Company: Southern California Gas Company (U 904 G)
Proceeding: 2016 General Rate Case
Application: A.14-11-___
NOI Exhibit: SCG-07

SOCALGAS

DIRECT TESTIMONY OF RAYMOND K. STANFORD

(GAS ENGINEERING)

November, 2014

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Southern California Gas Company

A Sempra Energy utility®

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SUMMARY

O&M	2013 ($000)	2016 ($000)	Change ($000)
Non-Shared	9,890	14,950	5,060
Shared	14,827	19,178	4,351
Total	**24,717**	**34,128**	**9,411**

Capital	2014 ($000)	2015 ($000)	2016 ($000)
	64,102	**103,795**	**141,595**

Gas Engineering is responsible for a compendium of key activities and programs that support the ongoing vitality of Southern California Gas Company (SoCalGas or Company) transmission operations and help SoCalGas achieve the overarching objective to provide safe and reliable natural gas service at reasonable cost. Gas Engineering supports Gas Transmission, Gas Distribution and Storage 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 and Storage 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 establishes policies to facilitate compliance with the multitude of state and federal regulations related to engineering, pipeline design, and construction, and provides technical support to the Pipeline Integrity, Storage, Gas Transmission and Gas Distribution organizations.
- Gas Transmission Capital invests in capital projects to enhance the efficiency and responsiveness of our operations, facilitate compliance with applicable regulatory and environmental regulations and support Gas Transmission and Storage operations to provide safe and reliable delivery of natural gas to customers at reasonable cost.
- Research and Development (RD&D) drives and pilots technological research and solutions to resolve safety and reliability challenges and develop innovative approaches to mitigating safety, reliability and integrity risks to pipeline and storage operations.

My testimony also sponsors closely-related activities and associated requests for the Emergency Services, Public Awareness and Major Projects organizations within SoCalGas:

- Emergency Services collaborates with and coordinates between first responders and SoCalGas operations personnel to prepare, respond to, and recover from emergency incidents and public inquiries. Emergency Services also represents the Company in pipeline safety audits.
- Public Awareness educates 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 provides analysis and consultation regarding cost estimates, permit requirements, and scheduling of major gas infrastructure facilities projects necessary for the continued safe and reliable storage and transmission of natural gas throughout the service territory.

All of the activities discussed in my testimony, either directly or indirectly, address potential safety and security risks.

SoCalGas and San Diego Gas & Electric Company (SDG&E) take a shared-service approach to many natural gas pipeline operator responsibilities, especially in Gas Engineering. The shared-service approach benefits both utilities and their ratepayers by enabling the utilities to pool their collective knowledge, experience, engineering expertise and intellectual property.

In preparing the Test Year 2016 (TY2016) forecast for this testimony, I conducted an extensive review of 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 forecasts rely upon a five-year (2009 through 2013) average. In total, SoCalGas requests the Commission adopt a TY2016 forecast of $34,128,000 for Gas Engineering operations and maintenance (O&M) expenses, which is composed of $14,950,000 for non-shared service activities and $19,178,000 for shared service activities. SoCalGas also requests the Commission adopt forecast capital expenditures for years 2014, 2015, and 2016 of $64,102,000, $103,795,000, and $141,595,000, respectively.

SOCALGAS DIRECT TESTIMONY OF RAYMOND K. STANFORD

GAS ENGINEERING

I. INTRODUCTION

A. Summary of Costs

I sponsor TY2016 forecasts of O&M costs for the forecast years 2014, 2015, and 2016 for the Gas Engineering, Emergency Services, Public Awareness, Major Projects organizations, and capital costs for the forecast years 2014, 2015, and 2016 for Gas Engineering services and Gas Transmission. Table RKS-1 summarizes sponsored O&M costs, and Table RKS-2 summarizes Gas Transmission capital expenditures. All costs in this testimony are presented in 2013 dollars, unless otherwise noted. In addition to this testimony, also refer to my workpapers, Exhibits SCG-07-WP (O&M) and SCG-07-CWP (capital), for additional information on the activities described here.

TABLE RKS-1
Southern California Gas Company
Summary of Total O&M Costs

GAS ENGINEERING			
Shown in Thousands of 2013 Dollars	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
Total Non-Shared	9,890	14,950	5,060
Total Shared Services (Incurred)	14,827	19,178	4,351
Total O&M	**24,717**	**34,128**	**9,411**

TABLE RKS-2
Southern California Gas Company
Total Capital Costs for Gas Transmission and Engineering

GAS TRANSMISSION AND ENGINEERING				
Shown in Thousands of 2013 Dollars	**2013 Adj. Recorded**	**2014 Estimated**	**2015 Estimated**	**2016 Estimated**
Total Capital:	**38,356**	**64,102**	**103,795**	**141,595**

B. Summary of Activities

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, Storage and Gas Distribution. Gas Engineering also manages and supports investments in Research and Development (RD&D) activities to promote and advance pipeline safety through collaborative innovation and selective pilot projects to further the development of innovative technological solutions to safety, reliability and efficiency challenges. All of these Gas Engineering activities are described in this testimony under the categories of Gas Engineering, Gas Transmission Capital, and Research, Development, and Demonstration.

I also sponsor the cost for SoCalGas' Emergency Services organization. Emergency Services supports natural gas operations through the education and outreach of First Responders and collaborates with, and coordinates between, first responders and SoCalGas operations personnel to respond to major emergency incidents and public inquiries. The Pipeline Safety and Compliance group within Emergency Services also helps coordinate interactions with the CPUC during pipeline safety audits and emergency events, and in response to inquiries.

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 SoCalGas remain prudent and fiscally astute in managing large capital investments. Major Projects provides analysis and consultation regarding cost estimates, permit requirements, and scheduling of major gas infrastructure facilities projects necessary for the continued safe and reliable storage 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 pipeline safety regulations, as well as the capital resources to sustain SoCalGas' vital gas transmission energy infrastructure and interdependency. The activities and expense forecasts presented in the

Prepared Direct Testimony of Frank Ayala for Gas Distribution (Exhibit SCG-04), the Prepared Direct Testimony of John Dagg for Gas Transmission (Exhibit SCG-05), the Prepared Direct Testimony of Phillip Baker for Gas Storage (Exhibit SCG-06), and the Prepared Direct Testimony of Maria Martinez for Pipeline Integrity (Exhibit SCG-08), are separate and address costs not included in my testimony.

To better understand the expansiveness of Gas Engineering's areas of responsibilities, a brief description of the SoCalGas' operations and the size of the natural gas system is provided.

Gas System Overview

The SoCalGas natural gas system encompasses transmission lines, underground storage fields, and distribution lines. The SoCalGas gas system is comprised of approximately 3,509 miles of pipeline defined as "transmission" under applicable Department of Transportation (DOT) regulations,[1] 11 compressor stations and four underground storage fields. The system is designed to receive natural gas from interstate pipelines and various California production sources from both offshore and onshore. The gas quantity is measured, odorized, analyzed for quality, and then allowed to flow through the pipeline network. This pipeline-quality gas is delivered to the Company's distribution system, storage fields, and non-core customers. Of the 3,509 miles[2] of DOT-defined transmission pipelines operated by SoCalGas, the Gas Transmission and Storage organizations are responsible for the safe operation and maintenance of approximately 2,744 miles of pipeline, the Gas Distribution organization is responsible for the safe operation and maintenance of approximately 765 miles. In addition to the miles of DOT-defined transmission pipelines, the Gas Transmission organization is responsible for the safe operation and maintenance of approximately 228 miles of high pressure pipelines that are defined as distribution under DOT regulations.

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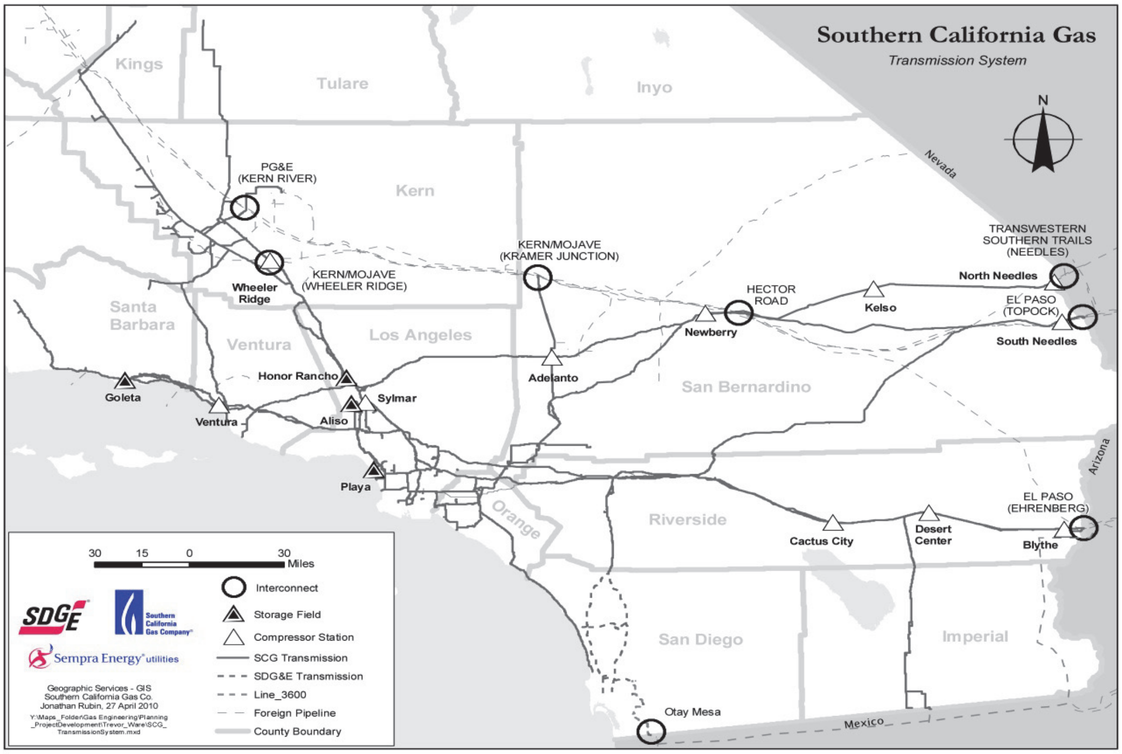
1 49 CFR 192.3.

2 EOY 2012 SCG GT_GG_Annual_Form_PHMSA_F71002-1.

Figure RKS-1
Southern California Gas Company
SoCalGas Transmission and Storage System



The capacity of a storage field is measured in billion cubic feet, or "Bcf." SoCalGas operates four underground storage fields, with a working inventory capacity of approximately 136 Bcf. These fields are Aliso Canyon - 86 Bcf, La Goleta – 21.5 Bcf, Honor Rancho - 26.1 Bcf, and Playa del Rey – 2.4 Bcf. These storage facilities are an integral part of the SoCalGas system and mitigate reliability risks by providing natural gas when flowing supplies are insufficient to meet customer load. Collectively, the storage fields support the mission to provide southern California residents and businesses with safe, reliable, and cost-effective energy services.

The distribution system is comprised of approximately 50,400 miles of mains, approximately 49,000 miles of service lines, and 5.8 million meters.[3] As noted above, this includes approximately 765 miles of DOT-defined transmission pipelines that are maintained and operated by the Gas Distribution organization. SoCalGas is one of the largest natural gas

[3] From SoCalGas website: http://www.socalgas.com/about-us/company-info.shtml.

distribution operation in the United States based on miles of mains and miles of services, providing service to thirteen counties.

Collectively, these components enable SoCalGas to deliver natural gas from receipt point to burner tip reliably and safely to over 20 million consumers in an area of approximately 20,000 square miles stretching from Visalia in the north to Mexico in the south, and as far east as the California/Nevada border. In order to continue to provide safe and reliable service, SoCalGas must continue to make prudent investments in its infrastructure pursuant to applicable regulatory requirements.

C. Gas Engineering Supports SoCalGas' Overarching Goal to Provide Safe and Reliable Service at Reasonable Cost

My cost forecasts support the Company's goal to continually enhance pipeline safety and help maintain reliability by making necessary and prudent investments. Additionally, SoCalGas is requesting 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 am sponsoring an increase in funding 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.

Within my testimony, I provide business drivers for judicious research and development investments to promote the development of innovative approaches to enhancing the safety and reliability of our gas system, as described in Section II.E.

D. Safety/Risk Considerations

The risk policy witnesses, Diana Day (Exhibit SCG-02) and Douglas Schneider (Exhibit SCG-03), describe how risks are assessed and factored into cost decisions on an enterprise-wide basis. My testimony includes costs to mitigate risks associated primarily with infrastructure integrity, system reliability, and physical security. SoCalGas is addressing the risk of service reliability due to aging infrastructure by reinvesting and replacing certain pipeline and compressor assets, as detailed in my testimony and O&M and capital workpapers.

Recent events affecting the energy sector where intrusions have occurred have heightened the awareness associated with physical security. As a prudent operator, SoCalGas is taking additional measures to harden the security of certain gas assets. The associated capital costs related to these risk types are described in my capital workpapers, within the Pipelines, Compressor Stations, and Cathodic Protection subject areas.

The forecast also helps support the increasing gas and electric interdependency, especially in Southern California. With the decommissioning of the San Onofre Nuclear Generating Station and air quality restrictions in the greater Los Angeles Basin, natural gas is the logical choice for generating electricity and being friendly to the environment. The advent of quick-start generators at power plants within the Los Angeles basin makes reliability of natural gas service even more critical to help sustain the electric grid and other energy plants, such as refineries. SoCalGas has forecasted capital projects to sustain the reliability of service and strengthen the interdependency bond.

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 SoCalGas' risk policy witness, Diana Day, in Exhibit SCG-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, SoCalGas must establish controls to manage and minimize the consequence of an unmitigated risk. Emergency Services and Public Awareness are both expenditures SoCalGas makes to mitigate such risk.
2. Systems required to support the identification of a risk. SoCalGas 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 requirement 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 SoCalGas 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 SCG-2, and Douglas Schneider, Exhibit SCG-03.

E. Support To/From Other Witnesses

Policy support for some costs described in this testimony may be found in the testimony of other witnesses. Specifically, the risk policy witnesses, Diana Day, Exhibit SCG-02, and Douglas Schneider, Exhibit SCG-03, provide general policy support for the risk mitigation activities described in my testimony. Policy support for the annual permit fees hydrostatic test water and dewatered groundwater treatment permits and Mojave Desert Air Quality Management District fees discussed in section IV.F of capital testimony, is provided by Environmental Services witness, Jill Tracy, in Exhibit SCG-17.

In addition to sponsoring costs for the Gas Engineering, Emergency Services, Public Awareness and Major Projects organizations, I also provide business or policy justifications for the following costs that are sponsored by other witnesses:

- Gas Operations Research, Development and Demonstration (RD&D) projects costs sponsored by Customer Service Technologies, Policies and Solutions witness Jeffrey G. Reed, Exhibit SCG-13.
- Cost associated with Subpart W requirements for fugitive emission monitoring, as supported by witness Jill Tracy in Exhibit SCG-17, that address facilities downstream of major equipment, such as compressors, regulator stations, and valves. The costs are sponsored by Phillip Baker, the Gas Storage witness, in Exhibit SCG-06, and the costs are proposed to be balanced in the New Environment Regulatory Balancing Account, which is discussed in the Regulatory Accounts testimony of Reginald Austria in Exhibit SCG-33.
- Capital costs for five capital projects—Prover Data Acquisition Meter Test Lab, Gas GIS Enhancements 2013, Gas GIS Enhancements 2014, Gas GIS Enhancements 2015, and Gas GIS Enhancements 2016—sponsored by the Information Technology witness, Chris Olmstead, in Exhibit SCG-18.
- Costs for five incremental vehicles sponsored by Carmen Herrera in her Fleet Services and Facilities testimony, Exhibit SCG-15.

II. NON-SHARED OPERATIONS AND MAINTENANCE COSTS

I sponsor non-shared expenses for the following four key areas: Gas Engineering (core functions), Major Projects, Emergency Services, and Public Awareness. Table RKS-3 summarizes the total non-shared O&M forecasts for the listed cost categories.

TABLE RKS-3
Southern California Gas Company
Non-Shared O&M Summary of Costs

ENGINEERING, MAJOR PROJECTS, AND EMERGENCY SERVICES			
Shown in Thousands of 2013 Dollars	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
A. Gas Engineering	7,497	9,836	2,339
B. Major Projects - Planning & Analysis	489	1,945	1,456
C. Emergency Services	1,125	1,951	826
D. Public Awareness	779	1,218	439
Total	**9,890**	**14,950**	**5,060**

A. Gas Engineering

Included in this section of the testimony are activities and associated O&M expenses to address the core Gas Engineering duties. These activities and expenses are categorized as either Gas Engineering or Land and Right-of-Way and summarized in Table RKS-4 below.

TABLE RKS-4
Southern California Gas Company
TY 2016 Core Gas Engineering Expenses

ENGINEERING, MAJOR PROJECTS, EMERGENCY SERVICES			
Shown in Thousands of 2013 Dollars			
A. Gas Engineering	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Gas Engineering	6,162	8,223	2,061
2. Land & Right of Way	1,335	1,613	278
Total	**7,497**	**9,836**	**2,339**

1. Gas Engineering

a. Description of Costs and Underlying Activities

Under the broad category of Gas Engineering, many core engineering activities are performed to maintain safe and reliable operation and support to the Transmission, Storage, Distribution, and Customer Services organizations at SoCalGas. In my testimony, these core engineering activities are divided into the following four workgroups to provide a clearer overview of the work and development of the forecast:

- Engineering Design
- Gas Measurement, Regulation & Pressure Control
- Engineering Analysis Center
- Asset and Data Management

The development of the O&M non-shared services forecast relied upon the historical spending for the years 2009 through 2013 and review by the experience of the engineering department managers. Because the work and workgroups are of a more mature nature, a five-year average has been employed to develop the forecast. A zero-based forecast was employed when no cost history was available.

