

Application of SAN DIEGO GAS & ELECTRIC)
COMPANY for authority to update its gas and)
electric revenue requirement and base rates)
effective January 1, 2024 (U 902-M))

Application No. 22-05-016

Exhibit No.: (SDG&E-13-CWP-R)

REVISED CAPITAL WORKPAPERS TO
PREPARED DIRECT TESTIMONY
OF JONATHAN WOLDEMARIAM
ON BEHALF OF SAN DIEGO GAS & ELECTRIC COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

AUGUST 2022



2024 General Rate Case - REVISED
INDEX OF WORKPAPERS

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MANAGEMENT**

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Overall Summary For Exhibit No. SDG&E-13-CWP-R

Area:	WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness:	Jonathan Woldemariam

In 2021 \$ (000)			
Adjusted-Forecast			
	2022	2023	2024
A. Risk Assessment and Mapping	2,200	2,420	2,662
B. Situational Awareness and Forecasting	7,803	800	1,864
C. Grid Design and System Hardening	452,533	649,871	690,987
D. Asset Management and Inspections	45,152	66,130	17,423
E. Grid Operations and Protocols	14,749	9,185	8,100
F. Data Governance	24,255	17,566	11,685
G. Emergency Planning and Preparedness	7,302	23,914	2,496
H. Stakeholder Cooperation and Community Engagement	6,874	3,361	3,131
Total	560,868	773,247	738,348

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Category: A. Risk Assessment and Mapping
Workpaper: 192480

Summary for Category: A. Risk Assessment and Mapping

	In 2021\$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2021	2022	2023	2024
Labor	0	0	0	0
Non-Labor	1,446	2,200	2,420	2,662
NSE	0	0	0	0
Total	1,446	2,200	2,420	2,662
FTE	0.0	0.0	0.0	0.0

192480 Fire Science Enhancement (WRRM-OPS)

Labor	0	0	0	0
Non-Labor	1,446	2,200	2,420	2,662
NSE	0	0	0	0
Total	1,446	2,200	2,420	2,662
FTE	0.0	0.0	0.0	0.0

Note: Totals may include rounding differences.

Beginning of Workpaper Group
192480 - Fire Science Enhancement (WRRM-OPS)

San Diego Gas & Electric Company
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Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19248.0
Category: A. Risk Assessment and Mapping
Category-Sub: 1. Fire Science Enhancement
Workpaper Group: 192480 - Fire Science Enhancement (WRRM-OPS)

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	0	0	0	0	0	0
Non-Labor	Zero-Based	0	0	345	1,448	1,446	2,200	2,420	2,662
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	345	1,448	1,446	2,200	2,420	2,662
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Business Purpose:

The purpose of this project is to develop new fire science technologies to increase the effectiveness of existing tools such as the Fire Potential Index (FPI) The modernization of existing tools is critical to daily operations and enhances efficiencies and increases reliability by reducing the number of required patrols following outages . This project, also called FireSafe 3.0, embodies a massive collaboration between SDG&E, academia, and private industry enabling efficient management and significant cutting-edge output from terabytes of data.

Physical Description:

New tools and technologies will be developed to enhance current technologies such as the FPI and create the next generation of fire weather tools.

Project Justification:

Modernization of existing software through collaborative research and development with industry and academia will ensure leading edge science to assess the risk and the impacts of wildfire. This will allow for safer daily utility operations and best practices.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19248.0
Category: A. Risk Assessment and Mapping
Category-Sub: 1. Fire Science Enhancement
Workpaper Group: 192480 - Fire Science Enhancement (WRRM-OPS)

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19248.0
Category: A. Risk Assessment and Mapping
Category-Sub: 1. Fire Science Enhancement
Workpaper Group: 192480 - Fire Science Enhancement (WRRM-OPS)

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	0	0	0	0	0	0	0	0	0
Non-Labor	Zero-Based	2,200	2,420	2,662	0	0	0	2,200	2,420	2,662
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		2,200	2,420	2,662	0	0	0	2,200	2,420	2,662
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
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Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19248.0
Category: A. Risk Assessment and Mapping
Category-Sub: 1. Fire Science Enhancement
Workpaper Group: 192480 - Fire Science Enhancement (WRRM-OPS)

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	0	0	0
Non-Labor	0	0	270	1,191	1,446
NSE	0	0	0	0	0
Total	0	0	270	1,191	1,446
FTE	0.0	0.0	0.0	0.0	0.0
Adjustments (Nominal \$) **					
Labor	0	0	0	0	0
Non-Labor	0	0	44	194	0
NSE	0	0	0	0	0
Total	0	0	44	194	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Nominal \$)					
Labor	0	0	0	0	0
Non-Labor	0	0	315	1,385	1,446
NSE	0	0	0	0	0
Total	0	0	315	1,385	1,446
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 2021\$					
Labor	0	0	0	0	0
Non-Labor	0	0	31	63	0
NSE	0	0	0	0	0
Total	0	0	31	63	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	0	0	0
Non-Labor	0	0	345	1,448	1,446
NSE	0	0	0	0	0
Total	0	0	345	1,448	1,446
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.

San Diego Gas & Electric Company
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Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19248.0
Category: A. Risk Assessment and Mapping
Category-Sub: 1. Fire Science Enhancement
Workpaper Group: 192480 - Fire Science Enhancement (WRRM-OPS)

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
Labor	0	0	0	0	0
Non-Labor	0	0	44	194	0
NSE	0	0	0	0	0
Total	0	0	44	194	0
FTE	0.0	0.0	0.0	0.0	0.0

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017 Total	0	0	0	0	0.0
2018 Total	0	0	0	0	0.0
2019	0	44	0	44	0.0
Explanation:	Adjustment to add back common FERC account, FERC-jurisdiction costs for RO model carve-out				
2019 Total	0	44	0	44	0.0
2020	0	194	0	194	0.0
Explanation:	Adjustment to add back common FERC account, FERC-jurisdiction costs for RO model carve-out				
2020 Total	0	194	0	194	0.0
2021 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 192480**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19248.0
 Category: A. Risk Assessment and Mapping
 Category-Sub: 1. Fire Science Enhancement
 Workpaper Group: 192480 - Fire Science Enhancement (WRRM-OPS)
 Workpaper Detail: 192480.001 - RAMP Fire Science Enhancements
 In-Service Date: Not Applicable
 Description:

SDG&E is investing in the development of new fire science technologies to increase the effectiveness of existing tools such as the Fire Potential Index. Modernize existing tools is critical to daily operations and it greatly enhance efficiencies and increases reliability by reducing the number of required patrols following outages .

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		0	0	0
Non-Labor		2,200	2,420	2,662
NSE		0	0	0
Total		2,200	2,420	2,662
FTE		0.0	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19248.0
Category: A. Risk Assessment and Mapping
Category-Sub: 1. Fire Science Enhancement
Workpaper Group: 192480 - Fire Science Enhancement (WRRM-OPS)
Workpaper Detail: 192480.001 - RAMP Fire Science Enhancements

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C01

RAMP Line Item Name: WRRM - OPS

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	1,446	2,200	2,420	2,662	7,282	6,456	7,890

Cost Estimate Changes from RAMP:

GRC forecast is within the RAMP range.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

Supplemental Workpapers for Workpaper Group 192480

TY2024 GRC FORECAST - DETAILS

Budget Code:

19248 Fire Science Enhancements

Estimated In Service Date:

Ongoing (If this is an ongoing blanket or program, please input "ongoing")

19248 -						2022		2023		2024				Comments
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Metric (ea./ft./mile)	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total Cost	
1	San Jose State Univ	Non-Labor	RAMP	Products Developed	1	\$300,000	\$ 300,000	2	\$330,000	\$ 660,000	2	\$363,000	\$ 726,000	Live Fuel Moisture Model
2	San Diego Super Computing Center	Non-Labor	RAMP	Products Developed	5	\$100,000	\$ 500,000	2	\$110,000	\$ 220,000	2	\$121,000	\$ 242,000	Archiving and accessibility of all SDG&E super computer output and post processed indices
3	Technosylva	Non-Labor	RAMP	Products Developed	1	\$800,000	\$ 800,000	1	\$880,000	\$ 880,000	1	\$968,000	\$ 968,000	Enhance fire behavior modeling and Wildfire Risk modeling Phase 1: 2022 Annual Subscriptions Phase 2: 2022 Data Analytics and Software Enhancements Phase 3: WINGS-WINGS OPS Integration
4	Scripps Institute of Oceanography	Non-Labor	RAMP	Products Developed	1	\$600,000	\$ 600,000	1	\$660,000	\$ 660,000	1	\$726,000	\$ 726,000	Take their output and apply to our service territory. Downscale High resolution weather model out to a regional level (service territory)
5							\$ -		\$ -			\$ -	\$ -	
6							\$ -		\$ -			\$ -	\$ -	
7							\$ -		\$ -			\$ -	\$ -	
8							\$ -		\$ -			\$ -	\$ -	
9							\$ -		\$ -			\$ -	\$ -	
10							\$ -		\$ -			\$ -	\$ -	
11							\$ -		\$ -			\$ -	\$ -	
12							\$ -		\$ -			\$ -	\$ -	
13							\$ -		\$ -			\$ -	\$ -	
14							\$ -		\$ -			\$ -	\$ -	
15							\$ -		\$ -			\$ -	\$ -	

*Costs should be reported in direct costs only (no overheads)

Summary														
		Labor	RAMP			\$ -		\$ -		\$ -		\$ -		
		Non-Labor	RAMP			\$ 2,200,000		\$ 2,420,000		\$ 2,662,000		\$ 7,282,000		
	Subtotal RAMP					\$ 2,200,000		\$ 2,420,000		\$ 2,662,000		\$ 7,282,000		
		Labor	Non-RAMP			\$ -		\$ -		\$ -		\$ -		
		Non-Labor	Non-RAMP			\$ -		\$ -		\$ -		\$ -		
	Subtotal Non-RAMP					\$ -		\$ -		\$ -		\$ -		
	Total Project Forecast					\$ 2,200,000		\$ 2,420,000		\$ 2,662,000		\$ 7,282,000		

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Category: B. Situational Awareness and Forecasting
Workpaper: VARIOUS

Summary for Category: B. Situational Awareness and Forecasting

	In 2021\$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2021	2022	2023	2024
Labor	98	697	520	626
Non-Labor	1,454	7,106	280	1,238
NSE	0	0	0	0
Total	1,552	7,803	800	1,864
FTE	0.7	5.4	3.8	4.9

192470 Advanced Weather Station Integration and Forecast

Labor	14	210	100	100
Non-Labor	378	707	280	280
NSE	0	0	0	0
Total	392	917	380	380
FTE	0.0	1.8	0.8	0.8

112530 Wireless Fault Indicators

Labor	30	67	0	106
Non-Labor	1,076	599	0	958
NSE	0	0	0	0
Total	1,106	666	0	1,064
FTE	0.2	0.6	0.0	1.1

208770 WMP CIRCUIT RISK INDEX

Labor	54	420	420	420
Non-Labor	0	0	0	0
NSE	0	0	0	0
Total	54	420	420	420
FTE	0.5	3.0	3.0	3.0

202400 Meteorology Super Computer Replacements

Labor	0	0	0	0
Non-Labor	0	5,800	0	0
NSE	0	0	0	0
Total	0	5,800	0	0
FTE	0.0	0.0	0.0	0.0

Note: Totals may include rounding differences.

Beginning of Workpaper Group
192470 - Advanced Weather Station Integration and Forecast

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19247.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 1. Advanced Weather Station Integration
Workpaper Group: 192470 - Advanced Weather Station Integration and Forecast

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	87	259	14	210	100	100
Non-Labor	Zero-Based	0	0	605	906	378	707	280	280
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	692	1,165	392	917	380	380
FTE	Zero-Based	0.0	0.0	0.5	1.9	0.0	1.8	0.8	0.8

Business Purpose:

The SDG&E Weather Station Network was originally developed and deployed in 2009 and weather stations are reaching end of life. The purpose of this project is to strategically enhance the Weather Network ensuring continuing operations of critical fire weather infrastructure. This project will continuously enhance the Weather Network to ensure a reliable flow of operationally critical fire weather information. This information will be fed into fire weather tools such as the Fire Potential Index (FPI) and the Santa Anna Wildfire Threat Index (SAWTI). This data is used for decision-making during emergency situations to mitigate fire and weather-related risks.

Physical Description:

The Weather Network will be upgraded by installing new weather stations capable of more frequent weather reads . Additionally, multi-spectral cameras, fuel moisture sensors, and additional capabilities will be integrated to help predict and monitor weather during extreme weather events.

Project Justification:

Recent years have been unprecedented with many large, destructive wildfires impacting California. With the year-round threat of wildfires, having a robust Weather Station Network is essential to help understand and mitigate the risk . This project is essential to ensure SDG&E maintains focus on weather-related innovation and technology.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19247.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 1. Advanced Weather Station Integration
Workpaper Group: 192470 - Advanced Weather Station Integration and Forecast

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
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Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19247.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 1. Advanced Weather Station Integration
Workpaper Group: 192470 - Advanced Weather Station Integration and Forecast

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	210	100	100	0	0	0	210	100	100
Non-Labor	Zero-Based	707	280	280	0	0	0	707	280	280
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		917	380	380	0	0	0	917	380	380
FTE	Zero-Based	1.8	0.8	0.8	0.0	0.0	0.0	1.8	0.8	0.8

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19247.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 1. Advanced Weather Station Integration
Workpaper Group: 192470 - Advanced Weather Station Integration and Forecast

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	69	217	12
Non-Labor	0	0	465	784	378
NSE	0	0	0	0	0
Total	0	0	534	1,001	390
FTE	0.0	0.0	0.4	0.4	0.0
Adjustments (Nominal \$) **					
Labor	0	0	0	0	0
Non-Labor	0	0	87	83	0
NSE	0	0	0	0	0
Total	0	0	87	83	0
FTE	0.0	0.0	0.0	1.2	0.0
Recorded-Adjusted (Nominal \$)					
Labor	0	0	69	217	12
Non-Labor	0	0	552	867	378
NSE	0	0	0	0	0
Total	0	0	621	1,084	390
FTE	0.0	0.0	0.4	1.6	0.0
Vacation & Sick (Nominal \$)					
Labor	0	0	10	31	2
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	10	31	2
FTE	0.0	0.0	0.1	0.3	0.0
Escalation to 2021\$					
Labor	0	0	8	11	0
Non-Labor	0	0	54	40	0
NSE	0	0	0	0	0
Total	0	0	61	51	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	87	259	14
Non-Labor	0	0	605	906	378
NSE	0	0	0	0	0
Total	0	0	692	1,165	392
FTE	0.0	0.0	0.5	1.9	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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19247.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 1. Advanced Weather Station Integration
Workpaper Group: 192470 - Advanced Weather Station Integration and Forecast

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
Labor	0	0	0	0	0
Non-Labor	0	0	87	83	0
NSE	0	0	0	0	0
Total	0	0	87	83	0
FTE	0.0	0.0	0.0	1.2	0.0

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017 Total	0	0	0	0	0.0
2018 Total	0	0	0	0	0.0
2019	0	87	0	87	0.0
Explanation:	Adjustment to add back common FERC account, FERC-jurisdiction costs for RO model carve-out				
2019 Total	0	87	0	87	0.0
2020	0.001	0	0	0.001	1.2
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2020	0	83	0	83	0.0
Explanation:	Adjustment to add back common FERC account, FERC-jurisdiction costs for RO model carve-out				
2020 Total	0.001	83	0	83	1.2
2021 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 192470**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19247.0
 Category: B. Situational Awareness and Forecasting
 Category-Sub: 1. Advanced Weather Station Integration
 Workpaper Group: 192470 - Advanced Weather Station Integration and Forecast
 Workpaper Detail: 192470.001 - RAMP Advanced Station Integration and Forecast
 In-Service Date: Not Applicable
 Description:

The SDG&E weather network was originally developed and deployed in 2009 and is reaching end of life. The purpose of this project will be to strategically enhance the weather network ensuring continuing operations of critical fire weather infrastructure. With the year-round threat of wildfires, having a robust wildfire mitigation SDG&E weather network is essential to mitigate the risk. Additionally, SDG&E Meteorology is integrating multi-spectral cameras, fuel moisture sensors and additional capabilities to help predict and monitor during extreme weather events.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	100	100	100
Non-Labor	280	280	280
NSE	0	0	0
Total	380	380	380
FTE	0.8	0.8	0.8

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19247.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 1. Advanced Weather Station Integration
Workpaper Group: 192470 - Advanced Weather Station Integration and Forecast
Workpaper Detail: 192470.001 - RAMP Advanced Station Integration and Forecast

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C02

RAMP Line Item Name: Advanced Weather Station Integration

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	392	917	380	380	1,677	1,625	1,986

Cost Estimate Changes from RAMP:

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 # of weather sensors	0.00	20.00	20.00	20.00	60.00	135.00	165.00

Work Unit Changes from RAMP:

After RAMP a forecast reduction in the number of weather station rebuilds per year was identified.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19247.0
 Category: B. Situational Awareness and Forecasting
 Category-Sub: 1. Advanced Weather Station Integration
 Workpaper Group: 192470 - Advanced Weather Station Integration and Forecast
 Workpaper Detail: 192470.002 - RAMP Advanced Station Integration and Forecast (Same RAMP as 192470.001)
 In-Service Date: 12/31/2022
 Description:

The SDG&E weather network was originally developed and deployed in 2009 and is reaching end of life. The purpose of this project will be to strategically enhance the weather network ensuring continuing operations of critical fire weather infrastructure.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	110	0	0
Non-Labor	427	0	0
NSE	0	0	0
Total	537	0	0
FTE	1.0	0.0	0.0

Note: Totals may include rounding differences.

Supplemental Workpapers for Workpaper Group 192470

San Diego Gas & Electric Company

2024 GRC - REVISED

Capital Workpapers

TY2024 GRC FORECAST - DETAILS

Budget Code:	19247	Meteorology - SDGE Weather Network

19247 -															
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Metric	# of units	2022 Cost per unit*	Total cost	# of units	2023 Cost per unit*	Total cost	# of units	2024 Cost per unit*	Total cost	Total Cost	Comments
1	Air Quality Index Sensors	Non-Labor	RAMP	Sensors	6	\$9,000	\$ 54,000	6	\$9,000	\$ 54,000	6	\$9,000	\$ 54,000	\$ 162,000	Air quality index sensor purchase
2	Fuel Sensors	Non-Labor	RAMP	Sensors	4	\$9,500	\$ 38,000	4	\$9,500	\$ 38,000	4	\$9,500	\$ 38,000	\$ 114,000	Fuel sensor purchase
3	Kearny	Labor	RAMP	Hours	1,725	\$58	\$ 100,050	1,725	\$58	\$ 100,050	1,725	\$58	\$ 100,050	\$ 300,150	Labor for installation and commination connection
4	Upgrading Stations (Replacement of sensors)	Non-Labor	RAMP	Sensors	10	\$7,000	\$ 70,000	10	\$7,000	\$ 70,000	10	\$7,000	\$ 70,000	\$ 210,000	Sensor replacements
5	Visualization / Communication Tools	Non-Labor	RAMP	ea	1	\$118,000	\$ 118,000	1	\$118,000	\$ 118,000	1	\$118,000	\$ 118,000	\$ 354,000	Visualization of data and data communication
6	IT Labor	Labor	RAMP	FTE	1	\$ 110,000	\$ 110,000			\$ -			\$ -	\$ 110,000	IT Labor to connect particulate sensor data
7	Contracted Services (IT support)	Non-Labor	RAMP	ea	1	\$ 427,170	\$ 427,170			\$ -			\$ -	\$ 427,170	Contractor IT labor to connect particulate sensor data
8							\$ -			\$ -			\$ -	\$ -	
9							\$ -			\$ -			\$ -	\$ -	
10							\$ -			\$ -			\$ -	\$ -	
11							\$ -			\$ -			\$ -	\$ -	
12							\$ -			\$ -			\$ -	\$ -	
13							\$ -			\$ -			\$ -	\$ -	
14							\$ -			\$ -			\$ -	\$ -	
15							\$ -			\$ -			\$ -	\$ -	

Summary														
	Labor	RAMP				\$ 210,050			\$ 100,050			\$ 100,050	\$ 410,150	
	Non-Labor	RAMP				\$ 707,170			\$ 280,000			\$ 280,000	\$ 1,267,170	
Subtotal RAMP						\$ 917,220			\$ 380,050			\$ 380,050	\$ 1,677,320	
	Labor	Non-RAMP				\$ -			\$ -			\$ -	\$ -	
	Non-Labor	Non-RAMP				\$ -			\$ -			\$ -	\$ -	
Subtotal Non-RAMP						\$ -			\$ -			\$ -	\$ -	
Total Project Forecast						\$ 917,220			\$ 380,050			\$ 380,050	\$ 1,677,320	

Beginning of Workpaper Group
112530 - Wireless Fault Indicators

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 11253.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 2. Wireless Fault Indicators
Workpaper Group: 112530 - Wireless Fault Indicators

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	25	17	30	67	0	106
Non-Labor	Zero-Based	1,135	500	851	859	1,076	599	0	958
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		1,135	500	877	876	1,106	666	0	1,064
FTE	Zero-Based	0.1	0.0	0.1	0.1	0.2	0.6	0.0	1.1

Business Purpose:

The purpose of this program is to install Wireless Fault Indicators (WFIs) which will be used to monitor overhead and underground lines and locate faults more efficiently and accurately. WFIs, typically mounted on conductors or in underground vaults, cause a state change on a mechanical target flag, LED, or remote indication device that indicates a fault on the system. When coupled with the On-Ramp Wireless system, the WFI will communicate information to distribution system operators. This allows the operators to dispatch electric troubleshooters closer to the exact fault location to more quickly identify and isolate the fault and begin service restorations. This program helps to improve reliability and find faults on the system more quickly, minimizing the consequence of a fire should it occur. Deploying new network devices throughout the HFTD will strengthen and modernize Low Power Communication Network (LPCN) coverage and reliability.

Physical Description:

Wireless fault circuit indicators (FCI's) are used to monitor overhead and underground lines and locate faults more efficiently and accurately due to more rapid pinpointing of line faults. FCIs, typically mounted on conductors or in underground vaults, cause a state change on a mechanical target flag, LED, or remote indication device that indicates a fault in the system. When coupled with the On-Ramp Wireless system, the wireless FCI will communicate information to distribution system operators. This allows the operators to dispatch electric troubleshooters closer to the exact fault location to more quickly identify and isolate the fault and begin service restorations.

Project Justification:

WFI's will be used to monitor distribution lines and locate faults more efficiently and accurately using Low Power Communication Network (LPCN) communication to alert distribution system operators. These WFI's can detect faults without having a minimum continuous current on the line, allowing the installation at remote locations that have very little load. This allows operators to dispatch electric troubleshooters closer to the exact fault location to more quickly identify and isolate the fault, begin service restoration, and mitigate the impacts of ignitions resulting from faults.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 11253.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 2. Wireless Fault Indicators
Workpaper Group: 112530 - Wireless Fault Indicators

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 11253.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 2. Wireless Fault Indicators
Workpaper Group: 112530 - Wireless Fault Indicators

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	67	0	106	0	0	0	67	0	106
Non-Labor	Zero-Based	599	0	958	0	0	0	599	0	958
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		666	0	1,064	0	0	0	666	0	1,064
FTE	Zero-Based	0.6	0.0	1.1	0.0	0.0	0.0	0.6	0.0	1.1

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 11253.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 2. Wireless Fault Indicators
Workpaper Group: 112530 - Wireless Fault Indicators

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	20	14	26
Non-Labor	874	439	776	822	1,076
NSE	0	0	0	0	0
Total	874	439	797	836	1,102
FTE	0.0	0.0	0.1	0.1	0.1
Adjustments (Nominal \$) **					
Labor	0	0	0	0	0
Non-Labor	74	0	0	0	0
NSE	0	0	0	0	0
Total	74	0	0	0	0
FTE	0.1	0.0	0.0	0.0	0.1
Recorded-Adjusted (Nominal \$)					
Labor	0	0	20	14	26
Non-Labor	949	439	776	822	1,076
NSE	0	0	0	0	0
Total	949	439	797	836	1,102
FTE	0.1	0.0	0.1	0.1	0.2
Vacation & Sick (Nominal \$)					
Labor	0	0	3	2	4
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	3	2	4
FTE	0.0	0.0	0.0	0.0	0.0
Escalation to 2021\$					
Labor	0	0	2	1	0
Non-Labor	186	62	75	38	0
NSE	0	0	0	0	0
Total	186	62	78	38	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	25	17	30
Non-Labor	1,135	500	851	859	1,076
NSE	0	0	0	0	0
Total	1,135	500	877	876	1,106
FTE	0.1	0.0	0.1	0.1	0.2

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 11253.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 2. Wireless Fault Indicators
Workpaper Group: 112530 - Wireless Fault Indicators

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
Labor	0	0	0	0	0
Non-Labor	74	0	0	0	0
NSE	0	0	0	0	0
Total	74	0	0	0	0
FTE	0.1	0.0	0.0	0.0	0.1

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017	0.033	74	0	74	0.1
Explanation:	One sided adjustment to add back missing CPD orders from 2017 electric capital.				
2017 Total	0.033	74	0	74	0.1
2018 Total	0	0	0	0	0.0
2019 Total	0	0	0	0	0.0
2020 Total	0	0	0	0	0.0
2021	0.001	0	0	0.001	0.1
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2021 Total	0.001	0	0	0.001	0.1

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 112530**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 11253.0
 Category: B. Situational Awareness and Forecasting
 Category-Sub: 2. Wireless Fault Indicators
 Workpaper Group: 112530 - Wireless Fault Indicators
 Workpaper Detail: 112530.001 - RAMP - Wireless Fault Indicators
 In-Service Date: Not Applicable
 Description:

This program mitigates the risk of wildfire by providing awareness to where faults occurred so that remote cameras can be directed to see if an ignition took place. This program aims to mitigate the consequence of a fire should it occur. SDG&E will deploy new network devices throughout the HFTD to strengthen and modernize Low Power Communication Network (LPCN) coverage and reliability, and install SEL wireless fault indicator devices in strategic locations throughout HFTD Tier 3 and Tier 2.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	67	0	106
Non-Labor	599	0	958
NSE	0	0	0
Total	666	0	1,064
FTE	0.6	0.0	1.1

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 11253.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 2. Wireless Fault Indicators
Workpaper Group: 112530 - Wireless Fault Indicators
Workpaper Detail: 112530.001 - RAMP - Wireless Fault Indicators

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C03 T1 - T3

RAMP Line Item Name: Wireless Fault Indicators

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2; Tranche3: Non-HFTD

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	1,106	333	0	532	865	0	0
Tranche 2 Cost Estimate	0	333	0	532	865	0	0
Tranche 3 Cost Estimate	0	0	0	0	0	590	722

Cost Estimate Changes from RAMP:

The GRC forecast is outside the RAMP range due to forecast and scope updates.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 # wireless fault indicators installed	0.00	250.00	0.00	400.00	650.00	0.00	0.00
Tranche 2 # wireless fault indicators installed	0.00	250.00	0.00	400.00	650.00	0.00	0.00
Tranche 3 # wireless fault indicators installed	0.00	0.00	0.00	0.00	0.00	450.00	550.00

Work Unit Changes from RAMP:

The GRC unit forecast is outside the RAMP range due to forecast and scope updates.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	270.000	1,516.000

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 11253.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 2. Wireless Fault Indicators
Workpaper Group: 112530 - Wireless Fault Indicators
Workpaper Detail: 112530.001 - RAMP - Wireless Fault Indicators

Tranche 2	244.000	1,516.000
Tranche 3	0.000	0.000

RSE Changes from RAMP:

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2)

Supplemental Workpapers for Workpaper Group 112530

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Wireless Fault Indicators

Budget Code **11253**
Budget Code Name **Wireless Fault Indicators (OH/UG)**

GRC Request		2022	2023	2024
Labor		\$ 66,512	\$ -	\$ 106,420
Non-Labor		\$ 598,500	\$ -	\$ 957,600
Cost Breakdown		2022	2023	2024
Unit Cost				
Labor	Hourly Rate	\$ 64	\$ -	\$ 64
Service +Wireless Fault Indicators	Dollars	\$ 1,197	\$ -	\$ 1,197
Units		2022	2023	2024
Labor	Hours	1,039	-	1,663
Service + Wireless Fault Indicators	Ea	500	-	800
Total		2022	2023	2024
Labor		\$ 66,512	\$ -	\$ 106,420
Service +Wireless Fault Indicators		\$ 598,500	\$ -	\$ 957,600
		<u>\$ 665,012</u>	<u>\$ -</u>	<u>\$ 1,064,020</u>

Additional Notes:

Production of the existing WFIs installed in the territory runs out in 2022. No new device has been selected, and it is anticipated that SDG&E will not have a new device vetted for installation until 2024. Therefore, there are no anticipated WFIs to be installed in 2023.

Labor cost per unit based on historical spend. Four FTEs accounts for a troubleman, field support service, network engineering, and vehicle utilization labor.

Costs vary per site. Average labor costs for WFI lump sum installation includes one contracted crew for approximately four hours. The installation also requires the use of company assets that may include assist trucks with lifts. WFI material cost varies per unit based on the job site and type of WFI.

Beginning of Workpaper Group
208770 - WMP CIRCUIT RISK INDEX

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20877.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 3. Circuit Risk Index
Workpaper Group: 208770 - WMP CIRCUIT RISK INDEX

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	4	-1	54	420	420	420
Non-Labor	Zero-Based	0	0	0	445	0	0	0	0
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	4	443	54	420	420	420
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.5	3.0	3.0	3.0

Business Purpose:

The purpose of this project is to develop new machine learning models to predict failures and ignitions for different asset types and drivers of ignitions. The models developed in this project will be used to inform both operational and long-term decision making.

Physical Description:

Several models will be developed for different asset types (poles, conductors, transformers, etc.) as well as other ignition drivers (vegetation, vehicle, balloon contact, etc.). These models will then be aggregated up to a single model such as WiNGS and/or WiNGS-Ops as an enhancement to those tools. In addition to model development, there will be an effort to run these models in the cloud to enable more dynamic updates to these models.

