

Application of SOUTHERN CALIFORNIA GAS )  
COMPANY for authority to update its gas revenue )  
requirement and base rates )  
effective January 1, 2019 (U 904-G) )

Application No. 17-10-008

Exhibit No.: (SCG-17-WP-R)

REVISED WORKPAPERS TO  
PREPARED DIRECT TESTIMONY  
OF RENE F. GARCIA  
ON BEHALF OF SOUTHERN CALIFORNIA GAS COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA

DECEMBER 2017



2019 General Rate Case - REVISED  
INDEX OF WORKPAPERS

Exhibit SCG-17-WP-R - ADVANCED METERING

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**Overall Summary For Exhibit No. SCG-17-WP-R**

<b>Area:</b>	<b>ADVANCED METERING</b>
<b>Witness:</b>	<b>Rene F. Garcia</b>

Description	In 2016 \$ (000) Incurred Costs			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
<i>Non-Shared Services</i>	0	0	0	10,477
<i>Shared Services</i>	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10,477</b>

*Note: Totals may include rounding differences.*

Southern California Gas Company  
 2019 GRC - REVISED  
 Non-Shared Service Workpapers

Area: ADVANCED METERING  
 Witness: Rene F. Garcia

**Summary of Non-Shared Services Workpapers:**

Description	In 2016 \$ (000) Incurred Costs			
	Adjusted-Recorded 2016	Adjusted-Forecast		
		2017	2018	2019
A. Advanced Meter Operations	0	0	0	10,477
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10,477</b>

*Note: Totals may include rounding differences.*

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2019 GRC - REVISED  
Non-Shared Service Workpapers

Area: ADVANCED METERING  
 Witness: Rene F. Garcia  
 Category: A. Advanced Meter Operations  
 Workpaper: 2AM002.000

**Summary for Category: A. Advanced Meter Operations**

	In 2016\$ (000) Incurred Costs			
	Adjusted-Recorded	Adjusted-Forecast		
	2016	2017	2018	2019
Labor	0	0	0	5,601
Non-Labor	0	0	0	3,683
NSE	0	0	0	1,193
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10,477</b>
FTE	0.0	0.0	0.0	53.1

**Workpapers belonging to this Category:**

**2AM002.000 Advanced Meter Operations**

Labor	0	0	0	5,601
Non-Labor	0	0	0	3,683
NSE	0	0	0	1,193
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10,477</b>
FTE	0.0	0.0	0.0	53.1

*Note: Totals may include rounding differences.*

**Beginning of Workpaper**  
**2AM002.000 - Advanced Meter Operations**

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Area: ADVANCED METERING  
 Witness: Rene F. Garcia  
 Category: A. Advanced Meter Operations  
 Category-Sub: 1. Advanced Meter Operations  
 Workpaper: 2AM002.000 - Advanced Meter Operations

**Activity Description:**

This workpaper includes costs associated with the Advanced Meter Operations (AMO) organization. AMO will be responsible for AM systems maintenance and Data Collection Units (DCU) network management, post-project deployment.

**Forecast Explanations:**

**Labor - Zero-Based**

Costs prior to 2019 are balanced in the Advanced Metering Infrastructure Balancing Account, and therefore are not reflected in the historical data and the 2017/2018 forecasts.

**Non-Labor - Zero-Based**

Costs prior to 2019 are balanced in the Advanced Metering Infrastructure Balancing Account, and therefore are not reflected in the historical data and the 2017/2018 forecasts.

**NSE - Zero-Based**

N/A

**Summary of Results:**

		In 2016\$ (000) Incurred Costs								
		Adjusted-Recorded					Adjusted-Forecast			
Years		2012	2013	2014	2015	2016	2017	2018	2019	
Labor		0	0	0	0	0	0	0	5,601	
Non-Labor		0	0	0	0	0	0	0	3,683	
NSE		0	0	0	0	0	0	0	1,193	
<b>Total</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10,477</b>	
FTE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.1	

*Note: Totals may include rounding differences.*

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Area: ADVANCED METERING  
 Witness: Rene F. Garcia  
 Category: A. Advanced Meter Operations  
 Category-Sub: 1. Advanced Meter Operations  
 Workpaper: 2AM002.000 - Advanced Meter Operations

**Summary of Adjustments to Forecast:**

In 2016 \$(000) Incurred Costs										
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	5,601	0	0	5,601
Non-Labor	Zero-Based	0	0	0	0	0	3,683	0	0	3,683
NSE	Zero-Based	0	0	0	0	0	1,193	0	0	1,193
<b>Total</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10,477</b>	<b>0</b>	<b>0</b>	<b>10,477</b>
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	53.1	0.0	0.0	53.1

**Forecast Adjustment Details:**

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

2019 Other                      2,030      1,882      143      4,055      18.8      1-Sided Adj      LNGODINE20161203164647270

**Explanation:** Network Management - This adjustment includes labor, non-labor and NSE costs associated with the Data Collection Unit (DCU) Network Management team within the Advanced Meter Operations (AMO) organization. The AMO forecast methodology is zero-based because costs through 2018 are being recorded in a balancing account. These ongoing O&M costs are being introduced in TY 2019.

2019 Other                      1,236      236      319      1,791      12.0      1-Sided Adj      LNGODINE20161203170252927

**Explanation:** Business Systems Analytics - This adjustment includes labor, non-labor and NSE costs associated with the Business Systems Analytics team within the Advanced Meter Operations (AMO) organization. The AMO forecast methodology is zero-based because costs through 2018 are being recorded in a balancing account. These ongoing O&M costs are being introduced in TY 2019.

2019 Other                      644      1,526      0      2,170      6.5      1-Sided Adj      LNGODINE20161203170902960

**Explanation:** Network Maintenance & Construction - This adjustment includes labor and non-labor costs associated with the Data Collection Unit (DCU) Network Maint. & Const. team within the Advanced Meter Operations (AMO) organization. The AMO forecast methodology is zero-based because costs through 2018 are being recorded in a balancing account. These ongoing O&M costs are being introduced in TY 2019.

2019 Other                      1,235      39      731      2,005      11.0      1-Sided Adj      LNGODINE20161203171314230

Note: Totals may include rounding differences.