The total non-shared services (NSS) O&M forecast for the Gas Engineering, which is comprised of the four sub-workgroups is $9,836,000. However, of the total, only 20% of the increase is associated with the core duties and responsibilities of Gas Engineering. Most of that increase over 2013 recorded expenses reflects the natural variability inherent of the group's work, which can reasonably be expected to continue in these activities, coupled with the use of the five-year average.

i. Engineering Design

This workgroup encompasses pipeline and gas facilities engineering design. The work performed includes: evaluation, specification, and/or modification of major compressor station, such as turbo-charging systems, starting air systems, emission controls, etc., and storage facility plant equipment such as heat exchangers, cooling towers, pressure vessels, compressors, generators, and gas treatment apparatus; drafting; engineering drawing management; strategic planning; and field support. Facilities engineering encompasses civil, electrical, control systems, and structural designs for pipelines, compressor stations, storage fields, and seismic/geo-hazards retrofit activities. The work performed also includes development of gas processing standards and design; drafting and design services; and distribution planning policy development. This workgroup provides an enhanced coordination of development and implementation of company policies and procedures company-wide for consistency among the various operating offices. The single point of contact helps facilitate consistency. Activities within this area include the review of existing and development of new procedures to memorialize standards and practices, coordination and development of distribution system analysis training, review of critical distribution planning projects, and providing technical guidance to the planning engineers within distribution. A five-year average was used to forecast the TY2016 expenses and where necessary adjustments were made to recognize the increased work demands.

An increase to this category of work is to support the expansion of our Process Hazard Analysis program. Process Hazard Analysis is a technical and critical review of proposed new equipment or processes that is conducted through a collaborative framework involving field employees (equipment operators) and the design engineers. The review process seeks to identify potential hazards and re-design the hazard out of the proposed process or equipment. Process Hazard Analysis provides a two-fold benefit—it provides for a safer operation and at a reduced cost.

SoCalGas forecasts the need for an additional vehicle, to be added in 2016, to be utilized by Engineering Design employees to investigate adverse conditions reported by operating personnel as they occur in real-time. One example is when an operating condition on equipment is outside the design criteria, such as the cavitation of a pump. Although it can be described to the design engineers by the field operators through pictures and verbal dialogue, it may be more efficient for the design engineer to visit the site while the problem is occurring. There, the equipment can be physically examined, interrogated, and an engineered solution can be developed to address the cause, and not just the symptoms. It is often more efficient and effective to have our design engineers visit the sites where problems are occurring in order to efficiently develop more effective engineering solutions. The costs for this additional vehicle are sponsored and shown in the Direct Testimony of Carmen Herrera, Exhibit SCG-15.

ii. Gas Measurement, Control, and Pressure Regulation

Activities in this cost center include: the maintenance and operation of 24 SoCalGas natural gas vehicle fueling stations used for public and operational fleet fueling, limited support for customers' natural gas vehicle fueling stations, electrical maintenance/basic electrician services to support SoCalGas' multitude of operational and office facilities, and the maintenance of gasoline station Underground Storage Tank control and monitoring systems. The TY2016 forecast methodology for this category is a five-year average. This methodology best reflects the future activity and accounts for the year-to-year variation in the work. An adjustment was made to reflect the increase work associated with added natural gas vehicle stations as described in the capital testimony and workpapers of Mrs. Carmen Herrera (Exhibit SCG-15). The adjustment is to account for an additional natural gas vehicle technician to contend with the added natural gas vehicle stations and aging of existing stations. The majority of the engineering work for this group is done through a shared-service cost center and is further detailed in my shared-service testimony.

In order to perform the incremental work forecasted in this area, SoCalGas is adding four vehicles to be assigned to field technician to enable them to carry their tools and execute their assigned duties. The costs of these four incremental vehicles are sponsored and shown in the Direct Testimony of Carmen Herrera, Exhibit SCG-15.

iii. Engineering Analysis Center

The work performed in this sub-group includes a variety of Engineering and technical services support on such matters as air quality, gas quality, gas odorization, and environmental compliance. This group provides support for over 200,000 horsepower of compression used for transmission and storage activities. The compressor engines are geographically dispersed throughout the SoCalGas service territory and, as such, fall under various air quality management regulations and land-use permitting requirements, such as those of the South Coast Air Quality Management District, the Bureau of Land Management, the Coastal Commission, Fish and Game, and Department of Forestry, to name a few. Specialized testing for compliance with air quality regulations is provided by this workgroup. Compressor equipment standards, the assessment of new compressor technology, and compressor design fall within the responsibility of this group. This group also provides system-wide support to Distribution, Transmission, and Storage in gas quality, gas odorization and environmental testing to the field operations in order to protect the safety of our employees, customers and public, and to enable the proper classification and disposal of various wastes generated by field operations. In addition, the work performed in this category includes the support services necessary to develop and maintain gas facility standards, corrosion control, metallurgy, water treatment, materials specifications and material quality control, and quality assurance.

A five-year average was used to forecast the TY2016 expenses. However, increases in environmental regulations are requiring more resources be added. An incremental amount is being forecasted to support the impacts of increased environmental regulations associated with the various monitoring, sampling and analyzing, reporting, and recordkeeping activities driven by Rule 1160 and California Occupational Safety and Health Administration certifications. Details for the requested funding are summarized in the associated workpapers to this testimony.

The Gas Engineering NERBA[4] Subpart W historical costs are associated with the Engineering Analysis Center's air quality compressor service. The forecast relied on the base year. The costs and forecast associated with the Subpart W reporting requirements are illustrated in the cost detail in section II-C in Exhibit SCG-06 "Direct Testimony of Phillip E. Baker. In addition, the NERBA policy support is provided by the witness Jill Tracy. See Exhibit SCG-17.

iv. Asset and Data Management

Asset and data management requires computer-based work management systems, mapping products, geographic information system development, and technical computing management and support. Part of the activity performed in this workgroup is to maintain and upgrade software applications. These systems and supporting activities are necessary for the safe and efficient operation and maintenance of the gas infrastructure from receipt point through the Transmission, Storage, and Distribution pipeline networks, as well as to support Customer Services.

Within this category is work performed to support computer programs and systems not provided by the Company's Information Technology group. Operations Technology provides computer-aided drafting and design support within Engineering, and development of Geographical Information Systems (GIS) which will be used to satisfy federally and state mandated requirements, support of the High Pressure Pipeline Database (HPPD) and related Geofields applications, and the network analysis computational analysis database and related application. It also includes the resources required to manage and maintain four mapping

[4] The New Environmental Regulatory Balancing Account (NERBA) is a two-way balancing treatment established for certain emergent environmental costs such as AB32 Administrative Fees and Energy Protection Act Subpart W methane emissions monitoring. The NERBA was established pursuant to SoCalGas' prior rate case application (A.10-12-006) in D.13-05-010.

systems and the work management systems vital to operations.

b. Forecast Method

The forecast method developed for all four of these cost categories is a five-year average because it best reflects the costs associated with a mature organization and better accounts for the work that ebbs and flows over time. As compared to the 2013 recorded expense, the five-year average corrects for the low recorded expenses, and provides the expected increase in work that cycles over a five-year period.

c. Cost Drivers

The cost drivers behind the four categories within this work paper are the increase work for natural gas vehicle stations, as discussed previously for the Gas Measurement group. Another cost driver is the air quality regulations, namely Mojave Desert Air Quality Management District's Rule 1160 affecting large compressor engines which have a large impact on the forecast, primarily impacting the Energy Analysis Center. Lastly, one cost driver also increasing the request in this non-shared category is the implementation of Process Hazard Analysis. Specifically, Process Hazard Analysis is a technical and critical review of proposed new equipment or processes that is conducted through a collaborative framework involving field employees (equipment operators) and the design engineers. The review process seeks to identify potential hazards and re-design the hazard out of the proposed process or equipment. Process Hazard Analysis provides a two-fold benefit it provides for a safer operation and at a reduced cost.

2. Land and Right-of-Way

TABLE RKS-5
Southern California Gas Company
Gas Engineering Land and Right-of-Way

ENGINEERING, MAJOR PROJECTS, AND EMERGENCY SERVICES			
Shown in Thousands of 2013 Dollars			
A. Gas Engineering	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Gas Engineering	6,162	8,223	2,061
2. Land & Right of Way	1,335	1,613	278
Total	**7,497**	**9,836**	**2,339**

a. Description of Costs and Underlying Activities

As discussed earlier, SoCalGas has a vast pipeline network traversing public and privately held lands. The Land & Right of Way group for Southern California Gas Company within Gas Engineering manages the necessary property rights that allow for the access, operation and maintenance of our pipeline infrastructure on public and private properties.

Compensation for the property interests needed is provided according to specific provisions of the contractual arrangements that allow for access, operation and maintenance of our pipeline infrastructure placed on those lands. As part of its business need, SoCalGas provides compensation for these necessary property rights to allow its natural gas assets to traverse both public and private properties.

b. Forecast Method

The five-year average was chosen for the labor in this group because the historical data indicate that activities and staffing levels have been transient and this trend is expected to continue. As the foundation for future non-labor expense requirements, zero-base method was chosen. The forecast for the non-labor include the Rights of Way lease payments which have been forecasted by the Land and Right of Way group in Gas Engineering.

c. Cost Drivers

The cost driver and forecast can be and are uncertain. The uncertainty varies widely because it is driven by negotiated terms based on contractual arrangements and influenced by the perceived value of the access and possible viable alternatives.

B. Major Projects – Project Controls, Quality Management, Risk Management and Compliance and Construction Management

TABLE RKS-6
Southern California Gas Company
Major Projects

ENGINEERING, MAJOR PROJECTS, EMERGENCY SERVICES			
Shown in Thousands of 2013 Dollars			
Major Projects	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Major Projects	489	1,945	1,456
Total	**489**	**1,945**	**1,456**

1. Major Projects

a. Description of Costs and Underlying Activities

Major Projects is a new organization at SoCalGas that has been established to provide cost, schedule, quality management, risk management, and change control management for major construction projects. Major Projects is composed of four primary groups. The following three recently-established groups, and the Project and Construction Management department, were reorganized and integrated into Major Projects functions, along with department management and project support:

- Project Controls and Technology – newly established;
- Quality, Risk and Compliance – newly established;
- Project Management and Construction – Historic activity moved from Gas Engineering department; and
- Major Projects Management – newly established.

With many large gas capital projects now being planned at SoCalGas and SDG&E, there is an increasing need for resources to more effectively and successfully manage the costs, schedules, quality and risks and execution of these projects. SoCalGas has always integrated these critical aspects into project management and due to the growing scope and complexity of major capital projects, more focus is required. A prudent and effective approach to support this goal is to implement a centralized project controls and quality and risk management groups that can take the responsibility of analyzing and developing cost forecasting, cost estimating, schedule updating and analysis, quality reviews and risk analysis, off of the project manager's list of responsibilities, and conduct these activities using a unified methodology based on project controls and quality risk and compliance practices.

i. Project Controls and Quality, Risk and Compliance Management

Project Controls and Quality, Risk and Compliance, as distinct disciplines, are emerging functions at SoCalGas. These disciplines initially emerged as successful support functions for major projects in various large industries the last couple of decades, such as aerospace and large capital infrastructure projects (refineries, freeway projects, etc.). These practices have supported cost and schedule management, as well as the quality and risk and change control aspects for projects, to enhance the management of projects. Project controls and quality, risk and compliance management have always been integrated into SoCalGas and SDG&E policies and practices. SoCalGas and SDG&E developed these as disciplines and as part of the Pipeline Safety Enhancement Plan. Furthermore, The Consumer Protection and Safety Division (now Safety and Enforcement Division) recognized the importance of a centralized group to "…effectively review schedules, costs, contingency drawdown, and all aspects of quality related to the program and quickly implements changes to correct any deficiencies identified through its own review" in their technical report on SoCalGas and SDG&E Pipeline Safety Enhancement Plan.[5] SoCalGas has made the commitment to expand the applicability of project controls and quality, risk and compliance management to cover more large and complex projects and not limit this forward-thinking management philosophy to its Pipeline Safety Enhancement Program.

The overview of each function is further broken down to help illuminate the activities taken place in each function. The Project Controls and Technology function focuses on project planning and execution including:

- Analyzing and Developing Cost Forecasts;
- Cost Estimating; and
- Schedule Development, Updating and Analysis.

The Quality, Risk and Compliance Management function concentrates on the quality management, risk management and compliance on major construction projects.

Quality Management

- Quality Plan development, review and implementation.
- Oversight of Quality Controls and/or Quality Assurance by the Functional Teams (Project Execution, Engineering & Design, Construction, Supply Management, etc.).
- Quality Team Review and Audits including corrective action plans, continuous process improvement, audit frequency, sampling and metrics and general feedback loop follow-up.
- Document & Record Management including version control and archiving for traceable, verifiable and correct records throughout the life of the asset.

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[5] *Technical Report of the Consumer Protection and Safety Division Regarding the Southern California Gas Company and San Diego Gas and Electric Company Pipeline Safety Enhancement Plan,* January 17, 2012, p. 22.

Risk Management

- Risk Register development, review and implementation for both Portfolio and Project levels.
- Risk Identification, Mitigation, Avoidance and Closure.
- Issue Management, Escalation and Closure.

Compliance Management

- Supports Sempra Internal Audit schedules, data requests and recommendations.
- Supports External Audits from PHMSA, CPUC and other agencies.
- Evaluates audit results and makes recommendations for new or enhancements to policies, practices or other institutional improvements for Major Projects and SoCalGas/SDG&E.

Collectively, these newly-established workgroups provide the added validation that major projects are being executed prudently and have the proper level of oversight.

ii. Major Projects Management and Project and Construction Management

The functional expertise and resources needed to perform technical development consultation, planning, permitting, direct some of the detailed design, material specifications and management, infrastructure facility construction, and the commissioning and general project management of major gas facility infrastructure projects, are represented under this work group. The functional responsibility to oversee, maintain, and provide continuous development of construction standards and best practices for Gas Transmission and Storage infrastructure facilities, construction, and contractor services are also provided by this group. These resources provide analysis and consultation, cost estimates, permit requirements, and scheduling of major gas infrastructure facilities necessary to serve major customers for the continued safe and reliable transmission of natural gas throughout the service territory. 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. These major project management resources are also 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 rain events.

b. Forecast Method

The forecast methodology that best reflects the resource requirements is a zero-based one. This methodology is most appropriate because Major Projects department was newly created in late 2013, which has no past cost history for the newly inaugurated functions.

Labor is composed of Major Projects Department management and non-management direct salaries associated with the work to support the management and execution of large construction projects. There is a complementary cost element for each added positions. It is the non-labor component. The Non-Labor cost is composed of employees' expenses, employee training costs, software license fees for project management and control systems and consulting fees. Under this category of work, SoCalGas is requesting a total of $1,945,000. Specifically the increase over the 2013 recorded is $1,456,000. About 40% of this increase is to recognize the full year's salary of the staff hired in 2013 and to begin implementation and enhancement of planning, project controls and quality managements systems and practices. The remainder of the increase is associated with the increase in capital expenditures in infrastructure modernization. The proposed Capital increase from 2013 to 2016 is more than double and covers SoCalGas hiring the needed resources to effectively support the management and control for this level of capital investments.

c. Cost Drivers

The cost driver for this work category is the required labor to meet the proposed capital expenditure forecasts. Moreover, the costs shown in Table RKS-6 comprise two elements of labor resources—full year impacts of newly established management and non-management positions on direct labor (2014 to 2015) and the increase in resources to keep pace with capital expenditures. The first cost driver brings the full-time equivalent count to nine for the year 2014.

C. Emergency Services

TABLE RKS-7
Southern California Gas Company
Emergency Services

ENGINEERING, MAJOR PROJECTS, EMERGENCY SERVICES			
Shown in Thousands of 2013 Dollars			
C. Emergency Services	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Emergency Services	1,125	1,951	826
Total	**1,125**	**1,951**	**826**

1. Emergency Services

a. Description of Costs and Underlying Activities

As referenced in witness Diana Day's Risk Policy testimony, it is not possible to mitigate all risks to a point where there is zero probability of a risk-caused incident occurring. One of the primary roles of Emergency Services is to minimize the potential consequence of the occurrence of a risk-based incident. Emergency Services mitigates safety risks. The Emergency Service group establishes the framework and oversee SoCalGas' comprehensive emergency response plan that includes emergency preparedness, crisis management, and business resumption planning that provides for the safety of employees, customers, and the general public and the protection of property during natural gas emergencies. Additional activities also include the development of plans for coping with a major emergency including provisions for training, response and recovery, on-call schedules and duties, inter-organizational assistance, coordination with, and notification of, governmental agencies, conformance with governmental regulations, media contact, assignments to governmental emergency organizations and activation of the Company's Emergency Response Center. Additionally, the group oversees the requirement to meet annually with fire departments and county emergency coordinators.

b. Forecast Method

The forecast method developed for this cost category is a base year due the emerging state requirements to require additional communications and interaction with the emergency response communities. Using historical data other than a base year approach would severely understate the resources needed to meet the regulatory demands. The forecast is built on the base year value of $1,125,000 and added to it are the resources needed to meet the regulatory requirements demanding additional and annual communications with First Responders as well as the implementation of technology to improve overall response communication and coordination.

c. Cost Drivers

The primary cost drivers behind this incremental forecast are based on regulatory expectations and Assembly Bill 56 (Hill) which requires communicating emergency response information as well as reviewing and discussing emergency contingency plans with each local agency having fire suppression responsibilities. Senate Bill 44 requires the CPUC to establish compatible emergency response standards to ensure utilities have adequate response plans.

Those additional resources needed are six additional FTEs to support the communication efforts specific to emergency response, which would include specialized and technical dialog exchanges about response capabilities, scenario planning, and hazard training to raise the level of emergency response for First Responders and the company. The need for more resources is driven by the vast service territory the workgroup must cover which is twelve counties and over 180 fire agencies.

D. Public Awareness

TABLE RKS-8
Southern California Gas Company
Public Awareness

ENGINEERING, MAJOR PROJECTS, EMERGENCY SERVICES			
Shown in Thousands of 2013 Dollars			
D. Public Awareness	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Public Awareness	779	1,218	439
Total	**779**	**1,218**	**439**

1. Public Awareness

a. Description of Costs and Underlying Activities

SoCalGas has developed and implemented a federally-mandated Public Awareness program, as prescribed in 49 CFR 192.616. The Public Awareness program contributes to enhanced public safety by providing certain risk mitigation measures, as described in my testimony. 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."[6] 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 (5) procedures for reporting such an event.[7]

"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."[8] 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 the operator's area."[9] 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."[10]

Annually, the SoCalGas Public Awareness Program reaches approximately:

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

[7] 49 CFR 192.616(d).

[8] 49 CFR 192.616(e)-(f).

[9] 49 CFR 192.616(g).

[10] 49 CFR 192.616(i).

