## I. INTRODUCTION AND QUALIFICATIONS

**Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND PLACE OF EMPLOYMENT.**

A. My name is Stacy R. Whitehurst. I serve as Supervisor of Regulatory Policy and Planning for TNMP in the Regulatory Policy Department at PNMR Services Company ("PNMR Services"), a wholly owned subsidiary of PNM Resources, Inc. ("PNM Resources"). My business address is 225 E. John Carpenter Freeway, Suite 1500 Irving, Texas 75062.

**Q. ON WHOSE BEHALF ARE YOU TESTIFYING?**

A. I am testifying on behalf of Texas-New Mexico Power Company ("TNMP" or "Company").

**Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.**

A. Exhibit SRW-1 describes my background and experience, including proceedings in which I have provided testimony.

**Q. PLEASE DESCRIBE YOUR DUTIES AS THE SUPERVISOR OF REGULATORY POLICY AND PLANNING FOR PNMR SERVICES.**

A. As the Supervisor of Regulatory Policy and Planning, I report directly to the Vice President of Regulatory Affairs. I am in charge of all regulatory activities for TNMP, which include compliance filings, complaints, rulemakings and contested cases.

**Q. HAVE YOU PREPARED ANY EXHIBITS?**

A. Yes. I am sponsoring Exhibits SRW-1 through Exhibits SRW-4, which are attached to my testimony. Each of these exhibits was prepared by me or under my direction and control. The information contained in these exhibits is true and correct to the best of my knowledge and belief.

## II. PURPOSE OF TESTIMONY

**Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

A. The purpose of my testimony is the following:

- provide an overview of the filing made by TNMP pursuant to P.U.C. SUBST. R. 25.130 and to introduce TNMP's witnesses and the subject matters of their testimonies;
- describe the objectives sought through the installation of an AMS system;
- provide an overview of the AMS technology being deployed at TNMP; and provide an explanation of certain McKinsey Model Assumptions.

## III. OVERVIEW OF TNMP'S APPLICATION

**Q. WHY IS TNMP MAKING THIS FILING?**

A. Through this petition and application, in accordance with P.U.C. SUBST. R. 25.130(d), TNMP requests approval of its proposed Advanced Metering System Deployment Plan and approval of an AMS surcharge. Under its advanced meter deployment plan, TNMP will provide full deployment of advanced meters to approximately 240,000 retail electric customers over the period 2010-2015. TNMP requests approval of an AMS Surcharge tariff to recover the reasonable and necessary costs it will incur under the deployment plan for the full deployment of advanced meters to residential and non-residential customers in its retail electric service area, except for those customers who have Interval Date Recorders (IDR) or take unmetered service.

**Q. PLEASE LIST THE COMPANY'S OTHER WITNESSES AND THE TOPICS EACH WILL DISCUSS.**

A. Below is the list of TNMP other witnesses and the topics each will discuss.

Allan Burke - Presents TNMP's deployment schedule and the effects to TNMP Operations;

Gary Kessler – Presents the technology solutions that are required for TNMP to successfully implement an AMS solution;

Kim Morris - Presents the back-office budget requirements and assumptions to successfully implement an AMS solution;

Henry Monroy - Presents the accounting requirements and assumptions to successfully implement an AMS solution;

Michael Montgomery – Presents the McKinsey model and cost allocation and rate design.

**Q. PLEASE SUMMARIZE HOW TNMP'S PROPOSED AMS DEPLOYMENT PLAN MEETS THE REQUIREMENTS OF SUBST. R. 25.130.**

A. TNMP's AMS Deployment Plan is attached as Attachment A to the petition and application, and is sponsored by Mr. Burke, Mr. Kessler and me. As required by P.U.C. SUBST. R. 25.130(d)(4), the AMS Deployment Plan describes the following: (i) the type of meter technology; (ii) the type of communications equipment supporting the AMS; (iii) the systems to be developed during the deployment period; (iv) the timeline for the web portal deployment; (v) the deployment by specific geographical area; (vi) when posting on the website will begin; and (vii) the schedule for deployment of the web portal functionalities. The plan also includes information pertaining to the estimated costs of all the AMS components and to the contracts for equipment and services that establish the reasonableness of the plan.

**Q. PLEASE SUMMARIZE TNMP'S REQUEST IN THIS PROCEEDING.**

A. TNMP is filing for Commission approval for an AMS deployment plan and an AMS surcharge. In this application, TNMP provides the testimony and supporting information of six witnesses. TNMP witnesses Kessler, Morris, Montgomery, Monroy, Burke, and myself provide actual and estimated costs for implementing AMS, the contracts for equipment and services, and estimated net operating cost-savings expected, if any.

**Q. DOES TNMP'S DEPLOYMENT CONTAIN THE REQUIRED INFORMATION IN PUC SUBST R. 25.130(d)(4) AND THE FEATURES DESCRIBED IN PUC SUBST R. 25.130(g)(1)?**

A. Yes. TNMP witnesses Kessler, Burke, and myself support TNMP's deployment plan and describe how TNMP's deployment contains the information requested PUC SUBST. R. 25.130(d) (4) and 25.130(g) (4).

**Q. HOW DOES TNMP'S RESIDENTIAL SURCHARGE COMPARE TO THE OTHER APPROVED AMS SURCHARGES, AS WELL AS OTHER UTILITIES' NON-AMS FIXED CHARGES?**

A. While TNMP's residential AMS surcharge is higher than Oncor, Centerpoint, AEP Texas North Company (TNC), and AEP Texas Central Company, a more appropriate comparison includes not only the AMS surcharge, but also the metering charge.

| Tariff Charge | Centerpoint | Oncor | AEP TNC | AEP TCC | TNMP |
|---|---|---|---|---|---|
| Metering Charge | $ 1.79 | $ 2.20 | $ 5.24 | $ 3.55 | $ 2.20 |
| AMS Metering Charge | 3.24 | 2.19 | 3.15 | 3.15 | 4.80 |
| | | | | | |
| Total Monthly "Metering" Cost | $ 5.03 | $ 4.39 | $ 8.39 | $ 6.70 | $ 7.00 |

As the table demonstrates, TNMP total fixed "metering" costs (as defined above and if approved), would be in the range of all ERCOT utilities with a Commission-approved AMS surcharge. It is also worth noting that TNMP's AMS surcharge is less than TNC's metering charge.

## IV. OVERVIEW OF TNMP'S AMS DEPLOYMENT PLAN

**Q. HAS TNMP PREVIOUSLY FILED A NOTICE OF DEPLOYMENT AND STATEMENT OF FUNCTIONALITY?**

A. Yes. On August 4, 2009, TNMP filed a contingent notice of deployment and statement of functionality since it was seeking federal stimulus funds to expedite the deployment of advance meters in its service territory. TNMP is filing a new deployment plan, as described in Mr. Burke's testimony, with full deployment of meters in TNMP's service territory in five years. TNMP had previously proposed a full deployment within three years, which would have been possible through a 50 percent matching grant through federal stimulus funds. However, TNMP was not selected to receive such a federal grant.

**Q. DID TNMP'S GRANT SUBMISSION CONTAIN COSTS JUST FOR THE PROPOSED DEPLOYMENT OF AMS?**

A. No. TNMP's application for federal stimulus funds not only included the costs for deployment of an AMS, but included cost to implement a "Smart Grid". The costs for the "Smart Grid" included cost for SCADA (supervisory control and data acquisition) in every substation and distribution automation. TNMP has only included costs associated with the deployment of AMS.

**Q. DOES TNMP EXPECT TO RECEIVE FEDERAL STIMULUS FUNDS IN THE FUTURE?**

A. TNMP is not aware of any future opportunities to receive matching federal funds under the American Recovery and Reinvestment Act of 2009.

**Q. ARE THERE SPECIFIC REASONS WHY TNMP IS DEPLOYING METERS OVER A LONGER TIME PERIOD THAN COMPARED TO THE ORIGINAL NOTICE OF DEPLOYMENT?**

A. Yes. TNMP did submit an application[1] to the Department of Energy in order to be a recipient of federal stimulus funds that would have made more funds available to TNMP for a more expedient deployment. TNMP received notification during the fourth quarter 2009 that its filing was not selected to receive a federal grant. Currently, TNMP is trying to improve its credit rating metrics[2]. In addition, even though TNMP's last rate case was recently finalized with a unanimous settlement agreement, TNMP is not achieving its allowed rate of return.

**Q. SUMMARIZE TNMP'S EFFORT TO FIND AN AMS SOLUTION.**

A. TNMP has been seeking an AMS solution for several years, as discussed by TNMP witness Kessler. The solution has led TNMP to implement several pilot programs and demonstrations, all of which have been successful. I will describe the pilot effort and demonstration in more detail.

**Q. PLEASE DESCRIBE TNMP'S PILOT EFFORTS?**

A. TNMP has successfully implemented three pilot programs and has held two public demonstrations. The first pilot program consisted of 100 meters in the Clifton service area. Clifton was chosen specifically to test the communication ability and reliability, since this area is neither a highly populated nor a highly commercially developed area. In order to verify the accuracy of the meters and communications, TNMP duel-socketed these metering points to validate the data. While this initial pilot of meters does not have all the functionality of the rules[3], TNMP was able to determine that these meters could access existing cellular towers, could be remotely read, send 15-minute interval data, and send outage notifications[4]. The second pilot consisted on 400 meters in metropolitan areas: the Gulf Coast service area near Houston, and the Lewisville area. While TNMP was already confident that the cellular technology would not have any coverage issues, this allowed TNMP to have results in the areas where most of its residential customers reside. Finally, TNMP installed roughly another 9,400 meters in the fourth quarter of 2009 and the first quarter of 2010; approximately 80% were installed in the Gulf Coast service territory. TNMP has been successful at reading the meters, performing move-ins and move-outs, receiving outage notifications, and receiving tampering notifications.

[1] TNMP did receive confirmation that its application was complete and was considered on the merits of the technology and costs.
[2] On March 9th 2010, Moody's revised their outlook and ratings for TNMP, citing TNMP's improved cash flow. Exhibit SRW-4
[3] TNMP seeks recover of these meters, since these meters will be relocated to premises that do not require disconnect or reconnect capabilities, such as certain unmetered lighting.
[4] A key component of TNMP's AMS is the implementation of an outage management system.

**Q. PLEASE DESCRIBE TNMP'S PILOT DEMONSTRATION EFFORTS.**

A. TNMP has held two separate demonstrations; the first one was part of the REP annual in meeting in 2008. The second meeting was in 2009 for the additional members of Commission Staff that were not able to attend the REP meeting. At these meetings, TNMP was able to demonstrate the disconnect and reconnect functions, on-demand readings, and outage notifications (email from the meter) with a demonstration meter. A demonstration was also performed on a TNMP employee's[5] SmartSynch meter.

**Q. PLEASE PROVIDE A SUMMARY OF TNMP'S ADVANCE METER TECHNOLOGY.**

A. As described in detail in the testimony of TNMP witness Kessler, TNMP is proposing to deploy SmartSynch's AMI Intelligence™ smart metering solution, which features a communications module that is integrated into several vendors' electricity meters, such as GE I-210+c, Elster's REX, and Landis+Gyr Focus. The SmartMeter can communicate with C12.21 head-end systems (such as MV-90) and complies with ANSI C12.19 protocols for data storage. All SmartSynch Meters deployed transmit data using C12.22 ANSI communications. Those meters in the field that are not C12.22 compliant will be upgraded from C12.19 via an over-the-air firmware update.