Project Justification:

SDG&E seeks continuous improvement related to its risk assessment processes and tools. These tools help prioritize wildfire mitigation efforts by providing additional data and analysis that can be easily replicated and update . This project was identified as a key area of improvement when benchmarking against the other IOUs. The development of these new models, and integration into a cloud environment will lead to better information being utilized within decision-making tools for grid hardening and PSPS.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20877.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 3. Circuit Risk Index
Workpaper Group: 208770 - WMP CIRCUIT RISK INDEX

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20877.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 3. Circuit Risk Index
Workpaper Group: 208770 - WMP CIRCUIT RISK INDEX

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	420	420	420	0	0	0	420	420	420
Non-Labor	Zero-Based	0	0	0	0	0	0	0	0	0
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		420	420	420	0	0	0	420	420	420
FTE	Zero-Based	3.0	3.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20877.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 3. Circuit Risk Index
Workpaper Group: 208770 - WMP CIRCUIT RISK INDEX

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	3	-1	47
Non-Labor	0	0	0	425	0
NSE	0	0	0	0	0
Total	0	0	3	424	47
FTE	0.0	0.0	0.0	0.0	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	0	0	3	-1	47
Non-Labor	0	0	0	425	0
NSE	0	0	0	0	0
Total	0	0	3	424	47
FTE	0.0	0.0	0.0	0.0	0.4
Vacation & Sick (Nominal \$)					
Labor	0	0	0	0	7
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	0	0	7
FTE	0.0	0.0	0.0	0.0	0.1
Escalation to 2021\$					
Labor	0	0	0	0	0
Non-Labor	0	0	0	19	0
NSE	0	0	0	0	0
Total	0	0	0	19	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	4	-1	54
Non-Labor	0	0	0	445	0
NSE	0	0	0	0	0
Total	0	0	4	443	54
FTE	0.0	0.0	0.0	0.0	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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20877.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 3. Circuit Risk Index
Workpaper Group: 208770 - WMP CIRCUIT RISK INDEX

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
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Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 208770**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20877.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 3. Circuit Risk Index
Workpaper Group: 208770 - WMP CIRCUIT RISK INDEX
Workpaper Detail: 208770.001 - RAMP - Circuit Risk Index

In-Service Date: Not Applicable
Description:

The purpose of the CRI project is to develop machine learning models to predict failures and ignitions for different assets and drivers of ignitions. The models developed in this project will be used to inform both operational and long-term decision making.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	420	420	420
Non-Labor	0	0	0
NSE	0	0	0
Total	420	420	420
FTE	3.0	3.0	3.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20877.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 3. Circuit Risk Index
Workpaper Group: 208770 - WMP CIRCUIT RISK INDEX
Workpaper Detail: 208770.001 - RAMP - Circuit Risk Index

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C04

RAMP Line Item Name: Fire Science and Climate Adaptation Department

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	0	420	420	420	1,260	272	333

Cost Estimate Changes from RAMP:

The GRC forecast is outside the RAMP range due to forecast and scope updates . An increase in the development of risk models has been identified after the RAMP filing.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

Supplemental Workpapers for Workpaper Group 208770

TY2024 GRC FORECAST - DETAILS

Budget Code: 20877

Estimated In Service Date: Ongoing (If this is an ongoing blanket or program, please input "ongoing")

20877 -					2022			2023			2024				
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Metric (ea./ft./mile)	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost	Total Cost	Comments
1	POI Model(s)	Labor	RAMP	FTE	3.0	\$ 140,000	\$ 420,000	3.0	\$ 140,000	\$ 420,000	3.0	\$ 140,000	\$ 420,000	\$ 1,260,000	Assuming development of 3 models every year Equivalent of 2 FTEs per year Estimate of FTEs based on AD2-3 positions (\$156K - \$126K) average of \$140K per FTE
2							\$ -			\$ -			\$ -	\$ -	
3							\$ -			\$ -			\$ -	\$ -	
4							\$ -			\$ -			\$ -	\$ -	
5							\$ -			\$ -			\$ -	\$ -	
6							\$ -			\$ -			\$ -	\$ -	
7							\$ -			\$ -			\$ -	\$ -	
8							\$ -			\$ -			\$ -	\$ -	
9							\$ -			\$ -			\$ -	\$ -	
10							\$ -			\$ -			\$ -	\$ -	
11							\$ -			\$ -			\$ -	\$ -	
12							\$ -			\$ -			\$ -	\$ -	
13							\$ -			\$ -			\$ -	\$ -	
14							\$ -			\$ -			\$ -	\$ -	
15							\$ -			\$ -			\$ -	\$ -	

*Costs should be reported in direct costs only (no overheads)

Summary		Labor	RAMP		\$ 420,000	\$ 420,000	\$ 420,000	\$ 1,260,000	
		Non-Labor	RAMP		\$ -	\$ -	\$ -	\$ -	
	Subtotal RAMP				\$ 420,000	\$ 420,000	\$ 420,000	\$ 1,260,000	
		Labor	Non-RAMP		\$ -	\$ -	\$ -	\$ -	
		Non-Labor	Non-RAMP		\$ -	\$ -	\$ -	\$ -	
	Subtotal Non-RAMP				\$ -	\$ -	\$ -	\$ -	
	Total Project Forecast				\$ 420,000	\$ 420,000	\$ 420,000	\$ 1,260,000	

Beginning of Workpaper Group
202400 - Meteorology Super Computer Replacements

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20240.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 4. Meteorology Super Computer Replacement
Workpaper Group: 202400 - Meteorology Super Computer Replacements

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	0	0	0	0	0	0
Non-Labor	Zero-Based	0	0	0	0	0	5,800	0	0
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	5,800	0	0
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Business Purpose:

SDG&E utilizes high performance supercomputing to run the Weather Research and Forecasting model specifically tailored to the unique weather and terrain characteristics of SDG&E's service territory. Additionally, the computing cluster is also involved in numerous big data analytics projects that generate terabytes of data required for operational Meteorology. Currently, SDG&E owns and operates 3 High Performance Computing Clusters (HPCC) that have reached the end of operational life and will require replacement with the latest cluster technology to accommodate an ever-increasing big data computational demand. The purpose of this project is to utilize the San Diego Supercomputing Center to ingest and store datasets for weather forecast, Fire Potential Index (FPI), and fuels to enable metadata-based querying for various stakeholders through web APIs and visual maps.

Physical Description:

This project will replace the three High Performance Computing Clusters that SDG&E owns and operates. The existing equipment has reached the end of operational life and will require replacement with the latest cluster technology to accommodate an ever-increasing big data computational demand.

Project Justification:

The HPCC system is critical for all data applications within Meteorology. Generating over 170 GB of numerical weather prediction data on a daily basis, HPCC output not only provides station-level weather forecasts for all 220 weather stations for 7 days in the future, but is also the foundational data for all post processed indices including the Santa Ana Wildfire Threat Index (SAWTI), the FPI, and the Outage Potential Index (OPI). To accommodate the increasing amount of weather data, these new computing clusters are required to replace the outdated existing units.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20240.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 4. Meteorology Super Computer Replacement
Workpaper Group: 202400 - Meteorology Super Computer Replacements

Forecast Methodology:

Labor - Zero-Based

Not applicable.

Non-Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20240.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 4. Meteorology Super Computer Replacement
Workpaper Group: 202400 - Meteorology Super Computer Replacements

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	0	0	0	0	0	0	0	0	0
Non-Labor	Zero-Based	0	0	0	5,800	0	0	5,800	0	0
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		0	0	0	5,800	0	0	5,800	0	0
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20240.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 4. Meteorology Super Computer Replacement
Workpaper Group: 202400 - Meteorology Super Computer Replacements

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (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
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	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
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 2021\$					
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 (Constant 2021\$)					
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

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20240.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 4. Meteorology Super Computer Replacement
Workpaper Group: 202400 - Meteorology Super Computer Replacements

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
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Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 202400**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 20240.0
 Category: B. Situational Awareness and Forecasting
 Category-Sub: 4. Meteorology Super Computer Replacement
 Workpaper Group: 202400 - Meteorology Super Computer Replacements
 Workpaper Detail: 202400.001 - RAMP - Meteorology Super Computer Replacement
 In-Service Date: 07/31/2022
 Description:

SDG&E utilizes high performance supercomputing to run the Weather Research and Forecasting model specifically tailored to the unique weather and terrain characteristics of the service territory. Additionally, the computing cluster is critical to numerous big data analytics projects that generate terabytes of data required for operational Meteorology. The San Diego Supercomputing Center will ingest and store these SDG&E datasets for weather forecast, fire potential index, and fuels to enable metadata-based querying for various stakeholders through web APIs and visual maps.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	0	0	0
Non-Labor	5,800	0	0
NSE	0	0	0
Total	5,800	0	0
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20240.0
Category: B. Situational Awareness and Forecasting
Category-Sub: 4. Meteorology Super Computer Replacement
Workpaper Group: 202400 - Meteorology Super Computer Replacements
Workpaper Detail: 202400.001 - RAMP - Meteorology Super Computer Replacement

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C05

RAMP Line Item Name: High Performance Computing Infrastructure

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	0	5,800	0	0	5,800	6,579	8,041

Cost Estimate Changes from RAMP:

GRC forecast is outside the RAMP range due to forecast updates

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

Supplemental Workpapers for Workpaper Group 202400

TY2024 GRC FORECAST - DETAILS

Budget Code: 20240 Meteorology Super Computer Replacements
Estimated In Service Date: 7/1/2022

20240 -					2022			2023			2024			Physical Asset - High Performance Computer - Hosted Externally.
1	High Performance Computer Cluster	Non-Labor	RAMP	ea	2	\$2,900,000	\$ 5,800,000							
2							\$ -						\$ -	
3							\$ -						\$ -	
4							\$ -						\$ -	
5							\$ -						\$ -	
6							\$ -						\$ -	
7							\$ -						\$ -	
8							\$ -						\$ -	
9							\$ -						\$ -	
10							\$ -						\$ -	
11							\$ -						\$ -	
12							\$ -						\$ -	
13							\$ -						\$ -	
14							\$ -						\$ -	
15							\$ -						\$ -	

*Costs should be reported in direct costs only (no overheads)

Summary																		
		Labor	RAMP				\$	-		\$	-		\$	-		\$	-	
		Non-Labor	RAMP				\$	5,800,000		\$	-		\$	-		\$	5,800,000	
	Subtotal RAMP						\$	5,800,000		\$	-		\$	-		\$	5,800,000	
		Labor	Non-RAMP				\$	-		\$	-		\$	-		\$	-	
		Non-Labor	Non-RAMP				\$	-		\$	-		\$	-		\$	-	
	Subtotal Non-RAMP						\$	-		\$	-		\$	-		\$	-	
	Total Project Forecast						\$	5,800,000		\$	-		\$	-		\$	5,800,000	

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Category: C. Grid Design and System Hardening
Workpaper: VARIOUS

Summary for Category: C. Grid Design and System Hardening

	In 2021\$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2021	2022	2023	2024
Labor	16,863	11,417	14,917	17,069
Non-Labor	295,347	441,116	634,954	673,918
NSE	0	0	0	0
Total	312,210	452,533	649,871	690,987
FTE	111.4	97.2	127.5	144.9

202580 HFTD SCADA CAPACITOR REPLACEMENT

Labor	238	250	253	253
Non-Labor	1,707	1,760	1,125	1,174
NSE	0	0	0	0
Total	1,945	2,010	1,378	1,427
FTE	1.5	1.8	1.9	1.9

141400 Overhead Transmission Fire Hardening (Distribution Underbuild)

Labor	107	140	101	202
Non-Labor	5,370	4,589	8,534	14,262
NSE	0	0	0	0
Total	5,477	4,729	8,635	14,464
FTE	0.7	1.2	0.9	1.7

192450 Public Safety Power Shutoff (PSPS) Engineering Enhancements

Labor	130	168	168	168
Non-Labor	1,773	1,399	1,399	1,399
NSE	0	0	0	0
Total	1,903	1,567	1,567	1,567
FTE	0.7	1.3	1.3	1.3

081650 CNF Fire Hardening

Labor	2,643	140	132	132
Non-Labor	9,854	1,859	1,543	1,074
NSE	0	0	0	0
Total	12,497	1,999	1,675	1,206
FTE	15.0	1.2	1.1	1.1

192460 Strategic Undergrounding

Labor	1,005	1,495	3,224	3,868
Non-Labor	68,533	187,859	350,978	407,633
NSE	0	0	0	0
Total	69,538	189,354	354,202	411,501
FTE	8.2	14.2	30.7	36.8

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Category: C. Grid Design and System Hardening
Workpaper: VARIOUS

In 2021\$ (000)				
Adjusted-Recorded		Adjusted-Forecast		
2021	2022	2023	2024	
222420 High Risk Pole Replacement Program HFTD				
Labor	0	0	450	1,764
Non-Labor	0	0	1,170	4,584
NSE	0	0	0	0
Total	0	0	1,620	6,348
FTE	0.0	0.0	3.4	13.2
202850 OH SYSTEM COVERED CONDUCTOR				
Labor	2,848	6,217	7,493	7,914
Non-Labor	35,883	118,426	143,379	151,705
NSE	0	0	0	0
Total	38,731	124,643	150,872	159,619
FTE	18.3	50.7	61.1	64.5
198730 WMP PRIVATE LTE				
Labor	792	0	0	0
Non-Labor	49,023	79,569	65,349	70,179
NSE	0	0	0	0
Total	49,815	79,569	65,349	70,179
FTE	6.0	0.0	0.0	0.0
191340 HFTD Transm. Fiber Optics				
Labor	117	117	117	117
Non-Labor	6,525	9,327	7,583	7,583
NSE	0	0	0	0
Total	6,642	9,444	7,700	7,700
FTE	1.2	1.2	1.2	1.2
202840 OH SYSTEM TRADITIONAL HARDENING				
Labor	6,300	795	296	296
Non-Labor	87,673	15,516	5,183	5,183
NSE	0	0	0	0
Total	93,973	16,311	5,479	5,479
FTE	41.8	6.5	2.4	2.4
192420 HFTD Expulsion Fuse Replacement				
Labor	573	70	0	0
Non-Labor	5,480	772	0	0
NSE	0	0	0	0
Total	6,053	842	0	0
FTE	3.6	0.5	0.0	0.0
152590 Advanced Protection				
Labor	1,219	1,217	1,217	1,217
Non-Labor	9,568	11,566	10,345	4,323
NSE	0	0	0	0
Total	10,787	12,783	11,562	5,540
FTE	8.6	12.0	12.0	12.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Category: C. Grid Design and System Hardening
Workpaper: VARIOUS

In 2021\$ (000)				
Adjusted-Recorded		Adjusted-Forecast		
	2021	2022	2023	2024
202820 Lightning Arrestor Replacement Program				
Labor	442	655	1,184	1,138
Non-Labor	1,353	3,558	2,419	2,419
NSE	0	0	0	0
Total	1,795	4,213	3,603	3,557
FTE	2.6	5.3	9.2	8.8
192490 WMP Microgrids				
Labor	449	153	282	0
Non-Labor	12,605	4,916	35,947	2,400
NSE	0	0	0	0
Total	13,054	5,069	36,229	2,400
FTE	3.2	1.3	2.3	0.0

Note: Totals may include rounding differences.

Beginning of Workpaper Group
202580 - HFTD SCADA CAPACITOR REPLACEMENT

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20258.0
Category: C. Grid Design and System Hardening
Category-Sub: 1. SCADA Capacitor Replacement
Workpaper Group: 202580 - HFTD SCADA CAPACITOR REPLACEMENT

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	4	-2	0	149	238	250	253	253
Non-Labor	Zero-Based	1	0	0	866	1,707	1,760	1,125	1,174
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		5	-2	0	1,015	1,945	2,010	1,378	1,427
FTE	Zero-Based	0.1	0.0	0.0	1.0	1.5	1.8	1.9	1.9

Business Purpose:

The purpose of this project is to replace existing non-SCADA capacitors with a more modern SCADA switchable capacitor or to remove non-SCADA capacitors if not required for voltage or reactive support. These modernized capacitors have a monitoring system to check for imbalances and isolate internal faults before they become catastrophic. In addition, SCADA capacitors have the capacity for remote isolation and monitoring of the system which provides additional situational awareness during extreme weather conditions. While this program will not reduce capacitor faults, the advanced protection equipment is designed to detect and isolate issues before a capacitor rupture occurs, reducing the failure mode most likely to lead to an ignition. SCADA line capacitors will send capacitor failures and fuse operation alerts to the electric control center. This will increase capacitor reliability, minimize downtime, and expedite repair work.

Physical Description:

This program will replace existing non-SCADA capacitors with a more modern SCADA switchable capacitor or to remove non-SCADA capacitors if not required for voltage or reactive support.

Project Justification:

Current capacitors are designed to provide continuous voltage and power factor correction for the distribution system. During a failure of a capacitor from either mechanical, electrical, or environmental overstress, an internal fault is created resulting in internal pressure and the potential to rupture the casing. This rupture of molten metal has the potential to be an ignition source. Capacitor faults are currently protected through fusing, which is not always effective at preventing this high-risk failure from becoming an ignition source. SCADA capacitors have a monitoring system to check for imbalances and isolate internal faults before they become catastrophic. In addition, SCADA capacitors have the capacity for remote isolation and monitoring of the system which provides additional situational awareness during extreme weather conditions. The SCADA Capacitors Program prioritizes replacing or removing fixed capacitors from service and then addresses capacitors with switches. Both types of capacitors will be modernized to a SCADA switchable capacitor. While this program will not reduce capacitor faults, the advanced protection equipment is designed to detect and isolate issues before a capacitor rupture occurs, reducing the failure mode most likely to lead to an ignition.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20258.0
Category: C. Grid Design and System Hardening
Category-Sub: 1. SCADA Capacitor Replacement
Workpaper Group: 202580 - HFTD SCADA CAPACITOR REPLACEMENT

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20258.0
Category: C. Grid Design and System Hardening
Category-Sub: 1. SCADA Capacitor Replacement
Workpaper Group: 202580 - HFTD SCADA CAPACITOR REPLACEMENT

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	250	253	253	0	0	0	250	253	253
Non-Labor	Zero-Based	1,760	1,125	1,174	0	0	0	1,760	1,125	1,174
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		2,010	1,378	1,427	0	0	0	2,010	1,378	1,427
FTE	Zero-Based	1.8	1.9	1.9	0.0	0.0	0.0	1.8	1.9	1.9

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20258.0
Category: C. Grid Design and System Hardening
Category-Sub: 1. SCADA Capacitor Replacement
Workpaper Group: 202580 - HFTD SCADA CAPACITOR REPLACEMENT

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	-1	0	124	207
Non-Labor	0	0	0	828	1,707
NSE	0	0	0	0	0
Total	0	-1	0	953	1,914
FTE	0.0	0.0	0.0	0.0	0.0
Adjustments (Nominal \$) **					
Labor	3	0	0	0	0
Non-Labor	1	0	0	0	0
NSE	0	0	0	0	0
Total	4	0	0	0	0
FTE	0.1	0.0	0.0	0.9	1.3
Recorded-Adjusted (Nominal \$)					
Labor	3	-1	0	124	207
Non-Labor	1	0	0	828	1,707
NSE	0	0	0	0	0
Total	4	-1	0	953	1,914
FTE	0.1	0.0	0.0	0.9	1.3
Vacation & Sick (Nominal \$)					
Labor	0	0	0	18	31
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	0	18	31
FTE	0.0	0.0	0.0	0.1	0.2
Escalation to 2021\$					
Labor	1	0	0	6	0
Non-Labor	0	0	0	38	0
NSE	0	0	0	0	0
Total	1	0	0	44	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	4	-2	0	149	238
Non-Labor	1	0	0	866	1,707
NSE	0	0	0	0	0
Total	5	-2	0	1,015	1,945
FTE	0.1	0.0	0.0	1.0	1.5

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20258.0
Category: C. Grid Design and System Hardening
Category-Sub: 1. SCADA Capacitor Replacement
Workpaper Group: 202580 - HFTD SCADA CAPACITOR REPLACEMENT

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
Labor	3	0	0	0	0
Non-Labor	1	0	0	0	0
NSE	0	0	0	0	0
Total	4	0	0	0	0
FTE	0.1	0.0	0.0	0.9	1.3

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017	3	1	0	4	0.1
Explanation:	One sided adjustment to add back missing CPD orders from 2017 electric capital.				
2017 Total	3	1	0	4	0.1
2018 Total	0	0	0	0	0.0
2019 Total	0	0	0	0	0.0
2020	0.001	0	0	0.001	0.9
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2020 Total	0.001	0	0	0.001	0.9
2021	0.001	0	0	0.001	1.3
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2021 Total	0.001	0	0	0.001	1.3

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 202580**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 20258.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 1. SCADA Capacitor Replacement
 Workpaper Group: 202580 - HFTD SCADA CAPACITOR REPLACEMENT
 Workpaper Detail: 202580.001 - RAMP - HFTD SCADA Capacitor Replacement
 In-Service Date: Not Applicable
 Description:

The purpose of this project is to convert existing distribution line capacitors to SCADA line capacitors in the HFTD in order to provide VAR control, have load information via a web portal, improve system efficiency and operability. SCADA line capacitors also will send an alert to Distribution Operation Center of capacitor failures, and/or fuse operations. This will increase capacitor reliability, minimize downtime, and expedite repair work.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	250	253	253
Non-Labor	1,760	1,125	1,174
NSE	0	0	0
Total	2,010	1,378	1,427
FTE	1.8	1.9	1.9

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20258.0
Category: C. Grid Design and System Hardening
Category-Sub: 1. SCADA Capacitor Replacement
Workpaper Group: 202580 - HFTD SCADA CAPACITOR REPLACEMENT
Workpaper Detail: 202580.001 - RAMP - HFTD SCADA Capacitor Replacement

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C06/M1 T2

RAMP Line Item Name: SCADA Capacitors (HFTD Tier 2)

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$) Low High	
Tranche 1 Cost Estimate	0	0	0	0	0	0	0
Tranche 2 Cost Estimate	1,945	2,010	1,378	1,427	4,815	1,612	1,970

Cost Estimate Changes from RAMP:

The GRC unit forecast is outside the RAMP range due to an increase in forecasted units for replacement.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities Low High	
Tranche 1 # of capacitors replaced	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tranche 2 # of capacitors replaced	35.00	36.00	23.00	24.00	83.00	36.00	44.00

Work Unit Changes from RAMP:

The GRC unit forecast is outside the RAMP range due to an increase in forecasted units for replacement.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000
Tranche 2	2,623.000	0.000

RSE Changes from RAMP:

RSE was not calculated for this project in prior RAMP filing.

Supplemental Workpapers for Workpaper Group 202580

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

SCADA Capacitor Replacement in High Fire Threat District

Budget Code **20258**
Budget Code Name **Upgrade SCADA CAP (HFTD)**

GRC Request		2022	2023	2024
Labor		\$ 250,532	\$ 253,364	\$ 253,364
Non-Labor		\$ 447,480	\$ 285,890	\$ 298,320
Cost Breakdown		2022	2023	2024
Unit Cost				
Labor	Hourly Rate	\$ 64	\$ 64	\$ 64
Service	Ea	\$ 36,466	\$ 36,466	\$ 36,466
Capacitors	Ea	\$ 12,430	\$ 12,430	\$ 12,430
Units		2022	2023	2024
Labor	Hours	3,813	3,856	3,856
Service + Capacitors	Ea	36	23	24
Total		2022	2023	2024
Labor		\$ 250,532	\$ 253,364	\$ 253,364
Service		\$ 1,312,776	\$ 838,718	\$ 875,184
Capacitors		\$ 447,480	\$ 285,890	\$ 298,320
		<u>\$ 2,010,788</u>	<u>\$ 1,377,972</u>	<u>\$ 1,426,868</u>

Additional Notes:

Cost estimate based on historical spend. There will be some variation by site on required substation support services and engineering and technician support for installation.

Installation of SCADA capacitors may require change out of wood to steel pole in addition to the capacitor based on pole loading and asset health.

Installation labor assumes contract labor using a two-man electrical maintenance crew, a four-man working foreman, one troubleman crew, and vehicle labor.

Beginning of Workpaper Group
202850 - OH SYSTEM COVERED CONDUCTOR

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20285.0
Category: C. Grid Design and System Hardening
Category-Sub: 2. Overhead System Covered Conductor
Workpaper Group: 202850 - OH SYSTEM COVERED CONDUCTOR

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	0	552	2,848	6,217	7,493	7,914
Non-Labor	Zero-Based	0	0	201	1,896	35,883	118,426	143,379	151,705
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	201	2,448	38,732	124,643	150,872	159,619
FTE	Zero-Based	0.0	0.0	0.0	3.7	18.3	50.7	61.1	64.5

Business Purpose:

The Electric System Hardening (ESH) Overhead (OH) Covered Conductor program is focused on hardening overhead distribution facilities within Tiers 2 and 3 of the HFTD and the WUI by implementing long-term solutions focused on significant reduction of both fire risk and impact to the public due to PSPS events. The primary objective of this program encompasses the rebuilding of the distribution system in fire prone areas with covered primary conductors. The priority and scope of the projects will be dictated by full circuit analysis using the Wildfire Next Generation System (WiNGS) model and input gathered from operational teams.

Physical Description:

The primary objective is to replace bare conductor with a new covered conductor consisting of Aluminum Core Steel Reinforced (ACSR) with a three-layered polyethylene cover. The cover acts to prevent incidental contacts from wire slap or objects such as tree branches, and mylar balloons. Other activities are performed simultaneously, and may include:

- replacing wood poles to steel
- replacing wood crossarms with fiberglass
- replacing insulators with new polymer insulators
- replacing guys and anchors
- replacing aged or open wire secondary
- replacing aged switches, transformers, regulators, and fuses
- Replacement of a small section of underground related to riser poles

Project Justification:

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20285.0
Category: C. Grid Design and System Hardening
Category-Sub: 2. Overhead System Covered Conductor
Workpaper Group: 202850 - OH SYSTEM COVERED CONDUCTOR

SDG&E operates and maintains nearly 3,500 miles of overhead distribution circuit miles within the HFTD and has already hardened approximately 850 miles or 25%. This aging infrastructure was originally designed to meet GO 95 requirements of an 8 psf or 55 mph transverse wind load, however, winds can reach 85-111 mph in certain areas of the HFTD during extreme Santa Ana conditions. High winds with an aging infrastructure make these lines more susceptible to equipment failures and more vulnerable to foreign object contacts, both risk events that could lead to ignitions. Covered conductor can mitigate the consequences of an energized wire-down, or a foreign object contacting electrified conductor (tree limbs, debris blown into lines, animals, etc.) as the conductor is covered by a layer of insulation that can eliminate a fault that can lead to ignition. Additionally, once full segments have covered conductor installed, the wind speed threshold on those segments can be raised, reducing the frequency of PSPS events. The initial scoping and decision making for each covered conductor project is developed with the WiNGS model, with inputs from the Wildfire Risk Reduction Model (WRRM), that assesses the relative risk of fire for various assets. WRRM conducts a risk assessment at every pole and span, using that asset's characteristics and geographic meteorological and environmental conditions to calculate risk metrics that are then used in the WiNGS model to determine what part of a circuit is to be hardened using covered conductor technology as the most cost-effective mitigation technology.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20285.0
Category: C. Grid Design and System Hardening
Category-Sub: 2. Overhead System Covered Conductor
Workpaper Group: 202850 - OH SYSTEM COVERED CONDUCTOR

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20285.0
Category: C. Grid Design and System Hardening
Category-Sub: 2. Overhead System Covered Conductor
Workpaper Group: 202850 - OH SYSTEM COVERED CONDUCTOR

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	6,217	7,493	7,914	0	0	0	6,217	7,493	7,914
Non-Labor	Zero-Based	118,426	143,379	151,705	0	0	0	118,426	143,379	151,705
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		124,643	150,872	159,619	0	0	0	124,643	150,872	159,619
FTE	Zero-Based	50.7	61.1	64.5	0.0	0.0	0.0	50.7	61.1	64.5

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20285.0
Category: C. Grid Design and System Hardening
Category-Sub: 2. Overhead System Covered Conductor
Workpaper Group: 202850 - OH SYSTEM COVERED CONDUCTOR

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	0	462	2,476
Non-Labor	0	0	183	1,813	35,883
NSE	0	0	0	0	0
Total	0	0	183	2,276	38,360
FTE	0.0	0.0	0.0	0.5	5.9
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	2.7	9.7
Recorded-Adjusted (Nominal \$)					
Labor	0	0	0	462	2,476
Non-Labor	0	0	183	1,813	35,883
NSE	0	0	0	0	0
Total	0	0	183	2,276	38,360
FTE	0.0	0.0	0.0	3.2	15.6
Vacation & Sick (Nominal \$)					
Labor	0	0	0	66	372
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	0	66	372
FTE	0.0	0.0	0.0	0.5	2.7
Escalation to 2021\$					
Labor	0	0	0	24	0
Non-Labor	0	0	18	83	0
NSE	0	0	0	0	0
Total	0	0	18	107	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	0	552	2,848
Non-Labor	0	0	201	1,896	35,883
NSE	0	0	0	0	0
Total	0	0	201	2,448	38,732
FTE	0.0	0.0	0.0	3.7	18.3

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20285.0
Category: C. Grid Design and System Hardening
Category-Sub: 2. Overhead System Covered Conductor
Workpaper Group: 202850 - OH SYSTEM COVERED CONDUCTOR

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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	2.7	9.7

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017 Total	0	0	0	0	0.0
2018 Total	0	0	0	0	0.0
2019 Total	0	0	0	0	0.0
2020	0.001	0	0	0.001	2.7
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2020 Total	0.001	0	0	0.001	2.7
2021	0.001	0	0	0.001	9.7
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2021 Total	0.001	0	0	0.001	9.7

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 202850**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 20285.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 2. Overhead System Covered Conductor
 Workpaper Group: 202850 - OH SYSTEM COVERED CONDUCTOR
 Workpaper Detail: 202850.001 - RAMP OH System Covered Conductor
 In-Service Date: Not Applicable
 Description:

The Electric System Hardening (ESH) Overhead (OH) Covered Conductor program is focused on hardening SDG&E's overhead distribution facilities within the High Fire Threat District (HFTD) Tier 3, Tier 2, and the Wildland Urban Interface (WUI) by implementing long-term solutions focused on significant reduction of both the fire risk and impact to the public due to Public Safety Power Shutoff (PSPS) events. The primary objective of this program encompasses the rebuilding of the distribution system in fire prone areas with covered primary conductors. The priority and scope of the projects will be dictated by full circuit analysis using the Wildfire Next Generation System (WiNGS) model, and input gathered from operational teams.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		6,217	7,493	7,914
Non-Labor		118,426	143,379	151,705
NSE		0	0	0
Total		124,643	150,872	159,619
FTE		50.7	61.1	64.5

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20285.0
Category: C. Grid Design and System Hardening
Category-Sub: 2. Overhead System Covered Conductor
Workpaper Group: 202850 - OH SYSTEM COVERED CONDUCTOR
Workpaper Detail: 202850.001 - RAMP OH System Covered Conductor

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C07/M2 T1-T2

RAMP Line Item Name: OH Dist Fire Hardening Covered Conductor

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	31,759	102,208	123,715	130,888	356,811	298,691	365,066
Tranche 2 Cost Estimate	6,972	22,435	27,157	28,731	78,323	65,566	80,137

Cost Estimate Changes from RAMP:

GRC forecast is within the RAMP range.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 # of miles hardened	11.00	49.00	82.00	82.00	213.00	192.00	235.00
Tranche 2 # of miles hardened	2.00	11.00	18.00	18.00	47.00	42.00	51.00

Work Unit Changes from RAMP:

GRC forecast is within the RAMP range.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	80.000	32.000
Tranche 2	54.000	14.000

RSE Changes from RAMP:

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20285.0
Category: C. Grid Design and System Hardening
Category-Sub: 2. Overhead System Covered Conductor
Workpaper Group: 202850 - OH SYSTEM COVERED CONDUCTOR
Workpaper Detail: 202850.001 - RAMP OH System Covered Conductor

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2).

