Application of San Diego Gas & Electric Company (U-902-E) for Adoption of an Advanced Metering Infrastructure Deployment Scenario and Associated Cost Recovery and Rate Design.

Application 05-03-015
Exhibit No.: ________

CHAPTER 12
GAS MODULES, METER & MODULE INSTALLATIONS

JULY 14, 2006 AMENDMENT

Prepared Supplemental, Consolidating, Superseding and Replacement Testimony of
JOSE L. CARRANZA
SAN DIEGO GAS & ELECTRIC COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

July 14, 2006
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I. INTRODUCTION

The purpose of this amended testimony is to refresh my March 28, 2006 testimony to include material information which will impact my (Chapter 12) testimony in which I describe the incremental costs and benefits related to (1) electric metering costs and benefits, (2) gas modules and gas meters, (3) gas metering costs and benefits, and (4) electric meter, gas module, and gas meter installation. Please refer to table JC 12-1 for total costs and table JC 12-2 for benefits. The cost estimates are based on the higher of solution sets derived from the Request for Proposal (RFP) process described in Mr. Charles’ testimony (Chapter 9). The total capital direct dollar request is approximately $221 million and the associated Operations & Maintenance (O&M) is approximately $24 million. This updated testimony serves to correct an error made that omitted the labor costs for the redeployment during the 2025 – 2027 time frame. Table JC 12-1 has been updated to reflect the correction. This testimony consolidates, supersedes, and replaces all previous direct and supplemental testimony filed by me or by any other SDG&E witness testifying in this docket, on the topics covered herein.

II. BACKGROUND

My testimony focuses on the costs to install approximately 1.4 million electric meters and 900,000 gas communication modules approximately over a two and one half year deployment period, beginning in mid-2008. Additionally, it includes costs to replace approximately 3% of the currently installed gas meters that are not suitable to be retrofitted with communications modules due to their design.

SDG&E recognizes the magnitude of an AMI field deployment and is aware that this project cannot be completed with current staffing levels, and must rely on contracted
labor to perform most of these functions. SDG&E completed an extensive and rigorous Request for Proposal (RFP) process, as described in Chapter 8 and Chapter 9 by Mr. Reguly and Mr. Charles, respectively. SDG&E has not yet selected an AMI installation vendor. However, when an AMI installation vendor is selected and contracts are finalized, SDG&E will file by advice letter with the California Public Utilities Commission (CPUC) the executed contracts. The costs included in my testimony reflect pricing received through the RFP bidding process, RFP reviews, and clarification sessions with installation vendors. Anticipated internal SDG&E costs to perform duties not covered by the installation vendor, such as ongoing operations and maintenance (O&M) costs, were also included. Based on this information, SDG&E will not exceed the stated costs to install the required metering equipment (i.e. these costs included herein are ‘not to exceed’ costs as described in the ‘solution set’ selection process). For further detail on all of these issues, please refer to the testimony of Mr. Charles (Chapter 9). Furthermore, the estimated costs included here are representative of installation costs required to implement AMI.

Benefits included in my testimony are avoided costs that would otherwise have been incurred during the AMI business case analysis time horizon that are either accelerated or enabled with the installation and deployment of AMI.

III. BASE ASSUMPTIONS

A. Contract Personnel and Union Labor. SDG&E assumes that vendors will supply all contract personnel to complete the installations over the specified deployment period. Moreover, vendors will be responsible for all facilities, logistics, and resulting claims related to installation activities of contract personnel and sub-contracted personnel. These requirements were included in the RFP. The external costs included herein are based on the costs provided as part of this RFP process.

SDG&E maintains a strong relationship with the International Brotherhood of Electrical Workers (IBEW) Local Union 465. SDG&E reached an agreement with the Union to require AMI installation vendors performing gas and electric meter installations within SDG&E’s service territory, to use Union Local 465 members.
B. **Customer Notification.** SDG&E requested, through the RFP process, that the vendor(s) bidding on electric meter, gas module and gas meter installations assume responsibility for customer notification and scheduling, and customer contact for access problems. Customer contact prior to and post meter installation is discussed in Chapter 5 by Mr. Gaines. Additionally, during the deployment period, SDG&E Account Executives will interact with the installation vendor to facilitate meter installation schedules for large Commercial and Industrial customers.