SCG/ADVANCED METERING/Exh No:SCG-17-WP-R/Witness: R. Garcia



Southern California Gas Company  
2019 GRC - REVISED  
Non-Shared Service Workpapers

Area: ADVANCED METERING  
 Witness: Rene F. Garcia  
 Category: A. Advanced Meter Operations  
 Category-Sub: 1. Advanced Meter Operations  
 Workpaper: 2AM002.000 - Advanced Meter Operations

<u>Year</u>	<u>Adj Group</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>	<u>Adj Type</u>	<u>RefID</u>
<b>Explanation:</b> System Operations - This adjustment includes labor, non-labor and NSE costs associated with the Systems Operations team within the Advanced Meter Operations (AMO) organization. The AMO forecast methodology is zero-based because costs through 2018 are being recorded in a balancing account. These ongoing O&M costs are being introduced in TY 2019.								
2019	RAMP Incremental	183	0	0	183	2.0	1-Sided Adj	LNGODINE20161203180710660
<b>Explanation:</b> RAMP - Employee Contractor Customer and Public Safety (RAMP Chapter SCG-2) - This adjustment includes labor costs and FTE count related to Advanced Meter (AM) Consumption Analytics. The AMO forecast is zero-based because costs through 2018 are being recorded in a balancing account. RAMP costs for ongoing operations are introduced in TY 2019.								
2019	RAMP Incremental	273	0	0	273	2.8	1-Sided Adj	LNGODINE20170627093210947
<b>Explanation:</b> RAMP - Employee Contractor Customer and Public Safety (RAMP Chapter SCG-2) - This adjustment includes labor costs and FTE count related to the inspection of Data Collector Unit poles. The AMO forecast is zero-based because costs through 2018 are being recorded in a balancing account. RAMP costs for ongoing operations are introduced in TY 2019.								
<b>2019 Total</b>		<b>5,601</b>	<b>3,683</b>	<b>1,193</b>	<b>10,477</b>	<b>53.1</b>		

Note: Totals may include rounding differences.

SCG/ADVANCED METERING/Exh No:SCG-17-WP-R/Witness: R. Garcia

Southern California Gas Company  
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Non-Shared Service Workpapers

Area: ADVANCED METERING  
 Witness: Rene F. Garcia  
 Category: A. Advanced Meter Operations  
 Category-Sub: 1. Advanced Meter Operations  
 Workpaper: 2AM002.000 - Advanced Meter Operations

**Determination of Adjusted-Recorded (Incurred Costs):**

	2012 (\$000)	2013 (\$000)	2014 (\$000)	2015 (\$000)	2016 (\$000)
<b>Recorded (Nominal \$)*</b>					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
FTE	0.0	0.0	0.0	0.0	0.0
<b>Adjustments (Nominal \$) **</b>					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
FTE	0.0	0.0	0.0	0.0	0.0
<b>Recorded-Adjusted (Nominal \$)</b>					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
FTE	0.0	0.0	0.0	0.0	0.0
<b>Vacation &amp; Sick (Nominal \$)</b>					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
FTE	0.0	0.0	0.0	0.0	0.0
<b>Escalation to 2016\$</b>					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
FTE	0.0	0.0	0.0	0.0	0.0
<b>Recorded-Adjusted (Constant 2016\$)</b>					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
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.

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Non-Shared Service Workpapers

Area: ADVANCED METERING  
 Witness: Rene F. Garcia  
 Category: A. Advanced Meter Operations  
 Category-Sub: 1. Advanced Meter Operations  
 Workpaper: 2AM002.000 - Advanced Meter Operations

**Summary of Adjustments to Recorded:**

In Nominal \$ (000) Incurred Costs					
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
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
FTE	0.0	0.0	0.0	0.0	0.0

<u>Year</u>	<u>Adj Group</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>FTE</u>	<u>Adj Type</u>	<u>RefID</u>
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*Note: Totals may include rounding differences.*

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Area: ADVANCED METERING  
Witness: Rene F. Garcia  
Category: A. Advanced Meter Operations  
Category-Sub: 1. Advanced Meter Operations  
Workpaper: 2AM002.000 - Advanced Meter Operations

**RAMP Item # 1**

Ref ID: LNGODINE20161203092812100

RAMP Chapter: SCG-2

Program Name: Pole and Data Collector Unit (DCU) Inspections

Program Description: Yearly inspection and tracking of all installed poles and Data Collector Units.

**Risk/Mitigation:**

Risk: Damaged or down poles may create an unsafe condition

Mitigation: Inspect annually and repair as needed

**Forecast CPUC Cost Estimates (\$000)**

	<u>2017</u>	<u>2018</u>	<u>2019</u>
Low	0	0	0
High	0	0	0

Funding Source: CPUC-GRC

Forecast Method: Base Year

Work Type: Mandated

Work Type Citation: 67% of DCUs are attached to poles that need to be inspected in compliance with General Order 95

**Historical Embedded Cost Estimates (\$000)**

Embedded Costs: 0

Explanation:

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Area: ADVANCED METERING  
Witness: Rene F. Garcia  
Category: A. Advanced Meter Operations  
Category-Sub: 1. Advanced Meter Operations  
Workpaper: 2AM002.000 - Advanced Meter Operations

**RAMP Item # 2**

Ref ID: LNGODINE20170616103921673

RAMP Chapter: SCG-2

Program Name: Gas Consumption Analytics

Program Description: Advanced Meter data analytics will identify atypical/unusual consumption patterns and monitor tamper alarms that will require investigation and follow up work

**Risk/Mitigation:**

Risk: Unusual consumption and tamper to meters

Mitigation: Analyze consumption patterns to identify atypical/unusual consumption

**Forecast CPUC Cost Estimates (\$000)**

	<u>2017</u>	<u>2018</u>	<u>2019</u>
Low	0	0	918
High	0	0	1,122

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:

**Supplemental Workpapers for Workpaper 2AM002.000**

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SCG-RFG-SUP-001 Workpaper 2AM0002.000  
SoCalGas - Advanced Meter Infrastructure - Witness Rene F. Garcia  
Supplemental Workpaper for TY2019 Labor Forecast  
TY2019 Labor Workpaper

