Second, PNM participates in a similar  
12 capital budgeting process at Four Corners and Palo Verde, which are plants in  
13 which PNM has a partial ownership interest, but which PNM does not operate.

14  
15 **Q. PLEASE DESCRIBE THE BUDGET PROCESS USED FOR**  
16 **GENERATION FACILITIES THAT PNM OWNS OR PARTIALLY OWNS**  
17 **AND OPERATES.**

18 **A.** The budget process for generation facilities that PNM owns, or partially owns and  
19 operates, begins by plant staff identifying potential projects that are considered  
20 essential to meet applicable regulatory compliance requirements and for safe and  
21 reliable operations. As explained by PNM Witness Buchanan, PNM Generation  
22 is provided annual capital targets for a five year period as a guide for budgeting.

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1 PNM develops cost estimates for the respective project budgets while working  
2 within the capital targets. The estimating process involves internal and external  
3 technical experts - engineers, manufacturers and other outside experts - who  
4 define the project scope and develop the cost estimates using best available  
5 information for each project. Senior management reviews the budget requests for  
6 PNM and sets the final capital budget.

7  
8 In the case of the budgets for San Juan and Luna, where PNM acts as operating  
9 agent, PNM presents the proposed capital budgets to the respective owners at  
10 these two facilities for review and final approval. Throughout this process, PNM  
11 strives to balance the cost of each project with the benefit to customers that will  
12 be derived from the project.

13  
14 **Q. PLEASE DESCRIBE THE CAPITAL BUDGET PROCESS USED FOR**  
15 **FOUR CORNERS AND PALO VERDE.**

16 **A.** Arizona Public Service Company (“APS”) is the operating agent for both Four  
17 Corners and Palo Verde. Very much like PNM, APS follows a rigorous process  
18 to determine project prioritization, cost estimates and funding levels. APS  
19 presents the capital plan for Palo Verde and Four Corners to the respective  
20 ownership groups for each plant. The ownership groups are composed of a voting  
21 member from each participant in that plant. The owners scrutinize APS’s plans,  
22 seek information and provide input on the proposed budgets. The final annual



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1 capital budgets are then put to a vote of each facility's owners and must be  
2 approved by the requisite voting majority.

3

4 **Q. CAN YOU DESCRIBE HOW THE CAPITAL PROJECT COST**  
5 **ESTIMATING PROCESS WORKS?**

6 **A.** Depending on the complexity of the project, PNM assembles data from a variety  
7 of sources to develop cost estimates for generation projects. Initially, PNM's  
8 Project Engineering staff develops cost estimates based on information from  
9 recent similar projects, equipment suppliers, construction contractors and industry  
10 information.

11

12 As the project is further refined, PNM often relies on a competitive bid process to  
13 finalize cost estimates for capital projects. The Project Engineering staff assesses  
14 the bids and selects the most qualified vendor or contractor to perform the work.  
15 PNM reviews the bid in totality (cost, quality, schedule) when selecting the  
16 winning bid and placing the contract.

17

18 Depending on the size and complexity of the project, estimating may also be  
19 performed by an outside firm engaged to engineer the project. For large or  
20 complex projects, estimating may be performed by an outside firm engaged in the  
21 role of "Owner's Engineer." This is an industry standard practice. The firm  
22 engaged as the Owner's Engineer is a firm with proven experience in designing  
23 and executing projects of the scope and technology being considered.

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For large or complex projects, one of the critical decisions is the contracting strategy. The contracting strategy influences the estimating strategy for the continuing development of the project. For example, if the contracting strategy is to use an Engineer, Procure, Construct (“EPC”) contract, the next refinement of the project cost estimate will likely be based on proposals from the EPC bidders. Depending on the structure of the request for proposals (“RFP”), either a single proposal may be selected for EPC or separate parties may be selected for engineering, equipment, supply and construction. If a multiple prime contracting strategy is selected, the next refinement of the cost estimate will come from the firm selected to perform the detail engineering for the project.

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**Q. WHAT ARE THE COMMON TYPES OF COSTS THAT GO INTO PROJECT COST ESTIMATES?**

21

22

**A.** Typical cost types and how they relate to the above activities include:

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1        110 and 120; Internal labor: This includes all labor performed by PNM  
2 employees from permitting through to project commissioning. As mentioned  
3 above, an assumption is made during the estimating process as to who will  
4 perform the work (internal or external). As the project gets closer in time, this  
5 assumption is reviewed based on current staff availability.

6        350 and 359; Materials and Equipment: This cost type includes all minor  
7 materials and equipment which are typically purchased as a stock item from a  
8 vendor or material provider. It includes items that PNM or its materials provider  
9 routinely stock or can acquire quickly. Examples include pipe, fittings, electrical  
10 cable, fasteners, valves, bearings, etc.

11       370 Outside Services: This cost type includes all outside professional services as  
12 well as construction services. Professional services may include environmental  
13 compliance and testing, engineering support, etc. This cost type also includes the  
14 purchase of specialty engineered equipment or site specific items such as motors,  
15 pumps, control systems, fans, compressors, conveyor belts and instrumentation.

16  
17       **Q.    ONCE CAPITAL PROJECTS ARE APPROVED, HOW DOES PNM**  
18       **MINIMIZE COSTS TO CUSTOMERS?**

19       **A.**    PNM actively manages its capital projects to ensure that the projects are  
20 completed at the lowest reasonable cost and within budget. As I described  
21 previously, each project is subject to a thorough scoping and design review  
22 process. PNM utilizes its Procurement team to competitively price materials and  
23 contract labor to achieve the lowest reasonable cost for customers. PNM utilizes

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1 a proactive process of reviews, cost controls, and communication to drive project  
2 and site level accountability.

3

4 **Q. DESCRIBE THE PROCESS THAT PNM GENERATION USES TO**  
5 **MONITOR EXPENDITURES UNDER ITS CAPITAL BUDGET**

6 **A.** PNM Generation reviews the status of the capital budget during monthly meetings  
7 between the plant directors and the department managers at each facility.  
8 Additionally, management reviews are held among the Vice President of  
9 Generation, the Plant Directors, and the Director of Generation Construction  
10 Project Management on a monthly basis. Luna and San Juan have additional  
11 budget reviews held among the members of each facility's respective ownership  
12 groups on a monthly basis. The goals of these reviews are to monitor the  
13 investments at each plant and make sure that expenditures are prudent and within  
14 the budgeted amount.

15

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

18 **A.** Flexibility in the specific projects to be completed is necessary to ensure the  
19 management of unforeseen events and necessary unbudgeted expenses that can  
20 arise during the year. For instance, equipment may fail, diverting the resources of  
21 the engineering and project management staff from on-going projects as well as  
22 requiring unbudgeted expenditures to ensure the supply of power to customers is  
23 not jeopardized. Projects and associated expenditures therefore cannot always be

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1 completed in the timeframe originally forecasted. A process is in place for  
2 managing mid-year changes, or “trade-offs” to ensure the funding of necessary,  
3 but unbudgeted, capital expenditures while not exceeding the approved capital  
4 target. The process requires documentation of the need for the new expenditure,  
5 the identification of a budgeted project expenditure that will be reduced to  
6 accommodate the new expenditure, and proper approvals. As a result of this  
7 process, some projects may be delayed while others are accelerated, but the total  
8 amount of capital invested during the budget period will not typically change by a  
9 significant amount.

10  
11 **Q. HOW IS BUDGETING HANDLED WITH RESPECT TO FACILITIES  
12 THAT PROVIDE POWER TO PNM PURSUANT TO A PPA?**

13 **A.** Because PNM does not own or operate any of the facilities covered by PPAs and  
14 only purchases power from these facilities, PNM is not involved in their  
15 budgeting process. Additionally the PPA’s respective capital investments and  
16 O&M costs are not included in PNM’s revenue requirements.

17  
18 **V. PNM’S GENERATION CAPITAL INVESTMENTS**

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

21 **A.** I address the capital costs associated with the additional generation resources that  
22 I just described. I also discuss PNM’s capital investment plan for existing

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1 generation facilities during the Capital Investment Period and summarize the  
2 benefits of, and justification for, making these investments. In addition, I show  
3 how the investments were projected and that the amounts are reasonable forecasts  
4 of the level of investment needed through the end of the Capital Investment  
5 Period.

6

7 **Q. WHAT ARE THE CAPITAL COSTS THAT PNM EXPECTS TO INCUR**  
8 **WITH RESPECT TO THE NEW GENERATION RESOURCES YOU**  
9 **DESCRIBED AS BEING PLACED INTO SERVICE DURING THE**  
10 **CAPITAL INVESTMENT PERIOD?**

11 **A.** I prepared Table CMO-2 which shows the estimated capital costs associated with  
12 each of these new generation resources that PNM will incur during the Capital  
13 Investment Period.

**Table CMO-2  
Capital Costs for Generation Resources  
Added During Capital Investment Period**

<u>Generating Plant</u>	<u>Estimated Capital Costs<sup>4</sup></u>
40 MW Utility Scale Solar Project	\$77.8 million <sup>5</sup>
La Luz Energy Center	\$55.3 million <sup>6</sup>
<b>Total</b>	<b>\$133.1 million</b>

<sup>4</sup> Represents estimated gross plant investment before adjustment for depreciation and other adjustments.

<sup>5</sup> Total capital investment is \$79.3 million which includes \$1.5 million related to land already in plant in service at March 31, 2015.

<sup>6</sup> Total capital investment is \$56 million which includes 0.7 million related to land already in plant in service at March 31, 2015.