Supplemental Workpapers for Workpaper Group 202850

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

ESH 2022-2024 GRC Supporting Workpaper Calculations

[*Note*: Costs per Mile* includes Engineering/Design for future projects hardened in following years. High-level methodology utilized in order to align costs with monthly cash flows required for 2022 Annual Plan for 2022-2024 timeframe]

Traditional Hardening Cost per Unit						
Category	2022	2023	2024	Total	Comments	
Costs (Non-Labor)	\$ 15,516,890	\$ 5,183,876	\$ 4,597,484	\$ 25,298,249		
Units (Miles Hardened)	25	5	5	35		
Costs per Mile	\$ 620,676	\$ 1,036,775	\$ 919,497	\$ 858,983	2023 increase cost/mile due to higher unit decrease for miles hardened, 2024 due to reduction in costs	
YoY Change (%)						
Costs		-66.59%	-11.31%			
Units		-80.00%	0.00%			
Reduction in costs as a result of fire hardening 5 miles from 25 miles in 2023 and beyond						
2023 reduction in miles due to scope converting over to Covered Conductor						
Category	2022	2023	2024	Total	Comments	
Costs (Labor)	\$ 794,652	\$ 295,584	\$ 234,587	\$ 1,324,823		
Costs per unit	59	59	59	59	Assume \$59 per internal bill rate for FTE	
# of hours	13,469	5,010	3,976	22,455	2023 & 2024 decrease in hours due to reduction in costs	
YoY Change (%)						
Costs		-62.80%	-20.64%			
Reduction in costs as a result of fire hardening 5 miles from 25 miles in 2023 and beyond						
Covered Conductor Cost per Unit						
Category	2022	2023	2024	Total	Comments	
Costs (Non-Labor)	\$ 118,426,214	\$ 143,379,126	\$ 151,704,577	\$ 413,509,917		
Units (Miles Hardened)	60	100	100	260		
Costs per Mile	\$ 1,973,770	\$ 1,433,791	\$ 1,517,046	\$ 1,641,536	2023 increase/mile due to higher unit (drives cost increase) for miles hardened; 2024 increase/mile due to increased engineering to finish off program in future years	
YoY Change (%)						
Costs		21.07%	5.81%		Increase in costs as a result of fire hardening 100 miles from 60 in 2023 and beyond	
Units		66.67%	0.00%		2023 increase in miles as a result of incremental scope for Covered Conductor and shifts in scope from Traditional Hardening	
Category	2022	2023	2024	Total	Comments	
Costs (Labor)	\$ 6,216,979	\$ 7,492,537	\$ 7,914,422	\$ 21,623,938		
Costs per unit	59	59	59	59	Assume \$59 per internal bill rate for FTE	
# of hours	105,373	126,992	134,143	366,507	2023 & 2024 due to increase in costs	
YoY Change (%)						
Costs		20.52%	5.63%			
Increase in costs as a result of fire hardening 100 miles from 60 in 2023 and beyond						
Direct Costs						
Source: TW1 2022 Corporate Plan]						
Traditional Hardening						
Category	2022	2023	2024	Total		
Non-Labor	\$ 15,516,890	\$ 5,183,876	\$ 4,597,484	\$ 25,298,249		
Labor	\$ 794,652	\$ 295,584	\$ 234,587	\$ 1,324,823		
Total Directs	\$ 16,311,542	\$ 5,479,460	\$ 4,832,071	\$ 26,623,073		
Covered Conductor						
Category	2022	2023	2024	Total		
Non-Labor	\$ 118,426,214	\$ 143,379,126	\$ 151,704,577	\$ 413,509,917		
Labor	\$ 6,216,979	\$ 7,492,537	\$ 7,914,422	\$ 21,623,938		
Total Directs	\$ 124,643,193	\$ 150,871,663	\$ 159,618,999	\$ 435,133,855		
Units						
Source: 2022-2024 Miles Hardened Targets for 2022 WMP Filing from ESH Management]						
Traditional Hardening						
Category	2022	2023	2024	Total		
Miles Hardened	25	5	5	35		
Covered Conductor						
Category	2022	2023	2024	Total		
Miles Hardened	60	100	100	260		

Beginning of Workpaper Group
198730 - WMP PRIVATE LTE

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19873.0
Category: C. Grid Design and System Hardening
Category-Sub: 3. Private LTE
Workpaper Group: 198730 - WMP PRIVATE LTE

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	3	40	48	867	792	0	0	0
Non-Labor	Zero-Based	842	2,594	10,378	42,734	49,023	79,569	65,349	70,179
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		845	2,634	10,426	43,601	49,815	79,569	65,349	70,179
FTE	Zero-Based	0.1	0.2	0.3	6.4	6.0	0.0	0.0	0.0

Business Purpose:

Existing wireless communications infrastructure is increasingly inadequate to meet the demand for greater volumes of high-speed data. Expanding existing systems can provide coverage over a larger area but cannot meet the demand for high volume low latency data and control. To address this, this project will implement a privately-owned LTE network using licensed radio frequency spectrum by means of the DCRI program. The communication network is foundational to many initiatives that demand reliable communication such as Advanced Protection (BC 152590) and PSPS Sectionalizing Devices (BC 192450). The ability to reliably enable and disable sensitive settings, enable or disable reclosing, or remotely operate a switch during a high-risk weather event demands reliable communication that the LTE network will provide. The Falling Conductor Protection in particular relies on a robust communications network to operate successfully and falling conductor circuits will continue to be enabled as the communication network comes online.

Physical Description:

Communication infrastructure includes site-specific designs and procurement of engineered steel poles and material, siting surveys, land rights, environmental analysis, community outreach, and community planning. This project will allow for the implementation of a private LTE network that can be expanded in stages, as needed, to provide communications capability in traditionally difficult to reach locations. In addition, it will provide a wireless network with broadband capabilities for a variety of uses such as voice, SCADA, and Advanced Protection.

Project Justification:

This project will enhance the overall reliability of SDG&E's communication network, which is critical for enabling fire prevention and public safety programs. The communication network is foundational to many initiatives that demand reliable communication. Expanded communications coverage for historically high-risk fire areas and other areas will improve service reliability, response times, PSPS impacts, and employee and public safety.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19873.0
Category: C. Grid Design and System Hardening
Category-Sub: 3. Private LTE
Workpaper Group: 198730 - WMP PRIVATE LTE

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19873.0
Category: C. Grid Design and System Hardening
Category-Sub: 3. Private LTE
Workpaper Group: 198730 - WMP PRIVATE LTE

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	0	0	0	0	0	0	0	0	0
Non-Labor	Zero-Based	79,569	65,349	70,179	0	0	0	79,569	65,349	70,179
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		79,569	65,349	70,179	0	0	0	79,569	65,349	70,179
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19873.0
Category: C. Grid Design and System Hardening
Category-Sub: 3. Private LTE
Workpaper Group: 198730 - WMP PRIVATE LTE

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	0	625	689
Non-Labor	0	0	8,223	35,566	49,023
NSE	0	0	0	0	0
Total	0	0	8,223	36,191	49,711
FTE	0.0	0.0	0.0	4.7	5.1
Adjustments (Nominal \$) **					
Labor	2	30	38	101	0
Non-Labor	704	2,275	1,238	5,301	0
NSE	0	0	0	0	0
Total	706	2,305	1,276	5,402	0
FTE	0.1	0.2	0.3	0.8	0.0
Recorded-Adjusted (Nominal \$)					
Labor	2	30	38	726	689
Non-Labor	704	2,275	9,461	40,867	49,023
NSE	0	0	0	0	0
Total	706	2,305	9,499	41,593	49,711
FTE	0.1	0.2	0.3	5.5	5.1
Vacation & Sick (Nominal \$)					
Labor	0	5	5	103	103
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	5	5	103	103
FTE	0.0	0.0	0.0	0.9	0.9
Escalation to 2021\$					
Labor	1	5	4	38	0
Non-Labor	138	319	917	1,867	0
NSE	0	0	0	0	0
Total	139	324	922	1,905	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	3	40	48	867	792
Non-Labor	842	2,594	10,378	42,734	49,023
NSE	0	0	0	0	0
Total	845	2,634	10,426	43,601	49,815
FTE	0.1	0.2	0.3	6.4	6.0

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19873.0
Category: C. Grid Design and System Hardening
Category-Sub: 3. Private LTE
Workpaper Group: 198730 - WMP PRIVATE LTE

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
Labor	2	30	38	101	0
Non-Labor	704	2,275	1,238	5,301	0
NSE	0	0	0	0	0
Total	706	2,305	1,276	5,402	0
FTE	0.1	0.2	0.3	0.8	0.0

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017	2	580	0	582	0.1
Explanation:	Moving Transmission Fiber costs to LTE Workpaper to align with forecast				
2017	0	124	0	124	0.0
Explanation:	Adjustment to add back common FERC account, FERC-jurisdiction costs for RO model carve-out (for Transmission Fiber links)				
2017 Total	2	704	0	706	0.1
2018	30	1,850	0	1,880	0.2
Explanation:	Moving Transmission Fiber costs to LTE workpaper to align with forecast				
2018	0	425	0	425	0.0
Explanation:	Adjustment to add back common FERC account, FERC-jurisdiction costs for RO model carve-out (for Transmission Fiber links)				
2018 Total	30	2,275	0	2,305	0.2
2019	0	19	0	19	0.0
Explanation:	Moving LTE CPD costs to LTE Workpaper				
2019	38	974	0	1,012	0.3
Explanation:	Moving Transmission Fiber costs to LTE workpaper to align with forecast				
2019	0	245	0	245	0.0
Explanation:	Adjustment to add back common FERC account, FERC-jurisdiction costs for RO model carve-out (for Transmission Fiber links)				
2019 Total	38	1,238	0	1,276	0.3
2020	0	62	0	62	0.0
Explanation:	Moving LTE CPD costs to LTE Workpaper				
2020	101	4,207	0	4,308	0.8
Explanation:	Moving Transmission Fiber costs to LTE workpaper to align with forecast				

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19873.0
Category: C. Grid Design and System Hardening
Category-Sub: 3. Private LTE
Workpaper Group: 198730 - WMP PRIVATE LTE

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2020	0	1,032	0	1,032	0.0
Explanation:	Adjustment to add back common FERC account, FERC-jurisdiction costs for RO model carve-out (for Transmission Fiber links)				
2020 Total	101	5,301	0	5,402	0.8
2021 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 198730**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19873.0
Category: C. Grid Design and System Hardening
Category-Sub: 3. Private LTE
Workpaper Group: 198730 - WMP PRIVATE LTE
Workpaper Detail: 198730.001 - RAMP WMP Private LTE

In-Service Date: Not Applicable

Description:

Existing wireless communications infrastructure is increasingly inadequate to meet the demand for greater volumes of data at high speed. Expanding the existing systems can provide coverage over a larger area but cannot meet the demand for high volume low latency data and control. To address this, SDG&E is implementing a private broadband wireless digital communications network.

SDG&E is deploying a privately-owned LTE network using licensed radio frequency (RF) spectrum by means of the Distribution Communications Reliability Improvements (DCRI) program. This will enhance the overall reliability of SDG&E's communication network, which is critical for enabling fire prevention and public safety programs. SDG&E's communication network is foundational to many initiatives that demand reliable communication. The ability to reliably enable and disable sensitive settings, enable or disable reclosing, or even remotely operating a switch during a high-risk weather event demands reliable communication that the LTE network will provide. SDG&E's Falling Conductor Protection in particular relies on a robust communications network to operate successfully and falling conductor circuits will continue to be enabled as SDG&E's communication network comes online.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	0	0	0
Non-Labor	53,269	61,599	70,179
NSE	0	0	0
Total	53,269	61,599	70,179
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19873.0
Category: C. Grid Design and System Hardening
Category-Sub: 3. Private LTE
Workpaper Group: 198730 - WMP PRIVATE LTE
Workpaper Detail: 198730.001 - RAMP WMP Private LTE

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C20

RAMP Line Item Name: LTE Communication Network

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	49,814	79,569	65,349	70,179	215,097	181,103	221,348

Cost Estimate Changes from RAMP:

GRC forecast is within the RAMP range.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 # of base stations	0.00	25.00	45.00	72.00	142.00	128.00	156.00

Work Unit Changes from RAMP:

GRC forecast is within the RAMP range.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

An RSE was not calculated for this activity.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19873.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 3. Private LTE
 Workpaper Group: 198730 - WMP PRIVATE LTE
 Workpaper Detail: 198730.002 - RAMP WMP Private LTE - License Fees (Same RAMP item as 19873.001)
 In-Service Date: Not Applicable
 Description:

Existing wireless communications infrastructure is increasingly inadequate to meet the demand for greater volumes of data at high speed. Expanding the existing systems can provide coverage over a larger area but cannot meet the demand for high volume low latency data and control. To address this, SDG&E is implementing a private broadband wireless digital communications network.

SDG&E is deploying a privately-owned LTE network using licensed radio frequency (RF) spectrum by means of the Distribution Communications Reliability Improvements (DCRI) program. This will enhance the overall reliability of SDG&E's communication network, which is critical for enabling fire prevention and public safety programs. SDG&E's communication network is foundational to many initiatives that demand reliable communication. The ability to reliably enable and disable sensitive settings, enable or disable reclosing, or even remotely operating a switch during a high-risk weather event demands reliable communication that the LTE network will provide. SDG&E's Falling Conductor Protection in particular relies on a robust communications network to operate successfully and falling conductor circuits will continue to be enabled as SDG&E's communication network comes online.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	0	0	0
Non-Labor	26,300	3,750	0
NSE	0	0	0
Total	26,300	3,750	0
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

Supplemental Workpapers for Workpaper Group 198730

TY2024 GRC FORECAST - DETAILS

Budget Code:	19873
Estimated In Service Date:	Ongoing

19873 -					2022			2023			2024			Total Cost	Comments
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Metric (ea./ft./mile)	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost		
1	LTE Projects - Lag 12 months - 19872, 19873	Labor	RAMP	FTE	-		\$ -	-		\$ -	-		\$ -		
2	LTE Projects - Lag 12 months - 19872, 19873	Non-Labor	RAMP	Base Stations	25	\$ 2,130,760	\$ 53,269,000	45	\$ 1,368,867	\$ 61,599,000	72	\$ 974,708	\$ 70,179,000		
3	LTE Projects - Spectrum - Zero Lag- 21880	Labor	RAMP	FTE	-		\$ -	-		\$ -	-		\$ -		
				(units not feasible)											Spectrum License for San Diego County: 2 milestone payments of \$13,150,000 each in 2022. Spectrum Licenses for Orange County: 2 milestone payments of \$1,600,000 each in 2023. Spectrum Licenses for Imperial County: 2 milestone payments of \$250,000 each in 2023.
4	LTE Projects - Spectrum - Zero Lag- 21880	Non-Labor	RAMP				\$ 26,300,000			\$ 3,750,000			\$ -	\$ 30,050,000	
5															
6														\$ -	
7														\$ -	
8														\$ -	
9														\$ -	
10														\$ -	
11														\$ -	
12														\$ -	
13														\$ -	
14														\$ -	
15														\$ -	

*Costs should be reported in direct costs only (no overheads)

Summary															
		Labor	RAMP			\$ -		\$ -		\$ -	\$ -				
		Non-Labor	RAMP			\$ 79,569,000		\$ 65,349,000		\$ 70,179,000	\$ 215,097,000				
Total Project Forecast						\$ 79,569,000		\$ 65,349,000		\$ 70,179,000	\$ 215,097,000				

Beginning of Workpaper Group
191340 - HFTD Transm. Fiber Optics

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19134.0
Category: C. Grid Design and System Hardening
Category-Sub: 4. HFTD Transmission Fiber Optics
Workpaper Group: 191340 - HFTD Transm. Fiber Optics

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Base YR Rec	0	0	0	0	117	117	117	117
Non-Labor	Base YR Rec	0	0	0	2	6,525	9,327	7,583	7,583
NSE	Base YR Rec	0	0	0	0	0	0	0	0
Total		0	0	0	2	6,642	9,444	7,700	7,700
FTE	Base YR Rec	-0.1	0.0	0.0	0.0	1.2	1.2	1.2	1.2

Business Purpose:

The purpose of this project is to fund the Transmission Fiber Link HFTD infrastructure buildout program which provides high speed communications to ensure safe and reliable electric service to customers.

Physical Description:

Fiber optic infrastructure will be attached to structures within existing electric right-of-ways. Two types of fiber optic infrastructure cable will be utilized:

- All Dielectric Self Supporting (ADSS), mainly used for wood pole attachments, and underground installations
- Optical Ground Wire (OPGW), replaces static ground wire on steel poles and towers

Installations may require replacement of existing wood poles to meet loading or GO-95 clearance requirements.

Environmental surveys will need to be completed for construction activities.

Project Justification:

The project will provide a company-owned and maintained communications network to support electric operations within Tier-2 and Tier-3 of the HFTD. In conjunction with Private LTE the communication infrastructure will support programs such as Advanced Protection that require high-speed communication to operate.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19134.0
Category: C. Grid Design and System Hardening
Category-Sub: 4. HFTD Transmission Fiber Optics
Workpaper Group: 191340 - HFTD Transm. Fiber Optics

Forecast Methodology:

Labor - Base YR Rec

The base-year forecast methodology was selected as most indicative of future work. New initiatives and programs have been implemented beginning in 2020 due to the Wildfire Mitigation Plan, and these enhancements are not captured in the historical costs of this category. Accordingly, 2021 base year expenses are most representative of future needs based on an expansion in complexity and scope of existing projects and initiatives.

Non-Labor - Base YR Rec

The base-year forecast methodology was selected as most indicative of future work. New initiatives and programs have been implemented beginning in 2020 due to the Wildfire Mitigation Plan, and these enhancements are not captured in the historical costs of this category. Accordingly, 2021 base year expenses are most representative of future needs based on an expansion in complexity and scope of existing projects and initiatives.

NSE - Base YR Rec

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19134.0
Category: C. Grid Design and System Hardening
Category-Sub: 4. HFTD Transmission Fiber Optics
Workpaper Group: 191340 - HFTD Transm. Fiber Optics

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Base YR Rec	117	117	117	0	0	0	117	117	117
Non-Labor	Base YR Rec	6,525	6,525	6,525	2,802	1,058	1,058	9,327	7,583	7,583
NSE	Base YR Rec	0	0	0	0	0	0	0	0	0
Total		6,642	6,642	6,642	2,802	1,058	1,058	9,444	7,700	7,700
FTE	Base YR Rec	1.2	1.2	1.2	0.0	0.0	0.0	1.2	1.2	1.2

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022	0	1,500	0	1,500	0.0
Explanation:	Additional six miles of scope at \$250K per mile.				
2022	0	1,302	0	1,302	0.0
Explanation:	FERC jurisdictional related costs included for Results of Operations modeling. Excluded from final revenue requirement.				
2022 Total	0	2,802	0	2,802	0.0
2023	0	1,058	0	1,058	0.0
Explanation:	FERC jurisdictional related costs included for Results of Operations modeling. Excluded from final revenue requirement.				
2023 Total	0	1,058	0	1,058	0.0
2024	0	1,058	0	1,058	0.0
Explanation:	FERC jurisdictional related costs included for Results of Operations modeling. Excluded from final revenue requirement.				
2024 Total	0	1,058	0	1,058	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19134.0
Category: C. Grid Design and System Hardening
Category-Sub: 4. HFTD Transmission Fiber Optics
Workpaper Group: 191340 - HFTD Transm. Fiber Optics

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	2	30	38	101	102
Non-Labor	580	1,850	974	4,192	6,525
NSE	0	0	0	0	0
Total	582	1,880	1,012	4,293	6,627
FTE	0.0	0.2	0.3	0.8	1.0
Adjustments (Nominal \$) **					
Labor	-2	-30	-38	-101	0
Non-Labor	-580	-1,850	-974	-4,192	0
NSE	0	0	0	0	0
Total	-582	-1,880	-1,012	-4,293	0
FTE	-0.1	-0.2	-0.3	-0.8	0.0
Recorded-Adjusted (Nominal \$)					
Labor	0	0	0	0	102
Non-Labor	0	0	0	0	6,525
NSE	0	0	0	0	0
Total	0	0	0	0	6,627
FTE	-0.1	0.0	0.0	0.0	1.0
Vacation & Sick (Nominal \$)					
Labor	0	0	0	0	15
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	0	0	15
FTE	0.0	0.0	0.0	0.0	0.2
Escalation to 2021\$					
Labor	0	0	0	0	0
Non-Labor	0	0	0	2	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 (Constant 2021\$)					
Labor	0	0	0	0	117
Non-Labor	0	0	0	2	6,525
NSE	0	0	0	0	0
Total	0	0	0	2	6,642
FTE	-0.1	0.0	0.0	0.0	1.2

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19134.0
Category: C. Grid Design and System Hardening
Category-Sub: 4. HFTD Transmission Fiber Optics
Workpaper Group: 191340 - HFTD Transm. Fiber Optics

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
Labor	-2	-30	-38	-101	0
Non-Labor	-580	-1,850	-974	-4,192	0
NSE	0	0	0	0	0
Total	-582	-1,880	-1,012	-4,293	0
FTE	-0.1	-0.2	-0.3	-0.8	0.0

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017	-2	-580	0	-582	-0.1
Explanation:	Moving Transmission Fiber costs to LTE Workpaper to align with forecast				
2017 Total	-2	-580	0	-582	-0.1
2018	-30	-1,850	0	-1,880	-0.2
Explanation:	Moving Transmission Fiber costs to LTE workpaper to align with forecast				
2018 Total	-30	-1,850	0	-1,880	-0.2
2019	-38	-974	0	-1,012	-0.3
Explanation:	Moving Transmission Fiber costs to LTE workpaper to align with forecast				
2019 Total	-38	-974	0	-1,012	-0.3
2020	0	15	0	15	0.0
Explanation:	Transfer environmental services expenses that were incorrectly charged to Gas Engineering WP EN 9030 to Wildfire witness WP 191340, where these expenses should have been charged.				
2020	-101	-4,207	0	-4,308	-0.8
Explanation:	Moving Transmission Fiber costs to LTE workpaper to align with forecast				
2020 Total	-101	-4,192	0	-4,293	-0.8
2021 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 191340**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19134.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 4. HFTD Transmission Fiber Optics
 Workpaper Group: 191340 - HFTD Transm. Fiber Optics
 Workpaper Detail: 191340.001 - RAMP - HFTD Transmission Fiber Optics
 In-Service Date: Not Applicable
 Description:

This project provides funds for the installation, upgrade, and expansion of SDG&E's Fiber Optic communication system for Control & Protection of Transmission and Distribution lines, and automation in areas of High Fire Threat Districts (HFTD). Secure fiber optic communications is required for transporting large amount of high speed data throughput for Condition Based Maintenance (CBM), Wide Area Measurement and Control (Synchrophasors/Phasor Measurement), Video Security and Surveillance, Smart Grid technologies and IT network communications.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	117	117	117
Non-Labor	9,327	7,583	7,583
NSE	0	0	0
Total	9,444	7,700	7,700
FTE	1.2	1.2	1.2

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19134.0
Category: C. Grid Design and System Hardening
Category-Sub: 4. HFTD Transmission Fiber Optics
Workpaper Group: 191340 - HFTD Transm. Fiber Optics
Workpaper Detail: 191340.001 - RAMP - HFTD Transmission Fiber Optics

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C20

RAMP Line Item Name: LTE Communication Network

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	6,641	9,444	7,700	7,700	24,844	181,103	221,348

Cost Estimate Changes from RAMP:

The GRC forecast is split among two workpapers (see also 198730) and is slightly above the RAMP range due to additional work associated with BC1978730.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 miles of cable	30.70	32.00	26.00	26.00	84.00	128.00	156.00

Work Unit Changes from RAMP:

The GRC forecast is split among two workpapers (see also 198730). For workpaper 191340, unit of measure is defined by miles of install and not base stations.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

An RSE was not calculated for this activity.

Beginning of Workpaper Group
202840 - OH SYSTEM TRADITIONAL HARDENING

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20284.0
Category: C. Grid Design and System Hardening
Category-Sub: 5. Overhead System Traditional Hardening
Workpaper Group: 202840 - OH SYSTEM TRADITIONAL HARDENING

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Base YR Rec	3,522	6,197	10,859	5,635	6,300	795	296	296
Non-Labor	Base YR Rec	61,699	54,960	125,149	137,868	87,673	15,516	5,183	5,183
NSE	Base YR Rec	0	0	0	0	0	0	0	0
Total		65,222	61,157	136,008	143,503	93,973	16,311	5,479	5,479
FTE	Base YR Rec	22.9	39.8	62.0	37.4	41.8	6.5	2.4	2.4

Business Purpose:

The Electric System Hardening (ESH) Overhead (OH) Traditional Hardening program is focused on hardening overhead distribution facilities within Tier 2 and 3 of the HFTD and the Wildland Urban Interface by implementing long-term solutions focused on reduction fire risk. The primary objective of this program encompasses the rebuilding of the distribution system in fire prone areas with new, stronger bare primary conductors. The priority and scope of the projects will be dictated by full circuit analysis using the Wildfire Next Generation System (WiNGS) model and input gathered from operational teams. Traditional hardening is being scaled back in favor of covered conductor and strategic undergrounding initiatives. Covered conductor and undergrounding provide greater wildfire risk reduction, while also being able to reduce the impacts of PSPS.

Physical Description:

Bare conductors will be replaced with a new, stronger bare conductors consisting of Aluminum Core Steel Reinforced (ACSR) or Aluminum Wire Aluminum Core (AWAC). Historically the predominant bare conductor that was replaced consisted of small copper wire (#8, #6, #4 single and three strand copper), which was determined to be the highest risk wire asset, oldest, and most predominant in fire prone areas. Other activities are performed simultaneously, and may include:

- replacing wood poles to steel
- replacing wood crossarms with fiberglass
- replacing insulators with new polymer insulators
- replacing guys and anchors
- replacing aged or open wire secondary
- replacing aged switches, transformers, regulators, and fuses
- replacement of a small section of underground related to riser poles
- In some cases permanent removal of poles, wires, equipment, guys, and anchors when possible

Project Justification:

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20284.0
Category: C. Grid Design and System Hardening
Category-Sub: 5. Overhead System Traditional Hardening
Workpaper Group: 202840 - OH SYSTEM TRADITIONAL HARDENING

SDG&E operates and maintains nearly 3,500 miles of overhead distribution circuit miles within the HFTD and has already hardened approximately 900 miles or 25%. This aging infrastructure was originally designed to meet GO 95 requirements of an 8 psf or 55 mph transverse wind load, due to climate change and winds can now reach 85- 111 mph in certain areas of the HFTD during extreme Santa Ana conditions. High winds with an aging infrastructure make these lines more susceptible to equipment failures and more vulnerable to foreign object contacts, both risk events that could lead to ignitions. The initial scoping and decision making for each traditional hardening project was developed with the WiNGS model, with inputs from the Wildfire Risk Reduction Model (WRRM), that assesses the relative risk of fire for various assets. WRRM conducts a risk assessment at every pole and span, using that asset's characteristics and geographic meteorological and environmental conditions to calculate risk metrics that are then used in the WiNGS model to determine what part of a circuit is to be hardened with traditional hardening as the most cost-effective mitigation technology. Relative to Covered Conductor and Strategic Undergrounding, the Traditional Hardening effort is expected to be much smaller in scope in 2022 and future years, as these initiatives provide greater wildfire risk reduction and reduce PSPS impacts.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20284.0
Category: C. Grid Design and System Hardening
Category-Sub: 5. Overhead System Traditional Hardening
Workpaper Group: 202840 - OH SYSTEM TRADITIONAL HARDENING

Forecast Methodology:

Labor - Base YR Rec

The base-year forecast methodology was selected as most indicative of future work. Several historical programs including FiRM, PRiME, and WiSE were consolidated into the Overhead System Traditional Hardening program in 2020. Historical costs prior to 2020 will not accurately represent the current project scope. Accordingly, 2021 base year expenses are most representative of future needs.

Non-Labor - Base YR Rec

The base-year forecast methodology was selected as most indicative of future work. Several historical programs including FiRM, PRiME, and WiSE were consolidated into the Overhead System Traditional Hardening program in 2020. Historical costs prior to 2020 will not accurately represent the current project scope. Accordingly, 2021 base year expenses are most representative of future needs.