- 20.5 million consumers
- 60,830 excavators and land developers
- 1,060 fire stations/ emergency officials
- 192 public officials

Every two years, the program reaches:

- 860,000 residents and businesses along pipeline right-of-way within SoCalGas distribution service territory
- 20,000 residents and businesses along pipeline right-of-way outside SoCalGas distribution service territory
- 3,000 residents and businesses near storage facilities and compressor stations
- 900 schools

To effectuate the Public Awareness plan, the Public Awareness Administrator (PAA) uses a matrix-managed approach relying upon multiple organizations within SoCalGas for plan element execution. The PAA is required to skillfully coordinate and manage the execution of the activities to successful completion. The program requires that PAA use various tools, such as software, to track and document activities. There are five audience categories to be communicated to and each has its own message, medium and frequency. New audiences can be developed, because certain audiences, for example farmers, may benefit from receiving specific information suited to a particular context, or otherwise do not identify with the content of another audience. SoCalGas faces the additional challenge of identifying and reaching non-gas customers who reside along pipeline rights-of-way. Developing mailing lists and messages that would be recognizable as pertinent and not junk mail by this segment is complex, and SoCalGas is required to make revisions continuously to keep the messaging fresh and relevant.

b. Forecast Method

The forecast method developed for this cost category is a five-year linear trend. This forecasting methodology serves to more accurately represent the new work variations and better represent the future of the Public Awareness group. Specifically, the linear trend best represents the increase work and costs to conduct more targeted surveys at more frequent intervals and to implement the program enhancements that result from the surveys. No labor was forecasted for this Non-Shared element because the centralized management for both utilities will be planned in the Utility Shared Service Cost Center 2200-2417.

c. 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.

Federal Public Awareness regulations specifically direct pipeline operators to continually assess and improve the effectiveness of their Public Awareness programs. A key to help promote continuous improvement is for SoCalGas 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 SoCalGas 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, SoCalGas 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 SoCalGas to develop more succinct and relevant messages and deliver them in formats and mediums that meet the needs of each particular identified audience. The more frequent and targeted the surveys are, however, the higher the costs of conducting those surveys will be. The need for more targeted and frequent surveys results in a forecast of increased costs over 2013.

Another costs driver is the recommendations from the Commission's Safety Enforcement Division when it concluded its Public Awareness audit, in which it offered additional communication messages to existing audiences to further promote pipeline safety.[11] SoCalGas is judiciously incorporating staff recommendations into the Public Awareness plan, but the amount

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[11] *See* SDG&E/SoCalGas' response to CPUC's Public Awareness audit results, dated June 17, 2013.

of information can become overwhelming to recipients. Therefore, caution must be exercised and carefully-crafted messages must be developed to avoid having information overlooked or discarded as "junk mail."

Lastly, another cost driver is anticipated revisions by PHMSA to the guidance document, Recommended Practice 1162 issued by American Petroleum Institute (API). PHMSA announced this effort last year (June 2013) at its Public Awareness workshop in Dallas. The anticipated changes will more than likely result in additional communication requirements, which may require additional resources beyond what is forecast here.

E. Research, Development, and Demonstration

Gas Operations' RD&D activities within the SoCalGas RD&D program are managed in the Gas Engineering and System Integrity Department. In my testimony, I offer business justification for the Gas Operations portion of the SoCalGas RD&D program. The Gas Operations' RD&D TY2016 cost forecast is contained within the overall SoCalGas RD&D program funding request witness Jeffrey G. Reed's Customer Service Technologies, Policies and Solutions testimony, Exhibit SCG-13.

The purpose of these activities is to develop, test, and introduce new technologies or advance existing technologies used in gas operations to benefit public and employee safety, the environment, and ratepayers. Thus, Gas Operations RD&D activities will continue to deliver benefits from research on pipeline inspection technologies, monitoring of remote rights-of-ways, prevention of damage from third-party excavation, leak detection, and continuous monitoring of gas quality. We are advancing technologies to enhance pipeline safety and reliability mandated by 49 CFR 192, Subpart O and Subpart P, General Order 112-E, and AB 1900 (renewables) regulations.

Recent RD&D successes include the Explorer Robotics Inspection System for Unpiggable Pipelines, Bio-methane Gas Quality Specifications, and Gas Interchangeability Ranges for Elastomer Performance and Satellite Monitoring for Pipeline Route Geohazard Threats. Having the ability to inspect unpiggable pipelines allows SoCalGas to collect information the health/condition of the pipeline. This information is used to evaluate the potential pipeline integrity risk and determine a control to mitigate that risk. The Explorer Robotics thus provides a public safety risk mitigation control, through its ability to help identify pipeline anomalies.

The Explorer Robotics Inspection System for Unpiggable Pipelines demonstrates the value of a long-term RD&D program to promote safety-enhancing technology. Traditional in-line-inspection tools are not always capable of inspecting pipes where flow dynamics do not facilitate such. In such circumstances, pipelines are "unpiggable," which means they cannot be inspected using in-line inspection technology. As discussed in the testimony of Pipeline Integrity witness Maria Martinez, where in-line inspection is one of the methods capable of assessing an identified threat to pipeline integrity, it is SoCalGas' preferred assessment method because it provides a more complete picture of the overall condition of a transmission pipeline. Accordingly, SoCalGas continues to focus on the advancement of in-line inspection technologies. Through the NYSEARCH research collaborative, with significant co-funding from DOT, through PHMSA, the number of commercially-available inspection systems has grown from two in the year 2010 to five commercially-available systems today, supporting inspection of a range of pipeline diameters, varying from 6-36 inches. Further, in situ recharging and mechanical damage/ovality sensor capabilities were added to the Explorer robotic inspection system capabilities in 2013. New enhancements, such as circumferential magnetic flux leakage sensors for long-seam weld inspection, are under development, with field demonstrations targeted for the 2015-2016 time period. Because pipeline material grade may be unknown, some techniques are needed to help define grade. Thus, SoCalGas is also pursuing ancillary technologies, such as in-situ hardness testing, of steel material properties.

When possible, SoCalGas seeks and secures terms that allow for remuneration of its Gas Operations RD&D investments to defray program cost. For example, the Explorer RD&D project has a royalty element, based on the licensing of underlying robotic inspection system patents to Invodane Engineering.

Another challenge being addressed is the transfer of knowledge from our maturing workforce to less-experienced technical employees. SoCalGas proactively expands its technical base by using RD&D projects and industry meetings as a teaching opportunity to encourage subject matter experts to serve as mentors. Continuous knowledge transfer is a critical departmental objective, consistent with long term Company goals.

In addition, the Gas Operations' RD&D program plans to augment project research and testing in gas quality and pipeline materials, which are new areas that have emerged as vital to achieving public and employee safety and system reliability. By engaging Engineering Analysis

Center[12] technicians and engineers early in the technology development process, we can accelerate the testing and evaluation process, thereby expediting the introduction of emerging technologies into our operations.

The Gas Operations RD&D program is administered into three sub-program areas. A program description and funding summary and examples of projects under development or recently completed are described below:

1. Gas Distribution Technologies

The Gas Distribution Technologies sub-program was developed to continue our focus on technologies that will reduce system installation, operation and maintenance costs, maintain system integrity, reliability, and extend its service life. New technologies include innovative field tools, equipment, and processes that will enhance field operations productivity and reduce overall costs. For example, the SpreadBoss Asset Tracking System will address the feasibility of using a third-party vendor's traceability system to track pipeline materials during procurement, fabrication, coating, transportation, and delivery to the jobsite with a proprietary coded tag applied directly onto each section of pipe or material. SpreadBoss uses a web-based software platform developed to track pipeline materials, together with its corresponding material test data, for logistics and inventory management and for pipeline integrity record-keeping purposes. In addition, the long-term durability of the asset tag and adhesion/application method will be tested at our Engineering Analysis Center.

The Gas Operations RD&D program also co-sponsors an Operations Technology Development project to partner with manufacturers' of Poly-Ethylene pipe-splitting systems to develop standardized system designs. Poly-Ethylene pipe splitting is a trenchless technology used to replace pipe by mechanically splitting the existing damaged segment and pulling new Poly-Ethylene pipe into the opened bore slot.[13] This unique approach is for niche applications where open trench is the only, and expensive, alternative. Based on extensive field testing at SoCalGas and other gas utilities, Operations Technology Development and pipe splitting manufacturers are developing packaged systems based on customer needs. This process could greatly benefit SoCalGas, by matching the equipment and parts to each pipe replacement job.

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[12] A description of the activities of the Engineering Analysis Center is provided in Section III.A.

[13] *See* Ex. SCG-08, Direct Testimony of Maria T. Martinez, for a high-level description of the process of using trenchless technology to install a pipeline.

2. Environment and Safety

The Environment and Safety sub-program was developed to improve customer, employee, and public safety. Objectives include the development of advanced pipeline-locating and gas leak detection systems and real-time monitoring of gas quality of biomethane supplies. A system to eliminate a persistent residual gas situation was developed to extract residual gas trapped underground in soils or substructures to mitigate a potentially hazardous condition. With input from SoCalGas' Environmental Services group, with experience from Manufactured Gas Plant clean-up projects, a prototype system was designed using strategically-placed extraction (vent) wells and an internal combustion engine to safely and effectively withdraw and consume the residual gas. Field testing and training on actual residual gas leak sites proved the effectiveness of the new system over traditional methods. Further system enhancements tailored for use by the Gas Distribution organization are planned.

SoCalGas also co-funded an Acoustic Pipe Locator research project under the Operations Technology Development program to locate buried pipelines, specifically non-metallic pipelines (such as plastic gas lines without locating wires) and/or non-metallic sewer lines. The technological approach involved a concept used in underwater sonar to transmit and receive acoustic signals, but applied the technology from above-ground into the soil. The Acoustic Pipe Locator is a portable handheld instrument designed to send an acoustic pulse into the ground/soil and to analyze the reflected signal to map the location of substructures. The Acoustic Pipe Locator is being field-tested for use in the Sewer Lateral Inspection Program, also known as SLIP. Information about the safety and reliability benefits of this inspection program may be found in the testimony of Maria Martinez, Exhibit SCG-08.

Although Gas Operations RD&D programs do not duplicate programs lead by State agencies and universities, SoCalGas may help support such programs. For example, SoCalGas funded a study conducted by the University of Southern California to understand the impact of Siloxane on the performance of residential appliances. Siloxane is a man-made organic compound that is often present in renewal biomethane gas (biogas) produced by landfill and wastewater facilities. The benefit of this was that the study found that a Siloxane upper limit was necessary in gas delivered to customers, as residential appliance performance could be negatively impacted by high levels of Siloxane. The study's findings were then used to shape our Rule 30 update and subsequently, in the implementation of AB 1900 (Renewables Energy

Resources, Biomethane), involving acceptable trace constituent levels from renewable gas supplies. A separate project is currently underway to develop a real-time sensor/chromatograph to analyze and monitor critical trace constituents in biomethane received from suppliers.

3. Transmission and Storage

The Transmission and Storage sub-program was developed to improve the reliability, asset life, and efficiency of equipment and systems used in high pressure gas utility operations. Projects include: developing tools consistent with DOT pipeline integrity and inspection regulations; advancing pipeline design standards; monitoring pipeline route hazards; and improving efficiencies of gas storage and compressor station assets.

The Explorer Robotics Inspection System described above is an example of innovative technologies being pursued in this area and how SoCalGas maximizes the benefits of technology through vertical integration in its operations.

Research at Pipeline Research Council International and NYSEARCH involve projects to overcome inspection-related challenges, including the accurate detection of anomalies that are currently difficult to characterize, such as longseam welds and fine cracks.

SoCalGas worked with a remote sensing Synthetic Aperture Radar satellite vendor and service provider to advance Synthetic Aperture Radar satellite imaging and interferometric analysis for monitoring pipeline rights-of-way. The objective of this work was to enhance existing capabilities of Synthetic Aperture Radar satellites (or sensors) for monitoring along transmission pipelines by detecting and measuring ground movement, performing terrain-related risk assessments, and providing alert notifications. A project was successfully conducted for landslide and soil erosion threats on transmission pipelines in the mountainous terrain of Ventura County. A more in-depth, multi-year Pipeline Research Council International study is underway that will further enhance Synthetic Aperture Radar satellite capabilities for ground movement monitoring and right-of-way encroachment detection. This project was then co-funded by the DOT’s Research and Innovative Technology Administration. The goal of the project is to further satellite technology research and develop a best practice guidance document and Decision Support System framework for ground movement and encroachment, including leading indicators, for monitoring along pipeline rights-of-way.

III. SHARED OPERATIONS AND MAINTENANCE COSTS

I sponsor shared service forecasts for two major areas, Gas Engineering and SoCalGas Emergency Services, on a total-incurred basis. Under Gas Engineering, I sponsor Core Engineering activities, as well as Pipeline Design and Gas Standard activities. Under Emergency Services, I sponsor the Pipeline Safety Compliance and Public Awareness activities. Further details for these areas are provided in my testimony. The shared-service forecast is based on using allocation percentages related to the costs. The allocation values may be found in my shared services workpapers, Exhibit SCG-07-WP, along with a description explaining the allocated activities. The dollar amounts allocated to affiliates are presented in the Shared Services Policy and Procedures testimony of witness Mark Diancin, Exhibit SCG-25. Table RKS-9 summarizes the total shared O&M forecasts for the listed cost categories. Discussion of each shared service grouping follows.

TABLE RKS-9
Southern California Gas Company
Shared O&M Summary of Costs

ENGINEERING, EMERGENCY SERVICES & LAND			
Shown in Thousands of 2013 Dollars Incurred Costs (100% Level)	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
A. Gas Engineering	13,650	17,346	3,696
B. Pipeline Design & Gas Standards	737	901	164
C. Pipeline Safety & Compliance	266	536	270
D. Public Awareness	174	395	221
Total (Incurred)	**14,827**	**19,178**	**4,351**

A. Gas Engineering

TABLE RKS-10
Southern California Gas Company
Gas Engineering Core Categories

ENGINEERING, EMERGENCY SERVICES & LAND			
Shown in Thousands of 2013 Dollars Incurred Costs (100% Level)			
A. General Engineering	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Engineering Design	3,055	3,788	733
2. Gas Measurement, Regulation & Pressure Control	5,588	5,892	304
3. Engineering Analysis Center	1,539	1,852	313
4. Asset and Data Management	3,468	5,814	2,346
Total (Incurred)	**13,650**	**17,346**	**3,696**

1. Engineering Design

a. Vice President and Director of Gas Engineering (Cost Centers 2200-0225 and 2200-0300)

i. Description of Costs and Underlying Activities

Within the Engineering Design group are the leadership and organization governance activities for cost centers 2200-0225 and 2200-0300, which represent the Vice President's and the Director's activities, respectively. The Vice President and Director provide the leadership, guidance, and policies to direct the Gas Engineering organization to ensure that their obligations are fulfilled, which benefits both utilities.

The Vice President's activities extend beyond Gas Engineering, since the Vice President is also responsible for System Integrity, Major Projects, and the Pipeline Safety Enhancement Program. The Vice President's expenses include technical and financial support, as well as policy issuance to successfully sustain the operation and provide the vision to further the goals of the company. The Vice President's activities also include the governance, technical and policy support for Gas Distribution and Gas Transmission functions at both utilities.

The Director's expenses are typically for the technical and engineering support for gas transmission, gas distribution, and gas storage. The expenses contained within cost center 2200-0300 include Gas Engineering's administrative and financial support functions for all the shared services activities the organization provides. The cost of this office, associated with support for Distribution and Transmission functions, is allocated to both utilities.

ii. Forecast Method

Both the labor and non-labor expense requirements for these two cost centers have been consistent over recorded historical data. Thus this trend is expected to continue, and as the foundation for future labor expense requirements, the five-year average was chosen.

iii. Cost Drivers

As discussed above, the Vice President and Director provide leadership and guidance to the System Integrity, Major Projects, Emergency Services, and Gas Engineering organizations. The cost drivers included within each section justifying the Major Projects, Emergency Services and Gas Engineering functions are therefore applicable here as well.

b. Mechanical, Civil, Pipeline Design, and Process Design

i. Description of Costs and Underlying Activities

The Engineering Design group is comprised of the following cost centers: 2200-0318, 2200-0320, 2200-0321, and 2200-0323. These cost centers represent the technical and engineering functions of mechanical, civil, pipeline design, materials and quality, and process design that benefit both utilities.

The activities provided by Engineering Design are the policy development and implementation of distribution capacity planning and specific technical engineering support for design. This centralized approach provides consistency across the operating groups. Design, technical, and mechanical engineering support for SoCalGas' and SDG&E's compressors are also provided. SoCalGas operates over 200,000 horsepower of compression, while SDG&E operates about 16,000 horsepower. The compression assets are a vital and integral part of gas operations. In addition, civil and structural engineering is provided to make certain that natural gas assets are constructed and placed safely into service.

ii. Forecast Method

The five-year average was chosen as the foundation for future labor expense requirements. The nature of work performed under this cost center has proven to be consistent over time, as evident by historical data. Therefore, current activity levels and program support functions are expected to continue moving forward. As such, the five-year average is expected to sufficiently meet future funding requirements and best represents future expense requirements.

iii. Cost Drivers

Cost drivers for this group include multiple PHMSA efforts to increase the requirements for pipeline design and proposed changes to CPUC, General Order 112-E. It is forecast that those additional, more stringent, requirements will have impact on the organization, but it is believed that those incremental costs will be absorbed within the five-year average.

c. Distribution System Engineering Support (Cost Center 2200-2377)

i. Description of Costs and Underlying Activities

Distribution System Engineering Support group activities are primarily focused on providing the Distribution region engineering groups with technical, data and policy support, as well as developing and implementing new technologies to enhance safety and effectiveness in those groups. Specific activities include: (1) the creation and validation of computer hydraulic models of medium and high-pressure pipe networks, as requested by the Distribution region engineering groups; (2) managing the Company's multi-year program to replace all mechanical pressure recorders with electronic recorders and enhance associated processes; (3) developing and providing system design policies and analysis, as well as associated training to Region Engineering employees; and (4) providing policy and project management over a range of other areas, including gas blown to atmosphere, isolation area management, year-end gas inventory calculation and reporting, review and update of Gas Standards and Forms, and participation in ASME B31.8 and GPTC/Z380 committees.

ii. Forecast Method

A 2013 Base-Year approach was used as the foundation for future labor expense requirements, because the Distribution System Engineering Support group is a relatively new group in the Engineering Design department with insufficient historical data to provide meaningful trends and averages, and incremental work identified to set the forecast. Thus the resulting forecast for Distribution System Engineering Support is $855,000, on an incurred basis.

iii. Cost Drivers

The cost drivers behind this forecast are the expense requirements in the current group as well as the proposal for a Distribution System Monitoring and Analysis group. The Distribution System Monitoring and Analysis group will further our ability to meet the requirements in SB 705 to "…identify and minimize hazards and systemic risks in order to minimize accidents, explosion, fires, and dangerous conditions, and protect the public and the gas corporation workforce." While the group's responsibilities may evolve over time, it is envisioned that initially the Distribution System Monitoring and Analysis group would be responsible for:

<u>Monitoring and analyzing incoming operating pressure data from electronic pressure monitoring devices</u>

- Verify compliance with applicable reporting requirements (*e.g.*, five-day PHMSA notification per the Pipeline Safety, Regulatory Certainty and Job Creation Act of 2011).
- Oversee data management (*e.g.*, affirm complete pressure records are maintained).