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1 **Q. WHY DOES THE RED MESA WIND ENERGY CENTER NOT APPEAR**  
2 **ON THE LIST?**

3 **A.** Red Mesa is providing generation pursuant to a PPA. Therefore, PNM will not  
4 incur any capital or O&M costs associated with Red Mesa.

5

6 **Q. WHAT IS THE TOTAL PNM GENERATION CAPITAL INVESTMENT**  
7 **DURING THE CAPITAL INVESTMENT PERIOD?**

8 **A.** PNM's total Generation capital investments during the Capital Investment Period  
9 are \$496 million which excludes adjustments of \$18.3 million to reduce  
10 forecasted capital investments in San Juan for PNM's anticipated additional 132  
11 MW interest in the facility. These adjustments are discussed in the testimony of  
12 PNM Witness Buchanan. The capital investments fall into three major categories.

13 1. Capital projects for new generation plants (La Luz and 40 MW Solar) are  
14 \$133.1 million.

15 2. Capital projects at existing generation plants are \$199.4 million.

16 3. Capital to purchase 64 MW of the Palo Verde Unit 2 leases is \$163.5  
17 million.

18 Table CMO-3 represents the total of PNM's generation capital expenditures for  
19 the Capital Investment Period including construction work in progress ("CWIP")  
20 estimated clearings from October 2016 through February 2017. The jurisdictional  
21 allocations of these expenditures are discussed by PNM Witness Monroy.

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**Table CMO-3  
Capital Costs for Generation Resources per Site  
For the Capital Clearing Period by Tier<sup>7</sup>**

Business Segment	Linkage and Test				5 Months Post Test (CWIP)				Linkage and Test + CWIP = Grand Total			
	Tier 1	Tier 2	Tier 3	Total	Tier 1	Tier 2	Tier 3	Total	Tier 1	Tier 2	Tier 3	Grand Total
Generation	451,403,342	15,367,076	1,831,211	468,601,629	26,607,292	578,720	201,464	27,387,476	478,010,634	15,945,796	2,032,675	495,989,105
Afton	1,663,425	674,442	-	2,337,867	-	-	-	-	1,663,425	674,442	-	2,337,867
Bulk Power Building	1,406,849	217,622	-	1,624,472	82,592	-	-	82,592	1,489,441	217,622	-	1,707,064
Four Corners	13,444,776	152,087	-	13,596,863	2,735,458	-	-	2,735,458	16,180,234	152,087	-	16,332,321
La Luz	55,342,122	-	-	55,342,122	-	-	-	-	55,342,122	-	-	55,342,122
Lordsburg	782,805	119,522	54,669	956,997	-	37,208	-	37,208	782,805	156,730	54,669	994,205
Luna	3,172,489	563,015	-	3,735,503	-	-	-	-	3,172,489	563,015	-	3,735,503
Palo Verde	203,430,301	252,865	-	203,683,167	19,334,235	-	-	19,334,235	222,764,536	252,865	-	223,017,402
Reeves	1,565,229	395,301	248,545	2,209,075	-	-	-	-	1,565,229	395,301	248,545	2,209,075
Rio Bravo	-	1,096,096	318,117	1,414,213	-	-	-	-	-	1,096,096	318,117	1,414,213
San Juan	92,841,320	11,896,125	1,209,880	105,947,324	4,455,007	541,512	201,464	5,197,983	97,296,327	12,437,637	1,411,344	111,145,308
Solar	77,754,026	-	-	77,754,026	-	-	-	-	77,754,026	-	-	77,754,026
<b>Grand Totals by Tier</b>	<b>451,403,342</b>	<b>15,367,076</b>	<b>1,831,211</b>	<b>468,601,629</b>	<b>26,607,292</b>	<b>578,720</b>	<b>201,464</b>	<b>27,387,476</b>	<b>478,010,634</b>	<b>15,945,796</b>	<b>2,032,675</b>	<b>495,989,105</b>

1    **Q.    CAN YOU DESCRIBE THE CAPITAL PROJECTS CONTAINED IN THIS**  
2    **RATE CASE REQUEST?**

3    **A.    Yes, please see PNM Exhibit CMO-2 for a summary listing and the detailed**  
4    **information of each of the Generation Tier 1 capital projects organized by each**  
5    **Generation site. This exhibit also includes the project details of the La Luz Gas**  
6    **Plant and the 40 MW Solar Project already discussed. PNM Exhibit CMO-3 is a**  
7    **summary listing and the detailed information of all the Generation Tier 2 capital**  
8    **projects organized by Generation site. PNM Exhibit CMO-4 is a summary listing**  
9    **and the detailed information of all the Generation Tier 3 capital projects organized**  
10   **by each Generation site. These exhibits list each capital project with an**  
11   **identification number, the associated Linkage and Test period cost, the associated**  
12   **CWIP cost, the total project cost for each project tier and the fully supported**

<sup>7</sup>Tiers represent capital projects categorized by dollar value for the Capital Clearing Period. Tier 1 generation projects include those capital projects whose Capital Clearing Period value is equal to or greater than \$750,000. Tier 2 generation projects include those capital projects for which the Capital Clearing Period value is between \$100,000 and \$750,000. Tier 3 generation projects include those capital projects for which the Capital Clearing Period value is less than or equal to \$100,000. Each generation site has its capital projects and costs segregated into these three Tiers.



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1 details of each project. These exhibits are filed in hardcopy within this testimony  
2 and electronically. Detailed project information including project justifications,  
3 estimated completion dates, alternatives reviewed and budget figures by cost type  
4 are hyperlinked from the project identification numbers in the electronic versions  
5 of PNM Exhibit CMO-2 through PNM Exhibit CMO-4.

6  
7 These three capital exhibits are a subset of all of PNM's total capital projects as  
8 described in PNM Witness Buchanan's testimony. As discussed in PNM Witness  
9 Buchanan's testimony, PNM has utilized a three tier system to categorize the  
10 amount of detail required to describe each capital project. For Generation, there  
11 are a total of 152 projects of which, 32 are Tier 1 projects representing 96% of the  
12 capital clearings. There are 69 Tier 2 projects representing 3.2% of the capital  
13 clearings. Finally, there are 51 Tier 3 projects representing less than 1% of the  
14 capital clearings.

15  
16 **Q. CAN YOU ADDRESS SOME OF THE MORE SIGNIFICANT CAPITAL**  
17 **PROJECTS THAT ARE INCLUDED IN PNM'S REVENUE**  
18 **REQUIREMENTS IN THIS CASE?**

19 **A.** Yes. I would like to highlight the more significant, i.e. Tier 1 capital projects, to  
20 be undertaken during the Capital Investment Period. The described Tier 1  
21 projects relate to eight of PNM's generation facilities, specifically San Juan, Palo  
22 Verde, Four Corners, Afton, Luna, Lordsburg, Reeves, and the Aztec office  
23 facility. Although Rio Bravo does not have a Tier 1 capital project, it was also

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1 included in the capital discussion for completeness. Each of these facilities is  
2 addressed separately below.

3  
4 **A. *San Juan Generating Station***

5 **Q. PLEASE PROVIDE ADDITIONAL BACKGROUND ON SAN JUAN AND**  
6 **ITS ROLE IN PNM'S RESOURCE PORTFOLIO?**

7 **A.** San Juan is a low-cost, coal-fired power plant that PNM depends on as a base load  
8 resource and for load following. It presently consists of four units and is located  
9 near Waterflow, New Mexico. San Juan currently produces approximately fifty  
10 percent of the energy used annually to supply PNM's customers' electricity needs.  
11 Even with the proposed retirement of San Juan Units 2 and 3 at the end of 2017,  
12 San Juan will continue to be an important base load generation resource for  
13 PNM's customers. The plant has been in operation for over forty years and is  
14 subject to the normal wear and tear that is associated with a base load plant that is  
15 also used for system regulation necessary to utilize renewable generation  
16 resources. To maintain needed reliability for the remaining years of use for Units  
17 2 and 3 and the longer term use of Units 1 and 4, PNM must replace system  
18 components. PNM minimizes the cost impact of repairing San Juan by  
19 scheduling maintenance using a planned maintenance cycle.

20

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1 **Q. WHAT ARE SOME OF THE MAJOR CAPITAL PROJECTS THAT WILL**  
2 **BE UNDERTAKEN AT SAN JUAN?**

3 **A.** The owners of San Juan Units 1 and 4 are implementing a major environmental  
4 upgrade, the SNCR Project. The SNCR Project includes SNCR emission control  
5 technology on Units 1 and 4 in order to comply with the Revised SIP. In  
6 conjunction with the installation of SNCR, San Juan Unit 1 and Unit 4 are being  
7 converted to a balanced draft configuration which is also included in the SNCR  
8 Project. The conversion to balanced draft is required under the San Juan air  
9 permits and is intended to assure that PNM continues to meet the National  
10 Ambient Air Quality Standards (“NAAQS”) and mitigate workplace exposure to  
11 particulates resulting from fly ash and ammonia emissions due to the installation  
12 of SNCR, among other reasons.

