Application of SAN DIEGO GAS & ELECTRIC COMPANY for authority to update its gas and electric revenue requirement and base rates effective January 1, 2019 (U 902-M)	))))

Application No. 17-10-___

Exhibit No.: (SDG&E-04-CWP)

CAPITAL WORKPAPERS TO
PREPARED DIRECT TESTIMONY
OF GINA OROZCO-MEJIA
ON BEHALF OF SAN DIEGO GAS & ELECTRIC COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

OCTOBER 2017

SDGE

A Sempra Energy utility®

2019 General Rate Case - APP

INDEX OF WORKPAPERS

Exhibit SDG&E-04-CWP - GAS DISTRIBUTION

Overall Summary For Exhibit No. SDG&E-04-CWP

Area: GAS DISTRIBUTION

Witness: Gina Orozco-Mejia

	In 2016 $ (000)		
	Adjusted-Forecast		
	2017	2018	2019
A. New Business	6,376	8,217	7,805
B. System Minor Additions, Relocations and Retirement	3,694	3,694	3,694
C. Meter and Regulator Materials	7,077	7,468	7,283
D. Pressure Betterment	1,695	1,695	1,695
E. Distribution Easements	38	38	38
F. Pipe Relocations - Franchise and Freeway	6,665	6,665	6,665
G. Tools and Equipment	2,219	2,219	2,219
H. Code Compliance	2,549	1,149	1,174
I. Replacement of Mains and Services	5,968	16,940	26,226
J. Cathodic Protection	5,450	5,656	5,861
K. Regulator Station Improvments and Other	1,688	20,509	25,633
L. CNG Station Upgrades	0	2,617	2,617
M. Local Engineering	7,247	14,739	20,083
Total	**50,666**	**91,606**	**110,993**

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Category: A. New Business
Workpaper: 005000

Summary for Category: A. New Business

	In 2016$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
Labor	2,260	2,022	2,606	2,475
Non-Labor	5,297	4,354	5,611	5,330
NSE	0	0	0	0
Total	**7,557**	**6,376**	**8,217**	**7,805**
FTE	29.1	26.4	34.0	32.3

005000 New Business

Labor	2,260	2,022	2,606	2,475
Non-Labor	5,297	4,354	5,611	5,330
NSE	0	0	0	0
Total	**7,557**	**6,376**	**8,217**	**7,805**
FTE	29.1	26.4	34.0	32.3

Note: Totals may include rounding differences.

Beginning of Workpaper Group
005000 - New Business

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00500.0
Category: A. New Business
Category-Sub: 1. New Business
Workpaper Group: 005000 - New Business

Summary of Results (Constant 2016 $ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2012	2013	2014	2015	2016	2017	2018	2019
Labor	Zero-Based	1,519	1,554	1,943	2,502	2,260	2,022	2,606	2,475
Non-Labor	Zero-Based	2,684	3,148	4,200	5,728	5,297	4,354	5,611	5,330
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		**4,203**	**4,702**	**6,143**	**8,230**	**7,557**	**6,376**	**8,217**	**7,805**
FTE	Zero-Based	21.3	21.1	25.9	30.0	29.1	26.4	34.0	32.3

Business Purpose:

Expenditures within budget code 500 provide for changes and additions to the existing gas distribution system for the purpose of serving new gas customers.

Physical Description:

Budget code 500 covers the installation of gas mains and services, meter set assemblies (MSAs), regulator stations, and all associated equipment except the purchase of gas meters and service regulators, which are reflected in budget code 502. Costs includes main and service extensions into new residential, commercial and industrial developments.

Project Justification:

This budget code provides the necessary capital to extend mains and services consistent with Gas Rules 2, 15 and 16. These additions support service for residential, commercial and industrial customers, including identified single customers such as co-generation, CNG, or concrete and asphalt plants where the gas distribution main must be extended.

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00500.0
Category:	A. New Business
Category-Sub:	1. New Business
Workpaper Group:	005000 - New Business

Forecast Methodology:

Labor - Zero-Based

New business forecast is based on the projected growth rate of new meter sets added to the gas distribution system. In general, the number of new meter set installations mirrors the level of housing and commercial growth. The projected number of new meter sets, obtained from Witness Rose-Marie Payan, results in a three year forecast of $6,376K in 2017, $8,217K in 2018, and $7,805K in 2019. Forecasted funding was estimated by applying the projected meter growth to the 5-year historical average cost per meter set.

Non-Labor - Zero-Based

New business forecast is based on the projected growth rate of new meter sets added to the gas distribution system. In general, the number of new meter set installations mirrors the level of housing and commercial growth. The projected number of new meter sets, obtained from Witness Rose-Marie Payan, results in a three year forecast of $6,376K in 2017, $8,217K in 2018, and $7,805K in 2019. Forecasted funding was estimated by applying the projected meter growth to the 5-year historical average cost per meter set. A 5-year historical average ratio of CIAC credits to total direct capital was used to forecast the collectible component of this budget code.

NSE - Zero-Based

N/A

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00500.0
Category: A. New Business
Category-Sub: 1. New Business
Workpaper Group: 005000 - New Business

Summary of Adjustments to Forecast

In 2016 $ (000)										
Forecast Method		**Base Forecast**			**Forecast Adjustments**			**Adjusted-Forecast**		
Years		**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Labor	Zero-Based	2,022	2,606	2,475	0	0	0	2,022	2,606	2,475
Non-Labor	Zero-Based	4,354	5,611	5,330	0	0	0	4,354	5,611	5,330
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		**6,376**	**8,217**	**7,805**	**0**	**0**	**0**	**6,376**	**8,217**	**7,805**
FTE	Zero-Based	26.4	34.0	32.3	0.0	0.0	0.0	26.4	34.0	32.3

Forecast Adjustment Details

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2017 Total		0	0	0	0	0.0	
2018 Total		0	0	0	0	0.0	
2019 Total		0	0	0	0	0.0	

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00500.0
Category: A. New Business
Category-Sub: 1. New Business
Workpaper Group: 005000 - New Business

Determination of Adjusted-Recorded:

	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	2016 ($000)
Recorded (Nominal $)*					
Labor	1,349	1,356	1,712	2,123	1,938
Non-Labor	2,729	3,182	4,292	5,771	5,297
NSE	0	0	0	0	0
Total	**4,078**	**4,538**	**6,004**	**7,894**	**7,236**
FTE	18.3	18.0	22.0	24.8	24.6
Adjustments (Nominal $) **					
Labor	0	0	0	61	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**61**	**0**
FTE	0.0	0.0	0.0	0.7	0.0
Recorded-Adjusted (Nominal $)					
Labor	1,349	1,356	1,712	2,184	1,938
Non-Labor	2,729	3,182	4,292	5,771	5,297
NSE	0	0	0	0	0
Total	**4,078**	**4,538**	**6,004**	**7,955**	**7,236**
FTE	18.3	18.0	22.0	25.5	24.6
Vacation & Sick (Nominal $)					
Labor	195	215	273	337	322
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**195**	**215**	**273**	**337**	**322**
FTE	3.0	3.1	3.9	4.5	4.5
Escalation to 2016$					
Labor	-26	-17	-43	-19	0
Non-Labor	-45	-34	-92	-44	0
NSE	0	0	0	0	0
Total	**-71**	**-51**	**-135**	**-63**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2016$)					
Labor	1,519	1,554	1,943	2,502	2,260
Non-Labor	2,684	3,148	4,200	5,728	5,297
NSE	0	0	0	0	0
Total	**4,203**	**4,702**	**6,143**	**8,230**	**7,557**
FTE	21.3	21.1	25.9	30.0	29.1

* After company-wide exclusions of Non-GRC costs
** Refer to "Detail of Adjustments to Recorded" page for line item adjustments
Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00500.0
Category: A. New Business
Category-Sub: 1. New Business
Workpaper Group: 005000 - New Business

Summary of Adjustments to Recorded:

In Nominal $(000)					
Years	**2012**	**2013**	**2014**	**2015**	**2016**
Labor	0	0	0	61	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**61**	**0**
FTE	0.0	0.0	0.0	0.7	0.0

Detail of Adjustments to Recorded in Nominal $:

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2012 Total		0	0	0	0	0.0	
2013 Total		0	0	0	0	0.0	
2014 Total		0	0	0	0	0.0	
2015	Other	61	0	0	61	0.7	DBENTLEY20161026143120773
Explanation:	Dec 2015 My Time Missing Labor Accrual						
2015 Total		61	0	0	61	0.7	
2016 Total		0	0	0	0	0.0	

Note: Totals may include rounding differences.

Beginning of Workpaper Sub Details for
Workpaper Group 005000

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00500.0
Category: A. New Business
Category-Sub: 1. New Business
Workpaper Group: 005000 - New Business
Workpaper Detail: 005000.001 - New Business Non-Collectable Expenses

In-Service Date: Not Applicable

Description:

New business non-collectable costs.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	2,022	2,606	2,475
Non-Labor	3,316	4,287	4,070
NSE	0	0	0
Total	**5,338**	**6,893**	**6,545**
FTE	26.4	34.0	32.3

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00500.0
Category:	A. New Business
Category-Sub:	1. New Business
Workpaper Group:	005000 - New Business
Workpaper Detail:	005000.002 - New business Collectable Expenses (CIAC)
In-Service Date:	Not Applicable

Description:

New business collectable costs (CIAC).

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	993	1,279	1,215
NSE	0	0	0
Total	**993**	**1,279**	**1,215**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00500.0
Category:	A. New Business
Category-Sub:	1. New Business
Workpaper Group:	005000 - New Business
Workpaper Detail:	005000.003 - RAMP - Base / Risk ID 16 - Odorization of New Pipeline
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Odorization of New Pipelines. This workpaper identifies historically embedded costs for odorization of new pipelines mandated by CFR 49 part 192, subpart L. No incremental costs for this activity have been identified.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	45	45	45
NSE	0	0	0
Total	**45**	**45**	**45**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00500.0
Category:	A. New Business
Category-Sub:	1. New Business
Workpaper Group:	005000 - New Business
Workpaper Detail:	005000.003 - RAMP - Base / Risk ID 16 - Odorization of New Pipeline

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Odorization of Pipelines

Program Description: Operations include locate and mark, emergency preparedness, and odorization. These activities are intended to address threats as identified by PHMSA.

Risk/Mitigation:

Risk: Undetected leaking gas

Mitigation: Odorization of gas

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	43	43	43
High	47	47	47

Funding Source: CPUC-GRC

Forecast Method: Base Year

Work Type: Mandated

Work Type Citation: CFR 49 Part 192 Subpart L

Historical Embedded Cost Estimates ($000)

Embedded Costs: 45

Explanation: 45K is the estimated annual amount to odorize new pipelines.

Supplemental Workpapers for Workpaper Group 005000

SDG&E-GOM-CAP-SUP-001
San Diego Gas and Electric Company -- Gas Distribution -- Witness Gina Orozco-Mejia
Supplemental Workpaper Calculations for Zero Based New Business Construction Forecast
New Business Construction Workpaper

Assumptions:

* Please refer to the work papers of Ms. Rosemary Payan, Exhibit SDG&E-37-WP, for the details on the calculation of new meter set installations.

Amounts are shown in 2016 dollars and include vacation and sick.

	[H] Historical New Meter Growth	[A] Adjusted Recorded Historical Total	[B] Adjusted Recorded Historical Labor	[F] Adjusted Recorded Historical Non-Labor	[D] Historical FTEs	[E] [B/D] Historical 5-yr Average Labor / FTE (Rounded)	[I] [A/H] Historical 5-yr Average Cost Per Meter Set
2012	4,618	$ 4,199,355	$ 1,517,646	$ 2,681,709	21		
2013	5,258	$ 4,697,225	$ 1,552,401	$ 3,144,824	21		
2014	3,083	$ 6,137,331	$ 1,941,100	$ 4,196,231	26		
2015	5,109	$ 8,222,584	$ 2,500,081	$ 5,722,503	30		
2016	5,260	$ 7,557,132	$ 2,259,879	$ 5,297,253	29		
	23,328	**$ 30,813,627**	**$ 9,771,107**	**$ 21,042,520**	**127.4**	**$76,696**	**$1,321**

	[C] [B/A] Labor	[G] [F/A] Non-Labor
5-Year Historical Average Ratio:	**32%**	**68%**

	[J] Projected Gas Customer Growth *	[K] [IxJ] Total Forecast	[L] [CxK] Labor Forecast	[M] [GxK] Non-Labor Forecast	[N] [L/E] Forecasted FTEs
2017	4,827	$ 6,376,000	$ 2,022,000	$ 4,354,000	26.4
2018	6,221	$ 8,217,000	$ 2,606,000	$ 5,611,000	34.0
2019	5,909	$ 7,805,000	$ 2,475,000	$ 5,330,000	32.3

SDGE-GOM-CAP-SUP-002
San Diego Gas & Electric – Gas Distribution – Witness Gina Orozco-Mejia
Supplemental Workpaper Calculations for CIAC New Business Forecast
New Business Workpaper

New Business (Budget Code 500) History
($000 in 2016$)

	Ln	2012	2013	2014	2015	2016	5-Yr Avg
CIAC Direct Credits Applied	1	($603)	($1239)	($1082)	($821)	($780)	
CIAC Indirect Credits Applied	2	($507)	($1163)	($840)	($547)	($392)	
Total CIAC Credits Applied to Non-Labor (w/o escalation) (1+2)	3	($1110)	($2402)	($1921)	($1368)	($1172)	
GRID Recorded History Labor (w/ V&S and escalation)	4	$1520	$1554	$1943	$2502	$2260	
GRID Recorded History Non-Labor (w/escalation)	5	$2684	$3148	$4200	$5728	$5297	
GRID Total Recorded History (w/ V&S and escalation) (4+5)	6	$4203	$4702	$6143	$8230	$7557	
Historical Direct Credit Ratio** (1/6)	7	(13.91%)	(25.55%)	(17.44%)	(10.09%)	(10.82%)	**(15.56%)**

Forecasted Capital
($000 in 2016$)

		2017	2018	2019
Forecasted Labor* w/ V&S	8	$2022	$2606	$2475
Forecasted Non-labor*	9	$4354	$5611	$5330
Total Forecasted w/V&S	***10***	**$6376**	**$8217**	**$7805**
Forecasted CIAC Collectible (10 x avg 7)	*11*	*($993)*	*($1279)*	*($1215)*
Forecasted Non-Collectible (=10+11)	***12***	***$5383***	***$6938***	***$6590***

***** See SDGE-FBA-CAP-SUP-002
** Resulting percentage differs slightly when using three digit rounding for line items 1 and 2. For forecast purposes six digit non-rounded values were utilized.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Category: B. System Minor Additions, Relocations and Retirement
Workpaper: 005010

Summary for Category: B. System Minor Additions, Relocations and Retirement

	In 2016$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
Labor	1,681	919	919	919
Non-Labor	7,709	2,775	2,775	2,775
NSE	0	0	0	0
Total	**9,390**	**3,694**	**3,694**	**3,694**
FTE	20.0	12.3	12.3	12.3

005010 Systems Minor Additions, Relocations and Retirements

Labor	1,681	919	919	919
Non-Labor	7,709	2,775	2,775	2,775
NSE	0	0	0	0
Total	**9,390**	**3,694**	**3,694**	**3,694**
FTE	20.0	12.3	12.3	12.3

Note: Totals may include rounding differences.

Beginning of Workpaper Group
005010 - Systems Minor Additions, Relocations and Retirements

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00501.0
Category: B. System Minor Additions, Relocations and Retirement
Category-Sub: 1. Sys Minor Adds, Relocations and Retirements
Workpaper Group: 005010 - Systems Minor Additions, Relocations and Retirements

Summary of Results (Constant 2016 $ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2012	2013	2014	2015	2016	2017	2018	2019
Labor	5-YR Average	620	727	736	830	1,681	919	919	919
Non-Labor	5-YR Average	956	748	1,288	3,174	7,709	2,775	2,775	2,775
NSE	5-YR Average	0	0	0	0	0	0	0	0
Total		**1,576**	**1,475**	**2,024**	**4,004**	**9,390**	**3,694**	**3,694**	**3,694**
FTE	5-YR Average	9.8	11.0	10.9	10.0	20.0	12.3	12.3	12.3

Business Purpose:

Expenses in budget code 501 provide for minor gas distribution main and service additions, retirements and relocations. These expenditures are required to maintain the continued integrity of SDG&E's gas distribution system.

Physical Description:

Projects in this budget allow for minor gas distribution main and service additions, retirements, and relocations due to customer requests or as required by SDG&E to support system operation and integrity, retirement of gas mains and services, and expenses for associated street repairs.

Project Justification:

These projects are necessary for new or continued gas service; to address the needs of property owners requesting SDG&E to move its facilities from their property; or to meet the Company's need for minor additions, facility relocations or abandonments to address conflicts, integrity or reliability concerns. The work must be performed to ensure the integrity of the gas system that serves SDG&E customers.

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00501.0
Category:	B. System Minor Additions, Relocations and Retirement
Category-Sub:	1. Sys Minor Adds, Relocations and Retirements
Workpaper Group:	005010 - Systems Minor Additions, Relocations and Retirements

Forecast Methodology:

Labor - 5-YR Average

The 5-year historical average was used for this group (BC 501, 512). BC 512 tracks permanent gas orders, a subset of work associated with BC 501.

Due to the wide range of activities recorded, as well as varying costs from year to year, a trend was undetectable. A 5-year historical average for labor was used to forecast the combination of base routine work and less frequent, larger projects as the best representation of future costs for minor additions, relocations, or retirements of gas distribution mains and services. While costs have increased annually from 2013 to 2016, a linear trend fails to account for the fluctuation in larger projects from year to year resulting in a higher than anticipated projection for 2017-2019. Likewise, a zero-based forecast does not capture larger projects which are undetermined.

Non-Labor - 5-YR Average

The 5-year historical average was used for this group (BC 501, 512). BC 512 tracks permanent gas orders, a subset of work associated with BC 501.

Due to the wide range of activities recorded, as well as varying costs from year to year, a trend was undetectable. A 5-year historical average for non-labor was used to forecast the combination of base routine work and less frequent, larger projects as the best representation of future costs for minor additions, relocations, or retirements of gas distribution mains and services. While costs have increased annually from 2013 to 2016, a linear trend fails to account for the fluctuation in larger projects from year to year resulting in a higher than anticipated projection for 2017-2019. Likewise, a zero-based forecast does not capture larger projects which are undetermined.

A 5-year historical average ratio of CIAC credits to total direct capital was used to forecast the collectible component of this budget code.

NSE - 5-YR Average

N/A

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00501.0
Category: B. System Minor Additions, Relocations and Retirement
Category-Sub: 1. Sys Minor Adds, Relocations and Retirements
Workpaper Group: 005010 - Systems Minor Additions, Relocations and Retirements

Summary of Adjustments to Forecast

In 2016 $ (000)										
Forecast Method		**Base Forecast**			**Forecast Adjustments**			**Adjusted-Forecast**		
Years		**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Labor	5-YR Average	918	918	918	1	1	1	919	919	919
Non-Labor	5-YR Average	2,775	2,775	2,775	0	0	0	2,775	2,775	2,775
NSE	5-YR Average	0	0	0	0	0	0	0	0	0
Total		**3,693**	**3,693**	**3,693**	**1**	**1**	**1**	**3,694**	**3,694**	**3,694**
FTE	5-YR Average	12.3	12.3	12.3	0.0	0.0	0.0	12.3	12.3	12.3

Forecast Adjustment Details

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2017 Total		0	0	0	0	0.0	
2018 Total		0	0	0	0	0.0	
2019 Total		0	0	0	0	0.0	

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00501.0
Category: B. System Minor Additions, Relocations and Retirement
Category-Sub: 1. Sys Minor Adds, Relocations and Retirements
Workpaper Group: 005010 - Systems Minor Additions, Relocations and Retirements

Determination of Adjusted-Recorded:

	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	2016 ($000)
Recorded (Nominal $)*					
Labor	550	634	649	721	1,442
Non-Labor	972	756	1,316	3,198	7,709
NSE	0	0	0	0	0
Total	**1,523**	**1,390**	**1,965**	**3,920**	**9,151**
FTE	8.4	9.4	9.2	8.5	16.9
Adjustments (Nominal $) **					
Labor	0	0	0	3	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**3**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Nominal $)					
Labor	550	634	649	725	1,442
Non-Labor	972	756	1,316	3,198	7,709
NSE	0	0	0	0	0
Total	**1,523**	**1,390**	**1,965**	**3,923**	**9,151**
FTE	8.4	9.4	9.2	8.5	16.9
Vacation & Sick (Nominal $)					
Labor	80	101	104	112	239
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**80**	**101**	**104**	**112**	**239**
FTE	1.4	1.6	1.7	1.5	3.1
Escalation to 2016$					
Labor	-10	-8	-16	-6	0
Non-Labor	-16	-8	-28	-24	0
NSE	0	0	0	0	0
Total	**-26**	**-16**	**-44**	**-30**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2016$)					
Labor	620	727	736	830	1,681
Non-Labor	956	748	1,288	3,174	7,709
NSE	0	0	0	0	0
Total	**1,576**	**1,475**	**2,024**	**4,004**	**9,390**
FTE	9.8	11.0	10.9	10.0	20.0

* After company-wide exclusions of Non-GRC costs
** Refer to "Detail of Adjustments to Recorded" page for line item adjustments
Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00501.0
Category: B. System Minor Additions, Relocations and Retirement
Category-Sub: 1. Sys Minor Adds, Relocations and Retirements
Workpaper Group: 005010 - Systems Minor Additions, Relocations and Retirements

Summary of Adjustments to Recorded:

In Nominal $(000)					
Years	**2012**	**2013**	**2014**	**2015**	**2016**
Labor	0	0	0	3	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**3**	**0**
FTE	0.0	0.0	0.0	0.0	0.0

Detail of Adjustments to Recorded in Nominal $:

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2012 Total		0	0	0	0	0.0	
2013 Total		0	0	0	0	0.0	
2014 Total		0	0	0	0	0.0	
2015	Other	3	0	0	3	0.0	DBENTLEY20161026143237820
Explanation:	Dec 2015 My Time Missing Labor Accrual						
2015 Total		3	0	0	3	0.0	
2016 Total		0	0	0	0	0.0	

Note: Totals may include rounding differences.