Assumptions: Total hours per year = 2080

Group	Role/Team	Reference #	FTEs
Network Management	Network Operations MTU Field Tech	1a	2
Network Management	Network Operations Business Systems Advisor/ Tech Advisor (MTU Operations)	1b	2
Network Management	Network Operations Senior Infrastructure Technologist (MTU Operations/NonCore Operations)	1c	1
Network Management	Network Operations Technical Advisor (MTU Operations/CSF)	1d	1
Network Management	Network Operations AMI Technologist (DCU Operations)	1e	1
Network Management	Network Operations Project Manager I (DCU Operations)	1f	1
Network Management	Network Operations - Team/Project Manager	1g	0.84
Network Management	System Health	1h	3
Network Management	RF Engineers	1i	1.58
Network Management	Test Engineers	1j	1.99
Network Management	Network Engineering / DCU Upgrade Project Manager	1k	0.86
Network Management	Network Engineering - Team/Project Manager	1l	0.78
Network Management	Network Management PM	1m	1
Network Management	Network Management Manager	1n	1
Network Management	New Business (Refer to SCG-04 for costs)	1o	1
Network Maintenance & Construction	Site Acquisition	2a	2.4
Network Maintenance & Construction	Construction Management	2b	1
Network Maintenance & Construction	Network M&C Supervisor	2c	0.5

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Network Maintenance & Construction	New Business (Refer to SCG-04 for costs)	2d	2
Network Maintenance & Construction	Field Operations	2e	3
Network Maintenance & Construction	RAMP: Pole Inspections	2f	2.8
Business Systems Analytics	Business Operations Support	3a	7
Business Systems Analytics	Business Systems Analytics Manager	3b	1
Business Systems Analytics	AM Analytics	3c	4
Business Systems Analytics	RAMP: Consumption Analytics	3d	2
Systems Operations	HeadEnd Services (AMO O&M)	4a-1	4
Systems Operations	HeadEnd Services (Capital costs sponsored by IT Cap Projects; Refer to SCG-26)	4a-2	1
Systems Operations	MDMS Services (AMO O&M)	4b-1	3
Systems Operations	MDMS Services (Capital costs sponsored by IT Cap Projects; Refer to SCG-26)	4b-2	2
Systems Operations	CEMT Services (AMO O&M)	4c-1	2
Systems Operations	CEMT Services (Capital costs sponsored by IT Cap Projects; Refer to SCG-26)	4c-2	1
Systems Operations	NEMO Support	4d	1
Systems Operations	HeadEnd & MDMS Services Manager	4e	1

**Reference 1a** Network Operations MTU Field Tech

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
Field Visit - Site Analysis & RF Testing	2600	1.5	3900	
General Administrative	200	2	400	
			(c)	(d)
	2800	3.5	4300	<b>2</b>



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Network Operations Business Systems Advisor/ Tech Advisor  
(MTU Operations)

**Reference 1b**

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
MTU Exceptions Analysis	24000	0.1	1992	
Field Recommendation Analysis	2600	0.5	1300	
Remediation Order Management	1400	0.1	116.2	
Miscellaneous Triage Management & SQL Query Deverlopment/ Execution	100	2	200	
Field Visit - Site Analysis & RF Testing	100	2	200	
General Adminstrative	200	2	400	
			(c)	(d)
	28400	7	4208	<b>2</b>

Network Operations Senior Infrastructure Technologist (MTU Operations/NonCore Operations)

**Reference 1c**

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
Management/Supervision of MTU Operations Team - Field & Office	50	5	250	
M&R Core Exception Analysis	50	4	200	
M&R NonCore Exception Analysis	50	6	300	
M&R Field Coordination	50	6	300	
M&R Remediation Order Management	50	4	200	
M&R Technical Consultation	50	4	200	
M&R Field Visit - Site Analysis & RF Testing	50	3	150	

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HR Management	50	3	150	
General Administrative	200	2	400	
			(c)	(d)
	600	37	2150	1

**Reference 1d** Network Operations Technical Advisor (MTU Operations/CSF)

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
CSF Fieldwork Coordination	1400	0.2	233.8	
CSF Inventory Coordination	1400	0.2	233.8	
High priority CGI's	25	6.0	150	
RMA Support	25	8.0	200	
Field Visit - Site Analysis & RF Testing	100	2.0	200	
NonCore Support	50	8.0	400	
Business Communications Support	50	4.0	200	
General Administrative	250	2.0	500	
			(c)	(d)
	3300	30.3	2117.6	1

**Reference 1e** Network Operations AMI Technologist (DCU Operations)

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
DCU Performance Management	1300	1.0	1300	
Miscellaneous SQL Programming	50	10.0	500	
General Administrative	200	2.0	400	
			(c)	(d)
	1550	13.0	2200	1

**Reference 1f** Network Operations Project Manager I (DCU Operations)

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080

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AM Cellular Network Support	50	4.0	200	
AM Cellular Vendor Management	25	4.0	100	
DCU Performance Management	1300	0.5	650	
DCU Firmware Support	13800	0.0	234.6	
Head End Software Support	15	8.0	120	
NonCore Support Management	50	4.0	200	
Technical Consultation with Sempra IT Network	25	4.0	100	
General Adminstrative	250	2.0	500	
			(c)	(d)
	15515	26.5	2104.6	<b>1</b>

**Reference 1g** Network Operations - Team/Project Manager

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
NetOps Department Management, Issue Resolution	50	8.0	400	
Weekly Metrics and Reporting Review and Management (DCU stats, MTU exception stats, Alarming Modules, Network Warranty KPIs)	50	12.0	600	
Management Communications	50	3.0	150	
HR Management	50	2.0	100	
General Adminstrative	250	2.0	500	
			(c)	(d)
	450	27.0	1750	<b>0.84</b>

**Reference 1h** System Health

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
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Non-Shared Service Workpapers

	(a)	(b)	(a)*(b)	(c)/2080
System Health Exceptions - Resolution	15000	0.083	1250	
System Health Exceptions - Root Cause Analysis	15000	0.048	720	
Billing Exceptions / Consecutive Estimates	12000	0.030	400	
Opt-Out Program Exceptions - Management	12000	0.0167	200	
Non-AM Billed Meters - Management	30000	0.0167	500	
Annual Initiatives (i.e. Status Codes, Reports, etc.)	5	80	400	
Alarming Modules - Support	26	16	416	
Weekly Metrics and Reporting Review and Management (DCU stats, MTU exception stats, Alarming Modules, Network Warranty KPIs)	50	12.0	400	
Ongoing Management of AM Opt-Out Accounts / "Customer Experience" exceptions	50	2.0	100	
Management Communications/Pre presentations	50	3.0	150	
Misc. Business Requests	750	2.0	1500	
			(c)	(d)
	84931	115.19	6036	3