13  
14 **Q. CAN YOU PLEASE DESCRIBE WHAT YOU HAVE REFERRED TO AS**  
15 **THE “SNCR PROJECT”?**

16 **A.** The San Juan SNCR Project encompasses both the installation of SNCR on San  
17 Juan Units 1 and 4 as required by the Revised SIP as well as the conversion of  
18 these units to a balanced draft configuration. They are denoted on PNM Exhibit  
19 CMO-2 as projects:

- 20 • “U1 SNCR” (ID# 76121912)
- 21 • “U4 SNCR” (ID# 76421912)
- 22 • “SJGS SNCR costs PNM Share” (ID# 77021913)

23

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1 **Q. CAN YOU PLEASE GENERALLY DESCRIBE SNCR AND HOW IT**  
2 **WORKS?**

3 **A.** SNCR is a post-combustion control technology for NO<sub>x</sub> emissions. In very  
4 general terms, SNCR uses an amine-based reagent (urea in San Juan's case) which  
5 is injected into the boiler and reacts with Nitrogen Oxide ("NO<sub>x</sub>") to reduce it to  
6 molecular nitrogen ("N<sub>2</sub>") and water. In order to inject the reagent, the boiler  
7 walls must be penetrated and lances must be installed for the delivery of the  
8 reagent into the heated boiler.

9

10 **Q. CAN YOU PLEASE GENERALLY DESCRIBE WHAT BALANCED**  
11 **DRAFT IS AND HOW IT WORKS?**

12 **A.** The San Juan boilers were originally designed with only forced draft ("F.D.")  
13 fans. These boilers and associated flues and ducts operate at positive pressure.  
14 A positive pressure or "forced draft" system pushes or forces gases through  
15 several pieces of equipment including the steam generator, particulate control  
16 devices, scrubber, and up the stack. Solely pushing combustion air and  
17 product gases through the entire system requires relatively high gas pressures  
18 throughout the equipment path and results in the intrusion of flue gas into the  
19 ambient air due to imperfect sealing between high temperature tube sections,  
20 expansion joints, and ductwork transitions. The integrity of these seals is  
21 compromised with time due to wear, particularly in load-following or cycling  
22 duty. Coal combustion particles that accumulate outside of the boiler pressure  
23 boundary pose various maintenance, health and safety issues.

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1 A balanced draft gas handling system both “pushes” and “pulls” the gas  
2 through the entirety of the boiler and environmental controls which  
3 significantly reduces, if not eliminates, the positive static gas pressure  
4 throughout most of the gas path and eliminates intrusion of flue gas into the  
5 ambient air

6

7 **Q. WHY IS IT NECESSARY TO CONVERT SAN JUAN TO A BALANCED**  
8 **DRAFT CONFIGURATION?**

9 **A.** In a September 2011 Title V permit application, after consultation with the New  
10 Mexico Environment Department (“NMED”) concerning San Juan’s fugitive  
11 emissions, PNM made the commitment to convert to balanced draft when the  
12 boilers were upgraded to meet the Regional Haze Federal or State Implementation  
13 Plan. In a subsequent NSR permit modification issued by NMED in August 2012  
14 that allowed the installation of either SCR under the federal plan or SNCR under  
15 that state plan, NMED required San Juan to install balanced draft.

16

17 **Q. DOES BALANCED DRAFT HELP ASSURE COMPLIANCE WITH**  
18 **RESPECT TO FUGITIVE EMISSIONS?**

19 **A.** Yes. Balanced draft is achieved by installing induced draft (“I.D.”) fans to  
20 balance the pressure in the boilers, flues and ducts. This greatly lessens the escape  
21 of untreated combustion products including particulate matter, SO<sub>2</sub>, NO<sub>x</sub> and  
22 ammonia (from the SNCR) caused by the positive pressures created by the F.D.

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1 fans. The reduction in fugitive emissions will help ensure demonstrated  
2 compliance with the NAAQS as well as with San Juan's air permits.

3

4 **Q. DOES BALANCE DRAFT POSITIVELY IMPACT THE SAFETY OF THE**  
5 **SAN JUAN EMPLOYEES?**

6 **A.** Yes. As stated above, balanced draft will result in a significant reduction in  
7 fugitive emissions and the ammonia associated with the SNCR process. The  
8 reduction in these emissions provides a myriad of environmental, operational and  
9 worker benefits by reducing the intrusion of combustion products prior to  
10 environmental controls into the ambient air and improving ambient air quality in  
11 the working environment and immediate plant vicinity.

12

13 **Q. DOES BALANCED DRAFT BENEFIT THE OPERATIONS OF THE SAN**  
14 **JUAN PLANT?**

15 **A.** Yes. As stated above, balanced draft will result in a significant reduction in  
16 fugitive emissions including fly ash. As the plant in general is exposed to less fly  
17 ash, there will be lowered on-going maintenance and labor required to address  
18 fugitive dust.

19

20 **Q. HOW MUCH OF THE COST FOR THE SNCR PROJECT WILL BE**  
21 **INCURRED DURING THE CAPITAL INVESTMENT PERIOD?**

22 **A.** PNM's share of the anticipated costs for the SNCR Project during the Capital  
23 Investment Period is \$35.9 million for San Juan Unit 1 and \$42.3 million for San

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1 Juan Unit 4. Included in the costs of Unit 4 are the costs associated with the  
2 additional 132 MW of capacity that PNM is seeking to acquire in NMPRC Case  
3 No. 13-00390. However, as previously discussed, the forecasted additional 132  
4 MW capital interest was removed from the Capital Investment Period and Capital  
5 Clearings Period as described in PNM Witness Buchanan’s testimony.

6

7 **Q. HOW ARE THE COSTS OF THE SNCR PROJECT SPLIT BETWEEN**  
8 **BALANCED DRAFT AND SNCR?**

9 **A.** Table CMO-4 details PNM’s share of the costs allocated to balance draft and the  
10 SNCR’s for Unit 1 and Unit 4. These costs include PNM’s addition of 132 MW  
11 in San Juan Unit 4, but exclude the costs of the proposed 65 MW acquisition by  
12 PNMR – Development and Management Corporation.

**Table CMO - 4  
Capital Costs Breakdown between Balanced Draft and SNCR  
For the Capital Investment Period**

	Balanced Draft	SNCR	Total
<b>SJ Unit 1</b>	\$21,784,082	\$14,140,867	\$35,924,949
<b>SJ Unit 4</b>	\$30,492,959	\$11,792,876	\$42,285,835
<b>Total</b>	<b>\$52,277,041</b>	<b>\$25,933,743</b>	<b>\$78,210,784</b>

13 **Q. CAN YOU EXPLAIN HOW TO TIE THE COSTS IN TABLE CMO-4 TO**  
14 **THE COSTS CONTAINED IN PNM EXHIBIT CMO-2?**

15 **A.** PNM’s total cost of the SNCR Project in Table CMO-4 is \$78,210,784 and  
16 includes \$281,220 of costs which will clear after the Linkage and Test Periods.  
17 The \$281,220 will be excluded from the rate case request and was subtracted from

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1 the \$78,210,784 yielding a revised total of \$77,929,564. The \$77,929,564 value  
2 matches the total value of the three projects listed in PNM Exhibit CMO-2 as:

- 3 1. SJ U1 SNCR Project (ID# 76121912)
- 4 2. SJ U4 SNCR Project (ID# 76421912)
- 5 3. SJGS SNCR costs PNM Share (ID# 77021913)

6  
7 **Q. ARE THE COSTS FOR THE SNCR PROJECT NECESSARY?**

8 **A.** Yes. They are required to comply with the EPA's Regional Haze Rule, Visibility  
9 Transport Rule, the NAAQS, the San Juan New Source Review Permit, and the  
10 San Juan Title V Operating permit.

11  
12 **Q. WHAT ARE PNM'S PLANS FOR CAPITAL INVESTMENT IN SAN  
13 JUAN UNITS 2 AND 3?**

14 **A.** Because of their proposed retirement, the Participants will not make capital  
15 investments in Units 2 and 3 beyond what is reasonably necessary to keep them in  
16 operation through 2017. There is currently one capital project for San Juan Unit 3,  
17 Attenuator Spray Valve Replacement (ID# 76316015), which is anticipated to  
18 be in service by December 31, 2015. The detailed description of this project is  
19 contained in PNM Exhibit CMO-3. There are no current capital projects for San  
20 Juan Unit 2.



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1 **Q. ARE THERE ANY OTHER SIGNIFICANT CAPITAL PROJECTS THAT**  
2 **WILL BE IMPLEMENTED AT SAN JUAN DURING THE CAPITAL**  
3 **INVESTMENT PERIOD?**

4 **A.** Yes, along with the SNCR Project on Units 1 and 4, there are an additional twelve  
5 Tier 1, fifty two Tier 2, and thirty eight Tier 3 capital projects at San Juan. These  
6 projects are listed and contain detailed descriptions in PNM Exhibit CMO-2  
7 through PNM Exhibit CMO-4. In general, these projects target reliability, safety  
8 and compliance, or opportunities to improve plant productivity or reduce O&M  
9 costs. The Tier 1 projects are discussed in greater detail below.

10

11 There are four Tier 1 capital projects targeting the reliability of San Juan Unit 1.

12 These projects are:

- 13 1. Unit 1 Reheat Outlet Header (ID# 76116112)
- 14 2. Unit 1 Boiler Modifications (ID# 76116015)
- 15 3. Unit 1 Cooling Tower MCC's Replacement (ID# 76117618)
- 16 4. Unit 1 Economizer Ash Removal (ID# 76117915)

17 These projects address the obsolescence or wearing out of major components or  
18 provide enhancements that support Unit 1's generation of electricity. Completion  
19 of these capital projects will maintain or improve Unit 1 reliability.