Beginning of Workpaper Sub Details for
Workpaper Group 005010

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00501.0
Category:	B. System Minor Additions, Relocations and Retirement
Category-Sub:	1. Sys Minor Adds, Relocations and Retirements
Workpaper Group:	005010 - Systems Minor Additions, Relocations and Retirements
Workpaper Detail:	005010.001 - System Minor Additions Relocations and Retirements Non-Collectable Expenses
In-Service Date:	Not Applicable

Description:

System minor additions relocations and retirement non-collectable costs.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	919	919	919
Non-Labor	1,577	1,577	1,577
NSE	0	0	0
Total	**2,496**	**2,496**	**2,496**
FTE	12.3	12.3	12.3

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00501.0
Category:	B. System Minor Additions, Relocations and Retirement
Category-Sub:	1. Sys Minor Adds, Relocations and Retirements
Workpaper Group:	005010 - Systems Minor Additions, Relocations and Retirements
Workpaper Detail:	005010.002 - System Minor Additions Relocations and Retirements Collectable Expenses (CIAC)
In-Service Date:	Not Applicable

Description:

System minor additions relocations and retirement collectable costs (CIAC).

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	955	955	955
NSE	0	0	0
Total	**955**	**955**	**955**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00501.0
Category:	B. System Minor Additions, Relocations and Retirement
Category-Sub:	1. Sys Minor Adds, Relocations and Retirements
Workpaper Group:	005010 - Systems Minor Additions, Relocations and Retirements
Workpaper Detail:	005010.003 - RAMP - Base / Risk ID 2 - Locate and Mark Field Activities
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 02 / SDG&E Dig-Ins. Mitigating activity: Locate and Mark Field Activities. This workpaper identifies historically embedded costs for locate and mark activities mandated by CFR 193.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	225	225	225
NSE	0	0	0
Total	**225**	**225**	**225**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00501.0
Category:	B. System Minor Additions, Relocations and Retirem
Category-Sub:	1. Sys Minor Adds, Relocations and Retirements
Workpaper Group:	005010 - Systems Minor Additions, Relocations and Retirements
Workpaper Detail:	005010.003 - RAMP - Base / Risk ID 2 - Locate and Mark Field Activities

RAMP Item # 1

RAMP Chapter: SDG&E-2

Program Name: Locate and Mark

Program Description: Prevention of damages to substructures due to unsafe excavation practices

Risk/Mitigation:

Risk: Excavation damage

Mitigation: Locate and Mark

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	220	239	243
High	243	264	269

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Mandated

Work Type Citation: CFR 193

Historical Embedded Cost Estimates ($000)

Embedded Costs: 225

Explanation: Base 2016 Value

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00501.0
Category:	B. System Minor Additions, Relocations and Retirement
Category-Sub:	1. Sys Minor Adds, Relocations and Retirements
Workpaper Group:	005010 - Systems Minor Additions, Relocations and Retirements
Workpaper Detail:	005010.004 - RAMP - Incremental / Risk ID 2 - Locate and Mark Field Activities
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 02 / SDG&E Dig-Ins. Mitigating activity: Locate and Mark Field Activities. This workpaper identifies RAMP costs greater than the historically embedded 2016 costs for locate and mark activities mandated by CFR 193. These costs are captured within the 5-year-average forecast methodology.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	18	18	18
NSE	0	0	0
Total	**18**	**18**	**18**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00501.0
Category:	B. System Minor Additions, Relocations and Retirem
Category-Sub:	1. Sys Minor Adds, Relocations and Retirements
Workpaper Group:	005010 - Systems Minor Additions, Relocations and Retirements
Workpaper Detail:	005010.004 - RAMP - Incremental / Risk ID 2 - Locate and Mark Field Activities

RAMP Item # 1

RAMP Chapter: SDG&E-2

Program Name: Locate and Mark

Program Description: Prevention of damage to substructures due to unsafe excavation practices

Risk/Mitigation:

Risk: Excavation damage

Mitigation: Locate and Mark

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	220	239	243
High	243	264	269

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Mandated

Work Type Citation: CFR 193

Historical Embedded Cost Estimates ($000)

Embedded Costs: 0

Explanation: 2016 value of $225K is captured in WP Detail 501.003.

Supplemental Workpapers for Workpaper Group 005010

SDGE-GOM-CAP-SUP-003
San Diego Gas & Electric – Gas Distribution – Witness Gina Orozco-Mejia
Supplemental Workpaper Calculations for CIAC System Additions, Relocations, Retirements Forecast
System Minor Adds, Relocations and Retirements Workpaper

System Minor Adds, Relocations and Retirements (Budget Code 501&512) History
($000 in 2016$)

	Ln	2012	2013	2014	2015	2016	5-Yr Avg
CIAC Direct Credits Applied	1	($462)	($403)	($855)	$1,075)	($546)	
CIAC Indirect Credits Applied	2	($388)	($334)	($667)	($611)	($190	
Total CIAC Credits Applied to Non-Labor (w/o escalation) (1+2)	3	($850)	($738)	$1,522)	$1,686)	($737)	
GRID Recorded History Labor (w/ V&S and escalation)	4	$620	$727	$736	$830	$1,681	
GRID Recorded History Non-Labor (w/escalation)	5	$956	$748	$1,288	$3,174	$7,709	
GRID Total Recorded History (w/ V&S and escalation) (4+5)	6	$1,576	$1,475	$2,027	$4,004	$9,390	
Historical Direct Credit Ratio* (1/6)	7	(27.02%)	(24.94%)	(41.91%)	(28.98%)	(6.47%)	**(25.86%)**

Forecasted Capital
($000 in 2016$)

		2017	2018	2019
Forecasted Labor w/ V&S	8	$919	$919	$919
Forecasted Non-labor	9	$2,775	$2,770	$2,775
Total Forecasted w/V&S	**10**	**$3,694**	**$3,694**	**$3,694**
Forecasted CIAC Collectible (10x avg 7)	11	*($955)*	*($955)*	*($955)*
Forecasted Non-Collectible (=10+11)	**12**	***$2,739***	***$2,739***	***$2,739***

***** Resulting percentage differs slightly when using three digit rounding for line items 1 and 2. For forecast purposes six digit non-rounded values were utilized.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Category: C. Meter and Regulator Materials
Workpaper: 005020

Summary for Category: C. Meter and Regulator Materials

	In 2016$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
Labor	0	0	0	0
Non-Labor	4,097	7,077	7,468	7,283
NSE	0	0	0	0
Total	**4,097**	**7,077**	**7,468**	**7,283**
FTE	0.0	0.0	0.0	0.0

005020 Meter and Regulator Materials

Labor	0	0	0	0
Non-Labor	4,097	7,077	7,468	7,283
NSE	0	0	0	0
Total	**4,097**	**7,077**	**7,468**	**7,283**
FTE	0.0	0.0	0.0	0.0

Note: Totals may include rounding differences.

Beginning of Workpaper Group
005020 - Meter and Regulator Materials

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00502.0
Category: C. Meter and Regulator Materials
Category-Sub: 1. Meter and Regulator Materials
Workpaper Group: 005020 - Meter and Regulator Materials

Summary of Results (Constant 2016 $ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2012	2013	2014	2015	2016	2017	2018	2019
Labor	Zero-Based	0	0	0	0	0	0	0	0
Non-Labor	Zero-Based	6,180	6,662	7,493	4,881	4,097	7,077	7,468	7,283
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		**6,180**	**6,662**	**7,493**	**4,881**	**4,097**	**7,077**	**7,468**	**7,283**
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Business Purpose:

Budget code 502 provides funding for the purchase of new domestic, commercial and industrial gas meters and regulators used in establishing service to new customers, and also for replacement of meters and regulators that have reached the end of their useful life or removed as part of the Gas Meter Performance Control Program.

Physical Description:

This effort involves the purchasing of new domestic, commercial and industrial gas meters and regulators. These meters are required to provide gas service to new customers as well as replace aging meters for some existing customers. Existing residential gas meter measurement accuracy is monitored by sampling meters in the service territory under the Gas Meter Performance Control Program. Meters are grouped into "families" for monitoring purposes. As these family groups age, they may fall outside prescribed accuracy limits and must be replaced. Budget code 502 provides funds to replace family groups of meters that do not meet strict accuracy guidelines. In addition to the replacements of meters, this budget code includes the costs of additional regulators to replace obsolete regulators.

Project Justification:

Meters are purchased under this budget code to provide accurate gas measurement for new customers and to replace aging meters whose measurement performance is falling outside prescribed accuracy limits. Regulators purchased in this budget code support new business customers or regulators replaced for age or programmatic replacements.

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00502.0
Category:	C. Meter and Regulator Materials
Category-Sub:	1. Meter and Regulator Materials
Workpaper Group:	005020 - Meter and Regulator Materials

Forecast Methodology:

Labor - Zero-Based

N/A

Non-Labor - Zero-Based

A zero-based forecasting methodology was selected for non-labor for the 502 budget. Expenses are based on the forecasted quantities for new business, trending of routine replacements, additions for program replacements and inventory needs. The forecasted units are multiplied by the current material contracting pricing. The meter forecasting methodology is sponsored by Witness Rose Marie Payan. The three-year forecast is $7,077K in 2017; $7,468K in 2018; and $7,283K in 2019.

NSE - Zero-Based

N/A

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00502.0
Category: C. Meter and Regulator Materials
Category-Sub: 1. Meter and Regulator Materials
Workpaper Group: 005020 - Meter and Regulator Materials

Summary of Adjustments to Forecast

In 2016 $ (000)										
Forecast Method		**Base Forecast**			**Forecast Adjustments**			**Adjusted-Forecast**		
Years		**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Labor	Zero-Based	0	0	0	0	0	0	0	0	0
Non-Labor	Zero-Based	7,077	7,468	7,283	0	0	0	7,077	7,468	7,283
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		**7,077**	**7,468**	**7,283**	**0**	**0**	**0**	**7,077**	**7,468**	**7,283**
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Forecast Adjustment Details

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2017 Total		0	0	0	0	0.0	
2018 Total		0	0	0	0	0.0	
2019 Total		0	0	0	0	0.0	

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00502.0
Category: C. Meter and Regulator Materials
Category-Sub: 1. Meter and Regulator Materials
Workpaper Group: 005020 - Meter and Regulator Materials

Determination of Adjusted-Recorded:

	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	2016 ($000)
Recorded (Nominal $)*					
Labor	0	0	0	0	0
Non-Labor	6,284	6,734	7,657	4,918	4,097
NSE	0	0	0	0	0
Total	**6,284**	**6,734**	**7,657**	**4,918**	**4,097**
FTE	0.0	0.0	0.0	0.0	0.0
Adjustments (Nominal $) **					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Nominal $)					
Labor	0	0	0	0	0
Non-Labor	6,284	6,734	7,657	4,918	4,097
NSE	0	0	0	0	0
Total	**6,284**	**6,734**	**7,657**	**4,918**	**4,097**
FTE	0.0	0.0	0.0	0.0	0.0
Vacation & Sick (Nominal $)					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Escalation to 2016$					
Labor	0	0	0	0	0
Non-Labor	-104	-72	-164	-37	0
NSE	0	0	0	0	0
Total	**-104**	**-72**	**-164**	**-37**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2016$)					
Labor	0	0	0	0	0
Non-Labor	6,180	6,662	7,493	4,881	4,097
NSE	0	0	0	0	0
Total	**6,180**	**6,662**	**7,493**	**4,881**	**4,097**
FTE	0.0	0.0	0.0	0.0	0.0

* After company-wide exclusions of Non-GRC costs
** Refer to "Detail of Adjustments to Recorded" page for line item adjustments
Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00502.0
Category: C. Meter and Regulator Materials
Category-Sub: 1. Meter and Regulator Materials
Workpaper Group: 005020 - Meter and Regulator Materials

Summary of Adjustments to Recorded:

In Nominal $(000)						
Years	**2012**	**2013**	**2014**	**2015**	**2016**
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID

Note: Totals may include rounding differences.

Beginning of Workpaper Sub Details for
Workpaper Group 005020

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00502.0
Category:	C. Meter and Regulator Materials
Category-Sub:	1. Meter and Regulator Materials
Workpaper Group:	005020 - Meter and Regulator Materials
Workpaper Detail:	005020.001 - Meters and Regulator Materials
In-Service Date:	Not Applicable

Description:

Meter and regulator material costs.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	7,077	7,468	7,283
NSE	0	0	0
Total	**7,077**	**7,468**	**7,283**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Supplemental Workpapers for Workpaper Group 005020

SDG&E-GOM-CAP-SUP-004

San Diego Gas and Electric Company -- Gas Distribution -- Witness Gina Orozco-Mejia

Supplemental Workpaper Zero Based Meter and Regulator Calculations

Assumptions:

Meter and regulator costs are calculated from forecasted quantities of meters, regulators, and smart meter modules multiplied by supplier contract costs, freight charges, and applicable sales tax. Contract pricing is considered confidential information pursuant to PUC Code Section 583 & General Order 66-C. Contract pricing is available with appropriate confidentiality measures.

Capital Cost Type	Adjusted - Recorded History (Thousands in 2016$)					Forecast (Thousands in 2016$)		
	2012	2013	2014	2015	2016	2017	2018	2019
Labor	0	0	0	0	0	0	0	0
Non-Labor	6,180	6,662	7,493	4,881	4,097	7,077	7,468	7,283
Total	**6,180**	**6,662**	**7,493**	**4,881**	**4,097**	**7,077**	**7,468**	**7,283**

The quantities of meters, regulators and smart meter modules utilized in developing the forecast are listed below:

Forecasted Rotary Meter Quantities			
Meter Size	**2017**	**2018**	**2019**
5M LCTR	101	102	98
5M CTR/TC	0	1	2
7M CTR/TC	40	41	42
7M CTR/CD	1	0	1
11M CTR/TC	22	26	33
11M CTR/CD	8	3	5
16M CTR/TC	13	21	0
16M CTR/CD	4	3	11
38M CTR/CD	0	0	5
56M CTR/CD	0	1	1
102M-B3 CD	0	0	0
8C LCTR	14	24	21
2M LCTR	31	123	170
3M LCTR	218	222	252
3M CTR/TC	2	0	5
23M CTR/CD	3	1	6
8C TQM*	748	756	400
7M CTR/CD	3	4	1
15C LCTR	240	255	264
11C LCTR	446	411	402
Total	**1,894**	**1,994**	**1,719**

Forecasted Smart Meter Module Quantity			
Meter Component	**2017**	**2018**	**2019**
Module	3,195	3,195	3,195

Forecasted Regulator Quantities			
Type	**2014**	**2015**	**2016**
3/4" 1813C	16,445	17,839	17,527
3/4" Itron B42	100	100	100
CABINET REG	10	10	10
LARGE REG	713	919	873

Forecasted Diaphragm Meter Quantities			
Meter Size	**2017**	**2018**	**2019**
AC-250 Curb	100	100	100
AL-425 Curb	75	75	75
AC-630 Curb	50	50	50
METRIS 250	34,827	36,221	35,909
400A	1,610	1,610	1,610
400A	20	20	20
AC-630	1,340	1,340	1,340
Total	**38,022**	**39,416**	**39,104**

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Category: D. Pressure Betterment
Workpaper: 005030

Summary for Category: D. Pressure Betterment

	In 2016$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
Labor	225	224	224	224
Non-Labor	1,412	1,471	1,471	1,471
NSE	0	0	0	0
Total	**1,637**	**1,695**	**1,695**	**1,695**
FTE	3.1	3.1	3.1	3.1

005030 Pressure Betterment

Labor	225	224	224	224
Non-Labor	1,412	1,471	1,471	1,471
NSE	0	0	0	0
Total	**1,637**	**1,695**	**1,695**	**1,695**
FTE	3.1	3.1	3.1	3.1

Note: Totals may include rounding differences.

Beginning of Workpaper Group
005030 - Pressure Betterment

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00503.0
Category: D. Pressure Betterment
Category-Sub: 1. Pressure Betterment
Workpaper Group: 005030 - Pressure Betterment

Summary of Results (Constant 2016 $ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2012	2013	2014	2015	2016	2017	2018	2019
Labor	5-YR Average	371	322	93	107	225	224	224	224
Non-Labor	5-YR Average	1,269	1,123	1,158	2,392	1,412	1,471	1,471	1,471
NSE	5-YR Average	0	0	0	0	0	0	0	0
Total		**1,640**	**1,444**	**1,252**	**2,499**	**1,637**	**1,695**	**1,695**	**1,695**
FTE	5-YR Average	5.5	4.5	1.2	1.4	3.1	3.1	3.1	3.1

Business Purpose:

Expenditures within budget code 503 provide for gas distribution system reinforcement projects required to maintain gas service to core customers. This work category addresses critical areas of the distribution pipeline network that are most susceptible to pressure drops to alleviate the potential risk of loss of service to customers.

Physical Description:

This budget code provides Capital expenditures for gas distribution system reinforcement or pressure betterment projects required to maintain gas service to all customers. System reinforcement projects are designed to remedy low-pressure problems and/or improve reliability to large single feed areas, to meet load growth. These projects typically involve installing new mains and/or regulator stations, extending high pressure mains or upgrading existing mains to increase delivery pressure.

Project Justification:

SDG&E determines system reinforcement needs by constantly monitoring system growth, anticipating changes to loads on the existing system, observing pressures within the existing system and modeling the system response to predicted growth and system reinforcements. As new loads are added, such as new residential, commercial and industrial developments, the existing gas system infrastructure may not have sufficient capacity to maintain pressure to adequately serve all customers. As gas demand loads are anticipated to be added, an analysis of the existing system is performed using a gas flow model to predict the system response. If there is not sufficient capacity to serve the added load, individual projects are identified to determine the most cost-effective system reinforcement options which will allow the system to meet the projected demand.

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00503.0
Category:	D. Pressure Betterment
Category-Sub:	1. Pressure Betterment
Workpaper Group:	005030 - Pressure Betterment

Forecast Methodology:

Labor - 5-YR Average

SDG&E's gas infrastructure is a large dynamic system of pipelines and pipeline connections, with continual changes in customer load and construction activity. As a result of these fluctuations, a trend or base year forecasting methodology is not appropriate. The 5-year historical average methodology was selected to forecast the base requirement for labor as it captures the yearly variation in system pressure betterment requirements which align with the constantly changing new construction development schedules, economic conditions, and large customer system impacts.

Non-Labor - 5-YR Average

SDG&E's gas infrastructure is a large dynamic system of pipelines and pipeline connections, with continual changes in customer load and construction activity. As a result of these fluctuations, a trend or base year forecasting methodology is not appropriate. The 5-year historical average methodology was selected to forecast the base requirement for non-labor as it captures the yearly variation in system pressure betterment requirements which align with the constantly changing new construction development schedules, economic conditions, and large customer system impacts.