**Reference 1i** RF Engineers

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080

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New Temp DCU Testing	40	24.0	960	
Site Walks & RF Site Surveys (DCU or MTU Hard To Hear)	20	16.0	320	
RF Interference Analysis	24	16.0	384	
DCU ECO Process for SW & HW	10	48.0	480	
MTU ECO Process for SW & HW	5	48.0	240	
DCU Network Troubleshooting (i.e. Issue resolution and root cause analysis)	15	20.0	300	
Admin (Email, Training, Conference, etc...)	50	4.0	200	
Travel (Windshield time)	100	4.0	400	
			(c)	(d)
	264	180.0	3284	<b>1.58</b>

**Reference 1j** Test Engineers

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
New Temp DCU Testing	40	12.0	480	
Site Walks & RF Site Surveys (DCU or MTU Hard To Hear)	20	8.0	160	
RF Interference Analysis	24	8.0	192	
DCU ECO Process for SW & HW	10	160.0	1600	
MTU ECO Process for SW & HW	5	160.0	800	
DCU Network Troubleshooting (i.e. Issue resolution and root cause analysis)	15	20.0	300	

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Non-Shared Service Workpapers

Admin (Email, Training, Conference, etc...)	100	4.0	400	
Travel (Windshield time)	50	4.0	200	
			(c)	(d)
	264	376	4132	<b>1.99</b>

**Reference 1k** Network Engineering/DCU Upgrade Project Manager

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
Management and Tracking of DCU 5 Year battery changes	1300	0.3	325	
Management and Tracking of DCU LTE cards changes	1000	0.3	250	
Management and Tracking of DCU & MTU ECO Processes	15	40.0	600	
Action Item Tracking and Weekly Engineering Status Meeting Facilitation/Prep	52	8.0	416	
Admin (Email, Training, Conference, etc...)	50	4.0	200	
			(c)	(d)
	2417	52.5	1791	<b>0.86</b>

**Reference 1l** Network Engineering - Team/Project Manager

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
Network Engineering Department Management, Issue Resolution	50	8.0	400	
Review and feedback on RF Propagation and DCU Design work	120	4.0	480	

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Manage Vendor Relationship with Aclara for DCU and MTU Product Quality issues, Product Roadmap updates, ECO Process, etc.	50	4.0	200	
HR Management	25	2.0	50	
General Administrative	250	2.0	500	
			(c)	(d)
	495	20	1630	<b>0.78</b>

**Reference 1m**      Network Management PM

Tasks	FTE Time Allocation (%)
Resource management, support & consultation	20%
Support strategy, roadmap and implementation plans (AM Technology, Info Security, Systems Enhancements, etc)	5%
General knowledge of Advanced Meter Technology (DCU, MTU, HE, Backhaul Network)	10%
Review, oversight, and feedback of Network Engineering design work for New Business and Network Optimization	5%
Review, oversight, and tracking of Network Engineering Change Order (ECO) acceptance process and implementation	5%
Review, analysis, follow-up, and resolution of MTU Operations and Systems Health issues and metrics	10%
Review, analysis, follow-up, and resolution of DCU Operations and DCU Field Operations issues and metrics	15%
Vendor management and relations: Aclara, Verizon, AT&T, GE	10%

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Manage the Agenda & Follow-up items for monthly AM Operations meetings	5%
Manage relationships with internal partner organizations: Billing, Call Center, CSF Dispatch, M&R, Sempra IT, Gas Engineering	5%
Support budget forecast and outlooks	5%
Support and deliver Performance Dialogs	5%
Total %	100%
Total FTEs	<b>1</b>

**Reference 1n**      Network Management Manager

Tasks	FTE Time Allocation (%)
Resource management support, HR Communications	15%
Support strategy, roadmap and implementation plans	10%
General knowledge of Customer Service, Gas Engineering, Distribution Operations and Advanced Meter	10%
Provide guidance in the development of new systems and processes where AMI data can be used	5%
Support budget forecast and outlooks	10%
On-going business alignment with business partners	10%
External Affairs Coordination (City Meetings, Public Affairs, Contractor Meetings )	15%
Metrics, Reporting Review and Management	5%
Management Communications	5%
General Administrative	10%
Support and deliver Performance Dialogs	5%
Total %	100%
Total FTEs	<b>1</b>

**Reference 1o**      New Business (Refer to SCG-04)



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	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
New Business DCU/HTH MTU Coordination with Network Engineering	120	2.0	240	
(RF Engineers) RF Propagation analysis and design for new DCUs	120	8.0	960	480
(Test Engineers) RF Propagation analysis and design for new DCUs	120	2.0	240	120
New Business RER evaluation triage	300	1.0	300	300
Manage DCU Field Testing efforts for New Business and ongoing optimization efforts	40	4.0	160	160
Manage New Business Network Evaluation process	300	1.0	300	300
			(c)	(d)
	1000	18	2200	1

**Reference 2a** Site Acquisition

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
City Meetings & Negotiations	40	16	640	
Site Walks	40	6	240	
Site Survey	80	4	320	
Land Use/Permits	40	16	640	
Maintenance Permits	195	4	780	
Easement	9	80.0	720	
Attachment	0	40.0	0	

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Acceptance	40	2.0	80	
Asset Management	4600	0.3	1518	
			(c)	(d)
	5044	168.33	4938	<b>2.4</b>

**Reference 2b** Construction Management

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
Construction	40	8	320	
Outreach	40	8	320	
Supply Chain	91	8	728	
			(c)	(d)
	171	24	1368	<b>1</b>

**Reference 2c** Network M&C Supervisor

	Total Hours by Year	FTEs
		(a)/2080
Network Maintenance & Construction, Issue Resolution	104	
Weekly Metrics and Reporting Review and Management (DCU Stats, Permit Status, Budget, Supply Chain, Incidents)	208	
New Business DCU/HTH MTU Coordination with Network Operations and Regional Planning	0	
External Affairs Coordination (City Meetings, Public Affairs, Contractor Meetings )	208	
Management Communications	208	
HR Communications	104	
General Administrative	104	