NSE - Base YR Rec

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20284.0
Category: C. Grid Design and System Hardening
Category-Sub: 5. Overhead System Traditional Hardening
Workpaper Group: 202840 - OH SYSTEM TRADITIONAL HARDENING

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Base YR Rec	6,300	6,300	6,300	-5,505	-6,004	-6,004	795	296	296
Non-Labor	Base YR Rec	87,673	87,673	87,673	-72,157	-82,490	-82,490	15,516	5,183	5,183
NSE	Base YR Rec	0	0	0	0	0	0	0	0	0
Total		93,973	93,973	93,973	-77,662	-88,494	-88,494	16,311	5,479	5,479
FTE	Base YR Rec	41.8	41.8	41.8	-35.3	-39.4	-39.4	6.5	2.4	2.4

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022	-5,505	-72,157	0	-77,662	-35.3
Explanation: Reducing units from 100 miles to 25 as the program ramps down.					
2022 Total	-5,505	-72,157	0	-77,662	-35.3
2023	-6,004	-82,490	0	-88,494	-39.4
Explanation: Reducing units from 100 miles to 5 miles as the program ramps down.					
2023 Total	-6,004	-82,490	0	-88,494	-39.4
2024	-6,004	-82,490	0	-88,494	-39.4
Explanation: Reducing units from 100 miles to 5 miles as the program reaches a steady state of remaining work units.					
2024 Total	-6,004	-82,490	0	-88,494	-39.4

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20284.0
Category: C. Grid Design and System Hardening
Category-Sub: 5. Overhead System Traditional Hardening
Workpaper Group: 202840 - OH SYSTEM TRADITIONAL HARDENING

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	2,564	4,722	8,659	4,733	5,477
Non-Labor	51,568	48,196	114,085	132,070	87,673
NSE	0	0	0	0	0
Total	54,132	52,918	122,745	136,803	93,151
FTE	19.6	32.5	36.1	24.3	12.4
Adjustments (Nominal \$) **					
Labor	0	-3	0	-14	0
Non-Labor	0	-1	0	-227	0
NSE	0	0	0	0	0
Total	0	-4	0	-240	0
FTE	0.0	1.6	17.3	7.9	23.3
Recorded-Adjusted (Nominal \$)					
Labor	2,564	4,719	8,659	4,720	5,477
Non-Labor	51,568	48,195	114,086	131,843	87,673
NSE	0	0	0	0	0
Total	54,132	52,914	122,745	136,563	93,151
FTE	19.6	34.1	53.4	32.2	35.7
Vacation & Sick (Nominal \$)					
Labor	380	715	1,240	669	823
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	380	715	1,240	669	823
FTE	3.3	5.7	8.6	5.2	6.1
Escalation to 2021\$					
Labor	578	763	960	246	0
Non-Labor	10,131	6,766	11,063	6,025	0
NSE	0	0	0	0	0
Total	10,709	7,528	12,023	6,271	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	3,522	6,197	10,859	5,635	6,300
Non-Labor	61,699	54,960	125,149	137,868	87,673
NSE	0	0	0	0	0
Total	65,222	61,157	136,008	143,503	93,973
FTE	22.9	39.8	62.0	37.4	41.8

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20284.0
Category: C. Grid Design and System Hardening
Category-Sub: 5. Overhead System Traditional Hardening
Workpaper Group: 202840 - OH SYSTEM TRADITIONAL HARDENING

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
Labor	0	-3	0	-14	0
Non-Labor	0	-1	0	-227	0
NSE	0	0	0	0	0
Total	0	-4	0	-240	0
FTE	0.0	1.6	17.3	7.9	23.3

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017 Total	0	0	0	0	0.0
2018	-3	-1	0	-4	-0.1
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2018	0.001	0	0	0.001	1.7
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2018 Total	-3	-1	0	-4	1.6
2019	0	1	0	1	0.0
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2019	-0.015	-1	0	-1	-0.1
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2019	0.001	0	0	0.001	11.1
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2019	0.001	0	0	0.001	6.3
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2019 Total	-0.013	0.188	0	0.175	17.3
2020	-0.194	-107	0	-108	-0.1
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2020	0	-0.776	0	-0.776	0.0
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2020	-11	-76	0	-86	-0.1
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20284.0
Category: C. Grid Design and System Hardening
Category-Sub: 5. Overhead System Traditional Hardening
Workpaper Group: 202840 - OH SYSTEM TRADITIONAL HARDENING

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2020	0	-9	0	-9	0.0
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2020	-3	-34	0	-37	-0.1
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2020	0.001	0	0	0.001	0.5
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2020	0.001	0	0	0.001	7.7
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2020 Total	-14	-227	0	-240	7.9
2021	0.001	0	0	0.001	23.3
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2021 Total	0.001	0	0	0.001	23.3

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 202840**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 20284.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 5. Overhead System Traditional Hardening
 Workpaper Group: 202840 - OH SYSTEM TRADITIONAL HARDENING
 Workpaper Detail: 202840.001 - RAMP OH System Traditional Hardening
 In-Service Date: Not Applicable
 Description:

The Electric System Hardening (ESH) Overhead (OH) Traditional Hardening program is focused on hardening SDG&E's overhead distribution facilities within the HFTD Tier 3, Tier 2, and the WUI by implementing long-term solutions focused on significant reduction of both the fire risk and impact to the public due to PSPS events. The primary objective of this program encompasses the rebuilding of the distribution system in fire prone areas with new, stronger bare primary conductors. The priority and scope of the projects will be dictated by full circuit analysis using the WINGS model, and input gathered from operational teams.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	795	296	296
Non-Labor	15,516	5,183	5,183
NSE	0	0	0
Total	16,311	5,479	5,479
FTE	6.5	2.4	2.4

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20284.0
Category: C. Grid Design and System Hardening
Category-Sub: 5. Overhead System Traditional Hardening
Workpaper Group: 202840 - OH SYSTEM TRADITIONAL HARDENING
Workpaper Detail: 202840.001 - RAMP OH System Traditional Hardening

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C17/M12 T1-T3

RAMP Line Item Name: OH Dist Fire Hardening Bare Conductor

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2; Tranche3: Non-HFTD

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$) Low High	
Tranche 1 Cost Estimate	39,469	6,851	5,479	5,479	17,809	4,500	5,500
Tranche 2 Cost Estimate	50,745	8,808	0	0	8,808	0	0
Tranche 3 Cost Estimate	3,759	652	0	0	652	0	0

Cost Estimate Changes from RAMP:

The GRC unit forecast is outside the RAMP range due to forecast and scope updates . At the time of RAMP filing, it was expected that only five miles would be completed in 2022. However, work not completed in 2021 is expected to be permitted and ready for construction through 2024.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities Low High	
Tranche 1 # of miles hardened	42.00	10.50	5.00	5.00	20.50	5.00	6.00
Tranche 2 # of miles hardened	54.00	13.50	0.00	0.00	13.50	0.00	0.00
Tranche 3 # of miles hardened	4.00	1.00	0.00	0.00	1.00	0.00	0.00

Work Unit Changes from RAMP:

The GRC unit forecast is outside the RAMP range due to forecast and scope updates . At the time of RAMP filing, it was expected that only five miles would be completed in 2022. However, work not completed in 2021 is expected to be permitted and ready for construction through 2024.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20284.0
Category: C. Grid Design and System Hardening
Category-Sub: 5. Overhead System Traditional Hardening
Workpaper Group: 202840 - OH SYSTEM TRADITIONAL HARDENING
Workpaper Detail: 202840.001 - RAMP OH System Traditional Hardening

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	41.000	52.700
Tranche 2	0.000	52.700
Tranche 3	0.000	0.000

RSE Changes from RAMP:

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2).

Beginning of Workpaper Group
192420 - HFTD Expulsion Fuse Replacement

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19242.0
Category: C. Grid Design and System Hardening
Category-Sub: 6. Expulsion Fuse Replacements
Workpaper Group: 192420 - HFTD Expulsion Fuse Replacement

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	1,274	2,021	573	70	0	0
Non-Labor	Zero-Based	0	0	2,670	4,555	5,480	772	0	0
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	3,944	6,576	6,053	842	0	0
FTE	Zero-Based	0.0	0.0	6.4	11.0	3.6	0.5	0.0	0.0

Business Purpose:

Fuses act as electrical safety devices that operate to provide overcurrent protection of an electrical circuit. This project will proactively replace at-risk electric distribution cutout bodies and fuses in Tier 2 and 3 of the HFTD with CAL FIRE-approved devices in order to reduce the risk of wildfire ignition. Infrastructure upgrades as required to facilitate these fuse changeouts may also be implemented.

Physical Description:

This project will replace existing expulsion fuses and other necessary hardware with CAL FIRE -approved cutout body and fuse assemblies.

Project Justification:

At risk fuse and associated cutout body removals and replacements will deliver wildfire risk reductions associated with expulsion fuse operation.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19242.0
Category: C. Grid Design and System Hardening
Category-Sub: 6. Expulsion Fuse Replacements
Workpaper Group: 192420 - HFTD Expulsion Fuse Replacement

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details. The forecast for this budget code is based on the number of fuse replacements completed, and the scoping for these jobs is complete.

Non-Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details. The forecast for this budget code is based on the number of fuse replacements completed, and the scoping for these jobs is complete.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19242.0
Category: C. Grid Design and System Hardening
Category-Sub: 6. Expulsion Fuse Replacements
Workpaper Group: 192420 - HFTD Expulsion Fuse Replacement

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	70	0	0	0	0	0	70	0	0
Non-Labor	Zero-Based	772	0	0	0	0	0	772	0	0
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		842	0	0	0	0	0	842	0	0
FTE	Zero-Based	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19242.0
Category: C. Grid Design and System Hardening
Category-Sub: 6. Expulsion Fuse Replacements
Workpaper Group: 192420 - HFTD Expulsion Fuse Replacement

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	1,016	1,693	498
Non-Labor	0	0	2,434	4,356	5,480
NSE	0	0	0	0	0
Total	0	0	3,450	6,049	5,978
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	5.5	9.5	3.1
Recorded-Adjusted (Nominal \$)					
Labor	0	0	1,016	1,693	498
Non-Labor	0	0	2,434	4,356	5,480
NSE	0	0	0	0	0
Total	0	0	3,450	6,049	5,978
FTE	0.0	0.0	5.5	9.5	3.1
Vacation & Sick (Nominal \$)					
Labor	0	0	146	240	75
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	146	240	75
FTE	0.0	0.0	0.9	1.5	0.5
Escalation to 2021\$					
Labor	0	0	113	88	0
Non-Labor	0	0	236	199	0
NSE	0	0	0	0	0
Total	0	0	349	287	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	1,274	2,021	573
Non-Labor	0	0	2,670	4,555	5,480
NSE	0	0	0	0	0
Total	0	0	3,944	6,576	6,053
FTE	0.0	0.0	6.4	11.0	3.6

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19242.0
Category: C. Grid Design and System Hardening
Category-Sub: 6. Expulsion Fuse Replacements
Workpaper Group: 192420 - HFTD Expulsion Fuse Replacement

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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	5.5	9.5	3.1

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017 Total	0	0	0	0	0.0
2018 Total	0	0	0	0	0.0
2019	0.001	0	0	0.001	5.5
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2019 Total	0.001	0	0	0.001	5.5
2020	0.001	0	0	0.001	9.5
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2020 Total	0.001	0	0	0.001	9.5
2021	0.001	0	0	0.001	3.1
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2021 Total	0.001	0	0	0.001	3.1

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 192420**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19242.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 6. Expulsion Fuse Replacements
 Workpaper Group: 192420 - HFTD Expulsion Fuse Replacement
 Workpaper Detail: 192420.001 - RAMP HFTD Expulsion Fuse Replacements
 In-Service Date: Not Applicable
 Description:

This project will proactively replace at risk electric distribution cutout bodies and fuses in HFTD Tier 2 and Tier 3 with Cal Fire approved devices in order to reduce the risk of wildfire ignition. Infrastructure upgrades as required to facilitate these fuse changeouts may also be implemented. This work is pursuant to Wildfire Mitigation Plan (WMP) scoping.

Forecast In 2021 \$(000)				
	Years	2022	2023	2024
Labor		70	0	0
Non-Labor		772	0	0
NSE		0	0	0
	Total	842	0	0
FTE		0.5	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19242.0
Category: C. Grid Design and System Hardening
Category-Sub: 6. Expulsion Fuse Replacements
Workpaper Group: 192420 - HFTD Expulsion Fuse Replacement
Workpaper Detail: 192420.001 - RAMP HFTD Expulsion Fuse Replacements

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C08/M3 T2

RAMP Line Item Name: Expulsion Fuse Replacements

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$) Low High	
Tranche 1 Cost Estimate	0	0	0	0	0	0	0
Tranche 2 Cost Estimate	6,052	842	0	0	842	2,771	3,387

Cost Estimate Changes from RAMP:

The GRC forecast is outside the RAMP range due to additional installations being completed in prior years . The program has less forecasted fuses remaining to replace before all HFTD fuses are completed in 2022.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities Low High	
Tranche 1 # of fuses replaced	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tranche 2 # of fuses replaced	3,507.00	100.00	0.00	0.00	100.00	815.00	997.00

Work Unit Changes from RAMP:

The GRC forecast is outside the RAMP range due to additional installations being completed in prior years . The program has less forecasted fuses remaining to replace before all HFTD fuses are completed in 2022.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000
Tranche 2	0.000	0.000

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19242.0
Category: C. Grid Design and System Hardening
Category-Sub: 6. Expulsion Fuse Replacements
Workpaper Group: 192420 - HFTD Expulsion Fuse Replacement
Workpaper Detail: 192420.001 - RAMP HFTD Expulsion Fuse Replacements

RSE Changes from RAMP:

An RSE was not calculated for this activity.

Supplemental Workpapers for Workpaper Group 192420

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Fuse Replacements in High Fire Threat District

Budget Code **19242**
Budget Code Name **HFTD Fuse Upgrades**

GRC Request		2022	2023	2024
Labor		\$ 69,504	\$ -	\$ -
Non-Labor		\$ 626,020	\$ -	\$ -
Cost Breakdown		2022	2023	2024
Unit Cost				
Labor	Hourly Rate	\$ 64	\$ -	\$ -
Services	Dollars	\$ 2,790	\$ -	\$ -
Units		2022	2023	2024
Labor	Hours	1,086	-	-
Fuses + Services	Ea	277	-	-
Total		2022	2023	2024
Labor		\$ 69,504	\$ -	\$ -
Services		\$ 772,830	\$ -	\$ -
		<u>\$ 842,334</u>	<u>\$ -</u>	<u>\$ -</u>

Additional Notes:

Fuse replacement program in HFTD is expected to close out at the end of 2022.

Labor includes construction labor for installation of fuses on circuit.

Installation of replacement fuse is approximately four hours per structure and requires the use of two assist trucks with lifts. Construction labor includes one 2-man electrical crew, two troubleman, and one service

Fuse material cost varies per unit based on the job site and type of fuse.

Beginning of Workpaper Group
152590 - Advanced Protection

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 15259.0
Category: C. Grid Design and System Hardening
Category-Sub: 7. Advanced Protection
Workpaper Group: 152590 - Advanced Protection

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	475	187	582	1,083	1,219	1,217	1,217	1,217
Non-Labor	Zero-Based	3,940	1,117	3,254	8,500	9,568	11,566	10,345	4,323
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		4,415	1,304	3,836	9,583	10,787	12,783	11,562	5,540
FTE	Zero-Based	3.3	1.4	4.1	7.1	8.6	12.0	12.0	12.0

Business Purpose:

The purpose of this project is to replace aging circuit breakers and/or obsolete electromechanical relays and to create a more comprehensive protection system with installation of Distribution Supervisory Control and Data Acquisition (SCADA).

Substation improvements include the following:

- Reconfiguration of 12kV circuit breakers and relays to meet reliability and safety standards.
- Installation of Distribution SCADA.
- Installation of new transformer bank relays.
- Installation of new 12kV Bus Differential relays.
- Installation of microprocessor feeder relays.

Advanced Protection devices to enhance feeder protection, reduce fire risk, and enable opportunities include:

- o Falling conductor logic
- o Downed conductor detection (DCD)
- o Arc sensing technology (AST)
- o Advanced SGF (spike counting/adaptive set-point)
- o Remote event retrieval
- o Remote setting changes

Physical Description:

The Advanced Protection Program includes installation of new circuit breakers, relays, and distribution SCADA.

Project Justification:

This project will upgrade distribution relaying and associated circuit breakers at select substation locations and improve system visibility for operators. It will allow for implementation of new relay standards with improved coordination in locations where device coordination is difficult due to lower fault currents. Lastly, once field devices are upgraded, it will allow for communication between field devices and substation feeder relays. These Advanced Protection schemes can de-energize broken conductor before it makes contact with the ground, reducing the chance of ignition, and limit the available fault current when faults on the system do occur.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 15259.0
Category: C. Grid Design and System Hardening
Category-Sub: 7. Advanced Protection
Workpaper Group: 152590 - Advanced Protection

Forecast Methodology:

Labor - Zero-Based

The forecast method developed for this cost category is zero-based. This method is most appropriate because Advanced Protection hardware needs vary across each site and vendor services incorporate numerous contracts over this period. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method developed for this cost category is zero-based. This method is most appropriate because Advanced Protection hardware needs vary across each site and vendor services incorporate numerous contracts over this period. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 15259.0
Category: C. Grid Design and System Hardening
Category-Sub: 7. Advanced Protection
Workpaper Group: 152590 - Advanced Protection

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	1,217	1,217	1,217	0	0	0	1,217	1,217	1,217
Non-Labor	Zero-Based	11,566	10,345	4,323	0	0	0	11,566	10,345	4,323
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		12,783	11,562	5,540	0	0	0	12,783	11,562	5,540
FTE	Zero-Based	12.0	12.0	12.0	0.0	0.0	0.0	12.0	12.0	12.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 15259.0
Category: C. Grid Design and System Hardening
Category-Sub: 7. Advanced Protection
Workpaper Group: 152590 - Advanced Protection

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	345	143	464	907	1,060
Non-Labor	3,293	979	2,966	8,129	9,568
NSE	0	0	0	0	0
Total	3,639	1,122	3,431	9,035	10,628
FTE	2.8	1.2	3.5	5.1	6.0
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	1.0	1.4
Recorded-Adjusted (Nominal \$)					
Labor	345	143	464	907	1,060
Non-Labor	3,293	979	2,966	8,129	9,568
NSE	0	0	0	0	0
Total	3,639	1,122	3,431	9,035	10,628
FTE	2.8	1.2	3.5	6.1	7.4
Vacation & Sick (Nominal \$)					
Labor	51	22	66	129	159
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	51	22	66	129	159
FTE	0.5	0.2	0.6	1.0	1.2
Escalation to 2021\$					
Labor	78	23	51	47	0
Non-Labor	647	137	288	371	0
NSE	0	0	0	0	0
Total	725	161	339	419	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	475	187	582	1,083	1,219
Non-Labor	3,940	1,117	3,254	8,500	9,568
NSE	0	0	0	0	0
Total	4,415	1,304	3,836	9,583	10,787
FTE	3.3	1.4	4.1	7.1	8.6

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 15259.0
Category: C. Grid Design and System Hardening
Category-Sub: 7. Advanced Protection
Workpaper Group: 152590 - Advanced Protection

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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	1.0	1.4

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017 Total	0	0	0	0	0.0
2018 Total	0	0	0	0	0.0
2019 Total	0	0	0	0	0.0
2020	0.001	0	0	0.001	1.0
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2020 Total	0.001	0	0	0.001	1.0
2021	0.001	0	0	0.001	1.4
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2021 Total	0.001	0	0	0.001	1.4

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 152590**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 15259.0
Category: C. Grid Design and System Hardening
Category-Sub: 7. Advanced Protection
Workpaper Group: 152590 - Advanced Protection
Workpaper Detail: 152590.001 - RAMP - Advanced Protection

In-Service Date: Not Applicable

Description:

The purpose of this project is to replace aging circuit breakers and/or obsolete electromechanical relays, to create a more comprehensive protection system by taking advantage of newer field technologies under installation by the FiRM project, and to create visibility in fire threat areas with installation of Distribution SCADA. Some of the substations addressed by this project do not have distribution SCADA and has obsolete distribution relaying without fault locating capability.

The objectives of this project are to replace aging equipment, improve distribution reliability, and improve fire safety the substations:

- Reconfiguration of 12kV circuit breakers and relays to meet reliability and safety standards.
- Installation of Distribution SCADA.
- Installation of new transformer bank relays
- Installation of new 12kV Bus Differential relays
- Installation of microprocessor feeder relays.
- Install Advanced Protection devices to enhance feeder protection , reduce fire risk, and enable opportunities such as:
 - o Falling conductor logic
 - o Downed conductor detection (DCD)
 - o Arc sensing technology (AST)
 - o Advanced SGF (spike counting/adaptive set-point)
 - o Remote event retrieval
 - o Remote setting changes

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	1,034	1,034	1,034
Non-Labor	9,831	8,793	3,675
NSE	0	0	0
Total	10,865	9,827	4,709
FTE	10.2	10.2	10.2

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 15259.0
Category: C. Grid Design and System Hardening
Category-Sub: 7. Advanced Protection
Workpaper Group: 152590 - Advanced Protection
Workpaper Detail: 152590.001 - RAMP - Advanced Protection

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C11/M6 T1

RAMP Line Item Name: Advanced Protection

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$) Low High	
Tranche 1 Cost Estimate	10,787	12,783	11,562	5,540	29,885	27,564	33,689
Tranche 2 Cost Estimate	0	0	0	0	0	0	0

Cost Estimate Changes from RAMP:

GRC forecast is within the RAMP range.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities Low High	
Tranche 1 # of circuits enabled	4.00	15.00	15.00	8.00	38.00	22.00	26.00
Tranche 2 # of circuits enabled	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

The GRC unit forecast is outside the RAMP range due to additional circuits that were delayed in 2021 being pushed out into 2022 and 2023.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	832.000	309.000
Tranche 2	0.000	0.000

RSE Changes from RAMP:

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 15259.0
Category: C. Grid Design and System Hardening
Category-Sub: 7. Advanced Protection
Workpaper Group: 152590 - Advanced Protection
Workpaper Detail: 152590.001 - RAMP - Advanced Protection

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2).

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 15259.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 7. Advanced Protection
 Workpaper Group: 152590 - Advanced Protection
 Workpaper Detail: 152590.002 - Advanced Protection - Electric General (Same RAMP item as 152590.001)

In-Service Date: Not Applicable

Description:

The purpose of this project is to replace aging circuit breakers and/or obsolete electromechanical relays, to create a more comprehensive protection system by taking advantage of newer field technologies under installation by the FiRM project, and to create visibility in fire threat areas with installation of Distribution SCADA.
 Some of the substations addressed by this project do not have distribution SCADA and has obsolete distribution relaying without fault locating capability.

The objectives of this project are to replace aging equipment, improve distribution reliability, and improve fire safety the substations:

- Reconfiguration of 12kV circuit breakers and relays to meet reliability and safety standards.
- Installation of Distribution SCADA.
- Installation of new transformer bank relays
- Installation of new 12kV Bus Differential relays
- Installation of microprocessor feeder relays.
- Install Advanced Protection devices to enhance feeder protection , reduce fire risk, and enable opportunities such as:
 - o Falling conductor logic
 - o Downed conductor detection (DCD)
 - o Arc sensing technology (AST)
 - o Advanced SGF (spike counting/adaptive set-point)
 - o Remote event retrieval
 - o Remote setting changes

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	183	183	183
Non-Labor	1,735	1,552	648
NSE	0	0	0
Total	1,918	1,735	831
FTE	1.8	1.8	1.8

Note: Totals may include rounding differences.

Supplemental Workpapers for Workpaper Group 152590

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Advanced Protection

Budget Code **15259**
Budget Code Name **Advanced Protection**

GRC Request	2022	2023	2024
Labor	\$ 1,216,800	\$ 1,216,800	\$ 1,216,800
Non-Labor	\$ 11,565,998	\$ 10,344,998	\$ 4,323,000

Cost Breakdown

Unit Cost

Labor	Monthly Rate	\$ 101,400	\$ 101,400	\$ 101,400
Non-Labor, Includes Equipment*	Per Circuit*	\$ 771,067	\$ 689,667	\$ 540,375

Units

SCADA & Relay Technicians	Monthly Rate	\$8,600	\$8,600	\$8,600
Senior Engineers, Engineers, Team Leads	Monthly Rate	\$92,800	\$92,800	\$92,800
Circuits		15	15	8

Total	2022	2023	2024
Labor	\$ 1,216,800	\$ 1,216,800	\$ 1,216,800
Circuits	\$ 11,565,998	\$ 10,344,998	\$ 4,323,000
	<u>\$ 12,782,798</u>	<u>\$ 11,561,798</u>	<u>\$ 5,539,800</u>

***Equipment Average Unit Cost**

Equipment for Substation Upgrade

Circuit Breakers	\$35,000
Circuit Breaker Relays	\$9,000
Synchrophasor Panel Assemblies	\$22,000

Equipment installed on Circuit

Advanced SCADA Device Radios	\$6,000
Distribution Reclosers	\$40,000
Line Monitors	\$14,000
Steel Poles	\$15,000

Notes:

*Unit costs are projected to come down over the three year timeframe as larger substation rebuilds are completed and the remaining circuits require less material and equipment for installation.

Equipment costs vary between substations and circuit projects depending on the scope of each project. Site visits and engineering analysis determine what equipment is required to be replaced or upgraded.

Units in RAMP only reflect Falling Conductor Protection installed on HFTD distribution circuits. In order to activate FCP, additional circuit breaker upgrades and installation of relay equipment is required within the substation serving the distribution circuit which is tracked via a separate project due to accounting requirements (distribution vs. substation work orders). Once both projects are completed, FCP is commissioned and activated.

Due to construction delays on two major projects, costs are forecasted to be on high side of RAMP estimate in 2022 and decrease more significantly in 2024. New projects which are not forecasted currently will drive full RAMP expenditures in subsequent years.

Beginning of Workpaper Group
202820 - Lightning Arrestor Replacement Program

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20282.0
Category: C. Grid Design and System Hardening
Category-Sub: 8. Lightning Arrestor Replacement Program
Workpaper Group: 202820 - Lightning Arrestor Replacement Program

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	0	8	442	655	1,184	1,138
Non-Labor	Zero-Based	0	0	0	12	1,353	3,558	2,419	2,419
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	0	21	1,795	4,213	3,603	3,557
FTE	Zero-Based	0.0	0.0	0.0	0.0	2.6	5.3	9.2	8.8

Business Purpose:

Lightning arrestors are installed on the distribution system throughout the service territory to protect electric power equipment from exceeding thermal insulation ratings in the event of surge voltages due to lightning strikes or other faults. The lightning arrestor enables a surge in the current to be diverted through the arrestor to a ground terminal and protect the insulation and conductors on the distribution system. The lightning arrestor replacement program utilizes new technology to reduce the risk of equipment-related failures and ignitions. Through this process, a new lightning arrestor standard product was introduced that received CAL FIRE approval. The purpose of this project is to replace outdated lightning arrestors with the CAL FIRE-approved lightning arrestors.

Embedded within this budget code is also work related to avian protection. SDG&E will bundle these types of jobs together to avoid revisiting the same pole and causing multiple planned outages for customers. The avian protection program seeks to install avian protection equipment or otherwise rearrange distribution poles to prevent avian contact with energized conductor. This is in compliance with the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and codes defined by the California Department of Fish and Game. This will harden the system, reducing the risk of ignition associated with avian contact, improve reliability, and align with Avian Power Line Interaction Committee (APLIC) Guidelines.

Physical Description:

This program will replace outdated lightning arrestors with CAL FIRE-approved lightning arrestors within the HFTD and WUI. Avian protection work will assess all distribution lines and poles in the overhead distribution system within the HFTD that either 1) lie within the Avian Protection Zone, or 2) have associated known bird contacts, and resolve potential avian risks through installing avian protection equipment or otherwise rearranging equipment.

Project Justification:

When thermally overloaded, existing lightning arrestors can become an ignition source. Utilizing the CAL FIRE-approved lightning arrestors with Spark Prevention Unit (SPU) will reduce the ratio of lightning arrestor operation-caused ignitions per lightning arrestor operation over time.

Avian protection work will reduce the risk of ignition associated with avian contact and ensure SDG &E is in compliance with State and Federal guidelines including the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and codes defined by the California Department of Fish and Game.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20282.0
Category: C. Grid Design and System Hardening
Category-Sub: 8. Lightning Arrestor Replacement Program
Workpaper Group: 202820 - Lightning Arrestor Replacement Program

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. This budget code has minimal historical costs prior to 2021. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details. The forecast is based on the number of lightning arrestors being replaced each year, and this work has been scoped through 2024.

Non-Labor - Zero-Based

The forecast method used is zero based. This budget code has minimal historical costs prior to 2021. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details. The forecast is based on the number of lightning arrestors being replaced each year, and this work has been scoped through 2024.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20282.0
Category: C. Grid Design and System Hardening
Category-Sub: 8. Lightning Arrestor Replacement Program
Workpaper Group: 202820 - Lightning Arrestor Replacement Program

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	655	1,184	1,138	0	0	0	655	1,184	1,138
Non-Labor	Zero-Based	3,558	2,419	2,419	0	0	0	3,558	2,419	2,419
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		4,213	3,603	3,557	0	0	0	4,213	3,603	3,557
FTE	Zero-Based	5.3	9.2	8.8	0.0	0.0	0.0	5.3	9.2	8.8

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20282.0
Category: C. Grid Design and System Hardening
Category-Sub: 8. Lightning Arrestor Replacement Program
Workpaper Group: 202820 - Lightning Arrestor Replacement Program

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	0	7	385
Non-Labor	0	0	0	12	1,353
NSE	0	0	0	0	0
Total	0	0	0	19	1,737
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	2.2
Recorded-Adjusted (Nominal \$)					
Labor	0	0	0	7	385
Non-Labor	0	0	0	12	1,353
NSE	0	0	0	0	0
Total	0	0	0	19	1,737
FTE	0.0	0.0	0.0	0.0	2.2
Vacation & Sick (Nominal \$)					
Labor	0	0	0	1	58
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	0	1	58
FTE	0.0	0.0	0.0	0.0	0.4
Escalation to 2021\$					
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 2021\$)					
Labor	0	0	0	8	442
Non-Labor	0	0	0	12	1,353
NSE	0	0	0	0	0
Total	0	0	0	21	1,795
FTE	0.0	0.0	0.0	0.0	2.6

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20282.0
Category: C. Grid Design and System Hardening
Category-Sub: 8. Lightning Arrestor Replacement Program
Workpaper Group: 202820 - Lightning Arrestor Replacement Program

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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	2.2

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017 Total	0	0	0	0	0.0
2018 Total	0	0	0	0	0.0
2019 Total	0	0	0	0	0.0
2020 Total	0	0	0	0	0.0
2021	0.001	0	0	0.001	2.2
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2021 Total	0.001	0	0	0.001	2.2

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 202820**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 20282.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 8. Lightning Arrestor Replacement Program
 Workpaper Group: 202820 - Lightning Arrestor Replacement Program
 Workpaper Detail: 202820.001 - RAMP Lightning Arrestor Replacement Program
 In-Service Date: Not Applicable
 Description:

SDG&E analyzes equipment data, reliability data, and ignition data, together with equipment technology innovation in the industry, to propose programs that target high risk equipment with ignition history. SDG&E's lightning arrestor replacement program is an example of how SDG&E is exploring new technology to reduce the risk of equipment-related failures and ignitions. Through this process, a new lightning arrestor standard product was introduced that recieved CAL FIRE approval.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	286	809	763
Non-Labor	2,559	1,423	1,423
NSE	0	0	0
Total	2,845	2,232	2,186
FTE	2.2	6.1	5.7

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20282.0
Category: C. Grid Design and System Hardening
Category-Sub: 8. Lightning Arrestor Replacement Program
Workpaper Group: 202820 - Lightning Arrestor Replacement Program
Workpaper Detail: 202820.001 - RAMP Lightning Arrestor Replacement Program

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C21/M14 T1

RAMP Line Item Name: Lightning Arrestor Removal/Replacement Program

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	373	1,152	2,005	1,964	5,121	7,051	8,618
Tranche 2 Cost Estimate	1,421	1,693	227	222	2,142	0	0

Cost Estimate Changes from RAMP:

The GRC forecast is outside the RAMP range due to forecast and scope updates between tranche activities.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 # of Lightning Arrestors	377.00	748.00	1,660.00	1,660.00	4,068.00	4,990.00	6,098.00
Tranche 2 # of Lightning Arrestors	1,435.00	1,100.00	188.00	188.00	1,476.00	0.00	0.00

Work Unit Changes from RAMP:

The GRC unit forecast is outside the RAMP range due to forecast and scope updates between tranche activities.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	245.000	112.800
Tranche 2	52.000	112.800

RSE Changes from RAMP:

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20282.0
Category: C. Grid Design and System Hardening
Category-Sub: 8. Lightning Arrestor Replacement Program
Workpaper Group: 202820 - Lightning Arrestor Replacement Program
Workpaper Detail: 202820.001 - RAMP Lightning Arrestor Replacement Program

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2).

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20282.0
Category: C. Grid Design and System Hardening
Category-Sub: 8. Lightning Arrestor Replacement Program
Workpaper Group: 202820 - Lightning Arrestor Replacement Program
Workpaper Detail: 202820.002 - RAMP - Avian Protection HFTD

In-Service Date: Not Applicable

Description:

Identify and retro-fit, rearrange, or build-to-standard distribution poles in the SDG&E service territory to prevent electrocution of birds in compliance with:

1. Migratory Bird Treaty Act
2. Bald and Golden Eagle Protection Act
3. Codes defined by California Department of Fish and Game

The project will also:

1. Harden the system and reduce fire risk associated with avian electrocutions
2. Improve SDG&E reliability and customer service
3. Will align with Avian Power Line Interaction Committee (APLIC) Guidelines

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	369	375	375
Non-Labor	999	996	996
NSE	0	0	0
Total	1,368	1,371	1,371
FTE	3.1	3.1	3.1

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20282.0
Category: C. Grid Design and System Hardening
Category-Sub: 8. Lightning Arrestor Replacement Program
Workpaper Group: 202820 - Lightning Arrestor Replacement Program
Workpaper Detail: 202820.002 - RAMP - Avian Protection HFTD

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-2 Electric Infrastructure Integrity

RAMP Line Item ID: C08

RAMP Line Item Name: Avian Protection Program

Tranche(s): Tranche1: OH Distribution

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	0	1,368	1,371	1,371	4,110	1,591	1,967

Cost Estimate Changes from RAMP:

The GRC forecast for this mitigation is split with another witness area (SDG&E- 11 Electric Distribution Capital), and is outside the RAMP range due to this mitigation not being forecasted as part of WMP at the time of the RAMP filing .