NSE - 5-YR Average

N/A

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00503.0
Category: D. Pressure Betterment
Category-Sub: 1. Pressure Betterment
Workpaper Group: 005030 - Pressure Betterment

Summary of Adjustments to Forecast

In 2016 $ (000)										
Forecast Method		**Base Forecast**			**Forecast Adjustments**			**Adjusted-Forecast**		
Years		**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Labor	5-YR Average	223	223	223	1	1	1	224	224	224
Non-Labor	5-YR Average	1,470	1,470	1,470	1	1	1	1,471	1,471	1,471
NSE	5-YR Average	0	0	0	0	0	0	0	0	0
Total		**1,693**	**1,693**	**1,693**	**2**	**2**	**2**	**1,695**	**1,695**	**1,695**
FTE	5-YR Average	3.1	3.1	3.1	0.0	0.0	0.0	3.1	3.1	3.1

Forecast Adjustment Details

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2017 Total		0	0	0	0	0.0	
2018 Total		0	0	0	0	0.0	
2019 Total		0	0	0	0	0.0	

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00503.0
Category: D. Pressure Betterment
Category-Sub: 1. Pressure Betterment
Workpaper Group: 005030 - Pressure Betterment

Determination of Adjusted-Recorded:

	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	2016 ($000)
Recorded (Nominal $)*					
Labor	668	283	82	87	193
Non-Labor	2,467	1,205	1,190	2,410	1,412
NSE	0	0	0	0	0
Total	**3,134**	**1,488**	**1,272**	**2,497**	**1,605**
FTE	9.1	3.8	1.0	1.1	2.6
Adjustments (Nominal $) **					
Labor	-338	-3	0	7	0
Non-Labor	-1,176	-70	-6	0	0
NSE	0	0	0	0	0
Total	**-1,515**	**-73**	**-6**	**7**	**0**
FTE	-4.4	0.0	0.0	0.1	0.0
Recorded-Adjusted (Nominal $)					
Labor	329	281	82	94	193
Non-Labor	1,290	1,135	1,184	2,410	1,412
NSE	0	0	0	0	0
Total	**1,620**	**1,415**	**1,266**	**2,504**	**1,605**
FTE	4.7	3.8	1.0	1.2	2.6
Vacation & Sick (Nominal $)					
Labor	48	44	13	14	32
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**48**	**44**	**13**	**14**	**32**
FTE	0.8	0.7	0.2	0.2	0.5
Escalation to 2016$					
Labor	-6	-3	-2	-1	0
Non-Labor	-21	-12	-25	-18	0
NSE	0	0	0	0	0
Total	**-28**	**-16**	**-27**	**-19**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2016$)					
Labor	371	322	93	107	225
Non-Labor	1,269	1,123	1,158	2,392	1,412
NSE	0	0	0	0	0
Total	**1,640**	**1,444**	**1,252**	**2,499**	**1,637**
FTE	5.5	4.5	1.2	1.4	3.1

* After company-wide exclusions of Non-GRC costs
** Refer to "Detail of Adjustments to Recorded" page for line item adjustments
Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00503.0
Category: D. Pressure Betterment
Category-Sub: 1. Pressure Betterment
Workpaper Group: 005030 - Pressure Betterment

Summary of Adjustments to Recorded:

In Nominal $(000)					
Years	**2012**	**2013**	**2014**	**2015**	**2016**
Labor	-338	-3	0	7	0
Non-Labor	-1,176	-70	-6	0	0
NSE	0	0	0	0	0
Total	**-1,515**	**-73**	**-6**	**7**	**0**
FTE	-4.4	0.0	0.0	0.1	0.0

Detail of Adjustments to Recorded in Nominal $:

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2012	Other	-338	-1,176	0	-1,515	-4.4	DBENTLEY20161031112951847
Explanation:	Adjustment to delete non-typical costs associated with BC 09545.0						
2012 Total		-338	-1,176	0	-1,515	-4.4	
2013	Other	-3	-70	0	-73	0.0	DBENTLEY20161031113107737
Explanation:	Adjustment to delete non-typical costs associated with Budget Code 09545.0						
2013 Total		-3	-70	0	-73	0.0	
2014	Other	0	-6	0	-6	0.0	DBENTLEY20161031113154550
Explanation:	Adjustment to delete non-typical costs associated with Budget Code 09545.0						
2014 Total		0	-6	0	-6	0.0	
2015	Other	7	0	0	7	0.1	DBENTLEY20161026143341787
Explanation:	Dec 2015 My Time Missing Labor Accrual						
2015 Total		7	0	0	7	0.1	
2016 Total		0	0	0	0	0.0	

Note: Totals may include rounding differences.

Beginning of Workpaper Sub Details for
Workpaper Group 005030

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00503.0
Category:	D. Pressure Betterment
Category-Sub:	1. Pressure Betterment
Workpaper Group:	005030 - Pressure Betterment
Workpaper Detail:	005030.001 - Pressure Betterment
In-Service Date:	Not Applicable

Description:

Pressure betterment project costs.

Forecast In 2016 $(000)

Years	2017	2018	2019
Labor	224	224	224
Non-Labor	1,471	1,471	1,471
NSE	0	0	0
Total	**1,695**	**1,695**	**1,695**
FTE	3.1	3.1	3.1

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Category: E. Distribution Easements
Workpaper: 005040

Summary for Category: E. Distribution Easements

	In 2016$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
Labor	1	1	1	1
Non-Labor	11	37	37	37
NSE	0	0	0	0
Total	**12**	**38**	**38**	**38**
FTE	0.0	0.1	0.1	0.1

005040 Distribution Easements

Labor	1	1	1	1
Non-Labor	11	37	37	37
NSE	0	0	0	0
Total	**12**	**38**	**38**	**38**
FTE	0.0	0.1	0.1	0.1

Note: Totals may include rounding differences.

Beginning of Workpaper Group
005040 - Distribution Easements

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00504.0
Category: E. Distribution Easements
Category-Sub: 1. Distribution Easements
Workpaper Group: 005040 - Distribution Easements

Summary of Results (Constant 2016 $ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2012	2013	2014	2015	2016	2017	2018	2019
Labor	3-YR Average	1	0	0	1	1	1	1	1
Non-Labor	3-YR Average	27	31	76	24	11	37	37	37
NSE	3-YR Average	0	0	0	0	0	0	0	0
Total		**28**	**31**	**76**	**26**	**12**	**38**	**38**	**38**
FTE	3-YR Average	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1

Business Purpose:

Budget Code 504 provides funding to purchase gas distribution pipeline and facility easements on private property or public lands.

Physical Description:

Expenditures under budget code 504 are used to perform necessary surveys and mapping functions, document research, document preparation, and negotiations for the acquisition of easements to allow the installation of gas distribution facilities on private property or public lands.

Project Justification:

This is necessary in order to continue to serve new gas customers across private property or public lands.

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00504.0
Category:	E. Distribution Easements
Category-Sub:	1. Distribution Easements
Workpaper Group:	005040 - Distribution Easements

Forecast Methodology:

Labor - 3-YR Average

The 3-year historical average forecasting methodology was selected for labor as it best represents the most recent fluctuation of work associated with the current number of easements or renewals.

Non-Labor - 3-YR Average

The 3-year historical average forecasting methodology was selected for non-labor as it best represents the most recent fluctuation of work associated with the current number of easements or renewals.

NSE - 3-YR Average

N/A

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00504.0
Category: E. Distribution Easements
Category-Sub: 1. Distribution Easements
Workpaper Group: 005040 - Distribution Easements

Summary of Adjustments to Forecast

In 2016 $ (000)										
Forecast Method		**Base Forecast**			**Forecast Adjustments**			**Adjusted-Forecast**		
Years		**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Labor	3-YR Average	0	0	0	1	1	1	1	1	1
Non-Labor	3-YR Average	37	37	37	0	0	0	37	37	37
NSE	3-YR Average	0	0	0	0	0	0	0	0	0
Total		**37**	**37**	**37**	**1**	**1**	**1**	**38**	**38**	**38**
FTE	3-YR Average	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1

Forecast Adjustment Details

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2017	Other	0	0	0	0	0.1	DBENTLEY20170616165016570
Explanation:	The 3-year forecast methodology resulted in less than the minimum .1 FTE required by the system. This adjustment corrects the system error.						
2017 Total		0	0	0	0	0.1	
2018	Other	0	0	0	0	0.1	DBENTLEY20170616165033537
Explanation:	The 3-year forecast methodology resulted in less than the minimum .1 FTE required by the system. This adjustment corrects the system error.						
2018 Total		0	0	0	0	0.1	
2019	Other	0	0	0	0	0.1	DBENTLEY20170616165052667
Explanation:	The 3-year forecast methodology resulted in less than the minimum .1 FTE required by the system. This adjustment corrects the system error.						
2019 Total		0	0	0	0	0.1	

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00504.0
Category: E. Distribution Easements
Category-Sub: 1. Distribution Easements
Workpaper Group: 005040 - Distribution Easements

Determination of Adjusted-Recorded:

	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	2016 ($000)
Recorded (Nominal $)*					
Labor	1	0	0	1	1
Non-Labor	27	31	77	25	11
NSE	0	0	0	0	0
Total	**28**	**31**	**77**	**26**	**12**
FTE	0.0	0.0	0.0	0.0	0.0
Adjustments (Nominal $) **					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Nominal $)					
Labor	1	0	0	1	1
Non-Labor	27	31	77	25	11
NSE	0	0	0	0	0
Total	**28**	**31**	**77**	**26**	**12**
FTE	0.0	0.0	0.0	0.0	0.0
Vacation & Sick (Nominal $)					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Escalation to 2016$					
Labor	0	0	0	0	0
Non-Labor	0	0	-2	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**-2**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2016$)					
Labor	1	0	0	1	1
Non-Labor	27	31	76	24	11
NSE	0	0	0	0	0
Total	**28**	**31**	**76**	**26**	**12**
FTE	0.0	0.0	0.0	0.0	0.0

* After company-wide exclusions of Non-GRC costs
** Refer to "Detail of Adjustments to Recorded" page for line item adjustments
Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00504.0
Category: E. Distribution Easements
Category-Sub: 1. Distribution Easements
Workpaper Group: 005040 - Distribution Easements

Summary of Adjustments to Recorded:

In Nominal $(000)						
Years	**2012**	**2013**	**2014**	**2015**	**2016**
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID

Note: Totals may include rounding differences.

Beginning of Workpaper Sub Details for
Workpaper Group 005040

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00504.0
Category: E. Distribution Easements
Category-Sub: 1. Distribution Easements
Workpaper Group: 005040 - Distribution Easements
Workpaper Detail: 005040.001 - Easements

In-Service Date: Not Applicable

Description:

Easement fees.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	1	1	1
Non-Labor	37	37	37
NSE	0	0	0
Total	**38**	**38**	**38**
FTE	0.1	0.1	0.1

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Category: F. Pipe Relocations - Franchise and Freeway
Workpaper: 005050

Summary for Category: F. Pipe Relocations - Franchise and Freeway

	In 2016$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
Labor	1,034	1,012	1,012	1,012
Non-Labor	13,919	5,653	5,653	5,653
NSE	0	0	0	0
Total	**14,953**	**6,665**	**6,665**	**6,665**
FTE	13.1	14.4	14.4	14.4

005050 Pipe Relocations - Franchise and Freeway

Labor	1,034	1,012	1,012	1,012
Non-Labor	13,919	5,653	5,653	5,653
NSE	0	0	0	0
Total	**14,953**	**6,665**	**6,665**	**6,665**
FTE	13.1	14.4	14.4	14.4

Note: Totals may include rounding differences.

Beginning of Workpaper Group
005050 - Pipe Relocations - Franchise and Freeway

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00505.0
Category: F. Pipe Relocations - Franchise and Freeway
Category-Sub: 1. Pipe Relocations - Franchise and Freeway
Workpaper Group: 005050 - Pipe Relocations - Franchise and Freeway

Summary of Results (Constant 2016 $ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2012	2013	2014	2015	2016	2017	2018	2019
Labor	5-YR Average	1,097	964	1,001	963	1,034	1,012	1,012	1,012
Non-Labor	5-YR Average	2,853	3,180	3,230	5,084	13,919	5,653	5,653	5,653
NSE	5-YR Average	0	0	0	0	0	0	0	0
Total		**3,949**	**4,144**	**4,231**	**6,047**	**14,953**	**6,665**	**6,665**	**6,665**
FTE	5-YR Average	17.6	14.8	14.2	12.1	13.1	14.4	14.4	14.4

Business Purpose:

Budget code 505 provides funding for the required relocation of existing gas facilities when necessitated by conflict with the installation of public improvements.

Physical Description:

This project covers the relocation of existing gas distribution facilities when necessitated by public improvements as required by the company's franchise agreements to clear municipal or other improvements. Generally, the work involves a change in alignment and/or grade of existing gas pipelines and associated facilities driven by local and state agency requirements. Work may involve main replacement in a new location in lieu of lowering, raising or changing lateral position of the existing main due to municipal improvements such as street and highway, railroad, and water and sewer line construction.

Project Justification:

This project covers the relocation of existing gas distribution facilities in compliance with State Highway and Municipal Franchise Agreements. All pipeline work must be performed in compliance with CPUC GO 112-F.

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00505.0
Category:	F. Pipe Relocations - Franchise and Freeway
Category-Sub:	1. Pipe Relocations - Franchise and Freeway
Workpaper Group:	005050 - Pipe Relocations - Franchise and Freeway

Forecast Methodology:

Labor - 5-YR Average

The frequency and amount of franchise and freeway pipeline relocation projects is driven by outside agencies. A review of historical expenditures from 2012 through 2016 revealed no clear trend. The 5-year historical average forecasting methodology was selected for labor as it best represents the fluctuation of relocating existing gas facilities when in conflict with public improvements by local or state agencies over the years.

Non-Labor - 5-YR Average

The frequency and amount of franchise and freeway pipeline relocation projects is driven by outside agencies. A review of historical expenditures from 2012 through 2016 revealed no clear trend. The 5-year historical average forecasting methodology was selected for non-labor as it best represents the fluctuation of relocating existing gas facilities when in conflict with public improvements by local or state agencies over the years.

NSE - 5-YR Average

N/A

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00505.0
Category: F. Pipe Relocations - Franchise and Freeway
Category-Sub: 1. Pipe Relocations - Franchise and Freeway
Workpaper Group: 005050 - Pipe Relocations - Franchise and Freeway

Summary of Adjustments to Forecast

In 2016 $ (000)										
Forecast Method		**Base Forecast**			**Forecast Adjustments**			**Adjusted-Forecast**		
Years		**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Labor	5-YR Average	1,011	1,011	1,011	1	1	1	1,012	1,012	1,012
Non-Labor	5-YR Average	5,652	5,652	5,652	1	1	1	5,653	5,653	5,653
NSE	5-YR Average	0	0	0	0	0	0	0	0	0
Total		**6,663**	**6,663**	**6,663**	**2**	**2**	**2**	**6,665**	**6,665**	**6,665**
FTE	5-YR Average	14.4	14.4	14.4	0.0	0.0	0.0	14.4	14.4	14.4

Forecast Adjustment Details

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2017 Total		0	0	0	0	0.0	
2018 Total		0	0	0	0	0.0	
2019 Total		0	0	0	0	0.0	

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00505.0
Category: F. Pipe Relocations - Franchise and Freeway
Category-Sub: 1. Pipe Relocations - Franchise and Freeway
Workpaper Group: 005050 - Pipe Relocations - Franchise and Freeway

Determination of Adjusted-Recorded:

	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	2016 ($000)
Recorded (Nominal $)*					
Labor	974	841	882	824	868
Non-Labor	2,901	3,214	3,300	5,077	13,243
NSE	0	0	0	0	0
Total	**3,875**	**4,055**	**4,183**	**5,902**	**14,111**
FTE	15.2	12.6	12.0	10.2	10.9
Adjustments (Nominal $) **					
Labor	0	0	0	16	18
Non-Labor	0	0	0	45	676
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**61**	**695**
FTE	0.0	0.0	0.0	0.1	0.2
Recorded-Adjusted (Nominal $)					
Labor	974	841	882	841	887
Non-Labor	2,901	3,214	3,300	5,122	13,919
NSE	0	0	0	0	0
Total	**3,875**	**4,055**	**4,183**	**5,963**	**14,806**
FTE	15.2	12.6	12.0	10.3	11.1
Vacation & Sick (Nominal $)					
Labor	141	133	141	130	147
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**141**	**133**	**141**	**130**	**147**
FTE	2.4	2.2	2.2	1.8	2.0
Escalation to 2016$					
Labor	-18	-10	-22	-7	0
Non-Labor	-48	-34	-71	-39	0
NSE	0	0	0	0	0
Total	**-66**	**-45**	**-93**	**-46**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2016$)					
Labor	1,097	964	1,001	963	1,034
Non-Labor	2,853	3,180	3,230	5,084	13,919
NSE	0	0	0	0	0
Total	**3,949**	**4,144**	**4,231**	**6,047**	**14,953**
FTE	17.6	14.8	14.2	12.1	13.1

* After company-wide exclusions of Non-GRC costs
** Refer to "Detail of Adjustments to Recorded" page for line item adjustments
Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00505.0
Category: F. Pipe Relocations - Franchise and Freeway
Category-Sub: 1. Pipe Relocations - Franchise and Freeway
Workpaper Group: 005050 - Pipe Relocations - Franchise and Freeway

Summary of Adjustments to Recorded:

In Nominal $(000)					
Years	**2012**	**2013**	**2014**	**2015**	**2016**
Labor	0	0	0	16	18
Non-Labor	0	0	0	45	676
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**61**	**695**
FTE	0.0	0.0	0.0	0.1	0.2

Detail of Adjustments to Recorded in Nominal $:

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2012 Total		0	0	0	0	0.0	
2013 Total		0	0	0	0	0.0	
2014 Total		0	0	0	0	0.0	
2015	Other	16	0	0	16	0.1	DBENTLEY20161026143544180
Explanation:	Dec 2015 My Time Missing Labor Accrual						
2015	Other	0	45	0	45	0.0	JKIKUTS20161129081704363
Explanation:	00557.0 Mid Coast Corridor 2015 costs being combined with 00505.0 Street & Highway Relocation budget and reflected in this adjustment.						
2015 Total		16	45	0	61	0.1	
2016	Other	18	676	0	695	0.2	DBENTLEY20170206110157083
Explanation:	00557.0 Mid Coast Corridor 2015 costs being combined with 00505.0 Street & Highway Relocation budget and reflected in this adjustment.						
2016 Total		18	676	0	695	0.2	

Note: Totals may include rounding differences.

Beginning of Workpaper Sub Details for
Workpaper Group 005050

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00505.0
Category: F. Pipe Relocations - Franchise and Freeway
Category-Sub: 1. Pipe Relocations - Franchise and Freeway
Workpaper Group: 005050 - Pipe Relocations - Franchise and Freeway
Workpaper Detail: 005050.001 - Franchise Relocations

In-Service Date: Not Applicable

Description:

Franchise relocation costs.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	1,012	1,012	1,012
Non-Labor	5,653	5,653	5,653
NSE	0	0	0
Total	**6,665**	**6,665**	**6,665**
FTE	14.4	14.4	14.4

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Category: G. Tools and Equipment
Workpaper: 005060

Summary for Category: G. Tools and Equipment

	In 2016$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
Labor	37	188	188	188
Non-Labor	2,062	2,031	2,031	2,031
NSE	0	0	0	0
Total	**2,099**	**2,219**	**2,219**	**2,219**
FTE	0.5	2.3	2.3	2.3

005060 Tools and Equipment

Labor	37	188	188	188
Non-Labor	2,062	2,031	2,031	2,031
NSE	0	0	0	0
Total	**2,099**	**2,219**	**2,219**	**2,219**
FTE	0.5	2.3	2.3	2.3

Note: Totals may include rounding differences.

Beginning of Workpaper Group
005060 - Tools and Equipment

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00506.0
Category: G. Tools and Equipment
Category-Sub: 1. Tools and Equipment
Workpaper Group: 005060 - Tools and Equipment

Summary of Results (Constant 2016 $ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2012	2013	2014	2015	2016	2017	2018	2019
Labor	5-YR Average	22	189	505	187	37	188	188	188
Non-Labor	5-YR Average	2,537	1,447	1,494	2,613	2,062	2,031	2,031	2,031
NSE	5-YR Average	0	0	0	0	0	0	0	0
Total		**2,560**	**1,636**	**1,999**	**2,800**	**2,099**	**2,219**	**2,219**	**2,219**
FTE	5-YR Average	0.2	2.7	6.5	1.8	0.5	2.3	2.3	2.3

Business Purpose:

Budget code 506 provides funds for new tools and equipment required by field personnel in order to safely and efficiently install, operate and maintain the gas distribution system as well as maintainence of the Skills City inventory of training equipment.

Physical Description:

Funds in this budget code are used to acquire various tools and equipment used by gas crews, personnel in the field, construction operations, shop operations, and identical start-of-the-art tools used in training. Tools and equipment are replaced due to failure, age, advances in technology, and to improve employee safety and ergonomics These tools and equipment are necessary to economically and safely install, operate and maintain the gas distribution system.

Project Justification:

Tools age and/or become obsolete due to new technology, new construction methods are introduced requiring new tools, and new safety requirements. It is necessary to equip SDG&E's employees and trainers with safe and reliable tools and equipment. Funding in this budget code over the forecasted period from 2017 through 2019, includes tools and equipment necessary to safely perform gas distribution work, and improvements to training facilities such as Skills Training Facility and the weld school facility in compliance with GO112-F.

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00506.0
Category:	G. Tools and Equipment
Category-Sub:	1. Tools and Equipment
Workpaper Group:	005060 - Tools and Equipment

Forecast Methodology:

Labor - 5-YR Average

The need for new tools and equipment is influenced by the age and condition of the tools, technology, ergonomics, and changes in company gas standards or procedures. Due to the cost fluctuations from 2012-2016, a trend was not apparent. The 5-year historical average methodology was selected for labor as it captures the variation in yearly tool and equipment needs.

Non-Labor - 5-YR Average

The need for new tools and equipment is influenced by the age and condition of the tools, technology, ergonomics, and changes in company gas standards or procedures. Due to the cost fluctuations from 2012-2016, a trend was not apparent. The 5-year historical average methodology was selected for nonlabor as it captures the variation in yearly tool and equipment needs.