<u>Pressure Reporting</u>

- Oversee disbursement of pressure reports to region personnel.
- Provide enhanced visualization of pressure data to improve efficiency and effectiveness of review by region personnel.
- On a regular schedule, affirm that region personnel review and validate pressure data.
- Confirm that pressure anomalies are communicated, investigated, and tracked.
- Liaison with Pipeline Integrity to verify that all medium and high pressure zones are identified and monitored.
- Use pressure history to help identify zones that require additional capacity analysis and potential capital investments.

<u>Leveraging New Technology</u>

- Develop tools that integrate pressure data in eGIS (*e.g.*, to view pressure history charts by clicking on electronic pressure monitor feature in GIS).
- Utilize capabilities of Advanced Meter communications to realize real-time pressure information.
- Develop mobile distribution system monitoring and analysis capability (*e.g.* through Citrix connection, smartphone application, etc.).

<u>Incident Supporting</u>

- Support region personnel with real-time operating and GIS information, hydraulic models, and isolation planning.
- Distribution system monitoring and analysis can provide technical support in validating over-pressure and under-pressure alarms/events.

- Outage prevention – Support region personnel with assistance in pressure monitoring and determining supply alternatives.

2. Gas Measurement, Regulation and Pressure Control

TABLE RKS-11
Southern California Gas Company
General Engineering

ENGINEERING, EMERGENCY SERVICES & LAND			
Shown in Thousands of 2013 Dollars Incurred Costs (100% Level)			
A. General Engineering	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Engineering Design	3,055	3,788	733
2. Gas Measurement, Regulation & Pressure Control	5,588	5,892	304
3. Engineering Analysis Center	1,539	1,852	313
4. Asset and Data Management	3,468	5,814	2,346
Total (Incurred)	**13,650**	**17,346**	**3,696**

a. General Management and Administrative Support (Cost Center 2200-0309)

i. Description of Costs and Underlying Activities

This cost center provides general management and administrative support for approximately 82 employees performing work in shared cost centers 2200-0310, 2200- 0311, 2200-0312, 2200-2248, 2200-0799, 2200-2487; and for similar support of non-shared cost center 2200-2265. The shared cost centers are for engineering policy, design, material selection, testing and field support related to measurement, gas regulation, automated control systems for pipelines and compressor stations and other instrumentation for both SoCalGas and SDG&E. Expenses are typically for transmission and gas distribution-related engineering services and associated costs.

ii. Forecast Method

The methodology used to develop the forecast was five-year average for both labor and non-labor expenses. This cost center is mature and well-established. Thus, the recorded historical data best captures the ebbs and flows of the work and the five-year average best represents future expense requirements. The resulting forecast, on an incurred basis, is $830,000, which is nearly $100,000 below 2013 recorded.

iii. Cost Drivers

As described in the underlying activities, the cost drivers supporting this cost center is the general management and administrative support to the Gas Measurement, Regulation and Pressure Control group within the Gas Engineering department. There are no upwards pressures in this cost center; thus five-year average was selected, which is nearly $100,000 below 2013 recorded.

b. Measurement and Design (Cost Center 2200-0310)

i. Description of Costs and Underlying Activities

This cost center includes the detailed engineering design, planning, policy, equipment standards and consultation activities performed and related to: large meter and regulator stations; California producer gas facilities; interstate pipeline interconnections; and pressure protection for pipelines and related automated controls. The workpaper and associated forecast for cost center 2200-0310 also represent the pole maintenance, electrical and control system engineering associated with the design, operation and the related compliance and safety aspects of large gas handling facilities, which activities are being performed under cost center 2200-2487, beginning year 2014. These engineering services are provided for both SoCalGas and SDG&E. Design, material specifications and policy are typically managed for gas transmission, storage and gas distribution assets, and this group supports the operational personnel associated with those entities.

ii. Forecast Method

The labor and non-labor expense requirements for this cost center have been consistent over recorded historical data. Thus, the five-year average was chosen because it best represents the future expense requirements, and because it captures the fluctuations that this cost center can experience. However, SoCalGas anticipates increasing requirements for power and customer pole maintenance in which additional staffing and resources are identified and will be required. These incremental costs have been added to the five-year average.

iii. Cost Drivers

The cost drivers behind this forecast are the expense requirements and activities stated previously as well as the upward pressure and activities behind the power and customer pole maintenance. Therefore, having a staff for the design and standards associated with poles is necessitated.

c. Gas Measurement Technologies (Cost Center 2200-0311)

i. Description of Costs and Underlying Activities

This cost center includes the Measurement Technologies activities that provide for testing, evaluation, selection, deployment strategic planning and policies and practices associated with gas metering equipment, ranging from the smallest residential diaphragm meters to the largest ultrasonic meters and electronic measurement equipment. This work is conducted on behalf of both SDG&E and SoCalGas. This group is also responsible for managing the Company's meter and regulator maintenance and inspection scheduling and reporting system, for providing auditing of company measurement sites to verify compliance with policy and technical specifications, and for conducting engineering studies to determine replacement and performance enhancement strategies for installed measurement infrastructure.

ii. Forecast Method

The labor and non-labor expense requirements for this cost center have been consistent over recorded historical data. Thus, the five-year average was chosen because it best represents the future expense requirements, while addressing the fluctuations that this cost center can experience.

iii. Cost Drivers

The cost drivers behind this forecast are the expense requirements and activities, as stated previously, which include testing, evaluation, selection, strategic planning and policies associated with gas metering equipment, ranging from the smallest residential diaphragm meters to the largest ultrasonic meters and electronic measurement equipment.

d. Measurement Field Support (Cost Center 2200-0312)

i. Description of Costs and Underlying Activities

This cost center includes measurement field support activities comprised of both the labor and non-labor expenses that provide planning, field support, technical guidance, policy, procedures and training in the areas of large automated control systems for gas compressor stations, pipelines, California producers, metering and regulating stations, and ancillary equipment for both SDG&E and SoCalGas. The gas systems and operational personnel supported include: Gas Transmission; Distribution; and Underground Storage. Occasional support is also provided to Customer Services. This cost center also provides field support to maintain over 200 field computers used by Distribution/Transmission and Storage field personnel to program, calibrate and configure electronic field instruments, such as measurement systems, gas chromatographs and programmable logic controllers.

ii. Forecast Method

The labor and non-labor expense requirements for this cost center have been consistent over recorded historical data. Thus five-year average methodology was chosen as best representing the future expense requirements because it best captures the fluctuations that this cost center can experience. However, due to added upward pressure related to the electronic devices, discussed below, additional staffing and resources were added to the five-year average.

iii. Cost Drivers

The cost drivers behind this forecast are the expense requirements and activities described in the current group as well as the upward pressures associated with need for electronic devices to gather measurement data. The electronic devices are a cost driver because the measurement field support group will need to conduct more field work. The field work encompasses addressing programming and data processing issues, maintenance of hardware and software from additional remote monitoring, and capture of gas quality data.

e. Instrument Repair and Field Maintenance (Cost Center 2200-0799)

i. Description of Costs and Underlying Activities

In cost center 2200-0799 are the activities that provide: calibration of temperature and pressure gauges and secondary standards (a recognized and acceptable alternative to using the primary calibration standard) used by field personnel to maintain gas facilities, field inspection of large metering facilities using bore scoping techniques, maintenance of all company gas standards used to test and calibrate gas meters, and the laboratory configuration, programming testing and laboratory repair/assessment of all electronic measurement devices used for customer billing. Special meter testing is also conducted on gas meters removed from the field, where safety or other matters are investigated. This cost center also provides for the maintenance, troubleshooting repair and upgrade of all "bell proves" (primary measurement test standards) used by both SDG&E and SoCalGas to test over 100,000 meters annually.

ii. Forecast Method

The labor and non-labor expense requirements for this cost center have been consistent over recorded historical data. This trend is expected to continue. As such, the five-year average methodology was chosen as best representing the future expense requirements.

iii. Cost Drivers

The cost drivers behind this forecast are the expense requirements and activities, which include the field maintenance and inspection of large metering facilities and maintaining company calibration standards.

f. Measurement and Regulation Standards, Materials and BTU Districts (Cost Center 2200-2248)

i. Description of Costs and Underlying Activities

This cost center includes the activities to develop engineering, design, material specification and technical standards for small and medium-sized meter and regulator stations employed by both SoCalGas and SDG&E. Other activities include the management of all policy, standards and planning for the measurement of gas quality associated with thermal zone (SDG&E) and British Thermal Unit (BTU) district measurement, and for any special reporting and planning in both companies to contend with regulatory and customer need for gas quality/component reporting.

ii. Forecast Method

The methodology used to develop the forecast was a five-year average for both labor and non-labor expenses. However, due to anticipated reporting and analysis for Gas Quality and Green House Gas, an adjustment was added to the five-year average.

iii. Cost Drivers

The cost drivers behind this forecast are the expense requirements and activities to develop engineering, design, material specification and technical standards for small and medium-sized meter and regulator stations employed by both SoCalGas and SDG&E.

3. Engineering Analysis Center (Cost Center 2200-1178)

TABLE RKS-12
Southern California Gas Company
Engineering Analysis Center

ENGINEERING, EMERGENCY SERVICES & LAND			
Shown in Thousands of 2013 Dollars Incurred Costs (100% Level)			
A. General Engineering	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Engineering Design	3,055	3,788	733
2. Gas Measurement, Regulation & Pressure Control	5,588	5,892	304
3. Engineering Analysis Center	1,539	1,852	313
4. Asset and Data Management	3,468	5,814	2,346
Total (Incurred)	**13,650**	**17,346**	**3,696**

a. Description of Costs and Underlying Activities

The Engineering Analysis Center Chemical section provides environmental, gas operation, and British Thermal Unit (BTU) measurement related analytical services to the operating and customer services organizations. These activities include: polychlorinated biphenyl analysis and sample management, hazardous material, gas quality policy and operating procedures, gas composition including inert gases through heavier hydrocarbons in the C_{22}+ range and hydrocarbon and water dew point, simulated distillation through C_{40}+, sulfur gas analysis, odorization management and test development, gas line odor seasoning management and training, gas quality testing including, mobile gas operations test vehicle, BTU measurement services, fugitive and leakage gas identification and verification. These activities help to verify that safe pipeline quality natural gas is delivered and to detect and mitigate undesirable constituents from being transported to a customer's burner tip.

b. Forecast Method

The forecast methodology used for both labor and non-labor expenses was the five-year average. The nature of work performed by the Engineering Analysis Center department, primarily Operations and Engineering Support for Transmission, Storage and Distribution, has proven to be relatively stable over time. Thus the five-year average best represents the work group's funding requirements. To address new bio-methane gas (bio-gas) requirements, incremental resources were identified and added to the five-year average to build out the forecast, as shown in my workpapers, Exhibit SCG-07-WP. The result of combining the five-year forecast and incremental requirements results in a forecast of $1,852,000 on an incurred basis.

c. Cost Drivers

The cost drivers behind this forecast are directly related to new biogas producer requirements rooted in Rule 30 and Certified Unified Public Authority enforcement mandates.

4. Asset and Data Management

TABLE RKS-13
Southern California Gas Company
Asset and Data Management

ENGINEERING, EMERGENCY SERVICES & LAND			
Shown in Thousands of 2013 Dollars Incurred Costs (100% Level)			
A. General Engineering	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Engineering Design	3,055	3,788	733
2. Gas Measurement, Regulation & Pressure Control	5,588	5,892	304
3. Engineering Analysis Center	1,539	1,852	313
4. Asset and Data Management	3,468	5,814	2,346
Total (Incurred)	**13,650**	**17,346**	**3,696**

a. Business Process and Infographic Solutions Group (Cost Centers 2200-0302)

i. Description of Costs and Underlying Activities

The activities associated with this cost center include the labor and expenses associated with the new reorganized Business Process and Infographic Solutions group. These expenses include the GIS team lead, one administrative support individual, one project specialist and one Senior GIS analyst. Activities managed include: Compiling test script inventory for software release cycles; administration; developing business solutions related to asset management software; and developing reports, maps, and other essential data deliverables to meet increased demand for customized information visualization and data analytics. The information provided by this group, along with its related activities, help support the operation and engineering groups to assess probability and consequence of asset failure. This information supports the mitigation of safety and reliability risks.

ii. Forecast Method

The forecast method used to develop the forecast was the five-year average. This forecasting methodology serves to more accurately even out the year-to-year work variations that occur.

iii. Cost Drivers

The cost drivers behind this forecast are: the expense requirements and activities to manage the compiling of test scripts inventory for software release cycles; and the administration and development of solutions related to asset management.

b. Computer Aided Drafting and Design Applications (Cost Centers 2200-0303)

i. Description of Costs and Underlying Activities

The Computer Aided Drafting and Design Applications cost center includes expenditures for labor and non-labor expenses to support a broad range of computer programs and systems that are not provided by the Company's Information Technology group. The work included within this cost center is to manage, develop, and support specialized computer-aided drafting and design for Engineering Applications; manage and support the Gas computer-aided drafting and design and policies; manage and support hardware, file management, and back-end processes; manage help desk tickets and client support calls; manage, develop and maintain the Formal Communications Document Library & Publish Gas Standards; and develop and maintain Gas Operations Internal Websites. Expenditures covered in this cost center accounts for labor and expenses to support computer programs and systems not provided by the Company's Information Technology group. The work included within this cost center is to: manage, develop, and support specialized computer-aided drafting and design for Engineering Applications; manage and support the Gas computer-aided drafting and design policies; manage and support hardware, file management, and back-end processes; manage help desk tickets and client support calls; manage, develop and maintain the Formal Communications Document Library and publish Gas Standards; and develop and maintain Gas Operations internal websites.

ii. Forecast Method

The forecast method used to develop the forecast was a five-year average, with the addition of specific incremental adjustments to reflect unique resource requirements. This forecasting methodology serves to more accurately even out the work variations that occur. However, new and unique information systems implementations to meet compliance and strategic initiatives are emerging, which require additional staffing and resources to support. These incremental costs have been identified and added to the five-year average.

iii. Cost Drivers

End of technology life is precipitating the need to re-evaluate the design and data capture tools currently in use. Adjustments due to resources required for Operations Technology computer-aided drafting and design to support new and unique information system implementations over the next three years to meet compliance and strategic initiatives are as follows. The new systems include (1) a Storage 3D Modeling system and data capture to meet regulatory compliance; (2) an Engineering Design computer-aided drafting and design solution to meet regulatory compliance and Win7 strategic initiative, and (3) develop a work order sketching computer-aided drafting and design system to meet new business requirements being driven by compliance, Win7, Construction, Planning and Design/Graphic Work Design. These resources represent system implementation needs as well as continued support in the years to come. Overall the adjustments require five additional FTEs and some contract dollars to effectively manage the technology changes.

c. Work Management and Databases Development (Cost Center 2200-0306)

i. Description of Costs and Underlying Activities

Expenditures covered in this cost center account for labor and expenses to support the activities associated with the Work Management Systems for Meter and Regulation (M&R), System Protection Specialists and Work Order Tracking applications, AutoSol Enterprise System. Also, the cost center supports the Technical Services Group in Miramar (SDGE); specifically the Electronic Data Management System and the Cathodic Protection Data Management (Cathodic Protection Data Management) applications. All of these systems are key operational systems to support field functions to verify pipeline and ancillary facilities continue to be fit for service.

ii. Forecast Method

The forecast method used to develop the forecast was a five-year average with the addition of specific incremental adjustments to reflect unique resource requirements to support a new workflow system called MyProjects. This forecasting methodology serves to more accurately even out the work variations that occur. However, a new and unique workflow management system, MyProjects, has been implemented to facilitate better tracking and documenting of projects, which requires additional technical support. These incremental costs have been identified and added to the five-year average.

iii. Cost Drivers

The primary cost drivers are system expansions and the need for upgrades to the following key operational software applications:

- MyProjects Phase II and III (expansion)
- Work Order Tracking and Pipeline Database Management System upgrade
- Maximo 7.1 to 8.x (upgrade)
- Maximo Mobile deployment (upgrade)
- High availability server farm development (expansion)
- Cognos 8.3 to 10.x (upgrade)

Cumulative application and server support from the growth and use of the aforementioned systems (expansion) is also a key driver.

d. Software Licenses and Maintenance Contracts (Cost Centers 2200-0308)

i. Description of Costs and Underlying Activities

Expenditures covered in this cost center account for the non-labor expenses associated with software licenses and maintenance contracts (referred to in my workpapers as Contract/Maintenance) for Operations Technology. Operations Technology manages, administers and maintains hardware, software and back-end processes that support the systems and applications of various organizations at SoCalGas and SDG&E, including Safety, Distribution, Customer Service, Environmental, Transmission and Engineering.

ii. Forecast Method

The forecast method used to develop the forecast was a five-year average which adequately covers the license renewals of the upgraded software applications coming due.

iii. Cost Drivers

The cost driver is the periodic license renewal of various software in Gas Engineering used to support the operation. Upgrades and licensing fees are externally driven based on the manufacturer's life-cycle schedule and breadth of the upgrade.

e. Enterprise System Support – GIS (Cost Centers 2200-2376)

i. Description of Costs and Underlying Activities

Lastly, the need to gather and harmonize the disparate data sets is being addressed by the synchronization of the GIS system. The high pressure pipe (maximum operating pressure greater than 60 psi), medium pressure pipe (maximum operating pressure less than or equal to 60 psi), storage field pipe and other above-ground facility pipes exist across multiple GIS and computer-aided drafting and design databases and software platforms. For example transmission pipeline integrity requires a real-world representation of a pipeline location to calculate a risk assessment on a pipeline and therefore, cannot use a conflated model such as the enterprise GIS system. Since the Transmission Integrity Program (TIMP) is comprised of facilities operated by the Transmission, Distribution and Storage organizations at SoCalGas, data often resides in multiple systems with different levels and types of data attribution. Distribution and Storage have specific O&M compliance requirements that cannot be met efficiently in the high pressure pipeline database or with the current set of business processes. Given TIMP program requirements, and the constraints of the existing systems, a solution needs to be evaluated and executed to keep the data consistent and to improve and reconcile data attribution. The solution will also need to include the business processes necessary to support the analytics and reporting capabilities to comply with regulatory requirements. Proposed enhancements and changes will enable improved pipeline network asset management, safety, and integrity modeling. The data model will be revised to include additional attribution needed to comply with changing regulatory requirements. Linear asset data conversion is included in the project.

