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 3
METER READING AND CUSTOMER SERVICE FIELD FUNCTIONS, SAFETY, BILLING AND REVENUE PROTECTION

Prepared Supplemental, Consolidating Superseding and Replacement Testimony of JAMES S. TEETER

SAN DIEGO GAS & ELECTRIC COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

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I. INTRODUCTION

The purpose of my testimony is to present the customer service operational benefits and costs that SDG&E will experience when an advanced metering infrastructure (AMI) is deployed and installed in its service territory. The benefits include reduced operational costs, reduced or avoided energy theft, improved customer service and more accurate metering and billing information.

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

Manual meter reading requires considerable walking and driving. Meter readers must deal daily with sometimes dangerous traffic and customer premise accessibility issues. Currently, SDG&E meter readers travel to customers' meters each month to collect customer usage information (meter reads) with a hand-held data collection device. SG&E uses meter reads to prepare monthly bills.

After the meter reading route is completed, the customer meter reads are transferred from the hand-held device to SDG&E's customer information system. This data transfer must be done at a meter reading base location. SDG&E's back-office billing systems then perform a series of data validation routines which will, if warranted, automatically trigger a pre-billing review that may result in bill adjustments. The largest number of bill adjustments is due to meter reading error.

When customers move from one residence or business to another, Customer Service Field (CSF) personnel must visit the meter and complete a "close order" or a

"change of account" order to obtain the "end read" for the departing customer and a "start read" for the new customer. A certain number of these orders is to perform "revert to owner" reads where service is left on for the convenience of property owners or managers when a tenant moves. Also, when meter reading errors are suspected, CSF employees must perform a "read verify" order at the customer's meter.

AMI will eliminate many such field visits which are necessary under current manual meter reading operations and, therefore, will reduce meter reading costs. SDG&E also expects AMI to improve customer service since SDG&E will obtain meter reads electronically on the date a customer desires rather than on a service order schedule which is subject to delay due to workload constraints.

To prevent billing errors, once meter data is captured SDG&E's system performs a series of billing edits prior to sending the customer bill. Despite comprehensive edits, some billing adjustments are required after bills have been sent. Other anomalies (billing exceptions) are also detected after completion of the billing cycle, such as meters in "off" status but registering consumption (OBR), meter failures and unauthorized energy usage (theft). With AMI, many of these billing exceptions will be eliminated and others will be detected more quickly.

In my testimony, I discuss the following benefits:

Customer Service Operational Benefits of AMI System

Function	Operational Benefits
Meter Reading	Substantially reduced costs, customer convenience
Customer Service Field	More convenient service dates; reduced costs
Safety	Dramatic reduction in meter-reading related accidents following AMI deployment
Billing	Improved accuracy and timeliness
Meter Revenue Protection (MRP)	Reduced meter failures; reduction and earlier detection of energy theft and OBR, benefiting SDG&E customers

III. BASE ASSUMPTIONS

A. Manual Meter Reading Costs Will Be Eliminated

All meter data will be collected remotely by the AMI system. Meter readers will no longer visit customer premises, and the CSF staff will be reduced by approximately 25%. Meter access problems will be eliminated for all monthly meter readings and for a majority of "change of account" activities.

B. No Lay-Off Policy Resulting From AMI Deployment

SDG&E recognizes the value of its employees and has developed an approach to manage labor force impacts as effectively and efficiently as possible. Although SDG&E expects AMI to eliminate areas of work, SDG&E will manage the process with zero lay-offs as a result of the AMI deployment and installation. SDG&E has reviewed the historical annual turnover rates in the affected areas. The expected turnover during the deployment and installation period exceeds the number of positions eliminated. To further mitigate adverse impacts on the affected workforce, SDG&E plans to re-train displaced employees to fill new areas of work created by AMI.

Table JST 3-1

Field Workforce Attrition Rates / Expected FTE Losses

Attrition Rates / Expected FTE Losses				
	Historic Annual Attrition 2000 - 2005	**Expected Annual Attrition 2008 - 2010**	**Required* Annual Attrition 2008 - 2011**	**Approx Work-Group Population in Jan 2008**
Meter Readers	61%	75%	34.3%	178
Meter Reading Supervisors	20%	30%	34.3%	9
Meter Reading Analysts	13%	13%	34.3%	4
Meter Reading Administrative Support	18%	18%	34.3%	12
Customer Service Field Employees	7%	7%	5.1%	243

** necessary attrition required each year to reach projected post AMI workforce in 2011*

As shown in Table JST 3-1 (above), no layoffs of meter readers will be necessary over the AMI installation period. Any displaced employees will be offered retraining and reassignment.

C. Employee Safety

Meter Readers typically have relatively high injury rates due to repetitive motion, high vehicle use and environmental hazards. Following AMI system installation, far fewer employees will be required to visit meters, so these types of

injuries will virtually be eliminated. As a result, SDG&E expects a substantial improvement in overall employee safety.

D. Billing Will Be More Accurate And Timely

Meter reading errors currently account for 78% of adjusted bills. Since AMI meter reads will be transmitted electronically, the number of billing adjustments will drop dramatically. With a manual meter reading system, 15-20% of meters are currently read one to four days after the scheduled meter read date, delaying the processing and mailing of bills. Another 3% of bills are held by Billing for investigation. AMI will reduce dramatically the number of delayed bills. The associated benefit dollars are included in this chapter.

E. Information Will Be Available More Quickly

Since meter data will be available on a more frequent basis, it will be possible to resolve anomalies more quickly, shortening the time SDG&E needs to resolve the problem. For example, new algorithms will make it possible to detect gas leaks in days rather than months. Similarly, when meters stop functioning or when meters in "off" status begin registering usage, SDG&E can take appropriate action virtually in real time. Benefit dollars associated with these changes are included in this chapter.

F. More Complex Rates Will Be Enabled

AMI will provide more meter data which will, in turn, permit SDG&E to offer new dynamic rates. Dynamic rates will induce our customers to optimize their energy use thereby providing peak load reduction. With AMI, rates can be more customized and time differentiated as well. Additional rate options and increased billing flexibility will, however, create more complexity and increase labor time and costs for processing customer billing adjustments. For example, with 720 hourly data points each month (under AMI) instead of one data point (today), it will be more challenging to prepare pre-bill or post-bill adjustments. There also will be more data elements to maintain, such as meter pulse multipliers and demand response event tracking and reconciliation. These incremental costs are included in this chapter.

IV. SUMMARY OF COSTS & BENEFITS

Table JST 3-2
Direct Dollars (in Thousands)

					Average Annual
Costs	Total	2008	2009	2010	2011-2038
O&M					
Billing and MRP	17,265	361.2	677.2	773.0	551.9
Meter Reading and CSF	154	34.7	59.5	59.5	0.0
Total O&M Costs	*17,419*	*395.9*	*736.7*	*832.5*	*551.9*
Total Costs	**17,419**	**395.9**	**736.7**	**832.5**	**551.9**

					Average Annual
Benefits	Total	2008	2009	2010	2011-2038
Capital					
Electric Materials	1,654	2.2	10.7	19.1	57.9
Gas Materials	874	1.2	6.4	11.7	30.5
Meter Reading and CSF	5,509	32.7	32.7	0.0	194.4
Total Capital Benefits	*8,037*	*36.1*	*49.8*	*30.8*	*282.9*
O&M					
Billing	188,078	1,160.0	3,148.5	5,137.1	6,379.7
Claims	40	2.7	2.7	2.7	1.1
Electric Materials	11,121	25.3	121.1	216.9	384.2
Gas Materials	5,884	13.9	73.1	132.3	202.3
Labor and Contract Support	103,801	239.1	1,185.3	2,131.4	3,580.2
Meter Reading and CSF	334,121	500.2	3,673.8	7,485.4	11,516.5
Total O&M Benefits	*643,044*	*1,941.1*	*8,204.4*	*15,105.6*	*22,064.0*
Total Benefits	**651,081**	**1,977.2**	**8,254.2**	**15,136.4**	**22,346.9**

V. AMI COST IMPACTS BY FUNCTIONAL AREA- O&M ONLY

A. Meter Reading Cost Impacts

Additional labor will be required to adjust meter reading routes during the AMI deployment and installation period as referenced in Table JST 3-2. Reassigning meter routes allows SDG&E to achieve meter reading labor force reductions earlier. SDG&E envisions hiring three additional meter route coordinators. This will allow the meter reading workforce to be dispatched

efficiently and SDG&E to achieve labor savings only two months after the meters are replaced. The value of achieving these savings earlier in the deployment process is significantly greater than the additional costs.

B. Billing And Meter Revenue Protection Cost Impacts

1. Billing deployment costs

The Major Markets Billing staff are experienced in handling special billing issues and billing involving interval data. Accordingly, when AMI meters are installed and new information systems are introduced, the Major Markets Billing group will require approximately 40 hours of training. All other Billing employees will require 80 hours of training.

2. Billing Transition Period

System adjustments are routinely required following a large system installation. During this adjustment period, known as a "storm period," substantial effort is required to analyze and trouble-shoot installation problems and to correct billing information manually.

Moreover, when new meters are installed, a number of data elements must be recorded properly to set up the billing systems. The exception rate is approximately 7% higher than for other types of service orders. Additionally, new data about meter communications are typically required (such as AMI communication module serial numbers). SDG&E computed the costs associated with this effort by multiplying 7% of changed meters times the average cost to process a billing exception. These costs are included in this chapter.

3. More Complex Billing

Hourly meters generate more data to process. When billing adjustments are required (even though such adjustments will occur less often than with existing meters), the amount of data to process and the more complex rates will require additional labor time. Projections were based on SDG&E's experience in processing bills for the Statewide Pricing Pilot (SPP) conducted in 2003-04. SDG&E's current interval data accounts require 20-50% more

time to complete billing adjustments compared to simpler single-entry meter readings.

Further, more complex billing requires superior analytical skills and knowledge. Much of the exception bill processing will shift from clerical workers to billing analysts. In order to compensate, attract and retain employees with higher skill sets, SDG&E assumes salaries will increase by 20% for the impacted billing groups.

4. Meter Revenue Protection Costs

During the installation period, SDG&E will need six additional Meter Revenue Protection agents to handle the large number of energy theft cases the company anticipates discovering when the new meters are installed. There also will be some transitional costs during the first year to determine the best way to process false positive signals. After AMI installation is complete, SDG&E will require two additional agents to prosecute the large number of energy thefts we expect to uncover.

C. Meter Installation Costs

During AMI system installation, there is a potential for installation and meter communications problems that will require some bill estimations. Further, SDG&E will have difficulty obtaining access to install some meters. Accordingly, SDG&E anticipates a temporary increase in estimated bills. Estimating bills will allow SDG&E and customers to realize the meter reading reduction benefit regardless of any unexpected installation problems.

VI. AMI BENEFITS IMPACTS BY FUNCTIONAL AREA - CAPITAL, O&M

A. Meter Reading And Customer Service Field Benefits

All manual meter reading costs will be eliminated. These costs include labor for meter readers, office meter read routing and support, vehicles and associated fuel, hardware and software, equipment, uniforms, and supplies. SDG&E computed the cost savings in each of these categories from 2005 budget costs, escalated into 2006 dollars and translated to a cost per meter basis. O&M cost savings are presented in Table JST 3-2 based on cost per meter times the number of meters converted to AMI.

The capital benefits in this chapter include avoiding the need to replace meter reading handheld data collection devices, which are replaced on 5-7 year cycle, and CSF mobile data terminals and modems. Cost reductions have been included that would have been incurred in 2014-2015. Cost reductions were not included for data collection devices that are due to be replaced in 2007-2008 because SDG&E will need these new devices to read meters until the end of 2010.

CSF benefits for reducing change of accounts, revert to owner, and read verify field service orders were determined by projecting the number of service orders expected in future years, calculating the number of employees required to complete those orders and multiplying that number by current labor rates. Cost savings include labor, vehicles and mobile data terminal (MDT) devices as well as normal equipment breakage.

B. Safety Benefits

Meter readers and CSF have a high number of safety incidents attributed to the work environment. SDG&E expects AMI will eliminate Motor Vehicle Incidents (MVI) and injuries reported to doctors (OSHAs), which include Lost Work Days (LWDs) resulting from an OSHA-related incident.

Average workers compensation costs for meter readers in 2001-2004 were used to calculate expected safety cost benefits. To calculate this benefit, SDG&E multiplied the average cost per injury (OSHA recordable incident) by the number of safety incidents to be eliminated. SDG&E meter readers have experienced improved safety records in recent years and SDG&E continued this downward trend when calculating the cost reductions. For Customer Service Field injuries, SDG&E used a five-year average safety record since that group has not experienced declining safety incidents.

Similarly, SDG&E derived the benefit of reduced motor vehicle claims by multiplying the average vehicle incident claim paid from January 2000-June 2004 times the number of claims to be eliminated.

C. Billing And Meter Revenue Protection Benefits

Billing exceptions and billing adjustments will be reduced. Reduced billing adjustments due to meter reading errors will eliminate approximately 4,000

electric re-bills and 2,800 gas re-bills each month (78% of Mass Market bills). Billing exceptions are also expected to be reduced by 35%.

Cash flow will be improved by eliminating late meter reads. Historically, about 15-20% of meter readings have not been available on the scheduled billing date due to workload peaks and unavoidable operational issues. AMI will eliminate delayed bills. When bills are delayed one or more days, the due date is also delayed, and customers tend to pay their bills one day later. Similarly, billing for customers with a large number of accounts (summary billing) will also create cash flow benefits since SDG&E will no longer need to hold summary bills for four working days to allow time for manual meter reading.

Although industry estimates of energy theft are reported to be 1-2% of revenue, SDG&E assumes that no more than 0.65% of electric revenue is lost due to meter error, energy theft and other unaccounted for energy due to prior Unaccounted for Energy (UFE) analyses. Ratepayers benefit when losses are reduced and energy costs can be shifted to those who use the energy instead of to all remaining customers, creating downward pressure on rates.

A common method of stealing electric energy is to remove the meter and re-install it upside-down, causing the meter to run backwards. During 2004, 42% of energy theft discovered by SDG&E was reported by meter readers, predominantly as a result of upside-down meters. Using tamper alarms and analyzing hourly energy usage, these sources of energy theft can be eliminated. SDG&E estimates that losses prevented (revenue gained) will be 0.30% times 42%, and further reduced for losses that cannot be recovered.

Revenue losses are also caused by meter error including meters that fail (100% reduction in recording) and mechanical meters that slow down over time as mechanical parts wear out (but prior to change out when the meter falls out of calibration compliance). Such losses were assumed to be 0.30% lower with solid-state meters, which is in line with experience of other utilities that installed advanced metering. SDG&E derived the increased revenue by multiplying the average revenue gained per meter times the number of meters replaced.

VII. OTHER NON-QUANTIFIABLE BENEFITS AND IMPACTS

A. Fewer Estimated Bills Results In Fewer Adjusted Bills

Estimated bills very often result in adjusted bills in subsequent months. AMI will eliminate estimated bills due to meter access or staffing issues and manual meter reading errors also will be eliminated.

B. Customer Privacy/Less Intrusion On Customer Property

Since meter readers will not be required to visit customer premises, meter readers will not intrude on customers' property each month. Fewer SDG&E customer visits will reduce collateral customer property damage.[1]

C. More Accurate Meters

Mechanical meters, in addition to being less accurate than solid-state electronic meters when new, fail as they age. Many meters stop completely and register zero-use. Such failures often go undetected for a period of time because they are assumed to be caused by customer vacancy. When a failed meter is detected late, customers are obligated to pay a larger than "normal", retroactive bill. In many cases, SDG&E must reach a compromise with the customer on paying a large retroactive bill. Eliminating slow meters and other metering issues involving "lost and unaccounted for" energy use will result in accurate bills and assign payment obligations to those customers who use the energy rather than to all other customers.

D. Quicker Detection Of Anomalies (OBR, Gas Leaks)

Faster detection of high gas usage and potential gas leaks will allow SDG&E to investigate these situations as much as one month earlier. In addition to preventing a dangerous incident, earlier detection also reduces the financial burden on the customer. Also, quicker detection of anomalies, such as customers who begin using a meter in "off" status, will allow the customer to resolve their account before an adjusted bill is required. Similarly, access to hourly usage data

[1] SDG&E currently incurs expenses for property damage arising from SDG&E personnel service visits.

may also help customers understand their energy use patterns and end-uses during specific days.

VIII. AMI PROJECT RISK AND SDG&E MITIGATION

The major risk for the meter reading and safety benefits described above is the inability to reduce SDG&E's meter reading force as quickly as estimated. SDG&E has assumed that meter reader positions will be eliminated within two billing cycles after installation. To eliminate a meter reader position, SDG&E must be able to remotely read the majority of meters on an associated meter route. The ability to eliminate a route is mostly a function of gaining access to customer premises, which is discussed as a risk in Mr. Carranza's testimony (Chapter 12). SDG&E may estimate bills for a small number of customers for a short time period to eliminate whole meter routes.

The major risk for the revenue protection benefit is if customers learn to divert energy in new, unknown ways. Given historical data from Automated Meter Reading installations, this risk does not appear too great. Also, AMI endpoints may have increased sophistication in software and tamper sensors at detecting theft. Enhancements to back office systems with new algorithms and heuristics to identify new types of theft will be developed over time. That being said, SDG&E believes that the ingenuity of a few customers will lead to some new types of theft and we have, accordingly, included this assumption in the energy theft calculation.

SDG&E does not have sufficient baseline data concerning the accuracy of the meter population to precisely project the increase in accuracy from AMI meters, however, increased accuracy is supported by industry data. Moreover, the Division of Ratepayer Advocates testimony[2] discusses meter accuracy as a benefit for Pacific Gas and Electric Company in that company's AMI proceeding (Application 05-06-028). DRA cites a 0.4% increase in meter accuracy between electromechnical and solid state meters. SDG&E has assumed a 0.3% increase in meter accuracy.

The final area of risk in this chapter is the expected gaps in interval data. There are roughly 720 intervals per billing cycle, per meter for residential customers. We will

[2] Testimony on Pacific Gas and Electric Company's Application for Authority to Increase Revenue Requirements to Recover the Costs to Deploy an Advanced Metering Infrastructure; Application 05-06-028; January 18, 2006; page 7-6

be collecting four times that number of intervals for commercial customers. There are a number of issues that can and will lead to missing intervals. Based on SDG&E's experience with remote data collection, we anticipate that the communication infrastructure will cause the majority of interval data gaps. Missing intervals can be estimated using advanced algorithms based on an individual customer's usage pattern. If there are significant numbers of missing intervals, however, then the bill will be marked as "estimated". A percentage of these estimated bills will lead to customer inquiries. This risk is largely mitigated for SDG&E during the deployment period and for a few years thereafter, because the AMI communication vendor will be contractually responsible for the performance of the communication infrastructure through the Design, Build, Run, Transfer mechanism, as discussed in Paul Pruschki's testimony (Chapter 11).

IX. CONCLUSION

Once AMI is installed, SDG&E customers will receive even better service. Customer bills will be more accurate and timely. They will be able to schedule more same-day service orders and to start and stop service (change-of-accounts) on the day of their choice. Customers will receive the benefit of lower operating costs which should decrease the need for rate increases. Finally, customers will benefit from more intangible improvements, such as less intrusion on their property and fewer estimated bills.

X. QUALIFICATIONS OF JAMES S. TEETER

My name is James S. Teeter and I am employed by San Diego Gas & Electric Company (SDG&E). My business address is 8306 Century Park Court, Suite 42J, San Diego, CA 92123-1530.

My present position is Billing Manager in the Customer Billing Operations Department of SDG&E. I have been employed by SDG&E since 1972. Previous positions relevant to my testimony include Manager-Measurement and Billing (1998-2002) and Manager-Billing Services (1989-1998).

I received a B. S. in Accounting from San Diego State University. I have not previously testified before the California Public Utilities Commission.

This concludes my prepared direct testimony.