The meter construction and two-way communications capability will enable TNMP to process remote connects and disconnects of power service. The advanced meters have the ability to measure, store, and report both energy inflows and outflows, as necessary for net metering purposes. Deployed meters will use four channels at a minimum. This data will be available in 15-minute intervals and provide approximately 2,880 meter "reads" per month as opposed to the historic single read per month.

These meters will also be enabled to operate with a customer's HAN device through the ZigBee wireless component. Communication with HANs allows for increased demand response and demand-side management by providing pricing signals to customers, controlling selected appliances and their usage profiles, and providing energy consumption information to consumers via the web portal or in-home monitors. They will also support a more robust and efficient OMS and coordination with distribution automation by providing voltage threshold signals to the distribution system. The ZigBee protocol will be Smart Energy compliant.

**Q. PLEASE PROVIDE A SUMMARY OF TNMP'S COMMUNICATION TECHNOLOGY.**

[5] TNMP's Business Unit Director gave permission to perform the demonstration of her residence.

A. TNMP's meter communications will be based on the existing cellular communications network provided by AT&T. Current coverage validation by this provider indicates the majority of ESIDs have coverage within TNMP's service territory. This is covered in more detail in Mr. Kessler's testimony.

The geographic diversity coupled with TNMP's smaller customer base (relative to other primary ERCOT participants) challenges the feasibility of a large capital investment for a communications infrastructure. The communications infrastructure required for the Company's service territory would be prohibitively expensive for the customer base, and consequently, cellular communication represents a cost-effective solution to smaller utilities with a geographically dispersed rural customer base.

This approach is not unique in terms of technology, and represents a low-risk technological solution to Advanced Metering. For many years, Commercial and Industrial (C&I) meter reading has been done using the Plain Old Telephone System (POTS) by having a data collection system call each meter for a reading, then collecting the information and passing it on to the back-office. This has always been done for major commercial customers with complex billing requirements such as Time-of-Use, Critical Peak Pricing and Interval Pricing. TNMP's AMS solution is designed to utilize the technology created for C&I meters, simplify it, and move it to a residential form factor and small commercial application, lower the meter cost, and insert cellular telephony in place of the POTS communications.

**Q. HOW IS TNMP PROPOSING TO STRUCTURE THE LEVELIZED SURCHARGE?**

A. Like the Centerpoint and AEP (American Electric Power) approved tariffs, TNMP proposes a tiered surcharge. This surcharge is levelized for the first five years, and then is decreased and levelized over the last seven years. What makes TNMP's surcharge different is that TNMP is unable to spread the amount associated with the AMS infrastructure, excluding the meter costs, over a large population, such as Centerpoint or Oncor; nor does TNMP have a mandated refund that can be applied to offset the surcharge, as AEP TCC and AEP TNC do.

**Q. CAN YOU EXPLAIN WHY TNMP SEEKS A TWO-TIERED LEVELIZED SURCHARGE?**

A. Yes. TNMP management realizes the importance of AMS to the ERCOT market, which is designed to allow customers to have better pricing transparency; improved metrics

with move-ins, move-outs, disconnects, reconnects, rereads, 15-minute settlement, and monthly meter reading; and automatic outage notifications. For TNMP, this is a project outside the normal transmission and distribution budget. This is not an example of shifting budget dollars from one project to another or adding budget dollars back into the budget that were previously cut. Over the last five years, TNMP has continued to invest in its distribution and transmission system[6]. However, due to TNMP's lower credit ratings and the effect that negative cash flows have on the company's credit metrics, the company has developed a two-tier levelized surcharge that would minimize those effects.[7]

| *Agency* | *Rating* | *Outlook* |
|---|---|---|
| S&P | BBB- | Stable |
| Moody's | Baa1 | Stable |
| Fitch | BBB | Stable |

Without significant and sustained improvement to its credit metrics, TNMP may be facing a credit downgrade which has significant consequences to the Company and its customers. Access to credit will be severely restricted and the cost of additional debt will be significantly more expensive if TNMP were to be downgraded to below-investment grade. TNMP seeks a future in which it can help to bring a smarter grid to its service area and the many small and rural communities included in this service area. This two-tier levelized surcharge will accomplish that goal. A two-tiered levelized surcharge was approved by the Commission for TCC and TNC[8] and Centerpoint.[9]

## V. COMPLIANCE WITH THE COMMISSION'S ADVANCE METER RULE

**Q. PLEASE SUMMARIZE HOW THE AMS PROPOSED BY TNMP MEETS THE FUNCTIONALITY REQUIREMENTS OF SUBST. R. 25.130.**

A. As discussed by TNMP witnesses Kessler and Burke, TNMP's AMS technology: (i) involves meter technology that will be able to implement automated or remote meter reading; (ii) will allow two-way communication; (iii) will allow remote disconnect and reconnect for meters rated at or below 200 amps; (iv) will have the capability to time-stamp data; (v) will have the capability to provide direct access to consumer usage data

[6] On March 4, 2010, TNMP filed for an interim transmission cost of service filing as contemplated under PUC Substr. 25.192. The increase on nearly $34 million in transmission plant addition between Apr 2008 and Dec. 2009.
[7] Exhibit SRW-4
[8] Docket No. 36928

to the REP and end-use consumer; (vi) will have the means to furnish price signals; (vii) will have the capability to provide 15-minute data to ERCOT; (viii) will provide on board meter storage capability meeting ANSI C12.19, (ix) will accommodate open standards and protocols that meet nationally recognized standards; (x) will have the capability to communicate with devices within the home based on open standards and protocols; and (xi) will provide the ability to upgrade these minimum capabilities as technology advances.

**Q. DOES TNMP'S PROPOSED AMS DEPLOYMENT ALLOW FOR AUTOMATED OR REMOTE METER READINGS[10]?**

A. Yes. TNMP's current pilot meters are being remotely read on a monthly basis for billing. TNMP's witness Kessler discusses how TNMP's AMS technology performs this requirement.

**Q. DOES TNMP'S PROPOSED AMS DEPLOYMENT ALLOW FOR TWO-WAY COMMUNICATION[11]?**

A. Yes. TNMP's current pilot meters can receive communication from TNMP to perform a monthly or off-cycle meter reading, can energize or re-energize the service point, and can receive other type of communication sent by TNMP. In addition, the meters can communicate back to TNMP. The meters can send meter readings, tampering notifications and outage notifications. TNMP's witness Kessler discusses how TNMP's AMS technology performs this requirement.

**Q. DOES TNMP'S PROPOSED AMS DEPLOYMENT ALLOW FOR REMOTE DISCONNECTION AND RECONNECTION CAPABILITY FOR METERS RATED AT OR BELOW 200 AMPS[12]?**

A. Yes. TNMP's current pilot meters have remotely disconnected or remotely executed a turn-off and performed reconnection or remotely executed a move-in. TNMP's witness Kessler discusses how TNMP's AMS technology performs this requirement. TNMP will seek several waivers on this requirement, which I discuss later in my testimony.

**Q. DOES TNMP'S PROPOSED AMS DEPLOYMENT ALLOW FOR TIME-STAMP DATA SENT TO ERCOT[13]?**

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[9] Docket No. 35639
[10] PUC Subst R. 25.130(g)(1)(A)
[11] PUC Subst R. 25.130(g)(1)(B)

A. Yes. TNMP's current pilot meters are unable to send 15-minute interval directly to ERCOT. TNMP's pilot meters' monthly meter reading data is being pulled and summarized for billing in TNMP's existing billing system. In order for TNMP to meet this requirement, TNMP is requesting approval and recovery of a meter data management system. TNMP's witness Kessler discusses the meter data management system and the necessity to be included as part of TNMP's deployment plan and surcharge.

**Q. DOES TNMP'S PROPOSED AMS DEPLOYMENT ALLOW CUSTOMERS TO HAVE ACCESS TO USAGE DATA AND WILL ALLOW USAGE DATA TO BE POSTED ON THE JOINT TDSP WEB PORTAL[14]?**

A. TNMP seeks a waiver from P.U.C. SUBST. R. 25.130(g) (1) (E) (i) if and only to the extent those rules require real-time access to data for end-use customers. End-use customers will not have access to data through a web portal unless and until (A) provided by their REP, or (B) the Texas common data repository (hereinafter, Common Repository) and Texas common web portal (hereinafter, Common Portal) are in place pursuant to the *Implementation Project Relating to Advanced Metering,* Project No. 34610. Once the Common Portal is completed, customers (in addition to REPs and authorized third parties) will have secure access to data through the Common Portal. TNMP will provide interval data to the joint web portal, as described by TNMP witness Kessler.

**Q. DOES TNMP'S PROPOSED AMS DEPLOYMENT ALLOW REPS TO SEND PRICE SIGNALS TO THE CUSTOMER[15]?**

A. Yes. TNMP's AMS deployment allows for the use and communication to a home area network (HAN) energy monitoring device. A HAN energy monitoring device will allow customers to track daily usage against their budgets and take action to conserve before the billing period ends. Some energy monitors also allow the consumer to track usage against historical usage for the period. These monitors also can be used to communicate dynamic price signals from the REP to the consumer, as well as to provide demand response signals. TNMP's witness Kessler discusses how TNMP's AMS technology performs this requirement.

[12] PUC Subst R. 25.130(g)(1)(C)
[13] PUC Subst R. 25.130(g)(1)(D)
[14] PUC Subst R. 25.130(g)(1)(E)
[15] PUC Subst R. 25.130(g)(1)(F)

**Q. DOES TNMP'S PROPOSED AMS DEPLOYMENT ALLOW FOR 15-MINUTE INTERVAL DATA TO BE PROVIDE TO REPS, CUSTOMERS, ERCOT, OR THE JOINT TDSP WEB PORTAL ON A DAILY BASIS [16]?**

A. TNMP's current pilot meters are unable to send 15-minute VEEE (Validate, Edit and Estimate) interval directly to ERCOT. TNMP's pilot meters' monthly meter reading data is being extracted and summarized for billing in TNMP's existing billing system. In order for TNMP to meet this requirement, TNMP is requesting approval and recovery of a meter data management system. TNMP's witness Kessler discusses the meter data management system and the necessity to be included as part of TNMP's deployment plan and surcharge. TNMP is only able to meet the requirement of this section of the rule with the approval of the back-office solution, as discussed by Mr. Kessler.

**Q. DOES TNMP'S AMS DEPLOYMENT HAVE ON-BOARD STORAGE THAT COMPLIES WITH ANSI C12.19 TABLES AND OPEN STANDARDS AND PROTOCOLS THAT COMPLY WITH ANSI C12.22 STANDARDS[17]?**

A. Yes. TNMP's witness Kessler discusses how TNMP's AMS technology performs these requirements.

**Q. DOES TNMP'S AMS DEPLOYMENT ALLOW FOR THE COMMUNICATION WITH DEVICES INSIDE THE HOME THROUGH OPEN STANDARDS SUCH AS ZIGBEE OR HOME PLUG[18]?**

A. Yes. TNMP's witness Kessler discusses how TNMP's AMS technology performs these requirements.

**Q. DOES TNMP'S AMS DEPLOYMENT ALLOW FOR UPGRADE THESE MINIMUM CAPABILITIES AS TECHNOLOGY ADVANCES[19]?**

A. Yes; upgrades can be accomplished over the air. TNMP's witness Kessler discusses how TNMP's AMS technology performs these requirements.

