

Company: Southern California Gas Company (U904G)
Proceeding: 2019 General Rate Case
Application: A.17-10-007/-008 (cons.)
Exhibit: SCG-208

SOCALGAS

REBUTTAL TESTIMONY OF MICHAEL A. BERMEL

(GAS MAJOR PROJECTS)

JUNE 18, 2018

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**



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**SOCALGAS REBUTTAL TESTIMONY OF MIKE BERMEL
(GAS MAJOR PROJECTS)**

I. SUMMARY OF DIFFERENCES

TOTAL O&M - Constant 2016 (\$000)			
	Base Year 2016	Test Year 2019	Variance
SOCALGAS	1,258	3,971	--
ORA	1,258	3,971	0
TURN	1,258	3,971	0

TOTAL CAPITAL - Constant 2016 (\$000)					
	2017	2018	2019	Total	Variance
SOCALGAS	1,200	8,969	37,714	47,883	--
ORA	143	8,969	37,714	46,826	-1,057
TURN	1,200	8,969	11,813	21,982	-25,901

II. INTRODUCTION

This rebuttal testimony regarding SoCalGas' request for Gas Major Projects addresses the following testimony from other parties:

- The Office of Ratepayer Advocates (ORA) as submitted by Mr. Yakov Lasko (Exhibit ORA-13), dated April 13, 2018.
- The Utility Reform Network (TURN), as submitted by Mr. Eric Borden (Exhibit TURN-01), dated May 14, 2018.

As a preliminary matter, the absence of a response to any particular issue in this rebuttal testimony does not imply or constitute agreement by SoCalGas with the proposal or contention made by these or other parties. The forecasts contained in SoCalGas' direct testimony, performed at the project level, are based on sound estimates of its revenue requirements at the time of testimony preparation.

1 **A. ORA**

2 ORA issued its report on Gas Major Projects on April 13, 2018.¹ The following is a
3 summary of ORA’s position(s):

4 **O&M - Non-Shared Expenses**

5 **Non-Shared O&M Difference (In 2016 \$000s)**

Description	2016 Recorded	SoCalGas 2019 Forecasted	ORA 2019 Forecasted	Difference
Mgmt & Outreach	933	3,646	3,646	0
Proj & Const Mgmt	201	201	201	0
Project Controls	124	124	124	0
Total	1,258	3,971	3,971	0

- 6
- 7 • ORA does not oppose the proposed non-shared expenses for Gas Major Projects
- 8 in 2019 in the amount of \$3,971.²
- 9 • No other party contested these proposed non-shared expenses.

¹ April 13, 2018, ORA Report on SoCalGas – Gas Major Projects & Gas Engineering, SDG&E – Gas Engineering, Exhibit ORA-13 (Yakov Lasko).

² *Id.* at 2.

1 **Capital Expenditures**

2 **Capital Forecast Differences (In 2016 \$)**

Major Projects and Construction Capital Projects	SoCalGas Proposed			ORA Recommended		
	Estimated 2017 (\$000s)	Estimated 2018 (\$000s)	Estimated 2019 (\$000s)	Estimated 2017 (\$000s)	Estimated 2018 (\$000s)	Estimated 2019 (\$000s)
DISTRIBUTION OPERATIONS CONTROL CENTER	400	3,156	25,901	38	3,156	25,901
METHANE MONITORS & FIBEROPTIC PROJECTS	300	4,813	4,813	7	4,813	4,813
PIPELINE INFRASTRUCTURE MONITORING SYSTEM	500	1,000	7,000	98	1,000	7,000
Total Capital	1,200	8,969	37,714	143	8,969	37,714

- 3
- 4 • ORA recommends the Commission adopt SoCalGas’ 2017 adjusted-recorded
- 5 capital expenditures amount of \$143,095.³

6 ORA does not oppose SoCalGas’ 2018 and 2019 proposed capital expenditures for methane

7 monitors & fiber-optic projects, Distribution Operations Control Center and Pipeline

8 Infrastructure Monitoring System.⁴

9 **B. TURN**

10 The Utility Reform Network (TURN) submitted testimony on May 14, 2018.⁵

11 The following is a summary of TURN’s position(s):

³ *Id.*

⁴ *Id.*

⁵ May 14, 2018, Prepared Direct Testimony of Eric Borden Addressing San Diego Gas & Electric Company and Southern California Gas Company in Their Test Year 2019 General Rate Case Related to Electric Distribution Capital, Gas Transmission Operation, Gas Major Projects, Cash Working Capital, and Customer Forecast, on behalf of The Utility Reform Network [TURN], Exhibit TURN-01 (Borden).