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	(a)	(b)
	936	0.5

**Reference 2d**      New Business (Refer to SCG-04)

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
City Meetings & Negotiations	41	16	656	
Site Walks	41	6	246	
Site Survey	82	4	328	
Land Use/Permits	41	16	656	
Maintenance Permits	0	4	0	
Easement	0	80	0	
Attachment	9	40	360	
Acceptance	41	2	82	
Construction	41	8	328	
Outreach	41	8	328	
Supply Chain	41	8	328	
Network Maintenance & Construction, Issue Resolution			104	
Weekly Metrics and Reporting Review and Management (DCU Stats, Permit Status, Budget, Supply Chain, Incidents)			208	
New Business DCU/HTH MTU Coordination with Network Operations and Regional Planning			208	
External Affairs Coordination (City Meetings, Public Affairs, Contractor Meetings )			208	
Management Communications			208	
HR Communications			104	

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General Administrative			104	
			(c)	(d)
	378	192	4456	<b>2</b>

**Reference 2e** Field Operations

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
DCU Warranty SFT Tracking and Management	1100	1.2	1352	
DCU Non Warranty Incident Tracking and Management	200	5.9	1196	
H2H Tracking and Management	20	1.3	26	
Support Network Engineering	40	8	320	
DCU Non Warranty Incident Field Work	288	8	2304	
DCU Warranty SFT QA/Supervision	156	5.3	832	
H2H RXR Site Survey	20	8	160	
H2H Indoor DCU Site Walk	5	8	40	
			(c)	(d)
	1829	45.7	6230	<b>3</b>

**Reference 2f** RAMP: Pole Inspections

	Tasks per Year	Hours per Task	Total Hours by Year	FTEs
	(a)	(b)	(a)*(b)	(c)/2080
Maintenance/Pole Inspection	4600	1.25	5750	
			(c)	(d)
	4600	1.25	5750	<b>2.8</b>

**Reference 3a** Business Operations Support

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Title	FTE	Task	Time Allocation (%)
Team Lead - Business Operations Support	1	Resource management	20%
		Accruent and GE vendor mgmt	10%
		HE and MDMS - release	5%
		STAR Programmer - PKI certification release and resource management	5%
		HE, MDMS, Siterra and NEMO - Access governance and controls	5%
		HE and MDMS - Data requests and data governance	5%
		Maintain Opt-Out Outlook	5%
		Develop and maintain IT roadmap and implementation plan	5%
		PMO governance support	10%
		Project support	30%
Project Manager – Non-Core	1	Installation support for Non-Core facilities	20%
		Second level support for back-office business and system organizations	30%
		HE and STAR Programmer system enhancements & release support	10%
		Net Ops and System Health support for Non-Core facilities	20%
		Region Engineering / Distribution pressure monitor support	10%
		MDO / SCBS Billing support	10%
		Support delivery of Activity Logs	20%
Project Manager – CSF	1	Second level support for back-office business and system organizations - CSF Installation, CCC, Billing, Set Desk, Dispatch, CSF Ops liaison	30%
		HE and STAR Programmer system enhancement & release support	20%

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		Net Ops and System Health support for Non-Core facilities	20%
		CIS Billing support	10%
Project Manager – M&R	1	Support delivery of Activity Logs	20%
		Second level support for back-office business and system	30%
		HE and STAR Programmer system enhancement & release support	20%
		Net Ops and System Health support for Non-Core facilities	20%
		CIS Billing support	10%
Project Manager – NEMO & Siterra	1	Support Accruent and GE contracts	10%
		Siterra and NEMO release support	10%
		Develop and maintain IT roadmap and implementation plan	25%
		Develop, deploy and maintain small Siterra enhancements	10%
		Support DCU maintenance efforts to ensure complete and accurate compliance data	25%
		Manages Siterra and NEMO Access controls - Quarterly	10%
		Project support	10%
Project Manager - Business Operations Support	1	Support Billing efforts for Energy Diversion	40%
		Develop, deploy and maintain small process improvements and tools	10%
		Support - Security device asset management across CSF and M&R Districts	10%
		Manages HE and MDMS Access controls - Quarterly	10%
		Support BOS Sharepoint	10%
		Project support - DW liaison to evaluate and prioritize DW enhancements	20%

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Business Systems Analyst - DCU Asset Management Support	1	Production support for Network Deployment team	40%
		Project liaison to DCU management applications	15%
		Supports small enhancements, testing and validation	20%
		Manages DCU Asset management Access controls - Quarterly	10%
		Project support	15%
		Total %	700%
		Total FTEs	7

**Reference 3b** Business Systems Analytics Manager

Title	FTE	Task	Time Allocation
Business Systems Analytics Manager	1	Resource management support	5%
		Support strategy, roadmap and implementation plans	10%
		General knowledge of CIS, PACER, Click applications and the intersect of Advanced Meter	10%
		CSF Ops, MRC business organizations and the impact of Advanced Meter	20%
		General knowledge of Advanced Meter project - business and system processes	10%
		Provide SME in the development of new analytics areas where AMI data can be used	10%
		Support budget forecast and outlooks	10%
		On-going business alignment with business partners	20%
		Support and deliver Performance Dialogs	5%

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		Total FTEs	<b>1</b>
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**Reference 3c**      AM Analytics

Title	FTE	Task	Time Allocation
Team Lead - AM Analytics	1	Resource management	20%
		Develop strategy, roadmap and implementation plan for new analytics tools	20%
		Support ICDA roadmap as AM data SME	15%
		Support Sempra Data Analytics road map	10%
		Support external AM Data requests as data SME	5%
		Develop new analytis tools	20%
		Project support	10%
Technical Advisor - Data Analytics	1	Support roadmap and implementation plan for new analytics tools	20%
		Support data preparation for new analytics tools	30%
		Develop and deploy new analytics tools/models	30%
		Project support	20%
Business/Systems Analyst – Analytics Project Support	1	Support roadmap and implementation plan for new analytics tools	10%
		7 day production support of consumption analytics models	40%
		Verifies, tests and validates analytics tools/models	20%
		Project support	30%
		7 day production support of consumption analytics models	20%