**Q. IS TNMP PROPOSING ANY WAIVERS AS CONTEMPLATED BY PUC SUBST. R. 25.130(g)(3)?**

A. Yes. I will identify the waivers TNMP requests later in my testimony.

[16] PUC Subst R. 25.130(g)(1)(G)
[17] PUC Subst R. 25.130(g)(1)(H) and PUC Subst R. 25.130(g)(1)(I)
[18] PUC Subst R. 25.130(g)(1)(J)
[19] PUC Subst R. 25.130(g)(1)(K)

**Q. WHERE WILL TNMP'S ELECTRICITY DEPLOYMENT PLAN MADE AVAILABLE?**

A. Besides TNMP's AMS website, which is not currently created, TNMP's deployment plan will be available at 1005 Congress Avenue, Suite 550, Austin, Texas. In addition, the deployment plan will be available at 225 E. John Carpenter Freeway Suite 1500, Irving, Texas. Market participants who wish to view the deployment plan in Austin will need to provide advance notice, since this office is not fully staffed on a regular basis.

## VI. WAIVERS

A. As identified in TNMP's statement of functionality, TNMP requests waivers for the following:

Waiver on disconnection:

- Loads that may cause a safety or health issue if disconnected will not have an advanced meter with disconnect functionality installed. For example, TNMP proposes not to include the disconnection function for traffic lights, metered streetlights, railroad crossings, police stations, hospital facilities, service points providing cathodic protection, and TNMP's emergency facilities.
- Loads that currently have poly-phase and/or higher than class 200 (200 amp rating) meters will not have a disconnect device until poly-phase advanced meters with a disconnect device are available in the market

Waiver on HAN requirements:

- Loads that do not require and will never require HAN device will not have an advanced meter with a HAN device installed. For example, TNMP proposes not to include a HAN device for metered streetlights and other applications that would not benefit from a HAN device, such as electric gates, communications power supplies, sprinkler controls, and cathodic protection power supplies.
- Loads that have poly-phase and instrument rated meters will not have a HAN device until those advanced meters with HAN devices are available in the market.

Waiver on replacement outside of deployment plan:

- TNMP not be required to install advanced meters under the circumstances set forth in P.U.C. SUBST. R. 25.130(g) (6), in advance of the full deployment of advanced meters in a given area. TNMP will make efforts to install AMS meters on new meter installs.

Waiver on access to usage:

- TNMP seeks any and all waivers required from P.U.C. SUBST. R. 25.130(g) (1) (E) (i) and (G) if and only to the extent those rules require real-time access to data for end-use customers. End-use customers, however, will not have access to data through a web portal unless and until (A) provided by their REP, or (B) the Texas common data repository

(hereinafter, Common Repository) and Texas common web portal (hereinafter, Common Portal) are in place pursuant to the *Implementation Project Relating to Advanced Metering,* Project No. 34610. Once the Common Portal is completed, customers (in addition to REPs and authorized third parties) will have secure access to data through the Common Portal.

**Q. ARE THERE ANY OTHER WAIVERS THAT TNMP REQUESTS?**

A. Shortly after this filing, TNMP will be filing a general base rate proceeding as contemplated by PUC SUBST. R. 25.130(k) (4). TNMP requests a waiver to moving any AMS costs into base rate until TNMP has fully executed its deployment plan. Until TNMP has fully deployed AMS throughout its service area, TNMP will not be able to have a proper baseline for costs that will be used in any reconciliation proceeding.

## VII. TNMP'S CUSTOMER EDUCATION PLAN

**Q. DID TNMP INCLUDE EXPENSES EARMARKED FOR CUSTOMER EDUCATION?**

A. Yes, as an integral part of the Company's AMS deployment plan, TNMP is implementing a customer education program that is designed to reach customers who will be receiving an advanced meter. Through this program, TNMP is seeking to educate those customers about the benefits of advanced metering technology and how this capability can potentially help customers save energy and money, as well as provide better system reliability. A key message for TNMP is that during the installation of the new meters, TNMP will be photographing the old meter and new meter reading, and performing an audit on 100 percent of the meter replacements. TNMP's customer education program is centered on various customer outreach tools, such as community events, presentation materials (chamber meetings or city council forums), and electronic communications. Customers will receive several information sources that will provide an overview of TNMP and its role in the community, TNMP's use of technology to improve electric delivery and reliability, and information about what the advanced meter means for consumers.

**Q. WHAT TYPE OF MESSAGE IS TNMP'S CUSTOMER EDUCATION TRYING TO SEND?**

A. TNMP is installing advanced meters in homes and buildings across its Texas service areas. Some of these areas are not in highly populated areas; in fact, except the

Lewisville and Gulf Coast service territory, most of the customers are in rural areas. The deployment process will take place from 2010 through 2015 to prepare the state to manage the ever-increasing energy needs of the future. TNMP's customers need to understand that this rollout is part of a long-term statewide initiative, led by the Texas Public Utility Commission and the Texas Legislature, to upgrade from analog to digital meter technology. This rollout will lay the foundation for customer programs that can reduce energy consumption, decrease energy costs through new pricing programs by REPs, and create new energy efficiencies opportunities.

While TNMP's role in the Energy Chain is limited to owning and maintaining power lines, providing customer education before, during, and after the deployment is critical to minimize customer confusion and educate customers on the benefits of advanced meters. Specifically, TNMP's customer education plan: 1) explains what a smart meter is; 2) explains the difference between a smart meter compared to a customer's existing meter; 3) helps the customer understand how a smart meter works in a smart grid; 4) explains TNMP's technology; 5) addresses the timing and deployment schedule; 6) shares the benefits to TNMP and customers; and, 7) explains the security/privacy of smart meters. The detail of a potential educational message is below.

- ***Smart Meters***

  A Smart Meter is a device attached to a home or building that digitally reads and captures energy usage. A Smart Meter is one of the latest technologies that will enable consumers to better monitor and track energy use, and make more informed decisions on energy consumption.

- ***Smart Meters vs. Analog Meters***

  While the traditional, manual, analog meters have served Texas well, the Smart Meter digital technology is far more reliable, secure and accurate. It's a necessary evolution of technology to complement the state of Texas' future plans for a smarter, more efficient energy system.

- ***Accuracy***

  As identified in Mr. Burke's testimony, TNMP has identified several key steps to ensure the accuracy of the meter exchange process. Before the meter exchange process occurs, 100 percent of the new meters have been tested by General Electric and SmartSynch. In addition, TNMP performs an audit of a sample from every pallet of meters.

  TNMP's outside vendor is responsible for capturing the "out" reading of the old meter and the "in" reading of the new meter with a digital camera. These digital images will be audited. This audit includes 100 percent verification of all "out" readings and "in" readings before submission to TNMP for billing.

Finally, TNMP's billing system has a built in "high/low" meter reading verification that compares current consumption to be billed with historical consumption, if available.

- ***Smart Grid***

A smart grid is an intelligent power transmission and distribution network that controls the flow of electricity and data. It's the future of our country and state's energy infrastructure. A smart grid will increase real-time data and two-way communication with end users and utility resources. The ultimate vision for Texas' smart grid is to enable future technologies, reduce energy costs, integrate renewable energy sources and improve system reliability.

- ***Smart Meters and Smart Grid***

Smart Meters are the most visible aspect of a smart grid to consumers, although they are just one component of Texas' commitment to a more sophisticated energy system. A Smart Meter will produce an enormous amount of data, capturing power usage every 15-minutes, and reporting this back to the utility company hourly or daily. Information from Smart Meters will allow for the continued development of a smart grid for Texas.

  - ***The Technology***

    Smart Meters use two-way technology to "talk" through the existing cellular network infrastructure and send real-time meter data to customers, grid operators and utility companies. Eventually, the technology will allow sophisticated home appliances, energy systems and the Smart Meter to "talk" to each other. TNMP's Smart Meters utilize proven GSM cellular technology. The network provider is AT&T.

  - ***Timing and Deployment***

    Now through 2015, TNMP is installing Smart Meters for all residential and commercial users in TNMP's service areas across Texas. The switch to this advanced meter technology will allow for a more efficient and effective means of utility distribution and consumption. TNMP has planned a 5-year Smart Meters deployment, from 2010 to 2015, as part its aggressive – but fiscally responsible – timeline to allow all residential and commercial users the opportunity to benefit from this technology as soon as possible. TNMP's phased rollout begins along the Gulf Coast in 2010, followed by North Texas and Central Texas in 2013, and concluding in West Texas in 2015. This timeline was established to reach the greatest number of people as quickly as possible and to ensure a smooth transition for all involved.

  - ***Benefits***

    The Smart Meters' real-time, digital technology will send more accurate energy usage readings to utility companies, arming them with data to better serve customers. Capability to provide 15-minute interval data vs. the traditional once-a-month meter read to utility companies improved trouble-shooting capabilities for power disruptions. Less intrusive; remote

reading capability reduces need to access meter on property Enhanced reliability and speed for connection changes. Consumers will have access to real-time energy usage. Consumers will have capability to remotely communicate with in-premise devices to control energy usage, which will enhance efficiency to meet energy demand without adding resources, like power plants. TNMP will have the ability to remotely upgrade Smart Meters with future technologies. REPs will have the opportunity to offer more dynamic pricing, including peak pricing and peak pricing rebates.

- ***Security/Privacy of Smart Meters***

TNMP is committed to the highest standards of privacy and security for consumers' energy usage data. Smart Meters inherently are more secure, protected and precise than traditional, analog meters. The digital technology provides more accurate reads to the utility company which will result in pass-along benefits to the end user. Over time, consumers will have the opportunity to access specific personal energy usage information via a secure and password-protected Web portal.

- ***Cost Responsibility***

TNMP is committed to launching Smart Meters across its Texas communities in the most fiscally responsible manner, ever cognizant of the consumer costs involved. The Texas Public Utility Commission has approved a monthly consumer surcharge to cover the cost involved for this technology rollout for 12 years.

Advanced meters are a small investment for Texans for more responsible energy system in the future. Texans will see the financial and environmental benefits from this technology for decades to come.

- ***Cost Details***

Beginning in 2010, consumers who receive power from TNMP will see a minimal surcharge on their monthly electric bills. This 12-year surcharge will offset the costs involved to bring this technology to Texas residences and commercial facilities.

To offset the cost involved, consumers are encouraged to become more energy efficient at home and at work, including changing bulbs to compact fluorescent lights and unplugging appliances/devices when not in use.

**Q. PLEASE DESCRIBE HOW THE CUSTOMER EDUCATION WILL BE IMPLEMENTED.**

A. Since the majority of TNMP's advance meter deployment will be on residential premises, TNMP is implementing a customer education campaign that takes the form of two character mascots: Kilo and Wattson.

TNMP will roll out the customer education in areas before the deployment actually occurs, (using the same area identified in the deployment plan). The education process within the Gulf Coast service territory will begin before the January 1, 2011, deployment

and will end in West Texas during 2015. Throughout the customer education rollout, Kilo and Wattson will serve as mascots of the campaign, appealing to all ages and demographics. They are non-threatening vehicles to deliver the TNMP smart meter rollout using a down-to-earth message. The Kilo & Wattson campaign will focus on community events in order to spread the Smart Meter message.

**Q. FOR THE INITIAL CUSTOMER EDUCATION ROLLOUT, PLEASE DESCRIBE THE COMMUNITY EVENTS THAT WILL HAVE THE TARGETED MESSAGING.**

A. The types of events will be dictated based on the location of future deployment and scheduled community events. In the Gulf Coast area, in Alvin, the community events identified are high school football games, the 5th Annual SplashMania, FishFest, Frontiers Day, and Crawfish Festival. In Friendswood, the community events identified are the Holiday Hustle and Houston Rodeo. In Angleton, the community events identified are the Brazoria County Fair, Festival of Lights, Fall Family Fest, Heart of Christmas, and the Jingle Bell Run. In League City, the community events identified are the American Cancer Society's Pink Ladies golf tournament, Mardi Gras Galloway Gallop and Yachty Gras, Events at Kemah boardwalk, Spring Break celebration, Corvette Show and Crawfish festival, the Village Fair, and the Texas music festival. For Texas City, the community events identified are the Fun Fest, Chamber Golf Classic, and Music Fest by the Bay.