C. **Risk Mitigation, Installation Project Management and Training.** As a way to mitigate risk associated with deploying a large number of meters, SDG&E provides a field project management team. This team’s responsibility is to partner with the installation vendor and to assist in resolving operational issues, clarifying operational policies, approving repairs, addressing potential energy theft issues, verifying installation progress, and quality of the installations. This team is exclusive of the PMO personnel described in Mr. Charles’ testimony (Chapter 9). SDG&E believes that installation project management is an important role that will help facilitate meter installations, while maintaining deployment efficiencies. SDG&E has also included internal costs for claims it may incur beyond what that the vendor covers as a result of AMI meter deployment or as a result of SDG&E employee actions.

SDG&E will provide policy and procedures to the selected vendor(s) and expects that the installation vendor will satisfy the requirements contained within. SDG&E also plans to provide training to its field and staff employees who install, operate, and maintain gas and electric AMI-enabled metering equipment. Therefore, costs to provide this training are included.

D. **A-base Meter Costs, New Business and Redeployment.** As part of the AMI project, SDG&E has included costs: 1) to replace A-base electric meters with a socket conversion and an AMI-enabled electric meter, and 2) to repair residential meter sockets or panels that are damaged in the process of installing an AMI-enabled electric meter to minimize customer inconvenience and improve installation efficiencies. SDG&E estimates that approximately 0.5% of its
residential electric meter population will require socket or panel repairs. During the deployment period, SDG&E will install AMI-enabled meters in new business areas through our established internal process at no incremental cost.

Costs for deploying a second cycle of gas and electric metering technology are included beginning in year 2025, to address the end of the metering equipment service life. The cost of deploying a second cycle includes new gas metering equipment and labor to install and maintain the gas and electric metering equipment. Mr. Kyle’s testimony (Chapter 13) addresses the financial philosophy behind the second cycle of deployment.

IV. SUMMARY OF COSTS & BENEFITS

A. Electric Metering Costs and Benefits

1. Operations and Maintenance Costs

   a. Battery Replacement

      Costs include incremental labor and vehicles needed for maintenance due to higher failure rates than we currently experience with an electromechanical metering system, as referenced in Chapter 11 by Mr. Pruschki. Poly-phase AMI-enabled electric meter battery replacement is discussed in Chapter 11 by Mr. Pruschki. Field labor costs associated with these replacements are included here.

2. Benefits (Avoided Costs)

   a. Electric Meter Reprogramming for Rate Changes

      Today, customer rate changes require a field visit to replace or reprogram TOU electric meters. With an AMI-enabled meter, field visits to reprogram meters for rate changes may not be necessary.

   b. Battery Replacement in Existing TOU Electric Meters

      Currently, SDG&E replaces batteries in approximately 1% of TOU electric meters. SDG&E will avoid replacing batteries.

   c. Electric Meter Maintenance Testing

      SDG&E routinely performs tests on its electric meters. SDG&E is installing pre-tested electric meters by the meter manufacturer, accordingly, existing meters identified for replacement with an AMI-
enabled meter in the calendar year will not be tested in the field. SDG&E will take advantage of this reduction in number of tests and derive an avoided cost. Tests for these new electric meters will be deferred to the following calendar year.

d. Calendar Expiration Meter Replacement Project

SDG&E is in the process of replacing several thousand TOU electric meters with expiring calendars. The calendar for the majority of these meters will expire by the end of 2009. SDG&E is proposing to stop this “expiring calendar” project in 2007. Avoided cost estimates assume a Commission decision by December 2006.

B. Gas Metering Costs and Benefits

1. Description of the gas module and function

The gas communication module is a one-way communication device that is powered by a battery and transmits the following data via the AMI network on a daily or more frequent basis: a unique identification number, meter readings and various alarms. The gas module communicates wirelessly with the AMI communication network, as discussed by Mr. Pruschki (Chapter 11) regarding the AMI communication network.

The gas communications module will be either 1) directly mounted between the existing meter body and the mechanical index of a diaphragm or rotary gas meter or, 2) remotely mounted on the gas meter assembly and connected to the meter’s index drive via a wire harness and pulse pick-up device. In all cases, each meter will retain a mechanical index.

2. Gas Meter Replacements

a. Assumptions

SDG&E estimates 3% of existing installed gas meters are not suitable to be retrofitted with a communications module due to their design, and will require replacement. Costs associated with removing and replacing these meters and attaching the communication module are included.

b. Gas Outage Impact to Customers

SDG&E anticipates replacing 3% of its existing gas meter population.
About 80% of these meter replacements will be completed without requiring an interruption of gas service to the customer. SDG&E will work closely with the installation vendor to minimize the number of outages.

3. **K-type Regulator Replacements**
   
   **a. Current K-type regulator replacement program overview**
   
   Each year, SDG&E replaces approximately 5,000 American Meter Company’s Reliance K-type regulators, which do not provide over-pressure protection, with an internal relief valve, as required by our current standards. SDG&E manages a Reliance K-type regulator replacement program that is coupled with our meter change policy. When a field technician completes an order that requires changing a gas meter, and a Reliance K-type regulator is identified, the regulator is replaced.