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 # of poles protected	0.00	570.00	570.00	570.00	1,710.00	255.00	315.00

Work Unit Changes from RAMP:

The GRC forecast for this mitigation is split with another witness area (SDG&E- 11 Electric Distribution Capital), and is outside the RAMP range due to this mitigation not being forecasted as part of WMP at the time of the RAMP filing .
Change in units from RAMP filing (poles protected vs avian covers).

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	226.000	0.000

RSE Changes from RAMP:

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2)

Supplemental Workpapers for Workpaper Group 202820

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Lightning Arrestor Replacement

Budget Code **20282.001**
Budget Code Name **Lightning Arrestors**

GRC Request	2022	2023	2024
Labor	\$ 591,360	\$ 591,360	\$ 591,360
Non-Labor	\$ 2,254,560	\$ 1,641,024	\$ 1,594,824

Cost Breakdown	2022	2023	2024
Unit Cost			
Labor Hourly Rate	\$ 64	\$ 64	\$ 64
Construction Services and Material Ea	\$ 1,220	\$ 888	\$ 863

Units	2022	2023	2024
Labor Hrs	9,240	9,240	9,240
Construction Services and Material Ea	1,848	1,848	1,848

Total	2022	2023	2024
Labor	\$ 591,360	\$ 591,360	\$ 591,360
Construction Services and Material	\$ 2,254,560	\$ 1,641,024	\$ 1,594,824
	<u>\$ 2,845,920</u>	<u>\$ 2,232,384</u>	<u>\$ 2,186,184</u>

Additional Notes:

Construction services for installation of lightning arrestors are based on historical labor rates and spend. Material costs vary by contract and location but average to be approximately \$450-500/lightning arrestor. Construction service costs decrease significantly between 2022 and 2023 due to efficiencies gained from colocated projects. Lightning arrestor projects colocated with other high volume overhead projects including installation of avian protection, fuses, and hotline clamps will increase between 2022 and 2023 and result in lower service costs. Construction assumes five hours per lightning arrestor installation and two lightning arrestors per pole. Typical lightning arrestor installation uses a four person crew consisting of a working foreman and the use of two assist trucks with lift.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Avian Protection

Budget Code **20282.002**
Budget Code Name **Avian Protection HFTD**

GRC Request	2022	2023	2024
Labor	\$ 369,000	\$ 375,000	\$ 375,000
Non-Labor	\$ 999,000	\$ 996,000	\$ 996,000

Cost Breakdown	2022	2023	2024
Unit Cost			
Labor	Hourly Rate	\$ 64	\$ 64
Construction Services and Material	per Pole	\$ 1,752	\$ 1,747

Units	2022	2023	2024
Labor	Hrs	5,760	5,860
Construction Services and Material	Poles	570	570

Total	2022	2023	2024
Labor	\$ 368,640	\$ 375,040	\$ 375,040
Construction Services and Material	\$ 998,640	\$ 995,790	\$ 995,790
	<u>\$ 1,367,280</u>	<u>\$ 1,370,830</u>	<u>\$ 1,370,830</u>

Additional Notes:

Construction services for installation of avian protection vary by contract and location. Scope can vary depending on configuration of the pole and required work to bring up to standard.

Construction service costs decrease slightly between 2022 and 2023 due to efficiencies gained from colocated projects.

Construction assumes ten hours per pole.

Beginning of Workpaper Group
192490 - WMP Microgrids

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19249.0
Category: C. Grid Design and System Hardening
Category-Sub: 9. Microgrids
Workpaper Group: 192490 - WMP Microgrids

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	112	555	449	153	282	0
Non-Labor	Zero-Based	0	0	108	3,218	12,605	4,916	35,947	2,400
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	220	3,773	13,053	5,069	36,229	2,400
FTE	Zero-Based	0.0	0.0	0.9	4.3	3.2	1.3	2.3	0.0

Business Purpose:

The purpose of this project is to increase renewable back-up power infrastructure by building microgrids that can keep customers energized during PSPS events.

Physical Description:

Microgrids are constructed using solar generation and battery storage to enable the local critical infrastructure to stay energized during PSPS events.

Project Justification:

This project supports critical facilities and impacted areas during PSPS events. SDG&E's approved Wildfire Mitigation Plan includes investing in infrastructure (such as microgrids) to provide backup power at strategic locations to ensure resiliency during PSPS events and mitigate the impact of PSPS events to the community.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19249.0
Category: C. Grid Design and System Hardening
Category-Sub: 9. Microgrids
Workpaper Group: 192490 - WMP Microgrids

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The scope and size of the microgrids installed previously does not reflect the scope and size of microgrids forecast in future years. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. The scope and size of the microgrids installed previously does not reflect the scope and size of microgrids forecast in future years. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19249.0
Category: C. Grid Design and System Hardening
Category-Sub: 9. Microgrids
Workpaper Group: 192490 - WMP Microgrids

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	153	282	0	0	0	0	153	282	0
Non-Labor	Zero-Based	4,916	35,947	2,400	0	0	0	4,916	35,947	2,400
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		5,069	36,229	2,400	0	0	0	5,069	36,229	2,400
FTE	Zero-Based	1.3	2.3	0.0	0.0	0.0	0.0	1.3	2.3	0.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19249.0
Category: C. Grid Design and System Hardening
Category-Sub: 9. Microgrids
Workpaper Group: 192490 - WMP Microgrids

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	90	465	390
Non-Labor	0	0	98	3,077	12,605
NSE	0	0	0	0	0
Total	0	0	188	3,542	12,995
FTE	0.0	0.0	0.8	3.7	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	0.1
Recorded-Adjusted (Nominal \$)					
Labor	0	0	90	465	390
Non-Labor	0	0	98	3,077	12,605
NSE	0	0	0	0	0
Total	0	0	188	3,542	12,995
FTE	0.0	0.0	0.8	3.7	2.7
Vacation & Sick (Nominal \$)					
Labor	0	0	13	66	59
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	13	66	59
FTE	0.0	0.0	0.1	0.6	0.5
Escalation to 2021\$					
Labor	0	0	10	24	0
Non-Labor	0	0	10	141	0
NSE	0	0	0	0	0
Total	0	0	19	165	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	112	555	449
Non-Labor	0	0	108	3,218	12,605
NSE	0	0	0	0	0
Total	0	0	220	3,773	13,053
FTE	0.0	0.0	0.9	4.3	3.2

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19249.0
Category: C. Grid Design and System Hardening
Category-Sub: 9. Microgrids
Workpaper Group: 192490 - WMP Microgrids

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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	0.1

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017 Total	0	0	0	0	0.0
2018 Total	0	0	0	0	0.0
2019 Total	0	0	0	0	0.0
2020 Total	0	0	0	0	0.0
2021	0.001	0	0	0.001	0.1
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2021 Total	0.001	0	0	0.001	0.1

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 192490**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19249.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 9. Microgrids
 Workpaper Group: 192490 - WMP Microgrids
 Workpaper Detail: 192490.001 - RAMP Microgrids - Q1 2022 ISD
 In-Service Date: 04/30/2022

Description:

SDG&E s approved Wildfire Mitigation Plan includes a program which focuses on investing in infrastructure (such as microgrids) to provide backup power at strategic locations to ensure resiliency during Public Safety Power Shutoff (PSPS) events.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		34	0	0
Non-Labor		1,512	0	0
NSE		0	0	0
Total		1,546	0	0
FTE		0.4	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19249.0
Category: C. Grid Design and System Hardening
Category-Sub: 9. Microgrids
Workpaper Group: 192490 - WMP Microgrids
Workpaper Detail: 192490.001 - RAMP Microgrids - Q1 2022 ISD

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C10/M5 T2

RAMP Line Item Name: Microgrids

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$) Low High	
Tranche 1 Cost Estimate	0	0	0	0	0	0	0
Tranche 2 Cost Estimate	13,053	5,069	36,229	2,400	43,698	34,301	41,924

Cost Estimate Changes from RAMP:

The GRC forecast is outside the RAMP range due to forecast and scope updates . Specifically, additional scoping of off-grid power solutions in addition to the larger microgrids projects has been added after RAMP filing .

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities Low High	
Tranche 1 # of microgrids	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tranche 2 # of microgrids	0.00	0.00	3.00	0.00	3.00	3.00	3.00

Work Unit Changes from RAMP:

GRC forecasted unites is within the RAMP range.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000
Tranche 2	28.000	30.000

RSE Changes from RAMP:

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex.

SCG-03/SDG&E-03, Chapter 2)

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19249.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 9. Microgrids
 Workpaper Group: 192490 - WMP Microgrids
 Workpaper Detail: 192490.002 - RAMP Microgirds - RAAB Site (Same RAMP Item as 0192490.001)
 In-Service Date: 01/31/2022
 Description:

SDG&E s approved Wildfire Mitigation Plan includes a program which focuses on investing in infrastructure (such as microgrids) to provide backup power at strategic locations to ensure resiliency during Public Safety Power Shutoff (PSPS) events.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		51	0	0
Non-Labor		513	0	0
NSE		0	0	0
Total		564	0	0
FTE		0.3	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19249.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 9. Microgrids
 Workpaper Group: 192490 - WMP Microgrids
 Workpaper Detail: 192490.003 - RAMP Microgrids - 2023 ISDs (Same RAMP Item as 0192490.001)
 In-Service Date: 12/31/2023
 Description:

SDG&E s approved Wildfire Mitigation Plan includes a program which focuses on investing in infrastructure (such as microgrids) to provide backup power at strategic locations to ensure resiliency during Public Safety Power Shutoff (PSPS) events.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		68	282	0
Non-Labor		1,678	22,421	0
NSE		0	0	0
Total		1,746	22,703	0
FTE		0.6	2.3	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19249.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 9. Microgrids
 Workpaper Group: 192490 - WMP Microgrids
 Workpaper Detail: 192490.004 - RAMP Microgrids - 2023 ISD Solar Costs (Same RAMP Item as 0192490.001)
 In-Service Date: 12/31/2023
 Description:

SDG&E s approved Wildfire Mitigation Plan includes a program which focuses on investing in infrastructure (such as microgrids) to provide backup power at strategic locations to ensure resiliency during Public Safety Power Shutoff (PSPS) events.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	0	0	0
Non-Labor	963	12,526	0
NSE	0	0	0
Total	963	12,526	0
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19249.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 9. Microgrids
 Workpaper Group: 192490 - WMP Microgrids
 Workpaper Detail: 192490.005 - RAMP Microgrids - Off Grid Power Solutions (Same RAMP Item as 0192490.001)
 In-Service Date: Not Applicable
 Description:

SDG&E s approved Wildfire Mitigation Plan includes a program which focuses on investing in infrastructure (such as microgrids) to provide backup power at strategic locations to ensure resiliency during Public Safety Power Shutoff (PSPS) events.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		0	0	0
Non-Labor		250	1,000	2,400
NSE		0	0	0
Total		250	1,000	2,400
FTE		0.0	0.0	0.0

Note: Totals may include rounding differences.

Supplemental Workpapers for Workpaper Group 192490

TY2024 GRC FORECAST - DETAILS

Budget Code:	Multiple - WMP Microgrids
Estimated In Service:	Multiple and Ongoing

COR (%)

1%

19249 -					2022			2023			2024			Comments
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Metric (ea./ft./mile)	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost	
1	Internal Labor - Cameron Corners Site	Labor	RAMP	hours	561	\$ 60	\$ 33,637	-	\$ -	\$ -	-	\$ -	\$ -	SDG&E project labor
2	Contracted Services - Cameron Corners Site	Non-Labor	RAMP	ea	1	\$ 1,499,629	\$ 1,499,629	-	\$ -	\$ -	-	\$ -	\$ -	final EPC milestone and construction services payments
3	Materials - Cameron Corners Site	Non-Labor	RAMP	ea	1	\$ 12,338	\$ 12,338	-	\$ -	\$ -	-	\$ -	\$ -	electric meter and misc. electrical equipment
4	Internal Labor - Ramona Site	Labor	RAMP	hours	837	\$ 60	\$ 50,229	-	\$ -	\$ -	-	\$ -	\$ -	SDG&E project labor
5	Contracted Services - Ramona Site	Non-Labor	RAMP	ea	1	\$ 513,036	\$ 513,036	-	\$ -	\$ -	-	\$ -	\$ -	final EPC milestone and construction services payments
6	Internal Labor - 2023 ISD Sites (SV & BU)	Labor	RAMP	hours	1,146	\$ 60	\$ 68,783	4,708	\$ 60	\$ 282,500	-	\$ -	\$ -	SDG&E project labor
7	EPC Contracts - 2023 ISD Sites (SV & BU)	Non-Labor	RAMP	N/A	2	\$ 1,084,163	\$ 2,168,326	2	\$ 14,167,243	\$ 28,334,485	-	\$ -	\$ -	Scope estimate for solar arrays and battery storage system engineering, procurement, and constructions contracts
8	Other Contracted Services - 2023 ISD Sites (SV & BU)	Non-Labor	RAMP	N/A	2	\$ 61,476	\$ 122,952	2	\$ 2,520,383	\$ 5,040,765	-	\$ -	\$ -	3rd party project support and non-EPC construction
7	Non-EPC Materials - 2023 ISD Sites (SV & BU)	Non-Labor	RAMP	N/A	2	\$ -	\$ -	2	\$ 785,638	\$ 1,571,275	-	\$ -	\$ -	Communications, security fencing and other misc. materials
8	Land Acquisitions and Purchases - 2023 ISD Sites (SV & BU)	Non-Labor	RAMP	N/A	2	\$ 174,992	\$ 349,984	2	\$ -	\$ -	-	\$ -	\$ -	Land purchase for microgrid site
9	Contracted Services - Off Grid Solutions mini sites	Non-Labor	RAMP	ea	1	\$ 250,000	\$ 250,000	4	\$ 250,000	\$ 1,000,000	8	\$ 300,000	\$ 2,400,000	Engineering and installation services of smaller off-grid power solutions

*Costs listed are in direct costs

Summary		Labor	RAMP			\$ 152,648		\$ 282,500		\$ -	\$ 435,149
		Non-Labor	RAMP			\$ 4,916,264		\$ 35,946,525		\$ 2,400,000	\$ 43,262,790
Total Project Forecast						\$ 5,068,913		\$ 36,229,025		\$ 2,400,000	\$ 43,697,939

Beginning of Workpaper Group

141400 - Overhead Transmission Fire Hardening (Distribution Underbuild)

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 14140.0
Category: C. Grid Design and System Hardening
Category-Sub: 10. Overhead Transmission Fire Hardening (Distribution)
Workpaper Group: 141400 - Overhead Transmission Fire Hardening (Distribution Underbuild)

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	78	88	164	173	107	140	101	202
Non-Labor	Zero-Based	1,169	1,080	3,112	5,106	5,370	4,589	8,534	14,262
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		1,248	1,168	3,276	5,278	5,477	4,729	8,635	14,464
FTE	Zero-Based	0.6	0.7	1.3	1.3	0.7	1.2	0.9	1.7

Business Purpose:

Overhead Transmission Fire Hardening is replacing select existing wood poles with new steel poles and replacing aging conductor with new high-strength conductor to fire harden the electric transmission system. These pole and conductor replacements are part of an overall effort to help improve the reliability and integrity of the electric transmission system and to mitigate future potential fire risk. This project will improve the electric transmission system performance during extreme weather conditions such as Santa Ana wind events. When these transmission poles are replaced, the distribution facilities on the pole will need to be replaced or reloacted onto the new pole.

Physical Description:

This program will replace select existing wood poles with new steel poles and replace aging conductor with new high-strength conductor to fire harden the electric transmission system.

Project Justification:

These pole and conductor replacements are part of an overall effort to help improve the reliability and integrity of the electric transmission system and to mitigate future potential fire risk. By replacing the existing wood poles and aging conductor this program increases the service reliability of the transmission line during extreme weather conditions and protects the electric transmission system from wildfire damage, while also reducing the potential for the transmission line to be an ignition source.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 14140.0
Category: C. Grid Design and System Hardening
Category-Sub: 10. Overhead Transmission Fire Hardening (Distribution
Workpaper Group: 141400 - Overhead Transmission Fire Hardening (Distribution Underbuild)

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 14140.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 10. Overhead Transmission Fire Hardening (Distribution)
 Workpaper Group: 141400 - Overhead Transmission Fire Hardening (Distribution Underbuild)

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	140	101	202	0	0	0	140	101	202
Non-Labor	Zero-Based	4,589	8,534	14,262	0	0	0	4,589	8,534	14,262
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		4,729	8,635	14,464	0	0	0	4,729	8,635	14,464
FTE	Zero-Based	1.2	0.9	1.7	0.0	0.0	0.0	1.2	0.9	1.7

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 14140.0
Category: C. Grid Design and System Hardening
Category-Sub: 10. Overhead Transmission Fire Hardening (Distribution)
Workpaper Group: 141400 - Overhead Transmission Fire Hardening (Distribution Underbuild)

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	57	67	131	145	93
Non-Labor	977	947	2,837	4,870	5,370
NSE	0	0	0	0	0
Total	1,034	1,014	2,968	5,014	5,463
FTE	0.5	0.6	1.1	1.1	0.5
Adjustments (Nominal \$) **					
Labor	0	0	0	0	0
Non-Labor	0	0	0	12	0
NSE	0	0	0	0	0
Total	0	0	0	12	0
FTE	0.0	0.0	0.0	0.0	0.1
Recorded-Adjusted (Nominal \$)					
Labor	57	67	131	145	93
Non-Labor	977	947	2,837	4,881	5,370
NSE	0	0	0	0	0
Total	1,034	1,014	2,968	5,026	5,463
FTE	0.5	0.6	1.1	1.1	0.6
Vacation & Sick (Nominal \$)					
Labor	8	10	19	21	14
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	8	10	19	21	14
FTE	0.1	0.1	0.2	0.2	0.1
Escalation to 2021\$					
Labor	13	11	15	8	0
Non-Labor	192	133	275	224	0
NSE	0	0	0	0	0
Total	205	144	290	232	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	78	88	164	173	107
Non-Labor	1,169	1,080	3,112	5,106	5,370
NSE	0	0	0	0	0
Total	1,248	1,168	3,276	5,278	5,477
FTE	0.6	0.7	1.3	1.3	0.7

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 14140.0
Category: C. Grid Design and System Hardening
Category-Sub: 10. Overhead Transmission Fire Hardening (Distribution)
Workpaper Group: 141400 - Overhead Transmission Fire Hardening (Distribution Underbuild)

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
Labor	0	0	0	0	0
Non-Labor	0	0	0	12	0
NSE	0	0	0	0	0
Total	0	0	0	12	0
FTE	0.0	0.0	0.0	0.0	0.1

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017 Total	0	0	0	0	0.0
2018 Total	0	0	0	0	0.0
2019	0	-0.077	0	-0.077	0.0
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2019 Total	0	-0.077	0	-0.077	0.0
2020	0	-0.548	0	-0.548	0.0
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2020	0	12	0	12	0.0
Explanation:	Transfer environmental services expenses that were incorrectly charged to Gas Engineering WP EN 9030 to Wildfire witness WP 141400, where these expenses should have been charged.				
2020 Total	0	12	0	12	0.0
2021	0.001	0	0	0.001	0.1
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2021 Total	0.001	0	0	0.001	0.1

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 141400**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 14140.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 10. Overhead Transmission Fire Hardening (Distribution)
 Workpaper Group: 141400 - Overhead Transmission Fire Hardening (Distribution Underbuild)
 Workpaper Detail: 141400.001 - RAMP - OH Transmission Fire Hardening (Dist. Underbuild) - 2022 ISDs
 In-Service Date: 12/31/2022
 Description:

SDG&E's overhead transmission hardening program utilizes enhanced design criteria, design methods, steel poles over wood poles, high strength conductor, and increased conductor spacing in the HFTD to reduce the chance of risk events and ignitions.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	62	8	0
Non-Labor	1,386	1,558	0
NSE	0	0	0
Total	1,448	1,566	0
FTE	0.5	0.1	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 14140.0
Category: C. Grid Design and System Hardening
Category-Sub: 10. Overhead Transmission Fire Hardening (Distribution)
Workpaper Group: 141400 - Overhead Transmission Fire Hardening (Distribution Underbuild)
Workpaper Detail: 141400.001 - RAMP - OH Transmission Fire Hardening (Dist. Underbuild) - 2022 ISDs

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C18/M13 T1-T2

RAMP Line Item Name: OH Trans Fire Hardening Dist Underbuild

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	405	350	638	1,070	2,058	2,809	3,433
Tranche 2 Cost Estimate	5,071	4,379	7,997	13,394	25,770	37,604	45,960

Cost Estimate Changes from RAMP:

The GRC forecast is outside the RAMP range due to forecast and scope updates.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 # of miles hardened	0.20	0.20	0.60	1.00	1.80	3.00	4.00
Tranche 2 # of miles hardened	3.20	2.50	8.20	13.80	24.50	41.00	50.00

Work Unit Changes from RAMP:

The GRC forecast is outside the RAMP range due to forecast and scope updates.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	35.000	62.600
Tranche 2	22.000	31.700

RSE Changes from RAMP:

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 14140.0
Category: C. Grid Design and System Hardening
Category-Sub: 10. Overhead Transmission Fire Hardening (Distribution
Workpaper Group: 141400 - Overhead Transmission Fire Hardening (Distribution Underbuild)
Workpaper Detail: 141400.001 - RAMP - OH Transmission Fire Hardening (Dist. Underbuild) - 2022 ISDs

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2).

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 14140.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 10. Overhead Transmission Fire Hardening (Distribution
 Workpaper Group: 141400 - Overhead Transmission Fire Hardening (Distribution Underbuild)
 Workpaper Detail: 141400.002 - RAMP OH Transmission Fire Hardening (Dist. Underbuild) 2023 ISDs (Same RAMP
 Item as 141400.001)
 In-Service Date: 12/31/2023

Description:

SDG&E's overhead transmission hardening program utilizes enhanced design criteria, design methods, steel poles over wood poles, high strength conductor, and increased conductor spacing in the HFTD to reduce the chance of risk events and ignitions.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		38	41	128
Non-Labor		2,556	6,277	8,804
NSE		0	0	0
Total		2,594	6,318	8,932
FTE		0.4	0.4	1.1

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 14140.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 10. Overhead Transmission Fire Hardening (Distribution
 Workpaper Group: 141400 - Overhead Transmission Fire Hardening (Distribution Underbuild)
 Workpaper Detail: 141400.003 - OH Transmission Fire Hardening (Dist. Underbuild) - 2024 ISDs (Same RAMP Item as 141400.001)
 In-Service Date: 12/31/2024

Description:

SDG&E's overhead transmission hardening program utilizes enhanced design criteria, design methods, steel poles over wood poles, high strength conductor, and increased conductor spacing in the HFTD to reduce the chance of risk events and ignitions.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		23	23	44
Non-Labor		350	580	4,601
NSE		0	0	0
Total		373	603	4,645
FTE		0.2	0.2	0.4

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 14140.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 10. Overhead Transmission Fire Hardening (Distribution
 Workpaper Group: 141400 - Overhead Transmission Fire Hardening (Distribution Underbuild)
 Workpaper Detail: 141400.004 - RAMP OH Transmission Fire Hardening (Dist. Underbuild) - 2024-2 ISDs (Same RAMP
 Item as 141400.001)
 In-Service Date: 12/31/2024

Description:

SDG&E's overhead transmission hardening program utilizes enhanced design criteria, design methods, steel poles over wood poles, high strength conductor, and increased conductor spacing in the HFTD to reduce the chance of risk events and ignitions.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		17	29	30
Non-Labor		297	119	857
NSE		0	0	0
Total		314	148	887
FTE		0.1	0.2	0.2

Note: Totals may include rounding differences.

Supplemental Workpapers for Workpaper Group 141400

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Beginning of Workpaper Group
192450 - Public Safety Power Shutoff (PSPS) Engineering Enhancements

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19245.0
Category: C. Grid Design and System Hardening
Category-Sub: 11. PSPS Sectionalizing Enhancements
Workpaper Group: 192450 - Public Safety Power Shutoff (PSPS) Engineering Enhancements

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	83	374	130	168	168	168
Non-Labor	Zero-Based	0	0	1,345	4,804	1,773	1,399	1,399	1,399
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	1,428	5,178	1,904	1,567	1,567	1,567
FTE	Zero-Based	0.0	0.0	0.3	1.6	0.7	1.3	1.3	1.3

Business Purpose:

The purpose of this project is to add distribution sectionalizing devices in the HFTD to minimize customer impacts during PSPS events. Additional sectionalizing devices allow for the use of PSPS to be targeted to only the areas with extreme weather conditions, minimizing the number of customers impacted by PSPS.

Physical Description:

This project adds electric distribution sectionalizing devices (e.g., switches, associated automation devices, etc.) to minimize service interruptions resulting from PSPS events caused by fire weather conditions.

Project Justification:

This project will deliver improvements to fire weather operational response efforts and is expected to minimize the number of customers affected by PSPS events, decrease required patrol times, and ultimately restore service faster post-event.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19245.0
Category: C. Grid Design and System Hardening
Category-Sub: 11. PSPS Sectionalizing Enhancements
Workpaper Group: 192450 - Public Safety Power Shutoff (PSPS) Engineering Enhancements

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. This program selects specific locations for new installations each year. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. This program selects specific locations for new installations each year. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19245.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 11. PSPS Sectionalizing Enhancements
 Workpaper Group: 192450 - Public Safety Power Shutoff (PSPS) Engineering Enhancements

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	168	168	168	0	0	0	168	168	168
Non-Labor	Zero-Based	1,399	1,399	1,399	0	0	0	1,399	1,399	1,399
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		1,567	1,567	1,567	0	0	0	1,567	1,567	1,567
FTE	Zero-Based	1.3	1.3	1.3	0.0	0.0	0.0	1.3	1.3	1.3

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19245.0
Category: C. Grid Design and System Hardening
Category-Sub: 11. PSPS Sectionalizing Enhancements
Workpaper Group: 192450 - Public Safety Power Shutoff (PSPS) Engineering Enhancements

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	66	314	113
Non-Labor	0	0	1,226	4,600	1,773
NSE	0	0	0	0	0
Total	0	0	1,293	4,914	1,887
FTE	0.0	0.0	0.1	0.2	0.0
Adjustments (Nominal \$) **					
Labor	0	0	0	0	0
Non-Labor	0	0	0	-6	0
NSE	0	0	0	0	0
Total	0	0	0	-6	0
FTE	0.0	0.0	0.2	1.2	0.6
Recorded-Adjusted (Nominal \$)					
Labor	0	0	66	314	113
Non-Labor	0	0	1,226	4,594	1,773
NSE	0	0	0	0	0
Total	0	0	1,293	4,908	1,887
FTE	0.0	0.0	0.3	1.4	0.6
Vacation & Sick (Nominal \$)					
Labor	0	0	9	44	17
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	9	44	17
FTE	0.0	0.0	0.0	0.2	0.1
Escalation to 2021\$					
Labor	0	0	7	16	0
Non-Labor	0	0	119	210	0
NSE	0	0	0	0	0
Total	0	0	126	226	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	83	374	130
Non-Labor	0	0	1,345	4,804	1,773
NSE	0	0	0	0	0
Total	0	0	1,428	5,178	1,904
FTE	0.0	0.0	0.3	1.6	0.7

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19245.0
Category: C. Grid Design and System Hardening
Category-Sub: 11. PSPS Sectionalizing Enhancements
Workpaper Group: 192450 - Public Safety Power Shutoff (PSPS) Engineering Enhancements

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
Labor	0	0	0	0	0
Non-Labor	0	0	0	-6	0
NSE	0	0	0	0	0
Total	0	0	0	-6	0
FTE	0.0	0.0	0.2	1.2	0.6

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017 Total	0	0	0	0	0.0
2018 Total	0	0	0	0	0.0
2019	0.001	0	0	0.001	0.2
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2019 Total	0.001	0	0	0.001	0.2
2020	-0.058	-6	0	-6	-0.1
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2020	0.001	0	0	0.001	1.3
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2020 Total	-0.057	-6	0	-6	1.2
2021	0.001	0	0	0.001	0.6
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2021 Total	0.001	0	0	0.001	0.6

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 192450**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19245.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 11. PSPS Sectionalizing Enhancements
 Workpaper Group: 192450 - Public Safety Power Shutoff (PSPS) Engineering Enhancements
 Workpaper Detail: 192450.001 - RAMP PSPS Engineering Enhancements
 In-Service Date: Not Applicable
 Description:

Installing distribution sectionalizing devices (e.g., switches, associated automation devices, etc.) will enable minimizing customer impacts during Public Safety Power Shut-Off (PSPS) events.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		134	134	134
Non-Labor		1,119	1,119	1,119
NSE		0	0	0
Total		1,253	1,253	1,253
FTE		1.0	1.0	1.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19245.0
Category: C. Grid Design and System Hardening
Category-Sub: 11. PSPS Sectionalizing Enhancements
Workpaper Group: 192450 - Public Safety Power Shutoff (PSPS) Engineering Enhancements
Workpaper Detail: 192450.001 - RAMP PSPS Engineering Enhancements

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C09/M4 T1-T3

RAMP Line Item Name: PSPS Sectionalizing

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2; Tranche3: Non-HFTD

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	1,903	470	0	0	470	482	589
Tranche 2 Cost Estimate	0	1,097	1,567	1,567	4,231	2,628	3,213
Tranche 3 Cost Estimate	0	0	0	0	0	1,052	1,285

Cost Estimate Changes from RAMP:

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 # of switches installed	13.00	3.00	0.00	0.00	3.00	15.00	19.00
Tranche 2 # of switches installed	0.00	7.00	10.00	10.00	27.00	0.00	0.00
Tranche 3 # of switches installed	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

The GRC unit forecast is outside the RAMP range due to additional sectionalizing devices being scoped.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	2,112.000

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19245.0
Category: C. Grid Design and System Hardening
Category-Sub: 11. PSPS Sectionalizing Enhancements
Workpaper Group: 192450 - Public Safety Power Shutoff (PSPS) Engineering Enhancements
Workpaper Detail: 192450.001 - RAMP PSPS Engineering Enhancements

Tranche 2	280.000	1,063.000
Tranche 3	0.000	0.000

RSE Changes from RAMP:

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2).

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19245.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 11. PSPS Sectionalizing Enhancements
 Workpaper Group: 192450 - Public Safety Power Shutoff (PSPS) Engineering Enhancements
 Workpaper Detail: 192450.002 - RAMP PSPS Engineering Enhancements - Electric General (Same RAMP item as 192450.001)
 In-Service Date: Not Applicable

Description:

Installing distribution sectionalizing devices (e.g., switches, associated automation devices, etc.) will enable minimizing customer impacts during Public Safety Power Shut-Off (PSPS) events.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		34	34	34
Non-Labor		280	280	280
NSE		0	0	0
Total		314	314	314
FTE		0.3	0.3	0.3

Note: Totals may include rounding differences.

Supplemental Workpapers for Workpaper Group 192450

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

PSPS Engineering Enhancement

Budget Code **19245**
Budget Code Name **PSPS Engineering**

GRC Request		2022	2023	2024
Labor		\$ 167,680	\$ 167,680	\$ 167,680
Non-Labor		\$ 1,399,000	\$ 1,399,000	\$ 1,399,000
Cost Breakdown		2022	2023	2024
Unit Cost				
Labor	Dollars	\$ 64	\$ 64	\$ 64
Services	Dollars	\$ 139,900	\$ 139,900	\$ 139,900
Units		2022	2023	2024
Labor	Hrs	2,620	2,620	2,620
Services + Switches	Ea	10	10	10
Total		2022	2023	2024
Labor		\$ 167,680	\$ 167,680	\$ 167,680
Services		\$ 1,399,000	\$ 1,399,000	\$ 1,399,000
		<u>\$ 1,566,680</u>	<u>\$ 1,566,680</u>	<u>\$ 1,566,680</u>

Additional Notes:

Labor is estimated based on historical spend for network engineering and field support labor for installation of switches and sectionalizing devices.