**Q. WHY IS TNMP CHOOSING EVENTS SUCH AS THESE?**

A. Whether it is a high school football game or season event, TNMP's involvement in community events will allow for deeper penetration in the various markets, thus increasing exposure and educational opportunities.

**Q. WHAT TYPES OF COSTS ARE ASSOCIATED WITH THIS TYPE OF EDUCATION CAMPAIGN?**

A. Please see EXHIBIT SRW-2 which is the detailed proposal, which has been incorporated into the McKinsey Model.

## VIII. TNMP MCKINSEY MODEL ASSUMPTIONS

**Q. ARE YOU TESTIFYING ON SOME OF THE ASSUMPTIONS MADE THAT ARE USED IN THE MCKINSEY MODEL?**

A. Yes. In this section of my testimony, I will address some of the assumptions that were used in the "CustomerServiceBenefits" tab in the model. Mr. Burke will discuss the "Meter Reading Savings" in his testimony.

**Q. DID TNMP INCLUDE ANY SAVINGS ASSOCIATED WITH "BILLING SAVINGS"**

A. While one of the primary benefits of AMS is automated meter readings, and therefore taking the human element out of the equation, TNMP does not expect to see any billing savings. Currently TNMP's billing department handles daily billing exceptions and, these billing exceptions do not include any exceptions that were caught and corrected in the hand held that are used by meter readers. TNMP believes that these billing exceptions will still occur, because of the validation in the billing system, which tries to determine high/low billing exceptions before an invoice is sent to the REP. In addition to working billing exceptions, TNMP's billing department also performs the complex billing review of industrial bills and analysis and resolutions to MarkeTrak[20]. These functions will not be eliminated due to the implementation of AMS.

**Q. DID TNMP INCLUDE ANY SAVINGS ASSOCIATED WITH "CREDIT AND COLLECTION" OR THEFT PREVENTION**

A. No. The ERCOT market billing structure does not lend itself to any savings associated with "credit and collections". TNMP's customer is the REP and not the individual tenant at a business or residence. Therefore TNMP's customers are limited to the 70 REPs in TNMP service territory, and not the approximately 240,000 individual points where the advance meters will be installed. TNMP's billing group is the responsible group for handling REP defaults. Currently, TNMP does not maintain a revenue protection or theft prevention department; therefore the McKinsey Model included cost for additional headcounts, as discussed by TNMP witness Burke, since meter readers will not be viewing every meter each month.

**Q. IN GENERAL, WHAT WILL HAPPEN TO ANY ACTUAL SAVINGS THAT ARE GREATER THAN THOSE ESTIMATED IN THE AMS SURCHARGE MODEL?**

A. To the extent any additional savings are realized, they will be passed on to consumers either through a reduced discretionary fee, as part of the AMS reconciliation proceeding, or in a base rate case.

[20]MarkeTrak tracks ERCOT retail market issues and data discrepancies.

## IX. ADDITIONAL REQUESTS

**Q. ARE THERE ANY OTHER DETAILS OF TNMP AMS DEPLOYMENT THAT THE COMMISSION NEEDS TO APPROVE?**

A. Yes. TNMP has included costs associated with in-home devices for approximately 13,000 low income customers, and requests the Commission approve an accelerated depreciation of the existing analog and load research meters.

**Q. IS TNMP SEEKING RECOVERY OF COSTS THAT HAVE BEEN INCURRED AS A RESULT OF THE IMPLEMENTATION OF THE COMMISSION'S AMS RULE THROUGH PROJECT NO. 34610?**

A. Yes. Under P.U.C. SUBST. R. 25.130(k)(1), the Commission:

> . . . shall establish a nonbypassable surcharge for an electric utility to recover reasonable and necessary costs incurred in deploying AMS to residential and non-residential customers other than those required by the independent system operator to have an interval demand meter. The surcharge shall not be established until after a detailed Deployment Plan is filed pursuant to subsection (d) of this section. In addition, the surcharge shall not ultimately recover more than the AMS costs that are spent, reasonable and necessary, and fully allocated, but may include estimated costs that shall be reconciled pursuant to paragraph (6) of this subsection

TNMP's participation in the AMS implementation project, including sharing the funding of Solution's Cube, (consultants retained by the Commission) are reasonable and necessary to the proposed AMS deployment and are reasonable and necessary to ensure deployment consistent with the Commission's expectations. In the absence of AMS deployment, TNMP would not incur these costs.

**Q. IS TNMP SEEKING RECOVERY OF ESTIMATED COSTS FOR PROCESSING THIS CASE AT THE COMMISSION?**

A. Yes. Similar to the other utilities that have filed for an AMS surcharge, TNMP has included estimated TNMP legal costs, noticing costs, and travel costs in the event this case goes to hearing. If the case does not go to hearing, then these costs will need to be reconciled. This estimate does not include any amount associated with any cost that Cities with original jurisdiction may seek to collect from TNMP. If Cities that have retained original jurisdiction seek repayment of consultant and legal fees, TNMP will seek to recover these costs from the customers in these cities through an AMS rate case expense surcharge. In addition, due to cash flow impacts, TNMP seeks approval to

reimburse Cities over the time period that an AMS rate case expense surcharge is in effect.

**Q. PLEASE DESCRIBE THE COSTS ASSOCIATED WITH IN-HOME MONITORS?**

A. Advance meters will allow customers to receive information on their energy use; allow customers to change their energy consumption patterns; and allow customers to receive price signals from REPs. To give low-income customers the opportunity to receive some of the benefits from AMS, TNMP has included the costs for approximately 13,000 in-home monitors to be distributed to the 13,000 customers that have been identified as receiving the low-income discount. This economic class of customers might not normally spend the money on an in-home monitor. It is TNMP's goal for the AMS surcharge to include the cost of an in-home device, chosen by Commission Staff or the shareholder process, and be available to low-income customers.

**Q. WITH THE DEPLOYMENT OF ADVANCE METERS, IS TNMP REQUESTING APPROVAL FOR ACCELERATING THE DEPRECIATION OF ITS EXISTING METERS?**

A. Yes. The Advance Metering rule allows for reasonable recovery of any non-AMS metering equipment that has not yet been fully depreciated. In fact, the Commission has identified the amortization of advanced meters in the range from five to seven years, depending on the useful life of the meter. Therefore, consistent with P.U.C. SUBST. R. 25.130(k), TNMP requests approval to amortize the existing non-AMS meters over five years in its next general rate proceeding initiated after the filing of this docket.

**Q. IS TNMP IMPLEMENTING A NEW RATE RIDER FOR THE AMS SURCHARGE?**

A. Yes. Please see EXHIBIT SRW-3. This rider is based on Oncor's approved rider.

**Q. WHICH TNMP RATE CLASSES WILL BE AFFECTED BY THE AMS SURCHARGE?**

A. The following TNMP rate classes will be affected by the AMS Surcharge: 6.1.1.1.1 Residential, 6.1.1.1.2 Secondary Less Than or Equal to 5 kW, 6.1.1.1.3 Secondary Greater Than 5 kW Non-IDR, 6.1.1.1.4 Primary Non-IDR, and 6.1.1.1.6 Schedule VI - Metered Lighting.

**Q. DO THE CLASSIFICATIONS FOR THE PROPOSED AMS CLASSES COINCIDE WITH THE AVAILABILITY FOR EACH RATE SCHEDULE INCLUDED IN TNMP'S TARIFF?**

A. Yes.

**Q. WERE ANY CLASSES OF CUSTOMERS EXCLUDED FROM THE CALCULATION OF THE AMS COST RECOVERY FACTORS?**

A. No rate classes were excluded, but a subset of customers, those customers that have an interval data recorder installed, are excluded as required under PUC. Substr. R. 25.130(k)(1) .

## X. CONCLUSION

**Q. WHAT ACTION DO YOU PROPOSE THAT THE COMMISSION TAKE IN THIS PROCEEDING?**

Substantive Rule 25.130 authorizes electric utilities to assess a nonbypassable surcharge to recover costs incurred for deploying advanced metering systems that are consistent with the rule. TNMP is requesting approval of a Rider AMCRF, a two-tiered levelized surcharge that minimizes negative cash flow, and approval for accelerated depreciation on its existing meters in the TNMP's next rate case after the filing of this proceeding. TNMP requests an effective date of the earlier of the first billing cycle following a final order or November 1, 2010, for the new AMS surcharge.

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

A. Yes, it does.

**AFFIDAVIT**

STATE OF TEXAS §
§
COUNTY OF DALLAS §

BEFORE ME, the undersigned authority, on this day personally appeared Stacy R. Whitehurst, who, upon proving his identity to me and by me being duly sworn, deposes and states the following:

"My name is Stacy R. Whitehurst. I am of legal age, a resident of the State of Texas, and have never been convicted of a felony. I certify that the foregoing testimony, offered by me on behalf of Texas-New Mexico Power Company, are true and correct and based upon my personal knowledge and experience."

Stacy R. Whitehurst

SWORN TO AND SUBSCRIBED before me, Notary Public, on this 25 day of May, 2010, to certify which witness my hand and seal of office.

SEAL:

KENDALL ANN EVANS
Notary Public, State of Texas
My Commission Expires
November 13, 2013

Kendall Ann Evans
NOTARY PUBLIC in and for the
State of Texas

My Commission expires Nov 13 2013

## STACY R. WHITEHURST

### Education Background and Business Experience

Stacy R. Whitehurst is the Supervisor of Texas Regulatory Policy in the Regulatory Policy department at PNMR Services Company a subsidiary of PNM Resources, Inc. Mr. Whitehurst graduated from Texas A&M University in 1994 with a Bachelor's Degree in Political Science. Mr. Whitehurst has been employed in the electric utility industry since 2000, when Mr. Whitehurst took a position as a senior analyst with Texas-New Mexico Power Company. In this capacity, he was responsible for creation of and modifications to TNPE's customer information and billing systems to support the deregulation of electricity. In August 2003, Mr. Whitehurst took a position in the Regulatory Affairs department as a Senior Analyst. After the acquisition of TNP Enterprises by PNM Resources on June 6, 2005, Mr. Whitehurst took his current position.

### Proceedings in Which Stacy R. Whitehurst Filed Testimony

| JURISDICTION | DOCKET NO. | DESCRIPTION |
|---|---|---|
| Texas | 29206 | Application of Texas-New Mexico Power Company, First Choice Power, Inc. and Texas Generating Company, L.P. to Finalize Stranded Costs under PURA §39.262 |
| Texas | 31825 | Application of First Choice Power Special Purpose, LP to Increase Its Price To Beat Fuel Factors |
| Texas | 31994 | Application of Texas-New Mexico Power Company to Adjust the Competition of Transition Charge Pursuant to PURA § 39.262(g) |
| Texas | 32109 | Application of First Choice Power Special Purpose, L.P. to Adjust Its Price To Beat Base Rates Pursuant to PURA §39.202 and PUC Subst. R. §25.41(g)(3) |
| Texas | 32795 | Staff's Petition to Initiate a Generic Proceeding to Re-Allocate Stranded Costs pursuant to PURA §39.533(f) |
| Texas | 35460 | Petition Of PNM Resources, Inc. and Cap Rock Energy Corporation Regarding Proposed Merger and Acquisition of Stock |
| Texas | 36025 | Application Of Texas-New Mexico Power Company For Authority To Change Rates |
| Texas | 37613 | Application Of Texas New Mexico Power Company For Approval Of An Energy Efficiency Cost Recovery Factor |

Confidential Exhibit SRW-2

**Customer Education Campaign & Pricing**

**Filed Confidential**

# TEXAS-NEW MEXICO POWER COMPANY
# TARIFF FOR RETAIL DELIVERY SERVICE

**6.1. Rate Schedules**
**Applicable:** Entire Certified Service Area
**Effective Date:** November 1, 2010



## 6.1.1.6.8 RIDER AMCRF – ADVANCED METERING COST RECOVERY FACTOR

### APPLICATION

Applicable, pursuant to PURA § 39.107(h) and Substantive Rule § 25.130, to Retail Customers receiving metered service for which the Company will install and Advanced Metering System ("AMS") at any time during the AMS cost recovery period approved by the Public Utility Commission of Texas.