NSE - 5-YR Average

N/A

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00506.0
Category: G. Tools and Equipment
Category-Sub: 1. Tools and Equipment
Workpaper Group: 005060 - Tools and Equipment

Summary of Adjustments to Forecast

In 2016 $ (000)										
Forecast Method		**Base Forecast**			**Forecast Adjustments**			**Adjusted-Forecast**		
Years		**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Labor	5-YR Average	187	187	187	1	1	1	188	188	188
Non-Labor	5-YR Average	2,030	2,030	2,030	1	1	1	2,031	2,031	2,031
NSE	5-YR Average	0	0	0	0	0	0	0	0	0
Total		**2,217**	**2,217**	**2,217**	**2**	**2**	**2**	**2,219**	**2,219**	**2,219**
FTE	5-YR Average	2.3	2.3	2.3	0.0	0.0	0.0	2.3	2.3	2.3

Forecast Adjustment Details

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2017 Total		0	0	0	0	0.0	
2018 Total		0	0	0	0	0.0	
2019 Total		0	0	0	0	0.0	

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00506.0
Category: G. Tools and Equipment
Category-Sub: 1. Tools and Equipment
Workpaper Group: 005060 - Tools and Equipment

Determination of Adjusted-Recorded:

	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	2016 ($000)
Recorded (Nominal $)*					
Labor	20	165	445	163	31
Non-Labor	2,580	1,463	1,527	2,632	2,062
NSE	0	0	0	0	0
Total	**2,600**	**1,627**	**1,972**	**2,796**	**2,094**
FTE	0.2	2.3	5.5	1.5	0.4
Adjustments (Nominal $) **					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Nominal $)					
Labor	20	165	445	163	31
Non-Labor	2,580	1,463	1,527	2,632	2,062
NSE	0	0	0	0	0
Total	**2,600**	**1,627**	**1,972**	**2,796**	**2,094**
FTE	0.2	2.3	5.5	1.5	0.4
Vacation & Sick (Nominal $)					
Labor	3	26	71	25	5
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**3**	**26**	**71**	**25**	**5**
FTE	0.0	0.4	1.0	0.3	0.1
Escalation to 2016$					
Labor	0	-2	-11	-1	0
Non-Labor	-43	-16	-33	-20	0
NSE	0	0	0	0	0
Total	**-43**	**-18**	**-44**	**-21**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2016$)					
Labor	22	189	505	187	37
Non-Labor	2,537	1,447	1,494	2,613	2,062
NSE	0	0	0	0	0
Total	**2,560**	**1,636**	**1,999**	**2,800**	**2,099**
FTE	0.2	2.7	6.5	1.8	0.5

* After company-wide exclusions of Non-GRC costs
** Refer to "Detail of Adjustments to Recorded" page for line item adjustments
Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00506.0
Category: G. Tools and Equipment
Category-Sub: 1. Tools and Equipment
Workpaper Group: 005060 - Tools and Equipment

Summary of Adjustments to Recorded:

In Nominal $(000)					
Years	**2012**	**2013**	**2014**	**2015**	**2016**
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID

Note: Totals may include rounding differences.

Beginning of Workpaper Sub Details for
Workpaper Group 005060

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00506.0
Category:	G. Tools and Equipment
Category-Sub:	1. Tools and Equipment
Workpaper Group:	005060 - Tools and Equipment
Workpaper Detail:	005060.001 - Tools and Equipment
In-Service Date:	Not Applicable

Description:

Routine capital tool and equipment costs.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	188	188	188
Non-Labor	1,296	1,517	1,706
NSE	0	0	0
Total	**1,484**	**1,705**	**1,894**
FTE	2.3	2.3	2.3

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00506.0
Category:	G. Tools and Equipment
Category-Sub:	1. Tools and Equipment
Workpaper Group:	005060 - Tools and Equipment
Workpaper Detail:	005060.002 - RAMP - Base Risk ID 16/SDG&E Medium Pressure Pipeline Failure
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Construction of training props to simulate real-world scenarios while qualifying personnel. This workpaper identifies historically embedded costs for constructing training props mandated by GO112F.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	300	300	300
NSE	0	0	0
Total	**300**	**300**	**300**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00506.0
Category:	G. Tools and Equipment
Category-Sub:	1. Tools and Equipment
Workpaper Group:	005060 - Tools and Equipment
Workpaper Detail:	005060.002 - RAMP - Base Risk ID 16/SDG&E Medium Pressure Pipeline Failure

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Qualification of pipeline personnel

Program Description: For safety and distribution staff training, props are purchased for use in situation city to simulate real world situations when qualifying personnel.

Risk/Mitigation:

Risk: Pipeline failure

Mitigation: Training props

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	662	463	293
High	809	565	358

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Mandated

Work Type Citation: GO 112 F

Historical Embedded Cost Estimates ($000)

Embedded Costs: 300

Explanation: 2016 RAMP base value

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00506.0
Category:	G. Tools and Equipment
Category-Sub:	1. Tools and Equipment
Workpaper Group:	005060 - Tools and Equipment
Workpaper Detail:	005060.003 - RAMP - Incremental Risk ID 16/SDG&E Medium Pressure Pipeline Failure
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Construction of training props to simulate real-world scenarios while qualifying personnel. This workpaper identifies RAMP costs greater than the 2016 historically embedded costs to construct training props mandated by GO112-F. These costs are captured within the 5-year forecast methodology.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	435	214	25
NSE	0	0	0
Total	**435**	**214**	**25**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00506.0
Category:	G. Tools and Equipment
Category-Sub:	1. Tools and Equipment
Workpaper Group:	005060 - Tools and Equipment
Workpaper Detail:	005060.003 - RAMP - Incremental Risk ID 16/SDG&E Medium Pressure Pipeline Failure

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Qualification of pipeline personnel

Program Description: For safety and distribution staff training, props are purchased to be used in situation city to simulate real world scenarios while qulaifying personnel.

Risk/Mitigation:

Risk: Pipleline failure

Mitigation: Training props

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	662	463	293
High	809	565	358

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Mandated

Work Type Citation: GO 112 F

Historical Embedded Cost Estimates ($000)

Embedded Costs: 0

Explanation: 2016 base value of $300K is captured in WP 506.002. This is the incremental portion for this activity.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Category: H. Code Compliance
Workpaper: 005070

Summary for Category: H. Code Compliance

	In 2016$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
Labor	130	1,208	368	383
Non-Labor	608	1,341	781	791
NSE	0	0	0	0
Total	**738**	**2,549**	**1,149**	**1,174**
FTE	0.8	11.9	3.5	3.7

005070 Code Compliance

Labor	130	1,208	368	383
Non-Labor	608	1,341	781	791
NSE	0	0	0	0
Total	**738**	**2,549**	**1,149**	**1,174**
FTE	0.8	11.9	3.5	3.7

Note: Totals may include rounding differences.

Beginning of Workpaper Group
005070 - Code Compliance

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00507.0
Category: H. Code Compliance
Category-Sub: 1. Code Compliance
Workpaper Group: 005070 - Code Compliance

Summary of Results (Constant 2016 $ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2012	2013	2014	2015	2016	2017	2018	2019
Labor	3-YR Average	198	135	144	64	130	1,208	368	383
Non-Labor	3-YR Average	129	54	345	880	608	1,341	781	791
NSE	3-YR Average	0	0	0	0	0	0	0	0
Total		**327**	**189**	**489**	**944**	**738**	**2,549**	**1,149**	**1,174**
FTE	3-YR Average	2.1	1.1	1.2	0.7	0.8	11.9	3.5	3.7

Business Purpose:

Capital expenditures in budget code 507 are used to keep SDG&E's gas distribution system is in compliance with State and Federal regulations for natural gas pipelines.

Physical Description:

Four principle ongoing compliance issues involving the gas distribution system currently require funding under this budget code:
1. Labor for the Regulator Replacement Program for pre 1982 American Meter Type K-Regulators to be removed in compliance with 49 CFR § 192.197(b); 2. Labor and materials necessary for the installation of barricades to protect MSAs from vehicular traffic in compliance with 49 CFR § 192.353(a); 3. Labor and materials necessary for the installation of distribution system electronic pressure monitoring devices (EPM) in compliance with 49 CFR § 192.741(a)-(b); and 4. Installation of isolation valves necessary for the safe operation of the gas distribution system in compliance with 49 CFR § 192.181.

Project Justification:

The work completed under this budget code is required to insure compliance with State and Federal regulations for natural gas pipelines.

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00507.0
Category:	H. Code Compliance
Category-Sub:	1. Code Compliance
Workpaper Group:	005070 - Code Compliance

Forecast Methodology:

Labor - 3-YR Average

Charges to this budget code tend to fluctuate due to the unpredictability of the number of existing meter set locations identified for barrier post installations, curtailment zone optimization due to system growth, routine pre 1966 K-Regulator removal rates, and electronic pressure monitor (EPM) coverage optimization. A review of the data revealed a marked change in the volume of code compliance activities in 2014-2016, therefore, a 3-year average methodology was selected to forecast the base requirement for labor.

Non-Labor - 3-YR Average

Charges to this budget code tend to fluctuate due to the unpredictability of the number of existing meter set locations identified for barrier post installations, curtailment zone optimization due to system growth, routine pre 1966 K-Regulator removal rates, and electronic pressure monitor (EPM) coverage optimization. A review of the data revealed a marked change in the volume of code compliance activities in 2014-2016, therefore, a 3-year average methodology was selected to forecast the base requirement for non-labor.

NSE - 3-YR Average

N/A

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00507.0
Category: H. Code Compliance
Category-Sub: 1. Code Compliance
Workpaper Group: 005070 - Code Compliance

Summary of Adjustments to Forecast

In 2016 $ (000)										
Forecast Method		**Base Forecast**			**Forecast Adjustments**			**Adjusted-Forecast**		
Years		**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Labor	3-YR Average	112	112	112	1,096	256	271	1,208	368	383
Non-Labor	3-YR Average	610	610	610	731	171	181	1,341	781	791
NSE	3-YR Average	0	0	0	0	0	0	0	0	0
Total		**722**	**722**	**722**	**1,827**	**427**	**452**	**2,549**	**1,149**	**1,174**
FTE	3-YR Average	0.9	0.9	0.9	11.0	2.6	2.8	11.9	3.5	3.7

Forecast Adjustment Details

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2017	Other	135	90	0	225	1.4	DBENTLEY20161201144924567
Explanation:	A. Incremental costs for completing the electronic pressure monitor (EPM) deployment throughout SDG&E gas distribution system. EPM's will be deployed to the remaining 70 small distributions systems (pressure districts) currently without EPM coverage - 18 in 2017, 18 in 2018, and 34 in 2019.						
2017	Other	960	640	0	1,600	9.6	DBENTLEY20161201145544597
Explanation:	B. Incremental costs for the replacement of 18 aging and inoperable critical / regulator station valves hindering isolation zone integrity or ability to fully complete regulator station maintenance. Of these valves 16 will be replaced in 2017 and 2 in 2018.						
2017 Total		1,095	730	0	1,825	11.0	
2018	Other	135	90	0	225	1.4	DBENTLEY20161201145043857
Explanation:	A. Incremental costs for completing the electronic pressure monitor (EPM) deployment throughout SDG&E gas distribution system. EPM's will be deployed to the remaining 70 small distributions systems (pressure districts) currently without EPM coverage - 18 in 2017, 18 in 2018, and 34 in 2019.						
2018	Other	120	80	0	200	1.2	DBENTLEY20161201145605390
Explanation:	B. Incremental costs for the replacement of 18 aging and inoperable critical / regulator station valves hindering isolation zone integrity or ability to fully complete regulator station maintenance. Of these valves 16 will be replaced in 2017 and 2 in 2018.						
2018 Total		255	170	0	425	2.6	
2019	Other	270	180	0	450	2.8	DBENTLEY20170509163300173
Explanation:	A. Incremental costs for completing the electronic pressure monitor (EPM) deployment throughout SDG&E gas distribution system. EPM's will be deployed to the remaining 70 small distributions systems (pressure districts) currently without EPM coverage - 18 in 2017, 18 in 2018, and 34 in 2019.						
2019 Total		270	180	0	450	2.8	

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00507.0
Category: H. Code Compliance
Category-Sub: 1. Code Compliance
Workpaper Group: 005070 - Code Compliance

Determination of Adjusted-Recorded:

	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	2016 ($000)
Recorded (Nominal $)*					
Labor	176	118	127	56	112
Non-Labor	131	55	353	887	608
NSE	0	0	0	0	0
Total	**307**	**173**	**479**	**943**	**719**
FTE	1.8	0.9	1.0	0.6	0.7
Adjustments (Nominal $) **					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Nominal $)					
Labor	176	118	127	56	112
Non-Labor	131	55	353	887	608
NSE	0	0	0	0	0
Total	**307**	**173**	**479**	**943**	**719**
FTE	1.8	0.9	1.0	0.6	0.7
Vacation & Sick (Nominal $)					
Labor	26	19	20	9	19
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**26**	**19**	**20**	**9**	**19**
FTE	0.3	0.2	0.2	0.1	0.1
Escalation to 2016$					
Labor	-3	-1	-3	0	0
Non-Labor	-2	-1	-8	-7	0
NSE	0	0	0	0	0
Total	**-5**	**-2**	**-11**	**-7**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2016$)					
Labor	198	135	144	64	130
Non-Labor	129	54	345	880	608
NSE	0	0	0	0	0
Total	**327**	**189**	**489**	**944**	**738**
FTE	2.1	1.1	1.2	0.7	0.8

* After company-wide exclusions of Non-GRC costs
** Refer to "Detail of Adjustments to Recorded" page for line item adjustments
Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00507.0
Category: H. Code Compliance
Category-Sub: 1. Code Compliance
Workpaper Group: 005070 - Code Compliance

Summary of Adjustments to Recorded:

In Nominal $(000)						
	Years	**2012**	**2013**	**2014**	**2015**	**2016**
Labor		0	0	0	0	0
Non-Labor		0	0	0	0	0
NSE		0	0	0	0	0
	Total	**0**	**0**	**0**	**0**	**0**
FTE		0.0	0.0	0.0	0.0	0.0

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID

Note: Totals may include rounding differences.

Beginning of Workpaper Sub Details for
Workpaper Group 005070

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00507.0
Category: H. Code Compliance
Category-Sub: 1. Code Compliance
Workpaper Group: 005070 - Code Compliance
Workpaper Detail: 005070.001 - Code Compliance

In-Service Date: Not Applicable

Description:

Code compliance activitiy costs.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	1,208	368	383
Non-Labor	1,341	781	791
NSE	0	0	0
Total	**2,549**	**1,149**	**1,174**
FTE	11.9	3.5	3.7

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Category: I. Replacement of Mains and Services
Workpaper: 005080

Summary for Category: I. Replacement of Mains and Services

	In 2016$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
Labor	1,638	1,978	4,720	7,042
Non-Labor	3,980	3,990	12,220	19,184
NSE	0	0	0	0
Total	**5,618**	**5,968**	**16,940**	**26,226**
FTE	16.4	20.8	47.6	70.2

005080 Replacements of Mains & Services

Labor	1,638	1,978	4,720	7,042
Non-Labor	3,980	3,990	12,220	19,184
NSE	0	0	0	0
Total	**5,618**	**5,968**	**16,940**	**26,226**
FTE	16.4	20.8	47.6	70.2

Note: Totals may include rounding differences.

Beginning of Workpaper Group
005080 - Replacements of Mains & Services

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00508.0
Category: I. Replacement of Mains and Services
Category-Sub: 1. Replacement of Mains and Services
Workpaper Group: 005080 - Replacements of Mains & Services

Summary of Results (Constant 2016 $ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2012	2013	2014	2015	2016	2017	2018	2019
Labor	3-YR Average	445	574	1,417	1,453	1,638	1,978	4,720	7,042
Non-Labor	3-YR Average	1,108	1,292	2,032	1,688	3,980	3,990	12,220	19,184
NSE	3-YR Average	0	0	0	0	0	0	0	0
Total		**1,553**	**1,866**	**3,449**	**3,141**	**5,618**	**5,968**	**16,940**	**26,226**
FTE	3-YR Average	6.3	7.9	17.6	14.6	16.4	20.8	47.6	70.2

Business Purpose:

Expenditures in budget code 508 support SDG&E's continued safe and reliable delivery of natural gas in compliance with State and Federal code requirements for replacement of gas distribution system piping due to poor condition or location.

Physical Description:

This budget code includes the replacement of gas distribution pipelines due to its condition or location. Pipelines with a leak history are evaluated, resulting in a list of projects for replacement under this budget that are ranked by risk. This evaluation uses several criteria to prioritize candidate replacements including observed condition of the pipe, coating deterioration, leak history, age of the pipe, construction methods originally used, and location relative to places of gathering or population centers.

Project Justification:

Budget code 508 project replacements are required in order to comply with State and Federal code requirements and for the safe and reliable delivery of natural gas through the gas distribution system.

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services

Forecast Methodology:

Labor - 3-YR Average

Expenditures in this budget category change due to the variation in the number of identified main replacement projects. In addition, the timing of individual projects is based on a number of factors including the need for review of operating conditions, detailed planning requirements, acquiring the necessary permits, and coordination and scheduling of resources. An historical review of this budget category reveals such fluctuations in expenditures from 2012 through 2016 with a marked increase in costs from 2014-2016. The 3-year historical average forecasting methodology was selected for labor as it best represents the base level of work that is anticipated for the forecast years.

Non-Labor - 3-YR Average

Expenditures in this budget category change due to the variation in the number of identified main replacement projects. In addition, the timing of individual projects is based on a number of factors including the need for review of operating conditions, detailed planning requirements, acquiring the necessary permits, and coordination and scheduling of resources. An historical review of this budget category reveals such fluctuations in expenditures from 2012 through 2016 with a marked increase in costs from 2014-2016. The 3-year historical average forecasting methodology was selected for non-labor as it best represents the base level of work that is anticipated for the forecast years.

NSE - 3-YR Average

N/A

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00508.0
Category: I. Replacement of Mains and Services
Category-Sub: 1. Replacement of Mains and Services
Workpaper Group: 005080 - Replacements of Mains & Services

Summary of Adjustments to Forecast

In 2016 $ (000)										
Forecast Method		**Base Forecast**			**Forecast Adjustments**			**Adjusted-Forecast**		
Years		**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Labor	3-YR Average	1,502	1,502	1,502	476	3,218	5,540	1,978	4,720	7,042
Non-Labor	3-YR Average	2,566	2,566	2,566	1,424	9,654	16,618	3,990	12,220	19,184
NSE	3-YR Average	0	0	0	0	0	0	0	0	0
Total		**4,068**	**4,068**	**4,068**	**1,900**	**12,872**	**22,158**	**5,968**	**16,940**	**26,226**
FTE	3-YR Average	16.2	16.2	16.2	4.6	31.4	54.0	20.8	47.6	70.2

Forecast Adjustment Details

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2017	Other	475	1,425	0	1,900	4.6	JKIKUTS20170511185001140
Explanation:	A. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to remove early vintage steel pipelines. RAMP costs are forecast to be $475K labor, $1,425K non-labor in 2017; $1,371 labor, $4,114K non-labor in 2018; and $1,846 labor, $5,539 non-labor in 2019.						
2017	Other	0	-11	0	-11	0.0	ASUSTARI20170512131239143
Explanation:	C. RAMP Risk ID 16/Medium Pressure pipeline Failure. Adjustment removes costs for RAMP expenses already included in the 3-year average trend. Combines RAMP line items for leak repair and EPOCH replacements. $-11K non-labor in 2017, $-306K non-labor in 2018, and $-644K non-labor in 2019.						
2017	Other	0	46	0	46	0.0	ASUSTARI20170512131441730
Explanation:	D. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs for gas leak repairs. The activity invloves replacing pipe or components that are leaking. Incremental costs forecast to be $46K non-labor in 2017, 2018, and 2019.						
2017	Other	0	-37	0	-37	0.0	ASUSTARI20170512131647580
Explanation:	E. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to risk-rank and replace sections of pipe with a recurring leak history. Incremental RAMP costs forecast to be $-37K non-labor in 2017, $259K non-labor in 2018 and $597K non-labor in 2019.						
2017 Total		475	1,423	0	1,898	4.6	
2018	Other	1,371	4,114	0	5,485	13.4	JKIKUTS20170511185117973
Explanation:	A. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to remove early vintage steel pipelines. RAMP costs are forecast to be $475K labor, $1,425K non-labor in 2017; $1,371 labor, $4,114K non-labor in 2018; and $1,846 labor, $5,539 non-labor in 2019.						
2018	Other	1,846	5,539	0	7,385	18.0	JKIKUTS20170511185222833
Explanation:	B. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to remove non state-of-the-art threaded steel couplings. RAMP costs are forecast to be $0K labor, $0K non-labor in 2017; $1,846 labor, $5,539K non-labor in 2018; and $3,693 labor, $11,078 non-labor in 2019.						