Planned expenditures include all tiers within the HFTD.

Beginning of Workpaper Group
081650 - CNF Fire Hardening

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 08165.0
Category: C. Grid Design and System Hardening
Category-Sub: 12. Cleveland National Forest Fire Hardening
Workpaper Group: 081650 - CNF Fire Hardening

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	1,059	1,705	1,582	3,769	2,643	140	132	132
Non-Labor	Zero-Based	46,268	32,901	72,800	84,110	9,854	1,859	1,543	1,074
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		47,328	34,606	74,382	87,880	12,497	1,999	1,675	1,206
FTE	Zero-Based	6.8	9.2	8.6	22.2	15.0	1.2	1.1	1.1

Business Purpose:

The Cleveland National Forest (CNF) Fire Hardening program hardened distribution electric infrastructure within CNF boundaries through replacing wood poles with steel poles, replacing aged conductor with new high-strength conductor, and associated upgrades. The CNF hardening projects were all completed in 2021 but environmental restoration costs will continue.

Physical Description:

This budget code contains the costs associated with environmental restoration after CNF construction projects are completed.

Project Justification:

To fulfill its commitments and to promote sustainability, SDG&E will engage in environmental restoration associated with impacts of construction related to the CNF Fire Hardening projects.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 08165.0
Category: C. Grid Design and System Hardening
Category-Sub: 12. Cleveland National Forest Fire Hardening
Workpaper Group: 081650 - CNF Fire Hardening

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. Prior historical costs included the work to fire harden the distribution circuits within the Cleveland National Forest. This fire hardening work is complete, and these historical costs are not applicable to the future restoration work represented by this budget code. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. Prior historical costs included the work to fire harden the distribution circuits within the Cleveland National Forest. This fire hardening work is complete, and these historical costs are not applicable to the future restoration work represented by this budget code. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 08165.0
Category: C. Grid Design and System Hardening
Category-Sub: 12. Cleveland National Forest Fire Hardening
Workpaper Group: 081650 - CNF Fire Hardening

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	140	132	132	0	0	0	140	132	132
Non-Labor	Zero-Based	1,859	1,543	1,074	0	0	0	1,859	1,543	1,074
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		1,999	1,675	1,206	0	0	0	1,999	1,675	1,206
FTE	Zero-Based	1.2	1.1	1.1	0.0	0.0	0.0	1.2	1.1	1.1

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 08165.0
Category: C. Grid Design and System Hardening
Category-Sub: 12. Cleveland National Forest Fire Hardening
Workpaper Group: 081650 - CNF Fire Hardening

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	771	1,299	1,262	3,157	2,297
Non-Labor	38,671	28,851	66,364	80,435	9,854
NSE	0	0	0	0	0
Total	39,442	30,149	67,626	83,592	12,152
FTE	5.8	7.9	7.4	19.1	12.8
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	771	1,299	1,262	3,157	2,297
Non-Labor	38,671	28,851	66,364	80,435	9,854
NSE	0	0	0	0	0
Total	39,442	30,149	67,626	83,592	12,152
FTE	5.8	7.9	7.4	19.1	12.8
Vacation & Sick (Nominal \$)					
Labor	114	197	181	448	345
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	114	197	181	448	345
FTE	1.0	1.3	1.2	3.1	2.2
Escalation to 2021\$					
Labor	174	210	140	165	0
Non-Labor	7,597	4,050	6,435	3,676	0
NSE	0	0	0	0	0
Total	7,771	4,260	6,575	3,840	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	1,059	1,705	1,582	3,769	2,643
Non-Labor	46,268	32,901	72,800	84,110	9,854
NSE	0	0	0	0	0
Total	47,328	34,606	74,382	87,880	12,497
FTE	6.8	9.2	8.6	22.2	15.0

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 08165.0
Category: C. Grid Design and System Hardening
Category-Sub: 12. Cleveland National Forest Fire Hardening
Workpaper Group: 081650 - CNF Fire Hardening

Summary of Adjustments to Recorded:

In Nominal \$(000)						
Years	2017	2018	2019	2020	2021	
	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

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
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Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 081650**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 08165.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 12. Cleveland National Forest Fire Hardening
 Workpaper Group: 081650 - CNF Fire Hardening
 Workpaper Detail: 081650.001 - RAMP CNF Fire Hardening
 In-Service Date: Not Applicable
 Description:

Final restoration activities for the Cleveland National Forest Power Line Replacement Projects as required by the Mitigation Monitoring, Reporting, and Compliance Program (MMRCP),

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	140	132	132
Non-Labor	1,859	1,543	1,074
NSE	0	0	0
Total	1,999	1,675	1,206
FTE	1.2	1.1	1.1

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 08165.0
Category: C. Grid Design and System Hardening
Category-Sub: 12. Cleveland National Forest Fire Hardening
Workpaper Group: 081650 - CNF Fire Hardening
Workpaper Detail: 081650.001 - RAMP CNF Fire Hardening

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C19

RAMP Line Item Name: Cleveland National Forest Fire Hardening T1-T2

Tranche(s): Tranche1: Tier 3; Tranche2: Tier2; Tranche3: Distribution UG

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$) Low High	
Tranche 1 Cost Estimate	10,931	1,999	1,675	1,206	4,880	0	0
Tranche 2 Cost Estimate	0	0	0	0	0	0	0
Tranche 3 Cost Estimate	0	0	0	0	0	0	0

Cost Estimate Changes from RAMP:

The GRC forecast is outside the RAMP range due to the addition of environmental restoration efforts that were not forecasted in RAMP.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities Low High	
Tranche 1 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tranche 2 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tranche 3 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 08165.0
Category: C. Grid Design and System Hardening
Category-Sub: 12. Cleveland National Forest Fire Hardening
Workpaper Group: 081650 - CNF Fire Hardening
Workpaper Detail: 081650.001 - RAMP CNF Fire Hardening

Tranche 2	0.000	0.000
Tranche 3	0.000	0.000
RSE Changes from RAMP:		

Supplemental Workpapers for Workpaper Group 081650

TY2024 GRC FORECAST - DETAILS

8165 - CNF MSUP ENV Restoration															
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Metric (ea./ft./mile)	2022			2023			2024			Total Cost	Comments
					# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost		
1	SDG&E Program Mgmt	Labor	RAMP	FTE	1.2	\$120,000	\$ 140,071	1.1	\$ 120,000	\$ 132,000	1.1	\$ 120,000	\$ 132,000	\$ 404,071	Internal SDG&E Resources to manage and coordinate environmental restoration activities with third party vendors and key stakeholders including US Forest Service.
2	Contracted Environmental Services	Non-Labor	RAMP	ea	1	\$ 1,858,956	\$ 1,858,956	1	1,543,055	\$ 1,543,055	1	1,073,742	\$ 1,073,742	\$ 4,475,754	Contracted restoration activities required as part of project scope.

* Costs listed are in Direct Costs

Summary															
		Labor	RAMP			\$ 140,071		\$ 132,000		\$ 132,000		\$ 404,071			
		Non-Labor	RAMP			\$ 1,858,956		\$ 1,543,055		\$ 1,073,742		\$ 4,475,754			
Subtotal RAMP						\$ 1,999,027		\$ 1,675,055		\$ 1,205,742		\$ 4,879,825			
		Labor	Non-RAMP			\$ -		\$ -		\$ -		\$ -			
		Non-Labor	Non-RAMP			\$ -		\$ -		\$ -		\$ -			
Subtotal Non-RAMP						\$ -		\$ -		\$ -		\$ -			
Total Project Forecast						\$ 1,999,027		\$ 1,675,055		\$ 1,205,742		\$ 4,879,825			

**Beginning of Workpaper Group
192460 - Strategic Undergrounding**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19246.0
Category: C. Grid Design and System Hardening
Category-Sub: 13. Strategic Undergrounding
Workpaper Group: 192460 - Strategic Undergrounding

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	4	603	1,005	1,495	3,224	3,868
Non-Labor	Zero-Based	0	0	207	40,175	68,533	187,859	350,978	407,633
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	211	40,778	69,538	189,354	354,202	411,501
FTE	Zero-Based	0.0	0.0	0.0	4.1	8.2	14.2	30.7	36.8

Business Purpose:

The purpose of this project is to reduce the risk of wildfire and PSPS caused by foreign object contact, wind, extreme weather conditions, and other external triggers affecting overhead electrical facilities by converting overhead infrastructure to underground .

Physical Description:

The project will install new underground electric distribution facilities, and remove from service existing overhead electric facilities. The 2022 Scope of work will include approximately 163 miles of design and 65 miles of installed underground distribution.

The 2023 scope of work will include 195 miles of design and 125 miles of installed underground distribution. The 2024 scope of work will include 195 miles of design and 150 miles of installed underground distribution. The facilities being installed and removed are within the HFTD.

Project Justification:

The goal of the Strategic Undergrounding Program, established in 2019, is to reduce the threat of wildfire and the use of PSPS mitigation measures during extreme weather events. Underground electric distribution lines greatly reduces the risk of ignition from electric facilities, and underground electric distribution lines can remain energized during PSPS, reducing the impact of power outages to fire-prone communities. Undergrounding is the most effective mitigation against faults that lead to ignitions, and is estimated to reduce 98% of faults that lead to ignitions. In order to reduce the risk of wildfire within SDG&E's service territory, while also reaching PSPS reduction goals, undergrounding of distribution infrastructure will play an important role.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19246.0
Category: C. Grid Design and System Hardening
Category-Sub: 13. Strategic Undergrounding
Workpaper Group: 192460 - Strategic Undergrounding

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details. The forecast is based on the number of miles of strategic undergrounding being designed and constructed each year, which has already been scoped through 2024.

Non-Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details. The forecast is based on the number of miles of strategic undergrounding being designed and constructed each year, which has already been scoped through 2024.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19246.0
Category: C. Grid Design and System Hardening
Category-Sub: 13. Strategic Undergrounding
Workpaper Group: 192460 - Strategic Undergrounding

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	1,495	3,224	3,868	0	0	0	1,495	3,224	3,868
Non-Labor	Zero-Based	187,859	350,978	407,633	0	0	0	187,859	350,978	407,633
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		189,354	354,202	411,501	0	0	0	189,354	354,202	411,501
FTE	Zero-Based	14.2	30.7	36.8	0.0	0.0	0.0	14.2	30.7	36.8

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19246.0
Category: C. Grid Design and System Hardening
Category-Sub: 13. Strategic Undergrounding
Workpaper Group: 192460 - Strategic Undergrounding

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	3	506	874
Non-Labor	0	0	191	38,325	68,533
NSE	0	0	0	0	0
Total	0	0	194	38,830	69,407
FTE	0.0	0.0	0.0	2.6	6.4
Adjustments (Nominal \$) **					
Labor	0	0	0	0	0
Non-Labor	0	0	-2	94	0
NSE	0	0	0	0	0
Total	0	0	-2	94	0
FTE	0.0	0.0	0.0	0.9	0.6
Recorded-Adjusted (Nominal \$)					
Labor	0	0	3	505	874
Non-Labor	0	0	189	38,419	68,533
NSE	0	0	0	0	0
Total	0	0	192	38,924	69,407
FTE	0.0	0.0	0.0	3.5	7.0
Vacation & Sick (Nominal \$)					
Labor	0	0	0	72	131
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	0	72	131
FTE	0.0	0.0	0.0	0.6	1.2
Escalation to 2021\$					
Labor	0	0	0	26	0
Non-Labor	0	0	18	1,756	0
NSE	0	0	0	0	0
Total	0	0	19	1,782	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	4	603	1,005
Non-Labor	0	0	207	40,175	68,533
NSE	0	0	0	0	0
Total	0	0	211	40,778	69,538
FTE	0.0	0.0	0.0	4.1	8.2

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19246.0
Category: C. Grid Design and System Hardening
Category-Sub: 13. Strategic Undergrounding
Workpaper Group: 192460 - Strategic Undergrounding

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
Labor	0	0	0	0	0
Non-Labor	0	0	-2	94	0
NSE	0	0	0	0	0
Total	0	0	-2	94	0
FTE	0.0	0.0	0.0	0.9	0.6

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017 Total	0	0	0	0	0.0
2018 Total	0	0	0	0	0.0
2019	0	-2	0	-2	0.0
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2019 Total	0	-2	0	-2	0.0
2020	-0.305	-62	0	-62	-0.1
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2020	0.001	0	0	0.001	1.0
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2020	0	156	0	156	0.0
Explanation:	Adjustment to add back common FERC account, FERC-jurisdiction costs for RO model carve-out				
2020 Total	-0.304	94	0	94	0.9
2021	0.001	0	0	0.001	0.6
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2021 Total	0.001	0	0	0.001	0.6

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 192460**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19246.0
Category: C. Grid Design and System Hardening
Category-Sub: 13. Strategic Undergrounding
Workpaper Group: 192460 - Strategic Undergrounding
Workpaper Detail: 192460.001 - RAMP Strategic Undergrounding

In-Service Date: Not Applicable

Description:

Reduce the risk of wildfire, PSPS, and overhead distribution infrastructure failures caused by foreign object contact, wind, extreme weather conditions, and other external triggers by converting overhead infrastructure to underground.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		1,495	3,224	3,868
Non-Labor		185,980	347,468	403,557
NSE		0	0	0
Total		187,475	350,692	407,425
FTE		14.2	30.7	36.8

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19246.0
Category: C. Grid Design and System Hardening
Category-Sub: 13. Strategic Undergrounding
Workpaper Group: 192460 - Strategic Undergrounding
Workpaper Detail: 192460.001 - RAMP Strategic Undergrounding

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C16/M11 T1-T2

RAMP Line Item Name: Strategic Undergrounding

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$) Low High	
Tranche 1 Cost Estimate	43,809	119,293	223,147	259,245	601,685	552,350	675,095
Tranche 2 Cost Estimate	25,729	70,061	131,055	152,256	353,372	331,410	405,057

Cost Estimate Changes from RAMP:

GRC forecast is within the RAMP range.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities Low High	
Tranche 1 # of miles UG	19.50	36.50	78.80	94.40	209.70	200.00	244.00
Tranche 2 # of miles UG	11.50	21.50	46.30	55.50	123.30	120.00	146.00

Work Unit Changes from RAMP:

GRC unit forecast is within the RAMP range.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	235.000	155.900
Tranche 2	122.000	53.700

RSE Changes from RAMP:

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2).

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19246.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 13. Strategic Undergrounding
 Workpaper Group: 192460 - Strategic Undergrounding
 Workpaper Detail: 192460.002 - RAMP Strategic Undergrounding - Common Eqmt (Same RAMP item as 192460.001)
 In-Service Date: Not Applicable
 Description:

Reduce the risk of wildfire, PSPS, and overhead distribution infrastructure failures caused by foreign object contact, wind, extreme weather conditions, and other external triggers by converting overhead infrastructure to underground.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		0	0	0
Non-Labor		1,879	3,510	4,076
NSE		0	0	0
Total		1,879	3,510	4,076
FTE		0.0	0.0	0.0

Note: Totals may include rounding differences.

Supplemental Workpapers for Workpaper Group 192460

TY2024 GRC FORECAST - DETAILS

Budget Code: 19246

Estimated In Service Date: Ongoing

(If this is an ongoing blanket or program, please input "ongoing")

19246 - Strategic Undergrounding Program																				
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Measure	2022			2023			2024			2025			2026			Comments
					# of units	Cost per unit*	Total Cost	# of units	Cost per unit*	Total Cost	# of units	Cost per unit*	Total Cost	# of units	Cost per unit*	Total Cost	# of units	Cost per unit*	Total Cost	
1	Engineering & Design	Non-Labor	RAMP	Miles	163	\$ 347,200	\$ 56,420,000	195	\$ 347,200	\$ 67,704,000	195	\$ 347,200	\$ 67,704,000	195	\$ 347,200	\$ 67,704,000	195	\$ 347,200	\$ 67,704,000	\$ 297,824,000
2	Construction	Non-Labor	RAMP	Miles	58	\$ 1,785,000	\$ 103,530,000	125	\$ 1,785,000	\$ 223,125,000	150	\$ 1,785,000	\$ 267,750,000	150	\$ 1,785,000	\$ 267,750,000	150	\$ 1,785,000	\$ 267,750,000	\$ 994,650,000
3	Material	Non-Labor	RAMP	Miles	58	\$ 119,040	\$ 6,904,320	125	\$ 119,040	\$ 14,880,000	150	\$ 119,040	\$ 17,856,000	150	\$ 119,040	\$ 17,856,000	150	\$ 119,040	\$ 17,856,000	\$ 69,440,320
4	Contract Services	Non-Labor	RAMP	Miles	58	\$ 121,619	\$ 7,053,902	125	\$ 121,619	\$ 15,202,375	150	\$ 121,619	\$ 18,242,850	150	\$ 121,619	\$ 18,242,850	150	\$ 121,619	\$ 18,242,850	\$ 40,489,127
5	Labor	Labor	RAMP	Miles	58	\$ 25,792	\$ 1,485,936	125	\$ 25,792	\$ 3,224,000	150	\$ 25,792	\$ 3,868,800	150	\$ 25,792	\$ 3,868,800	150	\$ 25,792	\$ 3,868,800	\$ 8,588,736
6	Construction Contingency (WINGS)	Non-Labor	RAMP	Miles	58	\$ 239,935	\$ 13,916,230	125	\$ 239,935	\$ 29,991,875	150	\$ 239,935	\$ 35,990,250	150	\$ 239,935	\$ 35,990,250	150	\$ 239,935	\$ 35,990,250	\$ 79,888,355

*Costs should be reported in direct costs only (no overheads)

Summary																
		Labor	RAMP			\$ 1,495,936			\$ 3,224,000			\$ 3,868,800			\$ 3,868,800	\$ 8,588,736
		Non-Labor	RAMP			\$ 187,859,252			\$ 350,978,250			\$ 407,633,100			\$ 407,633,100	\$ 946,470,602
Subtotal RAMP						\$ 189,355,188			\$ 354,202,250			\$ 411,501,900			\$ 411,501,900	\$ 955,059,338
		Labor	Non-RAMP			\$ -			\$ -			\$ -			\$ -	\$ -
		Non-Labor	Non-RAMP			\$ -			\$ -			\$ -			\$ -	\$ -
Subtotal Non-RAMP						\$ -			\$ -			\$ -			\$ -	\$ -
Total Project Forecast						\$ 189,355,188			\$ 354,202,250			\$ 411,501,900			\$ 411,501,900	\$ 955,059,338

Beginning of Workpaper Group
222420 - High Risk Pole Replacement Program HFTD

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 22242.0
Category: C. Grid Design and System Hardening
Category-Sub: 14. High Risk Pole Replacement Program
Workpaper Group: 222420 - High Risk Pole Replacement Program HFTD

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	0	0	0	0	450	1,764
Non-Labor	Zero-Based	0	0	0	0	0	0	1,170	4,584
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	1,620	6,348
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	3.4	13.2

Business Purpose:

The purpose of this project is to target high risk poles located throughout SDG&E service territory for replacement. This will continue SDG&E's efforts in hardening the system within the HFTD. Examples of poles this program will focus on will include but not be limited to, gas-treated poles (may be known as Cellon treatment), steel reinforced and poles that are set in concrete. These identified poles are also nearing the end of their useful life and are known to have a higher failure potential than average.

Physical Description:

This program will have multiple categories of risk. SDG&E is prioritizing gas-treated poles in combination with being steel reinforced and encased in concrete. Based on research, it has been determined that the gas-treated poles are considered high priority based on the pole's interaction with the moisture in the soil. In combination with identified rot and inspection limitations of the pole being in concrete, SDG&E believes these are the highest risk group of poles to target. As SDG&E investigates further, there may be other contributing factors that present risks that need to be mitigated and/or prioritized.

Project Justification:

For continued improvement of the Wildfire Mitigation Plan, gas-treated poles have been determined to be high risk poles especially those that have steel reinforcement and/or are set in concrete. Determining the integrity of cellon treated poles encased in concrete is very difficult, which causes the greatest concern. The average age of these assets is nearing 50 years. Gas-treated poles have a higher propensity for dry rot due to the moisture in the soil. This program will mitigate the failure of these poles within the HFTD that could lead to ignitions.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 22242.0
Category: C. Grid Design and System Hardening
Category-Sub: 14. High Risk Pole Replacement Program
Workpaper Group: 222420 - High Risk Pole Replacement Program HFTD

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. This budget code has no historical costs and is related to a new initiative set to begin in 2023. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. This budget code has no historical costs and is related to a new initiative set to begin in 2023. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 22242.0
Category: C. Grid Design and System Hardening
Category-Sub: 14. High Risk Pole Replacement Program
Workpaper Group: 222420 - High Risk Pole Replacement Program HFTD

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	0	0	0	0	450	1,764	0	450	1,764
Non-Labor	Zero-Based	0	0	0	0	1,170	4,584	0	1,170	4,584
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		0	0	0	0	1,620	6,348	0	1,620	6,348
FTE	Zero-Based	0.0	0.0	0.0	0.0	3.4	13.2	0.0	3.4	13.2

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 22242.0
Category: C. Grid Design and System Hardening
Category-Sub: 14. High Risk Pole Replacement Program
Workpaper Group: 222420 - High Risk Pole Replacement Program HFTD

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (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
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	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
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 2021\$					
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 (Constant 2021\$)					
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

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 22242.0
Category: C. Grid Design and System Hardening
Category-Sub: 14. High Risk Pole Replacement Program
Workpaper Group: 222420 - High Risk Pole Replacement Program HFTD

Summary of Adjustments to Recorded:

In Nominal \$(000)						
Years	2017	2018	2019	2020	2021	
	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

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
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Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 222420**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 22242.0
 Category: C. Grid Design and System Hardening
 Category-Sub: 14. High Risk Pole Replacement Program
 Workpaper Group: 222420 - High Risk Pole Replacement Program HFTD
 Workpaper Detail: 222420.001 - RAMP - High Risk Pole Replacement Program HFTD
 In-Service Date: Not Applicable
 Description:

Target high risk poles located throughout SDG&E service territory. This will continue SDG&E's efforts in hardening the system while continuing the Wildfire mitigation program. Examples of poles this program will focus on will include but not limited to, gas-treated poles (may be known as Cellon treatment), steel reinforced and poles that are set in concrete. These identified poles are also nearing the end of their useful life and are known to have a higher failure potential than average. These poles will be located in the HFTD 2 & 3 areas.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	0	450	1,764
Non-Labor	0	1,170	4,584
NSE	0	0	0
Total	0	1,620	6,348
FTE	0.0	3.4	13.2

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 22242.0
Category: C. Grid Design and System Hardening
Category-Sub: 14. High Risk Pole Replacement Program
Workpaper Group: 222420 - High Risk Pole Replacement Program HFTD
Workpaper Detail: 222420.001 - RAMP - High Risk Pole Replacement Program HFTD

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: New 01

RAMP Line Item Name: Strategic Pole Replacement Program (HFTD)

Tranche(s): Tranche1: HFTD Tiers 2 & 3

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	0	0	1,620	6,348	7,968	0	0

Cost Estimate Changes from RAMP:

New RAMP Item

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 # of poles	0.00	0.00	51.00	200.00	251.00	0.00	0.00

Work Unit Changes from RAMP:

New RAMP Item

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

An RSE was not calculated for this activity.

Supplemental Workpapers for Workpaper Group 222420

TY2024 GRC FORECAST - DETAILS

Budget Code: 22242

Estimated In Service Date: Ongoing

22242 - High Risk Pole Replacement					2022				2023				2024									
1	Union Labor	Labor	Ramp	hours	-	\$	-	\$	-	7,024	\$	64	\$	449,536	27,509	\$	64	\$	1,760,576	\$	2,210,112	Union labor for pole installation
2	Construction Services	non-Labor	Ramp	Poles	-	\$	-	\$	-	51	\$	9,811	\$	500,337	200	\$	9,811	\$	1,962,104	\$	2,462,441	Construction services contractor costs for pole installation
3	Pole Materials	non-Labor	Ramp	Poles	-	\$	-	\$	-	51	\$	13,123	\$	669,268	200	\$	13,123	\$	2,624,579	\$	3,293,847	Material costs for new poles
4					-	\$	-	\$	-									\$	-	\$	-	
5								\$	-									\$	-	\$	-	
6								\$	-									\$	-	\$	-	
7								\$	-									\$	-	\$	-	
8								\$	-									\$	-	\$	-	
9								\$	-									\$	-	\$	-	
10								\$	-									\$	-	\$	-	
11								\$	-									\$	-	\$	-	
12								\$	-									\$	-	\$	-	
13								\$	-									\$	-	\$	-	
14								\$	-									\$	-	\$	-	
15								\$	-									\$	-	\$	-	

Summary																
		Labor	RAMP			\$	-	\$	449,536			\$	1,760,576	\$	2,210,112	
		Non-Labor	RAMP			\$	-	\$	1,169,604			\$	4,586,683	\$	5,756,287	
	Subtotal RAMP					\$	-	\$	1,619,140			\$	6,347,259	\$	7,966,399	
		Labor	Non-RAMP			\$	-	\$	-			\$	-	\$	-	
		Non-Labor	Non-RAMP			\$	-	\$	-			\$	-	\$	-	
	Subtotal Non-RAMP					\$	-	\$	-			\$	-	\$	-	
	Total Project Forecast					\$	-	\$	1,619,140			\$	6,347,259	\$	7,966,399	

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Category: D. Asset Management and Inspections
Workpaper: VARIOUS

Summary for Category: D. Asset Management and Inspections

	In 2021\$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2021	2022	2023	2024
Labor	4,761	3,986	3,667	3,736
Non-Labor	21,423	41,166	62,463	13,687
NSE	0	0	0	0
Total	26,184	45,152	66,130	17,423
FTE	30.5	36.2	33.3	33.3

002390 Pole Replacement and Reinforcement in HFTD

Labor	4,526	3,826	3,507	3,576
Non-Labor	8,654	7,181	6,163	6,286
NSE	0	0	0	0
Total	13,180	11,007	9,670	9,862
FTE	29.1	34.7	31.8	31.8

201270 CORRECTIVE MAINTENANCE PROGRAM TIER 2&3

Labor	6	40	40	40
Non-Labor	500	660	1,100	540
NSE	0	0	0	0
Total	506	700	1,140	580
FTE	0.1	0.5	0.5	0.5

202480 DRONE INVESTIGATION ASSESMENT AND REPAIR

Labor	229	120	120	120
Non-Labor	12,269	33,325	55,200	6,861
NSE	0	0	0	0
Total	12,498	33,445	55,320	6,981
FTE	1.3	1.0	1.0	1.0

Note: Totals may include rounding differences.

Beginning of Workpaper Group
002390 - Pole Replacement and Reinforcement in HFTD

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Pole Replacement and Reinforcement in HFTD

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Base YR Rec	240	799	4,828	3,839	4,526	3,826	3,507	3,576
Non-Labor	Base YR Rec	546	2,660	6,748	6,693	8,654	7,181	6,163	6,286
NSE	Base YR Rec	0	0	0	0	0	0	0	0
Total		786	3,458	11,577	10,532	13,180	11,007	9,670	9,862
FTE	Base YR Rec	2.2	5.4	29.5	25.1	29.1	34.7	31.8	31.8

Business Purpose:

Short and long term deterioration of equipment can increase the likelihood of asset failure and cause potential risk, including injury, to the public, contractors, and employees. This program is mandated per GO 165 and non-compliance poses risk of regulatory action, including fines.

Physical Description:

All electric distribution facilities are visually patrolled on an annual basis in urban and rural areas, and inspected in detail every three, five, or ten years depending on equipment type. Conditions found during these inspections may require repair or replacement of equipment that is no longer serviceable. The costs included within this workpaper are the capital pole replacements/reinforcements completed as a result of the various asset inspection programs discussed in 1WM004.

Project Justification:

This program is mandated by CPUC GO 165. It is also required to ensure reliable service and a safe environment for employees and the public. Failure to perform inspections and repairs under this program would subject SDG&E to regulatory sanctions, fines, and legal liability.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Pole Replacement and Reinforcement in HFTD

Forecast Methodology:

Labor - Base YR Rec

The base-year forecast methodology was selected as most indicative of future work. New initiatives and programs have been implemented beginning in 2020 due to the Wildfire Mitigation Plan, and these enhancements are not captured in the historical costs of this category. Accordingly, 2021 base year expenses are most representative of future needs based on an expansion in complexity and scope of existing projects and initiatives.

Non-Labor - Base YR Rec

The base-year forecast methodology was selected as most indicative of future work. New initiatives and programs have been implemented beginning in 2020 due to the Wildfire Mitigation Plan, and these enhancements are not captured in the historical costs of this category. Accordingly, 2021 base year expenses are most representative of future needs based on an expansion in complexity and scope of existing projects and initiatives.