Rider AMCRF is not applicable to Retail Customers whose: (1) load is required to be metered by an interval data recorder meter by the independent System Operator (ERCOT), (2) load was metered by and interval data recorder meter prior to the effective date of PUCT Substantive Rule § 25.130 (May 30, 2007), or (3) load is unmetered.

### NET MONTHLY BILL AMOUNT

The AMCRF for each of the Company's applicable retail rate schedules is as follows:

| Rate Schedule | Year 1- 5 Surcharge | Year 6- 12 Surcharge | |
|---|---|---|---|
| Residential Service | $ 4.80 | $ 4.17 | Per ESI ID per month |
| Secondary Service Less than or Equal to 5 kW | $ 5.00 | $ 5.00 | Per ESI ID per month |
| Secondary Service Greater than 5kW | $ 16.70 | $ - | Per ESI ID per month |
| Primary Service | $ 20.13 | $ - | Per ESI ID per month |
| Lighting Service (Metered Facilities) | $ 11.04 | $ - | Per ESI ID per month |

### NOTICE

This rate schedule is subject to the Company's Tariff and Applicable Legal Authorities.

Moody's Investors Service

# Rating Action: Moody's revises outlook of PNM Resources, PNM & TNMP to stable

## Global Credit Research - 09 Mar 2010

**Approximately $2.5 billion of securities and loans affected**

New York, March 09, 2010 -- Moody's Investors Service changed the rating outlook of PNM Resources, Inc. (PNMR: senior unsecured Ba2) and its subsidiaries Public Service Company of New Mexico (PNM: senior unsecured Baa3) and Texas-New Mexico Power Company (TNMP: senior unsecured Baa3), to stable from negative. In addition Moody's upgraded the senior secured obligations of TNMP to Baa1 from Baa2 and withdrew the (P) B1 rating assigned to a PNMR shelf registration for preferred stock that has expired. All other ratings of PNMR, PNM (including the Baa1 rating assigned to its $65 million secured pollution control revenue bonds), and TNMP are affirmed.

"The stable outlook for PNMR, PNM and TNMP considers the companies' improved financial and operating performance, including its progress on debt reduction and success in achieving regulatory outcomes that are reasonably supportive of credit quality," said Laura Schumacher, Vice President/Senior Analyst. "As a result, assuming a continued focus on efficient utility operations, we anticipate the companies will be able to sustain financial credit metrics within the ranges appropriate for their ratings and risk profiles." The stable outlook also considers improvement in the liquidity profile of TNMP.

The upgrade of secured debt at TNMP follows Moody's August 2009 upgrade of the majority of its senior secured debt ratings of investment grade regulated utilities by one notch. Issuers with negative outlooks were excluded from the August upgrade.

During 2009, PNMR's total consolidated debt burden was reduced by about $560 million. While the majority of this reduction came as result of PNM's sale of its gas utility assets, which generated cash proceeds of approximately $525 million after tax, improved performance by PNMR's unregulated retail energy provider in Texas also contributed to a reduction in parent level debt of about $270 million. Improved cash flow at PNM comes in part as a result of an emergency fuel cost recovery mechanism put in place in 2008, along with a 2009 rate increase and approval of a more permanent fuel cost recovery mechanism.

TNMP's cash flow improved, in part, as a result of its 2009 rate increase that was calculated based on among other things, actual interest expense resulting from its 2009 refinancing; as part of this decision the utility received authorization for formulaic rate making for transmission investment. The execution of a separate $75 million secured credit facility at TNMP significantly improved the utility's liquidity profile.

Going forward, we expect PNM and TNMP to demonstrate credit metrics that are appropriate for utilities rated at the lower end of the Baa rating range indicated in Moody's August 2009 Rating Methodology for Regulated Electric and Gas Utilities. For example, we anticipate the utilities' ratios of cash flow excluding the impact of working capital changes to debt to remain in the low to mid teens, with the potential for further improvement dependent on additional regulatory support.

While PNMR may demonstrate metrics similar to those of PNM and TNMP, its rating reflects the additional volatility of its unregulated businesses as well as the still significant amount of parent company leverage.

Moody's last rating action for TNMP occurred March 16, 2009 when a senior secured rating was assigned.

Moody's last rating actions for PNMR, PNM and TNMP occurred March 4, 2009 when the ratings were affirmed and the outlooks remained negative after those of PNMR and PNM were changed on April 25, 2008.

The principal methodology used in rating PNMR, PNM and TNMP was Rating Methodology: Regulated Electric and Gas Utilities, published August 2009 and available on www.moodys.com in the Rating Methodologies sub-directory under the Research and Ratings tab. Other methodologies and factors that may have been considered in the process of these issuers can also be found in the Rating Methodologies sub-directory on Moody's website.

Headquartered in Albuquerque, New Mexico, PNMR is a holding company which has as its primary subsidiaries, PNM, TNMP and First Choice Power, a Texas retail energy provider. PNMR also owns a 50% interest in Optim Energy, through which PNMR conducts unregulated energy operations primarily within the Electric Reliability Council of Texas (ERCOT).

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Moody's Investors Service

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PUC DOCKET NO. _____

BEFORE THE PUBLIC UTILITY COMMISSION OF TEXAS

# TEXAS-NEW MEXICO POWER COMPANY
# REQUEST FOR APPROVAL
# OF AN ADVANCE METERING SYSTEM (AMS)
# DEPLOYMENT AND AMS SURCHARGE

## PREPARED DIRECT TESTIMONY AND EXHIBITS

OF

GARY L. KESSLER

ON BEHALF OF

TEXAS-NEW MEXICO POWER COMPANY

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## I. INTRODUCTION AND QUALIFICATIONS

**Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND PLACE OF EMPLOYMENT.**

A. My name is Gary L. Kessler, and I am employed by PNMR Services Company ("PNMR Services"), a wholly owned subsidiary of PNM Resources, Inc. ("PNM Resources"). My business address is 225 E. John Carpenter Freeway, Irving, Texas 75062.

**Q. ON WHOSE BEHALF ARE YOU TESTIFYING?**

A. I am testifying on behalf of Texas-New Mexico Power Company ("TNMP" or "Company").

**Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.**

A. I hold a Bachelor of Science in Electrical Engineering from the University of Washington. I have been employed at PNMR Services as the Domain Architect for Smart Grid since March 2009. From 2007 to 2009, I held the position of Director of Operations Technology, working for PNM Resources. From 2001 to 2007, I held the position of Director of Technology and Operations for Avistar, a wholly-owned subsidiary of PNM Resources that developed technologies to enhance utility operations. During my employment at Avistar, I was responsible for identifying and developing technologies that aligned with key business strategies and resulted in revenue-generating products for the company.

Prior to my employment at PNM Resources, I was the Group Director of Product Development and Operations for Advanced Visual Systems from 1999 to 2001. I managed development of strategic products, services and technology roadmap for the company. From 1995 to 1999, I worked for AT&T Wireless Services as a Director of Engineering and Deployment. In this position, I was responsible implementation of third generation and Advanced Cellular Services and technologies into AT&T Wireless' cellular network. Prior to my experience at AT&T, I spent 13 years as a Regional Program Manager at Digital Equipment Corporation. I was responsible for marketing, development and implementation of comprehensive service programs and tools for Fortune 500 clients. Additionally, I have also been employed as a Group Program Manager for Silicon Graphics and Senior Engineer at Boeing Company.

**Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE PUBLIC UTILITY COMMISSION OF TEXAS OR BEFORE ANY OTHER REGULATORY BODY?**

A. Yes. I provided testimony in TNMP's most recent rate case, Docket No. 36025.

**Q. WHAT ARE THE PRIMARY RESPONSIBILITIES OF YOUR CURRENT POSITION?**

A. As a Domain Architect for Smart Grid at PNMR Services Company, I am responsible for the development of the Advanced Metering Systems (AMS) program for Texas New Mexico Power Company (TNMP), a PNM Resources ("PNMR") subsidiary. My responsibilities in this capacity include managing business cases for new technology proposals, developing new AMS technology architecture, assisting with technology development-related regulatory compliance and filings, evaluating and recommending vendors, and facilitating operations support and training in the implementation of AMS for TNMP.

**Q. HAVE YOU PREPARED ANY EXHIBITS?**

A. Yes. I have included several diagrams on the technical architecture, function, usage and security of the selected AMS technology.

## II. PURPOSE OF TESTIMONY

**Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

A. I am testifying as the technical representative on the architecture, functionality and security of the AMS system created by TNMP and the selected vendors.

## III. ADVANCED METERING SYSTEM & STATEMENT OF FUNCTIONALITY

**Q. WHAT ARE THE SIGNIFICANT COMPONENTS OF TNMP'S AMS?**

A. The components that are essential to the functioning of TNMP's AMS, in accordance to the Commission's rule §25.130, are as follows:

- Meter Data Management System (MDMS)
- Transaction Management System (TMS)
- Outage Management System (OMS)
- AMS Meters

- AT&T Cellular Network

**Q. CAN YOU SUMMARIZE THE FUNCTIONS OF EACH OF TNMP'S AMS COMPONENTS MENTIONED ABOVE?**

A. Yes.

1. Meter Data Management System (MDMS) – this component provides the core functionality for support of all business transactions pertaining to metering, metering logistics, and data associated with reading the meter. The MDMS ties together the Meter data and customer business transactions. The MDMS is the Database of Record for all TNMP meter data, meter transactions pertaining to customer activity, and meter logistics as it relates to change outs, meter type, serial number, and other requirements necessary to meet all components of §25.130 and the AMIT business use cases. See my testimony regarding the MDMS for further discussion.

2. Transaction Management System (TMS) – TMS is the head end data collection and meter communication system. It is responsible for collecting all meter data, routing alarms, and performing meter specific actions as dictated by the MDMS. TMS also performs network management, firmware updates, and meter health checks on a routine basis. TNMP plans to outsource to SmartSynch the operation and management of TMS. At the end of the deployment, TNMP will evaluate the cost benefit option of continuing to outsource this functionality versus procuring TMS and moving the functionality "in-house". The AT&T cellular network will then communicate directly with TNMP's back-office systems and use all of TNMP's security processes.

3. Outage Management System (OMS) – the OMS responds to meter outage messages and all alarms generated by the meters and processed by TMS. Generally, it is the responsibility of the OMS to manage all alarms generated by TMS. Specifically, the OMS will generate high-priority alarms for tampering events and outage events. Each event will create an actionable item in TNMP's work management system that causes intervention by a TNMP employee.

4. AMS Meters – These meters read consumer electric energy usage and pass it to the TMS system on request. The meters also perform remote connects and

disconnects, generate alarms based on events that transpire on the electric system such as outage notifications, tamper events, and other significant alerts.