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Business/Systems Analyst – Analytics Project Support	1	Support roadmap and implementation plan for new analytics tools	20%
		Support data requests for AMI data	20%
		Project support	40%
		Total %	400%
		Total FTEs	<b>4</b>

**Reference 3d** RAMP: Consumption Analytics

Title	FTE	Task	Time Allocation (%)
Technical Advisor – Analytics Project Support	1	Support regular meetings with CSF Districts to discuss AM Analytics orders	40%
		7 day production support of consumption analytics models	50%
		Support roadmap and implementation plan for new analytics tools	10%
Project Manager - Energy Diversion Lead	1	Support Energy Diversion policies and procedures	30%
		Production support of consumption analytics models	30%
		Support roadmap and implementation plan for new analytics tools	10%
		Energy Diversion analytics liaison to CSF Ops	30%
		Total %	200%
		Total FTEs	<b>2</b>

**Reference 4a** Headend Services

Title	FTE	Task	O&M or Cap	Time Allocation (%)
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HeadEnd Team Lead	1	resource management	O&M	20%
		vendor mgmt & client relationship	O&M	10%
		on-going system maintenance & enhancement	O&M	10%
		develop strategy, roadmap and implementation plan	O&M	20%
		IT capital project support	CAP	40%
Sr. Software Developer – Performance, Automation, Architecture Enhancement	1	24x7x365 production support	O&M	40%
		system enhancement & automation	O&M	30%
		system performance testing & tuning	O&M	20%
		IT capital project support	CAP	10%
Sr. Software Developer - Shared Network (Water) and Methane	1	24x7x365 production support	O&M	30%
		system enhancement & automation	O&M	20%
		functional and integration testing	O&M	10%
		IT capital project support	CAP	40%
Software Developer - Production Support & Functional Testing	1	24x7x365 production support	O&M	60%
		maintenance release testing and planning	O&M	15%
		other ops support (e.g. DR exercise execution & planning, reporting etc.)	O&M	20%
		IT capital project support	CAP	5%
Software Developer (EC) - Production Support & Interface Dev/Testing	1	24x7x365 production support	O&M	70%
		interfaces development, maintenance, enhancement &	O&M	10%
		other ops support (e.g. disaster recovery, Aliso methane, reporting etc.)	O&M	15%
		IT capital project support	CAP	5%
			O&M	400%
<b>4a-1</b>			O&M FTEs	<b>4</b>
			Cap	100%
<b>4a-2</b>			Cap FTEs	<b>1</b>

**Reference 4b** MDMS Services

Title	FTE	Task	O&M or Cap	Time Allocation (%)

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MDMS Team Lead	1	resource management	O&M	5%
		vendor mgmt & client relationship	O&M	5%
		on-going system maintenance & enhancement strategy development	O&M	5%
		develop strategy, roadmap and implementation plan	O&M	5%
		IT capital project support	CAP	80%
Sr. Software Developer – Performance, Analytics	1	24x7x365 production support	O&M	30%
		system performance testing & tuning	O&M	10%
		analytics (billing, safety, new business, WEN)	O&M	10%
		IT capital project support	CAP	50%
Sr. Software Developer – Stakeholder Liaison, Project Support	1	24x7x365 production support	O&M	30%
		develop strategy, roadmap and implementation plan	O&M	10%
		support client meeting, requirements gathering and data analysis	O&M	10%
		IT capital project support	CAP	50%
Software Developer - Production Support & Functional Testing	1	24x7x365 production support	O&M	60%
		maintenance release testing and planning	O&M	10%
		interfaces development, maintenance, enhancement & testing	O&M	10%
		other ops support (e.g. DR exercise execution & planning, reporting etc.)	O&M	5%
		IT capital project support	CAP	15%
Software Developer (EC) - Production Support & Interface Dev/Testing	1	24x7x365 production support	O&M	80%
		other ops support (e.g. CR coordination, SOX testing, reporting, etc.)	O&M	15%
		IT capital project support	CAP	5%
			O&M	300%
<b>4b-1</b>			O&M FTEs	<b>3</b>
			Cap	200%
<b>4b-2</b>			Cap FTEs	<b>2</b>

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**Reference 4c**      CEMT Services

Title	FTE	Task	O&M or	Time
Sr. Software Developer/CEMT Lead	1	24x7x365 production support	O&M	35%
		vendor mgmt & stakeholder relationship mgmt	O&M	10%
		on-going system maintenance & enhancement	O&M	5%
		develop strategy, roadmap and implementation plan	O&M	10%
		maintenance release planning, construct/build, configuration, deployment	CAP	40%
Software Engineer	1	24x7x365 production support	O&M	55%
		maintenance release planning, construct/build, configuration, deployment	O&M	10%
		capacity planning, automation, monitoring, reporting	O&M	5%
		IT capital project support	CAP	30%
Software Engineer	1	24x7x365 production support	O&M	60%
		maintenance release planning, construct/build, configuration, deployment	O&M	5%
		capacity planning, automation, monitoring, reporting	O&M	5%
		IT capital project support	CAP	30%
			O&M	200%
			<b>4c-1</b> O&M FTEs	<b>2</b>
			Cap	100%
			<b>4c-2</b> Cap FTEs	<b>1</b>

**Reference 4d**      NEMO Support

Title	FTE	Task	O&M or Cap	Allocation (%)
NEMO Software		24x7x365 production support	O&M	60%

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NEW Software Developer - Production Support & Functional Testing	1	maintenance release testing and planning	O&M	15%
		other ops support (e.g. DR exercise execution & planning, reporting etc.)	O&M	20%
		project support	O&M	5%
			O&M	100%
			O&M FTEs	1

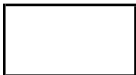
**Reference 4e** HeadEnd & MDMS Services Manager

Title	FTE	Task	O&M or Cap	Time Allocation (%)
HeadEnd & MDMS Services Manager	1	resource management	O&M	30%
		vendor mgmt & client relationship mgmt	O&M	10%
		project development	O&M	20%
		vision, strategy and roadmap development	O&M	20%
		project support	O&M	20%
			O&M	100%
			O&M FTEs	1

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SCG-RFG-SUP-002 Workpaper 2AM0002.000  
SoCalGas - Advanced Meter Infrastructure - Witness Rene F. Garcia  
Supplemental Workpaper for TY2019 Non-Labor Forecast  
TY2019 Non-Labor Workpaper