1 **O&M - Non-Shared Expenses**

2 TURN makes no recommendation regarding O&M expenses for Gas Major Projects in its
3 testimony.

4 **Capital Expenditures**

5 **Capital Forecast Difference (In 2016 \$)**

Major Projects and Construction Capital Projects	SoCalGas Proposed			TURN Recommended		
	Estimated 2017 (\$000s)	Estimated 2018 (\$000s)	Estimated 2019 (\$000s)	Estimated 2017 (\$000s)	Estimated 2018 (\$000s)	Estimated 2019 (\$000s)
DISTRIBUTION OPERATIONS CONTROL CENTER	400	3,156	25,901	400	3,156	0
METHANE MONITORS & FIBEROPTIC PROJECTS	300	4,813	4,813	300	4,813	4,813
PIPELINE INFRASTRUCTURE MONITORING SYSTEM	500	1,000	7,000	500	1,000	7,000
Total Capital	1,200	8,969	37,714	1,200	8,969	11,813

- 6
- 7
- TURN opposes the proposed Distribution Operation Control Center (DOCC) and recommends disallowance of the forecasted test year expenditures (\$26 million) for SoCalGas and SDG&E.⁶
 - TURN recommends that SoCalGas be instructed, if it wishes to propose the DOCC in a future rate case, to accomplish the following, at a minimum:
 - Quantify the safety benefits of the DOCC, including the ability to improve detection and improve response times;
 - Compare on a risk-spend efficiency basis the safety mitigation benefits of the DOCC with other safety mitigation measures;
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

⁶ *Id.* at 1.

- Commission a third-party study of PG&E’s DOCC facility that evaluates and quantifies, where possible, the safety benefits to PG&E’s system due to the operation of the DOCC facility.⁷

Since evaluation of the DOCC was approved in a previous GRC decision, TURN does not oppose the proposed capital expenditures for DOCC in 2017 and 2018.⁸

III. REBUTTAL TO PARTIES’ CAPITAL PROPOSALS

TOTAL CAPITAL - Constant 2016 (\$000)					
	2017	2018	2019	Total	Variance
SOCALGAS	1,200	8,969	37,714	47,883	--
ORA	143	8,969	37,714	46,826	-1,057
TURN	1,200	8,969	11,813	21,982	-25,901

A. Budget Code 343 - Major Projects and Construction

1. ORA

ORA recommends the Commission adopt SoCalGas’ 2017 recorded capital expenditures for methane & fiber-optic monitoring, DOCC, and Pipeline Infrastructure Monitoring System (PIMS) and pipeline monitoring instead of its forecasted expenditures.⁹ SoCalGas does not oppose ORA’s recommendation regarding 2017 capital expenditures.

ORA does not oppose SoCalGas’ 2018 and 2019 proposed capital expenditures for methane & fiber-optic monitoring, DOCC, and PIMS and pipeline monitoring.¹⁰

2. TURN

TURN takes issue with capital forecast for the DOCC for 2019. TURN’s position is based on the following arguments:¹¹

- It is not clear if the DOCC will improve the safety of SoCalGas’ system.
- The distribution system poses relatively low safety risk because it operates at medium pressure.

⁷ *Id.* at 48-49.

⁸ *Id.* at 49.

⁹ Ex. ORA-13 (Lasko) at 2.

¹⁰ *Id.*

¹¹ Ex. TURN-01 (Borden) at 43-45.

- 1 • Most safety incidents on SoCalGas' distribution system are caused by external
2 factors and cannot be avoided by the DOCC.
- 3 • Real-time monitoring will not significantly improve response times due to the
4 following:
 - 5 ○ The current system collects hourly data on minimum, average, and
6 maximum pressure and then transmits the information to SoCalGas'
7 Controllers once per day. In addition, out of tolerance pressures generate
8 exception alarms, which are transmitted to regional distribution offices for
9 processing within a few minutes after an event is detected;
 - 10 ○ Distribution system pressures are highly variable due to constantly
11 fluctuating demand and all the additional data points may lead to
12 obfuscation of long-term trends;
 - 13 ○ SoCalGas will continue to need to close valves manually and dispatch
14 personnel to repair;
 - 15 ○ DOCC would not have remote control capability for a majority of
16 SoCalGas' distribution system; and
 - 17 ○ There is little benefit in response time for the majority of regulators that
18 are not remote controlled.¹²

19 SoCalGas disagrees with TURN's arguments and respectfully believes that TURN does
20 not fully understand the functions of the proposed DOCC.