NSE - Base YR Rec

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Pole Replacement and Reinforcement in HFTD

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Base YR Rec	4,526	4,526	4,526	-700	-1,019	-950	3,826	3,507	3,576
Non-Labor	Base YR Rec	8,654	8,654	8,654	-1,473	-2,491	-2,368	7,181	6,163	6,286
NSE	Base YR Rec	0	0	0	0	0	0	0	0	0
Total		13,180	13,180	13,180	-2,173	-3,510	-3,318	11,007	9,670	9,862
FTE	Base YR Rec	29.1	29.1	29.1	5.6	2.7	2.7	34.7	31.8	31.8

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022	-700	-1,473	0	-2,173	5.6
Explanation: Adjusted internal work, contract estimates and adjusted for estimated number of poles remediated. 2022 has a reduction to 716 forecasted pole replacements.					
2022 Total	-700	-1,473	0	-2,173	5.6
2023	-1,019	-2,491	0	-3,510	2.7
Explanation: Adjusted internal work, contract estimates and adjusted for estimated number of poles remediated. 2023 has a reduction to 631 forecasted pole replacements.					
2023 Total	-1,019	-2,491	0	-3,510	2.7
2024	-950	-2,368	0	-3,318	2.7
Explanation: Adjusted internal work, contract estimates and adjusted for estimated number of poles remediated. 2024 has a reduction to 631 forecasted pole replacements.					
2024 Total	-950	-2,368	0	-3,318	2.7

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Pole Replacement and Reinforcement in HFTD

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	79	610	3,865	3,223	3,935
Non-Labor	287	2,333	6,155	6,403	8,654
NSE	0	0	0	0	0
Total	365	2,943	10,019	9,626	12,589
FTE	0.0	0.0	0.0	0.0	0.0
Adjustments (Nominal \$) **					
Labor	96	-2	-15	-8	0
Non-Labor	169	-1	-3	-2	0
NSE	0	0	0	0	0
Total	266	-2	-18	-10	0
FTE	1.9	4.6	25.4	21.6	24.9
Recorded-Adjusted (Nominal \$)					
Labor	175	608	3,850	3,215	3,935
Non-Labor	456	2,332	6,152	6,400	8,654
NSE	0	0	0	0	0
Total	631	2,940	10,002	9,616	12,589
FTE	1.9	4.6	25.4	21.6	24.9
Vacation & Sick (Nominal \$)					
Labor	26	92	551	456	591
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	26	92	551	456	591
FTE	0.3	0.8	4.1	3.5	4.2
Escalation to 2021\$					
Labor	39	98	427	168	0
Non-Labor	90	327	597	292	0
NSE	0	0	0	0	0
Total	129	426	1,023	460	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	240	799	4,828	3,839	4,526
Non-Labor	546	2,660	6,748	6,693	8,654
NSE	0	0	0	0	0
Total	786	3,458	11,577	10,532	13,180
FTE	2.2	5.4	29.5	25.1	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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Pole Replacement and Reinforcement in HFTD

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
Labor	96	-2	-15	-8	0
Non-Labor	169	-1	-3	-2	0
NSE	0	0	0	0	0
Total	266	-2	-18	-10	0
FTE	1.9	4.6	25.4	21.6	24.9

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017	-0.125	-0.002	0	-0.127	-0.1
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2017	0.001	0	0	0.001	0.6
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2017	96	169	0	266	1.4
Explanation:	One sided adjustment to add back missing CPD orders from 2017 electric capital.				
2017 Total	96	169	0	266	1.9
2018	-2	-0.772	0	-2	-0.1
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2018	0.001	0	0	0.001	4.7
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2018 Total	-2	-0.772	0	-2	4.6
2019	-15	-3	0	-18	-0.1
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2019	0.001	0	0	0.001	25.5
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2019 Total	-15	-3	0	-18	25.4
2020	-8	-2	0	-10	-0.1
Explanation:	Reduction for S960 order types costs already accounted for on 00235 - Transformer & Meter workpaper				
2020	0.001	0	0	0.001	21.7

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Pole Replacement and Reinforcement in HFTD

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2020 Total	-8	-2	0	-10	21.6
2021	0.001	0	0	0.001	24.9
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2021 Total	0.001	0	0	0.001	24.9

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 002390**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 00239.0
 Category: D. Asset Management and Inspections
 Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
 Workpaper Group: 002390 - Customer Service ITO
 Workpaper Detail: 002390.001 - RAMP Pole Replacement and Reinforcement in HFTD
 In-Service Date: Not Applicable
 Description:

Short and long term deterioration of equipment can increase the likelihood of asset failure and cause potential risk, including injury, to the public, contractors, and employees. This program is mandated per GO 165 and non-compliance poses risk of regulatory action, including fines.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	2,334	2,139	2,182
Non-Labor	4,381	3,759	3,834
NSE	0	0	0
Total	6,715	5,898	6,016
FTE	21.2	19.4	19.4

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Pole Replacement and Reinforcement in HFTD
Workpaper Detail: 002390.001 - RAMP Pole Replacement and Reinforcement in HFTD

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C22 T1-T2

RAMP Line Item Name: Distribution System Inspection CMP 5 Year Detailed Inspections T1-T2

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$) Low High	
Tranche 1 Cost Estimate	3,500	2,924	2,568	2,620	8,112	9,325	11,398
Tranche 2 Cost Estimate	4,539	3,791	3,330	3,396	10,517	12,093	14,780

Cost Estimate Changes from RAMP:

The GRC forecast is outside the RAMP range due to forecast and scope updates . A reduction in units when compared to the RAMP range has reduced the overall forecast.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities Low High	
Tranche 1 # Poles Replaced	177.00	190.00	168.00	168.00	526.00	0.00	0.00
Tranche 2 # Poles Replaced	229.00	247.00	217.00	217.00	681.00	0.00	0.00

Work Unit Changes from RAMP:

The GRC forecast is outside the RAMP range due to forecast and scope updates . A reduction in units when compared to the RAMP range has reduced the overall forecast.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	170.000	65.000
Tranche 2	43.000	33.000

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Pole Replacement and Reinforcement in HFTD
Workpaper Detail: 002390.001 - RAMP Pole Replacement and Reinforcement in HFTD

RSE Changes from RAMP:

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2).

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 00239.0
 Category: D. Asset Management and Inspections
 Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
 Workpaper Group: 002390 - Customer Service ITO
 Workpaper Detail: 002390.002 - RAMP Pole Replacement and Reinforcement in HFTD
 In-Service Date: Not Applicable
 Description:

Short and long term deterioration of equipment can increase the likelihood of asset failure and cause potential risk, including injury, to the public, contractors, and employees. This program is mandated per GO 165 and non-compliance poses risk of regulatory action, including fines.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		459	421	429
Non-Labor		862	740	754
NSE		0	0	0
Total		1,321	1,161	1,183
FTE		4.2	3.8	3.8

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Pole Replacement and Reinforcement in HFTD
Workpaper Detail: 002390.002 - RAMP Pole Replacement and Reinforcement in HFTD

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C25 T2

RAMP Line Item Name: Distribution System Inspection CMP 10 Year Intrusive T2

Tranche(s): Tranche1: N/A; Tranche2: Tier 2

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$) Low High	
Tranche 1 Cost Estimate	0	0	0	0	0	0	0
Tranche 2 Cost Estimate	1,582	1,321	1,161	1,183	3,665	2,266	2,770

Cost Estimate Changes from RAMP:

The GRC forecast is outside the RAMP range due to forecast and scope updates . A reduction in forecasted units leads to a reduction in forecasted costs.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities Low High	
Tranche 1 # Poles Replaced	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tranche 2 # Poles Replaced	80.00	86.00	76.00	76.00	238.00	0.00	0.00

Work Unit Changes from RAMP:

The GRC forecast is outside the RAMP range due to forecast and scope updates . A reduction in forecasted units leads to a reduction in forecasted costs.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000
Tranche 2	10.000	2.000

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Pole Replacement and Reinforcement in HFTD
Workpaper Detail: 002390.002 - RAMP Pole Replacement and Reinforcement in HFTD

RSE Changes from RAMP:

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2).

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 00239.0
 Category: D. Asset Management and Inspections
 Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
 Workpaper Group: 002390 - Customer Service ITO
 Workpaper Detail: 002390.003 - RAMP Pole Replacement and Reinforcement in HFTD
 In-Service Date: Not Applicable
 Description:

Short and long term deterioration of equipment can increase the likelihood of asset failure and cause potential risk, including injury, to the public, contractors, and employees. This program is mandated per GO 165 and non-compliance poses risk of regulatory action, including fines.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		765	701	715
Non-Labor		1,436	1,233	1,257
NSE		0	0	0
Total		2,201	1,934	1,972
FTE		6.9	6.4	6.4

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Pole Replacement and Reinforcement in HFTD
Workpaper Detail: 002390.003 - RAMP Pole Replacement and Reinforcement in HFTD

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C27

RAMP Line Item Name: Distribution System Inspection HFTD Tier 3 Inspections T1-T2

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$) Low High	
Tranche 1 Cost Estimate	2,636	2,201	1,934	1,972	6,107	7,181	8,789
Tranche 2 Cost Estimate	0	0	0	0	0	8	10

Cost Estimate Changes from RAMP:

GRC forecast is outside the RAMP range due to forecast updates . A reduction in units has led to a reduction in forecasted costs.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities Low High	
Tranche 1 # Poles Replaced	133.00	143.00	126.00	126.00	395.00	0.00	0.00
Tranche 2 # Poles Replaced	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

GRC forecast is outside the RAMP range due to forecast updates . A reduction in units has led to a reduction in forecasted costs.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	187.000	111.100
Tranche 2	0.000	0.000

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Pole Replacement and Reinforcement in HFTD
Workpaper Detail: 002390.003 - RAMP Pole Replacement and Reinforcement in HFTD

RSE Changes from RAMP:

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2)

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Customer Service ITO
Workpaper Detail: 002390.004 - RAMP Pole Replacement and Reinforcement in HFTD

In-Service Date: Not Applicable
Description:

Short and long term deterioration of equipment can increase the likelihood of asset failure and cause potential risk, including injury, to the public, contractors, and employees. This program is mandated per GO 165 and non-compliance poses risk of regulatory action, including fines.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	268	246	250
Non-Labor	502	431	441
NSE	0	0	0
Total	770	677	691
FTE	2.4	2.2	2.2

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Pole Replacement and Reinforcement in HFTD
Workpaper Detail: 002390.004 - RAMP Pole Replacement and Reinforcement in HFTD

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C30 T1-T2

RAMP Line Item Name: Distribution System Inspection CMP Annual Patrol T1-T2

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$) Low High	
Tranche 1 Cost Estimate	422	352	310	316	978	1,210	1,479
Tranche 2 Cost Estimate	501	418	367	375	1,160	1,437	1,756

Cost Estimate Changes from RAMP:

The GRC forecast is outside the RAMP range due to forecast and scope updates . A reduction in units has led to a reduction in forecasted costs.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities Low High	
Tranche 1 # Poles Replaced	21.00	23.00	20.00	20.00	63.00	0.00	0.00
Tranche 2 # Poles Replaced	25.00	27.00	24.00	24.00	75.00	0.00	0.00

Work Unit Changes from RAMP:

The GRC forecast is outside the RAMP range due to forecast and scope updates . A reduction in units has led to a reduction in forecasted costs.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	994.000	683.700
Tranche 2	533.000	373.000

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 00239.0
Category: D. Asset Management and Inspections
Category-Sub: 1. Pole Replacement and Reinforcement in HFTD
Workpaper Group: 002390 - Pole Replacement and Reinforcement in HFTD
Workpaper Detail: 002390.004 - RAMP Pole Replacement and Reinforcement in HFTD

RSE Changes from RAMP:

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2)

Beginning of Workpaper Group
201270 - CORRECTIVE MAINTENANCE PROGRAM TIER 2&3

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20127.0
Category: D. Asset Management and Inspections
Category-Sub: 2. Corrective Maintenance Program HFTD Tiers 2&3
Workpaper Group: 201270 - CORRECTIVE MAINTENANCE PROGRAM TIER 2&3

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Base YR Rec	32	34	24	0	6	40	40	40
Non-Labor	Base YR Rec	973	643	446	876	500	660	1,100	540
NSE	Base YR Rec	0	0	0	0	0	0	0	0
Total		1,006	676	470	876	506	700	1,140	580
FTE	Base YR Rec	0.1	0.1	0.1	0.0	0.1	0.5	0.5	0.5

Business Purpose:

To meet SDG&E's obligation to serve by providing funding for the Corrective Maintenance Program (CMP) in areas designated as HFTD. To meet SDGE's obligation to serve and the safety requirements promulgated by CPUC G.O 95, A.B. 1890, A.B. 1017, etc., this project provides funds for several purposes, such as:

1. To maintain and restore transmission facilities.
2. To repair the system in the event of disaster such as storm or fire
3. To provide funding for a pole restoration program for in-service transmission wood poles.
4. To provide funding for annual NERC and Tie Lines Assessments (TLA)

Physical Description:

This project replaces wood poles with steel poles, changes insulators, replaces conductor, and associated hardware upgrades in the HFTD (Tier 2 and Tier 3) areas. These assets are FERC driven with CPUC components related to underbuilt distribution.

Project Justification:

This project fulfills SDG&E's obligation to serve and meet safety requirements associated with the transmission system. The costs associated with this budget code are the CPUC components related to the distribution circuits underbuilt on the transmission structures.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20127.0
Category: D. Asset Management and Inspections
Category-Sub: 2. Corrective Maintenance Program HFTD Tiers 2&3
Workpaper Group: 201270 - CORRECTIVE MAINTENANCE PROGRAM TIER 2&3

Forecast Methodology:

Labor - Base YR Rec

The base-year forecast methodology was selected as most indicative of future work. New initiatives and programs have been implemented beginning in 2020 due to the Wildfire Mitigation Plan, and these enhancements are not captured in the historical costs of this category. Accordingly, 2021 base year expenses are most representative of future needs based on an expansion in complexity and scope of existing projects and initiatives.

Non-Labor - Base YR Rec

The base-year forecast methodology was selected as most indicative of future work. New initiatives and programs have been implemented beginning in 2020 due to the Wildfire Mitigation Plan, and these enhancements are not captured in the historical costs of this category. Accordingly, 2021 base year expenses are most representative of future needs based on an expansion in complexity and scope of existing projects and initiatives.

NSE - Base YR Rec

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20127.0
Category: D. Asset Management and Inspections
Category-Sub: 2. Corrective Maintenance Program HFTD Tiers 2&3
Workpaper Group: 201270 - CORRECTIVE MAINTENANCE PROGRAM TIER 2&3

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Base YR Rec	6	6	6	34	34	34	40	40	40
Non-Labor	Base YR Rec	500	500	500	160	600	40	660	1,100	540
NSE	Base YR Rec	0	0	0	0	0	0	0	0	0
Total		506	506	506	194	634	74	700	1,140	580
FTE	Base YR Rec	0.1	0.1	0.1	0.4	0.4	0.4	0.5	0.5	0.5

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022	34	160	0	194	0.4
Explanation: Additional employee labor costs associated with transmission poles replacements containing distribution circuits underbuilt on the pole. One FTE charging 40% of their time. $40\% * \$100,000 = \$40,000$ in total labor. An additional 8 pole replacements are forecasted for 2022 resulting in an upward adjustment of $8 * \$20k$ per pole = \$160k.					
2022 Total	34	160	0	194	0.4
2023	34	600	0	634	0.4
Explanation: Additional employee labor costs associated with transmission poles replacements containing distribution circuits underbuilt on the pole. One FTE charging 40% of their time. $40\% * \$100,000 = \$40,000$ in total labor. An additional 30 pole replacements are forecasted for 2023 resulting in an upward adjustment of $30 * \$20k$ per pole = \$600k.					
2023 Total	34	600	0	634	0.4
2024	34	40	0	74	0.4
Explanation: Additional employee labor costs associated with transmission poles replacements containing distribution circuits underbuilt on the pole. One FTE charging 40% of their time. $40\% * \$100,000 = \$40,000$ in total labor. An additional 2 pole replacements are forecasted for 2022 resulting in an upward adjustment of $2 * \$20k$ per pole = \$40k.					
2024 Total	34	40	0	74	0.4

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20127.0
Category: D. Asset Management and Inspections
Category-Sub: 2. Corrective Maintenance Program HFTD Tiers 2&3
Workpaper Group: 201270 - CORRECTIVE MAINTENANCE PROGRAM TIER 2&3

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	24	26	19	0	1
Non-Labor	813	564	407	838	397
NSE	0	0	0	0	0
Total	837	589	426	838	399
FTE	0.1	0.1	0.1	0.0	0.0
Adjustments (Nominal \$) **					
Labor	0	0	0	0	4
Non-Labor	0	0	0	0	102
NSE	0	0	0	0	0
Total	0	0	0	0	106
FTE	0.0	0.0	0.0	0.0	0.1
Recorded-Adjusted (Nominal \$)					
Labor	24	26	19	0	5
Non-Labor	813	564	407	838	500
NSE	0	0	0	0	0
Total	837	589	426	838	505
FTE	0.1	0.1	0.1	0.0	0.1
Vacation & Sick (Nominal \$)					
Labor	3	4	3	0	1
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	3	4	3	0	1
FTE	0.0	0.0	0.0	0.0	0.0
Escalation to 2021\$					
Labor	5	4	2	0	0
Non-Labor	160	79	39	38	0
NSE	0	0	0	0	0
Total	165	83	42	38	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	32	34	24	0	6
Non-Labor	973	643	446	876	500
NSE	0	0	0	0	0
Total	1,006	676	470	876	506
FTE	0.1	0.1	0.1	0.0	0.1

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20127.0
Category: D. Asset Management and Inspections
Category-Sub: 2. Corrective Maintenance Program HFTD Tiers 2&3
Workpaper Group: 201270 - CORRECTIVE MAINTENANCE PROGRAM TIER 2&3

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
Labor	0	0	0	0	4
Non-Labor	0	0	0	0	102
NSE	0	0	0	0	0
Total	0	0	0	0	106
FTE	0.0	0.0	0.0	0.0	0.1

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017 Total	0	0	0	0	0.0
2018 Total	0	0	0	0	0.0
2019 Total	0	0	0	0	0.0
2020 Total	0	0	0	0	0.0
2021	4	102	0	106	0.1
Explanation: Budget code 100 was split into several projects. This adjustment is to allocate costs that trickled in 2021 and were not journal entried prior to the data upload into GRID.					
2021 Total	4	102	0	106	0.1

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 201270**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20127.0
Category: D. Asset Management and Inspections
Category-Sub: 2. Corrective Maintenance Program HFTD Tiers 2&3
Workpaper Group: 201270 - CORRECTIVE MAINTENANCE PROGRAM TIER 2&3
Workpaper Detail: 201270.001 - RAMP - Transmission CMP (Distribution Costs)

In-Service Date: Not Applicable

Description:

To meet SDG&E's obligation to serve by providing funding for the Corrective Maintenance Program (CMP) in areas designated as HFTD. To meet SDGE's obligation to serve and the safety requirements promulgated by CPUC G.O 95, A.B. 1890, A.B. 1017, etc., this project provides funds for several purposes, such as:

1. To maintain and restore transmission facilities.
2. To repair the system in the vent of disaster such as storm or fire
3. To provide funding for a pole restoration program for in-service transmission wood poles.
4. To provide funding for annual NERC and Tie Lines Assessments (TLA)

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	40	40	40
Non-Labor	660	1,100	540
NSE	0	0	0
Total	700	1,140	580
FTE	0.5	0.5	0.5

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20127.0
Category: D. Asset Management and Inspections
Category-Sub: 2. Corrective Maintenance Program HFTD Tiers 2&3
Workpaper Group: 201270 - CORRECTIVE MAINTENANCE PROGRAM TIER 2&3
Workpaper Detail: 201270.001 - RAMP - Transmission CMP (Distribution Costs)

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C23

RAMP Line Item Name: Transmission System Inspection

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$) Low High	
Tranche 1 Cost Estimate	506	700	1,140	580	2,420	1,957	2,392

Cost Estimate Changes from RAMP:

The GRC forecast is slightly above the RAMP range due to additional pole replacements forecast in 2023 and 2024.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities Low High	
Tranche 1 # of HFTD inspections	0.00	0.00	0.00	0.00	0.00	7,331.00	8,661.00

Work Unit Changes from RAMP:

No capital activity unit for this program.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

An RSE was not calculated for this activity.

Beginning of Workpaper Group
202480 - DRONE INVESTIGATION ASSESMENT AND REPAIR

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20248.0
Category: D. Asset Management and Inspections
Category-Sub: 3. Drone Investigation Assessment & Repair
Workpaper Group: 202480 - DRONE INVESTIGATION ASSESMENT AND REPAIR

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	0	88	229	120	120	120
Non-Labor	Zero-Based	0	0	0	16,538	12,269	33,325	55,200	6,861
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	0	16,625	12,499	33,445	55,320	6,981
FTE	Zero-Based	0.0	0.0	0.0	0.3	1.3	1.0	1.0	1.0

Business Purpose:

SDG&E's Drone Investigation Assessment and Repair (DIAR) program performs drone inspections of SDG&E's overhead distribution infrastructure in the HFTD. These drone inspections provide high definition images of distribution infrastructure from vantage points that are not obtainable using traditional ground inspections. These images are processed through machine learning and reviewed by qualified electrical workers to find infractions. This budget code represents the repairs associated with correcting the infractions found during these inspections. These repairs include pole replacements and associated work that help ensure reliability and safety of the electric distribution system.

Physical Description:

The capital portion of the DIAR program consists of replacement of electrical distribution poles in the HFTD that have been evaluated by qualified electrical workers who have concluded the pole has reached the end of its useful life.

Project Justification:

The infractions found by the drone inspections are reviewed by qualified electrical workers who determine that the pole has reached the end of its useful life. These pole replacements are required to ensure the reliability and safety of the electric distribution system. Correcting these infractions prior to failure will reduce the risk of a fault or ignition occurring as a result of electric infrastructure, and ensure compliance with all applicable codes and regulations.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20248.0
Category: D. Asset Management and Inspections
Category-Sub: 3. Drone Investigation Assessment & Repair
Workpaper Group: 202480 - DRONE INVESTIGATION ASSESMENT AND REPAIR

Forecast Methodology:

Labor - Zero-Based

The forecast method developed for this cost category is zero-based. This method is most appropriate because the drone inspection program will undergo a significant change in 2023 as the program transitions from an initial three-year cycle to an ongoing five-year cycle. Supplemental workpapers with the forecasts have been developed for this program.

Non-Labor - Zero-Based

The forecast method developed for this cost category is zero-based. This method is most appropriate because the drone inspection program will undergo a significant change in 2023 as the program transitions from an initial three-year cycle to an ongoing five-year cycle. Supplemental workpapers with the forecasts have been developed for this program.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20248.0
Category: D. Asset Management and Inspections
Category-Sub: 3. Drone Investigation Assessment & Repair
Workpaper Group: 202480 - DRONE INVESTIGATION ASSESMENT AND REPAIR

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	120	120	120	0	0	0	120	120	120
Non-Labor	Zero-Based	33,325	55,200	6,861	0	0	0	33,325	55,200	6,861
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		33,445	55,320	6,981	0	0	0	33,445	55,320	6,981
FTE	Zero-Based	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20248.0
Category: D. Asset Management and Inspections
Category-Sub: 3. Drone Investigation Assessment & Repair
Workpaper Group: 202480 - DRONE INVESTIGATION ASSESMENT AND REPAIR

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	0	73	199
Non-Labor	0	0	0	15,815	12,269
NSE	0	0	0	0	0
Total	0	0	0	15,889	12,469
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	0.3	0.8
Recorded-Adjusted (Nominal \$)					
Labor	0	0	0	73	199
Non-Labor	0	0	0	15,815	12,269
NSE	0	0	0	0	0
Total	0	0	0	15,889	12,469
FTE	0.0	0.0	0.0	0.3	1.1
Vacation & Sick (Nominal \$)					
Labor	0	0	0	10	30
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	0	10	30
FTE	0.0	0.0	0.0	0.0	0.2
Escalation to 2021\$					
Labor	0	0	0	4	0
Non-Labor	0	0	0	723	0
NSE	0	0	0	0	0
Total	0	0	0	727	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	0	88	229
Non-Labor	0	0	0	16,538	12,269
NSE	0	0	0	0	0
Total	0	0	0	16,625	12,499
FTE	0.0	0.0	0.0	0.3	1.3

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20248.0
Category: D. Asset Management and Inspections
Category-Sub: 3. Drone Investigation Assessment & Repair
Workpaper Group: 202480 - DRONE INVESTIGATION ASSESMENT AND REPAIR

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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	0.3	0.8

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017 Total	0	0	0	0	0.0
2018 Total	0	0	0	0	0.0
2019 Total	0	0	0	0	0.0
2020	0.001	0	0	0.001	0.3
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2020 Total	0.001	0	0	0.001	0.3
2021	0.001	0	0	0.001	0.8
Explanation:	One-sided adjustment to add the FTE related to CPD orders that were inadvertently missing from the initial data load of historical costs				
2021 Total	0.001	0	0	0.001	0.8

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 202480**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 20248.0
 Category: D. Asset Management and Inspections
 Category-Sub: 3. Drone Investigation Assessment & Repair
 Workpaper Group: 202480 - DRONE INVESTIGATION ASSESMENT AND REPAIR
 Workpaper Detail: 202480.001 - RAMP - Drone Investigation Assessment & Repair
 In-Service Date: Not Applicable
 Description:

Ensure electrical distribution reliability by replacing poles in the HFTD that have been evaluated by subject matter experts to have reached the end of their useful life.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		120	120	120
Non-Labor		27,131	54,000	5,661
NSE		0	0	0
Total		27,251	54,120	5,781
FTE		1.0	1.0	1.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20248.0
Category: D. Asset Management and Inspections
Category-Sub: 3. Drone Investigation Assessment & Repair
Workpaper Group: 202480 - DRONE INVESTIGATION ASSESMENT AND REPAIR
Workpaper Detail: 202480.001 - RAMP - Drone Investigation Assessment & Repair

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C28 T1-T2

RAMP Line Item Name: Distribution System Inspection Drone Inspections

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	12,498	1,400	0	0	1,400	0	0
Tranche 2 Cost Estimate	0	32,045	55,320	6,981	94,346	10,085	12,326

Cost Estimate Changes from RAMP:

The GRC forecast is outside the RAMP range due to forecast and scope updates. Specifically, there was a delay in beginning inspections in 2021 due to setting up a new PMO to run the drone inspection program. This delay led to capital repairs originally forecasted in 2021 being delayed into 2022. In 2021, there was also an increase in defects found through drone inspections as the program transitioned into Tier 2 and out of Tier 3.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 # of pole replacements	355.00	46.00	0.00	0.00	46.00	0.00	0.00
Tranche 2 # of pole replacements	0.00	858.00	1,800.00	159.00	2,817.00	0.00	0.00

Work Unit Changes from RAMP:

Capital units added. The GRC unit forecast is outside the RAMP range due to forecast and scope updates.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	22.000	194.000
Tranche 2	9.000	9.000

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20248.0
Category: D. Asset Management and Inspections
Category-Sub: 3. Drone Investigation Assessment & Repair
Workpaper Group: 202480 - DRONE INVESTIGATION ASSESMENT AND REPAIR
Workpaper Detail: 202480.001 - RAMP - Drone Investigation Assessment & Repair

RSE Changes from RAMP:

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2)

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 20248.0
 Category: D. Asset Management and Inspections
 Category-Sub: 3. Drone Investigation Assessment & Repair
 Workpaper Group: 202480 - DRONE INVESTIGATION ASSESMENT AND REPAIR
 Workpaper Detail: 202480.002 - RAMP Drone Investigation Assessment & Repair - Software (Same RAMP Item as 20248.001)
 In-Service Date: Not Applicable

Description:

Ensure electrical distribution reliability by replacing poles in the HFTD that have been evaluated by subject matter experts to have reached the end of their useful life.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		0	0	0
Non-Labor		6,194	1,200	1,200
NSE		0	0	0
Total		6,194	1,200	1,200
FTE		0.0	0.0	0.0

Note: Totals may include rounding differences.

Supplemental Workpapers for Workpaper Group 202480

BC 20248

Costs from Initial HFTD Flights Across Tier 2 and Tier 3				
	Year	2022	2023	2024
		Follow-Up work from Initial Flights	Follow-Up work from Initial Flights	Follow-Up work from Initial Flights
O&M	Support, Flights, and assessment	\$16,132,372	\$4,032,000	\$672,000
O&M	Engineer and Repair	\$63,151,329	\$31,930,701	\$464,341
O&M	Technology	\$1,611,250	\$1,611,250	\$1,611,250
O&M	Total	\$80,894,951	\$37,573,951	\$2,747,591
Capital	Pole Replacement	\$27,131,085	\$54,000,000	\$5,660,851
Capital*	Technology	\$6,193,750	\$1,200,000	\$1,200,078
Capital	Total	\$33,324,835	\$55,200,000	\$6,860,929
Ongoing Program costs in 2023 forward				
	Year	2022	2023	2024
		Ongoing Assessments/Repairs	Ongoing Assessments/Repairs	Ongoing Assessments/Repairs
O&M	Support, Flights, and assessment		\$12,696,000	\$9,580,000
O&M	Engineer and Repair		\$31,930,701	\$464,341
O&M	Technology		\$1,611,250	\$1,611,250
O&M	Total		\$46,237,951	\$11,655,591
Capital	Pole Replacement			
Capital*	Technology			
Capital	Total			
Overall Total		2022	2023	2024
O&M		\$80,894,951	\$83,811,902	\$14,403,182
Capital		\$33,324,835	\$55,200,000	\$6,860,929

Support costs of approximately \$340k per month for all of 2022 and 2023 and first two months of 2024. Flight/Assessment costs at \$529 per flight and 23,671 flights in 2022. O&M Repair costs assume 25% of poles have issues found. 80% of repairs are O&M.

Ongoing O&M costs to keep running machine learning models that review drone images for infractions.

Pole replacement costs assume 20% of repairs are Capital pole replacements at \$30k per pole. Ongoing technology costs to develop machine learning models for drone imagery review.

Based on 5 consultant FTEs for safety, management and outreach at \$160/hr, plus 14000 inspections at \$500/pole assessment with \$10 escalation on rate and assessment in 2024.

O&M Repair costs assume 15% of poles have issues found. 80% of repairs are O&M.

Ongoing O&M costs to keep running machine learning models that review drone images for infractions.

No capital repair costs forecasted in this budget code after initial flight repairs.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Category: E. Grid Operations and Protocols
Workpaper: VARIOUS

Summary for Category: E. Grid Operations and Protocols

	In 2021\$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2021	2022	2023	2024
Labor	0	0	0	0
Non-Labor	13,460	14,749	9,185	8,100
NSE	0	0	0	0
Total	13,460	14,749	9,185	8,100
FTE	0.0	0.0	0.0	0.0

202770 AVIATION FIREFIGHTING PROGRAM

Labor	0	0	0	0
Non-Labor	10,461	2,753	9,185	8,100
NSE	0	0	0	0
Total	10,461	2,753	9,185	8,100
FTE	0.0	0.0	0.0	0.0

212550 HELICOPTER IR & HD CAMERA

Labor	0	0	0	0
Non-Labor	817	400	0	0
NSE	0	0	0	0
Total	817	400	0	0
FTE	0.0	0.0	0.0	0.0

212560 TWIN ENGINE MEDIUM LIFT HELICOPTER

Labor	0	0	0	0
Non-Labor	2,182	11,596	0	0
NSE	0	0	0	0
Total	2,182	11,596	0	0
FTE	0.0	0.0	0.0	0.0

Note: Totals may include rounding differences.

Beginning of Workpaper Group
202770 - AVIATION FIREFIGHTING PROGRAM

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20277.0
Category: E. Grid Operations and Protocols
Category-Sub: 1. Aviation Firefighting Program
Workpaper Group: 202770 - AVIATION FIREFIGHTING PROGRAM

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	0	0	0	0	0	0
Non-Labor	Zero-Based	0	0	0	8,626	10,461	2,753	9,185	8,100
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	0	8,626	10,461	2,753	9,185	8,100
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Business Purpose:

Under certain conditions, a wildfire that is not suppressed may grow rapidly and uncontrollably and endanger public safety. Additionally, in the event of an simultaneous wildfire events fire agencies could divert aerial resources to fight wildfires outside of SDG&E's service territory. To mitigate this risk, the aviation firefighting program serves as a wildfire suppression resource to ensure aerial firefighting resources remain available in the region. To enhance SDG&E's aviation firefighting program, this budget code includes the purchase of a new Sikorsky S-70M Firehawk and the development of an aviation training area. The purpose of purchasing and equipping of a new Sikorsky S-70M Firehawk is to complete firefighting and heavy construction needs for SDG&E. The purpose of the "On the Rocks" Aviation Training Area is to train helicopter and UAS pilots.

Physical Description:

The twin-engine Sikorsky S-70M Firehawk will be equipped with a 9,000 lb. construction hook, a 1,000-gallon belly-mounted firefighting water tank, FLIR camera, helicopter mesh network downlink system, and other specialized mission equipment. The "On the Rocks" aviation training facility is 152 acres and has an FAA approved airstrip, classroom, aircraft hangar, 5 sea cargo containers, 2 wells, 2 water storage units, and water rights to 4 bonds and an aquifer.

Project Justification:

The S-70M Firehawk will support firefighting and additional heavy construction needs for SDG&E. Wildfire Mitigation Plan construction projects have increased construction load requirements, which call for additional lift capacity. To meet this growing need, SDG&E will acquire the twin-engine Sikorsky S-70M Firehawk. This heavy-lift helicopter will specialize in heavy construction projects, contribute to fire suppression with its 1,000-gallon belly-mounted water tank, and will carry out continual transmission and distribution work in the HFTD.