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00508.0
Category: I. Replacement of Mains and Services
Category-Sub: 1. Replacement of Mains and Services
Workpaper Group: 005080 - Replacements of Mains & Services

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2018	Other	0	-306	0	-306	0.0	ASUSTARI20170512132330513
Explanation:	C. RAMP Risk ID 16/Medium Pressure pipeline Failure. Adjustment removes costs for RAMP expenses already included in the 3-year average trend. Combines RAMP line items for leak repair and EPOCH replacements. $-11K non-labor in 2017, $-306K non-labor in 2018, and $-644K non-labor in 2019.						
2018	Other	0	46	0	46	0.0	ASUSTARI20170512132359327
Explanation:	D. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs for gas leak repairs. The activity invloves replacing pipe or components that are leaking. Incremental costs forecast to be $46K non-labor in 2017, 2018, and 2019.						
2018	Other	0	260	0	260	0.0	ASUSTARI20170512132430953
Explanation:	E. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to risk-rank and replace sections of pipe with a recurring leak history. Incremental RAMP costs forecast to be $-37K non-labor in 2017, $259K non-labor in 2018 and $597K non-labor in 2019.						
2018 Total		3,217	9,653	0	12,870	31.4	
2019	Other	1,846	5,539	0	7,385	18.0	JKIKUTS20170511185321837
Explanation:	A. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to remove early vintage steel pipelines. RAMP costs are forecast to be $475K labor, $1,425K non-labor in 2017; $1,371 labor, $4,114K non-labor in 2018; and $1,846 labor, $5,539 non-labor in 2019.						
2019	Other	3,693	11,078	0	14,771	36.0	JKIKUTS20170511185356073
Explanation:	B. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to remove non state-of-the-art threaded steel couplings. RAMP costs are forecast to be $0K labor, $0K non-labor in 2017; $1,846 labor, $5,539K non-labor in 2018; and $3,693 labor, $11,078 non-labor in 2019.						
2019	Other	0	-644	0	-644	0.0	ASUSTARI20170512132545933
Explanation:	C. RAMP Risk ID 16/Medium Pressure pipeline Failure. Adjustment removes costs for RAMP expenses already included in the 3-year average trend. Combines RAMP line items for leak repair and EPOCH replacements. $-11K non-labor in 2017, $-306K non-labor in 2018, and $-644K non-labor in 2019.						
2019	Other	0	46	0	46	0.0	ASUSTARI20170512132615843
Explanation:	D. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs for gas leak repairs. The activity invloves replacing pipe or components that are leaking. Incremental costs forecast to be $46K non-labor in 2017, 2018, and 2019.						
2019	Other	0	598	0	598	0.0	ASUSTARI20170512132645067
Explanation:	E. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to risk-rank and replace sections of pipe with a recurring leak history. Incremental RAMP costs forecast to be $-37K non-labor in 2017, $259K non-labor in 2018 and $597K non-labor in 2019.						
2019 Total		5,539	16,617	0	22,156	54.0	

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00508.0
Category: I. Replacement of Mains and Services
Category-Sub: 1. Replacement of Mains and Services
Workpaper Group: 005080 - Replacements of Mains & Services

Determination of Adjusted-Recorded:

	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	2016 ($000)
Recorded (Nominal $)*					
Labor	689	780	1,296	1,261	1,405
Non-Labor	1,894	3,220	2,554	1,708	3,980
NSE	0	0	0	0	0
Total	**2,583**	**4,000**	**3,849**	**2,969**	**5,385**
FTE	8.8	10.4	15.5	12.3	13.9
Adjustments (Nominal $) **					
Labor	-294	-279	-47	8	0
Non-Labor	-768	-1,914	-478	-8	0
NSE	0	0	0	0	0
Total	**-1,062**	**-2,193**	**-525**	**0**	**0**
FTE	-3.4	-3.7	-0.6	0.1	0.0
Recorded-Adjusted (Nominal $)					
Labor	395	501	1,249	1,269	1,405
Non-Labor	1,126	1,306	2,076	1,700	3,980
NSE	0	0	0	0	0
Total	**1,522**	**1,807**	**3,325**	**2,969**	**5,385**
FTE	5.4	6.7	14.9	12.4	13.9
Vacation & Sick (Nominal $)					
Labor	57	79	199	196	233
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**57**	**79**	**199**	**196**	**233**
FTE	0.9	1.2	2.7	2.2	2.5
Escalation to 2016$					
Labor	-7	-6	-31	-11	0
Non-Labor	-19	-14	-44	-13	0
NSE	0	0	0	0	0
Total	**-26**	**-20**	**-76**	**-24**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2016$)					
Labor	445	574	1,417	1,453	1,638
Non-Labor	1,108	1,292	2,032	1,688	3,980
NSE	0	0	0	0	0
Total	**1,553**	**1,866**	**3,449**	**3,141**	**5,618**
FTE	6.3	7.9	17.6	14.6	16.4

* After company-wide exclusions of Non-GRC costs
** Refer to "Detail of Adjustments to Recorded" page for line item adjustments
Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00508.0
Category: I. Replacement of Mains and Services
Category-Sub: 1. Replacement of Mains and Services
Workpaper Group: 005080 - Replacements of Mains & Services

Summary of Adjustments to Recorded:

In Nominal $(000)					
Years	**2012**	**2013**	**2014**	**2015**	**2016**
Labor	-294	-279	-47	8	0
Non-Labor	-768	-1,914	-478	-8	0
NSE	0	0	0	0	0
Total	**-1,062**	**-2,193**	**-525**	**0**	**0**
FTE	-3.4	-3.7	-0.6	0.1	0.0

Detail of Adjustments to Recorded in Nominal $:

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2012	Other	-294	-768	0	-1,062	-3.4	DBENTLEY20161031115502020
Explanation:	Adjustment to remove non-typical costs associate with BC 12550						
2012 Total		-294	-768	0	-1,062	-3.4	
2013	Other	-279	-1,914	0	-2,193	-3.7	DBENTLEY20161031121436840
Explanation:	Adjustment to remove non-typical costs associate with BC 12550						
2013 Total		-279	-1,914	0	-2,193	-3.7	
2014	Other	-47	-478	0	-525	-0.6	DBENTLEY20161031121539760
Explanation:	Adjustment to remove non-typical costs associate with BC 12550						
2014 Total		-47	-478	0	-525	-0.6	
2015	Other	8	0	0	8	0.1	DBENTLEY20161026143633557
Explanation:	Dec 2015 My Time Missing Labor Accrual						
2015	Other	0	-8	0	-8	0.0	DBENTLEY20161031121623970
Explanation:	Adjustment to remove non-typical costs associate with BC 12550						
2015 Total		8	-8	0	0.126	0.1	
2016 Total		0	0	0	0	0.0	

Note: Totals may include rounding differences.

Beginning of Workpaper Sub Details for
Workpaper Group 005080

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.001 - Replacements of Mains and Services
In-Service Date:	Not Applicable

Description:

Costs for routine replacement of mains and services not captured under RAMP activities.

Forecast In 2016 $(000)

Years	2017	2018	2019
Labor	1,502	1,502	1,502
Non-Labor	-458	-753	-1,091
NSE	0	0	0
Total	**1,044**	**749**	**411**
FTE	16.2	16.2	16.2

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.002 - RAMP - Incremental / Risk ID 16 - Early Vintage Steel Replacement
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Early vintage steel replacement. This program intends to remove early vintage, non-piggable, medium and high pressure pipelines primarily cathodically protected by cold tar asphaltic wrap. This program does not have an historical equivalent.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	476	1,372	1,846
Non-Labor	1,425	4,116	5,539
NSE	0	0	0
Total	**1,901**	**5,488**	**7,385**
FTE	4.6	13.4	18.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.002 - RAMP - Incremental / Risk ID 16 - Early Vintage Steel Replacement

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Early Vintage Steel Replacement

Program Description: This program is intended to remove pre-1947, non-piggable high pressure pipeline as well as pre-1955 medium pressure steel mains. In the years prior to 1955, cold tar asphaltic wrap was used as the primary protection against corrosion with cathodic protection supplementing as secondary protection.

Risk/Mitigation:

Risk: SDG&E Medium-Pressure Pipeline Failure

Mitigation: Improvements

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	14,231	14,231	14,231
High	15,729	15,729	15,729

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Non-Mandated

Work Type Citation: 49 CFR 192, GO 112-F

Historical Embedded Cost Estimates ($000)

Embedded Costs: 0

Explanation: New program.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.003 - RAMP - Incremental / Risk ID 16 - Early Vintage Threaded Main Removal
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Early vintage threaded main removal. This program intends to remove 152 miles of early vintage, threaded pipe over a 10-year period at an average of 15 miles per year. This program does not have an historical equivalent.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	1,846	3,694
Non-Labor	0	5,539	11,080
NSE	0	0	0
Total	**0**	**7,385**	**14,774**
FTE	0.0	18.0	36.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.003 - RAMP - Incremental / Risk ID 16 - Early Vintage Threaded Main Removal

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Pre-1933 Threaded Main Removal

Program Description: Prior to 1933, piping in the gas distribution system was joined by treaded couplings. This project aims to proactively remove a total of 152 miles of threaded pipe over a 10-year period. This would be a 10-year program to remove 15 miles of pipe per year.

Risk/Mitigation:

Risk: SDG&E Medium-Pressure Pipeline Failure

Mitigation: Improvements

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	14,231	14,231	14,231
High	15,729	15,729	15,729

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Non-Mandated

Work Type Citation: 49 CFR 192, GO 112-F

Historical Embedded Cost Estimates ($000)

Embedded Costs: 0

Explanation: New program.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.004 - RAMP - Base / Risk ID 2 - Excavation Standby
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 02 / SDG&E Dig-Ins. Mitigating activity: Stand by. This workpaper identifies historically embedded costs for surveilance of excavations in the vicinity of high pressure pipelines. No incremental costs for this activity have been identified.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	13	13	13
NSE	0	0	0
Total	**13**	**13**	**13**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.004 - RAMP - Base / Risk ID 2 - Excavation Standby

RAMP Item # 1

RAMP Chapter: SDG&E-2

Program Name: Pipeline Observations (Standby)

Program Description: Surveillance of excavations in the vicinity of high pressure gas lines to prevent damage

Risk/Mitigation:

Risk: Dig-ins

Mitigation: Standby

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	12	12	12
High	14	14	14

Funding Source: CPUC-GRC

Forecast Method: Average

Work Type: Mandated

Work Type Citation: CFR Part 192.614 California Government Code 4216

Historical Embedded Cost Estimates ($000)

Embedded Costs: 13

Explanation: 2016 base RAMP value for this activity

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.005 - RAMP - Base / Risk ID 16 - Leak Repair
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Leak repair. This workpaper identifies historically embedded costs for replacing pipe or system components that are leaking.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	1,000	1,000	1,000
NSE	0	0	0
Total	**1,000**	**1,000**	**1,000**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.005 - RAMP - Base / Risk ID 16 - Leak Repair

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Leak Repair

Program Description: Leak repair is the result of leak mitigation and pipeline patrol. This activity involves replacing pipe or components that are leaking.

Risk/Mitigation:

Risk: Pipeline failure

Mitigation: Maintenance

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	994	994	994
High	1,098	1,098	1,098

Funding Source: CPUC-GRC

Forecast Method: Base Year

Work Type: Mandated

Work Type Citation: 49 CFR 192, Subpart M

Historical Embedded Cost Estimates ($000)

Embedded Costs: 1000

Explanation: 2016 RAMP base value for this activity

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.006 - RAMP - Incremental / Risk ID 16 - Leak Repair
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Leak repair. This workpaper identifies RAMP costs greater than the 2016 historically embedded costs for replacing pipe or system components that are leaking. These costs have not been captured in the 3-year average forecast methodology and so have been included as forecast adjustments.

Forecast In 2016 $(000)

Years	2017	2018	2019
Labor	0	0	0
Non-Labor	46	46	46
NSE	0	0	0
Total	**46**	**46**	**46**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.006 - RAMP - Incremental / Risk ID 16 - Leak Repair

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Leak Repair

Program Description: Leak repair is the result of leak mitigation and pipeline patrol. This activity involves replacing pipe or components that are leaking.

Risk/Mitigation:

Risk: Pipeline failure

Mitigation: Maintenance

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	994	994	994
High	1,098	1,098	1,098

Funding Source: CPUC-GRC

Forecast Method: Base Year

Work Type: Mandated

Work Type Citation: 49 CFR 192, Subpart M

Historical Embedded Cost Estimates ($000)

Embedded Costs: 0

Explanation: 2016 Base RAMP value of $1,000 for this activity is captured in WP 508.005.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.007 - RAMP - Base / Risk ID 16 - EPOCH Planned Replacement of Pipe with Recurring Leak Histor
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: EPOCH Planned replacement of pipe with a recurring leak history. This workpaper identifies historically embedded costs for the planned replacement of pipe sections where multiple leaks have been repaired.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	2,000	2,000	2,000
NSE	0	0	0
Total	**2,000**	**2,000**	**2,000**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.007 - RAMP - Base / Risk ID 16 - EPOCH Planned Replacement of Pipe with Recurring Leak History

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: EPOCH

Program Description: Planned, risk-ranked replacement of pipe with recurring leak history.

Risk/Mitigation:

Risk: Pipeline Failure

Mitigation: Pipeline projects are prioritized based on condition and performance

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	1,866	2,146	2,467
High	2,062	2,372	2,727

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Mandated

Work Type Citation: DOT, 49 CFR 192

Historical Embedded Cost Estimates ($000)

Embedded Costs: 2000

Explanation: 2016 base RAMP value for this activity

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.008 - RAMP - Incremental / Risk ID 16 - EPOCH Planned Replacement of Pipe w/Recurring Leak Hi
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: EPOCH Planned replacement of pipe with a recurring leak history. This workpaper identifies costs incremental to those that are historically embedded for the planned replacement of pipe sections where multiple leaks have been repaired. These costs have not been captured in the 3-year average and so have been added as forecast adjustments.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	-36	259	597
NSE	0	0	0
Total	**-36**	**259**	**597**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00508.0
Category:	I. Replacement of Mains and Services
Category-Sub:	1. Replacement of Mains and Services
Workpaper Group:	005080 - Replacements of Mains & Services
Workpaper Detail:	005080.008 - RAMP - Incremental / Risk ID 16 - EPOCH Planned Replacement of Pipe w/Recurring Leak History

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: EPOCH

Program Description: EPOCH projects start with a single coded leak repair. When subsequent repairs are made to the same pipe, the segment is added to a risk-ranked list of planned replacements

Risk/Mitigation:

Risk: Pipeline Failure

Mitigation: Pipeline projects are prioritized based on condition and performance

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	1,866	2,146	2,467
High	2,062	2,372	2,727

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Mandated

Work Type Citation: DOT, 49 CFR 192

Historical Embedded Cost Estimates ($000)

Embedded Costs: 0

Explanation: 2016 base RAMP value of $2000K is captured in WP508.007.

Supplemental Workpapers for Workpaper Group 005080

SDG&E-GOM-Capital-SUP-006

San Diego Gas and Electric Company -- Gas Distribution -- Witness Gina Orozco-Mejia

Supplemental Workpaper - Summary of Capital and O&M RAMP Incremental Expenses

Reference: Capital Workpapers: SDG&E-04-CWP; O&M Workpapers: SDG&E-04-WP

							2019 GRC Forecast - $(000) of $2016					
							2017		2018		2019	
[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I] [GxH]	[J]	[K] [GxJ]	[L]	[M] [GxL]
Workpaper Detail:	Testimony Section	RAMP Risk ID:	Expense Element	RAMP Activity	Unit	Unit Cost	Units	Forecast	Units	Forecast	Units	Forecast
005080.002	IV. I (BC 508)	Risk ID 16	Capital	Early Vintage Steel Replacement[1]	1 Mile Replacement	$1,000,000	1.9	$1,900	5.5	$5,485	7.4	$7,385
005080.003	IV. I (BC 508)	Risk ID 16	Capital	Pre-1933 Threaded Steel Main Removal[2]	1 Mile Replacement	$1,000,000	0.0	$0	7.4	$7,385	14.8	$14,770
1GD001.000	III. B. 1	Risk ID 16	O&M	Dresser Mechanical Coupling Removal[3]	Hours (Work Order Review)	$80	780.0	$62	0.0	$0	0.0	$0
005100.002	IV. K (BC 510)	Risk ID 16	Capital	Dresser Mechanical Coupling Removal[3]	1 Fitting Removal	$160,000	5.8	$926	4.3	$6,952	49.1	$7,876
1GD001.000	III. B. 1	Risk ID 16	O&M	Oil Drip Piping Removal[4]	Hours (Work Order Review)	$80	176.0	$14	0.0	$0	0.0	$0
005100.003	IV. K (BC 510)	Risk ID 16	Capital	Oil Drip Piping Removal[4]	1 Oil Drip Removal	$160,000	0.0	$0	58.0	$9,275	58.0	$9,275
1GD001.000	III. B. 1	Risk ID 16	O&M	Buried Piping in Vaults Replacement	Hours (Work Order Review)	$80	0.0	$0	2,713.0	$217	2,713.0	$217
005100.004	IV. K (BC 510)	Risk ID 16	Capital	Buried Piping in Vaults Replacement	1 Buried Vault and Piping Removal	$160,000	0.0	$0	0.0	$0	48.2	$7,719
005100.005	IV. K (BC 510)	Risk ID 16	Capital	Closed Valves Between Medium and High Pressure	1 Valve Removal	$160,000	0.0	$0	22.3	$3,570	0.0	$0
009020.003	IV. M (BC 902)	Risk ID 16	Capital	CP Reliability Enhancment[5]	1 CP Station (Data Verification & Modeling)	$8,000	0.0	$0	128.4	$1,027	418.6	$3,349
1GD000.007	III. A. 8	Risk ID 17	O&M	Supervisor University[6]	1 FTE	$100,000	0.0	$0	2.7	$277	3.2	$319

NOTES:

1,2 / Vintage steel and Pre-1933 threaded steel replacement unit based on 1 mile of pipe with 106 services. Number of services is based on experience under DREAMS program.

3/ Approximately 100 Dresser couplings require removal. Each Dresser coupling will require 2 PCF fittings, traffic control and 3 excavations per job.

4/ Approximately 120 oil drips require removal. Each oil drip will require 2 PCF fittings, traffic control and 3 excavations per job.

5/ Approximately 547 CP stations will be modeled to predict station performance. Each CP station will need 20 hours data / attribute validation and 80 hours to establish in model.

6/ Implement dedicated training group and curriculum specific to Field Supervisor development.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Category: J. Cathodic Protection
Workpaper: VARIOUS

Summary for Category: J. Cathodic Protection

	In 2016$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
Labor	508	218	247	276
Non-Labor	2,297	5,232	5,409	5,585
NSE	0	0	0	0
Total	**2,805**	**5,450**	**5,656**	**5,861**
FTE	6.9	2.9	3.3	3.6
005090 Cathodic Protection				
Labor	226	218	247	276
Non-Labor	1,484	1,317	1,494	1,670
NSE	0	0	0	0
Total	**1,710**	**1,535**	**1,741**	**1,946**
FTE	3.1	2.9	3.3	3.6
125510 Cathodic Protection System Enhancement				
Labor	282	0	0	0
Non-Labor	813	3,915	3,915	3,915
NSE	0	0	0	0
Total	**1,095**	**3,915**	**3,915**	**3,915**
FTE	3.8	0.0	0.0	0.0

Note: Totals may include rounding differences.

Beginning of Workpaper Group
005090 - Cathodic Protection

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00509.0
Category: J. Cathodic Protection
Category-Sub: 1. Cathodic Protection
Workpaper Group: 005090 - Cathodic Protection

Summary of Results (Constant 2016 $ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2012	2013	2014	2015	2016	2017	2018	2019
Labor	5-YR Linear	83	96	153	99	226	218	247	276
Non-Labor	5-YR Linear	534	561	931	427	1,484	1,317	1,494	1,670
NSE	5-YR Linear	0	0	0	0	0	0	0	0
Total		**617**	**657**	**1,084**	**526**	**1,710**	**1,535**	**1,741**	**1,946**
FTE	5-YR Linear	1.3	1.5	2.4	1.3	3.1	2.9	3.3	3.6

Business Purpose:

Budget code 509 provides funds to enhance and improve SDG&E's cathodic protection (CP) system. CP equipment additions are required to ensure SDG&E meets code mandated corrosion control requirements for the steel portion of the gas distribution system. By placing steel pipelines under cathodic protection, corrosion is minimized, resulting in a safer and more reliable gas system as well as extending the life of the steel pipeline system.

Physical Description:

Corrosion on pipelines increases the potential for gas leaks and may reduce the useful lives of the pipelines. Cathodic protection is one method for mitigating external corrosion on steel pipelines by imposing an electric current flow toward the surface of a pipeline. This budget code funds the addition of new CP systems and the replacement or upgrade of existing CP systems. Installations include direct current rectifier stations, deep well anode beds, and related equipment.

Project Justification:

Cathodic protection extends the life of the steel portion of the gas distribution system and is mandated by CPUC GO112F. Each pipeline that is under cathodic protection must be tested to determine whether the CP meets the requirements of CFR 192.463 - External corrosion control: Cathodic Protection. Prompt remedial action to correct any deficiencies indicated by monitoring is required. Results obtained from ongoing cathodic protection system monitoring drives the installation of new or upgraded CP systems.