21 Approximately 30% of the 1,480 non-core customers identified are high pressure
22 customers.¹³ Additionally, SoCalGas' distribution system includes 3,994 miles of high-pressure
23 distribution pipeline and SDG&E has 363 miles of high-pressure distribution pipeline in its
24 system, as stated in Response 4c, of data request TURN-018, included in appendix A.¹⁴ The
25 DOCC will allow SoCalGas to monitor, in real-time, pressure and flow of nearly 1,800 points of
26 high-pressure in the distribution system. The DOCC will also provide remote control capability

¹² *Id.*

¹³ October 2017, Capital Workpapers to Prepared Direct Testimony of Michael A. Bermel on behalf of Southern California Gas Company, Ex. SCG-08-CWP (Bermel) at 27, Figure 10.

¹⁴ TURN-SCG-DR-018, Question 4c, attached as Appendix A - Discovery Responses.

1 of 200 of its most critical distribution regulator stations, most of which operate at high-pressure
2 (greater than 60 PSI), serve single fed districts, and/or feed critical high-pressure customers.
3 Abnormal operating conditions of these critical high-pressure distribution system regulator
4 stations will be readily identifiable with real-time pressure and flow measurement. The control
5 functionality on the 200 critical distribution regulator stations will allow SoCalGas to isolate the
6 downstream distribution system and protect from an over pressure condition thereby improving
7 overall safety and reliability of the system.

8 TURN correctly states that DOCC will not prevent damage caused by external factors,
9 such as dig-ins, or allow for remote control of every single valve on the distribution systems of
10 SoCalGas and SDG&E. However, TURN fails to recognize the value of receiving real-time
11 information from transmission to distribution and then to customers. Real-time monitoring of
12 the Company's transmission and distribution systems will provide consistent monitoring and
13 control with better visibility into the Company's system as a whole, resulting in better
14 management of the system and improving the Company's ability to more quickly and effectively
15 identify and correct abnormal and/or unsafe operating conditions before and after they arise.¹⁵

16 SoCalGas also finds no basis for TURN's devaluing a DOCC in the distribution system
17 and the contention that such capital investment is not justified due to the relatively low risk
18 posed by medium pressure distribution systems. It appears TURN does not recognize the extent
19 to which the distribution and transmission system and associated risk are operationally
20 interdependent. A major leak or rupture on the gas distribution pipeline system can potentially
21 result in depressurizing the gas transmission system pipeline network and visa-versa.

22 The proposed third-party study and evaluation of PG&E's DOCC facility is limited in
23 value. SoCalGas consulted with PG&E regarding their DOCC/Gas Control Center and system
24 benefits, including system response and safety advantages, during scope development.

25 However, an effective study of specific safety metrics on PG&E's DOCC would require
26 access to confidential information of their system, which PG&E is under no obligation to
27 provide. SoCalGas or a third party can simply track reported customer loss and overpressure

¹⁵ December 2017, Direct Testimony of Michael A. Bermel on Gas Major Projects, Exhibit SCG-08-R (Bermel) at MAB-21.

1 data from CPUC reports pre and post their DOCC, but the effort would not provide any insight
2 on improvement on response effectiveness, which is the primary benefit of the DOCC.

3 In summary, while SoCalGas operates a safe and reliable gas system, SoCalGas also
4 disagrees with TURN that distribution pipelines are currently operated with the best in cost-
5 effective control and monitoring techniques available and that the proposal only focuses on and
6 benefits distribution pipeline operations. Technological advancements improve the economics to
7 allow the real-time monitoring and control of smaller gas system assets. SoCalGas' proposal
8 acknowledges the tools are available to it now that can improve upon the Company's past
9 successes for its customers particularly as it relates to safety and reliability.

10 The DOCC will initially have control of the largest 200 distribution regulator stations
11 with highest potential to overpressure pipeline or result in customer loss of gas service in the
12 event of equipment malfunction, operator error, or any other event. This control would allow
13 SoCalGas to address some of these issues prior to an event impacting the system as well as
14 potentially reduce the severity of the event's impact on the system after it occurs.