The activities associated with the synchronizing project include the following:

- Providing a synchronized view of high pressure asset data across GIS and computer-aided drafting and design systems;
- Developing new data models for high pressure distribution, transmission and storage data;
- Reconciling existing assets and their attribution; Converting selected linear asset data to a geospatial format to support connectivity modeling;
- Converting and reconciling various existing electronic and non-electronic data sources into a single robust database in order to manage, store, preserve and deliver key documents and information; and

- Link documentation to asset data in GIS and Maintenance Management Systems.

Furthermore, the activities associated with this cost center include the following:

- Identification and documentation of system of record;
- Conversion of linear assets to geospatial data and Quality Assurance/Quality Control of data;
- Technical enhancements for forward-looking data capture;
- Policy changes and process improvements; and
- Improved risk assessment, analytics, and reporting capabilities.

ii. Forecast Method

The forecast method used to develop the forecast was the base year. This cost center is relatively new, with insufficient historical data to provide any meaningful averages or forecasts. The 2013 baseline level was used as a starting point, and the data synchronization work was added to the base-year.

iii. Cost Drivers

The cost drivers behind this forecast are the expense requirements and activities in this cost center as well as the O&M component of the High Pressure Synchronization project. The High Pressure Synchronization project will design and implement system and process enhancements for SoCalGas and SDG&E's GIS and computer-aided drafting and design systems required to support high-pressure pipeline and storage safety and integrity program requirements. This includes additional asset data attribution, conversion of linear to geospatial data and improved synchronization of pipeline and storage asset data across GIS and computer-aided drafting and design systems to support integrity analysis and modeling. This work is required to support pipeline safety and integrity modeling and analytics by the new High Pressure Pipeline Database system. This capability is critical to pipeline safety and integrity analysis and risk management. This project supports compliance with continually-evolving PHMSA standards, including 49 CFR Parts 190-193. This project is essential in order to successfully improve upon current high pressure asset management capability and to continue to build on existing risk models and reporting. Without this effort, performance-based risk management related to high pressure assets may not be possible, as the capability continues to evolve.

B. Pipeline Design and Gas Standards (Cost Center 2200-0322)

TABLE RKS-14
Southern California Gas Company
Pipeline Design and Gas Standards

ENGINEERING, EMERGENCY SERVICES & LAND			
B. Pipeline Design & Gas Standards	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Pipeline Design & Gas Standards	737	901	164
Total (Incurred)	**737**	**901**	**164**

1. Pipeline Design and Gas Standards (Cost Center 2200-0322)

a. Description of Costs and Underlying Activities

This group develops and manages engineering gas standards, develops publishing criteria, verifies compliance with publication requirements, reviews and revises the standards governed by the O&M plan annually, and other Gas Standards every five years. The Gas Standards comprise the policy and procedures that govern the design, construction, operations, and maintenance of the Transmission and Distribution systems and are based on the relevant regulatory codes and ordinances. Gas Standards are cornerstones for meeting compliance. This department also facilitates integration of SoCalGas and SDG&E Gas Standards yet to be combined into single comprehensive documents. SoCalGas Gas Engineering is the owner of all the engineering standards for the two utilities. The work accomplished in this work group serves as a cornerstone for pipeline safety by helping to memorialize compliance requirements in company policies and procedures.

b. Forecast Method

The forecast method used was based on a five-year average for both labor and non-labor. The nature of the associated activities provided by this work group, primarily to the Distribution and Transmission organizations of SoCalGas and SDG&E, has proven to be relatively stable over time. The five-year average best represents the work group's funding requirements. However, new enhancements are emerging and thus additional staffing and resources are required to comply. These incremental costs have been identified and added to the five-year average. The resulting effect is an incurred forecast of $901,000.

c. **Cost Drivers**

The key cost drivers for the incremental cost are associated with needed labor to help with increases in pipeline safety requirements, such as the management of the Safety Plan. This added work, along with other documentation demands, has necessitated the need for an additional resource. Specifically, in the area of Gas Standards management, one full-time employee was added and another was added for Design Data Sheet upgrade and management. The Design Data Sheet is a cornerstone program to help document, verify and set pressure testing requirements for newly-commissioned assets.

C. Pipeline Safety and Compliance (Cost Center 2200-2473)

TABLE RKS-15
Southern California Gas Company
Pipeline Safety and Compliance

ENGINEERING, EMERGENCY SERVICES & LAND			
C. Pipeline Safety & Compliance	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Pipeline Safety & Compliance	266	536	270
Total (Incurred)	**266**	**536**	**270**

1. Pipeline Safety and Compliance

a. Description of Costs and Underlying Activities

The Pipeline Safety and Compliance department will lead all audits for the gas utilities in areas related to policy and code pertaining to General Order 112-E. This workgroup provides counsel, guidance and information to Engineering and Operations and Field Services groups on pipeline safety issues relative to CPUC and DOT regulations. Specific activities associated with this work group include representing SoCalGas and SDG&E in all interactions with the CPUC Utility Safety and Reliability Branch related to natural gas operations, as well as to provide direction and guidance to utility personnel to maintain compliance with DOT/CPUC pipeline regulatory operations.

b. Forecast Method

The forecast method developed for this cost category to labor and non-labor expense requirements is the base year method. This forecasting methodology serves to more accurately represent this work group. Using the base-year methodology, the incurred-expense forecast for TY2016 is $536,000.

c. Cost Drivers

The key cost driver behind this forecast is the significant increase in CPUC oversight, which includes an increase in the number and complexity of program and field audits, data requests, field visits, and discussions of best practices. Additionally, new State regulations and enhancements are emerging that require more frequent dialogue with CPUC staff.

D. Public Awareness (Cost Center 2200-2417)

TABLE RKS-16
Southern California Gas Company
Public Awareness

ENGINEERING, EMERGENCY SERVICES & LAND			
D. Public Awareness	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Public Awareness	174	395	221
Total (Incurred)	**174**	**395**	**221**

1. Public Awareness

a. Description of Costs and Underlying Activities

The activities associated with the shared service component of Public Awareness include the central management of both SoCalGas and SDG&E's Public Awareness plans. This co-operator approach offers some resource efficiencies by leveraging the knowledge to the benefit of both companies. As noted in the non-shared service discussion, the Public Awareness work group is focused on the mandates from 49 CFR 192.616, which requires the development and implementation of a public awareness program. This program includes the identification of and communication with impacted customers and non-customers. There are specific messages, delivery methods and frequencies for the communications for each targeted audience. In addition, there are requirements for tracking of communications data analysis and effectiveness evaluations. The program impacts multiple organizations within SoCalGas and SDG&E. Coordination of these efforts is managed within Emergency Services.

b. Forecast Method

The forecast method developed for this cost category is the five-year linear trend. The nature of work by the Public Awareness group in the last five years has seen increases due to changes in the program requirements and regulator expectations with no signs of slowing down. Thus the linear method is most appropriate, and results in a $395,000 forecast for TY2016 on incurred basis.

c. Cost Drivers

As mentioned in the Non-Shared Service discussion, PHMSA has announced plans to revise its guidance documents, which will usher in more requirements. In addition, the CPUC's Public Awareness audit recommendations have increased the communication requirements, requiring additional resources. Furthermore, anticipated increases in the frequency of surveys and more customized communications, and different vehicles for conducting the surveys and distributing communication, will require additional resources to analyze data, extract meaningful information and implement improvements.

IV. CAPITAL

A. Introduction

The capital described in this chapter covers the capital expenditures estimated for SoCalGas' Transmission and Engineering operations. The driving philosophy behind SoCalGas' capital expenditure plan is to provide safe, reliable delivery of natural gas to customers at reasonable cost. These investments also enhance the efficiency and responsiveness of our gas operations and maintain compliance with applicable regulatory and environmental regulations.

Table RKS-17 summarizes the total capital forecasts for 2014, 2015, and 2016.

TABLE RKS-17
Southern California Gas Company
Capital Expenditures Summary of Costs

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
Categories of Management	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
B. New Pipelines	17,845	17,845	17,845
C. Replacements	6,123	6,706	5,819
D. Freeway Relocations	450	450	450
E. Relocations - Private/Franchise	9,879	4,672	8,791
F. Compressor Stations	9,883	32,250	79,639
G. Cathodic Protection	1,332	8,986	8,986
H. M&R Stations	7,991	9,423	9,321
I. Auxiliary Equipment	6,879	9,556	6,879
J. Land Rights	149	149	149
K. Storage - Buildings	24	1,589	24
L. Transmission - Buildings	480	8,679	11
M. Laboratory Equipment	485	485	485
N. Capital Tools	687	687	687
O. Supervision & Engineering Pool	1,895	2,318	2,509
Total	**64,102**	**103,795**	**141,595**

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 the 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 tools, but are much more expensive than elbows used in previous years. These material enhancement costs directly support, but do not duplicate, the Pipeline Integrity work described by Maria Martinez in her testimony in support of the Transmission Integrity Management and Distribution Integrity Management Programs, Exhibit SCG-08.

An additional upward pressure that impacts the capital pipeline projects in my testimony is the environmental agency fees related to Hydrostatic Testing and Dewatering Permit Renewals, Regional Water Quality Control Board, and State Water Resources Control Board Increase in Water Quality Annual Permits. These fees are imbedded in the costs in each capital project, if the permit is required.

These estimates exclude costs of implementing SoCalGas and SDG&E's Pipeline Safety Enhancement Program (PSEP).

B. New Pipelines

The New Pipeline Additions budget category recognizes the need to install new gas facilities to serve new or increased loads or provide natural gas supply reinforcement to an existing area. This forecast includes three large projects and multiple smaller projects to install new pipelines in order to mitigate reliability risks to the SoCalGas transmission system. Table RKS-18 below summarizes the capital cost forecast for New Pipelines.

TABLE RKS-18
Southern California Gas Company
New Pipeline Additions

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
B. New Pipelines	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. El Segundo Pipeline enhancement.	6,042	9,063	0
2. North Coast System Reliability - R/W acquisition	0	5,000	5,000
3. Line 2001 Looping - Chino to Moreno - R/W acquisition	0	2,000	2,000
4. Multiple smaller pipeline projects worked on Blanket W.O.	11,803	1,782	10,845
Total	**17,845**	**17,845**	**17,845**

The costs estimated in this budget category were derived using the five-year recorded average for years 2014, 2015, and 2016. This methodology is conservative since two of the five recorded years had costs much higher than the average shown here in all three planned years.

1. El Segundo Pipeline Enhancement

a. Description

SoCalGas plans to install approximately 3.75 miles of new 20-inch pipe, valves and fittings connecting Line 1172 on the west to Line 1170 and Line 1175 on the east in the City of El Segundo. Two large Utility Electric Generators, Chevron's El Segundo refinery, and the Hyperion wastewater treatment facility are currently on the end of a long dead-end with no alternative of supply in the case of needed shut-down of either Lines 1170 or 1175. Recent repowering at NRG's El Segundo Energy Center and at the Los Angeles Department of Water and Power's Scattergood facility, along with growing demand at Chevron's El Segundo refinery and new demand at the Hyperion Wastewater treatment facility have taxed the capacity of the transmission lines 1172 and 1173. Additionally, both the NRG and Los Angeles Department of Water and Power facilities have new "quick-start" technology, which will result in sudden and dramatic increases in demand on our system. System improvement is necessary to provide continued, uninterrupted, reliable gas service to the area.

The forecast for the El Segundo Pipeline Enhancement project for 2014, 2015, and 2016 is $6,042, $9,063, and $0, respectively. Specific details regarding the El Segundo Pipeline Enhancement project are found in my capital workpapers, Exhibit SCG-07- CWP.

b. Forecast Method

Costs are estimated by experienced pipeline construction management personnel using reference to recent pipeline construction projects of similar scope, pipe size and pressure, and construction environment.

c. Cost Drivers

The underlying cost drivers for this capital project relate to pipe size and pressure, the location of the project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. As stated previously, bid prices are a function of supply and demand of contractor capacity.

2. North Coast System Reliability – Right-of-Way Acquisitions

a. Description

Through the North Coast System Reliability – Right of Way Acquisitions project, SoCalGas plans to acquire rights-of-way in anticipation of construction of approximately 80 miles of 36-inch transmission pipeline from the Taft area in the southern San Joaquin valley area westerly to near Gaviota. Actual construction might begin as early as spring of 2017. This project, in its ultimate build-out, will provide improved reliability and a second source of supply to the North Coastal System north of Gaviota. The system is currently dependent on supply from PG&E during extreme design conditions, and entirely on PG&E in the event of an outage on Line 1010.

The capital forecast for North Coast System Reliability – Right of Way Acquisitions for 2014, 2015, and 2016 is $0, $5,000, and $5,000, respectively. Specific details regarding North Coast System Reliability – Right of Way Acquisitions are found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

Land rights purchases in recent years have averaged approximately $267,000 per mile. My forecast is based on approximately 18.7 miles of land rights purchases at $267,000 per mile in 2015 and 2016.

c. Cost Drivers

The cost of land acquisition varies according to many factors, among them the overall economic climate and more specifically, with that of the Real Estate market (buyer's market versus seller's market), which is often the function of supply versus demand. These factors are beyond the control or influence of SoCalGas.

3. Line 2001 Looping – Chino to Moreno – Right-of-Way Acquisitions

a. Description

With this project, SoCalGas plans to acquire rights-of-way in anticipation of construction of approximately 30 miles of 36-inch Transmission line between the Chino crossover and Moreno Station. This will be to reinforce supply and reduce pressure loss to the southerly coastal Transmission system. This tie-in provides the missing loop segment for Line 2001.

The capital forecast for the Line 2001 Looping – Chino to Moreno project for 2014, 2015, and 2016 is $0, $2,000, and $2,000, respectively. Specific details regarding Line 2001 Looping – Chino to Moreno may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

Land rights purchases in recent years have averaged approximately $267,000 per mile. This forecast is based on calculation of approximately 7.5 miles of land rights purchases at $267k per mile in 2015 and 2016.

c. Cost Drivers

The cost of land acquisition varies according to many factors, among them the overall economic climate and more specifically, with that of the Real Estate market (buyer's market versus seller's market), which is often the function of supply versus demand. These factors are beyond the control or influence of SoCalGas.

4. Multiple Smaller Projects Blanket Work Order

a. Description

The Multiple Smaller Projects Blanker Work Order is used to capture the costs of multiple capital projects that we expect to complete during the forecast period. The addition of these costs brings the forecast to the five-year average, which has been shown to be accurate in previous years. The capital forecast for the Multiple Smaller Projects Blanker Work Order for 2014, 2015, and 2016 is $11,803,000, $1,782,000, and $10,846,000, respectively. Specific details regarding the Multiple Smaller Projects Blanket Work Order may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The forecast method for the blanket work orders relied upon the five-year average less any projects that were known at the time we developed the estimate.

c. Cost Drivers

The cost drivers for the blanket work orders in line item 4 in Table RKS-18 represent costs that have historically been spent on multiple smaller projects.

C. Replacements

TABLE RKS-19
Southern California Gas Company
Pipeline Replacements

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
C. Replacements	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Replacements	6,123	6,706	5,819
Total	**6,123**	**6,706**	**5,819**

1. Replacements

a. Description

Typically, transmission pipelines are replaced to mitigate public safety and security risks 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 replacement projects are completed each year, ranging in size and magnitude from a few feet to several miles. Projects can involve difficult and hazardous access with many logistical challenges caused by weather or physical terrain. Not included in this category 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 SCG-08). Costs related to replacement of distribution pipelines are discussed in the testimony of Frank Ayala (Exhibit SCG-04).

The capital forecast for Pipeline Replacements for 2014, 2015, and 2016 is $6,123,000, $6,706,000, and $5,819,000, respectively. Specific details regarding Pipeline Replacements may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

As with larger projects, costs for these multiple, smaller, projects, are estimated by experienced pipeline construction management personnel using reference to recent pipeline construction projects of similar scope, pipe size and pressure, and construction environment. Estimate for 2016 is based on an average of the most recent five years of recorded costs. Estimates for 2014 and 2015 are slightly higher than the five- year average and are based on the experience and judgment of local pipeline people with knowledge of trends in construction costs and materials performance.

c. **Cost Drivers**

The underlying cost drivers for this capital project relate to pipe size and pressure, location of project (urban vs. rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. As stated previously, bid prices are a function of supply and demand of contractor capacity.

D. Freeway Relocations (Budget Code 3X3)

TABLE RKS-20
Southern California Gas Company
Freeway Relocations

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
D. Freeway Relocations	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Freeway Relocations	450	450	450
Total	**450**	**450**	**450**

1. Freeway Relocations

a. **Description**

SoCalGas plans to relocate and replace pipelines and related facilities found to be in conflict with California Department of Transportation (CalTrans) construction projects. Individual projects will vary from less than $10,000 to as high as multiple hundreds of thousands of dollars. These projects take place to meet operating, right-of-way, and franchise agreement requirements. Ongoing projects with CalTrans are not always known during the annual budgeting process. Throughout the year, SoCalGas is frequently required to relocate pipelines during the same year such projects are submitted to SoCalGas. Pipelines not relocated in a timely and accurate manner are subject to extreme damage by freeway construction equipment. The forecast for Gas Transmission – Pipeline Relocations – Freeway for 2014, 2015, and 2016 is

$450,000, $450,000, and $450,000, respectively. Specific details regarding Pipeline Relocations – Freeway may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The capital costs estimated for years 2014, 2015 and 2016 in this budget category are based on the five-year recorded average for years 2009 through 20013. This forecast is reasonable and conservative, since two of the five recorded years reflected costs much higher than the average shown here for all three planned years. Projects are typically 50% collectible unless the pipeline is within a right-of-way, in which case, it is usually 100% collectible. Based on our history and experience, we are estimating overall 50% collectability in this budget category.

c. Cost Drivers

The underlying cost drivers for this capital project relate to pipe size and pressure, location of project (urban vs. rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. As stated previously, bid prices are a function of supply and demand of contractor capacity.