5. AT&T Cellular Network – this is the communications backbone of the TNMP AMS network. The AT&T cellular network carries all the data to and from TNMP's deployed meters, providing an IP-based two-way communications link. For the TNMP network, this replaces the expensive, private networks that are generally built for AMS deployments. The data portion of the network, which will be used by the TNMP AMS system, is highly secure and extremely reliable, as described in the security portion of my testimony. I will describe the network in more detail later in my testimony.

**Q. WHAT COMMUNICATION TECHNOLOGIES IS TNMP PLANNING TO USE IN ITS DEPLOYMENT OF ADVANCED METERS?**

A. In an effort to provide the most cost effective, secure, and reliable AMS network to its consumers and customers, TNMP has chosen to utilize existing cellular public networks as the AMS network. TNMP has a widely distributed, non-contiguous service territory encompassing West Texas, Central Texas, North Texas and areas of East Texas. With this service territory, it is a prohibitively expensive solution to build-out a private network, either wireless or wired, to cover TNMP's service geography. The TNMP service territory is approximately 10,000 square miles with about 230,000 customers. That is approximately an average of 23 meters/ square mile, versus other Texas investor-owned utilities that range in meter density from approximately 10 to 400 meters per square mile (Centerpoint = 5,000 sq miles/2M meters; Oncor = 27,000 sq miles/3.4M meters; TNMP = 10,000 sq miles/230k meters; AEP Texas= 97,000/1M meters).

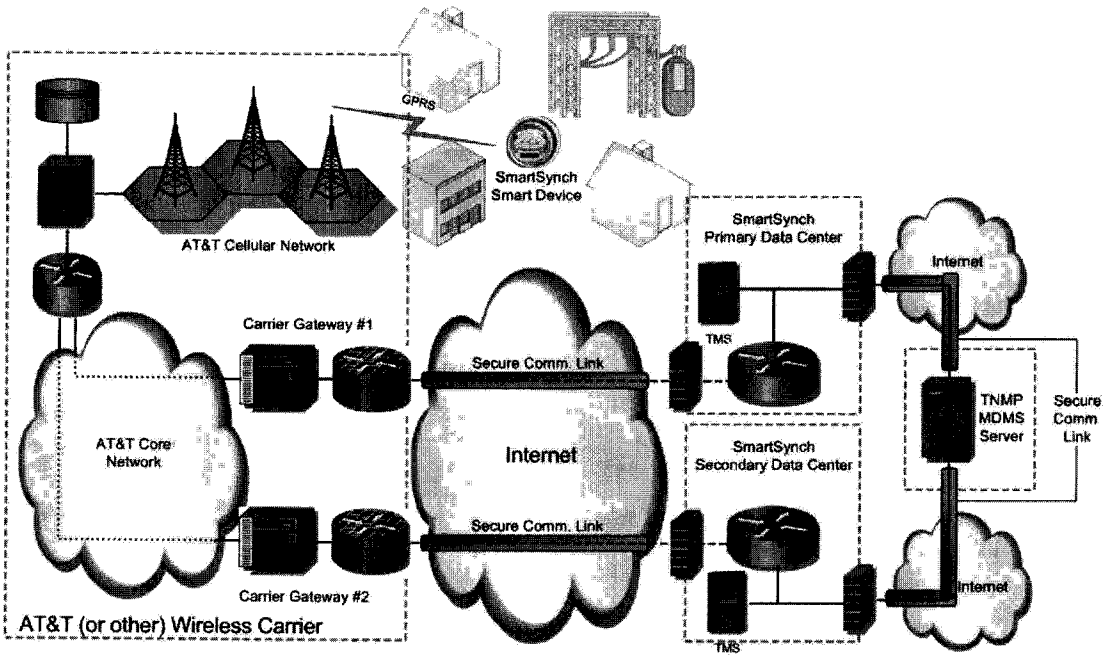
The majority of TNMP's AMS deployment will use the AT&T cellular network as the carrier of choice. AT&T has cellular coverage to the majority of TNMP's existing meter locations based on a geo-coded comparison with AT&T's existing coverage maps. For those customers who reside outside the current AT&T coverage areas, there are alternatives which have been identified by TNMP. During the course of the deployment, AT&T may expand their coverage to encompass some of these areas. A second consideration could be entering an agreement with an alternative carrier, such as Verizon, T-Mobile or Sprint. In the event that AT&T, or another carrier, is unable to provide service to these customers, TNMP will review alternative technologies, such as

satellite, Power Line Carrier, Wi-MAX, or private network, attempting to find a cost effective solution to provide AMS to those customers who fall in the deficient coverage area. TNMP will make its best effort to provide AMS to all the customers within its service territory using cost effective technology solutions.

The cellular tower to meter communications technology will utilize General Packet Radio Service (GPRS). General Packet Radio Services (GPRS) is a packet-based wireless communication service that provides data rates from 56 up to 114 Kbps and continuous connection to the Internet for mobile phone, computer users, and meters. GSM Association (GSMA - leading industry association for GSM) represents that GSM/GPRS is currently the largest cellular technology in use around the world, used in over 860 networks in more than 220 countries. Further information can be viewed at http://gsmworld.com/roaming/gsminfo/index.shtml or in the attached document from GSMA that provides an inventory of existing and proposed GSMA networks worldwide.

The following diagram illustrates TNMP's wireless architecture that is proposed for this AMS filing.

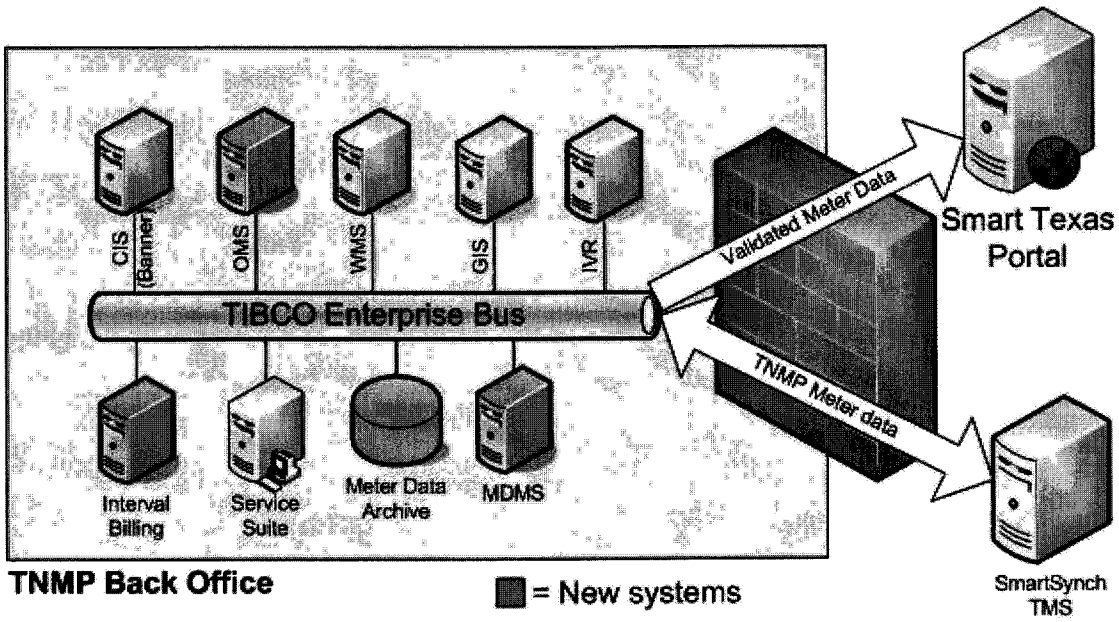
**Figure GK 1 - TNMP Communications Network**




**Q. PLEASE DESCRIBE TNMP'S PROPOSED AMS.**

A. TNMP's proposed AMS includes advanced meters, the associated computer hardware, testing and meter programming systems, server and applications software, public and private communications networks, and the back-office systems that will collect and provide time-differentiated energy usage to customers and their REPs through the Smart Meter Texas web portal described later in this testimony. The proposed AMS system is illustrated in two diagrams. Figure GK 1 illustrates the proposed communication architecture which will communicate with all deployed Smart Meters and will pass meter data, alarms, and information to SmartSynch's TMS system, and then to TNMP's Meter Data Management System. Figure GK 2, below, depicts the required back-office systems that will be implemented or modified as part of this filing. For the sake of clarity, the acronyms used in the diagram are defined as follows: CIS=Customer Information System; OMS = Outage Management System*; WMS=Work Management System; GIS=Geographic Information System; IVR=Interactive Voice Response Unit; Interval Billing=Interval Billing System*; Service Suite=In-Truck Dispatch; Meter Data Archive=AMS Meter data repository*; MDMS=Meter Data Management System*; TMS=Transaction Management System (Head-End Meter Reading)*

**Figure GK 2 - AMS Back-office systems**



**Q. CAN YOU DESCRIBE THE EVOLUTION OF THE ADVANCED METER TECHNOLOGY TESTED AND USED BY TNMP?**

A. TNMP has been conducting technology trials over the past three years of various meter and technology configurations. More specifics of the trials can be found in Mr. Burke's direct testimony. In December of 2007, TNMP installed 100 cellular based Elster A3 meters in the Clifton service territory. The Elster A3 meters do not have remote disconnect/reconnect as part of the configuration, as this feature was not available at the time of the trial. TNMP chose to dual meter 10% of the installations, using the old meter/new meter over a 3-month sample period. Results of the dual meter sample showed no difference in meter readings. These dual meter installations are still in place in the Clifton service territory.

In June of 2008, TNMP initiated a larger trial of meters using a hybrid technology of cellular network to a collector and Power Line Carrier (PLC) from the collector to the meter. The vendor, Echelon, provided AMS meters that had a remote disconnect switch which allowed TNMP to test the impact of remote service activation and de-activation. TNMP installed these meters in the Lewisville and Gulf Coast service territories, largely on high density occupancy buildings. After a year and a half trial, TNMP reviewed the results and determined that, although the meters performed accurately and allowed for reliable service activation and deactivation, the vendor would not meet the TX HAN requirements, and bandwidth to the meter was significantly limited such that market requirements for "real-time" meter reads may exceed the systems capabilities. No further installations were scheduled.

In May of 2009, TNMP began a larger trial of cellular-based meters that fully complied with Substantive Rule §25.130 requirements. These meters have been deployed in various locations in the TNMP service territory; specific locations can be found in Mr. Burke's direct testimony. TNMP has replaced all previous trial meters with this current technology. The results of the trial have been very successful. Key functionality tested with this technology has been: remote firmware upgrades, tampering alarms, remote service activation and deactivation (connect/disconnect), 15-minute data collection, two-way communication, and real-time meter "pings". TNMP has not tested HAN messaging yet, but will test that functionality once AMIT market requirements and use cases are

fully completed. The meters exhibit an extremely reliable communications history (99.9%) and are very consistent in the success of first-time read requests.