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00509.0
Category:	J. Cathodic Protection
Category-Sub:	1. Cathodic Protection
Workpaper Group:	005090 - Cathodic Protection

Forecast Methodology:

Labor - 5-YR Linear

The frequency and amount of projects performed in this work category are driven by the age of the CP system, the health of surrounding CP stations, soil conditions, and effective resolution of system shorts. A review of historical expenditures from 2012 through 2016 revealed an upward trend in the quantity of work in this category. CP stations installed in the 1970s-1980s are approaching the end of life in greater numbers, and deeper well drills in new stations, designed to provide greater reliability, are more costly. Budget code 509 was forecast using a 5-year linear calculation for labor as it best represents the required base level of routine work for cathodic protection.

Non-Labor - 5-YR Linear

The frequency and amount of projects performed in this work category are driven by the age of the CP system, the health of surrounding CP stations, soil conditions, and effective resolution of system shorts. A review of historical expenditures from 2012 through 2016 revealed an upward trend in the quantity of work in this category. CP stations installed in the 1970s-1980s are approaching the end of life in greater numbers, and deeper well drills in new stations, designed to provide greater reliability, are more costly. Budget code 509 was forecast using a 5-year linear calculation for nonlabor as it best represents the required base level of routine work for cathodic protection.

NSE - 5-YR Linear

N/A

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00509.0
Category: J. Cathodic Protection
Category-Sub: 1. Cathodic Protection
Workpaper Group: 005090 - Cathodic Protection

Summary of Adjustments to Forecast

In 2016 $ (000)										
Forecast Method		**Base Forecast**			**Forecast Adjustments**			**Adjusted-Forecast**		
Years		**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Labor	5-YR Linear	218	247	275	0	0	1	218	247	276
Non-Labor	5-YR Linear	1,317	1,493	1,670	0	1	0	1,317	1,494	1,670
NSE	5-YR Linear	0	0	0	0	0	0	0	0	0
Total		**1,535**	**1,740**	**1,945**	**0**	**1**	**1**	**1,535**	**1,741**	**1,946**
FTE	5-YR Linear	2.9	3.3	3.6	0.0	0.0	0.0	2.9	3.3	3.6

Forecast Adjustment Details

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2017 Total		0	0	0	0	0.0	
2018 Total		0	0	0	0	0.0	
2019 Total		0	0	0	0	0.0	

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00509.0
Category: J. Cathodic Protection
Category-Sub: 1. Cathodic Protection
Workpaper Group: 005090 - Cathodic Protection

Determination of Adjusted-Recorded:

	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	2016 ($000)
Recorded (Nominal $)*					
Labor	74	84	135	86	194
Non-Labor	543	567	951	431	1,484
NSE	0	0	0	0	0
Total	**617**	**651**	**1,086**	**517**	**1,678**
FTE	1.1	1.3	2.0	1.1	2.6
Adjustments (Nominal $) **					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Nominal $)					
Labor	74	84	135	86	194
Non-Labor	543	567	951	431	1,484
NSE	0	0	0	0	0
Total	**617**	**651**	**1,086**	**517**	**1,678**
FTE	1.1	1.3	2.0	1.1	2.6
Vacation & Sick (Nominal $)					
Labor	11	13	22	13	32
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**11**	**13**	**22**	**13**	**32**
FTE	0.2	0.2	0.4	0.2	0.5
Escalation to 2016$					
Labor	-1	-1	-3	-1	0
Non-Labor	-9	-6	-20	-3	0
NSE	0	0	0	0	0
Total	**-10**	**-7**	**-24**	**-4**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2016$)					
Labor	83	96	153	99	226
Non-Labor	534	561	931	427	1,484
NSE	0	0	0	0	0
Total	**617**	**657**	**1,084**	**526**	**1,710**
FTE	1.3	1.5	2.4	1.3	3.1

* After company-wide exclusions of Non-GRC costs
** Refer to "Detail of Adjustments to Recorded" page for line item adjustments
Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00509.0
Category: J. Cathodic Protection
Category-Sub: 1. Cathodic Protection
Workpaper Group: 005090 - Cathodic Protection

Summary of Adjustments to Recorded:

In Nominal $(000)						
Years	**2012**	**2013**	**2014**	**2015**	**2016**
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID

Note: Totals may include rounding differences.

Beginning of Workpaper Sub Details for
Workpaper Group 005090

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00509.0
Category: J. Cathodic Protection
Category-Sub: 1. Cathodic Protection
Workpaper Group: 005090 - Cathodic Protection
Workpaper Detail: 005090.001 - Cathodic Protection

In-Service Date: Not Applicable

Description:

Routine cathodic protection costs.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	218	247	276
Non-Labor	1,317	1,494	1,670
NSE	0	0	0
Total	**1,535**	**1,741**	**1,946**
FTE	2.9	3.3	3.6

Note: Totals may include rounding differences.

Beginning of Workpaper Group
125510 - Cathodic Protection System Enhancement

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 12551.0
Category: J. Cathodic Protection
Category-Sub: 2. Cathodic Protection System Enhancement
Workpaper Group: 125510 - Cathodic Protection System Enhancement

Summary of Results (Constant 2016 $ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2012	2013	2014	2015	2016	2017	2018	2019
Labor	Zero-Based	22	40	117	219	282	0	0	0
Non-Labor	Zero-Based	171	203	180	514	813	3,915	3,915	3,915
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		**193**	**243**	**297**	**733**	**1,095**	**3,915**	**3,915**	**3,915**
FTE	Zero-Based	0.3	0.6	1.7	3.2	3.8	0.0	0.0	0.0

Business Purpose:

Budget code 12551 provides funds to enhance and improve SDG&E's cathodic protection (CP) system in addition to the cathodic protection work performed in budget code 509. The Cathodic Protection System Enhancement budget code tracks projects specifically associated with creating dedicated high pressure and medium distribution pressure pipeline CP systems, and remediating non-state-of-the-art cathodic protection on steel pipe segments, risers and valves as determined through advances in GIS mapping capabilities.

Physical Description:

This budget code funds the proactive cathodic protection system improvements and reinforcements in addition to its routine work performed in budget code 509. Cathodic system enhancements are based on internal company assessments. A majority of work involves separating transmission gas mains from distribution gas mains, as well as isolating all high pressure distribution lines. CP system enhancements included in BC 125510 involve the installation of insulated unions to separate CP systems, new rectifiers, anode beds and test points allowing CP technicians to take CP reads.

Project Justification:

Projects funded under this budget code are individually justified using internal company assessments that identify areas where high pressure and medium pressure distribution CP systems can be isolated. The advantage of having dedicated, isolated, cathodically protected systems, provides protection of distribution systems and minimized current drawn from connected CP stations that can result from electric shorts downstream in the system.

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	12551.0
Category:	J. Cathodic Protection
Category-Sub:	2. Cathodic Protection System Enhancement
Workpaper Group:	125510 - Cathodic Protection System Enhancement

Forecast Methodology:

Labor - Zero-Based

A zero-based forecasting methadology was selected for labor and non-labor as the historic costs in this area are not consistant with future activity levels. Since the inception of this budget code, SDG&E continues to identify an increased number of cathodic protection (CP) areas in need of enhancments, therefore a zero based forecast for 2017, 2018, 2019 was derived from a list of pre-identified insulating joint, valve, and service replacement projects slated for completion in each respective year.

Non-Labor - Zero-Based

A zero-based forecasting methadology was selected for labor and non-labor as the historic costs in this area are not consistant with future activity levels. Since the inception of this budget code, SDG&E continues to identify an increased number of cathodic protection (CP) areas in need of enhancments, therefore a zero based forecast for 2017, 2018, 2019 was derived from a list of pre-identified insulating joint, valve, and service replacement projects slated for completion in each respective year.

NSE - Zero-Based

N/A

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 12551.0
Category: J. Cathodic Protection
Category-Sub: 2. Cathodic Protection System Enhancement
Workpaper Group: 125510 - Cathodic Protection System Enhancement

Summary of Adjustments to Forecast

In 2016 $ (000)										
Forecast Method		**Base Forecast**			**Forecast Adjustments**			**Adjusted-Forecast**		
Years		**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Labor	Zero-Based	0	0	0	0	0	0	0	0	0
Non-Labor	Zero-Based	3,915	3,915	3,915	0	0	0	3,915	3,915	3,915
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		**3,915**	**3,915**	**3,915**	**0**	**0**	**0**	**3,915**	**3,915**	**3,915**
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Forecast Adjustment Details

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2017 Total		0	0	0	0	0.0	
2018 Total		0	0	0	0	0.0	
2019 Total		0	0	0	0	0.0	

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 12551.0
Category: J. Cathodic Protection
Category-Sub: 2. Cathodic Protection System Enhancement
Workpaper Group: 125510 - Cathodic Protection System Enhancement

Determination of Adjusted-Recorded:

	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	2016 ($000)
Recorded (Nominal $)*					
Labor	19	35	103	191	241
Non-Labor	174	205	184	518	813
NSE	0	0	0	0	0
Total	**193**	**240**	**287**	**709**	**1,055**
FTE	0.3	0.5	1.4	2.7	3.2
Adjustments (Nominal $) **					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Nominal $)					
Labor	19	35	103	191	241
Non-Labor	174	205	184	518	813
NSE	0	0	0	0	0
Total	**193**	**240**	**287**	**709**	**1,055**
FTE	0.3	0.5	1.4	2.7	3.2
Vacation & Sick (Nominal $)					
Labor	3	6	16	29	40
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**3**	**6**	**16**	**29**	**40**
FTE	0.0	0.1	0.3	0.5	0.6
Escalation to 2016$					
Labor	0	0	-3	-2	0
Non-Labor	-3	-2	-4	-4	0
NSE	0	0	0	0	0
Total	**-3**	**-3**	**-7**	**-6**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2016$)					
Labor	22	40	117	219	282
Non-Labor	171	203	180	514	813
NSE	0	0	0	0	0
Total	**193**	**243**	**297**	**733**	**1,095**
FTE	0.3	0.6	1.7	3.2	3.8

* After company-wide exclusions of Non-GRC costs
** Refer to "Detail of Adjustments to Recorded" page for line item adjustments
Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 12551.0
Category: J. Cathodic Protection
Category-Sub: 2. Cathodic Protection System Enhancement
Workpaper Group: 125510 - Cathodic Protection System Enhancement

Summary of Adjustments to Recorded:

In Nominal $(000)						
Years	**2012**	**2013**	**2014**	**2015**	**2016**
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID

Note: Totals may include rounding differences.

Beginning of Workpaper Sub Details for
Workpaper Group 125510

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	12551.0
Category:	J. Cathodic Protection
Category-Sub:	2. Cathodic Protection System Enhancement
Workpaper Group:	125510 - Cathodic Protection System Enhancement
Workpaper Detail:	125510.001 - Cathodic Protection System Enhancement
In-Service Date:	Not Applicable

Description:

Cathodic protection system enhancement costs.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	1,855	1,648	1,535
NSE	0	0	0
Total	**1,855**	**1,648**	**1,535**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 12551.0
Category: J. Cathodic Protection
Category-Sub: 2. Cathodic Protection System Enhancement
Workpaper Group: 125510 - Cathodic Protection System Enhancement
Workpaper Detail: 125510.002 - RAMP - Base / Risk ID 16 - Maintain CP Assets

In-Service Date: Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Improvement of CP assets. This workpaper identifies historically embedded costs for the improvement of cathodic protection across the system.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	1,095	1,095	1,095
NSE	0	0	0
Total	**1,095**	**1,095**	**1,095**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	12551.0
Category:	J. Cathodic Protection
Category-Sub:	2. Cathodic Protection System Enhancement
Workpaper Group:	125510 - Cathodic Protection System Enhancement
Workpaper Detail:	125510.002 - RAMP - Base / Risk ID 16 - Maintain CP Assets

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Requirements for corrosion control

Program Description: Maintains cathodically protected assets by repairing, replacing, or retrofitting components

Risk/Mitigation:

Risk: Pipeline failure

Mitigation: Cathodic Protection

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	1,864	2,051	2,154
High	2,060	2,267	2,380

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Mandated

Work Type Citation: 49 CFR 452

Historical Embedded Cost Estimates ($000)

Embedded Costs: 1095

Explanation: 2016 Base RAMP value for this activiy

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 12551.0
Category: J. Cathodic Protection
Category-Sub: 2. Cathodic Protection System Enhancement
Workpaper Group: 125510 - Cathodic Protection System Enhancement
Workpaper Detail: 125510.003 - RAMP - Incremental / Risk ID 16 - Maintain CP Assets

In-Service Date: Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Improvement of CP assets. This workpaper identifiesRAMP costs greater than the 2016 historically embedded costs for the improvement of cathodic protection across the system. These costs are captured within the zero-based forecast methodology.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	965	1,172	1,285
NSE	0	0	0
Total	**965**	**1,172**	**1,285**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	12551.0
Category:	J. Cathodic Protection
Category-Sub:	2. Cathodic Protection System Enhancement
Workpaper Group:	125510 - Cathodic Protection System Enhancement
Workpaper Detail:	125510.003 - RAMP - Incremental / Risk ID 16 - Maintain CP Assets

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Requirements for corrosion control

Program Description: Maintains cathodically protected assets by repairing, replacing, or retrofitting components

Risk/Mitigation:

Risk: Pipeline failure

Mitigation: Cathodic Protection

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	1,864	2,051	2,154
High	2,060	2,267	2,380

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Mandated

Work Type Citation: 49 CFR 192 452

Historical Embedded Cost Estimates ($000)

Embedded Costs: 0

Explanation: 2016 Base RAMP value captured in WP 551.002

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Category: K. Regulator Station Improvments and Other
Workpaper: 005100

Summary for Category: K. Regulator Station Improvments and Other

	In 2016$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
Labor	96	360	5,066	6,347
Non-Labor	529	1,328	15,443	19,286
NSE	0	0	0	0
Total	**625**	**1,688**	**20,509**	**25,633**
FTE	1.0	3.5	49.7	62.2

005100 Regulator Station Improvements and Other

Labor	96	360	5,066	6,347
Non-Labor	529	1,328	15,443	19,286
NSE	0	0	0	0
Total	**625**	**1,688**	**20,509**	**25,633**
FTE	1.0	3.5	49.7	62.2

Note: Totals may include rounding differences.

Beginning of Workpaper Group
005100 - Regulator Station Improvements and Other

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00510.0
Category: K. Regulator Station Improvments and Other
Category-Sub: 1. Regulator Station Improvments and Other
Workpaper Group: 005100 - Regulator Station Improvements and Other

Summary of Results (Constant 2016 $ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2012	2013	2014	2015	2016	2017	2018	2019
Labor	3-YR Average	26	65	58	234	96	360	5,066	6,347
Non-Labor	3-YR Average	30	66	211	1,161	529	1,328	15,443	19,286
NSE	3-YR Average	0	0	0	0	0	0	0	0
Total		**56**	**131**	**269**	**1,395**	**625**	**1,688**	**20,509**	**25,633**
FTE	3-YR Average	0.2	0.7	0.7	2.1	1.0	3.5	49.7	62.2

Business Purpose:

Budget code 510 provides funding for small capital projects (not captured under the other budget codes) that improve safety, provide required code compliance, and improve gas system performance or reliability through the replacement of aging gas operating equipment.

Physical Description:

Projects completed under this budget code typically involve upgrades or improvements to distribution piping, pressure regulation or metering stations, valve stations, meter set assembly valve replacements, remote monitoring instrumentation equipment, LNG upgrades, or other gas distribution facilities.

Project Justification:

This budget code provides the necessary capital to support the company's goals of maintaining safety, integrity and reliability. Projects completed under this budget code are justified based on mandated compliance with Federal and State safety codes consistent with General Order 58-A, General Order 112-F, CFR 192.185, CFR 192.183, CFR 193, and OSHA Section 1910 Subpart A.

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00510.0
Category:	K. Regulator Station Improvments and Other
Category-Sub:	1. Regulator Station Improvments and Other
Workpaper Group:	005100 - Regulator Station Improvements and Other

Forecast Methodology:

Labor - 3-YR Average

Expenditures in this budget category vary depending largely on the number and nature of remediations identified, as well as planning, permitting and scheduling requirements. A 3-year average forecast was determined to capture both the more current volume of work in this category while also moderating the high and low spends in 2014, 2015, and 2016. The 3-year average forecast represents the base level of labor anticipated in the forecast years.

Non-Labor - 3-YR Average

Expenditures in this budget category vary depending largely on the number and nature of remediations identified, as well as planning, permitting and scheduling requirements. A 3-year average forecast was determined to capture both the more current volume of work in this category while also moderating the high and low spends in 2014, 2015, and 2016. The 3-year average forecast represents the base level of non-labor anticipated in the forecast years.

NSE - 3-YR Average

N/A

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00510.0
Category: K. Regulator Station Improvments and Other
Category-Sub: 1. Regulator Station Improvments and Other
Workpaper Group: 005100 - Regulator Station Improvements and Other

Summary of Adjustments to Forecast

In 2016 $ (000)										
Forecast Method		**Base Forecast**			**Forecast Adjustments**			**Adjusted-Forecast**		
Years		**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Labor	3-YR Average	129	129	129	231	4,937	6,218	360	5,066	6,347
Non-Labor	3-YR Average	633	633	633	695	14,810	18,653	1,328	15,443	19,286
NSE	3-YR Average	0	0	0	0	0	0	0	0	0
Total		**762**	**762**	**762**	**926**	**19,747**	**24,871**	**1,688**	**20,509**	**25,633**
FTE	3-YR Average	1.3	1.3	1.3	2.2	48.4	60.9	3.5	49.7	62.2

Forecast Adjustment Details

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2017	Other	231	694	0	925	2.2	DBENTLEY20170509174722033
Explanation:	A. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to mitigate potential leaks from Dresser mechanical couplings. RAMP costs are forecast to be $231K labor, $694K non-labor in 2017; $1,738 labor, $5,214K non-labor in 2018; and $1,969 labor, $5,908 non-labor in 2019.						
2017 Total		231	694	0	925	2.2	
2018	Other	1,738	5,213	0	6,951	17.1	DBENTLEY20161201151027093
Explanation:	A. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to mitigate potential leaks from Dresser mechanical couplings. RAMP costs are forecast to be $231K labor, $694K non-labor in 2017; $1,738 labor, $5,214K non-labor in 2018; and $1,969 labor, $5,908 non-labor in 2019.						
2018	Other	2,319	6,956	0	9,275	22.7	DBENTLEY20161201151348810
Explanation:	B. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to remove oil drip pipeline facilities. RAMP costs are forecast to be $0K in 2017; $2,319 labor, $6,956 non-labor in 2018; and $2,319 labor, $6,956 non-labor in 2019.						
2018	Other	880	2,640	0	3,520	8.6	DBENTLEY20170509175435410
Explanation:	C. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to remove the closed and locked valves between the medium and high pressure systems. RAMP costs are forecast to be $0K in 2017; $880 labor, $2,640 non-labor in 2018; and $0K in 2019.						
2018 Total		4,937	14,809	0	19,746	48.4	
2019	Other	1,969	5,907	0	7,876	19.3	DBENTLEY20161201151059950
Explanation:	A. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to mitigate potential leaks from Dresser mechanical couplings. RAMP costs are forecast to be $231K labor, $694K non-labor in 2017; $1,738 labor, $5,214K non-labor in 2018; and $1,969 labor, $5,908 non-labor in 2019.						
2019	Other	2,319	6,956	0	9,275	22.7	DBENTLEY20161201151449250

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00510.0
Category: K. Regulator Station Improvments and Other
Category-Sub: 1. Regulator Station Improvments and Other
Workpaper Group: 005100 - Regulator Station Improvements and Other

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
Explanation:	B. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to remove oil drip pipeline facilities. RAMP costs are forecast to be $0K in 2017; $2,319 labor, $6,956 non-labor in 2018; and $2,319 labor, $6,956 non-labor in 2019.						
2019	Other	1,930	5,789	0	7,719	18.9	DBENTLEY20170509175604597
Explanation:	D. RAMP Risk ID 16/Medium Pressure pipeline Failure. Costs to remediate corrosion on buried pipe in vaults. RAMP costs are forecast to be $0K in 2017; $0K in 2018; and $1,930 labor, $5,789 non-labor in 2019.						
2019 Total		6,218	18,652	0	24,870	60.9	

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00510.0
Category: K. Regulator Station Improvments and Other
Category-Sub: 1. Regulator Station Improvments and Other
Workpaper Group: 005100 - Regulator Station Improvements and Other

Determination of Adjusted-Recorded:

	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	2016 ($000)
Recorded (Nominal $)*					
Labor	23	57	51	202	82
Non-Labor	31	67	216	1,170	529
NSE	0	0	0	0	0
Total	**53**	**124**	**267**	**1,372**	**611**
FTE	0.2	0.6	0.6	1.8	0.8
Adjustments (Nominal $) **					
Labor	0	0	0	2	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**2**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Nominal $)					
Labor	23	57	51	204	82
Non-Labor	31	67	216	1,170	529
NSE	0	0	0	0	0
Total	**53**	**124**	**267**	**1,374**	**611**
FTE	0.2	0.6	0.6	1.8	0.8
Vacation & Sick (Nominal $)					
Labor	3	9	8	31	14
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**3**	**9**	**8**	**31**	**14**
FTE	0.0	0.1	0.1	0.3	0.2
Escalation to 2016$					
Labor	0	-1	-1	-2	0
Non-Labor	-1	-1	-5	-9	0
NSE	0	0	0	0	0
Total	**-1**	**-1**	**-6**	**-11**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2016$)					
Labor	26	65	58	234	96
Non-Labor	30	66	211	1,161	529
NSE	0	0	0	0	0
Total	**56**	**131**	**269**	**1,395**	**625**
FTE	0.2	0.7	0.7	2.1	1.0

* After company-wide exclusions of Non-GRC costs
** Refer to "Detail of Adjustments to Recorded" page for line item adjustments
Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00510.0
Category: K. Regulator Station Improvments and Other
Category-Sub: 1. Regulator Station Improvments and Other
Workpaper Group: 005100 - Regulator Station Improvements and Other

Summary of Adjustments to Recorded:

In Nominal $(000)					
Years	**2012**	**2013**	**2014**	**2015**	**2016**
Labor	0	0	0	2	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**2**	**0**
FTE	0.0	0.0	0.0	0.0	0.0

Detail of Adjustments to Recorded in Nominal $:

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2012 Total		0	0	0	0	0.0	
2013 Total		0	0	0	0	0.0	
2014 Total		0	0	0	0	0.0	
2015	Other	2	0	0	2	0.0	DBENTLEY20161026143800603
Explanation:	Dec 2015 My Time Missing Labor Accrual						
2015 Total		2	0	0	2	0.0	
2016 Total		0	0	0	0	0.0	

Note: Totals may include rounding differences.