E. Pipeline Relocations – Private/Franchise

TABLE RKS-21
Southern California Gas Company
Pipeline Relocations – Private and Public

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
E. Pipeline Relocations – Private/Franchise	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Line 2001 Relocation – Nogales Ave.	5,421	0	0
2. Westside Parkway - Line 7039 at Renfro Rd. N/O Stockdale	1,661	0	0
3. Fairway Drive Grade Separation - Line 2001	1,420	0	0
4. Fullerton Rd Grade Separation - Line 2001	203	893	0
5. Lines 1017 & 1018 Grand Ave. Grade Separation	0	1,014	5,072
6. Riverside Airport - Line 2001 Relocation	1,174	855	0
7. Gas Engineering - Pipeline Relocations - Franchise	0	476	2,694
8. Farmland Relocations	0	1,025	1,025
9. Gas Eng - Pipe Reloc - Franchise/Private - Blanket Projects	0	409	0
Total	**9,879**	**4,672**	**8,791**

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.

There are eight projects in this Budget Category large enough for individual description and are seen in the following paragraphs. The estimated cost for 2015 is the five-year average of recorded costs. Item 9 in the above table represents costs, in addition to known large projects, which will likely be spent on multiple smaller projects in 2015 if the average of previous years' recorded costs holds true.

1. Line 2001 Relocation – Nogales Ave.

a. Description

SoCalGas plans to procure, permit, and replace approximately 2,000 feet of Line 2001 30-inch pipeline that is in direct conflict with a grade separation project on Nogales St. and Union Pacific railroad in City of Industry. The grade separation retaining wall conflict with Line requires SoCalGas to relocate around Nogales Street and remove 560 feet of existing 30-inch Line 2001 pipe. This project is estimated to be approximately 43% collectible.

Pipelines are relocated according to the requirements of municipal franchises and property developers. Some are collectible and others are not, usually depending on the terms of rights-of-way agreements. Collectability in these types of relocations rests almost completely upon the prior rights established for the pipeline. Pipelines not relocated in a timely and accurate manner are subject to extreme damage by roadway construction equipment.

The capital forecast for Line 2001 Relocation – Nogales Ave. for 2014, 2015, and 2016 is $5,421,000 $0, and $0 respectively. Specific details regarding Line 2001 Relocation – Nogales Ave. may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

Costs are estimated by experienced pipeline construction management personnel using reference to recent pipeline construction projects of similar scope, pipe size and pressure, and construction environment.

c. Cost Drivers

The underlying cost drivers for this capital project relate to pipe size and pressure, location of project (urban vs. rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. As stated previously, bid prices are a function of supply and demand of contractor capacity.

2. Line 7039 Relocation – Westside Parkway at Renfro Road

a. Description

SoCalGas plans to relocate Line 7039 in the City of Bakersfield, at Westside Parkway and Renfro Road, due to roadway reconstruction. 24-inch Line 7039 is now located within Renfro Road. The Renfro Road crossing of Westside Parkway will be an overpass. The pipeline will require relocation into a cell within the newly-constructed bridge crossing Renfro Road. The pipeline relocation will consist of 30-inch casing pipe and 24-inch carrier pipe. This project is not collectible. The existing 24-inch pipeline must be relocated by SoCalGas because it is in direct conflict with roadway construction and is installed under terms of our franchise with the City of Bakersfield. Pipelines not relocated in a timely and accurate manner may be subject to extreme damage by roadway construction equipment.

The capital forecast for Westside Parkway at Renfro Road for 2014, 2015, and 2016 is $1,661,000 $0, and $0, respectively. Specific details regarding Westside Parkway at Renfro Road may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

Pipeline construction project costs are typically for materials, construction equipment, contract labor and paving repair. Such costs are estimated by experienced pipeline construction management personnel using reference to 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, location of project (urban vs. rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. As stated previously, bid prices are a function of supply and demand of contractor capacity.

3. Line 2001 – Fairway Drive Grade Separation

a. Description

SoCalGas plans to relocate approximately 845 feet of Line 2001 30-inch pipe to accommodate grade separation of Fairway Drive at the Union Pacific Railroad tracks in the City of Industry. We will also remove approximately 210 feet of abandoned 30-inch pipe. Relocating this portion of Line 2001 allows for new grade separation at Fairway Drive in the City if Industry. The project is 80% collectible. Work is being performed for the Alameda Corridor - East Construction Authority. Pipelines not relocated in a timely and accurate manner may be subject to extreme damage by construction equipment.

The capital forecast for Fairway Drive Grade Separation for 2014, 2015, and 2016 is $1,420,000 $0, and $0, respectively. Specific details regarding Fairway Drive Grade Separation may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

Pipeline construction project costs are typically for materials, construction equipment, contract labor and paving repair. Such costs are estimated by experienced pipeline construction management personnel using reference to 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, location of project (urban vs. rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. As stated previously, bid prices are a function of supply and demand of contractor capacity.

4. Line 2001 – Fullerton Road Grade Separation

a. Description

SoCalGas plans to relocate approximately 325 feet of 30-inch Line 2001 transmission pipeline to accommodate a grade separation from the Union Pacific Railroad tracks. We will also install casing piping and remove the abandoned existing line. This work is required by franchise agreement with the Alameda Corridor - East Construction Authority. Casing and groundwater removal are to be provided by the Alameda Corridor - East Construction Authority. The project is not collectible. Pipelines not relocated in a timely and accurate manner may be subject to extreme damage by construction equipment.

The forecast for Fullerton Road Grade Separation for 2014, 2015, and 2016 is $203,000, $893,000, and $0, respectively. Specific details regarding Fullerton Road Grade Separation may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

Pipeline construction project costs are typically for materials, construction equipment, contract labor and paving repair. Such costs are estimated by experienced pipeline construction management personnel using reference to 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, location of project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. Thus, bids vary based on the contractors' workloads and associated lead times.

5. Lines 1017 & 1018 Grand Ave. Grade Separation

a. Description

SoCalGas plans to relocate approximately 300 feet each of 24 and 30-inch transmission pipeline in Lines 1017 and 1018 to allow grade separation from the Burlington Northern/Santa Fe/Metrolink tracks south of Chestnut Ave in the City of Santa Ana. We will also install casing and remove existing piping. This project is required under terms of franchise agreements with the City of Santa Ana and the Orange County Transportation authority, and the cost is not collectible. Pipelines not relocated in a timely manner may be subject to extreme damage by construction equipment.

The forecast for the Grand Avenue Grade Separation for 2014, 2015, and 2016 is $0, $1,014,000 and $5,072,000 respectively. Specific details regarding the Grand Avenue Grade Separation project may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

Pipeline construction project costs are typically for materials, construction equipment, contract labor and paving repair. Such costs are estimated by experienced pipeline construction management personnel using reference to 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, location of project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. Thus, bids vary based on the contractors' workloads and associated lead times.

6. Line 2001 Relocation – Riverside Airport

a. Description

SoCalGas plans to relocate approximately 3,000 feet of 30-inch gas main to make way for extension of the main runway. This project also includes the removal of approximately 1,600 feet and the abandonment of 1,400 feet of existing 30-inch Line 2001. This relocation is 100% collectible due to the pipeline's prior rights and is required in order to accommodate the Airport's main runway extension. Pipelines not relocated in a timely and accurate manner are subject to extreme damage by construction equipment.

The forecast for Line 2001 Relocation – Riverside Airport for 2014, 2015, and 2016 is $1,174,000 $855,000 and $0, respectively. Specific details regarding the Line 2001 Relocation – Riverside Airport project may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

Costs are estimated by experienced pipeline construction management personnel using reference to recent pipeline construction projects of similar scope, pipe size and pressure, and construction environment.

c. Cost Drivers

The underlying cost drivers for this capital project relate to pipe size and pressure, location of project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. Thus, bids vary based on the contractors' workloads and associated lead times.

7. Line 1167 Relocation – Ballona Wetlands Restoration Project

a. Description

SoCalGas plans to abandon approximately 2,000 feet of 30- Line 1167, and construct new line in franchise public streets remote from the wetlands. This relocation is mandated by the governmental agency managing the Ballona wetlands. It is non-collectible due to the language of the existing easement. Pipelines not relocated in a timely and accurate manner are subject to extreme damage by construction equipment.

The forecast for Line 1167 Relocation – Ballona Wetlands Restoration Project for 2014, 2015, and 2016 is $0, $476,000, and $2,694,000, respectively. Specific details regarding the Line 1167 Relocation – Ballona Wetlands Restoration Project may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

Costs are estimated by experienced pipeline construction management personnel using reference to recent pipeline construction projects of similar scope, pipe size and pressure, and construction environment.

c. Cost Drivers

The underlying cost drivers for this capital project relate to pipe size and pressure, location of project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. Thus, bids vary based on the contractors' workloads and associated lead times.

8. Farmland Relocations

a. Description

SoCalGas plans to relocate at least two Transmission pipeline segments per year due to shallow depth under fields used for agriculture which causes the lines to be vulnerable to significant damage by plows and/or other implements. SoCalGas' Transmission lines have been averaging at least one actual damage per year over the last decade. This is indicative of many such lines now at depths much less than that of their original installation. Many Transmission pipelines were originally installed across grazing land that was subsequently converted to agriculture. Although these lines were originally installed at sufficient depth, subsequent grading to create level fields plus the natural process of erosion caused by wind and rainwater/irrigation runoff causes such lines to become shallow and vulnerable to damage. Pipelines not relocated in a timely and accurate manner are subject to extreme damage by agricultural equipment.

The forecast for Farmland Relocations for 2014, 2015, and 2016 is $0, $1,025,000, and $1,025,000, respectively. Specific details regarding Farmland Relocations may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

Costs are estimated by experienced pipeline construction management personnel using reference to recent pipeline construction projects of similar scope, pipe size and pressure, and construction environment. This estimate is based on the most recent farmland relocation that occurred in the Somis area which was approximately 750 feet of 15 inch transmission pipeline.

c. Cost Drivers

The underlying cost drivers for this capital project relate to pipe size and pressure, location of project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. Thus, bids vary based on the contractors' workloads and associated lead times.

F. Compressor Stations (Budget Code 3X5)

The Compressor Stations budget code includes costs associated with the installation and replacement of compressor station equipment used in operating the transmission system. 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. To keep operating costs down, reliance is made on automating data gathering systems to monitor performance data such as flows, pressures, and temperatures. The upgrade and replacement of controls consisting of out dated technology is critical to ensure the station is operating at its highest efficiency and that proper testing and diagnostics can be executed when the engine units are down. The capital forecast for Compressor Stations budget code is summarized in Table RKS-22 below.

TABLE RKS-22
Southern California Gas Company
Compressor Stations

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
F. Compressor Stations	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Transmission Operations – Newberry Springs – Power	1,544	0	0
2. Air Quality Retrofits (Rule 1160) & Update obsolete equipment	5,013	16,698	15,908
3. M&R – Wheeler Ridge Controls & Sensors upgrades	3,124	2,953	101
4. Compressor change outs for reliability & capacity – Ventura Station	0	4,518	28,855
5. Compressor change outs for reliability & capacity – Blythe Station	0	2,510	32,630
6. Compressor change outs for reliability & capacity – North & South Needles Stations	0	1,943	1,943
7. Compressor change outs for Reliability & capacity – Kelso Station	0	3,426	0
8. Multiple M&R projects for Controls & Upgrades – Blanket WOs	202	202	202
Total	**9,883**	**32,250**	**79,639**

1. Newberry Springs Power Generation

a. Description

SoCalGas plans to replace electrical power generation capacity at the Newberry Springs Compressor facility. This will add ten 200 kilowatts Capstone microturbines, controls, and all equipment necessary to completely switch to this new power generation system. The existing worn and obsolete Waukesha generators and associated equipment will be abandoned and removed as part of the scope of this project. In addition, the new Capstone units will help reduce greenhouse gas emissions in order to meet an Environmental Protection Agency ruling.

The forecast for the Newberry Springs Power Generation project for 2014, 2015, and 2016 is $1,544,000 $0, and $0, respectively. Specific details regarding the Newberry Springs Power Generation project may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

Costs are estimated by experienced Transmission and compressor management personnel using reference to recent compressor-related construction projects of similar scope, equipment type and construction environment.

c. Cost Drivers

The underlying cost drivers for this capital project relate to equipment size and pressure, location of project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. Thus, bids vary based on the contractors' workloads and associated lead times.

2. Mojave AQMD Rule 1160 and Update Obsolete Equipment

a. Description

SoCalGas plans to implement many individual projects that will consist of one or a combination of the following installations: replacing the pneumatic and electro-mechanical control systems and related station auxiliary systems, installation of new engine control panels, new station control panel and replacement of sensors, wiring, industrial communications and local controllers. The largest of these endeavors will take place at compressor facilities under the jurisdiction of the Mojave Desert Air Quality Management District, due to final passage of revised Rule 1160, which was delayed for several years. Compressor engine components have a finite life requiring regular replacement and/or upgrade as recommended by the manufacturer to ensure reliability and transportation ability for the Southern California market. For older stations where existing control and auxiliary equipment technology are outdated, replacements are required to interface with newer data acquisition systems and air quality mandated emission system upgrades.

As previously mentioned, the air quality rules that govern emission standards are being revised at both the federal and local levels in the Mojave Air District jurisdiction. Rule 1160 reduces nitrous oxide, carbon monoxide, and volatile organic compound limits. While specific technology is required on the various engines throughout the air district in order to comply with the revised rules, the available technology overlaps to achieve compliance with Rule 1160.

The forecast for Mojave AQMD Rule 1160 and Update Obsolete Equipment for 2014, 2015, and 2016 is $5,013,000, $16,699,000, and $15,908,000, respectively. Specific details regarding the Mojave AQMD Rule 1160 and Update Obsolete Equipment project may be found in my capital workpapers, Exhibit SCG-07-CWP. In addition, the policy support for Mojave Desert Air Quality Management District Rule 1160 is provided by the witness Jill Tracy in Exhibit SCG-17.

b. Forecast Method

Engine retrofit costs are typically for materials, construction equipment and contract labor and were estimated based on a site-specific basis which recognizes the requirements for each engine. Such costs are estimated by experienced compressor station management personnel using reference to recent compressor engine retrofit projects of similar scope, equipment type and construction environment.

c. Cost Drivers

The underlying cost drivers for this capital project relate to equipment size and pressure, location of project (urban vs. rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. As stated previously, bid prices are a function of supply and demand of contractor capacity.

3. Wheeler Ridge Controls and Sensors

a. Description

SoCalGas plans to upgrade electronic control system components and associated operating panels on four (4) Solar Saturn Gas turbines and related compressor station controls, including gas cooling, station valves, and emission control interfaces. This station was installed in 1992 and current electronic control system components are 22 or more years old. Work is needed to replace aging equipment prior to steep decline in reliability and to contend with equipment that is no longer actively supported by, or available, from suppliers. The proposed upgrades will sustain the station's availability and reliability. Specific replacements are to include new programmable logic controllers, wiring, modules for reading and controlling field instruments, operator interface control panels, fuel and mode control valves, power supplies, back-up battery systems, and software to optimize engine performance and emissions.

The forecast for Wheeler Ridge Controls & Sensors upgrades for 2014, 2015, and 2016 is $3,124,000, $2,953,000, and $101,000, respectively. Specific details regarding the Wheeler Ridge Controls and Sensors Upgrades project may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The largest component of project costs is typically for materials, construction equipment and contract labor. Such costs are estimated by personnel experienced with rebuilding and/or upgrading large industrial engines and other projects related to the compressors and related operating and controls technology. Estimating personnel use reference to recent compressor station projects of similar scope, equipment type and construction environment in order to produce accurate estimates that are based on recent experiences.

c. Cost Drivers

The underlying cost drivers for this capital project relate to equipment size and pressure, location of project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. Thus, bids vary based on the contractors' workloads and associated lead times.

4. Ventura Compressor and Engine Change-Out

a. Description

SoCalGas plans to increase the compressor engine horsepower from the currently-available 3,300-15,000 horsepower to meet Goleta Storage field requirements in future years. Most of the station will be rebuilt from scratch. Associated instrumentation and controls will also be upgraded. The existing 3,300 horsepower station has been utilized to provide increased "suction" pressure at the Goleta Storage Field and has been operated mainly based on gas injection activity at Goleta. Future utilization of this station is to meet Goleta's summer injection requirements and to meet the summer load gas demand on the coastal system impacted by a reduction in local gas production, namely from Pacific Offshore Production Company site. Meeting these needs will require 15,000 horsepower at the Ventura Station. SoCalGas' Energy Markets and Capacity Products departments recommend that this project be added as soon as possible.

The forecast for the Ventura Compressor and Engine Change-out for 2014, 2015, and 2016 is $0, $ 4,518,000, and $28,855,000, respectively. Specific details regarding the Ventura Compressor and Engine Change-out project may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The largest component of project costs is typically for materials, construction equipment and contract labor. Such costs are estimated by personnel experienced with rebuilding and/or upgrading large industrial engines and other projects related to the compressors and related operating and controls technology. Estimating personnel use reference to recent compressor station projects of similar scope, equipment type and construction environment in order to produce estimates that are as accurate and timely as possible.

c. Cost Drivers

The underlying cost drivers for this capital project relate to equipment size and pressure, location of project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. Thus, bids vary based on the contractors' workloads and associated lead times.

5. Blythe Compressor and Engine Change-Out

a. Description

The Blythe Compressor Station is one of SoCalGas' oldest and is the largest receipt-point compression facility. It currently has five poorly-performing compressor engines, which severely limit reliability and capacity. This project is a conservative attempt to restore capacity and that falls far short of replacing all eight 60 and older compressor engines, pads, piping supports and associated controls. The most critical issue at Blythe is the engine/compressor foundation's movement at the high-speed Caterpillar units. This movement and settling has caused piping stresses and alignment problems with the compressors, engines, frames, and auxiliary equipment. It also is causing the exhaust stack and silencers to lean several degrees and to show signs of "crushing." This may pose a safety issue if not rectified along with the other problems. The other of many issues is related to the Clark engines having been equipped with a variety of piston rider bands. They need to be standardized with a common modern design using industry-standard rider bands. This is to occur while the compressor cylinders and liners are repaired and refurbished as appropriate.

The forecast for the Blythe Compressor and Engine Change-out project for 2014, 2015, and 2016 is $0, $ 2,510,000, and $32,630,000, respectively. Specific details regarding the Blythe Compressor and Engine Change-out project may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The largest component of project costs is typically for materials, construction equipment and contract labor. Such costs are estimated by personnel experienced with rebuilding and/or upgrading large industrial engines and other projects related to the compressors and related operating and controls technology. Estimating personnel use reference to recent compressor station projects of similar scope, equipment type and construction environment in order to produce estimates that are as accurate and timely as possible.

c. Cost Drivers

The underlying cost drivers for this capital project relate to equipment size and pressure, location of project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. Thus, bids vary based on the contractors' workloads and associated lead times.