20

21 There are two Tier 1 capital projects targeting the reliability of San Juan Unit 4.

22 These projects are:

- 23 1. Unit 4 Fly Ash System Upgrades (ID# 76416115)

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1           2. Unit 4 Economizer Ash Removal System (ID# 76417115)

2           Similar to Unit 1, these capital projects address the obsolescence or wearing out  
3           of major components or provide enhancements that support Unit 4's generation of  
4           electricity and will maintain or improve Unit 4 reliability.

5

6           Next, there are two capital projects that target the operation of the entire plant, not  
7           any specific Unit. These projects are:

8           1. SJ common Lake Station Switchgear (ID# 76617109)

9           2. Emergent Work for 2016 (ID# 76616116)

10          The switchgear project will replace obsolete electrical equipment used to pump  
11          water from the plant reservoir to the plant. The emergent work project will be  
12          used to maintain the plant's reliability, safety and compliance by handling  
13          unforeseen capital maintenance issues. These two capital projects support all of  
14          the units and completion of the work will maintain or improve overall plant  
15          performance.

16

17          Next, there are three Tier 1 capital projects that target the plant's safety and  
18          compliance profile. These projects are:

19          1. Plant Common Shumway Arroyo Slurry Wall and Water Containment  
20             (ID# 76617332)

21          2. Common Coal Handling (ID# 76616317)

22          3. Plant Common North Side Wastewater Product Line Replacement (ID#  
23             76617724)

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1           The Shumway Arroyo Slurry Wall (ID# 76617332) is a required project  
2           stemming from the Sierra Club Consent Decree (U.S.D.C. Case No. 10-cv-00332-  
3           MCA-LAM). The “Common Coal Handling” project is a safety and compliance  
4           project which is targeting the reduction of fugitive coal dust in the plant. Finally,  
5           the “Plant Common North Side Wastewater Product Line Replacement” relates to  
6           moving and replacing a section of the waste water pipe line. This line runs  
7           underneath the limestone storage pile and can be damaged by the heavy  
8           equipment frequenting the location.

9  
10          Finally, there is one Tier 1 project which targets reducing the plant’s overall  
11          O&M cost. This project is:

12                 1. Plant Common Evaporation Pond Heightening (ID# 76616235)

13          This project will heighten the walls on the evaporation pond which will extend the  
14          time intervals between pond dredging operations. Increasing the time interval  
15          between dredging activities reduces the overall O&M costs of running the plant.

16  
17          The estimated capital cost for all of the San Juan Capital projects during the  
18          Capital Investment Period is \$105.9 million and, \$111.1 million for the Capital  
19          Clearing period.

20

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1        **B.**     *Palo Verde Nuclear Generating Station*

2        **Q.**     **PLEASE PROVIDE ADDITIONAL INFORMATION ABOUT PALO**  
3        **VERDE AND ITS ROLE IN PNM'S GENERATION RESOURCE**  
4        **PORTFOLIO.**

5        **A.**     APS operates Palo Verde. Palo Verde is located west of Phoenix, Arizona, and is  
6        the nation's largest nuclear generating station. The three units at Palo Verde came  
7        on line between 1986 and 1988 and have operating licenses that extend to 2046  
8        and 2047. As discussed by PNM Witness Eden, PNM owns or leases 10.2% of  
9        each of the units at Palo Verde. Only Unit 1 and Unit 2 currently have CCNs to  
10       serve PNM's New Mexico jurisdictional customers. Palo Verde Unit 3 is a  
11       resource that was previously excluded from PNM's jurisdictional generating  
12       resources, but PNM is requesting a CCN for its 134 MW interest in Palo Verde  
13       Unit 3 in NMPRC Case No. 13-00390-UT. The requested CCN effective date is  
14       January 1, 2018. Consequently, there are no Palo Verde Unit 3 costs included in  
15       this rate case application. Palo Verde is an existing, reliable source of capacity  
16       and energy.

17  
18       **Q.**     **WHAT ARE SOME OF THE SIGNIFICANT CAPITAL PROJECTS THAT**  
19       **THE PALO VERDE OWNERS PLAN TO MAKE DURING THE CAPITAL**  
20       **INVESTMENT PERIOD?**

21       **A.**     The owners of Palo Verde have identified a number of capital projects that will  
22       need to be implemented during the Capital Investment Period. On a collective

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1 basis, these projects represent a significant portion of PNM's capital spending  
2 related to generation resources. There are approximately nine major capital  
3 improvement initiatives that will be implemented at Palo Verde across all of the  
4 units. The capital costs discussed below are for all three Palo Verde units. As  
5 detailed by PNM Witness Monroy, adjustments have been made to PNM's  
6 revenue requirements associated with Palo Verde because Unit 3 is not included  
7 in PNM's Test Period cost of service, and to account for sales to wholesale  
8 customers.

9  
10 Nuclear generating units, including Palo Verde, must operate in compliance with  
11 Nuclear Regulatory Commission ("NRC") regulations and oversight. Plant  
12 operations are continuously reviewed by the NRC and failure to implement  
13 capital projects that are necessary for the safe and reliable operation of a nuclear  
14 plant can lead to regulatory action, including curtailment of operations in extreme  
15 situations.

16  
17 **Q. WHAT ROLE DOES CAPITAL INVESTMENT PLAY IN THE**  
18 **AVAILABILITY OF PALO VERDE?**

19 **A.** Appropriate capital improvements are essential to insure that Palo Verde's  
20 availability factor remains at or above industry benchmarks. Palo Verde provides  
21 very cost-effective base load generation for PNM's customers. Therefore, the  
22 more that Palo Verde is available to meet the needs of PNM customers, the lower  
23 the cost of energy to customers.

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1   **Q.    ARE THERE ANY SPECIFIC CAPITAL INVESTMENTS AT PALO**  
2   **VERDE THAT PNM WISHES TO DETAIL?**

3   **A.**    The majority of the ongoing capital investment at Palo Verde is captured in the  
4    six Tier 1 projects entitled:

- 5           1. PV1 Capital structures all years (ID# 72123410)
- 6           2. PV2 Capital structures all years (ID# 72223410)
- 7           3. PV3 Capital structures all years (ID# 72323410)
- 8           4. PV Common capital structures all years (ID# 72423410)
- 9           5. PV Common water rec facility capital structures all years (ID# 72523410)
- 10          6. PV Common (ID# 72423008)

11

12           APS operates Palo Verde and prefers to aggregate multiple capital projects under  
13           single blanket projects. All of the above six Tier 1 projects are structured in this  
14           manner. Within these capital blanket project are multiple projects targeting work  
15           to maintain the nuclear reactors, steam generation systems, turbine generators and  
16           related nuclear safety components. Each of these individual projects is referred to  
17           as a Capital Budget Item (“CBI”). Prior to the start of any CBI, the scope of  
18           work, schedule, and costs are reviewed by the Palo Verde owners. The owners  
19           then vote to approve the CBI and the associated capital expenditures. All of the  
20           projects under these six Tier 1 projects are reviewed and approved in this manner.

21

22           The capital cost for these six Tier 1 projects during the Capital Investment period  
23           is approximately \$39.9 million and is approximately \$59.2 million for the Capital

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1 Clearing period. A more detailed description of the Palo Verde Tier 1 capital  
2 projects along with additional Tier 2 projects can be found in PNM Exhibit  
3 CMO-2 and PNM Exhibit CMO-3.

4  
5 **Q. ARE THERE OTHER NON-O&M EXPENDITURES ASSOCIATED**  
6 **WITH PALO VERDE?**

7 A. Yes, there are two expenditures that I would like to highlight. First, as mentioned  
8 earlier in my testimony, PNM is exercising renewal options to extend the terms of  
9 the Palo Verde Unit 1 and Unit 2 leases, and purchasing 64 MW of capacity of  
10 Unit 2 at fair market value. This project is identified in PNM Exhibit CMO-2 as  
11 “PV Asset Lease” (ID# 72223006) and totals to approximately \$163.5 million  
12 during the Capital Investment period. Additional detail on these capital costs can  
13 be obtained in the testimony of PNM Witness Eden.

14  
15 **Q. ARE THE PALO VERDE LEASE EXTENSIONS AND PURCHASES**  
16 **NECESSARY TO SERVE PNM’S CUSTOMERS?**

17 A. Yes. As I stated before, Palo Verde provides needed base load generation on a  
18 cost-effective and reliable basis. PNM’s IRP includes generation capacity from  
19 Palo Verde Units 1 and 2 at current levels.

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1 **Q. WHAT IS THE OTHER NON-O&M EXPENDITURE ASSOCIATED**  
2 **WITH PALO VERDE?**

3 **A.** The second expenditure deals with the cost of nuclear fuel which is used by Palo  
4 Verde to generate electricity. As part of the operations of the plant, APS  
5 purchases, processes and stocks nuclear fuel waiting to be loaded into the reactor.  
6 Palo Verde reloads its reactors with nuclear fuel on an eighteen month cycle.  
7 Once the fuel has been loaded into the reactor, the nuclear process converts the  
8 fuel to produce heat. This heat is used to boil water which creates the steam that  
9 drives Palo Verde's turbines which in turn drive electric generators. After the  
10 eighteen month cycle, approximately forty percent of the fuel rods will require  
11 replacement due to the nuclear fission process.