Beginning of Workpaper Sub Details for
Workpaper Group 005100

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00510.0
Category: K. Regulator Station Improvments and Other
Category-Sub: 1. Regulator Station Improvments and Other
Workpaper Group: 005100 - Regulator Station Improvements and Other
Workpaper Detail: 005100.001 - Regulator Station Improvements and Other

In-Service Date: Not Applicable

Description:

Regulator station improvement costs.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	129	129	129
Non-Labor	633	633	633
NSE	0	0	0
Total	**762**	**762**	**762**
FTE	1.3	1.3	1.3

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00510.0
Category:	K. Regulator Station Improvments and Other
Category-Sub:	1. Regulator Station Improvments and Other
Workpaper Group:	005100 - Regulator Station Improvements and Other
Workpaper Detail:	005100.002 - RAMP - Incremental / Risk ID 16 - Dresser Mechanical Couplings
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Evaluation of Dresser mechanical coupling field locations, and excavating to assess the weld housing to encapsulate the couplings on the main in the area near Downtown San Diego. This program does not have an historical equivalent.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	231	1,738	1,969
Non-Labor	695	5,214	5,908
NSE	0	0	0
Total	**926**	**6,952**	**7,877**
FTE	2.2	17.1	19.3

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00510.0
Category:	K. Regulator Station Improvments and Other
Category-Sub:	1. Regulator Station Improvments and Other
Workpaper Group:	005100 - Regulator Station Improvements and Other
Workpaper Detail:	005100.002 - RAMP - Incremental / Risk ID 16 - Dresser Mechanical Couplings

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Dresser Mechanical Couplings

Program Description: This program consists of evaluating the coupling field location, excavating, and assessing the weld housing to encapsulate the dresser mechanical couplings main in and near downtown San Diego.

Risk/Mitigation:

Risk: SDG&E Medium Pressure Pipeline Failure

Mitigation: Improvements

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	0	7,589	7,589
High	0	8,387	8,387

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Non-Mandated

Work Type Citation: NA

Historical Embedded Cost Estimates ($000)

Embedded Costs: 0

Explanation: New program.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00510.0
Category:	K. Regulator Station Improvments and Other
Category-Sub:	1. Regulator Station Improvments and Other
Workpaper Group:	005100 - Regulator Station Improvements and Other
Workpaper Detail:	005100.003 - RAMP - Incremental / Risk ID 16 - Oil Drip Piping Removal
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Verification of above ground and buried oil drip lines and containers and and removal of facilities that are not necessary. This program does not have an historical equivalent.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	2,319	2,319
Non-Labor	0	6,956	6,956
NSE	0	0	0
Total	**0**	**9,275**	**9,275**
FTE	0.0	22.7	22.7

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00510.0
Category:	K. Regulator Station Improvments and Other
Category-Sub:	1. Regulator Station Improvments and Other
Workpaper Group:	005100 - Regulator Station Improvements and Other
Workpaper Detail:	005100.003 - RAMP - Incremental / Risk ID 16 - Oil Drip Piping Removal

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Oil Drip Piping

Program Description: This project is designed to verify the location of above ground and buried oil drip lines and containers. As part of the process, SDG&E consults with Pipeline Operations and Region Engineering to determine and remove facilities that are not necessary.

Risk/Mitigation:

Risk: SDG&E Medium Pressure Pipeline Failure

Mitigation: Improvements

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	0	8,935	8,935
High	0	9,876	9,876

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Non-Mandated

Work Type Citation: NA

Historical Embedded Cost Estimates ($000)

Embedded Costs: 0

Explanation: New program.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00510.0
Category: K. Regulator Station Improvments and Other
Category-Sub: 1. Regulator Station Improvments and Other
Workpaper Group: 005100 - Regulator Station Improvements and Other
Workpaper Detail: 005100.004 - RAMP - Incremental / Risk ID 16 - Buried Piping in Vaults

In-Service Date: Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Locate and assess buried pipelines in vaults and assess the coating and condition of the above ground and below ground facilities within vaults that may be corroded or pitted This program does not have an historical equivalent.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	1,930
Non-Labor	0	0	5,789
NSE	0	0	0
Total	**0**	**0**	**7,719**
FTE	0.0	0.0	18.9

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00510.0
Category:	K. Regulator Station Improvments and Other
Category-Sub:	1. Regulator Station Improvments and Other
Workpaper Group:	005100 - Regulator Station Improvements and Other
Workpaper Detail:	005100.004 - RAMP - Incremental / Risk ID 16 - Buried Piping in Vaults

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Buried Piping in Vaults

Program Description: SDG&E has pipeline buried in vaults that may be corroded by above ground facilities and pitting of below ground piping. This activity will determine the locations vaults containing medium and high pressure facilities. SDG&E will assess the coating and the condition of the above-ground and below-ground facilities within the vaults.

Risk/Mitigation:

Risk: SDG&E Medium Pressure Pipeline Failure

Mitigation: Improvements

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	0	7,437	0
High	0	8,220	0

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Non-Mandated

Work Type Citation: NA

Historical Embedded Cost Estimates ($000)

Embedded Costs: 0

Explanation: New program.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00510.0
Category:	K. Regulator Station Improvments and Other
Category-Sub:	1. Regulator Station Improvments and Other
Workpaper Group:	005100 - Regulator Station Improvements and Other
Workpaper Detail:	005100.005 - RAMP - Incremental / Risk ID 16 - Closed Valves Between High and Medium Pressure Pipes
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Verification, excavation and removal of closed and locked valves which connect high pressure piping to medium pressure piping. This program does not have an historical equivalent.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	880	0
Non-Labor	0	2,640	0
NSE	0	0	0
Total	**0**	**3,520**	**0**
FTE	0.0	8.6	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00510.0
Category:	K. Regulator Station Improvments and Other
Category-Sub:	1. Regulator Station Improvments and Other
Workpaper Group:	005100 - Regulator Station Improvements and Other
Workpaper Detail:	005100.005 - RAMP - Incremental / Risk ID 16 - Closed Valves Between High and Medium Pressure Pipes

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Closed Valves Between High and Medium Pressure Piping

Program Description: This proposed activity involves verifying the valve location, excavating, and removing the closed and locked valves which connect high pressure piping to medium pressure piping.

Risk/Mitigation:

Risk: SDG&E Medium Pressure Pipeline Failure

Mitigation: Improvements

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	0	0	3,392
High	0	0	3,749

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Non-Mandated

Work Type Citation: NA

Historical Embedded Cost Estimates ($000)

Embedded Costs: 0

Explanation: New program.

Supplemental Workpapers for Workpaper Group 005100

SDG&E-GOM-Capital-SUP-006
San Diego Gas and Electric Company -- Gas Distribution -- Witness Gina Orozco-Mejia
Supplemental Workpaper - Summary of Capital and O&M RAMP Incremental Expenses
Reference: Capital Workpapers: SDG&E-04-CWP; O&M Workpapers: SDG&E-04-WP

							2019 GRC Forecast - $(000) of $2016					
							2017		2018		2019	
[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I] [GxH]	[J]	[K] [GxJ]	[L]	[M] [GxL]
Workpaper Detail:	Testimony Section	RAMP Risk ID:	Expense Element	RAMP Activity	Unit	Unit Cost	Units	Forecast	Units	Forecast	Units	Forecast
005080.002	IV. I (BC 508)	Risk ID 16	Capital	Early Vintage Steel Replacement[1]	1 Mile Replacement	$1,000,000	1.9	$1,900	5.5	$5,485	7.4	$7,385
005080.003	IV. I (BC 508)	Risk ID 16	Capital	Pre-1933 Threaded Steel Main Removal[2]	1 Mile Replacement	$1,000,000	0.0	$0	7.4	$7,385	14.8	$14,770
1GD001.000	III. B. 1	Risk ID 16	O&M	Dresser Mechanical Coupling Removal[3]	Hours (Work Order Review)	$80	780.0	$62	0.0	$0	0.0	$0
005100.002	IV. K (BC 510)	Risk ID 16	Capital	Dresser Mechanical Coupling Removal[3]	1 Fitting Removal	$160,000	5.8	$926	4.3	$6,952	49.1	$7,876
1GD001.000	III. B. 1	Risk ID 16	O&M	Oil Drip Piping Removal[4]	Hours (Work Order Review)	$80	176.0	$14	0.0	$0	0.0	$0
005100.003	IV. K (BC 510)	Risk ID 16	Capital	Oil Drip Piping Removal[4]	1 Oil Drip Removal	$160,000	0.0	$0	58.0	$9,275	58.0	$9,275
1GD001.000	III. B. 1	Risk ID 16	O&M	Buried Piping in Vaults Replacement	Hours (Work Order Review)	$80	0.0	$0	2,713.0	$217	2,713.0	$217
005100.004	IV. K (BC 510)	Risk ID 16	Capital	Buried Piping in Vaults Replacement	1 Buried Vault and Piping Removal	$160,000	0.0	$0	0.0	$0	48.2	$7,719
005100.005	IV. K (BC 510)	Risk ID 16	Capital	Closed Valves Between Medium and High Pressure	1 Valve Removal	$160,000	0.0	$0	22.3	$3,570	0.0	$0
009020.003	IV. M (BC 902)	Risk ID 16	Capital	CP Reliability Enhancment[5]	1 CP Station (Data Verification & Modeling)	$8,000	0.0	$0	128.4	$1,027	418.6	$3,349
1GD000.007	III. A. 8	Risk ID 17	O&M	Supervisor University[6]	1 FTE	$100,000	0.0	$0	2.7	$277	3.2	$319

NOTES:
1,2 / Vintage steel and Pre-1933 threaded steel replacement unit based on 1 mile of pipe with 106 services. Number of services is based on experience under DREAMS program.
3/ Approximately 100 Dresser couplings require removal. Each Dresser coupling will require 2 PCF fittings, traffic control and 3 excavations per job.
4/ Approximately 120 oil drips require removal. Each oil drip will require 2 PCF fittings, traffic control and 3 excavations per job.
5/ Approximately 547 CP stations will be modeled to predict station performance. Each CP station will need 20 hours data / attribute validation and 80 hours to establish in model.
6/ Implement dedicated training group and curriculum specific to Field Supervisor development.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Category: L. CNG Station Upgrades
Workpaper: 145530

Summary for Category: L. CNG Station Upgrades

	In 2016$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
Labor	38	0	44	44
Non-Labor	2,596	0	2,573	2,573
NSE	0	0	0	0
Total	**2,634**	**0**	**2,617**	**2,617**
FTE	0.4	0.0	0.6	0.6

145530 CNG STATION UPGRADES

Labor	38	0	44	44
Non-Labor	2,596	0	2,573	2,573
NSE	0	0	0	0
Total	**2,634**	**0**	**2,617**	**2,617**
FTE	0.4	0.0	0.6	0.6

Note: Totals may include rounding differences.

Beginning of Workpaper Group
145530 - CNG STATION UPGRADES

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 14553.0
Category: L. CNG Station Upgrades
Category-Sub: 1. CNG Station Upgrades
Workpaper Group: 145530 - CNG STATION UPGRADES

Summary of Results (Constant 2016 $ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2012	2013	2014	2015	2016	2017	2018	2019
Labor	Zero-Based	0	0	0	1	38	0	44	44
Non-Labor	Zero-Based	0	0	0	159	2,596	0	2,573	2,573
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		**0**	**0**	**0**	**159**	**2,635**	**0**	**2,617**	**2,617**
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.4	0.0	0.6	0.6

Business Purpose:

Provides for labor, services and materials to improve and build alternative fueling station infrastructure for use by company fleet vehicles and the public.

Physical Description:

Infrastructure includes canopy structure, lighting, card readers, dispensers, security, and signage; compressed natural gas equipment including compressors, dryers, controllers, valves, piping, and storage vessels; and engineering, design, fabrication, construction, initial testing and start up fees.

Project Justification:

Supports the California clean transportation initiative by increasing throughput capacity of existing stations and extending accessabilty to a larger service territory.

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	14553.0
Category:	L. CNG Station Upgrades
Category-Sub:	1. CNG Station Upgrades
Workpaper Group:	145530 - CNG STATION UPGRADES

Forecast Methodology:

Labor - Zero-Based

SDG&E has a program to build or renovate one compressed natural gas fueling station per year for five years beginning in 2018. Actual costs from a 2016 CNG station renovation provide the expected average annual labor cost for this zero-based budget.

Non-Labor - Zero-Based

SDG&E has a program to build or renovate one compressed natural gas fueling station per year for five years beginning in 2018. Actual costs from a 2016 CNG station renovation provide the expected average annual non-labor cost for this zero-based budget.

NSE - Zero-Based

N/A

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 14553.0
Category: L. CNG Station Upgrades
Category-Sub: 1. CNG Station Upgrades
Workpaper Group: 145530 - CNG STATION UPGRADES

Summary of Adjustments to Forecast

In 2016 $ (000)										
Forecast Method		**Base Forecast**			**Forecast Adjustments**			**Adjusted-Forecast**		
Years		**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Labor	Zero-Based	0	44	44	0	0	0	0	44	44
Non-Labor	Zero-Based	0	2,573	2,573	0	0	0	0	2,573	2,573
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		**0**	**2,617**	**2,617**	**0**	**0**	**0**	**0**	**2,617**	**2,617**
FTE	Zero-Based	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.6	0.6

Forecast Adjustment Details

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2017 Total		0	0	0	0	0.0	
2018 Total		0	0	0	0	0.0	
2019 Total		0	0	0	0	0.0	

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 14553.0
Category: L. CNG Station Upgrades
Category-Sub: 1. CNG Station Upgrades
Workpaper Group: 145530 - CNG STATION UPGRADES

Determination of Adjusted-Recorded:

	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	2016 ($000)
Recorded (Nominal $)*					
Labor	0	0	0	0	33
Non-Labor	0	0	0	160	2,596
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**160**	**2,629**
FTE	0.0	0.0	0.0	0.0	0.3
Adjustments (Nominal $) **					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Nominal $)					
Labor	0	0	0	0	33
Non-Labor	0	0	0	160	2,596
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**160**	**2,629**
FTE	0.0	0.0	0.0	0.0	0.3
Vacation & Sick (Nominal $)					
Labor	0	0	0	0	5
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**5**
FTE	0.0	0.0	0.0	0.0	0.1
Escalation to 2016$					
Labor	0	0	0	0	0
Non-Labor	0	0	0	-1	0
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**-1**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2016$)					
Labor	0	0	0	1	38
Non-Labor	0	0	0	159	2,596
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**159**	**2,635**
FTE	0.0	0.0	0.0	0.0	0.4

* After company-wide exclusions of Non-GRC costs
** Refer to "Detail of Adjustments to Recorded" page for line item adjustments
Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 14553.0
Category: L. CNG Station Upgrades
Category-Sub: 1. CNG Station Upgrades
Workpaper Group: 145530 - CNG STATION UPGRADES

Summary of Adjustments to Recorded:

In Nominal $(000)						
	Years	**2012**	**2013**	**2014**	**2015**	**2016**
Labor		0	0	0	0	0
Non-Labor		0	0	0	0	0
NSE		0	0	0	0	0
	Total	**0**	**0**	**0**	**0**	**0**
FTE		0.0	0.0	0.0	0.0	0.0

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID

Note: Totals may include rounding differences.

Beginning of Workpaper Sub Details for
Workpaper Group 145530

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 14553.0
Category: L. CNG Station Upgrades
Category-Sub: 1. CNG Station Upgrades
Workpaper Group: 145530 - CNG STATION UPGRADES
Workpaper Detail: 145530.001 - CNG Station Upgrades

In-Service Date: Not Applicable

Description:

CNG station upgrade costs.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	44	44
Non-Labor	0	2,573	2,573
NSE	0	0	0
Total	**0**	**2,617**	**2,617**
FTE	0.0	0.6	0.6

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Category: M. Local Engineering
Workpaper: 009020

Summary for Category: M. Local Engineering

	In 2016$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
Labor	4,459	3,474	5,124	5,870
Non-Labor	4,938	3,773	9,615	14,213
NSE	0	0	0	0
Total	**9,397**	**7,247**	**14,739**	**20,083**
FTE	56.8	36.0	52.0	59.0

009020 Local Engineering Pool

Labor	4,459	3,474	5,124	5,870
Non-Labor	4,938	3,773	9,615	14,213
NSE	0	0	0	0
Total	**9,397**	**7,247**	**14,739**	**20,083**
FTE	56.8	36.0	52.0	59.0

Note: Totals may include rounding differences.

Beginning of Workpaper Group
009020 - Local Engineering Pool

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00902.0
Category: M. Local Engineering
Category-Sub: 1. Local Engineering
Workpaper Group: 009020 - Local Engineering Pool

Summary of Results (Constant 2016 $ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2012	2013	2014	2015	2016	2017	2018	2019
Labor	Zero-Based	2,759	2,902	3,196	3,558	4,459	3,474	5,124	5,870
Non-Labor	Zero-Based	620	762	638	1,500	4,938	3,773	9,615	14,213
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		**3,379**	**3,663**	**3,835**	**5,059**	**9,398**	**7,247**	**14,739**	**20,083**
FTE	Zero-Based	37.0	37.8	41.4	45.3	56.8	36.0	52.0	59.0

Business Purpose:

This budget code represents the forecasted costs associated with the Gas Distribution Local Engineering (LE) Pool. Certain costs are incurred by capital projects that originate from central activities which are subsequently distributed to those capital projects. These central activity costs are also called 'pooled' or 'indirect' costs.

Physical Description:

This budget code is comprised of labor and non-labor costs associated with technical planning for capital projects. This includes production of project drawings, acquiring and managing third party services, and estimating work order costs. This budget code also includes Region Engineering personnel's labor and non-labor costs associated with capital projects as well as other engineering functions including pipeline network analysis, development of pipeline project specifications, developing construction requirements, and analysis of the construction impact on the gas distribution system.

Project Justification:

Design and engineering personnel are a necessity for the development of safe and cost effective constrution specifications for new gas distribution infrastructure. To facilitate an equitable distribution of indirect costs to all capital projects, these costs are pooled and redistributed to the various capital project budget codes on a monthly basis.

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00902.0
Category:	M. Local Engineering
Category-Sub:	1. Local Engineering
Workpaper Group:	009020 - Local Engineering Pool

Forecast Methodology:

Labor - Zero-Based

A zero-based forecasting methodology was selected for this budget code. The forecast was developed by evaluating the Local Engineering (LE) pool with respect to the total direct component for labor and non-labor across all budget code categories except for the Meter and Regulator Materials (502) and the historical Tools and Equipment (506) budget codes. This produced an annual relationship of the percentage of the LE to total direct capital expenditures. An average of this ratio from 2012 through 2016 was used to forecast capital expenses for Local Engineering for the years 2017, 2018, and 2019.

Non-Labor - Zero-Based

A zero-based forecasting methodology was selected for this budget code. The forecast was developed by evaluating the Local Engineering (LE) pool with respect to the total direct component for labor and non-labor across all budget code categories except for the Meter and Regulator Materials (502) and the historical Tools and Equipment (506) budget codes. This produced an annual relationship of the percentage of the LE to total direct capital expenditures. An average of this ratio from 2012 through 2016 was used to forecast capital expenses for Local Engineering for the years 2017, 2018, and 2019.