6. North and South Needles Compressor and Engine Change-Outs

a. Description

This project includes costs associated with the installation and replacement of compressor station equipment used in operating the transmission system and covers needed replacements and upgrades at both the North and South Needles compressor stations. The nature of compressor station operation requires consistent maintenance and replacement of key engine components and controls equipment to support the reliability and safety of the facility. To keep operating costs down, reliance is made on automating data gathering systems to monitor performance data such as flows, pressures, and temperatures.

North Needles is strategically important as it is the single receipt point for the 34 inch Transwestern pipeline. It has been in service since 1965. Although no new capacity is planned for North Needles at this time, there is critical need for a new power generator, a new air compressor and the other capital maintenance items listed on the below-noted work paper.

South Needles is also a major receipt point on the California-Arizona border that has been in service since 1957. It also needs no additional capacity but is in critical need of capital maintenance as also listed on the work paper in order to keep this aging asset operating reliably and efficiently.

The forecast for the Needles Compressor and Engine Change-Outs project for 2014, 2015, and 2016 is $0, $1,943,000, and $1,943,000, respectively. Specific details regarding the Needles Compressor and Engine Change-outs project may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The largest component of project costs is typically for materials, construction equipment and contract labor. Such costs are estimated by personnel experienced with rebuilding and/or upgrading large industrial engines and other projects related to the compressors and related operating and controls technology. Estimating personnel use reference to recent compressor station projects of similar scope, equipment type and construction environment in order to produce estimates that are as accurate and timely as possible.

c. Cost Drivers

The underlying cost drivers for this capital project relate to equipment size and pressure, location of project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. Thus, bids vary based on the contractors' workloads and associated lead times.

7. Kelso Compressor Change-Outs for Reliability

a. Description

SoCalGas plans to replace the leaking Clark centrifugal compressor wet seal with a mechanical dry seal system and to replace the turbine recuperator/regenerator lower tube sheet, which has been weld-repaired several times, with a new side-mount design. The Clark centrifugal compressor wet seal leaks gas to the atmosphere which, despite the remote location of the Kelso Station, creates a methane emissions issue that needs to be remediated. The recuperator/generator has not only been weld repaired several times due to cracking, but tubes in the recuperator have been plugged due to the tube sheet cracks. Thermal efficiency of the recuperator has been compromised. Additional repairs may not be possible. Replacing it with a side mount design would allow easier stack access for emissions testing but more importantly would improve safety and access to the hot section of the turbine for maintenance.

The forecast for the Kelso Compressor & Engine Change-outs for 2014, 2015, and 2016 is $0, $ 3,426,000 and $0, respectively. Specific details regarding the Kelso Compressor and Engine Change-outs project may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The largest component of project costs is typically for materials, construction equipment and contract labor. Such costs are estimated by personnel experienced with rebuilding and/or upgrading large industrial engines and other projects related to the compressors and related operating and controls technology. Estimating personnel use reference to recent compressor station projects of similar scope, equipment type and construction environment in order to produce estimates that are as accurate and timely as possible.

c. Cost Drivers

The underlying cost drivers for this capital project relate to equipment size and pressure, location of project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. Thus, bids vary based on the contractors' workloads and associated lead times.

8. Multiple M&R Projects for Controls and Upgrades – Blanket

a. Description

SoCalGas plans multiple smaller controls upgrade projects not qualifying for individual workpapers. These are typically addressed in blanket work orders. Individual project scopes can consist of one or a combination of the following installations: replacing the pneumatic and electro-mechanical control systems and related station auxiliary systems, installation of new engine control panels, new station control panel and replacement of sensors, wiring, industrial communications and local controllers, new Programmable Logic Controllers, local control networks, operator interfaces, continuous emissions monitoring, pre-combustion chambers, and new catalysts. Compressor engine components have a finite life requiring regular replacement and/or upgrade as recommended by the manufacturer to facilitate reliability and transportation ability for the Southern California market. For older stations where existing control and auxiliary equipment technology are outdated, replacements are required to interface with newer data acquisition systems and air quality mandated emission system upgrades.

The forecast for Multiple M&R Projects for Controls and Upgrades – Blanket for 2014, 2015, and 2016 is $202, $202, and $202, respectively. Specific details regarding Multiple M&R Projects for Controls and Upgrades – Blanket may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The largest component of project costs is typically for materials, construction equipment and contract labor. Such costs are estimated by personnel experienced with rebuilding and/or upgrading large industrial engines and other projects related to the compressors and related operating and controls technology. Estimating personnel use reference to recent compressor station projects of similar scope, equipment type and construction environment in order to produce estimates that are as accurate and timely as possible.

c. Cost Drivers

The underlying cost drivers for this capital project relate to equipment size and pressure, location of project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. Thus, bids vary based on the contractors' workloads and associated lead times.

G. Cathodic Protection (Budget Code 316)

TABLE RKS-23
Southern California Gas Company
Cathodic Protection

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
G. Cathodic Protection	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. GT Cathodic Protection / Externally Driven	1,332	8,986	8,986
Total	**1,332**	**8,986**	**8,986**

1. Gas Transmission – Cathodic Protection

a. Description

Cathodic Protection includes costs associated with the installation of cathodic protection equipment used to preserve the integrity of transmission pipelines by protecting them from external corrosion. These projects are mandated by federal and state minimum pipeline safety regulations, and facilitate the maintenance of adequate cathodic protection on company facilities. Typical expenditures include the replacement of surface anode beds, deep well anodes and/or rectifier systems, installation of new cathodic protection stations, and applying cathodic protection to existing steel mains and service lines. Cathodic protection projects may also include the installation of new remote satellite communication technology, which allows for more efficient operation and monitoring of the cathodic protection system.

The increased spending beginning in 2015 is to fund needed capital repairs of pipelines with poor or disbonded coating, which prevents cathodic protection from preventing rusting and pitting over the entire exposed wall of the pipeline. To correct these conditions, in many cases, the pipeline will be exposed for application of new coating, but if found in poor condition, the entire affected pipe segment will be replaced. SoCalGas believes prompt action is warranted in the case of disbonded wrap because the exterior wall of the line is exposed to localized corrosion and deep pitting at these locations. Application of cathodic protection provides greater system protection against corrosion but only if buried steel structures are adequately insulated from their soil environment. Cathodic protection allows SoCalGas to meet Federal and State safety compliance requirements, ensuring reliability of transportation into the Southern California market. The incremental amount mentioned above is to remediate inadequate and localized exposure of Transmission pipelines with poor coating to rust, pitting, and eventual failure.

The forecast for Cathodic Protection for 2014, 2015, and 2016 is $1,332,000 $8,986,000 and $8,986,000 respectively. Specific details regarding Cathodic Protection costs may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The 2014 forecast is zero-based because the Region's capital plan for that year reflects recent work demands in the cathodic protection area. Estimates for years 2015 and 2016 are a rough lump sum amount based on condition discoveries over the past few years where cathodic protection has been only marginally effective due to poor wrap on the pipe. To excavate, expose, strip, rewrap, backfill and compact, and repave Transmission piping can easily cost $1,000.00 per foot. This estimate provides for approximately 1.5 miles of poorly coated line per year. SoCalGas expects to use this entire amount each year to either re-coat pipe or to replace the pipe segments found deeply pitted.

c. Cost Drivers

The underlying cost drivers for this capital project relate to the specialized nature of pipeline coating application and the need to install rectifiers that provide adequate protection without affecting nearby foreign pipelines. Also a driver is the location of the project (urban versus rural), lead time, availability of qualified contractors and drilling rigs, and work load. Lead time is often a function of capacity and volume demands or the demands of local governmental agencies. There are only so many qualified drilling contractors in Southern California and they perform work for customers other than SoCalGas. Thus the bid climate varies, depending on contractor workload and associated lead times.

H. Measurement and Regulation Stations (Budget Code 3X8)

TABLE RKS-24
Southern California Gas Company
Meter and Regulator Stations

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
H. M&R Stations	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Kettleman Station Valve replacement	1,543	0	0
2. Valves for Class Location compliance – Aging infrastructure	3,582	6,149	7,171
3. M&R Operations – Major Customer MSA Rebuilds; BTU District GC & ancillaries	2,866	3,274	2,150
Total	**7,991**	**9,423**	**9,321**

This Budget Category includes local controls and communication devices such as programmable logic controllers, pressure transmitters, Uninterruptable Power Supplies systems, temperature probes, gas quality remote sensors, and communication interfaces/technologies. This equipment is used to control the flow of gas in pipelines, valves and regulator stations both locally and through the initiation of remote commands from central Supervisory Control and Data Acquisition (SCADA) system.

1. Kettleman Station Valve Replacement

a. Description

SoCalGas plans to replace the existing plug valve at Kettleman Measuring station 89 on Line 800 with a full-opening ball valve with remote actuator and to add a flow meter. Installation of a full-opening ball valve off Line 7043 provides for added capacity in downstream Line 800, which feeds several distribution Supply lines in need of reinforcement due to customer growth. This station will provides flow and pressure monitoring and remote control at this tap valve in the event of a downstream break. The ability by Gas Control to close this valve in the event of an emergency protects throughput in upstream Line 7043 and the feed originating in backbone Line 85.

The forecast for the Kettleman Station Valve Replacement for 2014, 2015, and 2016 is $1,543,000 $0, and $0, respectively. Specific details regarding the Kettleman Station Valve Replacement project may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

Costs are estimated by experienced pipeline construction management personnel using reference to recent pipeline construction projects of similar scope, pipe size and pressure, and construction environment in order to provide accurate and timely cost estimates.

c. Cost Drivers

The underlying cost drivers for this capital project relate to pipe size and pressure, location of project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. Thus, bids vary based on the contractors' workloads and associated lead times.

2. Valves for Class Location Compliance – Aging Infrastructure

a. Description

Typical expenditures for this project include the instrumentation necessary for the metering or regulating of natural gas in connection with transmission operations and, in particular, costs associated with additions or replacements of station piping, valves, regulators, control and communications equipment, shelters and enclosures. This project also includes adding and/or replacing critical valves in transmission pipelines to comply with federal class location regulations. In addition, local projects are included to replace or upgrade customer meter sites and large pressure regulating equipment due to age and/or obsolescence. Funding planned for this project includes installation of new meter and regulation equipment associated with operation of the transmission pipeline system. 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.

The installation of this equipment is associated with the safe and reliable local operation of SoCalGas meter, regulator and valve stations in conformance with DOT and CPUC requirements for the limiting of pipeline and vessel operating pressures. All gas facilities must be operated within their maximum allowable operating pressure parameters, and this equipment, whether for newly-installed stations or where replacement is warranted, maintains this compliance and operating integrity.

The forecast for the Valves for Class Location Compliance – Aging Infrastructure for 2014, 2015, and 2016 is $3,582,000, $6,149,000, and $7,171,000, respectively. Specific details regarding Valves for Class Location Compliance – Aging Infrastructure may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The largest component of project costs is typically for materials, construction equipment and contract labor. Such costs are estimated by personnel experienced with rebuilding and/or upgrading large industrial meter sets, pressure regulating and valve stations, and other projects related to the meters, regulators and valves and related operating and controls technology. Estimating personnel use reference to recent station projects of similar scope, equipment type and construction environment in order to produce estimates that are as accurate and timely as possible.

c. Cost Drivers

The underlying cost drivers for this capital project relate to the growth of the system and the increasing average age of gas pressure metering and regulation equipment. Also, a factor is the trend toward automation and remote operating capabilities, as is simple obsolescence of installed equipment that may no longer be supported by the manufacturer, and the associated and increasing scarcity of replacement parts.

3. Major Customer Meter Set Assembly Rebuilds, BTU District Gas Chromatographs and Ancillaries

a. Description

In this project, SoCalGas plans for the installation (new, rebuild or upgrade) of gas metering and regulator stations associated with gas transmission pipeline operation and customers served from those pipelines. The assets include base mechanical and electronic metering systems, pressure regulating and valve stations used in conjunction with volume measurement and gas quality measurement facilities use to compute heating values applied to 6 million customers; and to track gas quality for regulatory reporting. Customer metering infrastructure projects are associated with two principal drivers, the age of existing equipment (typically 35-50 years old) and changes to the operating profile of many Electric Generating plants located in the Los Angeles basin due to "repowering" activity. Customers have changed equipment and associated load profiles for service. In most instances, peak load has been reduced while load range and transient operational requirements have or will increase. The target facilities to be rebuilt include Scattergood Electrical Generating Plant (to be completed first quarter 2014), and one other large facility in each of years 2014, 2015 and 2016. Many of these large Meter Set Assembly sites have been in service for decades and are approaching or are past their expected service lives. These replacements are critical to continue to provide safe, reliable and accurate measurement and pressure regulation to these large industrial customers. BTU measurement of natural gas in the system is vital to accurate billing of every customer of SoCalGas and these sites deserve the most accurate and reliable measuring equipment available to meet mandated requirements and customers' expectations.

The forecast for Major Customer Meter Set Assembly Rebuilds, BTU District Gas Chromatographs & Ancillaries for 2014, 2015, and 2016 is $2,866,000, $3,274,000, and $2,150,000, respectively. Specific details regarding Major Customer Meter Set Assembly Rebuilds, BTU District Gas Chromatographs and Ancillaries may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The forecast used a zero-based methodology, because historical spending is not fully reflective of future cost. The project costs are typically for materials, construction equipment, contract labor, and these cost estimates are based on subject matter experts using recent installation experience. Recent installations exceed $2 million per site. These historical and recent costs were utilized to forecast the installation and upgrades of two to four sites, annually. The forecast is a combination of new installations and retrofits. This combination includes the work to rebuild one large customer metering facility per year (at approximately $2 million) and the upgrade and/or new installation of transmission pipeline BTU metering stations per year.

c. **Cost Drivers**

The need for this work is driven by changing operational flow requirements and conditions on SoCalGas transmission pipeline system, which drive the need for additional or relocation of existing gas heating value measurement facilities, in order for SoCalGas to fully comply with the requirements in General Orders 58-A and 58-B for customer billing accuracy.

I. Auxiliary Equipment (Budget Code 3X9)

Estimated costs in this category include new installations or upgrades of aging Measurement and Regulation station and pipeline system control and telemetry systems which link with and provide information to, but are not a direct part of SoCalGas centralized Gas Control's SCADA computer system. Assets that reside on the upstream side of the remote communications network to SoCalGas central SCADA system are defined and requested under plant category 309/319. SoCalGas has over 200 pipeline locations where local controls interface with its operations control center/central SCADA system. SoCalGas installs and/or modifies 10-20 such facilities in a typical year.

TABLE RKS-25
Southern California Gas Company
Auxiliary Equipment

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
I. Auxiliary Equipment	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Transmission Operations - Pipeline Span Supports	1,274	0	0
2. Communications Replacement for critical Remote Tel	0	809	809
3. GT-Aux_Equipment	2,929	3,394	3,394
4. High Pressure Data Synchronization	2,676	5,353	2,676
Total	**6,879**	**9,556**	**6,879**

1. Pipeline Span Supports

a. **Description**

SoCalGas plans to install new transmission pipeline supports on existing spans in Lines 247, 159, and 128 in the Goleta Storage Field (transmission pipelines), and to replace a span in Line 103 across the Buena Vista canal adjacent to Tupman Road near the community of Buttonwillow, California. The replacements include permitting, engineering design, soil testing and analysis, plus fabrication and installation and removal of old structures. The existing spans are old and weak and no longer provide the required support for these pipelines. To not perform this work would expose these lines to out-of-tolerance stress and ultimate failure.

The forecast for Pipeline Span Supports for 2014, 2015, and 2016 is $1,274,000 $0, and $0, respectively. Specific details regarding Pipeline Span Supports may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

Costs are estimated by experienced pipeline construction management personnel using reference to recent pipeline construction projects involving spans of similar scope, pipe size, length, and construction environment in order to produce estimates that are as accurate and timely as possible.

c. Cost Drivers

The underlying cost drivers for this capital project relate to pipe size and pressure, location of project (urban versus rural), lead time, availability of qualified contractors, and work load. Pipe size and pressure is a function of required volume. Pipe grade and wall thickness is a function of design related to operating pressure and location class location. Lead time is often a function of customer notice to SoCalGas or the demands of local governments. There are only so many qualified contractors in Southern California and they perform work for customers other than SoCalGas. Thus, bids vary based on the contractors' workloads and associated lead times.

2. Communications Replacement for Key Remote Telemetry Units

a. Description

Estimated funding in this category includes new installations or upgrades of aging Measurement and Regulation station and pipeline system control and telemetry systems which link with and provide information to, but are not a direct part of SoCalGas centralized Gas Control's SCADA computer system. SoCalGas has over 200 pipeline locations where local controls interface with its operations control center/central SCADA system. SoCalGas installs, replaces and/or upgrades 10-20 such facilities in a typical year. This capital work will maintain reliable operation of important transmission assets by replacing equipment that is worn out and/or has been deployed past its useful life. These assets require replacement due to aging, change in use patterns, and enhancement of the transmission system to contend with gas quality and capacity issues.

The forecast for Replacement for key Remote Telemetry Unit (RTU) for 2014, 2015, and 2016 is $0, $809,000 and $809,000 respectively. Specific details regarding Key Remote Telemetry Unit may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

This estimate is based on 15 to 20 site telemetry systems replacements and/or upgrades per year during 2015 and 2016 at approximately $46,000 per site.

c. Cost Drivers

The underlying cost drivers for this capital project relate to the unique nature of power back-up systems installed to support operation of natural gas Transmission systems. There are a limited number of providers of acceptable equipment and price and performance are the drivers in determining costs for installations and replacements.

3. Auxiliary Equipment – Blanket Projects

a. Description

Estimated costs in this category includes new installations or upgrades of aging Measurement and Regulation station and pipeline system control and telemetry systems which link with and provide information to, but are not a direct part of SoCalGas centralized SCADA computer system. Many of these projects will involve costs not high enough for separate listing on their own work paper. Some will be in the magnitude of several tens of thousands of dollars to as high as several hundred thousands of dollars. Assets which reside on the upstream side of the remote communications network to SoCalGas central SCADA system are defined and requested under plant category 309/319. SoCalGas has over pipeline 200 locations where local controls interface with its operations control center/central SCADA system. SoCalGas installs and/or modifies 10 to 20 such facilities in a typical year. This capital work maintains reliable operation of critical transmission assets by replacing equipment that has been deployed past its useful life. These assets require replacement due to aging, change in use patterns, and enhancement of the transmission system to contend with gas quality and capacity issues. Many such projects involve the telemetry necessary to operate remote, critical, valves and to monitor pressures and flows in the Transmission system.

The forecast for Auxiliary (Aux) Equipment – Blanket Projects for 2014, 2015, and 2016 is $2,929,000 $3,394,000 and $3,394,000 respectively. Specific details regarding Aux Equipment – Blanket Projects may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

Costs are estimated by experienced pipeline construction management personnel using reference to recent gas operating controls projects of similar scope, equipment type and operating location. The estimate for the test year is based on approximately 18 projects at an average cost of $188,500 per project.

c. Cost Drivers

The underlying cost drivers for this capital project relate to equipment type and complexity, operating location, availability of qualified contractors, and workload. Thus, bids vary, depending on contractor workloads and associated lead times.

4. High Pressure Data Synchronization

a. Description

This project will implement Gas GIS application solutions to support Operations, which include Gas Transmission. This work is required to support and demonstrate compliance with federal and state regulations. The project focuses on software development, configuration, and data model enhancements of the existing Gas GIS systems.

The objective of this project is to enhance SoCalGas' GIS and computer-aided drafting and design systems to enable improvements for high pressure and storage integrity and safety management. This first phase includes the following:

- Providing a synchronized view of high pressure asset data across GIS and computer-aided drafting and design systems;
- Developing new data models for high pressure distribution, transmission and storage data;
- Reconciling existing assets and their attribution; and
- Converting selected linear asset data to a geospatial format to support connectivity modeling.

The second phase includes the following:

- Identification and documentation of system of record;
- Conversion of linear assets to geospatial data and QA/QC of data;
- Technical enhancements for forward-looking data capture;
- Policy changes and process improvements; and

- Improved risk assessment, analytics, and reporting capabilities.

This project represents the capital activities that support requested operational O&M activities to help SoCalGas meet regulatory compliance and reporting requirements. Benefits are the ability to demonstrate compliance, complete regulatory reporting, and cost avoidance.

The forecast for High Pressure Data Synchronization for 2014, 2015, and 2016 is $2,676,000, $5,353,000, and $2,676,000, respectively. Specific details regarding High Pressure Data Synchronization may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The forecast method used is that of personnel experienced in data systems' development of similar scope and complexity as well as data conversion and management. FTE requirements, company and contract, were estimated and tallied for each required functionality and data set and priced accordingly. Company labor is based on:

- Six (6) FTEs to do data modeling and specify rules for conversion;
- Eight (8) FTEs to do vendor conversion and perform Quality Assurance (QA); and
- Eight (8) FTEs to do application and Integration, Process/policy and technical guidance and direction, change management and project management.

Contract costs are based on:

- Six (6) contract resources to do data modeling and specify rules for conversion;
- Three (3) contract resources to do vendor conversion and QA; and
- Fourteen (14) contract resources and three (3) consultants to do application and Integration, support Process/policy and technical guidance and direction, change management and project management.

c. Cost Drivers

The underlying cost drivers for this capital project relate to the highly specialized nature of data systems' development and its applicability to transmission pipeline records keeping, analysis and operations. Costs for skilled personnel who are qualified for this work, especially related to GIS, is market-driven by supply and demand and vary somewhat according to the complexity, platform, and experience level of the labor forces employed.

J. Land Rights (Budget Code 617)

TABLE RKS-26
Southern California Gas Company
Land Rights

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
J. Land Rights	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Land Rights	149	149	149
Total	**149**	**149**	**149**

1. Land Rights

a. Description

This Budget Code provides capital funding for purchases of land or land rights for new Transmission pipelines and for existing rights-of-way that have expired per contractual obligation and need to be re-negotiated. Typically, these are for pipelines installed in private lands. Federal law requires public utility lines occupying private lands to be protected by acquisition of land rights thus protecting the utility and their downstream consumers.

The forecast for Pipeline Land Rights for 2014, 2015, and 2016 is $149,000, $149,000, and $149,000, respectively. Specific details regarding Pipeline Land Rights may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The forecast method used is the five-year average of recorded costs in this budget code. The five- year average is both fair and conservative, because the most recent recorded year's cost is four times the estimate presented here and leaves SoCalGas with the risk of severe under-funding in this budget category.

c. Cost Drivers

The underlying cost drivers for this capital project relate to market conditions, typically driven by supply and demand, of the real estate market and by overall economic conditions in place at the time of purchase or re-negotiation.

K. Storage – Buildings (Budget Code 632)

TABLE RKS-27
Southern California Gas Company
Buildings – Gas Storage

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
K. Storage – Buildings	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Storage Buildings	24	1,589	24
Total	**24**	**1,589**	**24**

1. Storage Buildings

a. Description

Storage Buildings and Structures may be gauge houses, shelters for multiple critical valves or buildings providing shelter and protection for critical controls or SCADA-related equipment. Such structures and buildings vary from frame-and-stucco houses or buildings made from reinforced masonry blocks in cases where protection and security is needed. Protection of electronic equipment from the elements is done by placing it in a suitable housing and if in a remote location that housing may be a hardened structure to also protect it from vandalism. Such protection may be required by federal or state laws, but most often, is required to protect vulnerable and expensive equipment.

The forecast for Gas Storage - Buildings for 2014, 2015, and 2016 is $24,000 $1,589,000 and $24,000 respectively. In 2015, an incremental amount of $1.565 million has been added to the five-year average recorded cost to provide physical security at a critical Storage field described in my workpapers. Specific details regarding Gas Storage – Buildings may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The forecast method used is the five-year average (2009 through 2013) of recorded costs in this budget code in years 2014 and 2016. The five-year average is appropriate because costs were only recorded in one of five years and were five times higher than the annual estimates presented here in 2014 and 2016. Funds to provide enhanced security at critical sites have been added to the estimate for 2015 as noted above.

c. **Cost Drivers**

The underlying cost drivers for this capital project relate to general construction costs in industrialized settings, typically gas storage fields, and the specialized nature of structures utilized in the storage fields. Usually, every building, shelter, etc. is a unique one-time structure and the costs of building or modifying it is unique to a specialized class of contractors. Competitive bids are taken but are limited to a limited class of specialized builders.

L. Transmission – Buildings (Budget Code 633)

TABLE RKS-28
Southern California Gas Company
Buildings – Gas Transmission

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
L. Transmission – Buildings	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Transmission Buildings	480	8,679	11
Total	**480**	**8,679**	**11**

1. Transmission Buildings

a. **Description**

This Budget Category provides funding for construction, replacement or upgrades to building structures used by Transmission operations to contain, shelter and/or protect Transmission equipment such as meter stations, pressure regulating equipment, critical valves, or controls equipment. Such buildings and structures may be gauge houses, shelters for multiple critical valves or buildings providing shelter and protection for critical controls or SCADA-related equipment. Such structures and buildings vary from frame-and-stucco houses or buildings made from reinforced masonry blocks in cases where protection and security is needed. The estimated amount in 2014 and 2015 is to provide physical hardening, such as what is described below, at the nine locations with the specific names noted in my capital workpapers.

The planned work includes:

- Upgraded perimeter barriers and fencing;
- Enhanced or added cameras at entrance points and/or perimeters;
- Enhanced locking systems; and
- A new security guard kiosk.

Protection of electronic equipment from the elements is done by placing it in suitable housing and. if in a remote location, that housing may be a hardened structure to also protect it from vandalism. Such protection may be required by federal or state laws, but most often is required to protect vulnerable and expensive equipment, critical valves and pressure regulating equipment.

The forecast for Gas Transmission - Buildings for 2014, 2015, and 2016 is $480,000, $8,679,000, and $11,000, respectively. Specific details regarding Gas Transmission – Buildings may be found in my confidential capital workpapers, Exhibit SCG-07-CWP (Confidential).

b. Forecast Method

The forecast for years 2014 and 2015 is based on a list of needed improvements in security at selected remote sites based on objective criteria. The objective criteria was developed in a collaborative framework by first using Transportations Security Administration's) guidelines, in consultation of local field management's expertise and knowledge, and with Corporate Security's guidance and technical review. The cost estimates are based on prevailing rates for fencing, cameras, barricades, and locking systems. I used 2012 recorded actual for the TY2016 forecast, as there were no charges here from 2009 to 2012.

c. Cost Drivers

The underlying cost drivers for this capital project relate to general construction costs in industrialized settings, typically gas valve or pressure regulating stations, and the specialized nature of structures related to Transmission pipelines. Usually, every building, shelter, etc. is a unique one-time structure and the costs of building or modifying it are unique to a specialized class of contractors. Competitive bids are taken but are limited to a limited class of specialized builders.

M. Laboratory Equipment (Budget Code 730)

TABLE RKS-29
Southern California Gas Company
Laboratory Equipment

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
M. Laboratory Equipment	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Laboratory Equipment	485	485	485
Total	**485**	**485**	**485**

1. Laboratory Equipment

a. Description

SoCalGas equips the Engineering Analysis Center with modern, state-of-the-art laboratory equipment necessary to maintain the Company's ability to perform necessary analysis and evaluation of materials, emissions and technology. Tools used by laboratory personnel are frequently sensitive instruments for measuring a variety of materials, substances and gases including emissions. Other equipment may be ovens, burners, microscopes, scales and handling equipment.

Tools used by laboratory personnel are frequently sensitive instruments for measuring a variety of materials, substances and gases including emissions. Other equipment may be ovens, burners, microscopes, scales and handling equipment. Regulations are already in process requiring equipment upgrades for both pipeline and engine monitoring. Equipment replacement schedules are developed based on equipment life and past practices thus requiring purchase of new equipment. Laboratory-grade equipment will continue to evolve and become more costly.

The forecast for Laboratory Equipment for 2014, 2015, and 2016 is $485,000, $485,000, and $485,000, respectively. Specific details regarding Laboratory Equipment may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The forecast method used is the five-year average of recorded costs in this budget code for years 2009 through 2013. The five-year average is reasonable and conservative due to the fact that the most recent recorded year had costs nearly double the estimate presented here.

c. Cost Drivers

The underlying cost drivers for this capital project relate to the specialized nature of laboratory equipment and the relatively few suppliers of quality cost-effective tools and measuring systems.

N. Capital Tools (Budget Code 736)

TABLE RKS-30
Southern California Gas Company
Capital Tools

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
N. Capital Tools	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Capital Tools	687	687	687
Total	**687**	**687**	**687**

1. Capital Tools

a. Description

This budget code provides for acquiring and replacing high-value tools used on a daily basis by the operating people of Transmission and Storage. These can include Volt/Amp Meters, Global Positioning System receivers, leak detection equipment, gauges, wrenches, tapping and stopping equipment, etc. Purchases are mostly 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 and Storage equipment and assets.

The forecast for Capital Tools for 2014, 2015, and 2016 is $687,000, $687,000, and $687,000, respectively. Specific details regarding Capital Tools may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

This budget code was forecasted using the most recent three years of recorded costs as being the most representative of expected costs. Costs actually trend sharply upward during 2011, 2012 and 2013, but an average was adopted in order to present a conservative and fair estimate.

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 lines and associated facilities and the relatively few suppliers of quality cost-effective tools and measuring systems.

O. Supervision and Engineering Pool (Budget Code 908)

TABLE RKS-31
Southern California Gas Company
Supervision and Engineering Pool

GAS TRANSMISSION			
Shown in Thousands of 2013 Dollars			
O. Supervision & Engineering Pool	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Supervision & Engineering Pool	1,895	2,318	2,509
Total	**1,895**	**2,318**	**2,509**

1. Supervision and Engineering Pool

a. Description

This budget code provides a pool for Supervision and Engineering charges to be made on a direct basis to this capital category that will then be reassigned to the various budget categories on an indirect basis. Charges reside in this budget category temporarily and are reassigned on a monthly basis. In addition to the five-year average used for a base estimate are added incremental amounts for 1.2 FTEs in 2014, 4.4 FTEs in 2015, and 5.9 FTEs in 2016. The incremental amount added is to fund a portion of the newly-created Major Projects department, which has responsibilities and costs not included in previous rate case applications. Major Projects is a new organization at SoCalGas that has been established to augment and provide cost, schedule, risk, quality control and change control management for major construction projects. Projected growth in the number and complexity of Transmission and Storage capital projects drives the requirement for increasing the potential for successfully managing the costs, schedule, risk and quality of these projects. An effective approach to support this goal is a centralized project controls and quality management groups that can take the burden of analyzing and developing cost forecasting, cost estimating, schedule updating and analysis, and risk analysis, off of the project manager's work plate, and conduct these activities using a unified methodology based on project controls and quality, risk, and compliance practices. 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 increases in this category recognizes that data critical to the operation and maintenance of the Transmission system, as well as regulatory compliance, have never been more important in maintaining safety and reliability.

The forecast for Supervision and Engineering overheads pool for 2014, 2015, and 2016 is $1,895,000, $2,318,000, and $2,509,000, respectively. Specific details regarding Supervision and Engineering overheads pool may be found in my capital workpapers, Exhibit SCG-07-CWP.

b. Forecast Method

The forecast method used for Supervision and Engineering overheads is the five-year average of costs recorded in this budget code as a base amount. Then, as noted previously, incremental amounts are added to accommodate the Major Projects department, which applies additional attention to project controls and quality, risk, and compliance practices.

c. Cost Drivers

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

P. Information Technology Capital Projects.

I provide the business justification for the following five Capital projects: Prover Data Acquisition Meter Test Lab, Gas GIS Enhancements 2013, Gas GIS Enhancements 2014, Gas GIS Enhancements 2015, and Gas GIS Enhancements 2016. Support for these five Gas GIS projects are sponsored by Chris Olmsted in Exhibit SCG-18, and reside in the Gas Business and Technical Support department.

1. Prover Data Acquisition Meter Test Lab

The Prover Data Acquisition Meter Test Lab located at Pico Rivera processes all gas meter inspections for SDG&E and SoCalGas, which includes new vendor shipments and field return meters. Also included are the SDG&E Smart Meters and SoCalGas Advanced Meters. The meter accuracy test equipment (Provers) used for testing is controlled by technology that is antiquated and difficult to support.

Technology issues include:

- The use of 80386 personal computers within the Provers. The 80386 personal computers have been in use in the lab since the early 1990s. The hardware components for the 80386s are limited and are currently being maintained using parts from spare 80386s within the lab. Only one lab technician is capable of providing support due to the complexity of the technology. By comparison, the 80386 is an Intel-manufactured microprocessor introduced in 1986 and most frequently used in personal computers, and was considered obsolete for that purpose with the introduction of the 80486 microprocessor in 1989. 80386 processors continued in specialized instrumentation use through 2007, when production ceased.

- The legacy Prover Data Acquisition reporting applications. The current version is not Windows 7 compatible. Applications were developed in PowerBuilder version 8, a language that limits support by the Information Technology Shared Application department. Version 8 is no longer supported by Sybase; the current version of PowerBuilder is version 12. The serial cables used to connect the hardware places limits on communication with newer technology, along with limited support by Information Technology.

The objective of this project is to replace obsolete technology that has been in place for roughly twenty years, with industry standard technology to improve the reliability, support, and longevity of the Prover Data Acquisition Meter Test Lab. The testing of Gas Meters is mandated and regulated by the California Public Utility Commissioner under General Order 58-A. If the test Provers becomes nonoperational or cannot provide accurate test results:

- Fines could be imposed for not being in compliance.
- Possible revocation of our Meter Performance Control Program. This program is worth $25 million per year in avoided capital replacement via meter life extension.
- Inaccurate test results could cause meter families to be removed and replaced in error which in turn could require any meter over ten years in service to be retested/replaced, roughly five million meters.

2. Gas GIS Enhancements

These projects focus on software development, configuration and data-model enhancements of the existing Gas GIS systems, which costs are sponsored by the Information Technology department. These projects represent the capital activities that support company-wide operational activities to help the Company meet regulatory compliance and reporting requirements. Benefits are the ability to demonstrate compliance, complete regulatory reporting, cost avoidance, and ready-access to asset information and records.

The new application tools to be developed support compliance and productivity enhancement activities as follows:

- Support modeling risk and threat from the GIS;

- Provide DOT annual reports directly from GIS;
- Provide compliance dashboard and reporting from the GIS summarizing risk and threat models, identifying pipe on special survey, etc.;
- Provide automated tools to support Leak Survey and Special Survey for Distribution, Transmission, and Storage. Specifically, provide a means for Leak Survey maps to be produced from GIS;
- Provide emergency Operations support from the GIS. Specifically, a dashboard that provides event locations and important statistics such as, affected customers;
- Provide Computer-Aided Design and 3D Storage solutions. Specifically, provide tools to aid in design and construction of Transmission and Distribution pipelines, regulator stations, meter set assemblies, valve control stations, Storage Fields, compression stations and miscellaneous support drawings; and
- Provide GIS Quality Assurance/Quality Control tools to support GIS standards and data integrity for Cathodic Protection Areas, Isolation Areas Pressure Districts, etc.

V. CONCLUSION

The SoCalGas forecast of the O&M expenses and planned capital expenditures represented in my testimony balances 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 was not employed, another appropriate methodology was used, such as a zero-based projection, because the history was not adequate to reflect the requirements demanding more work and resources.

As a result, SoCalGas requests the Commission adopt SoCalGas' TY2016 forecast of $34,128,000 for Gas Engineering O&M expenses, which is composed of $14,950,000 for non-shared service activities and $19,178,000 for shared service activities. SoCalGas also requests the Commission adopt capital expenditure forecasts of $64,102,000, $103,795,000, and $141,595,000, for years 2014, 2015, and 2016.

In summary, these forecasts reflect sound judgment and represent the impact from higher regulatory expectations to continuously enhance the safety of the SoCalGas natural gas system and provide safe and reliable natural gas service at reasonable cost. 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 have 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

Bcf:	Billion Cubic Feet
BTU:	British Thermal Unit
CALTRANS:	California Department of Transportation
CFR:	Code of Federal Regulations
CPUC:	California Public Utilities Commission
DOT:	United States Department of Transportation
FTE:	Full Time Equivalent
GC:	Gas Chromatograph
GIS:	Geographic Information System
HPPD:	High Pressure Pipeline Database
MSA:	Meter Set Assembly
M&R:	Measurement and Regulation
NERBA:	New Environmental Regulatory Balancing Account
O&M:	Operations and Maintenance
PHMSA:	Pipeline and Hazardous Materials Safety Administration
RD&D:	Research, Development and Demonstration
SB:	Senate Bill
SCADA:	Supervisory, Control and Data Acquisition
SDG&E:	San Diego Gas & Electric Company
SoCalGas:	Southern California Gas Company
TIMP:	Transmission Integrity Management Program
TY:	Test Year