   **b. AMI meter replacements provide opportunity to accelerate K-type regulator replacements**
   
   During deployment, SDG&E expects to change out 3% of the existing gas meters. SDG&E anticipates Reliance K-type regulators will be identified and changed out during about 50% of these gas meter changes. This provides SDG&E an opportunity to proactively accelerate the removal of the Reliance K-type regulators from service over the existing removal schedule.

4. **Gas Meter Growth**

   Included herein are incremental costs for gas modules to account for gas meter population growth in the years following AMI deployment. The costs related to gas meter population growth is part of SDG&E’s General Rate Case and, therefore, excluded from costs.

5. **Operations and Maintenance Costs**
   
   **a. Gas Module Replacement**
   
   The service life of the gas module is quoted by metering vendors to be 15 to 20 years. Costs are not included for replacing batteries because the meter vendors expect the battery to last as long as the gas module. Incremental gas operations and maintenance costs include the labor,
materials and vehicle costs related to AMI communication module failures, at a rate less than 1%, and pulser failures for remote AMI communication devices with failure rates at 2%. This testimony includes labor and material costs for performing corrective maintenance of premature module failures. There are no incremental costs for gas meter failures as a result of AMI-enabled gas modules.

6. **Benefits**

   a. **Accelerated Gas Meter Replacements**

      SDG&E will replace approximately 3% of existing gas meters. For the reasons stated above, these meters cannot be retrofitted with an AMI communication module. SDG&E will realize a benefit for accelerating gas meter replacements.

   b. **Accelerated K-type Regulator Replacements**

      During AMI deployment, SDG&E anticipates replacing up to 5% of the Reliance K-type regulators. SDG&E will benefit from the accelerated replacement.

C. **Electric Meter, Gas Module, and Gas Meter Installation**

   1. **Metering Equipment Installation**

      a. **Work Scope and Timeline**

         The AMI meter installation scope includes the replacement of approximately 1.4 million electric meters and installation of approximately 900,000 gas meter modules. SDG&E expects to replace up to 3% of the currently installed gas meter population, which are not suitable to be retrofitted with an AMI communications module due to their design. SDG&E estimates that this work will take approximately two and one half years, with a targeted start date in the second quarter of 2008.

      b. **Contracted Workforce**

         SDG&E will hire an installation vendor who will manage and complete installation of all electric and gas metering equipment. This vendor will provide installation management, work scheduling and customer notification, appointments, issue resolution, a customer call
center, meter and module logistics, and installation labor. The installation vendor will partner with International Brotherhood of Electric Workers (IBEW) Local Union 465. The vendor and subcontractors will provide the tools and vehicles necessary to complete meter deployment. The vendor will provide a field workforce that has been drug-screened and background checked. Furthermore, installers performing gas meter replacements will be operator qualified per Department of Transportation (DOT) Operator Qualification Program as required by Title 49 of the Code of Federal Regulations part 192.801 through part 192.809.

The installation vendor will provide trained meter installers and will have safety and quality assurance programs to make sure the workforce operates safely and provides quality installations. SDG&E will provide the installation vendor its policies and procedures related to working around metering equipment.

c. Logistics and Cross Docks

Due to the magnitude of the project, SDG&E requires the vendor to establish “cross docks” for receiving, warehousing, and tracking the metering equipment until it is installed at an end point. It is expected that the vendor will work with the manufacturers to control the supply of gas and electric meters necessary to meet the installation schedule.

SDG&E anticipates that the vendor will use multiple cross docks, from which the installation workforce will be dispatched, new meters will be warehoused and distributed for installation, and the removed meters returned for salvage. This approach helps to reduce drive time to installation locations and helps maintain installation efficiencies.

d. Contracted Customer Call Center

To minimize impacts to SDG&E’s customer call center during the meter deployment period, SDG&E requires the installation vendor to provide a separate customer call center to manage customer notifications, meter installation appointments, and customer inquiries. SDG&E Customer Service Representatives will be advised by the vendor of meter
installation locations and will redirect AMI installation related calls to the vendor’s customer call center. This will keep SDG&E Customer Service Representatives informed.

e. Meter Installation Notification

During the meter installation period, the vendor will work closely with SDG&E to identify the installation areas and to set up customer notifications. Communication after meter installations is discussed in Chapter 5 by Mr. Gaines. Throughout the installation phase, the vendor will be responsible for notifying customers through a mailer, that meter installation crews will be in the area installing AMI-enabled metering equipment. The mailer will provide contact information in case customers have questions or concerns, or need to make an appointment. All customer inquiries and appointments will be handled by the contracted customer call center.

If no customer contact is made at the time of meter replacement, the meter installer will leave a door hanger. The door hangers will inform customers that the metering equipment has been replaced. The hanger also will have contact information should customers have any questions or concerns. All customer inquiries will be handled by vendor’s call center.

f. Field Installations

The vendor will provide the meter installers with uniforms indicating that they are a SDG&E contractor. SDG&E will also provide installers with SDG&E contractor badges. Meter installers will follow established safety, driving, installation, and quality assurance procedures. SDG&E will perform audits to verify workmanship and quality. SDG&E personnel will respond to operational, equipment, energy theft, and policy issues encountered by meter installers.

SDG&E estimates 1% of its metering end points will be hard to access. In these instances, the installation vendor will make three installation attempts. The attempts may be a combination of premise visits, telephone calls, and notifications via mail. After three unsuccessful
attempts to gain access to the gas and/or electric meter, the account will be
returned to SDG&E for further evaluation. SDG&E may decide to handle
the problem itself or ask the installation vendor to complete the meter
installation at an incremental cost.

In residential areas, the vendor will do a mass notification prior to
entering the area to install meters. The notification will indicate that the
vendor will be in the area installing AMI-enabled electric and gas
metering equipment. If no appointment is requested, the first premise visit
will be a “cold call”. The meter installer will complete the meter
installation if they can safely gain access and install the metering
equipment.

For commercial and industrial customers, the vendor will schedule an
appointment if an outage is required. SDG&E Account Executives will
act as liaisons between the installer and large commercial and industrial
customers, as discussed in Chapter 5 by Mr. Gaines.

g. Electric Meter Installations

1. Electric Meter Replacement Service Interruptions
   All electric customers, whose equipment does not include test
   blocks or test switches, will experience a service interruption for
   the duration of the meter installation.

2. Post Installation Testing of Instrument Rated Meters
   SDG&E will continue to perform post installation tests where
   instrument rated metering equipment is replaced. The testimony
   includes costs to perform these tests.

h. Gas Module and Gas Meter Installations

1. Quality Assurance Sample Testing
   Costs are included to conduct quality assurance sample tests of
   AMI gas modules.

2. Gas Meter Replacement Service Interruptions
   SDG&E will replace approximately 3% of existing gas meters
   that are not suitable to be retrofitted with AMI communication
modules due to their design. Approximately 80% of these gas meter replacements will be completed without a gas service interruption.

### V. AMI COSTS IMPACTS BY FUNCTIONAL AREA-BY CAPITAL, BY O&M

#### Table JC 12-1

Gas Meters and Modules, Gas & Electric Meter Installation, Gas Maintenance Materials

Direct Dollars (Dollars in Thousands)

<table>
<thead>
<tr>
<th>Costs</th>
<th>Total</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011-2024</th>
<th>2025-2027</th>
<th>2028-2038</th>
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<tbody>
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<td><strong>Capital</strong></td>
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<td></td>
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<td>Total Deployment</td>
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<td>11,835.5</td>
<td>20,246.1</td>
<td>20,246.1</td>
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<td>389.9</td>
<td>31</td>
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<tr>
<td>Labor and Contract Support Capital Costs</td>
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<td>480.7</td>
<td>907.6</td>
<td>913.4</td>
<td>73.4</td>
<td>277.9</td>
<td>192.7</td>
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<td>Total Gas Deployment Materials</td>
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<td>11,975.4</td>
<td>20,574.1</td>
<td>20,650.4</td>
<td>1,052.8</td>
<td>15,991.0</td>
<td>2,632.5</td>
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<td>Total Gas Maintenance Materials</td>
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<td>97.8</td>
<td>265.8</td>
<td>434</td>
<td>486.8</td>
<td>552.6</td>
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<td>42,243.9</td>
<td>1,613.0</td>
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<td>Total Claims O&amp;M Costs</td>
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<td>145.5</td>
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<td><strong>Total O&amp;M Costs</strong></td>
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<td>145.5</td>
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<td>2,771.0</td>
<td>2,931.3</td>
<td>486.7</td>
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<td><strong>Total Costs</strong></td>
<td>245,342</td>
<td>146</td>
<td>26,114</td>
<td>44,765</td>
<td>45,175</td>
<td>2,100</td>
<td>18,306</td>
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### VI. AMI BENEFITS IMPACTS BY FUNCTIONAL AREA- BY CAPITAL, BY O&M

#### Table JC 12-2

Gas Meters and Modules, Gas & Electric Meter Installation, Gas Maintenance Materials

Direct Dollars (Dollars in Thousands)

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Total</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011-2024</th>
<th>2025-2027</th>
<th>2028-2038</th>
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<tbody>
<tr>
<td><strong>Capital</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Total Electric Labor Capital Benefits</td>
<td>817</td>
<td>204.1</td>
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<td>0</td>
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<tr>
<td>Total Gas Labor Capital Benefits</td>
<td>145</td>
<td>0</td>
<td>6.9</td>
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<td>Total Gas Materials Capital Benefits</td>
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<td>36.2</td>
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<td><strong>Total Capital Benefits</strong></td>
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<td>204.1</td>
<td>247.2</td>
<td>290</td>
<td>290</td>
<td>52.7</td>
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<tr>
<td><strong>O&amp;M</strong></td>
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<tr>
<td>Total Labor and Contract Support O&amp;M Benefits</td>
<td>4,256</td>
<td>21.3</td>
<td>106.5</td>
<td>214.8</td>
<td>267.1</td>
<td>133.8</td>
<td>126.7</td>
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<tr>
<td><strong>Total O&amp;M Benefits</strong></td>
<td>4,256</td>
<td>21.3</td>
<td>106.5</td>
<td>214.8</td>
<td>267.1</td>
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<td><strong>Total Benefits</strong></td>
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<td>505</td>
<td>557</td>
<td>186</td>
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VII. AMI PROJECT RISK AND SDG&E MITIGATION

The major risk of potential over run of installation costs is the inability to gain safe access to customer premises to install AMI meter and equipment. Another risk is the need to revisit meters due to installation errors or meter failures. To a significant degree, these risks will be absorbed by the installation contractor.

As described above, the installation vendor will make three attempts to install the equipment before turning the order back to SDG&E. In concert with these attempts, both the installation vendor and SDG&E will be actively coordinating with customers. In addition, SDG&E will be advertising/educating extensively about AMI as discussed further in Mr. Gaines’ testimony (Chapter 5). Given these mitigating factors, SDG&E has assumed that less than one percent of meters will not be installed after three attempts. The business case costs for installation reflect this assumption.

Installation errors will be minimized through extensive audits. In addition to the audits that the installation vendor will perform, SDG&E will verify installation of 100% of transformer-rated meters and 5% the remaining meter population. SDG&E will also perform QA reviews at meter and gas module manufacturing facilities.

The major risk associated with the gas meters and modules is that RFP bids estimated retrofits of approximately 97% of its existing gas meter population. Since retrofitting gas meters is cheaper than replacing the meters, replacing more than 3% of SDG&E’s existing gas meters could negatively impact our business case costs. However, SDG&E will contractually require the vendors to demonstrate their ability to retrofit gas meters.

Meter and gas module failure rate assumptions, discussed above for gas meters and in Mr. Pruschki’s testimony (Chapter 11) for electric meters, drive maintenance costs after deployment. Installation errors discovered during the deployment period will be the responsibility of the installation vendor.

VIII. CONCLUSION

My testimony has discussed both the costs and benefits related to installing approximately 1.4 million electric meters, approximately 900,000 gas meter modules, and replacing approximately 3% of the gas meter population. The most significant costs for this aspect of the AMI project comes from purchasing gas metering equipment, installing
gas modules and meters, and installing electric meters with embedded AMI technology.

Additionally, my testimony discusses the various processes that must be implemented to have a successful meter installation in the field. SDG&E determined, through the RFP process, that installation vendors can partner with SDG&E to provide project management, labor, facilities, and safe and quality meter installations necessary to implement this project. Based on the ‘not to exceed’ costs included in this chapter, we are confident that meter installations can be performed in approximately two and one-half years to provide the functionality described in Chapter 8 by Mr. Reguly and, therefore, to provide the benefits described throughout this filing.

This concludes my supplemental testimony.
IX. QUALIFICATIONS OF JOSE L. CARRANZA

My name is Jose Luis Carranza and I am employed by San Diego Gas and Electric Company (SDG&E). My Business Address is 6875 Consolidated Way, San Diego, CA 92121.

My current position is Electric Metering Operations Manager in the Customer Operations Department of SDG&E. I have been employed by SDG&E since 1994. I have held various positions of increasing responsibility in Electric Distribution and Customer Operations. I assumed my current position in 2006.

I am a registered Electrical Engineer in the State of California. I received a Bachelor of Science degree in Electrical Engineering from the San Diego State University.

I have not previously testified before the California Public Utilities Commission.