15 SoCalGas suggests that part of TURN's misunderstanding arises from TURN's
16 understanding on the full scope of what the DOCC will monitor on the high-pressure pipeline
17 system and the extent of measurement and control at each of the Company's 2,400 regulator
18 stations. Please refer to figures 1 through 8 in SCG-08-CWP, Pages 21 through 25,¹⁶ for
19 additional clarification on these two concepts:

- 20 • Figure 6 shows the inlet to regulator stations at 665 locations to be monitored.
21 100% of these measurements are on the high-pressure side.
- 22 • Figure 7 show 200 locations where remote control will occur in addition to
23 monitoring. All 200 of these stations will have measurement on the high-pressure
24 pipeline feeding the stations.
- 25 • Figure 5 shows non-core customer data provided each hour as average, maximum,
26 and minimum.

27 Additionally, these enhancements should be considered within the context of work that
28 will be conducted on the Gas Distribution system as part of the Company's Pipeline Safety
29 Enhancement Plan (PSEP) program in which another 160 assets or valves serving distribution

¹⁶ Ex. SCG-08-CWP (Bermel) at 21-25.

1 will be controlled to prevent customer loss in the event of a rupture, or to prevent continuous
2 back flow through a district regulator station to a rupture on a gas transmission pipeline. The
3 DOCC will also serve as the monitoring point for an additional 80 assets on the distribution
4 supply lines and in points of interconnection between the gas distribution and transmission
5 systems installed under PSEP, with assets providing an effective real-time gas system from the
6 supply source to the customer.

7 Finally, TURN appears to interpret the extent of SoCalGas' vision for the DOCC as
8 limited to the 200 control points. SoCalGas did not ask for funding to complete remote control
9 of all 2,200 district regulator stations in this initial scoping because the time for such completion
10 is expected to take over 10 years. For this initial scoping, SoCalGas has prioritized the top 10%
11 of stations which pose the risk for greatest potential system impacts under an abnormal operating
12 condition and for which the greatest benefits can be derived under an event management
13 protocol. Lessons learned from this initial deployment will be used to refine the pace, scope, and
14 functionality of future monitoring and/or control deployments on the distribution system.

15 TURN claims that “[r]eceiving real-time data on the distribution system is unlikely to
16 lead to identification and stoppage of leaks more quickly” because distribution system pressures
17 fluctuate depending on demand and that “all the additional data points may lead to obfuscation of
18 long-term trends.”¹⁷ SoCalGas' experience does not align with TURN's speculation on the
19 behavior of a gas distribution under significant pipeline ruptures, equipment failure, or other
20 operational scenarios. Large dig-ins or operational and equipment issues on the gas distribution
21 pipeline system can be significant and have patterns much different than simple pipeline drafting
22 and packing due to changes in customer use. Contrary to TURN's contention, which is
23 unsupported by technical or experiential foundation, SoCalGas has experienced customer loss
24 from events which have occurred on its distribution system. One such event occurred in July
25 2014 in Newport Beach when a third-party contractor struck a distribution pipeline causing a
26 leak and interrupting gas service to 3,133 SoCalGas customers. SoCalGas has also experienced
27 over-pressurizations at times where work on the distribution systems was being conducted such
28 as incidents with SoCalGas' regulator station 903 on December 9, 2014 and SDG&E's regulator
29 station R-1212 on March 18, 2014.

¹⁷ Ex. TURN-01 (Borden) at 44, 45.

1 Where improvements in response time are to be considered, additional advantages of
2 Supervisory Control and Data Acquisition (SCADA) system expansion to distribution should
3 also be incorporated. One specific additional feature will allow field personnel to view
4 operational pressures remotely and in real-time via smart phones and tablets as they work on
5 areas of the system, which may not be configurable with local pressure gauges when operations
6 are being conducted. This will particularly benefit work operations at valve sites where closure
7 or opening operations affects pressures several miles from the work location.

8 **3. Other Items**

9 In the course of discovery, SoCalGas identified an error in my testimony regarding the
10 PIMS Operations and Maintenance Forecast Summary, which should be \$1,140,000 rather than
11 \$1,098,000, a discrepancy of \$42,000.¹⁸ This was acknowledged in data request ORA-SCG-DR-
12 135-YNL, a copy of which can be found in Appendix A.

13 **IV. CONCLUSION**

14 To summarize, the DOCC will improve safety and reliability in SoCalGas' and
15 SDG&E's distribution systems and improve SoCalGas and SDG&E's operational flexibility
16 during situational response. The DOCC will provide enhanced visibility into SoCalGas' and
17 SDGE's distribution system resulting in more efficient management of the system operations and
18 improved ability to identify and respond to pressure abnormalities efficiently. The DOCC will
19 provide real-time monitoring of the distribution system, including nearly 1,800 points of high-
20 pressure and over 4,000 miles of high-pressure pipeline. It will also control 200 of the most
21 critical distribution regulator stations with a long-term vision to control all 2200 regulator
22 stations, allowing SoCalGas to isolate runs that can impact the distribution system. SoCalGas
23 requests the Commission to adopt its recommendation for the construction of its Distribution
24 Operations Control Center.

25 This concludes my prepared rebuttal testimony.

¹⁸ Appendix B - Errata.

1 Appendix A to Exhibit SCG-208
2 SCG-008 Gas Major Projects - Discovery Responses
3

4 **1. Extract from**

5 TURN DATA REQUEST-018 SDG&E-SOCALGAS 2019 GRC – A.17-11-007/8

6 SDG&E_SOCALGAS RESPONSE

7 DATE RECEIVED: FEBRUARY 22, 2018

8 DATE RESPONDED: MARCH 22, 2018
9

10 Question 4:

11 Re. SCG-08 and SCG-08-CWP MBermel: Page MAB-7 of testimony states the DOCC will
12 mitigate the identified risk of “Catastrophic Damage Involving Medium-Pressure Pipeline
13 Failure.”

- 14 c. Please provide the approximate mileage of existing low, medium and high
15 pressure distribution lines in SCG’s service territory and in SDG&E’s service
16 territory, separately by utility.

17 Utility Response:

18 SoCalGas – Distribution System

- 19 • High Pressure – 3,994 miles
20 • Medium Pressure – 47,075 miles
21 • Low Pressure – < 1 mile
22

23 SDG&E – Distribution System

- 24 • High Pressure – 363 miles
25 • Medium Pressure – 7,823 miles
26 • Low Pressure – 0

1 **2. Extract from:**

2 A DATA REQUEST ORA-SCG-135-YNL

3 SOCALGAS 2019 GRC – A.17-10-008

4 SOCALGAS RESPONSE

5 DATE RECEIVED: FEBRUARY 14, 2018

6 DATE RESPONDED: MARCH 1, 2018

7
8 Question 2:

9 Referring to Ex. SCG-08-R, p. MAB-9, Table MAB-11, SoCalGas estimates non-shared
10 O&M expenses by cost center for management & outreach to be \$3,646,000 in 2019.

11 Referring to Ex. SCG-08-CWP, Appendices A-D show O&M costs to be \$1,399,000,
12 \$1,098,000, \$211,000 and \$202,000. These costs, based on appendix titles are for
13 four programs: DOCC, PIMS, Methane Sensors and Fiber-Optics projects for the
14 grand total of \$2,910,000.

15
16 a. Please account for the difference between \$3,646,000 and \$2,910,000.

17
18 b. Please provide an Excel file listing all of the components of \$3,646,000 as well
19 as references to the workpapers where these costs may be found.

20
21 SoCalGas Response 2:

22
23 a. Management and Outreach is part of the O&M Workpapers, please refer to SCG-08-
24 WP pages 5 -11 for detail. This cost center includes additional activities in addition to
25 the O&M cost for DOCC, PIMS, Methane Sensors and Fiber-Optics projects. As can
26 be seen on the workpapers at page 7 for year 2019 forecast adjustment entries, an
27 amount of \$1,398k below the center of the page with the explanation “Adjustment to
28 incorporate the O&M forecast of the Distribution Operations Control Center
29 (DOCC)” represents the O&M total of labor and non-labor for that DOCC activity.
30 Similarly, on page 8 of those workpapers can also be found a total of \$1,140k for
31 PIMS, and \$413k for Methane Sensors and Fiber projects. These three items total

1 \$2,951k. In addition, during the course of research conducted in responding to this
2 data request, SoCalGas identified an error of \$42k understated in the testimony
3 appendices descriptions, further explained in part b below. The \$2,910k from
4 testimony appendices A-D plus the \$42k understatement totals \$2,952k which, after
5 accounting for rounding, represents the \$2,951k total of the workpapers.
6

- 7 b. Please refer to SCG-08-R pages MAB-11 and MAB-16 and SCG-08-WP pages 5 -11
8 for detail. See table below for a breakdown of costs under Management and Outreach.
9 The historical base year 2016 expenses for this this cost center was used as a starting
10 point, to which various adjustments were made, either adding or subtracting, to
11 represent the expected future costs for these activities as shown in the workpapers and
12 the table below. Note that the \$1,398k value for the DOCC is shown separately and
13 the totals of \$1,140k for PIMS and \$413 for Methane Sensors and Fiber project are
14 combined to yield the value \$1,553k.

SoCalGas Response 2 Continued:

Cost Centers and O&M Expense Element	2016-Adj (\$000s)	Estimated 2017 (\$000s)	Estimated 2018 (\$000s)	Estimated 2019 (\$000s)
2200-2259, 2200-2391, 2200-2576 Historical base year 2016 work/expenses	933	933	933	933
2200-2259, 2200-2391, 2200-2576 Enterprise-wide additions for Dist. Op. and Control Center O&M	0	0	17	1,398
2200-2259, 2200-2391, 2200-2576 Additions for Pipeline Information Management System (Enterprise-wide). Fiber and Methane system-wide support – O&M *	0	0	656	1,553
2200-2259, 2200-2391, 2200-2576 FoF Savings. Project Management personnel reduction system-wide due to FoF initiatives 60, 70 and 920. O&M Project Management efficiency gains.	0	-83	-207	-422
Adjustment for work deferred in 2016 due to staffing and required focus on special assignment accounted for in cost center.	0	185	185	185
Total O&M	933	1,035	1,584	3,647

* The forecasted cost for 2019 presented in SCG-08-CWP, page 36 of 56, table 5- PIMS Operations and Maintenance Forecast Summary and Table 6 - PIMS Operation and Maintenance Cost Forecast Summary by Resource Category, should be \$1,140,000, instead of 1,098,000, a discrepancy of \$42,000. This will be corrected on the next opportunity.

APPENDIX B
SCG-008 Gas Major Projects – Errata

Appendix B to Exhibit SCG-208
SCG-008 Gas Major Projects – Errata

The forecasted cost for 2019 presented in SCG-08-CWP, table 5- PIMS Operations and Maintenance Forecast Summary, table 6 - PIMS Operation and Maintenance Cost Forecast Summary by Resource Category (page 36 of 56), and table 7 - PIMS Operations and Maintenance Cost Forecast Detail (page 37 of 56), should be \$1,140,000, instead of 1,098,000, a discrepancy of \$42,000.

Original tables, as presented in SCG-08-CWP:

Table 5 - PIMS Operations and Maintenance Forecast Summary

2016 Operations and Maintenance Forecast \$(000s) - Direct								
Expenditure Category	2017	2018	2019	Total 2017 - 2019	2020	2021	2022	Total 2017 - 2022
Labor	\$0	\$186	\$558	\$744	\$1,023	\$1,023	\$1,023	\$3,813
Non-Labor	\$0	\$100	\$540	\$640	\$840	\$790	\$790	\$3,060
Total	\$0	\$286	\$1,098	\$1,384	\$1,863	\$1,813	\$1,813	\$6,873

Table 6 - PIMS Operation and Maintenance Cost Forecast Summary by Resource Category

2016 Operations and Maintenance Forecast \$(000s) - Direct									
Resource Category	Expenditure Category	2017	2018	2019	Total 2017 - 2019	2020	2021	2022	Total 2017 - 2022
Labor Resources	Labor	\$0	\$186	\$558	\$744	\$1,023	\$1,023	\$1,023	\$3,813
	Non-Labor	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hardware	Labor	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Non-Labor	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Software	Labor	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Non-Labor	\$0	\$0	\$540	\$540	\$790	\$790	\$790	\$2,910
Vendor Services	Labor	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Non-Labor	\$0	\$100	\$0	\$100	\$50	\$0	\$0	\$150
Total	Labor	\$0	\$186	\$558	\$744	\$1,023	\$1,023	\$1,023	\$3,813
	Non-Labor	\$0	\$100	\$540	\$640	\$840	\$790	\$790	\$3,060
	Total	\$0	\$286	\$1,098	\$1,384	\$1,863	\$1,813	\$1,813	\$6,873

1
2

Table 7 - PIMS Operations and Maintenance Cost Forecast Detail

Detailed 2016 Operations and Maintenance Forecast \$(000s) - Direct												
Resource Category	Expenditure Category	Description	Hourly Rate/ Units	Hours/ Price per Unit (\$)	2017	2018	2019	Total 2017 - 2019	2020	2021	2022	Total 2017 - 2022
Labor Resources	Labor	Existing System Modification Support (AM/SAP/PI/GIS)	\$50	3,720	\$0	\$186	\$0	\$186	\$0	\$0	\$0	\$186
		SoCalGas Support for 7/24 environment (GIS)	\$50	5,580	\$0	\$0	\$0	\$0	\$93	\$93	\$93	\$279
		SoCalGas Support for 7/24 environment (GIS)	\$50	5,580	\$0	\$0	\$0	\$0	\$93	\$93	\$93	\$279
		SoCalGas support for PI/AES and compliances reporting	\$50	29,760	\$0	\$0	\$372	\$372	\$372	\$372	\$372	\$1,488
		SoCalGas Support for PIMS AM HeadEnd	\$50	7,740	\$0	\$0	\$93	\$93	\$93	\$93	\$93	\$372
		SDG&E Support for PIMS CE	\$50	11,160	\$0	\$0	\$0	\$0	\$186	\$186	\$186	\$558
		SDG&E 7/24 support for Tier 1 environment (Network)	\$50	5,580	\$0	\$0	\$0	\$0	\$93	\$93	\$93	\$279
		SoCalGas Support for 7/24 environment (SAP)	\$50	7,440	\$0	\$0	\$93	\$93	\$93	\$93	\$93	\$372
	Non-Labor											
Hardware	Labor											
	Non-Labor											
Software	Non-Labor	SoCalGas GIS - SQL Server Maintenance	3	\$ 30,000	\$0	\$0	\$0	\$0	\$30	\$30	\$30	\$90
		SoCalGas GIS - ESRI Maintenance	3	\$ 100,000	\$0	\$0	\$0	\$0	\$100	\$100	\$100	\$300
		SoCalGas - PI Software	4	\$ 300,000	\$0	\$0	\$300	\$300	\$300	\$300	\$300	\$1,200
		SoCalGas AM Aclara - Incremental Maintenance	4	\$ 120,000	\$0	\$0	\$120	\$120	\$120	\$120	\$120	\$480
		SoCalGas SAP Maintenance	4	\$ 120,000	\$0	\$0	\$120	\$120	\$120	\$120	\$120	\$480
		SDG&E SM Itron - Incremental Maintenance	3	\$ 120,000	\$0	\$0	\$0	\$0	\$120	\$120	\$120	\$360
			Labor									
Vendor Services	Non-Labor	SoCalGas GIS - Senior BA	1	\$ 100,000	\$0	\$100	\$0	\$100	\$0	\$0	\$0	\$100
		SoCalGas GIS - Senior Developer	1	\$ 50,000	\$0	\$0	\$0	\$0	\$50	\$0	\$0	\$50
Total	Labor				\$0	\$186	\$558	\$744	\$1,023	\$1,023	\$1,023	\$3,813
	Non-Labor				\$0	\$100	\$540	\$640	\$840	\$790	\$790	\$3,060
	Total				\$0	\$286	\$1,098	\$1,384	\$1,863	\$1,813	\$1,813	\$6,873

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Revised tables:

Table 5 - PIMS Operations and Maintenance Forecast Summary

2016 Operations and Maintenance Forecast \$(000s) - Direct								
Expenditure Category	2017	2018	2019	Total 2017 - 2019	2020	2021	2022	Total 2017 - 2022
Labor	\$0	\$186	\$600	\$786	\$1,023	\$1,023	\$1,023	\$3,855
Non-Labor	\$0	\$100	\$540	\$640	\$840	\$790	\$790	\$3,060
Total	\$0	\$286	\$1,140	\$1,426	\$1,863	\$1,813	\$1,813	\$6,915

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Table 6 - PIMS Operation and Maintenance Cost Forecast Summary by Resource Category

2016 Operations and Maintenance Forecast \$(000s) - Direct									
Resource Category	Expenditure Category	2017	2018	2019	Total	2020	2021	2022	Total
					2017 - 2019				2017 - 2022
Labor Resources	Labor	\$0	\$186	\$558	\$744	\$1,023	\$1,023	\$1,023	\$3,813
	Non-Labor	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hardware	Labor	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Non-Labor	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Software	Labor	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Non-Labor	\$0	\$0	\$540	\$540	\$790	\$790	\$790	\$2,910
Vendor Services	Labor	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Non-Labor	\$0	\$100	\$0	\$100	\$50	\$0	\$0	\$150
Total	Labor	\$0	\$186	\$600	\$786	\$1,023	\$1,023	\$1,023	\$3,855
	Non-Labor	\$0	\$100	\$540	\$640	\$840	\$790	\$790	\$3,060
	Total	\$0	\$286	\$1,140	\$1,426	\$1,863	\$1,813	\$1,813	\$6,915

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Table 7 - PIMS Operations and Maintenance Cost Forecast Detail

Detailed 2016 Operations and Maintenance Forecast \$(000s) - Direct												
Resource Category	Expenditure Category	Description	Hourly Rate/ Units	Hours/ Price per Unit (\$)	2017	2018	2019	Total 2017 - 2019	2020	2021	2022	Total 2017 - 2022
Labor Resources	Labor	Existing System Modification Support (AM/SAP/PI/GIS)	\$50	3,720	\$0	\$186	\$0	\$186	\$0	\$0	\$0	\$186
		SoCalGas Support for 7/24 environment (GIS)	\$50	5,580	\$0	\$0	\$0	\$0	\$93	\$93	\$93	\$279
		SoCalGas Support for 7/24 environment (GIS)	\$50	5,580	\$0	\$0	\$0	\$0	\$93	\$93	\$93	\$279
		SoCalGas support for PI/AES and compliances reporting	\$50	29,760	\$0	\$0	\$390	\$390	\$372	\$372	\$372	\$1,506
		SoCalGas Support for PIMS AM HeadEnd	\$50	7,740	\$0	\$0	\$105	\$105	\$93	\$93	\$93	\$384
		SDG&E Support for PIMS CE	\$50	11,160	\$0	\$0	\$0	\$0	\$186	\$186	\$186	\$558
		SDG&E 7/24 support for Tier 1 environment (Network)	\$50	5,580	\$0	\$0	\$0	\$0	\$93	\$93	\$93	\$279
		SoCalGas Support for 7/24 environment (SAP)	\$50	7,440	\$0	\$0	\$105	\$105	\$93	\$93	\$93	\$384
Hardware	Labor											
	Non-Labor											
Software	Non-Labor	SoCalGas GIS - SQL Server Maintenance	3	\$ 30,000	\$0	\$0	\$0	\$0	\$30	\$30	\$30	\$90
		SoCalGas GIS - ESRI Maintenance	3	\$ 100,000	\$0	\$0	\$0	\$0	\$100	\$100	\$100	\$300
		SoCalGas - PI Software	4	\$ 300,000	\$0	\$0	\$300	\$300	\$300	\$300	\$300	\$1,200
		SoCalGas AM Aclara - Incremental Maintenance	4	\$ 120,000	\$0	\$0	\$120	\$120	\$120	\$120	\$120	\$480
		SoCalGas SAP Maintenance	4	\$ 120,000	\$0	\$0	\$120	\$120	\$120	\$120	\$120	\$480
		SDG&E SM Itron - Incremental Maintenance	3	\$ 120,000	\$0	\$0	\$0	\$0	\$120	\$120	\$120	\$360
Vendor Services	Labor											
	Non-Labor	SoCalGas GIS - Senior BA	1	\$ 100,000	\$0	\$100	\$0	\$100	\$0	\$0	\$0	\$100
		SoCalGas GIS - Senior Developer	1	\$ 50,000	\$0	\$0	\$0	\$0	\$50	\$0	\$0	\$50
Total	Labor				\$0	\$186	\$600	\$786	\$1,023	\$1,023	\$1,023	\$3,855
	Non-Labor				\$0	\$100	\$540	\$640	\$840	\$790	\$790	\$3,060
	Total				\$0	\$286	\$1,140	\$1,426	\$1,863	\$1,813	\$1,813	\$6,915

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