Group	Reference #	Non-Labor, Non-Standard Escalation	Cost Description	Total
Network Management	1a	NSE	Professional Services	\$142,633
Network Management	1b	Non-Labor	DCU Warranty Extension	\$1,075,783
Network Management	1c	Non-Labor	DCU Ethernet	\$54,000
Network Management	1d	Non-Labor	DCU Phone bills	\$690,000
Network Management	1e	Non-Labor	Network Engineering Lab/Field Expenses	\$10,000
Network Management	1f	Non-Labor	Employee Support Expenses	\$52,000
Network Maint. & Const.	2a	Non-Labor	DCU Maintenance Permits - Warranty	\$43,725
Network Maint. & Const.	2b	Non-Labor	DCU Maintenance Permits - Non-Warranty	\$31,950
Network Maint. & Const.	2c	Non-Labor	Misc Materials	\$50,000
Network Maint. & Const.	2d	Non-Labor	BSL fees/other attachment fees	\$278,424
Network Maint. & Const.	2e	Non-Labor	Bucket Trucks	\$171,600
Network Maint. & Const.	2f	Non-Labor	Follow-up repairs / incidents	\$50,000
Network Maint. & Const.	2g	Non-Labor	Easement Renewals	\$20,000
Network Maint. & Const.	2h	Non-Labor	Forklift	\$30,000
Network Maint. & Const.	2i	Non-Labor	DCU Battery Replacements	\$588,449
Network Maint. & Const.	2j	Non-Labor	Battery Replacement Permits	\$32,065
Network Maint. & Const.	2k	Non-Labor	New Business DCU Permits	\$49,680
Network Maint. & Const.	2l	Non-Labor	Field Operations Team Equipment Costs	\$5,000
Network Maint. & Const.	2m	Non-Labor	Pole Relocations - Customer Complaints/City Requests	\$97,695
Network Maint. & Const.	2n	Non-Labor	Pole Relocation Permits	\$46,575
Network Maint. & Const.	2o	Non-Labor	Employee Support Expenses	\$31,200
Business Systems & Analytics	3a	Non-Labor	NEMO, Siterra & STAR programming pro services	\$200,000
Business Systems & Analytics	3b	NSE	Siterra license fees	\$133,333

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Business Systems & Analytics	3c	NSE	NEMO (Maintenance)	\$186,000
Business Systems & Analytics	3d	Non-Labor	Employee Support Expenses	\$36,400
Systems Operations	4a	NSE	Headend Software Maintenance Fees	\$486,000
Systems Operations	4b	NSE	MDMS Software Maintenance Fees	\$171,720
Systems Operations	4c	NSE	Headend/MDMS Software Professional Services	\$73,440
Systems Operations	4d	Non-Labor	Employee Support Expenses	\$39,000

**Reference 1a** Professional Services

	(a)	(b)	(c)	(d)	(e)
Consultation/Cost Type	Consults per year	Hours per consult	\$ per Hour	Escalation from 2011 contract rate to 2019	Cost
					(a)*(b)*(c)*(d)
RF Engineering Consultation	4	40	\$96	1.369	\$21,028
MTU/Product Change Consultation	8	24	\$96	1.369	\$25,233
Project Manager		160	\$96	1.369	\$21,028
Senior Product Engineer		80	\$96	1.369	\$10,514
Senior RF Engineer		80	\$96	1.369	\$10,514
Software/Data Engineer		80	\$72	1.369	\$7,885
					(f)
					\$96,202

	(g)	(h)	(i)	(j)
	MTU/DCU changes per year	No. test units	Unit price	Cost
				(g)*(h)*(i)
Equipment Fees	8	10	\$400	\$32,000

(k)

(l)

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Travel Expense for onsite support (15% of Labor Subtotal)
(f)*15%
\$14,430

Total Cost
(f)+(j)+(k)
<b>\$142,633</b>

**Reference 1b**

DCU Warranty

(a)	(b)	(c)
Incremental Extended Warranty Cost	Ongoing Extended Warranty Cost	Total Cost
		(a)+(b)
\$139,533	\$936,250	<b>\$1,075,783</b>

**Reference 1c**

DCU Ethernet Charges

(a)	(b)	(c)
Months	Monthly Charges	Total Cost
		(a)*(b)
12	\$4,500	<b>\$54,000</b>

**Reference 1d**

DCU Phone Bills

(a)	(b)	(c)	(d)
DCU Count	Unit Cost	Months	Total Cost
			(a)*(b)*(c)
4600	\$12.50	12	<b>\$690,000</b>

**Reference 1e**

Network Engineering Lab/Field Expenses

(a)	(b)	(c)	(d)
Test/Calibration /Equipment	EDX software yearly upgrade	Equipment refresh/Misc. Field/Lab Equipment	Total Cost
			(a)+(b)+(c)
\$3,500	\$4,000	\$2,500	<b>\$10,000</b>

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**Reference 1f**

Employee Support Expenses

	(a)	(b)	(c)	(d)
	2014 Cost/Emp	2015 Cost/Emp	2016 Cost/Emp	3 Year Average
				(a)+(b)+(c)/3
Customer Services Employee Expenses	\$2,638	\$2,560	\$2,571	\$2,600

(e)	(f)
Network Management Headcount	Total Cost
	(d)*(e)
20	<b>\$52,000</b>

**Reference 2a**

DCU Maintenance Permits - Warranty

(a)	(b)	(c)	(d)
Historical Incidents	DCUs Requiring a Permit (15%)	Cost of Permit	Total Cost
	(a)*15%		(b)*(c)
1100	165	\$265	<b>\$43,725</b>

**Reference 2b**

DCU Maintenance Permits - Non-Warranty

(a)	(b)	(c)	(d)
Historical Incidents	DCUs Requiring a Permit (15%)	Cost of Permit	Total Cost
	(a)*15%		(b)*(c)
200	30	\$1,065	<b>\$31,950</b>

**Reference 2c**

Misc. Materials for DCUs

The <b>\$50,000</b> includes the cost of solar panels, nuts, bolts, cables, antennas that need to be replaced due to follow up repairs or minor incidents
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**Reference 2d**

BSL & Other Attachment Fees

(a)	(b)	(c)	(d)
DCU Sites Identified	BSL Sites (14%)	Annual Site Location Fee + Annual City Fee	BSL Cost
	(a)*13.89%		(b)*(c)
4600	639	\$385	\$246,015

(e)	(f)	(g)	(h)
DCU Sites Identified	Attachment Sites (18%)	Annual City Fee	Other Attachments Cost
	(e)*18.07%		(b)*(c)
4600	831	\$39	\$32,409

(i)
Total Cost
(d)+(h)
<b>\$278,424</b>

**Reference 2e**

Bucket Truck Rentals

(a)	(b)	(c)
Amount of Bucket Trucks Required	Rental Cost of Bucket Trucks	Total Cost
		(a)*(b)
2	\$85,800	<b>\$171,600</b>

**Reference 2f**

DCU Follow-up Repairs

(a)	(b)	(c)
Amount of Follow-up Repairs	Contractor Cost of Follow-up Repairs	Total Cost
		(a)*(b)
25	\$2,000	<b>\$50,000</b>

**Reference 2g**

Easement Renewals

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(a)	(b)	(c)
Amount of Easement Renewals/year	Cost of Easement Renewal	Total Cost
		(a)*(b)
5	\$4,000	<b>\$20,000</b>

Reference 2h

Forklift Rental

(a)	(b)	(c)
Amount of Forklifts Required	Rental Cost of Forklift	Total Cost
		(a)*(b)
1	\$30,000	<b>\$30,000</b>

Reference 2i

Battery Replacements

(a)	(b)	(c)
Equipment Costs	Contractor Costs	Total Cost
		(b)+(c)
\$318,633	\$269,816	<b>\$588,449</b>

Reference 2j

Battery Replacement Permits

(a)	(b)	(c)	(d)
DCU Battery Replacements	DCUs Requiring a Permit (15%)	Cost of Permit	Total Cost
	(a)*15%		(b)*(c)
807	121	\$265	<b>\$32,065</b>

Reference 2k

New Business DCU Permits

(a)	(b)	(c)	(d)
New Business DCUs	Outdoor DCUs Requiring Permit (38%)	Cost of Permit	Yearly cost
	(a)*38%		(b)*(c)
41	16	\$3,105	<b>\$49,680</b>

Reference 2l

Field Operations Team Equipment Costs

The <b>\$5,000</b> includes the cost of cabling, safety and test equipment used by Field Operations team.
---

Reference 2m

Pole Relocations

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(a)	(b)	(c)
Pole Relocations per Year	Contractor Costs	Total Cost
		(a)*(b)
15	\$6,513	<b>\$97,695</b>

**Reference 2n**

DCU Pole Relocation Permits

(a)	(b)	(d)
Pole Relocations	Cost of Permit	Yearly cost
		(b)*(c)
15	\$3,105	<b>\$46,575</b>

**Reference 2o**

Employee Support Expenses

	(a)	(b)	(c)	(d)
	2014 Cost/Emp	2015 Cost/Emp	2016 Cost/Emp	3 Year Average
				(a)+(b)+(c)/3
Customer Services Employee Expenses	\$2,638	\$2,560	\$2,571	\$2,600

(e)	(f)
Network Maintenance & Construction Headcount	Total Cost
(d)*(e)	
12	<b>\$31,200</b>

**Reference 3a**

Professional Services

	(a)	(b)	(c)
	Consult Hours	Cost per Hour	Total Cost
			(a)*(b)
Rate 1	1000	\$100	\$100,000
Rate 2	500	\$200	\$100,000
			(d)
			<b>\$200,000</b>

**Reference 3b**

Siterra License

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(a)	(b)	(c)
Yearly cost	Divided by 3	Total Cost
		(a)/(b)
\$400,000	3	<b>\$133,333</b>

**Reference 3c**

NEMO License

The <b>\$186,000</b> is the yearly license fee to maintain software.
--

**Reference 3d**

Employee Support Expenses

	(a)	(b)	(c)	(d)
	2014	2015	2016	3 Year Average
	Cost/Emp	Cost/Emp	Cost/Emp	(a)+(b)+(c)/3
Customer Services Employee Expenses	\$2,638	\$2,560	\$2,571	\$2,600

(e)	(f)
Network Maintenance & Construction Headcount	Total Cost
	(d)*(e)
14	<b>\$36,400</b>

**Reference 4a**

Headend Software Maintenance Fees

(a)	(b)	(c)
Yearly Maint. Cost	8% Escalation Cost	Total Cost
	(a)*8%	(a)+(b)
\$450,000	\$36,000	<b>\$486,000</b>

**Reference 4b**

MDMS Software Maintenance Fees

(a)	(b)	(c)
Yearly Maint. Cost	8% Escalation Cost	Total Cost
	(a)*8%	(a)+(b)
\$159,000	\$12,720	<b>\$171,720</b>

**Reference 4c**

Professional Services



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(a)	(b)	(c)	(d)	(e)
Consult Hours	Cost per Hour	Consul Cost	8% Escalation Cost	Total Cost
		(a)*(b)	(c)*8%	(c)+(d)
680	\$100.00	\$68,000	\$5,440	<b>\$73,440</b>

**Reference 4d**

Employee Support Expenses

	(a)	(b)	(c)	(d)
	2014	2015	2016	3 Year Average
	Cost/Emp	Cost/Emp	Cost/Emp	(a)+(b)+(c)/3
Customer Services Employee Expenses	\$2,638	\$2,560	\$2,571	\$2,600

(e)	(f)
Systems Operations Headcount	Total Cost
	(d)*(e)
15	<b>\$39,000</b>

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Area: ADVANCED METERING  
Witness: Rene F. Garcia

**Appendix A: List of Non-Shared Cost Centers**

<b>Cost Center</b>	<b>Sub</b>	<b>Description</b>
2200-2347	000	SCG ADVANCED METER - INFORMATION TECHLGY
2200-2348	000	SCG ADV MTR-BUSINESS SYSTEMS & ANALYTICS
2200-2356	000	SCG ADVANCED METER - NW FIELD CONSTRUCTN
2200-2382	000	SCG ADVANCED METER SYS ARCH SECTY & DESG
2200-2410	000	SCG ADVANCED METER - NW SITE ACQUISITION
2200-2421	000	SCG ADVANCED METER SYS OPS SYSTEMS
2200-2482	000	SCG ADVANCED METER - NETWORK MANAGEMENT