**Q. WHAT AMS TECHNOLOGIES IS TNMP PLANNING TO USE IN THE DEPLOYMENT OF ADVANCED METERS?**

A. Based on the results of the AMS meter trial, TNMP will use the GE-I210+c cellular based meter as the AMS solution for single phase residential and commercial installations. This meter is a multi-function residential meter that uses a vendor specific communications module plugged into the meter under the glass. A detailed description of the meter functionality and accuracy can be found in the attached exhibits[1]. An important distinction to make regarding this technology is that SmartSynch provides only the communications module, integrated into the GE meter. The Smart Synch module does NOT have any embedded meter functionality or metrology on the communications board, unlike other vendor solutions. All meter data is collected by the meter and stored in the GE meter on the register board. This avoids duplication of functionality and potential for meter data errors to occur. For non-IDR installations and poly-phase residential customers, TNMP will utilize the GE kV2c industrial meter. This meter meets and exceeds all PUCT requirements for AMS functionality, with the exception of a remote disconnect. The market currently does not support technology for remote disconnect, under glass, for poly-phase meters over 200 amps. I discuss this later in my testimony. Key features provided by the GE kV2c meter are:

- Revenue Accuracy (with DC Detection capability)
- Installation Verification and Tamper Detection Tools
- Coincident Demand Measures
- Power Quality Monitoring and Analysis
- AMR System Integration Options
- 20 Channel Recording
- Totalization Options (with 4 external inputs)
- 4-Quadrant Industrial or Substation Measures

[1] Exhibit GLK-1 through Exhibit GLK-3

- Per Phase AC Instrumentation (amps, volts, and frequency)

An expanded description of the GE kV2c[2] meter functionality can be found in the exhibits[3] attached to my testimony. For the purpose of this testimony, I will focus on the GE I210+c meter, as that meter technology will be the pervasive technology installed for this project.

The SmartSynch communications module will support upgrading the meter communications firmware to support the ANSI C12.22 standard. This can be done "over-the-air," where the firmware is upgraded remotely. The SmartSynch communications module also has the ability to perform over-the-air upgrades of the communications firmware and HAN communications protocols. The GE I210+c meter is used by multiple AMI vendors as part of their AMS solutions. As such, the GE I210+c is a highly reliable meter[4] with a calculated Mean-Time-Between failure of greater than 50 years. TNMP reserves the right to deploy more than one meter vendor as long as the meter meets all requirements of Substantive Rule §25.130(g) and is cost equivalent.

The GE I210+c meter is a widely utilized meter in the industry. Table GK-1 below is a short list of utilities deploying the GE I210 family meter:

**Table GK 1 - US GE I210 Meter deployments**

| Utility | Communications Network | Meter Type | Approx. Endpoints |
|---|---|---|---|
| AEP | RF System | I-210+c / kV2c | Installed > 2M one way meters and >120k units (Pilot System 2way) |
| OG&E | RF System | I-210+c / kV2c | >800k units |
| PHI | RF System | I-210+c / kV2c | >1Million units |

[2] Highly Confidential and Highly Sensitive Exhibit GLK-10

[3] Exhibit GLK-1 through Exhibit GLK-3

[4] Highly Confidential and Highly Sensitive Exhibit GLK-11

| | | | |
|---|---|---|---|
| Florida Power & Light | RF System | I-210+ | >4Million units |
| Pacific Gas & Electric | RF System | I-210+/kV2c | >4Million units |
| Misc REC Utilities | PLC System | I-210 / I-210+/kv2c | >1Million units |

The GE I210+c uses a daughter card configuration for plug-in communications and networking modules. It is used by many other AMI providers, most notably Silver Spring Networks, Sensus and Trilliant, as noted by GE. The GE I210+c meters are deployed at several utilities, using different communications technologies to achieve a functional AMI solution.

**Q. DO THE ADVANCED METERS SELECTED BY THE COMPANIES MEET THE TECHNOLOGICAL REQUIREMENTS OF SUBST. R. 25.130(G)?**

A. Yes, the advanced meters to be deployed by TNMP, pursuant to the AMS Deployment Plan described by Mr. Whitehurst in his direct testimony, provide the capabilities to comply with all AMS requirements outlined in Substantive Rule §25.130 (g). The table below compares the meters proposed to be installed by TNMP to the minimum advanced meter functionalities set forth in Substantive Rule §25.130 (g)(1)(A-K).

**Q. WILL TNMP'S AMS ALLOW AUTOMATED OR REMOTE METER READING?**

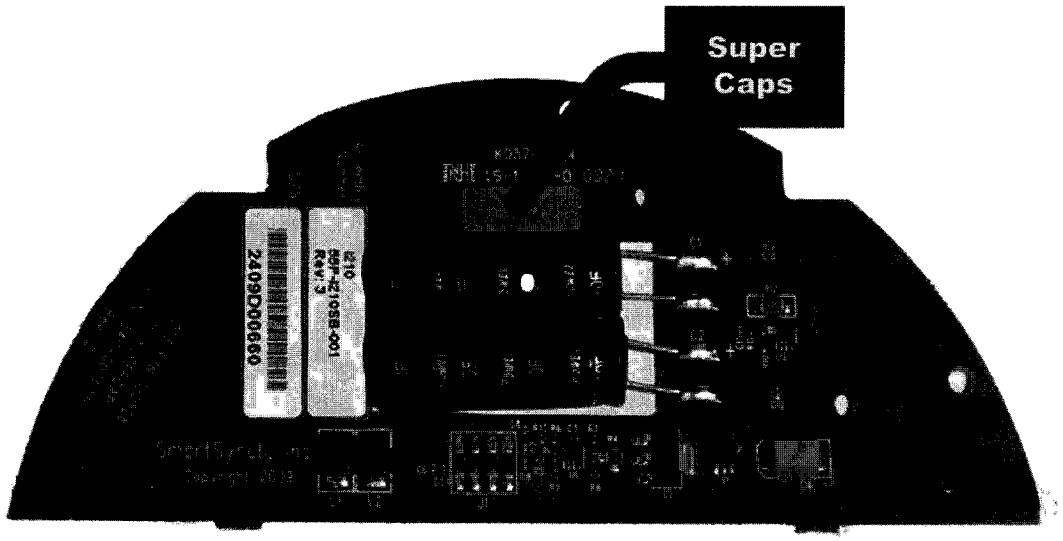
A. Yes. As described above, and in the testimony of Mr. Whitehurst, the TNMP AMS meets all technical AMS requirements defined in Substantive Rule §25.130 (g). The AT&T network provides highly reliable communications to the meter (as exhibited in the TNMP AMS meter trial where meter availability is often at 99.9%). During the TNMP trial, the AT&T cellular network has consistently provided repeatable communications with the deployed AMS trial meters. The details of the TNMP AMS meter trial are described in the direct testimony of Mr. Burke.

**Q. WILL TNMP'S AMS ALLOW TWO-WAY COMMUNICATIONS?**

A. Yes. The AT&T cellular communications network will provide for two-way communications and alarm signaling from the deployed AMS meter. The GE-I210+c

meters employ a push or pull technology for alarms and meter data. Meters can be programmed to push meter data at a specified time to the head-end system, or they can be read in a polled manner by the head-end system. Meter alarms are all pushed immediately to the head-end system. The GE I210+c communications board utilizes a "super cap" technology which allows the meter to provide a "real-time" outage and tamper alarms to the outage management system 1-2 minutes after power loss. The meter does NOT use batteries to power alarms. Lithium Ion (Li-On) Batteries are used as a backup power source for timekeeping whenever the meter experiences a power outage.

**Figure GK 3- SmartSynch Comm Board**




Aux board
Mounted behind main board

Using GPRS technology will provide a larger bandwidth pipe directly to the meter than most industry wide AMS solutions. As mentioned earlier in my testimony, General Packet Radio Services (GPRS) is a packet-based wireless communication service that provides data rates from 56 up to 114 Kbps, thus ensuring timely reading and reporting of meter data, bandwidth for future applications, and reliable communications. This bandwidth is on a per meter basis, as there are no "collectors" to diminish bandwidth in the TNMP AMS architecture, and few points of failure in the network.

**Q. WILL TNMP'S AMS ALLOW REMOTE DISCONNECTION AND RECONNECTION?**

A. Yes. This function is currently being used in production as part of the AMS meter pilot. Disconnects and reconnects are generally completed within 5 minutes of a request being issued by the operator. The disconnect mechanism is rated at 200 amps and is "under glass" on the GE I210+c meter.

**Q. WILL TNMP'S AMS HAVE THE CAPABILITY TO TIME-STAMP METER DATA?**

A. Yes. All meter data is time-stamped using a Greenwich Mean Time (GMT) format when read. When expressed in terms of a 24-hour clock, GMT is also called universal time (UT or Z). It is five hours ahead of the US Eastern Standard Time (EST), during standard period, and four hours ahead during the US daylight-saving period.

**Q. WILL TNMP'S AMS HAVE THE CAPABILITY TO PROVIDE CUSTOMER USAGE DATA?**

A. Yes. This functionality is available to external customers via the Smart Meter Texas (SMT) Web Portal project. Meter data will be stored in TNMP's MDMS after being properly validated in accordance with market rules in place. The data will then be "pushed" to the Smart Meter Texas ("SMT") Web Portal within the required time window as defined by the emerging AMS market rules

**Q. WILL TNMP'S AMS PROVIDE A MEANS BY WHICH REPS CAN PROVIDE PRICE SIGNALS AND COMMUNICATE WITH DEVICES INSIDE THE HOME?**

A. Yes. TNMP's AMS architecture will communicate to the Smart Meter Texas Web Portal to accept price signals and messages, and then pass those messages to the meter's ZigBee communications device for transport into the home. Status will be returned to the TNMP MDMS which will record the transaction status and pass it for posting on the Web Portal. An important point to note, in compliance to the new business requirements being developed by AMIT and as documented in the AMIT use cases, the status that is reported to the Web Portal is the success or failure of the transport of the message packet to the meter HAN interface, NOT if the message actually made it to the end device in the home, as currently defined AMIT use cases. The SMT portal will interface with TNMP's MDMS which will respond to request from the SMT.

**Q. WILL TNMP'S AMS HAVE THE CAPABILITY TO PROVIDE 15-MINUTE DATA?**

A. Yes. TNMP's AMS pilot is currently capturing 15-minute data at the meter and returning it to the Transaction Management System, hosted by SmartSynch. TNMP cannot

actively utilize the 15-minute data from the meter until the implementation of the TNMP MDMS and back-office systems.

**Q. WILL TNMP'S AMS BE CAPABLE OF ON-BOARD METER STORAGE OF METER DATA?**

A. Yes. The GE I210+c meters can hold 85 days of two channel, 15-minute interval data. The meter will hold 170 days of one channel, 15-minute data.

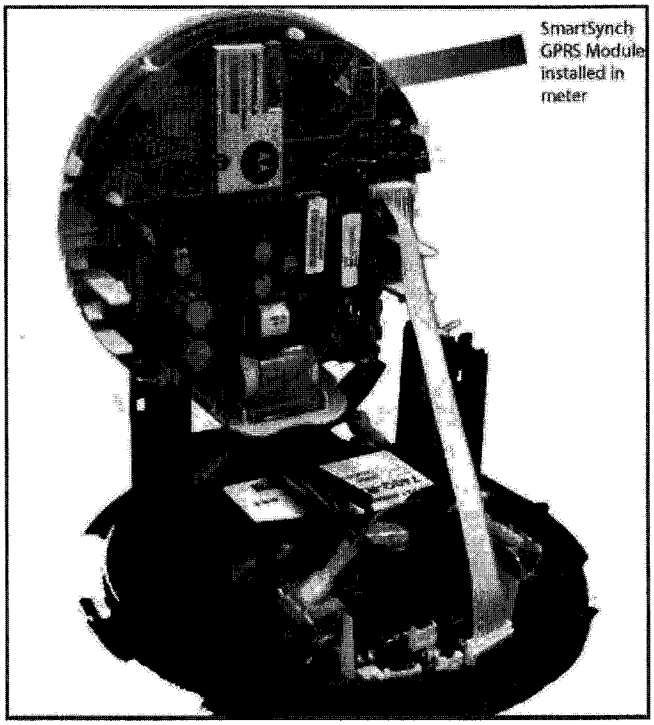
**Q. WILL TNMP'S ADVANCED METERS HAVE OPEN STANDARDS AND PROTOCOLS?**

A. Yes. The entire TNMP AMS architecture is based on open standards and emerging National Institute of Standards and Technology (NIST) recommended protocols. The communications protocol is TCP/IP from back-office to the meter. The GE I210+c meter utilizes ZigBee SE 1.0 for the Home Area Network (HAN). It is firmware programmable to ZigBee SE 2.0 and will support any 802.15.4 protocol. The meter communications to the head-end system will be C12.21. The C12.22 protocol will be implemented once the firmware update becomes available from SmartSynch.