12  
13 As the operator of Palo Verde, APS provides PNM with an accounting of the  
14 capital costs associated with nuclear fuel. The forecasted capital costs and  
15 refueling activity are presented in Rule 530, Schedule B-7 for the linkage data and  
16 test period. At March 31, 2015, the nuclear fuel capital account balances was  
17 \$79.2 million. After taking into account forecasted purchases, refueling and  
18 nuclear fuel amortization, the forecasted nuclear fuel capital account balances at  
19 the end of the test period, September 30, 2016, is \$79.8 million. The forecasted  
20 purchases, nuclear fuel reloads are based on information provided by APS. The  
21 increase in the Test Period compared to the Base Period is due to an increase in  
22 the cost of uranium and a new schedule for fuel rod fabrication. PNM relies on  
23 the information from APS to project the nuclear fuel capital. Please refer to the



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1 testimony of PNM Witness Taylor for discussion of nuclear fuel amortization  
2 related to nuclear fuel inventory balances.

3

4 **C. Four Corners Power Plant**

5 **Q. PLEASE PROVIDE SOME FURTHER BACKGROUND ON FOUR**  
6 **CORNERS AND ITS ROLE IN PNM'S GENERATION PORTFOLIO?**

7 **A.** APS also operates the Four Corners Power Plant. Four Corners is located near  
8 Fruitland, New Mexico and formerly consisted of five coal-fired generation units.  
9 Four Corners Units 1, 2 and 3 have been retired for purposes of compliance with  
10 the EPA's Regional Haze Rule. PNM does not own any interest in the retired  
11 units. PNM owns a thirteen percent share of Four Corners Units 4 and 5, which it  
12 acquired in 1969 and 1970, respectively. PNM owns a total of 200 MW of base  
13 load capacity in Four Corners.

14

15 **Q. ARE THERE ANY SPECIFIC CAPITAL INVESTMENTS AT FOUR**  
16 **CORNERS THAT PNM WISHES TO DETAIL?**

17 **A.** The majority of the ongoing capital investment at Four Corners is captured in one  
18 Tier 1 project entitled:

19 1. Four Corners Facility Improvement (ID# 71519210)

20 APS operates Four Corners and prefers to aggregate multiple capital projects  
21 under a single blanket project. The "Four Corners Facility Improvement" project  
22 is structured in this manner. Included in this capital blanket project are multiple

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1 projects targeting reliability, safety, security and environmental compliance. Prior  
2 to the start of any CBI, the scope of work, schedule, and costs are reviewed by the  
3 Four Corners owners. The owners then vote to approve the CBI and the  
4 associated capital expenditures. All of the projects under the “Four Corners  
5 Facility Improvement” project are reviewed and approved in this manner.

6  
7 The estimated capital cost for the Four Corners Facility Improvement project  
8 during the Capital Investment Period is \$13.6 million, and \$16.3 million for the  
9 Capital Clearing Period. A more detailed description of the Tier 1 Four Corners  
10 Facility Improvement project, along with an additional Tier 2 project, can be found in  
11 PNM Exhibit CMO – 2 and PNM Exhibit CMO – 3.

12  
13 ***D. Afton Generating Station***

14 **Q. PLEASE PROVIDE SOME BACKGROUND INFORMATION ON**  
15 **AFTON?**

16 **A.** Afton is a natural gas-fired generating plant that is wholly-owned and operated by  
17 PNM, and is located near La Mesa in the southern part of New Mexico. It  
18 consists of one General Electric (“GE”) Frame 7FA gas turbine, a heat recovery  
19 steam generator, and a GE A10 steam turbine. Afton can be operated in a simple  
20 cycle mode or as a combined cycle generating facility. Power generated at Afton  
21 can be delivered to customers in southern New Mexico or to northern New  
22 Mexico via contracted transmission rights.

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1   **Q.   PLEASE DESCRIBE THE CAPITAL INVESTMENTS THAT PNM WILL**  
2   **MAKE AT AFTON DURING THE CAPITAL INVESTMENT PERIOD.**

3   **A.**   The majority of the ongoing capital investment at Afton is captured in the two  
4   Tier 1 projects entitled:

- 5           1.   Afton Minimum Load Limitation (OpFlex Turndown) (ID# 70716610)
- 6           2.   Afton Capital Improvements 2016 (ID# 70716115)

7   The Afton Minimum Load Limitation (OpFlex Turndown) project is targeting  
8   mechanical, control, and human interface improvements to the gas and steam  
9   turbines. The capital cost for this project during the Capital Investment Period is  
10   estimated to be \$0.9 million. The completion of this project will maintain or  
11   improve Afton's overall reliability.

12  
13   The Afton Capital Improvements 2016 is a blanket capital spending project.  
14   These funds will be used to address emergent safety, regulatory and/or  
15   performance issues in 2016. The estimated capital cost for the Afton Capital  
16   Improvements 2016 project during the Capital Investment Period is \$0.8 million.  
17   A more detailed description of both of these Tier 1 projects and all of the Tier 2  
18   projects can be found in PNM Exhibits CMO – 2 and CMO - 3.

19

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1        *E.     Luna Energy Facility*

2        **Q.     PLEASE PROVIDE BACKGROUND INFORMATION ON THE LUNA**  
3        **ENERGY FACILITY?**

4        **A.**     Luna is a 570 MW natural gas-fired combined cycle generating facility located  
5        near Deming, New Mexico. The facility consists of two GE frame 7FA gas  
6        turbines, two heat recovery steam generators, and one GE D11 steam turbine.  
7        PNM, TEP, and Samchully Power and Utilities 1, LLC, jointly own equal shares  
8        in Luna, with PNM serving as Operating Agent under the terms of the  
9        participation agreement among the three owners. The owners have contracted  
10       with the NAES Corporation to provide on-site operations and maintenance.  
11       Power generated at Luna can be delivered to customers in southern New Mexico  
12       or to northern New Mexico via owned or contracted transmission rights.

13  
14       **Q.     PLEASE DESCRIBE THE CAPITAL INVESTMENTS THAT PNM WILL**  
15       **MAKE AT LUNA DURING THE CAPITAL INVESTMENT PERIOD?**

16       **A.**     The majority of the ongoing capital investment at Luna is captured in a single Tier  
17       1 expenditure entitled:

18            1. Luna GE Long Term Service Agreement (“LTSA”) (ID# 74417010)  
19       The LTSA capital work is performed under a contract between PNM and GE and  
20       targets turbine reliability. Under the terms of the LTSA, GE performs all required,  
21       periodic gas turbine major maintenance, which includes combustor inspections,  
22       hot gas path inspections and major inspections, on a prescribed schedule based on

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1 gas turbine operating hours and fired starts. The estimated capital cost for the  
2 Luna LTSA during the Capital Investment Period is \$3.2 million. Additional  
3 descriptions of the Tier 1 LTSA project and all of the Luna Tier 2 projects can be found  
4 in PNM Exhibit CMO-2 and PNM Exhibit CMO-3.

5  
6 **Q. PLEASE PROVIDE MORE DETAIL ABOUT WHAT WORK WILL BE**  
7 **PERFORMED BY GE UNDER THE LTSA.**

8 **A.** Required periodic major maintenance on the Luna gas turbines and steam turbine  
9 is performed by GE under the terms of the LTSA between the Luna owners and  
10 GE. Under the terms of the LTSA, GE performs all required, periodic gas turbine  
11 major maintenance, which includes Hot Gas Path Inspections and Major  
12 Inspections, as well as steam turbine Major Inspections, on a prescribed schedule  
13 based on gas turbine operating hours and fired starts. At Luna, Gas Turbine Hot  
14 Gas Path Inspections, which are performed every 900 starts or 24,000 operating  
15 hours, whichever occurs first, are approximately 21 day outages where all of the  
16 combustor parts (fuel nozzles, combustion sleeves, transition pieces, etc.) and  
17 turbine parts (nozzles, blades, wear pads, etc.) are replaced. Gas Turbine Major  
18 Inspections, which are performed every 2,700 starts or 72,000 operating hours,  
19 whichever occurs first, are approximately forty-five day outages where, in  
20 addition to the Hot Gas Path Inspection work scope, the compressor and the  
21 generator are opened, inspected and tested, and the entire turbine rotor is removed  
22 from the case for de-blading and testing. The Steam Turbine Major Inspection  
23 work scope, performed during the Gas Turbine Major Inspection, includes an

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1 open/clean/close on the turbine, steam valve refurbishment, and generator  
2 inspection and testing. The remaining major maintenance activities to be  
3 performed under the current LTSA are Hot Gas Path Inspections on U2 and U1  
4 gas turbines in the fall of 2017 and spring of 2018, respectively. Additional detail  
5 can be found in PNM Exhibit CMO-2.

6  
7 **Q. WHY DID PNM CHOOSE TO ENTER INTO THE LTSA WITH GE FOR**  
8 **THE DESCRIBED WORK AT LUNA?**

9 **A.** PNM chose to enter into the LTSA with GE, as the gas turbine original equipment  
10 manufacturer, due to the payments terms and risk sharing, which benefit PNM's  
11 customers. First, the payment terms of the LTSA are structured to somewhat  
12 levelize the year-to-year cash flow associated with routine major maintenance on  
13 the gas turbine. Second, the LTSA provides a mechanism to share risks related to  
14 any unexpected replacement costs. Under the terms of the LTSA, GE absorbs any  
15 unexpected replacement costs for covered parts that do not perform as designed or  
16 whose operating life is shorter than expected. The unexpected costs that are  
17 avoided by the LTSA would otherwise be passed on to PNM's customers.

18  
19 **Q. ARE SERVICE CONTRACTS, SUCH AS THE LTSA, COMMON IN THE**  
20 **UTILITY INDUSTRY?**

21 **A.** They are quite common, and for utilities such as PNM with a limited fleet of gas  
22 generation facilities, they represent the industry standard.

23

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1        *F.     Lordsburg Generating Station*

2        **Q.     PLEASE DESCRIBE THE LORDSBURG GENERATING STATION?**

3        **A.**     Lordsburg is an 80 MW simple cycle natural gas-fired generation facility located  
4        in Hidalgo County, New Mexico. The plant consists of two GE LM6000 aero-  
5        derivative gas turbines that provide peaking power to PNM's customer  
6        base. Lordsburg is wholly-owned by PNM, and PNM has contracted with the  
7        NAES Corporation to provide on-site operations and maintenance on behalf of  
8        PNM. Power generated at Lordsburg can be delivered to customers in southern  
9        New Mexico or to northern New Mexico via owned or contracted transmission  
10       rights.

11  
12       **Q.     PLEASE DESCRIBE THE CAPITAL INVESTMENTS THAT PNM WILL  
13       MAKE AT LORDSBURG DURING THE CAPITAL INVESTMENT  
14       PERIOD?**

15       **A.**     The majority of the ongoing capital investment at Lordsburg is captured in the  
16       Tier 1 project which is:

17            1. Combustion Turbine Upgrades (ID# 70316114)

18        This capital project targets multiple component replacements/upgrades on both  
19        generating units which are needed to ensure safe and reliable operation of the  
20        LM-6000 gas turbine engines. The estimated capital cost for the Lordsburg  
21        turbine upgrade during the Capital Investment Period is \$0.8 million. The  
22        completion of this project will maintain or improve Lordsburg's overall

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1 reliability. A more detailed description of the Tier 1 Combustion Turbine  
2 Upgrade project along with all of the Tier 2 and Tier 3 projects can be found in  
3 PNM Exhibit CMO-2, PNM Exhibit CMO-3 and PNM Exhibit CMO-4,  
4 respectively.

5  
6 **G. *Reeves Generating Station***

7 **Q. PLEASE PROVIDE SOME BACKGROUND INFORMATION ON THE**  
8 **REEVES GENERATING STATION?**

9 **A.** Reeves is a 254 MW natural gas-fired generating plant that is wholly-owned and  
10 operated by PNM, and is located in northern Albuquerque. Reeves consists of  
11 three gas-fired conventional boiler and steam turbine units. Unit's 1 & 2 produce  
12 44 MW each, and Unit 3 produces 66 MW. Power generated at Reeves can be  
13 delivered to customers in northern and southern New Mexico via owned or  
14 contracted transmission rights.

15  
16 **Q. PLEASE DESCRIBE THE CAPITAL INVESTMENTS THAT PNM WILL**  
17 **MAKE AT REEVES DURING THE CAPITAL INVESTMENT PERIOD?**

18 **A.** The majority of the ongoing capital investment at Reeves is captured in the two  
19 Tier 1 projects which are:

- 20 1. Reeves Units 1, 2 & 3 Cooling Tower Upgrade (ID# 71317725)
- 21 2. Reeves U3 Upper Economizer Replacement (ID# 71316125).



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1 For the cooling tower upgrade project, several issues need to be addressed to  
2 prevent structural failure. These cooling towers support all three Reeves units.  
3 The estimated capital cost for the Reeves cooling tower upgrade during the  
4 Capital Investment Period is \$0.8 million. The completion of this project will  
5 maintain or improve Reeve's overall reliability.

6  
7 For the Reeves Unit 3 Upper Economizer project, several of the upper economizer  
8 tubes have been damaged or fatigued due to a failure in the boiler refractory  
9 material. The refractory material has been replaced; however the upper  
10 economizer tubes also need replacement. The estimated capital cost for the  
11 Reeves economizer upgrade during the Capital Investment Period is \$0.8 million.  
12 The completion of this project will maintain or improve Reeves Unit 3 reliability.  
13 A more detailed description of both of these Tier 1 projects along with all of the  
14 Tier 2 and Tier 3 Reeves projects can be found in PNM Exhibit CMO-2, PNM  
15 Exhibit CMO-3, and PNM Exhibit CMO-4, respectively.

16  
17 ***H. Rio Bravo Generating Station***

18 **Q. PLEASE PROVIDE INFORMATION ON RIO BRAVO?**

19 **A.** Rio Bravo is a simple-cycle 138 MW dual fuel generating plant that is wholly-  
20 owned and operated by PNM, and is located in Albuquerque. Rio Bravo can  
21 operate on diesel fuel or natural gas and consists of one GE Frame 7FA gas

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1 turbine. Power generated at Rio Bravo can be delivered to customers in northern  
2 and southern New Mexico via owned or contracted transmission rights.

3  
4 **Q. PLEASE DESCRIBE THE CAPITAL INVESTMENTS THAT PNM WILL**  
5 **MAKE AT RIO BRAVO DURING THE CAPITAL INVESTMENT**  
6 **PERIOD?**

7 **A.** Rio Bravo has no major Tier 1 capital projects. It does have several Tier 2 and  
8 Tier 3 capital projects targeting compliance, safety and reliability of the station.  
9 A more detailed description of each of these projects can be found in PNM  
10 Exhibit CMO-3 and PNM Exhibit CMO-4, respectively.

11  
12 **I. *Other Generation Facilities***

13 **Q. PLEASE DESCRIBE ANY OTHER TIER 1 CAPITAL PROJECTS NOT**  
14 **ALREADY DISCUSSED.**

15 **A.** In addition to the capital investment at the above generating facilities, PNM will  
16 be executing a capital project to maintain the Aztec office facility in Albuquerque  
17 which houses the Generation administrative functions. This project is:

- 18 1. Aztec & Data Center Building Improvements (ID# 35730615)

19 This project targets building maintenance and will replace the roof, HVAC, and  
20 elevator in PNM's Aztec facility. The estimated capital cost for the building  
21 improvements during the Capital Investment Period is \$1.4 million. The total for  
22 the Capital Clearing Period is \$1.5 million. A more detailed description of this Tier

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1           1 project along with all of the Tier 2 Aztec & Data Center Building Improvement  
2 projects can be found in PNM Exhibit CMO-2 and PNM Exhibit CMO-3, respectively.

3

4           **V.     PNM'S GENERATION NON-FUEL O&M EXPENDITURES**

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

7   **A.**   In this section of my direct testimony, I address the PNM Generation O&M  
8 expenditures that were incurred in the Base Period to safely and reliably operate  
9 PNM's generation facilities. In particular, I:

- 10           • Describe the process used to establish PNM's Generation O&M budget  
11           and the oversight and management of these expenditures;
- 12           • Confirm the reasonableness of the Base Period Generation O&M expenses  
13           utilized by PNM Witness Monroy in his forecasts for these expenses in the  
14           Test Year;
- 15           • Confirm the appropriateness of including estimated additional O&M costs  
16           for new generation facilities that will be placed in service before the end  
17           of the Test Period;
- 18           • Describe why it is appropriate to normalize the O&M expenses for certain  
19           PNM generation resources;

20

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1   **Q.   WHAT O&M EXPENDITURES ARE ASSOCIATED WITH PNM'S**  
2   **GENERATION FACILITIES?**

3   **A.**   PNM's Generation O&M expenses are the result of the day-to-day cost of safely  
4   and reliably operating PNM's generation resources and expenditures that are  
5   required to successfully execute the O&M work completed during scheduled  
6   maintenance. O&M expenses in both cases are comprised of several categories.  
7   The most significant expenses are the labor and labor-related expenses of the  
8   employees and contract workers that operate and maintain PNM's generation  
9   resources as well as those employees in generation support roles, such as resource  
10  planning and development, and fuels.

11

12  **Q.   WHAT IS THE PROCESS THAT PNM GENERATION USES TO**  
13  **ESTABLISH THE O&M BUDGET?**

14  **A.**   PNM's O&M budget development is a multi-step process. Staff from each plant  
15  within PNM Generation reviews data from the previous years and evaluates  
16  known changes. Each plant's staff adjusts the projection based on historical data  
17  for known variances, such as scheduled maintenance work, additional contract  
18  studies, etc., and inputs this data into PNM's budgeting system and projects  
19  forward five years using standard escalation rates for these components. As  
20  discussed in the testimony of PNM Witness Vavruska-Marcum, the escalation rate for  
21  non-union labor is 2.5% and 2.0% for union labor. All non-labor costs are escalated at  
22  1.5% as discussed in PNM Witness Monroy's testimony. Examples of cost categories  
23  that are reviewed are staffing levels, payroll (both straight time and overtime),

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1 outside services, equipment and materials. Senior management approves the O&M  
2 budget.

3  
4 **Q. HOW DOES PNM HANDLE O&M BUDGETS FOR GENERATION**  
5 **RESOURCES THAT ARE JOINTLY OWNED WITH OTHER PARTIES?**

6 **A.** For the jointly owned resources that PNM operates, San Juan and Luna, PNM  
7 uses basically the same process that I just described in developing the O&M  
8 budgets. However, the O&M budgets are then presented to the respective owner  
9 representatives for these two facilities for review and approval.

10  
11 **Q. HOW DOES PNM GENERATION DEVELOP SCHEDULED**  
12 **MAINTENANCE COST ESTIMATES?**

13 **A.** For facilities that PNM operates, PNM Generation personnel develop scheduled  
14 maintenance costs by compiling a list of items that need to be addressed during  
15 each scheduled maintenance project. Cost estimates are then developed using  
16 information related to cost of equipment/materials, any outside support services  
17 needed and various other incidental costs that may be incurred during the  
18 scheduled maintenance.

19  
20 For facilities that PNM does not operate, the operating agent for those facilities  
21 prepares an O&M budget that PNM Generation personnel review. The owners of  
22 each generation facility must then vote to approve the O&M budgets.

23

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1 **Q. HOW DOES PNM MINIMIZE O&M COSTS TO CUSTOMERS?**

2 **A.** PNM actively manages projects to ensure that costs are consistent with budgeted  
3 amounts. Of course, some projects will come in above and others below budget.  
4 When necessary, PNM finds offsets to ensure that we achieve our overall O&M  
5 budget targets for Generation. PNM utilizes its Procurement team to  
6 competitively price materials and contract labor to achieve the lowest cost for  
7 customers. PNM utilizes a proactive process of reviews, cost controls, and  
8 communication to drive project and site level accountability. This results in a  
9 process that meets operational and customer needs.

10

11 **Q. WHAT PROCESS DOES PNM GENERATION USE TO MANAGE ITS**  
12 **O&M COSTS?**

13 **A.** PNM manages its O&M expenditures by reviewing all aspects of its operations  
14 for savings. Management reviews of the O&M budget are held among the Vice  
15 President of Generation, the Plant Directors, the Director of Wholesale Power  
16 Marketing, and the Director of Generation Services on a monthly and quarterly  
17 basis. Appropriate efforts are made to help ensure that the budgets remain on  
18 target.

19

20 Luna and San Juan also have additional budget reviews held among the members  
21 of the respective ownership groups on a monthly basis. The goal of these reviews  
22 is to monitor the expenditures of each plant and make sure that expenditures are  
23 prudent and within the expected amount. Unforeseen circumstances can result in

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1 scope changes that can cause cost variances and lead to changes to the  
2 maintenance schedules. As noted previously, PNM continually attempts to  
3 optimize scheduled maintenance as the need for maintenance work emerges at  
4 each unit and as work is completed during forced outages.

5

6 **Q. ARE YOU FAMILIAR WITH THE GENERATION O&M EXPENSES**  
7 **THAT PNM WITNESS MONROY USED FOR HIS BASE PERIOD**  
8 **CALCULATION?**

9 **A.** Yes. PNM Witness Monroy used the actual Generation O&M expenditures for  
10 the period between April 1, 2014 and March 31, 2015 in developing his Base  
11 Period O&M expenses. The expenditures were made in conformity with the  
12 O&M budgeting process that I just described and represent a reliable and  
13 reasonable foundation for PNM Witness Monroy's cost of service analysis.

14

15 **Q. WHAT IS YOUR UNDERSTANDING OF HOW THE BASE PERIOD**  
16 **GENERATION O&M EXPENSES WERE USED TO DEVELOP THE**  
17 **TEST YEAR O&M EXPENSES?**

18 **A.** As explained by PNM Witness Monroy, he started with the Base Period  
19 Generation expenditures and applied appropriate annual escalation factors to  
20 derive his Test Period numbers. He also made certain adjustments that he  
21 describes in his direct testimony.

22

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1 **Q. PNM WITNESS MONROY IS ALSO INCLUDING O&M COSTS FOR**  
2 **NEW FACILITIES THAT WILL BE IN SERVICE DURING THE TEST**  
3 **YEAR. IS THIS AN APPROPRIATE ADJUSTMENT TO MORE**  
4 **ACCURATELY ESTIMATE PNM'S O&M EXPENSES?**

5 **A.** Yes. As I discussed above, it is anticipated that the 40 MW Solar Project will be  
6 approved and in service before the end of 2015. Likewise, La Luz is forecasted to  
7 be in service in December 2015. Rio Bravo is now a PNM-owned resource and  
8 was in service in July 2014. There will be O&M costs associated with each of  
9 these facilities that are appropriate to include in the Test Period.

10

11 **Q. ONE OF THE ADJUSTMENTS THAT PNM WITNESS MONROY MADE**  
12 **TO ARRIVE AT HIS TEST YEAR O&M EXPENSES WAS TO LEVELIZE**  
13 **GENERATION O&M COSTS RELATED TO POWER PLANT**  
14 **OUTAGES. DO YOU AGREE THAT SUCH AN ADJUSTMENT**  
15 **PROVIDES A MORE REPRESENTATIVE ESTIMATE OF**  
16 **ANNUALIZED GENERATION O&M COSTS?**

17 **A.** Yes. Power plants are subject to periodic scheduled outages so that major  
18 maintenance can be performed. Outages are typically very cost-intensive.  
19 Planned major outages at San Juan typically occur every two to three years on  
20 each unit. Planned major outages at Four Corners typically occur every six years  
21 with a planned minor outage at the three year mid-point of the major outage for  
22 each unit. Planned outages at Palo Verde typically take place about every  
23 eighteen months on each unit. Depending on the year when outages are



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1 performed, they can skew any analysis of annual O&M expenses. For SJGS, Four  
2 Corners, and Palo Verde, PNM Witness Monroy analyzed the historical outage  
3 expenses incurred during the six year period from 2009 through 2014 to calculate  
4 an average outage expense. This time period would encompass one major outage  
5 for Four Corners, two to three major outages for San Juan, and four major outages  
6 for Palo Verde. This is a reasonable adjustment to make in order to derive  
7 representative O&M costs to be used for the Test Period.

8  
9 **Q. CAN YOU ADDRESS THE ADJUSTMENTS TO O&M EXPENSES FOR**  
10 **THE VARIOUS GENERATION FACILITIES?**

11 **A.** Yes. As stated earlier, each generation facility's Base Period O&M expenditures  
12 had the appropriate annual escalation factors applied to derive the Test Period  
13 numbers as discussed by PNM Witness Monroy. Of all the generation facilities,  
14 only San Juan, Rio Bravo, La Luz and the 40 MW Solar Project had O&M  
15 adjustments which varied from the standard annual escalation factors. Table  
16 CMO-5 denotes which O&M expenses were adjusted for each of these sites.

17  
Table CMO – 5  
Application of Non-Standard O&M Adjustments per Generation Site

Generation Site	Labor	Overtime	Non – Labor
San Juan	Yes	No	Yes
Rio Bravo	No	No	Yes
La Luz	Yes	Yes	Yes
40 MW Solar	No	No	Yes

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1 Any O&M expense adjustments denoted as ‘yes’ in Table CMO – 5 are discussed  
2 in detail separately below.

3  
4 **Q. DESCRIBE HOW SAN JUAN’S TEST PERIOD NON-LABOR O&M**  
5 **UREA EXPENSES WERE DEVELOPED**

6 **A.** The SNCR’s use urea, an amine-based reagent which is injected into the boiler  
7 and reacts with NO<sub>x</sub> to reduce it to molecular nitrogen (N<sub>2</sub>) and water. The  
8 two SNCRs were not in operation during the Base Period, but will be for a portion  
9 of the Test Period starting on February 1<sup>st</sup> of 2016. Therefore, the non-labor  
10 expenses for the urea consumed in the two SNCR’s need to be estimated and  
11 added to the Test Year Non-Labor expenses. For the Test Period, it is estimated  
12 that 2696 tons of urea will be consumed by the SNCR’s with an associated cost of  
13 \$2,021,890 (PNM’s share). These urea costs were added to the non-labor O&M  
14 total, but not escalated. PNM Exhibit CMO-5 contains the assumptions,  
15 consumption rates and associated urea cost calculations.

16  
17 **Q. DESCRIBE HOW SAN JUAN’S TEST PERIOD LABOR O&M EXPENSES**  
18 **WERE DEVELOPED**

19 **A.** To develop the Test Period Labor O&M expenses, PNM needed to make  
20 adjustments to the Base Period Expenses for employee headcount reductions due  
21 to attrition. The total employee headcount in the March 27<sup>th</sup> 2015 pay period was  
22 334. Due to the forecasted attrition of eight employees in the Linkage Period, the  
23 total headcount at the end of the Linkage Period (September 30, 2016) is

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1 projected to be 326. The average labor costs of eight employees were then  
2 subtracted from the March 2015 Base Period labor costs yielding an adjusted Base  
3 Period labor cost for one pay period of \$440,791. This was the most conservative  
4 cost approach as the eight employees are forecasted to leave across the entire  
5 linkage period. A more detailed description of the methodology used to calculate  
6 the Test Period Labor O&M expenses is provided and supported by PNM Exhibit  
7 HEM-4 WP LA-6.

8  
9 **Q. DESCRIBE HOW RIO BRAVO'S NON-LABOR O&M EXPENSES WERE**  
10 **DEVELOPED.**

11 **A.** Rio Bravo became a PNM asset in July 2014 (three months into the 12 month  
12 Base Period). To develop Rio Bravo's Base Period Non-Labor O&M expenses,  
13 PNM needed to annualize the nine months of Non-Labor O&M Base Period  
14 expenses. Since Rio Bravo is supported out of PNM's Reeves facility, the Labor  
15 and Overtime O&M expenses are already captured in the Reeves Labor O&M  
16 Expenses. Please see PNM Exhibit HEM-4 WP OM-9 for Rio Bravo labor  
17 expenses.

18  
19 The first step to develop the annualized Base Period was to capture the nine  
20 months of actual Base Period Non-Labor O&M expenses. Next, two major  
21 entries (LTSA annual bonus cost, Rio Bravo air permit credit) were removed to  
22 annualize the 9 months expense to a full year of O&M. The Rio Bravo air permit  
23 credit was a one-time, non-recurring entry, that is not expected to occur in the

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1 future, and the LTSA annual bonus costs was already an annual expense and did  
2 not need to be annualized. The remaining expenses were then annualized to  
3 provide the Base Period Non-Labor O&M expenses.