NSE - Zero-Based

N/A

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00902.0
Category: M. Local Engineering
Category-Sub: 1. Local Engineering
Workpaper Group: 009020 - Local Engineering Pool

Summary of Adjustments to Forecast

In 2016 $ (000)										
Forecast Method		**Base Forecast**			**Forecast Adjustments**			**Adjusted-Forecast**		
Years		**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Labor	Zero-Based	3,474	5,124	5,870	0	0	0	3,474	5,124	5,870
Non-Labor	Zero-Based	3,773	8,588	10,864	0	1,027	3,349	3,773	9,615	14,213
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		**7,247**	**13,712**	**16,734**	**0**	**1,027**	**3,349**	**7,247**	**14,739**	**20,083**
FTE	Zero-Based	36.0	52.0	59.0	0.0	0.0	0.0	36.0	52.0	59.0

Forecast Adjustment Details

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2017 Total		0	0	0	0	0.0	
2018	Other	0	1,027	0	1,027	0.0	DBENTLEY20170628130424843
Explanation:	RAMP Incremental - Risk 16/SDG&E Medium Pressure Pipeline Failure - Cathodic Protection (CP Reliability. This provides for a contractor for a San Diego Region specific program to perform a detailed CP evaluation to include an expanded analysis of the System's routine maintenance records collected per CFR 49 Part 192 Subpart I - Requirements for Corrosion Control, and the development of a risk algorithm to assess the health of the CP system. Non-labor expenses are estimated to be $1,027K in 2018 and $3,349K in TY 2019. There are no labor expenses estimated for this project.						
2018 Total		0	1,027	0	1,027	0.0	
2019	Other	0	3,349	0	3,349	0.0	DBENTLEY20170628130457880
Explanation:	RAMP Incremental - Risk 16/SDG&E Medium Pressure Pipeline Failure - Cathodic Protection (CP Reliability. This provides for a contractor for a San Diego Region specific program to perform a detailed CP evaluation to include an expanded analysis of the System's routine maintenance records collected per CFR 49 Part 192 Subpart I - Requirements for Corrosion Control, and the development of a risk algorithm to assess the health of the CP system. Non-labor expenses are estimated to be $1,027K in 2018 and $3,349K in TY 2019. There are no labor expenses estimated for this project.						
2019 Total		0	3,349	0	3,349	0.0	

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00902.0
Category: M. Local Engineering
Category-Sub: 1. Local Engineering
Workpaper Group: 009020 - Local Engineering Pool

Determination of Adjusted-Recorded:

	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	2016 ($000)
Recorded (Nominal $)*					
Labor	2,450	2,532	2,817	609	0
Non-Labor	631	770	652	390	0
NSE	0	0	0	0	0
Total	**3,081**	**3,301**	**3,469**	**1,000**	**0**
FTE	31.9	32.2	35.1	7.5	0.0
Adjustments (Nominal $) **					
Labor	0	0	0	2,496	3,825
Non-Labor	0	0	0	1,122	4,938
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**3,618**	**8,763**
FTE	0.0	0.0	0.0	31.1	48.1
Recorded-Adjusted (Nominal $)					
Labor	2,450	2,532	2,817	3,106	3,825
Non-Labor	631	770	652	1,512	4,938
NSE	0	0	0	0	0
Total	**3,081**	**3,301**	**3,469**	**4,617**	**8,763**
FTE	31.9	32.2	35.1	38.6	48.1
Vacation & Sick (Nominal $)					
Labor	355	401	450	480	635
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	**355**	**401**	**450**	**480**	**635**
FTE	5.1	5.6	6.3	6.7	8.7
Escalation to 2016$					
Labor	-46	-31	-70	-27	0
Non-Labor	-10	-8	-14	-11	0
NSE	0	0	0	0	0
Total	**-57**	**-40**	**-84**	**-38**	**0**
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2016$)					
Labor	2,759	2,902	3,196	3,558	4,459
Non-Labor	620	762	638	1,500	4,938
NSE	0	0	0	0	0
Total	**3,379**	**3,663**	**3,835**	**5,059**	**9,398**
FTE	37.0	37.8	41.4	45.3	56.8

* After company-wide exclusions of Non-GRC costs
** Refer to "Detail of Adjustments to Recorded" page for line item adjustments
Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00902.0
Category: M. Local Engineering
Category-Sub: 1. Local Engineering
Workpaper Group: 009020 - Local Engineering Pool

Summary of Adjustments to Recorded:

In Nominal $(000)					
Years	**2012**	**2013**	**2014**	**2015**	**2016**
Labor	0	0	0	2,496	3,825
Non-Labor	0	0	0	1,122	4,938
NSE	0	0	0	0	0
Total	**0**	**0**	**0**	**3,618**	**8,763**
FTE	0.0	0.0	0.0	31.1	48.1

Detail of Adjustments to Recorded in Nominal $:

Year	Adj Group	Labor	NLbr	NSE	Total	FTE	RefID
2012 Total		0	0	0	0	0.0	
2013 Total		0	0	0	0	0.0	
2014 Total		0	0	0	0	0.0	
2015	Other	2,496	1,122	0	3,618	31.1	DBENTLEY20161005104409837
Explanation:	Adjustment is to add in values for IO #7074262. This new (mid-2015) IO and these costs are missing in GRID data because order type was not picked up in original mapping exercise.						
2015 Total		2,496	1,122	0	3,618	31.1	
2016	Other	3,825	4,938	0	8,763	48.1	DBENTLEY20170206152732830
Explanation:	Adjustment is to add in values for IO #7074262. This new (mid-2015) IO and these costs are missing in GRID data because order type was not picked up in original mapping exercise.						
2016 Total		3,825	4,938	0	8,763	48.1	

Note: Totals may include rounding differences.

Beginning of Workpaper Sub Details for
Workpaper Group 009020

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00902.0
Category:	M. Local Engineering
Category-Sub:	1. Local Engineering
Workpaper Group:	009020 - Local Engineering Pool
Workpaper Detail:	009020.001 - Local Engineering Pool
In-Service Date:	Not Applicable

Description:

Local engineering pool costs.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	2,873	2,941	2,922
Non-Labor	-730	-661	-681
NSE	0	0	0
Total	**2,143**	**2,280**	**2,241**
FTE	30.0	31.0	31.0

Note: Totals may include rounding differences.

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00902.0
Category: M. Local Engineering
Category-Sub: 1. Local Engineering
Workpaper Group: 009020 - Local Engineering Pool
Workpaper Detail: 009020.002 - RAMP - Incremental Post Filing / Risk ID 16 - RAMP Proposed Projects Overhead

In-Service Date: Not Applicable

Description:

Local engineering pool costs driven by incremental RAMP projects.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	150	1,732	2,497
Non-Labor	450	5,196	7,492
NSE	0	0	0
Total	**600**	**6,928**	**9,989**
FTE	1.0	16.0	23.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00902.0
Category:	M. Local Engineering
Category-Sub:	1. Local Engineering
Workpaper Group:	009020 - Local Engineering Pool
Workpaper Detail:	009020.002 - RAMP - Incremental Post Filing / Risk ID 16 - RAMP Proposed Projects Overhead

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Local Engineering - RAMP component

Program Description: Local Engineering overhead costs associated with large RAMP proposed projects

Risk/Mitigation:

Risk: Pipeline Failure

Mitigation: Various

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	0	0	0
High	0	0	0

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Non-Mandated

Work Type Citation: N/A

Historical Embedded Cost Estimates ($000)

Embedded Costs: 0

Explanation: Planned incremental RAMP project overhead component. No 2016 values.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00902.0
Category:	M. Local Engineering
Category-Sub:	1. Local Engineering
Workpaper Group:	009020 - Local Engineering Pool
Workpaper Detail:	009020.003 - RAMP - Incremental / Risk ID 16 - CP System Risk Algorithm Development
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Performance of a detailed cathodic protectionevaluation to include an expanded analysis of the system's routine maintenance records collected per CFR 49 Part 192 Subpart 1 - requirements for corrosion control, and the development of a risk algorithm to assess the health of the CP system. This program does not have an historical equivalent.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	0	1,027	3,349
NSE	0	0	0
Total	**0**	**1,027**	**3,349**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00902.0
Category:	M. Local Engineering
Category-Sub:	1. Local Engineering
Workpaper Group:	009020 - Local Engineering Pool
Workpaper Detail:	009020.003 - RAMP - Incremental / Risk ID 16 - CP System Risk Algorithm Development

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Cathodic Protection (CP) Reliability Program

Program Description: This is a region specific program which will perform a detailed cathodic protection evaluation that will assess the health of the CP system

Risk/Mitigation:

Risk: SDG&E Medium Pressure Pipeline Failure

Mitigation: Improvements to CP reliability

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	0	0	0
High	0	0	6,698

Funding Source: CPUC-GRC

Forecast Method: Zero-Based

Work Type: Mandated

Work Type Citation: CFR 49 Part 192 Subpart I - Requirements for Corrosion Control

Historical Embedded Cost Estimates ($000)

Embedded Costs: 0

Explanation: RAMP activity costs are expected to begin in 2018.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00902.0
Category:	M. Local Engineering
Category-Sub:	1. Local Engineering
Workpaper Group:	009020 - Local Engineering Pool
Workpaper Detail:	009020.004 - RAMP - Base / Risk ID 3 - Traffic Control
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 03 / SDG&E Employee Contractor and Public Safety. Mitigating activity: Traffic Control. This workpaper identifies historically embedded costs for traffic control activities.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	3,700	3,700	3,700
NSE	0	0	0
Total	**3,700**	**3,700**	**3,700**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00902.0
Category:	M. Local Engineering
Category-Sub:	1. Local Engineering
Workpaper Group:	009020 - Local Engineering Pool
Workpaper Detail:	009020.004 - RAMP - Base / Risk ID 3 - Traffic Control

RAMP Item # 1

RAMP Chapter: SDG&E-3

Program Name: Traffic Control Work Group and Equipment

Program Description: Traffic control for construction work

Risk/Mitigation:

Risk: SDG&E Employee, Contractor and Public Safety

Mitigation: Safety policies and Programs

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	3,684	3,684	3,684
High	4,421	4,421	4,421

Funding Source: CPUC-GRC

Forecast Method: Base Year

Work Type: Mandated

Work Type Citation: California Manual for Uniform Traffic Control

Historical Embedded Cost Estimates ($000)

Embedded Costs: 3700

Explanation: 2016 RAMP value for this activity

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00902.0
Category:	M. Local Engineering
Category-Sub:	1. Local Engineering
Workpaper Group:	009020 - Local Engineering Pool
Workpaper Detail:	009020.005 - RAMP - Incremental / Risk ID 3 - Traffic Control
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 03 / SDG&E Employee Contractor and Public Safety. Mitigating activity: Traffic Control. This workpaper identifies RAMP costs greater than the 2016 historically embedded costs for traffic control activities. These costs are captured within the zero-based forecast methodology.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	0	0	0
Non-Labor	353	353	353
NSE	0	0	0
Total	**353**	**353**	**353**
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00902.0
Category:	M. Local Engineering
Category-Sub:	1. Local Engineering
Workpaper Group:	009020 - Local Engineering Pool
Workpaper Detail:	009020.005 - RAMP - Incremental / Risk ID 3 - Traffic Control

RAMP Item # 1

RAMP Chapter: SDG&E-3

Program Name: Traffic Control Work Group and Equipment

Program Description: Traffic Control for construction work

Risk/Mitigation:

Risk: SDG&E Employee, Contractor and Public Safety

Mitigation: Safety Policies and Programs

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	3,684	3,684	3,684
High	4,421	4,421	4,421

Funding Source: CPUC-GRC

Forecast Method: Base Year

Work Type: Mandated

Work Type Citation: California Manual for Uniform Traffic Control

Historical Embedded Cost Estimates ($000)

Embedded Costs: 0

Explanation: 2016 Base RAMP value of $3700K is captured in WP902.004

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00902.0
Category:	M. Local Engineering
Category-Sub:	1. Local Engineering
Workpaper Group:	009020 - Local Engineering Pool
Workpaper Detail:	009020.006 - RAMP - Base / Risk ID 16 - Gas Standards Review
In-Service Date:	Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: Gas standards review. This workpaper identifies historically embedded costs for the review of gas standards. No incremental costs for this activity have been identified.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	68	68	68
Non-Labor	0	0	0
NSE	0	0	0
Total	**68**	**68**	**68**
FTE	0.7	0.7	0.7

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00902.0
Category:	M. Local Engineering
Category-Sub:	1. Local Engineering
Workpaper Group:	009020 - Local Engineering Pool
Workpaper Detail:	009020.006 - RAMP - Base / Risk ID 16 - Gas Standards Review

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: Gas Standards Review

Program Description: All procedures in Gas Standards are reviewed yearly for updated regulator information and updating.

Risk/Mitigation:

Risk: Pipeline Failure

Mitigation: Operational Review

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	65	65	65
High	71	71	71

Funding Source: CPUC-GRC

Forecast Method: Base Year

Work Type: Non-Mandated

Work Type Citation: N/A

Historical Embedded Cost Estimates ($000)

Embedded Costs: 68

Explanation: 2016 Base RAMP value for this activity

Area: GAS DISTRIBUTION
Witness: Gina Orozco-Mejia
Budget Code: 00902.0
Category: M. Local Engineering
Category-Sub: 1. Local Engineering
Workpaper Group: 009020 - Local Engineering Pool
Workpaper Detail: 009020.007 - RAMP - Base / Risk ID 16 - New Construction QA/QC

In-Service Date: Not Applicable

Description:

RAMP Risk ID 16 / SDG&E Medium Pressure Pipeline Failure. Mitigating activity: QA/QC of new construction. This workpaper identifies historically embedded costs for the QA/QC of new construction. No incremental costs for this activity have been identified.

Forecast In 2016 $(000)			
Years	**2017**	**2018**	**2019**
Labor	383	383	383
Non-Labor	0	0	0
NSE	0	0	0
Total	**383**	**383**	**383**
FTE	4.3	4.3	4.3

Note: Totals may include rounding differences.

Area:	GAS DISTRIBUTION
Witness:	Gina Orozco-Mejia
Budget Code:	00902.0
Category:	M. Local Engineering
Category-Sub:	1. Local Engineering
Workpaper Group:	009020 - Local Engineering Pool
Workpaper Detail:	009020.007 - RAMP - Base / Risk ID 16 - New Construction QA/QC

RAMP Item # 1

RAMP Chapter: SDG&E-16

Program Name: QA/QC mostly new construction

Program Description: Inspections of installed asset, welding/bonding procedure, material verification, gas standards and other construction activities

Risk/Mitigation:

Risk: Pipeline Failure

Mitigation: Operational QA/QC

Forecast CPUC Cost Estimates ($000)

	2017	2018	2019
Low	363	363	363
High	402	402	402

Funding Source: CPUC-GRC

Forecast Method: Base Year

Work Type: Mandated

Work Type Citation: DOT

Historical Embedded Cost Estimates ($000)

Embedded Costs: 383

Explanation: 2016 Base RAMP value for this activity

Supplemental Workpapers for Workpaper Group 009020

SDG&E-GOM-CAP-SUP-005
San Diego Gas and Electric Company -- Gas Distribution -- Witness Gina Orozco-Mejia
Supplemental Workpaper Calculations Local Engineering Related To Capital
Local Engineering Pool Workpaper

Assumptions:

Construction costs include only the work categories applicable to the Local Engineering Pool.
(Amounts include vacation and sick leave)

	Historical (2016$)					Forecast (Thousands of 2016$)		
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
500 New Business	4,203,074	4,701,869	6,143,333	8,229,923	7,557,132	6,376,000	8,217,000	7,805,000
501 Syst. Minor Adds., Reloc., and Retire	1,575,949	1,474,794	2,024,477	4,004,250	9,390,152	3,692,000	3,692,000	3,692,000
503 Pressure Betterment	1,639,691	1,444,295	1,251,743	2,499,458	1,637,314	1,695,000	1,695,000	1,695,000
504 Distribution Easements	27,528	31,026	75,621	25,655	12,024	38,000	38,000	38,000
505 Franchise and Freeway	3,949,458	4,143,854	4,231,075	6,046,696	14,952,900	6,665,000	6,665,000	6,665,000
507 Code Compliance	327,311	189,270	488,766	944,256	737,585	2,549,000	1,149,000	1,174,000
508 Replacements of Mains & Services	1,553,088	1,866,322	3,448,521	3,140,901	5,618,290	5,967,000	16,937,264	26,222,395
509 Cathodic Protection	617,385	657,412	1,083,876	526,308	1,710,048	1,535,000	1,741,000	1,946,000
510 Regulator Station Improvements	55,749	131,185	269,148	1,394,956	624,585	1,689,250	20,509,305	25,632,743
551 CP System Enhancement	192,502	243,004	297,302	732,608	1,094,806	3,915,000	3,915,000	3,915,000
Total Construction Costs* [A]	**14,141,735**	**14,883,031**	**19,313,862**	**27,545,011**	**43,334,836**	**34,121,250**	**64,558,569**	**78,785,138**
Historical Local Engineering **[B]**	3,376,448	3,659,672	3,831,121	5,057,556	9,397,589			
Historical Local Engineering Ratio ([B]/[A])	23.9%	24.6%	19.8%	18.4%	21.7%			

Historical Calculations (2016$)

	[C] Historical 5-Year Total Applicable Capital	**[D]** Historical Capital Local Engineering
2012	$ 14,141,735	$ 3,376,448
2013	$ 14,883,031	$ 3,659,672
2014	$ 19,313,862	$ 3,831,121
2015	$ 27,545,011	$ 5,057,556
2016	$ 43,334,836	$ 9,397,589
5-Year 2012-2016 Total	**$ 119,218,475**	**$ 25,322,386**

22.08%

	[F] [D/C]
5-Year 2010-2013 Average Ratio of Labor to Capital Construction Total	**21.24%**

Forecast Data (Thousands of 2013$)

	[H] ([A]) Forecasted Total Applicable Capital	**[I]** ([H]*[F]) Forecasted Local Engineering Expenditures
2017	$ 34,121,250	$ 7,247,463
2018	$ 64,558,569	$ 13,712,447
2019	$ 78,785,138	$ 16,734,216

SDG&E-GOM-Capital-SUP-006
San Diego Gas and Electric Company -- Gas Distribution -- Witness Gina Orozco-Mejia
Supplemental Workpaper - Summary of Capital and O&M RAMP Incremental Expenses
Reference: Capital Workpapers: SDG&E-04-CWP; O&M Workpapers: SDG&E-04-WP

							2019 GRC Forecast - $(000) of $2016					
							2017		2018		2019	
[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I] [GxH]	[J]	[K] [GxJ]	[L]	[M] [GxL]
Workpaper Detail:	Testimony Section	RAMP Risk ID:	Expense Element	RAMP Activity	Unit	Unit Cost	Units	Forecast	Units	Forecast	Units	Forecast
005080.002	IV. I (BC 508)	Risk ID 16	Capital	Early Vintage Steel Replacement[1]	1 Mile Replacement	$1,000,000	1.9	$1,900	5.5	$5,485	7.4	$7,385
005080.003	IV. I (BC 508)	Risk ID 16	Capital	Pre-1933 Threaded Steel Main Removal[2]	1 Mile Replacement	$1,000,000	0.0	$0	7.4	$7,385	14.8	$14,770
1GD001.000	III. B. 1	Risk ID 16	O&M	Dresser Mechanical Coupling Removal[3]	Hours (Work Order Review)	$80	780.0	$62	0.0	$0	0.0	$0
005100.002	IV. K (BC 510)	Risk ID 16	Capital	Dresser Mechanical Coupling Removal[3]	1 Fitting Removal	$160,000	5.8	$926	4.3	$6,952	49.1	$7,876
1GD001.000	III. B. 1	Risk ID 16	O&M	Oil Drip Piping Removal[4]	Hours (Work Order Review)	$80	176.0	$14	0.0	$0	0.0	$0
005100.003	IV. K (BC 510)	Risk ID 16	Capital	Oil Drip Piping Removal[4]	1 Oil Drip Removal	$160,000	0.0	$0	58.0	$9,275	58.0	$9,275
1GD001.000	III. B. 1	Risk ID 16	O&M	Buried Piping in Vaults Replacement	Hours (Work Order Review)	$80	0.0	$0	2,713.0	$217	2,713.0	$217
005100.004	IV. K (BC 510)	Risk ID 16	Capital	Buried Piping in Vaults Replacement	1 Buried Vault and Piping Removal	$160,000	0.0	$0	0.0	$0	48.2	$7,719
005100.005	IV. K (BC 510)	Risk ID 16	Capital	Closed Valves Between Medium and High Pressure	1 Valve Removal	$160,000	0.0	$0	22.3	$3,570	0.0	$0
009020.003	IV. M (BC 902)	Risk ID 16	Capital	CP Reliability Enhancment[5]	1 CP Station (Data Verification & Modeling)	$8,000	0.0	$0	128.4	$1,027	418.6	$3,349
1GD000.007	III. A. 8	Risk ID 17	O&M	Supervisor University[6]	1 FTE	$100,000	0.0	$0	2.7	$277	3.2	$319

NOTES:
1,2 / Vintage steel and Pre-1933 threaded steel replacement unit based on 1 mile of pipe with 106 services. Number of services is based on experience under DREAMS program.
3/ Approximately 100 Dresser couplings require removal. Each Dresser coupling will require 2 PCF fittings, traffic control and 3 excavations per job.
4/ Approximately 120 oil drips require removal. Each oil drip will require 2 PCF fittings, traffic control and 3 excavations per job.
5/ Approximately 547 CP stations will be modeled to predict station performance. Each CP station will need 20 hours data / attribute validation and 80 hours to establish in model.
6/ Implement dedicated training group and curriculum specific to Field Supervisor development.