**Q. WILL THE AMS HAVE THE CAPABILITY TO UPGRADE THE ADVANCED METERS AS TECHNOLOGY ADVANCES?**

A. Yes. Of primary concern to TNMP is the advance of communications technology and ability to conform to changing or new standards. As requirements change, and communications technologies advance and/or retire, the GE I210+c meter is modularly upgradable. The SmartSynch communications hardware and firmware is built on a single daughter board. The board is inserted into the meter cage and provides all communications (cellular and ZigBee) for the meter. Retrofitting a new board to the meter is a simple process with this technology and is completed by a simple swap out the old communications board. The following figure shows the installation location of the SmartSynch communications module. The module is installed as a "snap-in" under the meter faceplate board. This makes for a simple process to replace the existing communications board with a new or upgraded technology communications board.

**Figure GK 4-GE Meter w/ Module installed**




## IV. COMMUNICATION TECHNOLOGY

**Q. PLEASE DESCRIBE THE COMMUNICATIONS TECHNOLOGY SELECTED BY TNMP FOR ITS AMS?**

A. As discussed in greater detail earlier in this testimony, the majority of TNMP's AMS deployments will use the AT&T cellular network as the carrier of choice. AT&T has coverage to the vast majority of the existing meter locations, based on a geo-coded comparison with current AT&T coverage maps as provided by AT&T. Those locations in the TNMP service territory are called out in an exhibit[5] attached to this testimony.

**Q. HOW DOES THIS COMMUNICATION TECHNOLOGY WORK?**

A. These meters function like a cell phone browsing the internet or downloading an application from the iTunes or the online Blackberry store. Each deployed meter has a GPRS radio embedded under the glass. The GPRS radio functions as a data modem and connects to the nearest AT&T cellular tower. The connection between the tower and the meter is only active on an "as-needed" basis. When a customer, or a REP,

[5] Exhibit GLK-4, GLK-7

makes a request to read the meter registers, the data flows from the web-portal, to the TNMP MDMS where the transaction is recorded and processed according to the business rules of the market. The appropriate data is then forwarded to TMS from the MDMS. TMS then passes data, using secure transactions, by communicating with AT&T servers. AT&T's cellular network then signals the meter to "wake-up" and the data is transmitted to the meter over the cellular air-link. Meter data is returned using the same pathway.

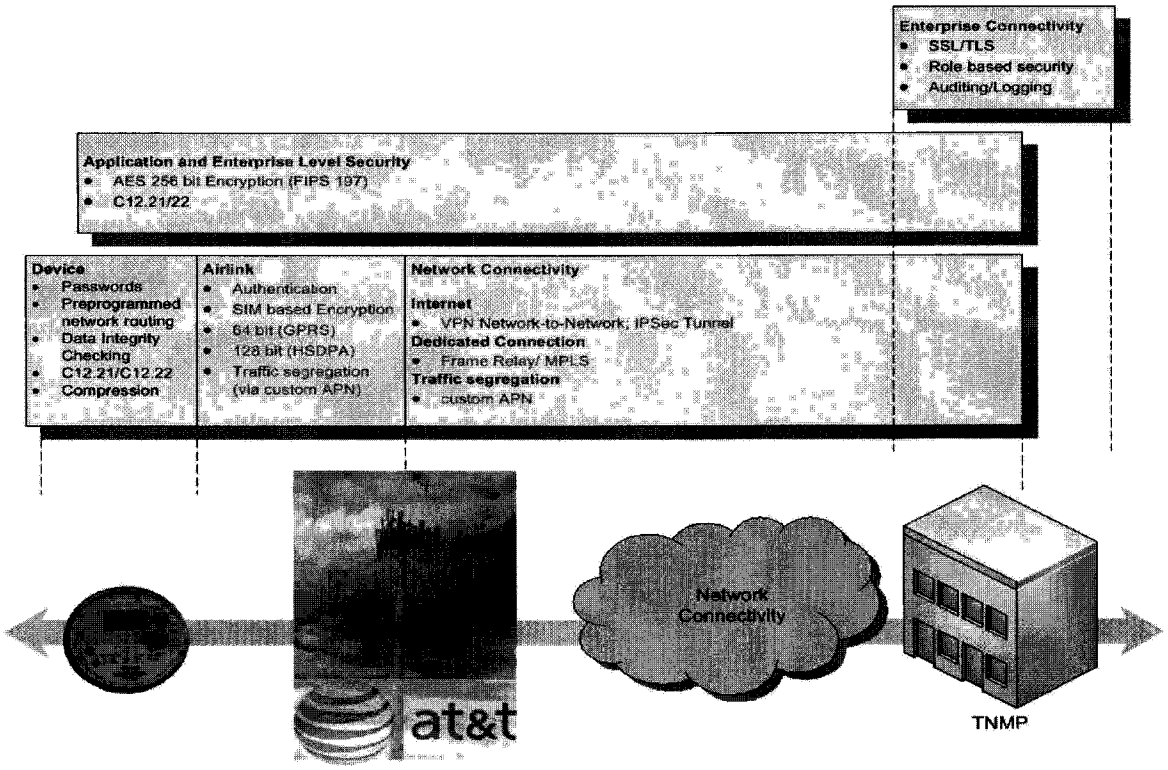
**Q. WILL YOU DESCRIBE THE DATA SECURITY FEATURES OF TNMP'S PROPOSED AMS IN DETAIL?**

A. Yes. I will address the data security by security domains as illustrated in Figure GK 4.

**AMS Security (Communication and Application)**

AMS security is tiered in three levels across four security domains. The levels are device, application, and network. The four security domains are: the device, the airlink, network connectivity, and enterprise connectivity. The following exhibit shows the security standards in use for each of the four security domains, and at what tier they are utilized in the network:

**Figure GK 4 - Security architecture**




## Device: GE I210+c Meter Security

The meter devices employ the message security methods described above. If a device receives a message that does not meet all of the accepted criteria for compression, encryption, etc., that device will send a notification message to TMS that it has received an invalid message.

Meter passwords are set up when the meter is initially configured. This configuration establishes ownership of each device with TMS by loading appropriate encryption keys and reporting addresses. Once the GE I210+c meter is deployed, users can access it in one of three ways:

- **Via the optical port using manufacturer-provided software (such as MeterCat or PC Pro).** User authentication and level are verified by this software.
- **Via the optical port using SmartSynch's Stamp software.** A user name and password are required to log on to the software. In addition, all communications

between Stamp and the GE I210+c SmartSynch communications module are encrypted using the utility's encryption key (assigned during integration).

- **Wirelessly from TMS.** All communications between TMS and the GE I210+c are encrypted using a meter-specific key derived from the utility's encryption key and the meter's serial number.

All other communications are rejected and messages received by the GE I210+c are considered "spam." The meter notifies TMS if repeated spam messages are received. All messages from foreign devices are logged.

**Air-link Security: Message Payload**

All messages transmitted across the network are encrypted using keys that are built from multiple key seeds. Encryption requires three unique keys, which provide meter-specific encryption. One key is unique to SmartSynch, one key is unique to the utility, and the other is unique to the meter. The meter has to pass three authentication challenges from the network and then attaches to a VPN tunnel created specifically for TNMP's Access Point Name (APN), which is the AT&T designated private network that TNMP will utilize to communicate data to and from the meter to the back-office.

Many carriers base their billing plans on the amount of data transmitted. To optimize data transfer and reduce cost, significant compression and redundant data elimination is performed on each message. Meter data that does not contain information of value may be eliminated from the payloads transmitted across the network. Indicators are used in the message to indicate where zero or blank data was eliminated. In addition, messages are converted to a binary format where appropriate to reduce message size.

The AMS utilizes AES-256 encryption for all data transmissions. Each message that leaves TMS is subjected to the processes of data elimination, binary conversion, compression, and encryption. There are security measures in place to ensure that intercepting data from the cellular network and meter is extremely difficult. But the core of the security methodology employed is for SmartSynch's technology designed to keep data thieves from being able to successfully translate or interpret any data that they may steal (which is the same concept used for all Internet credit card transactions using SSL encryption). To steal meaningful data from the AMS, a data thief would need to complete all of the following:

- Determine/Utilize a specialized device for sniffing packets on the network and ensure the device can authenticate as a valid base station with the network.
- Steal/Determine the meter-specific portion of the encryption key
- Steal/Determine the utility-specific portion of the encryption key
- Steal/Determine the SmartSynch portion of the encryption key
- Steal/Determine the encryption algorithm that SmartSynch utilizes
- Decrypt the payload
- Steal/Determine the compression algorithm that SmartSynch utilizes
- Decompress the payload
- Convert the payload from binary to hex ASCII
- Determine/Steal SmartSynch's transport format
- Decode the transport payload
- Determine/Steal SmartSynch's command format
- Decode the command payload
- Break into the utility's TMS database and steal a relevant account number/TMS device ID mapping
- Break into the utility's billing system to match a stolen account number with a customer name in order to determine whose data had been stolen.

To date, theft of data from a SmartSynch meter in this manner (or any other manner) has never been accomplished. IF a data thief successfully performed these actions (which would be extremely difficult), there would be no guarantee that the stolen data actually would represent the intended customer or customers' data, or even that the stolen data would represent complete packetized messages (after intercepting data, a thief looking at a bit stream would have no way of knowing where the messages and packets within each message begin and end). Although it is technically possible to execute all the above steps, it has never been done to date, and such a process would be very time consuming, requires extensive technical knowledge and carrier proprietary communications equipment, and is extremely costly.

**Air-link Security: TMS to GPRS Meter Devices**

Each GPRS device connects via IP to the TMS system. For the GE I210+c meters using the GPRS network, the System adds another communications server to manage IP connections with large numbers of devices. A device with information to report will connect to the IP address of the communications server. This connection will be authenticated by the communications server to verify that the requesting device is a valid meter. The communications server not only authenticates the devices but also verifies and uses only the protocol defined and implemented in the SmartSynch communications module. Once the connection is authenticated, the communications will occur in the same encrypted manner as all other device communications.

The communications server may reside on the same computer as TMS or may be placed on a separate machine. The communications server will typically reside either outside the utility's network or in the network Demilitarized Zone (DMZ). To further enhance security, the utility's firewall would be configured to allow connections within valid IP and port ranges only, or other secure connectivity methodology as identified by PNMR's security organization.

**Application Security**

TMS is a browser-based system used to manage devices and data. The system incorporates the following security mechanisms:

- **Authentication.** Users are first authenticated as valid users of the system. An administrator must create users in the system. Each user is created with both a profile and a password. These items are stored in an encrypted format in the TMS database. If a profile is repeatedly attempted with invalid passwords, that profile will be disabled and the administrator will be notified. This prevents automated tools from attempting to determine the password. All invalid account and password access attempts are logged.
- **Authorization.** The TMS system operates on a "see and do" model. In other words, the users can see only the options for which they are authorized within the system. There are four levels of authorization: