Company: San Diego Gas & Electric Company (U902M)
Proceeding: 2016 General Rate Case
Application: A.14-11-___
Exhibit: SDG&E-06

SDG&E

DIRECT TESTIMONY OF RAYMOND K. STANFORD

(GAS ENGINEERING)

November 2014

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

SDGE
A Sempra Energy utility®

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SUMMARY

ENGINEERING			
Shown in Thousands of 2013 Dollars	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
Total Non-Shared	261	718	457
Total Shared Services (Incurred)	8	92	84
Total O&M	**269**	**810**	**541**

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
Total Capital	**7,212**	**6,582**	**7,002**

Gas Engineering is responsible for a compendium of key activities and programs that support the ongoing vitality of San Diego Gas & Electric Company (SDG&E or Company) transmission pipeline operations and help SDG&E achieve the overarching objective to provide safe and reliable natural gas service at reasonable cost. Gas Engineering supports Gas Transmission and Gas Distribution operations by creating and issuing policies and standards that help establish and validate compliance with applicable laws, regulations and internal policies, providing and issuing engineering designs primarily for Gas Transmission projects, and making capital investments that support the safety and reliability of the transmission system. These activities are described in this testimony under the following broad categories:

- Gas Engineering
- Major Projects
- Public Awareness
- Gas Transmission Capital

In preparing my Test Year 2016 (TY2016) forecast for this testimony, I reviewed historical spending levels and developed an assessment of future requirements. Because of the mature nature of the activities that I am sponsoring, most of my forecast relies upon a five-year average and, where necessary, incremental costs are applied.

In total, SDG&E requests the Commission adopt TY2016 Gas Engineering forecasts of $718,000 for Non-Shared Service and $92,000 for Shared-Service. SDG&E also requests the

Commission adopt capital expenditures of $7,212,000, $6,582,000, and $7,002,000 for the forecast years 2014, 2015, and 2016, respectively.

SDG&E DIRECT TESTIMONY OF RAYMOND K. STANFORD
GAS ENGINEERING

I. INTRODUCTION

A. Summary of Costs

I sponsor TY 2016 forecasts of O&M costs for the forecast years 2014, 2015, and 2016 for the Gas Engineering, Major Projects, Public Awareness organizations, and capital costs for the forecast years 2014, 2015, and 2016 for Gas Transmission. In total, SDG&E requests the Commission adopt a TY2016 forecast of $810,000, of which $718,000 is for Non-shared Service Gas Engineering and Public Awareness O&M expenses and $92,000 is for Shared-Service Gas Engineering O&M expenses. SDG&E also requests the Commission adopt capital expenditures of $7,212,000, $6,582,000, and $7,002,000 for the forecast years 2014, 2015, and 2016, respectively. Table RKS-1 summarizes my sponsored costs. All costs in this testimony are presented in 2013 dollars unless otherwise noted. In addition to this testimony, also refer to my workpapers, Exhibit SDG&E-06-WP (O&M) and SDG&E-06-CWP (capital) for additional information on the activities described herein.

Table RKS-1
San Diego Gas & Electric Company
Test Year 2016 Summary of Total Costs

ENGINEERING			
Shown in Thousands of 2013 Dollars	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
Total Non-Shared	261	718	457
Total Shared Services (Incurred)	8	92	84
Total O&M	**269**	**810**	**541**

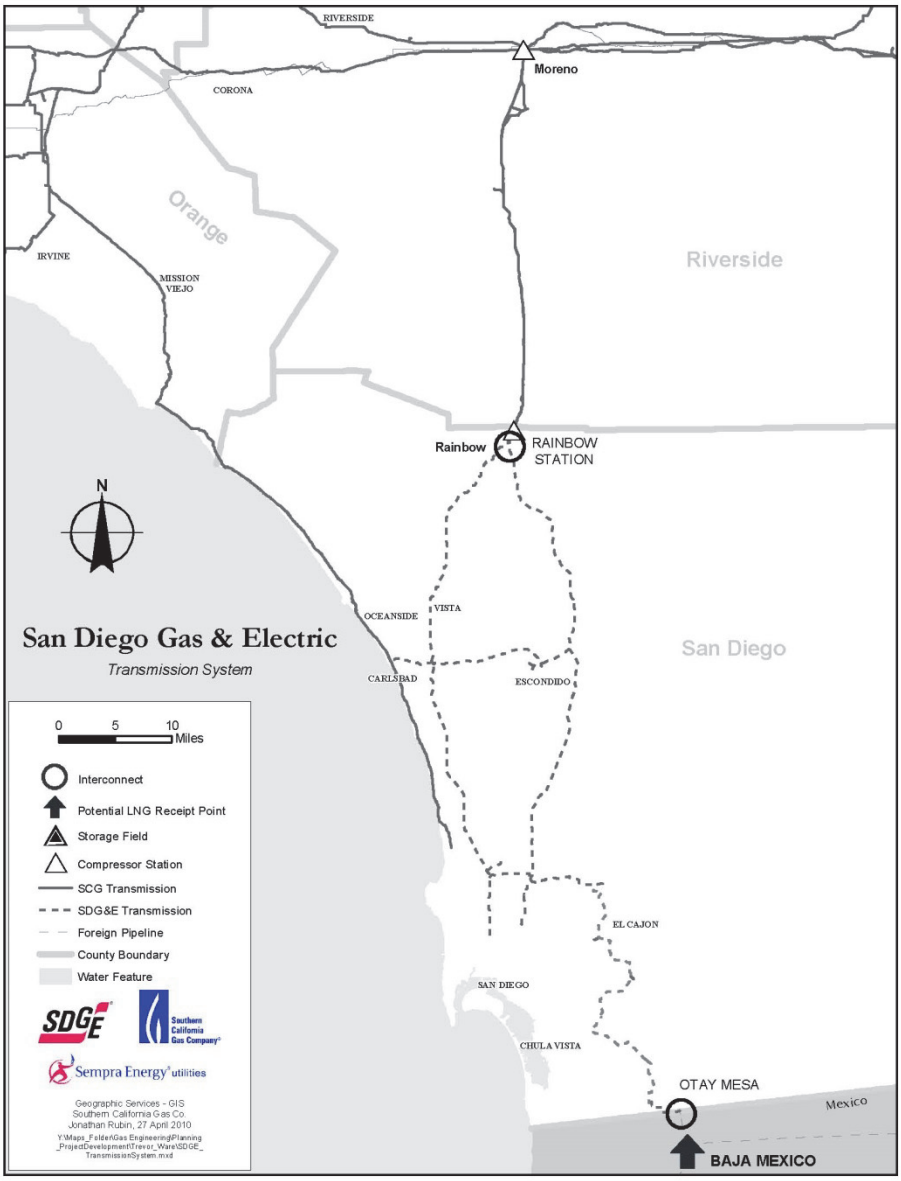
GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
Total Capital	**7,212**	**6,582**	**7,002**

B. Summary of Activities

1. SDG&E's Gas System Overview

Gas Transmission operates and maintains approximately 175 miles of high-pressure pipeline and two compressor stations (Moreno and Rainbow), as shown in Figure RKS-1.

Figure RKS-1
San Diego Gas & Electric Company
SDG&E Transmission System



SDG&E receives gas from Southern California Gas Company (SoCalGas) at the San Diego/Riverside County border at Rainbow, California and through various points of a pipeline that runs along the San Diego County coastline. SDG&E may also receive gas through an interconnect point at Otay Mesa with the Transportadora de Gas Natural pipeline in Mexico.

SDG&E's Distribution and Transmission operating units collectively operate approximately 234 miles of pipeline defined as "transmission" under United States Department

of Transportation (DOT) regulations.[1] Of those 234 of DOT transmission miles, as noted above, Gas Transmission operates approximately 175 miles of high pressure pipeline. The remaining miles are high-pressure distribution pipelines operated by Gas Distribution.

The distribution system comprises approximately 8,345 miles of mains, 633,000 services, and 860,000 meters.[2] Collectively, these components allow SDG&E to deliver natural gas from receipt point to customer reliably and safely. In order to continue to provide safe and reliable service, SDG&E must continue to make prudent investments in its infrastructure pursuant to applicable regulatory requirements.

2. Gas Engineering Responsibilities

Gas Engineering is responsible for performing an array of activities that culminate in technical guidance to support, on a non-shared and shared basis, day-to-day functions for Pipeline Integrity, Gas Transmission and Gas Distribution. Gas Engineering supports Pipeline Integrity, Gas Transmission and Gas Distribution by creating and issuing policies and standards that help establish and validate compliance with applicable laws, regulations and internal policies, providing and issuing engineering designs primarily for Gas Transmission and Gas Distribution projects, and making capital investments that support the safety and reliability of the transmission system. The Gas Transmission capital expenditures described in this testimony enhance the efficiency and responsiveness of our operations, facilitate compliance with applicable regulatory and environmental regulations, and support Gas Transmission and Gas Distribution operations to provide safe and reliable delivery of natural gas to customers at reasonable cost.

My testimony also sponsors closely-related activities and associated requests for Public Awareness and Major Projects. Public Awareness is a federally-mandated program established to educate the public, appropriate governmental organizations and persons engaged in excavation-related activities to mitigate safety and reliability risks by enhancing public awareness of pipelines and other natural gas facilities and communicating stakeholder roles relative to pipeline safety. Major Projects is a new organization that was formed to help SDG&E remain prudent and fiscally astute in managing large capital investments. Major Projects provides analysis and consultation regarding cost estimates, permit requirements, and scheduling

[1] 49 CFR 192.3.
[2] http://www.sdge.com/aboutus.

of major gas infrastructure facilities projects necessary for the continued safe and reliable distribution and transmission of natural gas throughout the service territory.

The Gas Engineering, Emergency Services, Public Awareness and Major Projects organizations all work toward a common goal of achieving operational excellence while providing safe and reliable natural gas service at reasonable cost.

This testimony describes anticipated changes in operations, explains the basis for these changes, and includes projections for the resulting change in expenditure requirements for each of the aforementioned areas.

The requested funding includes the cost of complying with federal and state pipeline safety regulations, as well as the capital resources to sustain SDG&E's vital gas transmission energy infrastructure and interdependency. The activities and expense forecasts represented in the Direct Testimony of Frank Ayala for Gas Distribution, Exhibit SDG&E-04, and in the Direct Testimony of John Dagg for Gas Transmission, Exhibit SDG&E-05 are separate and address costs not included in my testimony.

C. Gas Engineering Supports SDG&E's Overarching Goal to Provide Safety and Reliable Service at Reasonable Cost

My cost forecasts support SDG&E's goal to continually enhance pipeline safety and help maintain reliability by making necessary and prudent investments. Additionally, SDG&E requests resources to add quality assurance and quality control systems to provide additional confidence that the myriad of infrastructure investments continue to be made judiciously.

To further promote employee and public safety, I sponsor an increase to add resources for Process Hazard Analysis. Through Process Hazard Analysis, newly-proposed designs, equipment or processes are reviewed through a collaborative framework involving field employees and engineering with the aim to identify and re-engineer out potential hazards.

D. Safety/Risk Considerations

The risk policy witnesses, Diana Day (Exhibit SDG&E-02), and Douglas Schneider (Exhibit SDG&E-03), describe how risks are assessed and factored into cost decisions on an enterprise-wide basis. My testimony includes costs to mitigate risks associated mainly with infrastructure integrity, system reliability and physical security. Recent events where intrusions have occurred in the energy sector have heightened the awareness associated with physical

security. As a prudent operator, SDG&E is taking additional measures to harden security on certain gas assets. SDG&E is addressing service reliability risks posed by aging infrastructure, by reinvesting and refurbishing pipeline and compressor assets as detailed in my capital work papers. Specifically we are requesting funding to address compressor stations and cathodic protection on pipelines.

My testimony and the related revenue requirements specifically address three types of risk mitigation controls. The three are:

1. Coordination of emergency services between SDG&E, SoCalGas and Public Awareness. As explained by SDG&E's risk policy witness, Diana Day, in Exhibit SDG&E-02, there is very little likelihood that all risks can be mitigated to a point where the probability of an incident occurring is zero. Therefore, SDG&E must establish controls to manage and minimize the consequence of an unmitigated risk – Public Awareness is an expenditure SDG&E makes to mitigate such risk.
2. Systems required to support the identification of a risk. SDG&E requires Asset Management, Data Management and Document Management systems to capture asset health and life cycle data. This data is used to predict the likelihood of an asset failure and the consequence of a failure. For example, population and occupancy data is used to determine class location and whether an asset is located in a High Consequence Area. My testimony includes revenue requirements for these types of support systems.
3. Projects/programs directly related to mitigating a risk. For example, Gas Transmission may implement a pipeline replacement programs that falls outside of the Transmission Integrity Management Program (TIMP), to address aged pipelines that have deteriorated to a point where SDG&E believes replacement is appropriate.

All of these types of programs are implemented based on the policies described in the risk policy testimony of Diana Day, Exhibit SDG&E-02 and Douglas Schneider, Exhibit SDG&E-03.

II. NON-SHARED OPERATIONS AND MAINTENANCE COSTS

A. Introduction

The activities supported in this section are Gas Engineering and Public Awareness in support of distribution and transmission operations to effectively and efficiently deliver natural gas to SDG&E customers through approximately 840,000 meters, safely and reliably.

The Gas Engineering activities, as grouped, involve core duties in support of Transmission and Distribution operations. Public Awareness is a regulatory-driven program established to comply with United States Department of Transportation (DOT) requirements adopted through the Pipeline and Hazardous Materials Safety Administration (PHMSA). Table RKS-2 summarizes the total non-shared O&M forecasts for the listed cost categories. Because much of the management and engineering activities take place within SDG&E's affiliate, Southern California Gas Company (SoCalGas), SDG&E's GRC forecast for non-shared activities is limited to costs for the implementation, execution and documentation of the various compliance and engineering activities.

Table RKS-2
San Diego Gas & Electric Company
Non-Shared O&M Summary of Costs

ENGINEERING			
Shown in Thousands of 2013 Dollars	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
B. Gas Engineering	1	257	256
C. Public Awareness	260	461	201
Total	**261**	**718**	**457**

B. Gas Engineering

1. Description of Costs and Underlying Activities

Gas Engineering has two non-shared expenses specific to SDG&E: Asset and Data Management and Major Projects Management.

Asset and Data Management

Asset and data management encompasses computer-based work-management systems, mapping products, geographic information system development, and technical computing

support. These systems are necessary for the safe and efficient operation and maintenance of the gas system from receipt point through the Transmission and Distribution pipeline network.

This category includes detailed mapping products that are developed and maintained to meet regulatory requirements and support operations. As the gas infrastructure expands or is modified, maps are created and updated to provide geo-spatial representations of the SDG&E system. As an overlay to the need for geo-spatial mapping, SDG&E is enhancing its data management processes to improve the traceability of its documentation and verify the accuracy and completeness of existing data.

Major Projects Management

This work group provides analysis and consultation regarding cost estimates, permit requirements, and scheduling of major gas infrastructure facilities projects necessary for the continued safe and reliable transmission of natural gas throughout the service territory. Specifically, these resources provide functional expertise needed to perform technical development consultation, planning, permitting, some detailed design, material specifications development and management, infrastructure facility construction, and the commissioning and general project management of major gas facility infrastructure projects. The functional responsibility to oversee, maintain, and provide continuous development of construction standards and leading practices for SDG&E's Gas Transmission infrastructure facilities, construction, and contractor services are also provided by this group. In addition, Major Project resources are utilized to provide project management and construction needs to repair or replace heavily damaged or compromised major gas infrastructure facilities under emergency conditions, such as natural disasters, like major landslides caused by El Niño events.

The projects managed in this area vary by size and complexity. Project sizes can range from relatively small enhancements with difficult permit requirements, construction or public relations conditions, to auxiliary systems, controls, or major compression-drive units, such as Moreno Compressor Station.

2. Forecast Method

The forecast method developed for this cost category is a combination of a five-year average and zero-based approach. The zero-based approach is used to account for new activities to enhance SDG&E's data processing processes and associated documentation, which do not have a five-year history.

3. Cost Drivers

The cost drivers behind the zero-based cost forecast are GIS and high pressure (HP) database synchronization projects to enhance SDG&E's GIS and Computer Aided Design systems. These systems will enable improvements to the existing high pressure pipeline database and safety management practices. This includes a new data model, revised data attribution, reconciliation of existing asset data attribution, conversion of selected linear asset data to a geospatial format to support connectivity modeling and enhancements to provide a synchronized view of asset data. During technical enhancement and integration, testing data maintenance and capture processes will be documented and impacted personnel will be trained on any changes. Process and policy definition will also be developed to improve risk assessment, analytics, and reporting capabilities. While the project reflects a standard software development life cycle and data mapping and synchronization process, the field verification component requires additional resources.

C. Public Awareness

1. Description of Costs and Underlying Activities

SDG&E has developed and implemented a federally-mandated Public Awareness program, as prescribed in 49 CFR 192.616. In adopting these Public Awareness program requirements, the Pipeline and Hazardous Materials Safety Administration (PHMSA) determined that "[e]ffective public awareness programs are vital to continued safe pipeline operations" and that "[s]uch programs are an important factor in establishing communications with affected stakeholders, providing information necessary to enhance public awareness of pipelines, and communicating stakeholder roles relative to pipeline safety."[3] The federal regulations directing the implementation of this program specifically require that the program include activities to educate the public, appropriate government organizations, and persons engaged in excavation-related activities regarding: (1) use of the one-call notification system prior to excavation and other damage prevention activities; (2) possible hazards associated with unintended releases from a gas pipeline facility; (3) physical indications that such a release may have occurred; (4) steps that should be taken for public safety in the event of a gas pipeline release; and

[3] Public Safety: Pipeline Operator Public Awareness Program; Final Rule, 70 Fed. Reg. 28833-28842 (posted May 19, 2005) (codified at 49 CFR 192, 195).

(5) procedures for reporting such an event.[4] SDG&E's Public Awareness program therefore principally seeks to educate the public to understand the following:

1. How to recognize a natural gas leak;
2. How to properly respond in the event of gas leak, and;
3. How to help prevent personal injury or property damage.

These messages are intended to keep the public informed and safe.

To effectuate such a large plan, SDG&E involves multiple organizations within the utility and requires coordination and management assistance from within SoCalGas' Emergency Services department.[5]

2. Forecast Method

SDG&E forecasts an expense of $461,000 for TY2016, which is a significant increase over its 2013 adjusted recorded expenses, due to the need to assess the effectiveness of and continually improve Public Awareness communications to enhance pipeline safety, and to implement program expansion recommendations from regulators. The forecast methodology is based on a five-year linear approach, because the history does not adequately reflect cost increases anticipated as a result of these cost drivers, which are discussed in greater detail below.

3. Cost Drivers

The cost drivers behind this forecast are: (1) the requirements of 49 CFR 192.616; (2) the technical document, Public Awareness Programs for Pipeline Operators, American Petroleum Institute (API) Recommended Practice (RP) 1162, First Edition, also referred to as simply RP 1162 or 1162, because 49 CFR 192.616 expressly requires operators to follow the guidelines and recommendations set forth in API RP 1162; and (3) program expansion recommendations by regulators.

"The program and media used must be as comprehensive as necessary to reach all areas in which the operator transports gas" and "must include activities to advise affected municipalities, school districts, businesses, and residents of pipeline facility locations."[6] The program must be conducted not only in English, but also "in other languages commonly understood by a significant number and concentration of the non-English speaking population in

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4 49 CFR 192.616(d).
5 *See also* Ex. SCG-07, Direct Testimony of Raymond K. Stanford.
6 49 CFR 192.616(e)-(f).

the operator's area."[7] The operator is required to track these communications and evaluate the messages for resonance and impact and "[t]he operator's program documentation and evaluation results must be available for periodic review by appropriate regulatory agencies."[8] In addition, SDG&E anticipates heightened regulatory expectations as a result of pipeline incidents around the country, as confirmed by the results of the most recent Public Awareness audit by the California Public Utilities Commission (CPUC), in which the auditors recommended additional program elements be included within the Public Awareness program that are not required under the regulation.[9] These combined upward and increasing demands require that SDG&E take more frequent and more formal measurements of its program and expand the program scope by adding new program elements.

A high-level depiction of the Public Awareness program development process and continuous improvement cycle is shown in Figure RKS-2. As shown in the figure, SDG&E is in the on-going process of evaluating its program for improvement (steps 11 and 12). A key to help promote continuous improvement is for SDG&E to evaluate the impact of its Public Awareness program. The impact from the Public Awareness program lies within its communications both in content and medium (delivery). It is therefore necessary for SDG&E to evaluate both the content of its messages and message delivery systems.

An example would be to undertake an assessment of messaging to raise safety awareness. This measurement requires surveys of various groups to determine how and to what extent the Public Awareness messages are reaching them. Not all messages or delivery systems work for all stakeholders. In other words, a one-size-fits-all approach is not the most effective way to communicate. Through formal measurements or surveys of the various audiences, SDG&E assesses what is working and what is not.

The frequency of formal measurements or surveys, and how tailored those measurements and surveys are, are key factors that impact the costs of implementing a successful Public Awareness program. More frequent and targeted assessments help SDG&E to develop more succinct and relevant messages and deliver them in formats and mediums that meet the needs of

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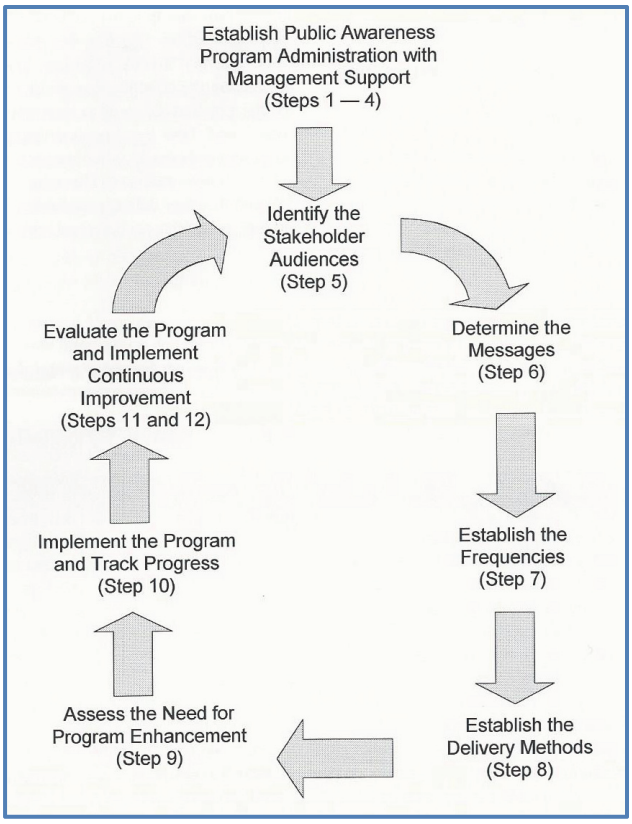
7 49 CFR 192.616(g).

8 49 CFR 192.616(i).

9 For example, the auditors recommended that the Liquefied Natural Gas facility in Borrego Springs be included within the Public Awareness program, even though this is not required under the applicable regulation. *See* SDG&E/SoCalGas' response to CPUC's Public Awareness audit results, dated June 17, 2013.

each particular identified audience. The more frequent and targeted the surveys are, however, the higher the costs of conducting those surveys. This need for more targeted and frequent surveys results in an increase over 2013 costs.

Figure RKS-2
San Diego Gas & Electric Company
Public Awareness Program Process Guide[10]



[10] Public Awareness Programs for Pipeline Operators, API RP1162, 1st edition, p. 9.

III. SHARED OPERATIONS AND MAINTENANCE COSTS

A. Introduction

In this section of testimony, the shared-services activities for Gas Engineering are described. Table RKS-3 summarizes the total shared O&M forecasts for this cost category.

Table RKS-3
San Diego Gas & Electric Company
Shared O&M Summary of Costs

ENGINEERING			
Shown in Thousands of 2013 Dollars	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
B. Gas Engineering	8	92	84
Total (Incurred)	**8**	**92**	**84**

I am sponsoring the forecasts on a total incurred basis, as well as the shared services allocation percentages related to those costs. Those percentages are presented in my shared services workpapers, Exhibit SDG&E-06-WP, along with a description explaining the activities being allocated. The dollar amounts allocated to affiliates are presented in our Shared Services Policy and Procedures testimony, Exhibit SDG&E-26 (Diancin).

B. Gas Engineering

1. Pipeline Design and Gas Standards (Cost Center 2100-3563)

Table RKS-4
San Diego Gas & Electric Company
Pipeline Design and Gas Standards

ENGINEERING			
Shown in Thousands of 2013 Dollars			
B. Gas Engineering	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Pipeline Design & Gas Standards	8	92	84
Total (Incurred)	**8**	**92**	**84**

a. Description of Costs and Underlying Activities

This cost center supports the development and integration of gas standards for both SoCalGas and SDG&E. Gas standards are policies that help the two utilities meet their regulatory obligations and allow for information exchange to enhance public and employee safety. The CPUC annually audits both companies and their gas standards. Table RKS-4 summarizes the total shared O&M forecasts for Pipeline Design and Gas Standards activities for TY2016, along with a comparison to 2013 adjusted-recorded costs.

The expense forecast for TY2016 is $92,000, which is an increase of $51,000 over the five-year average. This increase reflects the labor support needed to manage and provide consistency across both companies with respect to the gas standards, and to prepare documentation and perform follow-up work resulting from CPUC audits.

b. Forecast Method

The method used to develop a forecast for this cost category is the five-year average. This forecasting methodology serves to reflect annual work variations that can occur. In order to implement recent requests from CPUC auditors to enhance policies and procedures that support review and revision of the standards governed by the O&M plan, additional staffing and resources are needed. These incremental costs are identified and added to the five-year average.

c. Cost Drivers

A key cost driver in this category is the CPUC's expansion of its audit activities, and the needed support for this increased auditing activity by both utilities. Historically, CPUC audits generally focused on specific areas. The CPUC recently expanded its audits to include the review and analysis of more gas standards to verify that both utilities are meeting their regulatory obligations. It is not uncommon to have recommendations and follow up items, including data requests from an audit. Additional resources are needed to handle the increased workload.

A second key cost driver behind this forecast is recent CPUC audit recommendations for enhancements to policies and procedures supporting review and revision of the standards governed by the O&M plan, as well as the implementation of Process Hazard Analysis. To effectively implement the recommendations to enhance current systems and processes, additional staffing and resources are anticipated.

IV. CAPITAL

The capital described in this chapter covers the capital expenditures estimated for Gas Engineering to support SDG&E's Gas Transmission, and Gas Engineering operations. The driving philosophy behind SDG&E's capital expenditure plan is to provide safe and reliable delivery of natural gas to customers at reasonable cost. These investments also enhance the efficiency and responsiveness of our operations, and facilitate compliance with applicable regulatory and environmental regulations. Table RKS-5 summarizes the total Gas Transmission capital forecasts for 2014, 2015, and 2016.

Table RKS-5
San Diego Gas & Electric Company
Capital Expenditures Summary of Costs

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
Categories of Management	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
A. New Pipelines	210	592	1,012
B. Replacements	1,213	680	680
C. Relocations	474	474	474
D. Compressor Stations	3,127	3,127	3,127
E. Cathodic Protection	241	262	262
F. Land Rights	500	0	0
G. M&R Stations	1,184	1,184	1,184
H. Capital Tools	130	130	130
I. Local Engineering Pool	133	133	133
Total	**7,212**	**6,582**	**7,002**

The cost estimates that I sponsor and that appear in this testimony do not duplicate those sponsored by witness Maria Martinez related to the Transmission Integrity Management Program (TIMP) and Distribution Integrity Management Program (DIMP), Exhibit SDG&E-07. Nor do these estimates include costs of implementing SoCalGas and SDG&E's Pipeline Safety Enhancement Program (PSEP). My cost estimates are influenced by efforts to enhance engineering and design work to bolster the integrity of newly-commissioned pipeline. This effort is reflected in my cost estimates as an upward pressure in materials and construction costs related to installation and replacement of Transmission lines. New and replacement pipelines are built not only to be stronger but to be capable of being inspected using in-line inspection

technology and to remain safe over long life spans. Two specific examples of these material enhancements are: (1) the use of full-opening "ball valves," which are many times more expensive than valves used in prior decades; and (2) the use of "triple radius" elbows that can accommodate in-line inspection "smart pigs" and are much more expensive than elbows used in previous years.

A. New Pipelines (Budget Code 4X1)

This cost category includes:

1. Cost forecasts for the installation of new gas Transmission facilities to serve a new electric peaker plant in Carlsbad, California (NRG Joint-venture Utility Electric Generator at Carlsbad).
2. Costs associated with the design and installation of new Transmission pipelines to serve new customer loads and/or to improve the ability to move natural gas to points of critical need at adequate pressure (New Pipelines – Blanket W.O. projects).
3. Billed capital to provide for payment for non-shared engineering and planning services provided to SDG&E by SoCalGas (New Transmission Pipelines Billed – Capital). Table RKS-6 below summarizes the total capital forecasts for the New Pipelines cost category for 2014, 2015, and 2016.

Table RKS-6
San Diego Gas & Electric Company
Gas Transmission – New Pipelines

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
A. New Pipelines	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. NRG Joint-venture UEG at Carlsbad	105	525	945
2. New Pipelines - Blanket W.O. projects	38	0	0
3. New Transmission Pipelines - Billed Capital	67	67	67
Total	**210**	**592**	**1,012**

1. NRG Energy Joint Venture Utility Electric Generator - Carlsbad

a. Description

SDG&E plans to build and place in service facilities to serve the NRG Energy Joint Venture Utility Electric Generator by 2016. This project will entail installing new Transmission

facilities to serve a new 588-MW peaker power plant in Carlsbad, California. The forecast for the NRG Joint Venture Utility Electric Generation for 2014, 2015, and 2016 is $105,000, $525,000, and $945,000 respectively.

Closure of the 2,150 megawatt San Onofre Nuclear Generating Station, which accounted for approximately 20% of SDG&E's overall power supply, and the looming shutdown of several power plants that use once-through cooling, creates a need for new power supply to meet the energy needs of SDG&E electric customers. This project will address some of the power needs for the region. Specific details regarding the NRG Joint Venture Utility Electric Generator in Carlsbad are found in my capital workpapers, Exhibit SDG&E-06-CWP-00411A, p. 3.

b. Forecast Method

Project costs for this cost category are typically for materials, construction equipment and contract labor. Such costs are estimated by experienced pipeline construction management personnel based on recent pipeline construction projects of similar scope, pipe size and construction environment.

c. Cost Drivers

The underlying cost drivers for this capital project relate to pipe size and pressure, the class location of the project, lead time, availability of qualified contractors, and workload. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to the operating pressure and class location is a function of the population density where the pipeline is placed in service. Lead time is often a function of customer notice to SDG&E or the demands of local governments and agencies. Lastly, supply and demand forces will affect pricing, the pool of qualified contractors in Southern California is limited and these contractors perform work for customers other than SDG&E. Thus, construction and installation bids vary with the contractors' workload and associated projected lead times.

2. Gas Transmission Pipelines Blanket

a. Description

This Budget Code includes costs associated with the design and installation of new transmission pipelines to serve new customer loads and/or to improve the ability to move natural gas to points of critical need at adequate pressure. This includes costs planned in Budget Categories 401, 411, and 421 for "blanket" smaller projects that do not warrant the preparation of individual workpapers.

b. Forecast Method

The forecast method is based on the five-year average. The value shown is to true-up the average in recognition of smaller projects that occur within the given five-year cycle.

c. Cost Drivers

The underlying cost drivers for this capital project relate to pipe size and pressure, the class location of the project, lead time, availability of qualified contractors, and workload. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to the operating pressure and class location is a function of the population density where the pipeline is placed in service. Lead time is often a function of customer notice to SDG&E or the demands of local governments and agencies. Lastly, supply and demand forces will affect pricing, the pool of qualified contractors in Southern California is limited and these contractors perform work for customers other than SDG&E. Thus, construction and installation bids vary with the contractors' workload and associated projected lead times.

3. Gas Transmission Billed Capital

a. Description

This budget code includes billed capital to provide for payment for non-shared engineering and planning services provided to SDG&E by SoCalGas.

b. Forecast Method

The forecast is based on the five-year average. These are payments for billings sent to SDG&E by SoCalGas in compliance with merger requirements.

c. Cost Drivers

The cost driver is Gas Engineering's involvement in project design and planning, which is related to project scope and complexity.

B. Pipeline Replacements (Budget Code 4X2)

This Budget Code includes costs associated with the design and installation of transmission pipeline replacements. The forecast for Pipeline Replacements for 2014, 2015, and 2016 are $1,213,000, $680,000, and $680,000 respectively. Table RKS-7 summarizes the total capital forecasts for the Pipeline Replacements Budget Code for 2014, 2015, and 2016.

Table RKS-7
San Diego Gas & Electric Company
Gas Transmission Pipeline Replacements

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
B. Pipeline Replacements	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Replacements	1,213	680	680
Total	**1,213**	**680**	**680**

1. Replacements

a. Description

Typically, transmission pipelines are replaced due to either the condition of the existing pipeline or a hazardous condition affecting the existing pipeline location. Pipelines with a history of leakage, poor coating, or that are difficult to cathodically protect are routinely evaluated for possible replacement. Multiple projects are completed each year, ranging in size and magnitude from a few feet to several miles of replacement. Projects can involve difficult and hazardous access with many logistical challenges caused by weather or physical terrain. Not included in this workpaper are costs associated with compliance with the DOT pipeline integrity requirements found in 49 CFR 192, Subpart O. Those costs are addressed in the testimony of witness Maria Martinez, Exhibit SDG&E-07. Specific details regarding Pipeline Replacements are found in my capital workpapers, Exhibit SDG&E-06-CWP-004120, p.19.

b. Forecast Method

The estimate for 2014 comes from the operations area of the company and people familiar with local projects, none of which are large enough to warrant separate workpaper treatment. The estimates for 2015 and 2016 are based on an average of the most recent five years of recorded costs and on the experience and judgment of the local pipeline workforce with knowledge of trends in construction costs and materials performance. Costs in this budget category over the past five years have averaged 70% collectible.

c. Cost Drivers

The underlying cost drivers for these capital projects relate to pipe size and pressure, the class location of the project, lead time, availability of qualified contractors, and workload. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to the operating pressure and class location is a function of the population density

where the pipeline is placed in service. Lead time is often a function of customer notice to SDG&E or the demands of local governments and agencies. Lastly, supply and demand forces will affect pricing, the pool of qualified contractors in Southern California is limited and these contractors perform work for customers other than SDG&E. Thus, construction and installation bids vary with the contractors' workload and associated projected lead times.

C. Pipeline Relocations (Budget Codes 4X3 and 4X4)

This Budget Code includes costs associated with pipeline and associated facility relocations and are categorized depending on whether they are driven by requests from CalTrans to accommodate freeways (Pipeline Relocations – Freeway), or to accommodate planned private property development, municipal public works and street improvement projects, and other work required due to right-of-way agreements, contract and franchise requirements (Pipeline Relocations – Franchise/Private). SDG&E forecasts total Pipeline Relocation capital costs of $474,000 per year for the years 2014, 2015, and 2016, as summarized in Table RKS-8 below.

Table RKS-8
San Diego Gas & Electric Company
Gas Transmission – Pipeline Relocations

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
C. Pipeline Relocations	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. GT PL RELOC-FWAY/EXTERNAL DRIVEN	298	298	298
2. GT PL RELOC-FRAN/PRV ROW/EXTERNAL DRIVEN	176	176	176
Total	**474**	**474**	**474**

1. Gas Transmission – Pipeline Relocations - Freeway

a. Description

The forecast for Pipeline Relocations - Freeway for 2014, 2015, and 2016 are $299,000, $299,000, and $299,000 respectively. This Budget Code includes costs associated with pipeline and associated facility relocations necessitated by Caltrans construction projects. These forecasted capital expenditures support operating, right of way, and franchise agreement requirements. Ongoing projects with Cal Trans are not always known during the annual budgeting process. As with all CalTrans districts, District 11, San Diego office, is seeking to

improve traffic flow by reducing congestion through various highway projects some of which affect our pipelines. Throughout the year, SDG&E is required to relocate pipelines during the same year they are submitted to SDG&E. Costs are driven by safety and regulatory compliance as well as contractual requirements, and therefore, vary from project to project. Specific details regarding Pipeline Relocations - Freeway are found in my capital workpapers, Exhibit SDG&E-06-CWP-004130, p.29).

b. Forecast Method

The forecast method used for Pipeline Relocations - Freeway is the average of the most recent five years' recorded costs. SDG&E expects to see freeway locations work consistent with the five year trend and thus, this methodology best reflects anticipated needs. The costs in this Budget Code are normally 50% collectible.

c. Cost Drivers

The underlying cost drivers for this capital project relate to pipe size and pressure, the class location of the project, lead time, availability of qualified contractors, and workload. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to the operating pressure and class location is a function of the population density where the pipeline is placed in service. Lead time is often a function of customer notice to SDG&E or the demands of local governments and agencies. Lastly, supply and demand forces will affect pricing, the pool of qualified contractors in Southern California is limited and these contractors perform work for customers other than SDG&E. Thus, construction and installation bids vary with the contractors' workload and associated projected lead times, as well as with overall economic conditions.

2. Gas Transmission – Pipeline Relocations – Franchise/Private

a. Description

The forecast for Pipeline Relocations – Franchise/Private for 2014, 2015, and 2016 are $176,000, $176,000, and $176,000, respectively. This Budget Code includes costs associated with the modification and relocation of transmission pipelines to accommodate planned private property development, municipal public works and street improvement projects, and other work required due to right-of-way agreements, contract and franchise requirements. Specific projects with cities and developers are not always clear during the annual budgeting process. These projects can range in magnitude from less than one hundred feet of pipe to accommodate a storm

drain or sewer installation to several miles of relocated pipe, fittings, valves and appurtenances needed to accommodate residential development over large tracts of previously undeveloped land throughout the service territory. Throughout the year, SDG&E may be required to relocate pipelines during the same year the request is received due to the immediate needs of third party developers or municipal agencies. Individual projects in this budget code can vary in cost from less than $10,000 to as high as several hundred thousand dollars. Pipelines are relocated according to the requirements of municipal franchises and property developers. Some are collectible and others are not, usually depending on right-of-way agreement or franchise content. Specific details regarding Pipeline Relocations – Franchise/Private are found in my capital workpapers, Exhibit SDG&E-06-CWP-04140, p. 37.

b. Forecast Method

The forecast methodology for pipeline relocations consists of two different estimating approaches to best reflect future work, because the relocation activities are influenced by two different entities—CalTrans and the franchise/private sector. For the CalTrans-driven relocations, we used a five-year average. We opted not to eliminate the zero value that was recorded in 2013, which results in a lower average, and therefore, lower forecast. For franchise/private sector relocations, we used a zero-based approach, which is influenced by the limited-recorded history and input from local management. I could not reasonably employ a five-year average methodology for these pipeline replacements, because the recorded history varied considerably. These two projections were then summed to provide the total forecast.

c. Cost Drivers

The underlying cost drivers for this capital project relate to pipe size and pressure, the class location of the project, lead time, availability of qualified contractors, and workload. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to the operating pressure and class location is a function of the population density where the pipeline is placed in service. Lead time is often a function of customer notice to SDG&E or the demands of local governments and agencies. Lastly, supply and demand forces will affect pricing, the pool of qualified contractors in Southern California is limited and these contractors perform work for customers other than SDG&E. Thus, construction and installation bids vary with the contractors' workload and associated projected lead times.

D. Compressor Stations (Budget Code 4X5)

This Budget Code includes costs associated with the installation and replacement of compressor station equipment used in operating the transmission system. SDG&E's capital forecast for Compressor Stations for 2014, 2015, and 2016 is $3,127,000 per year, as reflected in Table RKS-9 below.

Table RKS-9
San Diego Gas & Electric Company
Gas Transmission –- Compressor Stations

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
D. Compressor Stations	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Compressor Stations	3,127	3,127	3,127
Total	**3,127**	**3,127**	**3,127**

1. Gas Transmission – Compressor Stations

a. Description

The nature of compressor station operation requires consistent maintenance and replacement of key engine components and controls equipment to maintain the reliability and safety of the facility, especially as this equipment continues to age. To keep operating costs down, SDG&E relies on automated data gathering systems to monitor performance data such as flows, pressures, and temperatures. The upgrade and replacement of outdated control technology is critical to enable the station to operate at its highest efficiency and facilitate the execution of proper testing and diagnostics when the engine units are down. Existing compressor station equipment has a finite life requiring regular replacement and/or upgrade, as recommended by manufacturers, or as required by operating experience, to maintain reliability and transportation ability for the Southern California market.

Another cost activity is physical security hardening. Recent events have heightened physical security awareness in the energy sector, and SDG&E proposes to make additional security investments. The additional work is to reinforce the perimeter security as well as install monitors and enhance motion sensors to prevent incursions. The details regarding Compressor Stations forecast and activities are found in my capital workpapers, Exhibit SDG&E-06-CWP-004150, p.46.

b. Forecast Method

The forecast method used for Compressor Stations is the average of the most recent five years' recorded costs. SDG&E considers reliance on the five-year average to be fair and conservative, because recorded costs over the past five-years have varied from a low of $1,796,000, in 2012 to a high of $4,840,000 in 2010. Costs in the coming years could easily be higher than the $3,127,000 presented here, due to the increasing age of the equipment, the diminishing performance of the machinery, and environmental emission limits.

SDG&E is not seeking any increase above its five-year average. However, the utility is concerned with end-of-useful life issues with the equipment and is developing a strategy for the next General Rate Case to deal with the aging compressor station infrastructure. These strategies will include actions and engineering solutions to help SDG&E minimize its carbon footprint, improve engine efficiency and meet the ever-increasing emission-reduction requirements.

c. Cost Drivers

The underlying cost drivers for Compressor Station capital projects relate to the highly specialized nature of very high pressure, high volume engine-driven compressors, the increasing average age (aging infrastructure) of gas engines and compressor equipment, and the limited number of qualified contractors that specialize in industrial engines and compressor equipment. The average ages of SDG&E's compressors range between 45 and 60 years. The oldest were commissioned in the 1950s, while the "newest" were commissioned in the 1970s. An additional factor is the obsolescence of installed equipment. As equipment ages, it becomes increasingly difficult to obtain support from the manufacturer, and replacement parts become increasingly scarce.

E. Cathodic Protection (Budget Code 4X6)

This Budget Code includes costs associated with the installation of cathodic protection equipment used to preserve the integrity of transmission pipelines by protecting them from external corrosion. SDG&E's forecast for Cathodic Protection for 2014, 2015, and 2016 is $241,000, $262,000, and $262,000, respectively, as reflected in Table RKS-10 below.

Table RKS-10
San Diego Gas & Electric Company
Gas Transmission – Cathodic Protection

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
E. Cathodic Protection	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Cathodic Protection	241	262	262
Total	**241**	**262**	**262**

1. Gas Transmission - Cathodic Protection

a. Description

Application of cathodic protection provides Transmission pipelines with protection against external corrosion. The cathodic protection projects included in this forecast are mandated by federal and state minimum pipeline safety regulations, which require the maintenance of adequate cathodic protection on pipeline facilities. Approval of this cost forecast will enable SDG&E to meet federal and state safety compliance requirements, and help maintain the reliability of gas transmission deliveries to San Diego. Specific details regarding the forecast of Cathodic Protection costs are found in my capital workpapers, Exhibit SDG&E-06-CWP-004160, p. 56.

b. Forecast Method

The forecast method used for Cathodic Protection is zero-based. The forecast was developed based on recent recorded cost for projects of similar scope and in reliance on local field expertise to account for the number of deep-well anode beds replaced and the number of worn out rectifiers identified in SDG&E's operating regions.

c. Cost Drivers

The underlying cost drivers for this capital forecast relate to the specialized nature of cathodic protection capital projects, especially with the installation of deep-well anode beds. There are very few qualified contractors, which has a direct bearing on costs.

F. Land Rights (Budget Code 417)

This Budget Code provides for purchase or renewal easements and the acquisition of rights-of-way or other land rights for the purpose of installing and maintaining Transmission

pipelines. SDG&E's forecast for Land Rights for 2014, 2015, and 2016 is $500,000, $0, and $0, respectively, as reflected in Table RKS-11 below.

Table RKS-11
San Diego Gas & Electric Company
Gas Transmission – Land Rights

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
F. Land Rights	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Land Rights	500	0	0
Total	**500**	**0**	**0**

1. Gas Transmission - Land Rights

a. Description

Many rights-of-way expire after a defined period of time and must be renewed with the current land owners. This Budget Code provides capital funding for such negotiations. There are few, if any, alternatives to negotiating and paying for land rights within certain areas, such as restricted areas, Tribal lands, and other limited access locations. The only alternative would be to abandon a serviceable pipeline and install a new one routed around the existing location. Generally, a rerouting of the pipeline requires the installation of many more miles of pipeline. Specific details regarding Land Rights are found in my capital workpapers, Exhibit SDG&E-06-CWP-004170, p. 65.

b. Forecast Method

This estimate was prepared by Transmission operating personnel based on recent experience, although negotiations for land rights vary considerably according to the demands of the land owners. I believe this estimate is reasonable and may even underestimate what will ultimately be required. Specifically, this estimate is for Transmission Line 2010, which crosses a large military reservation southeast of the Miramar Naval Air Station. The Line occupies a strip of land approximately 50 feet wide and 4,400 feet long within the military reservation, and the right-of-way expires in 2014.

c. Cost Drivers

The cost of land acquisition varies according to many factors, among them the overall economic climate in general and the real estate market, in particular, which is often the function of supply versus demand. These factors are beyond the control or influence of SDG&E.

G. Meter and Regulator Stations (Budget Code 4X8)

This Budget Code includes the costs of installing and rebuilding large meter set assemblies for transmission-served customers and pressure limiting stations residing on the gas transmission system. The forecast for M&R Stations for 2014, 2015, and 2016 is $1,184,000, per year, as reflected in Table RKS-12 below.

Table RKS-12
San Diego Gas & Electric Company
Gas Transmission – Meter and Regulator Stations

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
G. M&R Stations	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. M&R Stations	1,184	1,184	1,184
Total	**1,184**	**1,184**	**1,184**

1. Gas Transmission - Meter and Regulator Stations

a. Description

The forecasted amount includes installation of new meter and regulation equipment associated with operation of the transmission pipeline system. Meter and regulator stations require replacement for three principal reasons: aging, change in use patterns and/or population encroachment, and enhancement of the transmission system to contend with gas quality and capacity issues. This includes periodic replacement of local field measurement and control equipment directly linked with Gas Operations SCADA system via remote communications. It includes gas meters installed to help manage gas flows and quality on the transmission system, and to provide operating information to gas operations control personnel remotely managing the gas delivery system. Also included in this category are regulating stations used to control and limit gas pressure and the flow of gas within the gas transmission system, such as city gate stations.

As with all capital projects, in identifying and prioritizing meter and regulator station equipment for replacement, SDG&E considers the associated safety and reliability risks, as well

as the benefits of replacement over other alternatives, if any. The installation of this equipment is associated with the safe and reliable local operation of SDG&E pipelines in conformance with DOT and CPUC requirements for the limiting of pipeline and vessel operating pressures. All pipelines must be operated within their maximum allowable operating pressure parameters, and this equipment, whether for newly-installed pipelines or, where replacement is warranted on existing pipelines, maintains the operating integrity of the transmission system. Specific details regarding the capital forecast for Meter and Regulator Stations are found in my capital workpapers, Exhibit SDG&E-06-CWP-004180, p. 74.

b. Forecast Method

The forecast method used for Meter and Regulator Stations capital costs is the average of the most recent five years' recorded costs. This methodology is reasonable due to the wide variability in costs from year to year. In the last five recorded years, approximately 38% of the work in this Budget Code was collectible.

c. Cost Drivers

The underlying cost drivers for this activity relate to the highly specialized nature of the equipment used to regulate transmission pressures and measure flows. Added to this is the trend towards requiring higher levels of measurement accuracy, and the perceived safety benefits of pressure regulation and control, and additional remote control through SCADA and telemetry means, which in turn creates greater complexity and associated update and maintenance requirements.

H. Capital Tools (Budget Code 436)

This Budget Code provides for the costs of acquiring and replacing high-value tools used on a daily basis by Transmission operations personnel. The forecast for Capital Tools for 2014, 2015, and 2016 is $130,000 per year, as reflected in Table RKS-13 below.

Table RKS-13
San Diego Gas & Electric Company
Gas Transmission – Capital Tools

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
H. Capital Tools	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Capital Tools	130	130	130
Total	**130**	**130**	**130**

1. Gas Transmission - Capital Tools

a. Description

Required capital tools can include Volt/Amp Meters, Global Positioning System receivers, leak detection equipment, gauges, wrenches, tapping and stopping equipment, etc. Purchases are generally to replace old, worn or damaged tools used in the field. Such tools are used on a daily basis by personnel installing and maintaining Transmission equipment and assets. The specific details regarding the Capital Tools forecast are found in my capital workpapers, Exhibit SDG&E-06-CWP-004360, p. 85.

b. Forecast Method

The forecast used for Capital Tools was zero-based by local Gas Transmission operating personnel with local knowledge of replacement and acquisition needs in the field. Such local personnel are the ones using old, worn, or obsolete tools on a daily basis and have specific familiarity with equipment in need of replacement and/or upgrade.

c. Cost Drivers

The underlying cost drivers for this capital cost relate to the specialized nature of tools utilized in the operation and maintenance of Gas Transmission facilities and the relatively few suppliers of high quality tools and measuring systems.

I. Local Engineering Pool (Budget Code 903)

This Budget Code provides a pool for Supervision and Engineering charges that will be reassigned to the various budget categories on a direct cost basis. The forecast for Local Engineering Pool for 2014, 2015, and 2016 is $133,000, $133,000, and $133,000, respectively, as reflected in Table RKS-14 below.

Table RKS-14
San Diego Gas & Electric Company
Gas Transmission – Local Engineering Pool

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
I. Local Engineering Pool	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Local Engineering Pool	133	133	133
Total	**133**	**133**	**133**

1. Gas Transmission - Local Engineering Pool

a. Description

This Budget Code continues an established accounting procedure for making charges for certain overheads, on a direct cost basis, to Transmission's specific budget categories. The specific details regarding Local Engineering Pool are found in my capital workpapers, Exhibit SDG&E-06- CWP-009030, p. 94.

b. Forecast Method

The forecast method used for Local Engineering Pool costs is the average of the most recent four years' recorded costs. In order to present an estimate that is conservative and likely more representative of expected future costs, year 2009, which reflected unusually high costs, was excluded.

c. Cost Drivers

The underlying cost drivers for this capital project relate to the cost of labor assigned to the planning and engineering of Gas Transmission capital projects and the increasing complexity of such projects.

V. CONCLUSION

SDG&E requests the Commission adopt SDG&E's TY2016 expense forecasts of $718,000 for Non-shared Service and $92,000 for Shared-Service Gas. SDG&E also requests the Commission adopt capital expenditures of $7,212,000, $6,582,000, and $7,002,000 for the forecast years 2014, 2015, and 2016, respectively. The SDG&E forecast of O&M expenses and planned capital expenditures represented in my testimony balance compliance obligations, risk, as well as the cost to deliver natural gas safely and reliably. The forecast relies principally on five-year averages. In those few cases where a five-year average is not employed, another appropriate methodology is used, such as a zero-based projection, because the history is not adequate to reflect the requirements demanding more work and resources, such as in Public Awareness.

In summary, these forecasts reflect sound judgment and represent the impact from higher regulatory expectations to continuously enhance the public and employee safety and maintain the reliability of the transmission pipeline system. The Commission should adopt the forecasted expenditures discussed in this testimony, because they are prudent and reasonable.

This concludes my prepared direct testimony.

VI. WITNESS QUALIFICATIONS

My name is Raymond K. Stanford. My business address is 555 W. Fifth Street, Los Angeles, California, 90013. I am employed by SoCalGas as the Engineering Design Manager in Gas Engineering for SoCalGas and SDG&E. In this position, I am responsible for providing centralized gas infrastructure design engineering and technical utility support to operations for Distribution, Transmission, and Storage. To accomplish this responsibility, I manage an organization of approximately 40 employees with technical expertise in specific engineering fields.

In addition, I possess a broad background in engineering and natural gas pipeline operations with over 30 years of experience with SoCalGas. I have held a number of managerial positions with increasing responsibility in the Engineering, Distribution, and Transmission Departments. I have been responsible for various areas related to the design, construction, operation, and maintenance of natural gas system facilities. I have held my current position as Engineering Design Manager since January 2008.

I earned a Bachelor of Science degree in Chemical Engineering from California State Polytechnic University, Pomona, and completed the Masters in Business Administration from the University of Redlands, School of Business.

I have previously testified before the Commission.

Appendix A

Glossary of Acronyms

API	American Petroleum Institute
CFR	Code of Federal Regulation
DOT	United States Department of Transportation
GIS	Geographic Information System
O&M	Operations and Maintenance
PHMSA	Pipeline and Hazardous Materials Safety Administration
RP	Recommended Practice
SCADA	Supervisory Control and Data Acquisition