4  
5 **Q. DESCRIBE HOW LA LUZ NON-LABOR O&M EXPENSES WERE**  
6 **DEVELOPED.**

7 **A.** La Luz is a new 40 MW gas peaking plant and is forecasted to be in service by  
8 December 2015. The majority of the La Luz O&M expenses were developed  
9 using actual non-labor O&M expenses from Lordsburg, taking into consideration  
10 differences in known operating characteristics, equipment, and chemicals needed  
11 for environmental controls. Costs not associated with Lordsburg plant such as  
12 selective catalytic reduction environmental controls, and facility specific costs  
13 were obtained from other similar PNM gas plants including Luna, Afton and Rio  
14 Bravo, in addition to various quotes from qualified vendors. As discussed by  
15 PNM Witness Monroy, these costs were escalated at the standard 1.5% to provide  
16 the test period expenses of \$615,208. PNM Exhibit CMO-6 contains the detailed  
17 explanation for the La Luz non-labor O&M Expenses.

18  
19 **Q. DESCRIBE HOW LA LUZ LABOR O&M EXPENSES WERE**  
20 **DEVELOPED.**

21 **A.** Based on experience from other gas plants, PNM has projected that it will require  
22 support from two employees to operate this plant. Base Period labor costs for two  
23 employees were utilized to project the total Test Period Labor cost. For the union

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1 employee, both a 15% allocation for overtime and an additional required remote  
2 pay differential was applied. All of the labor costs were escalated the standard  
3 amounts to determine the annual costs. These costs were prorated to the nine  
4 month Test Period yielding a total of \$202,433, inclusive of overtime costs. PNM  
5 Exhibit CMO-7 provides the details of these calculations.

6  
7 **Q. DESCRIBE HOW THE INCREMENTAL 40 MW SOLAR NON-LABOR**  
8 **O&M EXPENSES WERE DEVELOPED.**

9 **A.** The 40 MW solar incremental non-labor O&M costs were developed from  
10 existing PNM solar resources costs during the base period. Base Period costs  
11 were annualized and escalated by the standard non-labor escalation rate. The  
12 annualized base period costs totaled \$776,535. To calculate the incremental non-  
13 labor O&M costs associated with the new 40 MW of solar, the base period non-  
14 labor O&M costs of \$17,851 per MW were escalated by the non-labor standard of  
15 1.5% yielding \$18,119 per MW. Then, the \$18,119 per MW was multiplied by  
16 40 MWs which yielded an incremental solar non-labor O&M cost \$724,766.  
17 Please see PNM Exhibit CMO – 8 for the 40 MW solar incremental non-labor  
18 cost worksheet.

19 **Q. ARE THE GENERATION O&M COSTS THAT PNM SEEKS TO**  
20 **RECOVER IN THIS CASE REASONABLE?**

21 **A.** Yes. The estimated O&M expenditures are reasonable because they are based on  
22 actual expenditures that were incurred after undergoing a robust budgeting  
23 process and represent costs that are necessary to provide for the operation and

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1 maintenance of PNM's generation facilities to ensure that the lowest cost  
2 resources to PNM's customers are available as much as possible rather than  
3 having to make more expensive external market purchases of generation.  
4 Additionally, because these resources are necessary for the foreseeable future,  
5 PNM's customers will get the benefit of a cost-effectively maintained generation  
6 fleet.

**VI. FUEL AND FUEL TRANSPORTATION COSTS**

9 **Q. HOW IS THE SAN JUAN COAL PRICING INPUT FOR PROMOD**  
10 **DEVELOPED?**

11 **A.** Coal is currently provided under a contract with BHP Billiton's San Juan Coal  
12 Company ("SJCC"). Coal price projections for SJCC-supplied coal at San Juan  
13 use the year-ahead budget information provided by SJCC as a basis from which to  
14 project future coal prices. Future costs are projected by applying a high level  
15 escalation of current-year mining costs and incorporating other adjustments that  
16 may be suggested by future burn, inventory, mine production or other changes.  
17 Historical SJCC budget information is used to estimate an overall escalation rate  
18 for SJCC mining costs. Future costs are then converted into two pricing tiers,  
19 known as "Base" and "Incremental" prices. The two pricing tiers are expressed in  
20 \$/MMBTU and reflect the pricing structure in the SJCC Underground Coal Sales  
21 Agreement, as well as forecasted coal quality, overall burn, inventory changes and  
22 other factors that are known at the time the forecast is developed.

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1 **Q. HAS PNM ENTERED INTO A NEW COAL SUPPLY AGREEMENT FOR**  
2 **SAN JUAN?**

3 **A.** Yes. PNM has entered into a new set of coal contracts with Westmoreland Coal  
4 Company. Provided PNM receives the requisite approvals in NMPRC Case No.  
5 13-00390-UT, the new coal agreements will result in significant fuel savings as  
6 discussed by PNM Witness Taylor.

7

8 **Q. HOW WAS THE FOUR CORNERS COAL PRICING INPUT FOR**  
9 **PROMOD DEVELOPED?**

10 **A.** The Four Corners Coal Supply Agreements (“CSAs”) are structured as Base Price  
11 Escalated (BPE). The agreements specify how a base price is escalated after the  
12 base date to yield current pricing. The escalators are generally national economic  
13 indices. The 2010 CSA is currently in effect. The 2016 CSA becomes effective  
14 in July 2016. The operating agent, APS, meets periodically with the participants  
15 in the Fuels Committee regarding coal supply matters, including coal price  
16 forecasting. At the June 18, 2015, Fuels Committee meeting, APS presented its  
17 latest forecast of annual coal pricing through the term of the agreements in  
18 conformance with the provisions of the CSAs. This forecast was used as the basis  
19 of PNM’s internal coal cost forecasting.

20

21 **Q. A FUEL-RELATED COST ELEMENT ADDRESSED IN PNM WITNESS**  
22 **TAYLOR’S TESTIMONY DEALS WITH FUEL TRANSPORTATION**

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1           **COSTS FOR PNM’S GAS GENERATION FACILITIES. CAN YOU**  
2           **EXPLAIN THE BASIS FOR THESE COSTS?**

3    **A.**    PNM’s gas generation facilities use natural gas for fuel. The natural gas is  
4           delivered to each facility via gas pipelines. The pipeline operators charge PNM  
5           for the transportation and delivery of natural gas to PNM’s gas generation plants.

6

7    **Q.    WHAT ARE THE ARRANGEMENTS WHEREBY GAS IS**  
8           **TRANSPORTED TO PNM’S GAS FACILITIES?**

9    **A.**    PNM has firm transportation agreements with the pipeline operators. PNM has  
10           acquired additional firm gas transportation to ensure a reliable supply of fuel to its  
11           gas generation plants. For reliability considerations, PNM is shifting to more firm  
12           transportation agreements instead of interruptible supplies. See PNM Exhibits  
13           SAT-2 WP Fuel-7-Fixed Gas Transportation.

14

15

**VII. CONCLUSION**

16   **Q.    DO YOU HAVE ANY CONCLUDING OBSERVATIONS?**

17   **A.**    Yes. Generating electricity is a very capital intensive enterprise. PNM has a  
18           portfolio of generation resources that has served its customers well and requires  
19           ongoing investments to safely, reliably and efficiently operate in the future. The  
20           coal and nuclear base load plants have been the foundation of PNM’s low cost  
21           generation, which is reflected in PNM’s reasonable rates. Investments in the  
22           baseload plants as well as the other units in PNM’s generation fleet are necessary



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1           now and in the future to maintain the reliable level of service and low costs while  
2           complying with all federal and state regulations. The costs associated with  
3           investing in generation resources and operating and maintaining the generation  
4           resources that PNM is presenting in this rate case are reasonable and necessary to  
5           continue to provide cost-effective, reliable electricity to PNM's customers.

6

7   **Q.   DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

8   **A.   Yes.**

*GCG#520342*

**BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION**

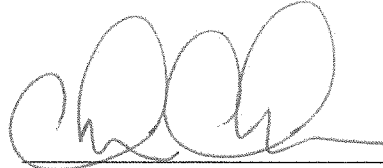
IN THE MATTER OF THE APPLICATION OF )  
OF PUBLIC SERVICE COMPANY OF NEW )  
MEXICO FOR REVISION OF ITS RETAIL ) **Case No. 15-00261-UT**  
ELECTRIC RATES PURSUANT TO ADVICE )  
NOTICE NO. 513, )  
)  
)  
PUBLIC SERVICE COMPANY OF NEW MEXICO, )  
Applicant. )  
\_\_\_\_\_ )

**AFFIDAVIT**

STATE OF NEW MEXICO )  
) ss  
COUNTY OF BERNALILLO )

**CHRIS M. OLSON, Vice President, Generation for Public Service Company of New Mexico**, upon being duly sworn according to law, under oath, deposes and states:  
I have read the foregoing **Direct Testimony and Exhibits of Chris M. Olson** and it is true and accurate based on my own personal knowledge and belief.

SIGNED this 21<sup>st</sup> day of August, 2015.



CHRIS M. OLSON

SUBSCRIBED AND SWORN to before me this 21<sup>st</sup> day of August, 2015.



NOTARY PUBLIC IN AND FOR  
THE STATE OF NEW MEXICO

My Commission Expires:



September 14, 2018