The "On the Rocks" aviation training area will provide a space for training, maintaining currency, evaluating new pilots, and improving pilot proficiency. The training area will reduce risk associated with aviation incidents such as helicopter or UAS crashes and resulting fires by offering a controlled environment for aviation training.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20277.0
Category: E. Grid Operations and Protocols
Category-Sub: 1. Aviation Firefighting Program
Workpaper Group: 202770 - AVIATION FIREFIGHTING PROGRAM

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The addition of the new helicopter and development of the aviation training area are not represented in historical costs. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. The addition of the new helicopter and development of the aviation training area are not represented in historical costs. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20277.0
Category: E. Grid Operations and Protocols
Category-Sub: 1. Aviation Firefighting Program
Workpaper Group: 202770 - AVIATION FIREFIGHTING PROGRAM

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	0	0	0	0	0	0	0	0	0
Non-Labor	Zero-Based	2,753	9,185	8,100	0	0	0	2,753	9,185	8,100
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		2,753	9,185	8,100	0	0	0	2,753	9,185	8,100
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20277.0
Category: E. Grid Operations and Protocols
Category-Sub: 1. Aviation Firefighting Program
Workpaper Group: 202770 - AVIATION FIREFIGHTING PROGRAM

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	0	0	0
Non-Labor	0	0	0	7,092	10,461
NSE	0	0	0	0	0
Total	0	0	0	7,092	10,461
FTE	0.0	0.0	0.0	0.0	0.0
Adjustments (Nominal \$) **					
Labor	0	0	0	0	0
Non-Labor	0	0	0	1,157	0
NSE	0	0	0	0	0
Total	0	0	0	1,157	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Nominal \$)					
Labor	0	0	0	0	0
Non-Labor	0	0	0	8,249	10,461
NSE	0	0	0	0	0
Total	0	0	0	8,249	10,461
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 2021\$					
Labor	0	0	0	0	0
Non-Labor	0	0	0	377	0
NSE	0	0	0	0	0
Total	0	0	0	377	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	0	0	0
Non-Labor	0	0	0	8,626	10,461
NSE	0	0	0	0	0
Total	0	0	0	8,626	10,461
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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20277.0
Category: E. Grid Operations and Protocols
Category-Sub: 1. Aviation Firefighting Program
Workpaper Group: 202770 - AVIATION FIREFIGHTING PROGRAM

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
Labor	0	0	0	0	0
Non-Labor	0	0	0	1,157	0
NSE	0	0	0	0	0
Total	0	0	0	1,157	0
FTE	0.0	0.0	0.0	0.0	0.0

Detail of Adjustments to Recorded in Nominal \$:

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2017 Total	0	0	0	0	0.0
2018 Total	0	0	0	0	0.0
2019 Total	0	0	0	0	0.0
2020	0	1,157	0	1,157	0.0
Explanation:	Adjustment to add back common FERC account, FERC-jurisdiction costs for RO model carve-out				
2020 Total	0	1,157	0	1,157	0.0
2021 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 202770**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 20277.0
 Category: E. Grid Operations and Protocols
 Category-Sub: 1. Aviation Firefighting Program
 Workpaper Group: 202770 - AVIATION FIREFIGHTING PROGRAM
 Workpaper Detail: 202770.001 - RAMP Aviation Firefighting Program - Firehawk Helicopter
 In-Service Date: 06/30/2023
 Description:

The S-70M Firehawk will complete firefighting and heavy construction needs for SDG&E. The twin-engine Firehawk is equipped with a 9,000lb construction hook, 1,000 gallon firefighting water tank, FLIR camera, and other necessary mission equipment.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		0	0	0
Non-Labor		2,603	1,710	0
NSE		0	0	0
Total		2,603	1,710	0
FTE		0.0	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20277.0
Category: E. Grid Operations and Protocols
Category-Sub: 1. Aviation Firefighting Program
Workpaper Group: 202770 - AVIATION FIREFIGHTING PROGRAM
Workpaper Detail: 202770.001 - RAMP Aviation Firefighting Program - Firehawk Helicopter

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C35 T1-T3

RAMP Line Item Name: Aviation Firefighting Program

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2; Tranche3: Non-HFTD

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$) Low High	
Tranche 1 Cost Estimate	8,601	2,753	9,185	8,100	20,038	1,358	1,660
Tranche 2 Cost Estimate	0	0	0	0	0	801	979
Tranche 3 Cost Estimate	0	0	0	0	0	58	70

Cost Estimate Changes from RAMP:

The GRC forecast is outside the RAMP range due to forecast and scope updates . The RAMP report did not include the purchase of additional helicopters or the development of the training facility.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities Low High	
Tranche 1 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tranche 2 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tranche 3 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

No Feasible Units.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	218.000	24.000

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20277.0
Category: E. Grid Operations and Protocols
Category-Sub: 1. Aviation Firefighting Program
Workpaper Group: 202770 - AVIATION FIREFIGHTING PROGRAM
Workpaper Detail: 202770.001 - RAMP Aviation Firefighting Program - Firehawk Helicopter

Tranche 2	453.000	14.000
Tranche 3	0.000	0.000

RSE Changes from RAMP:

General changes to risk scores or RSE values are primarily due to changes in the MAVF and RSE methodology as discussed in the RAMP to GRC integration testimony of R. Scott Pearson and Gregory S. Flores (Ex. SCG-03/SDG&E-03, Chapter 2).

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 20277.0
 Category: E. Grid Operations and Protocols
 Category-Sub: 1. Aviation Firefighting Program
 Workpaper Group: 202770 - AVIATION FIREFIGHTING PROGRAM
 Workpaper Detail: 202770.002 - RAMP Aviation Firefighting Program - Airbus Helicopter (Same RAMP Item as 20277.001)
 In-Service Date: 12/31/2024

Description:

Provides for a twin engine, multi-mission helicopter for primary use of external load work replacing a leased aircraft.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		0	0	0
Non-Labor		0	4,000	8,000
NSE		0	0	0
Total		0	4,000	8,000
FTE		0.0	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 20277.0
 Category: E. Grid Operations and Protocols
 Category-Sub: 1. Aviation Firefighting Program
 Workpaper Group: 202770 - AVIATION FIREFIGHTING PROGRAM
 Workpaper Detail: 202770.003 - RAMP Aviation Firefighting Program - Unmanned Aerial Systems (Same RAMP Item as 20277.001)
 In-Service Date: Not Applicable

Description:

The increase in personnel dedicated to UAS will directly benefit the business units who have use cases for UAS flights. Currently when a UAS team is dispatched to conduct a mission, there is no charge to the requesting business unit. With additional personnel, there would be a responsive and flexible UAS team ready to respond.

Forecast In 2021 \$(000)				
	Years	2022	2023	2024
Labor		0	0	0
Non-Labor		150	150	100
NSE		0	0	0
	Total	150	150	100
FTE		0.0	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 20277.0
 Category: E. Grid Operations and Protocols
 Category-Sub: 1. Aviation Firefighting Program
 Workpaper Group: 202770 - AVIATION FIREFIGHTING PROGRAM
 Workpaper Detail: 202770.004 - RAMP - Aviation Training Acquisition (Same RAMP Item as 20277.001)
 In-Service Date: 12/31/2023
 Description:

SDG&E is proposing an Aviation Training Center to mitigate aviation operations incident risks . This will be accomplished by facilitating helicopter and Unmanned Aerial Systems (UAS) operator proficiency training and other related work to be practiced in a controlled environment.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		0	0	0
Non-Labor		0	3,325	0
NSE		0	0	0
Total		0	3,325	0
FTE		0.0	0.0	0.0

Note: Totals may include rounding differences.

Supplemental Workpapers for Workpaper Group 202770

TY2024 GRC FORECAST - DETAILS

Budget Code:

20277

Estimated In Service Date:

multiple

20277	Item Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Month (sq. ft./mils)	# of units	2022	2023	2024	Total Cost	Comments
	Use Item					Est'd cost	Est'd cost	Est'd cost		
2	Firehawk Purchase - QD 3/2023	Non-Labor	RAMP	Helicopter	1	N/A	\$ 3,661,179	\$ -	\$ -	Costs include purchase of firehawk helicopter and firefighting modifications.
4	Airbus Helicopter - QD Dec 2024	Non-Labor	RAMP	Each	-	\$ -	\$ -	1 \$ 4,000,000	\$ 4,000,000	New helicopter acquisition. 2022 down payment, next milestone payment in 2023 and delivery in 2024. This is for purchase of an airbus helicopter similar to H135.
5	Purchase of Aviation Training Center Land	Non-Labor	RAMP	Each	-	\$ -	\$ -	1 \$ 3,125,000	\$ 3,125,000	To develop an area that can facilitate helicopter and UAS flights for training, maintaining currency, and gaining proficiency, ensuring aviation safety, team building, and next level professionalization. This property is a FAA approved airstrip. The location and infrastructure at this location may also be used by other business units of SDG&E, as well as the ability to be leased to outside organizations for training or events.
6	Facility Improvements	Non-Labor	RAMP	Each	-	\$ -	\$ -	1 \$ 200,000	\$ 200,000	Improvements are aviation training props and development with potential installations of 2-3 lattice towers, 1 distribution circuit with 3-4 poles, observation tower, helicopter landing pad, and office space modifications.
7	Unmanned aerial systems (UAS)	Non-Labor	RAMP	Each	20	\$ 7,500	\$ 150,000	\$ 20 \$ 5,000	\$ 100,000	Replace UAS assets and equipment as they age out and accounts for the continual advancement of unmanned aerial systems (UAS). Cost of drone is approx \$4k to \$5k. Cost of added equipment (i.e. camera) could run up to \$50k per drone. Not all drones will get a camera.
8										
9										
10										
11										
12										
13										
14										
15										
*Costs should be reported in direct costs only (no overheads)										
Summary										
	Labor	RAMP				\$ -	\$ -	\$ -	\$ -	
	Non-Labor	RAMP				\$ 2,751,179	\$ 9,184,905	\$ 8,100,000	\$ 20,037,681	
	Total Project Forecast					\$ 2,751,179	\$ 9,184,905	\$ 8,100,000	\$ 20,037,681	

Beginning of Workpaper Group
212550 - HELICOPTER IR & HD CAMERA

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21255.0
Category: E. Grid Operations and Protocols
Category-Sub: 2. Helicopter IR & HD Cameras
Workpaper Group: 212550 - HELICOPTER IR & HD CAMERA

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	0	0	0	0	0	0
Non-Labor	Zero-Based	0	0	0	0	817	400	0	0
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	0	0	817	400	0	0
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Business Purpose:

The purpose of purchasing High Definition Infrared (HD/IR) cameras is to enhance inspections and to supplement firefighting capabilities. Additionally, community partners and first responder agencies have access to this powerful situational awareness tool integrated into a live mesh network for real-time situational awareness during emergencies. Cameras mounted onto aerial firefighting assets will have live stream capabilities via a mesh network to display imagery, video, or infrared video on ground stations. This video will be accessible to public safety entities that require information on the collected data.

Physical Description:

HD/IR cameras will be installed on two of SDG&E's helicopters and integrate with the Aerial Mesh Network.

Project Justification:

The two HD/IR cameras will be installed on the SDG&E's H145 and H135 helicopters and be integrated with the Aerial Mesh Network to support the detailed inspections on transmission and distribution assets within the HFTD. The infrared cameras help to discover system issues that cannot be seen through traditional visual inspections, such as overheating connections. They will also be available during emergencies, such as fires, where infrastructure is impacted or threatened. The camera-equipped helicopters will be made available to CALFIRE for fire monitoring flights providing real-time situational awareness during emergencies. Cameras mounted onto aerial firefighting assets will have live stream capabilities via a mesh network to display imagery, video, or infrared video on ground stations. This video will be accessible to public safety entities that require information on the collected data..

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21255.0
Category: E. Grid Operations and Protocols
Category-Sub: 2. Helicopter IR & HD Cameras
Workpaper Group: 212550 - HELICOPTER IR & HD CAMERA

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. This budget code has not historical costs prior to 2021. The specific cameras being installed in 2022 are scoped and forecasted independently of previous costs. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. This budget code has not historical costs prior to 2021. The specific cameras being installed in 2022 are scoped and forecasted independently of previous costs. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21255.0
Category: E. Grid Operations and Protocols
Category-Sub: 2. Helicopter IR & HD Cameras
Workpaper Group: 212550 - HELICOPTER IR & HD CAMERA

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	0	0	0	0	0	0	0	0	0
Non-Labor	Zero-Based	400	0	0	0	0	0	400	0	0
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		400	0	0	0	0	0	400	0	0
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21255.0
Category: E. Grid Operations and Protocols
Category-Sub: 2. Helicopter IR & HD Cameras
Workpaper Group: 212550 - HELICOPTER IR & HD CAMERA

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	817
NSE	0	0	0	0	0
Total	0	0	0	0	817
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	0	0	0	0	817
NSE	0	0	0	0	0
Total	0	0	0	0	817
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 2021\$					
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 (Constant 2021\$)					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	817
NSE	0	0	0	0	0
Total	0	0	0	0	817
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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 21255.0
 Category: E. Grid Operations and Protocols
 Category-Sub: 2. Helicopter IR & HD Cameras
 Workpaper Group: 212550 - HELICOPTER IR & HD CAMERA

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
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Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 212550**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 21255.0
 Category: E. Grid Operations and Protocols
 Category-Sub: 2. Helicopter IR & HD Cameras
 Workpaper Group: 212550 - HELICOPTER IR & HD CAMERA
 Workpaper Detail: 212550.001 - RAMP Helicopter IR & HD Cameras
 In-Service Date: 08/31/2022
 Description:

The HD/IR cameras being installed on SDG&E's H145 and H135 helicopters integrate with the Aerial Mesh Network and can be deployed during emergencies, such as fires, where SDG&E infrastructure is being impacted or threatened. These cameras can also be used for required inspections of distribution and transmission assets.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	0	0	0
Non-Labor	400	0	0
NSE	0	0	0
Total	400	0	0
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21255.0
Category: E. Grid Operations and Protocols
Category-Sub: 2. Helicopter IR & HD Cameras
Workpaper Group: 212550 - HELICOPTER IR & HD CAMERA
Workpaper Detail: 212550.001 - RAMP Helicopter IR & HD Cameras

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C35 T1-T3

RAMP Line Item Name: Aviation Firefighting Program

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2; Tranche3: Non-HFTD

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	817	400	0	0	400	1,358	1,660
Tranche 2 Cost Estimate	0	0	0	0	0	801	979
Tranche 3 Cost Estimate	0	0	0	0	0	58	70

Cost Estimate Changes from RAMP:

RAMP data includes three budget codes, 202770, 212550, and 212560. See 202770 for changes for RAMP.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tranche 2 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tranche 3 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21255.0
Category: E. Grid Operations and Protocols
Category-Sub: 2. Helicopter IR & HD Cameras
Workpaper Group: 212550 - HELICOPTER IR & HD CAMERA
Workpaper Detail: 212550.001 - RAMP Helicopter IR & HD Cameras

Tranche 2	0.000	0.000
Tranche 3	0.000	0.000
RSE Changes from RAMP:		

Supplemental Workpapers for Workpaper Group 212550

Budget Code: 21255

21255					2022			
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Metric (ea./ft./mile)	# of units	Cost per unit*	Total cost	Comments
1	Camera Purchase and Installation - remaining milestones	Non-Labor	RAMP	Cameras	2	\$ 200,000	\$ 400,000	The HD/IR cameras being installed on SDG&E's H145 and EC135 helicopters integrate with the Aerial Mesh Network and can be deployed during emergencies, such as fires, where SDG&E infrastructure is being impacted or threatened. These cameras can also be used for required inspections of distribution and transmission assets. Budget #21255.

Beginning of Workpaper Group
212560 - TWIN ENGINE MEDIUM LIFT HELICOPTER

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21256.0
Category: E. Grid Operations and Protocols
Category-Sub: 3. Twin Engine Medium Lift Helicopter
Workpaper Group: 212560 - TWIN ENGINE MEDIUM LIFT HELICOPTER

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	0	0	0	0	0	0
Non-Labor	Zero-Based	0	0	0	0	2,182	11,596	0	0
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	0	0	2,182	11,596	0	0
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Business Purpose:

The twin engine, medium lift Bell 412 EPX helicopter is necessary to provide an increase in lifting capability for construction work related to WMP and Capital projects. This helicopter addresses the gaps between the H145 and the Blackhawk.

Physical Description:

This budget code is for the purchase of a twin engine, medium lift Bell 412 EPX helicopter.

Project Justification:

The Twin engine, medium lift Bell 412 EPX helicopter has a heavier lift capability for ongoing transmission and distribution work in the HTFD. This fills an immediate need/gap in our service profile and will replace a leased aircraft. This aircraft can also be used as an additional firefighting helicopter in if outfitted in the future. This is a standard category helicopter which will allow it to be used on patrol and/or ferry flights as needed and appropriate.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21256.0
Category: E. Grid Operations and Protocols
Category-Sub: 3. Twin Engine Medium Lift Helicopter
Workpaper Group: 212560 - TWIN ENGINE MEDIUM LIFT HELICOPTER

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. This budget code has no historical costs prior to 2021. The costs in 2022 are specific to the purchase of the helicopter and are forecasted separately from historical costs. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. This budget code has no historical costs prior to 2021. The costs in 2022 are specific to the purchase of the helicopter and are forecasted separately from historical costs. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21256.0
Category: E. Grid Operations and Protocols
Category-Sub: 3. Twin Engine Medium Lift Helicopter
Workpaper Group: 212560 - TWIN ENGINE MEDIUM LIFT HELICOPTER

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	0	0	0	0	0	0	0	0	0
Non-Labor	Zero-Based	11,596	0	0	0	0	0	11,596	0	0
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		11,596	0	0	0	0	0	11,596	0	0
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21256.0
Category: E. Grid Operations and Protocols
Category-Sub: 3. Twin Engine Medium Lift Helicopter
Workpaper Group: 212560 - TWIN ENGINE MEDIUM LIFT HELICOPTER

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	2,182
NSE	0	0	0	0	0
Total	0	0	0	0	2,182
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	0	0	0	0	2,182
NSE	0	0	0	0	0
Total	0	0	0	0	2,182
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 2021\$					
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 (Constant 2021\$)					
Labor	0	0	0	0	0
Non-Labor	0	0	0	0	2,182
NSE	0	0	0	0	0
Total	0	0	0	0	2,182
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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21256.0
Category: E. Grid Operations and Protocols
Category-Sub: 3. Twin Engine Medium Lift Helicopter
Workpaper Group: 212560 - TWIN ENGINE MEDIUM LIFT HELICOPTER

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
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Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 212560**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21256.0
Category: E. Grid Operations and Protocols
Category-Sub: 3. Twin Engine Medium Lift Helicopter
Workpaper Group: 212560 - TWIN ENGINE MEDIUM LIFT HELICOPTER
Workpaper Detail: 212560.001 - RAMP Aviation Firefighting Program - Firehawk, Bell 412

In-Service Date: 12/31/2022
Description:

The Bell 412 helicopter is a twin-engine medium lift helicopter that provides an increase in lifting capability for construction-related loads. The Bell 412 will be outfitted with equipment necessary for firefighting capabilities.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	0	0	0
Non-Labor	11,596	0	0
NSE	0	0	0
Total	11,596	0	0
FTE	0.0	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21256.0
Category: E. Grid Operations and Protocols
Category-Sub: 3. Twin Engine Medium Lift Helicopter
Workpaper Group: 212560 - TWIN ENGINE MEDIUM LIFT HELICOPTER
Workpaper Detail: 212560.001 - RAMP Aviation Firefighting Program - Firehawk, Bell 412

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C35 T1-T3

RAMP Line Item Name: Aviation Firefighting Program

Tranche(s): Tranche1: Tier 3; Tranche2: Tier 2; Tranche3: Non-HFTD

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$) Low High	
Tranche 1 Cost Estimate	2,182	11,596	0	0	11,596	1,358	1,660
Tranche 2 Cost Estimate	0	0	0	0	0	801	979
Tranche 3 Cost Estimate	0	0	0	0	0	58	70

Cost Estimate Changes from RAMP:

RAMP data includes three budget codes, 202770, 212550, and 212560. The costs associated with this helicopter were not included in RAMP forecasting.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities Low High	
Tranche 1 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tranche 2 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tranche 3 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21256.0
Category: E. Grid Operations and Protocols
Category-Sub: 3. Twin Engine Medium Lift Helicopter
Workpaper Group: 212560 - TWIN ENGINE MEDIUM LIFT HELICOPTER
Workpaper Detail: 212560.001 - RAMP Aviation Firefighting Program - Firehawk, Bell 412

Tranche 2	0.000	0.000
Tranche 3	0.000	0.000
RSE Changes from RAMP:		

Supplemental Workpapers for Workpaper Group 212560

Budget Code: 21256

21256 -					2022			
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Metric (ea./ft./mile)	# of units	Cost per unit*	Total cost	Comments
1	Bell 412 Helicopter Purchase - ISD Dec 2022	Non-Labor	RAMP	Helicopter	1		\$ 11,595,475	Costs include purchase of Bell 412 helicopter and firefighting modifications. Budget #21256

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Category: F. Data Governance
Workpaper: VARIOUS

Summary for Category: F. Data Governance

	In 2021\$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2021	2022	2023	2024
Labor	916	1,769	1,727	1,404
Non-Labor	19,890	22,486	15,839	10,281
NSE	0	0	0	0
Total	20,806	24,255	17,566	11,685
FTE	8.3	13.7	13.2	10.6

208910 WMP CENTRALIZED REPOSITORY FOR DATA

Labor	793	973	703	404
Non-Labor	16,873	15,430	9,803	5,279
NSE	0	0	0	0
Total	17,666	16,403	10,506	5,683
FTE	7.1	7.6	5.5	3.1

218840 WMP ADVANCED ANALYTICS

Labor	47	347	327	327
Non-Labor	887	5,721	3,668	3,667
NSE	0	0	0	0
Total	934	6,068	3,995	3,994
FTE	0.5	3.0	2.9	2.9

218770 WMP Asset Investment Prioritization

Labor	76	449	697	673
Non-Labor	2,130	1,335	2,368	1,335
NSE	0	0	0	0
Total	2,206	1,784	3,065	2,008
FTE	0.7	3.1	4.8	4.6

Note: Totals may include rounding differences.

Beginning of Workpaper Group
208910 - WMP CENTRALIZED REPOSITORY FOR DATA

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20891.0
Category: F. Data Governance
Category-Sub: 1. Centralized Repository for Data
Workpaper Group: 208910 - WMP CENTRALIZED REPOSITORY FOR DATA

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Base YR Rec	0	0	1	454	793	973	703	404
Non-Labor	Base YR Rec	0	0	23	10,227	16,873	15,430	9,803	5,279
NSE	Base YR Rec	0	0	0	0	0	0	0	0
Total		0	0	24	10,681	17,665	16,403	10,506	5,683
FTE	Base YR Rec	0.0	0.0	0.0	4.0	7.1	7.6	5.5	3.1

Business Purpose:

This budget code contains projects related to the centralization of Wildfire Mitigation Plan (WMP) data and utilizing that data to advance asset management capabilities, develop advanced analytics, and automate WMP-related reporting. The Centralized Repository for Data will centralize data from 10+ business units into the central repository, with a primary focus of automating aggregated summary metrics required for the WMP Performance Metrics (Tables 1-12). Business units include: GIS, Electric Distribution, Electric Transmission, Fire Science and Climate Adaptation, Reliability, Safety, and Vegetation Management. Raw data will be gathered and centralized from multiple sources. The project will work in close collaboration with WMP Data Governance for data auditability and initial WMP data catalog development. Utilizing this combined data, asset management capabilities will be enhanced to develop a centralized repository for Electric Asset data, asset health and risk models for critical distribution and transmission assets, and visualization for end users to interact with the data. The Office of Energy Infrastructure Safety (OEIS) requires submission of a Quarterly Data Report (QDR) utilizing a defined data taxonomy and schema for many feature classes to use for future WMP data analysis. This project will provide an automated solution to gather the required data, convert the data to geospatial format, and create the QDR for submission to OEIS.

Physical Description:

The centralized repository for data, and the additional software and analytics are software tools developed with internal labor and contracted labor and software licensing.

Project Justification:

The Centralized Repository for Data will centralize and automate data required for quarterly reporting of WMP Performance Metrics (Resolution WSD-011 Attachment 2.3) and documentation of the logic used for showing progress on the filed Wildfire Mitigation Plan. It will also progress the maturity of existing Data Governance processes. The asset management portion of the project will unify critical asset data so that asset managers can make better informed decisions on maintenance and inspection. Asset condition and risk indices will enable data-driven decisions rather than relying on institutional knowledge and data across multiple sources. The QDR automation portion of the project will develop automation to reduce the current significant manual effort to gather data and generate the QDR. This will allow for more timely reporting with a reduction in human-related errors associated with data entry and reporting.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20891.0
Category: F. Data Governance
Category-Sub: 1. Centralized Repository for Data
Workpaper Group: 208910 - WMP CENTRALIZED REPOSITORY FOR DATA

Forecast Methodology:

Labor - Base YR Rec

Base-year was selected as most indicative of future work. This budget code has no significant historical costs prior to 2021. Therefore, the base year 2021 was utilized as most indicative of future development for the Centralized Repository for Data.

Non-Labor - Base YR Rec

Base-year was selected as most indicative of future work. This budget code has no significant historical costs prior to 2021. Therefore, the base year 2021 was utilized as most indicative of future development for the Centralized Repository for Data.

NSE - Base YR Rec

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20891.0
Category: F. Data Governance
Category-Sub: 1. Centralized Repository for Data
Workpaper Group: 208910 - WMP CENTRALIZED REPOSITORY FOR DATA

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Base YR Rec	793	793	793	180	-90	-389	973	703	404
Non-Labor	Base YR Rec	16,873	16,873	16,873	-1,443	-7,070	-11,594	15,430	9,803	5,279
NSE	Base YR Rec	0	0	0	0	0	0	0	0	0
Total		17,666	17,666	17,666	-1,263	-7,160	-11,983	16,403	10,506	5,683
FTE	Base YR Rec	7.1	7.1	7.1	0.5	-1.6	-4.0	7.6	5.5	3.1

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022	180	-1,443	0	-1,263	0.5
Explanation:	The forecast was based on cost estimate template used by IT Portfolio Mgmt Office , which takes into account number of FTEs and number of average productive hours estimated. Adjustments were made with assumptions for project specific scope and potential remaining work in future years.				
2022 Total	180	-1,443	0	-1,263	0.5
2023	-90	-7,070	0	-7,160	-1.6
Explanation:	The forecast was based on cost estimate template used by IT Portfolio Mgmt Office , which takes into account number of FTEs and number of average productive hours estimated. Adjustments were made with assumptions for project specific scope and potential remaining work in future years.				
2023 Total	-90	-7,070	0	-7,160	-1.6
2024	-389	-11,594	0	-11,983	-4.0
Explanation:	The forecast was based on cost estimate template used by IT Portfolio Mgmt Office , which takes into account number of FTEs and number of average productive hours estimated. Adjustments were made with assumptions for project specific scope and potential remaining work in future years.				
2024 Total	-389	-11,594	0	-11,983	-4.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20891.0
Category: F. Data Governance
Category-Sub: 1. Centralized Repository for Data
Workpaper Group: 208910 - WMP CENTRALIZED REPOSITORY FOR DATA

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	1	380	689
Non-Labor	0	0	21	9,780	16,873
NSE	0	0	0	0	0
Total	0	0	22	10,160	17,562
FTE	0.0	0.0	0.0	3.4	6.1
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	1	380	689
Non-Labor	0	0	21	9,780	16,873
NSE	0	0	0	0	0
Total	0	0	22	10,160	17,562
FTE	0.0	0.0	0.0	3.4	6.1
Vacation & Sick (Nominal \$)					
Labor	0	0	0	54	104
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	0	54	104
FTE	0.0	0.0	0.0	0.6	1.0
Escalation to 2021\$					
Labor	0	0	0	20	0
Non-Labor	0	0	2	447	0
NSE	0	0	0	0	0
Total	0	0	2	467	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	1	454	793
Non-Labor	0	0	23	10,227	16,873
NSE	0	0	0	0	0
Total	0	0	24	10,681	17,665
FTE	0.0	0.0	0.0	4.0	7.1

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20891.0
Category: F. Data Governance
Category-Sub: 1. Centralized Repository for Data
Workpaper Group: 208910 - WMP CENTRALIZED REPOSITORY FOR DATA

Summary of Adjustments to Recorded:

In Nominal \$(000)						
Years	2017	2018	2019	2020	2021	
	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

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
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Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 208910**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20891.0
Category: F. Data Governance
Category-Sub: 1. Centralized Repository for Data
Workpaper Group: 208910 - WMP CENTRALIZED REPOSITORY FOR DATA
Workpaper Detail: 208910.001 - RAMP - Centralized Repository for Data

In-Service Date: Not Applicable

Description:

Centralize data from 10+ different business units into the central repository, with primary focus of automating aggregated summary metrics required for the WMP Performance Metrics (Tables 1-12). Business units include: Asset Mgmt (GIS), Asset Mgmt (Distribution Inspections), Asset Mgmt (Transmission Inspections), Fire Science, Meteorology, PSPS, Reliability, Safety, Electric Grid Ops, Vegetation Management. Raw data leveraged/centralized from sources: GIS, CMP, TCM, Powerworkz TCM, Ignition File, FPI/RFW File, FTSAutocaller (RAWZ), OUA, SAIDIDAT/Datacore, Transmission Outage Access, Powerworkz. Work in close collaboration with WMP Data Governance for data auditability and initial WMP data catalog, and EAMP/WSD Schema for coordination of shared sources and eventual alignment for Quarterly Data Request.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	973	703	404
Non-Labor	15,430	9,803	5,279
NSE	0	0	0
Total	16,403	10,506	5,683
FTE	7.6	5.5	3.1

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20891.0
Category: F. Data Governance
Category-Sub: 1. Centralized Repository for Data
Workpaper Group: 208910 - WMP CENTRALIZED REPOSITORY FOR DATA
Workpaper Detail: 208910.001 - RAMP - Centralized Repository for Data

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C38

RAMP Line Item Name: Centralized Repository for Data

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	17,665	16,403	10,506	5,683	32,592	56,578	69,150

Cost Estimate Changes from RAMP:

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

Beginning of Workpaper Group
218840 - WMP ADVANCED ANALYTICS

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21884.0
Category: F. Data Governance
Category-Sub: 2. Advanced Analytics
Workpaper Group: 218840 - WMP ADVANCED ANALYTICS

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	0	0	47	347	327	327
Non-Labor	Zero-Based	0	0	0	0	887	5,721	3,668	3,667
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	0	0	934	6,068	3,995	3,994
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.5	3.0	2.9	2.9

Business Purpose:

The purpose of the WMP Advanced Analytics project is to increase the capacity and skills to enable and develop advanced analytics and predictive use cases to support ongoing WMP and Risk Management initiatives . This project includes the build out of a data lake and machine learning pipeline to leverage readily-available cloud machine learning and artificial intelligence capabilities.

Physical Description:

This budget code contains both the internal labor and contracted non labor costs associated with developing the WMP Advanced Analytics.

Project Justification:

This project will develop the use of artificial intelligence and machine learning capabilities to proactively identify, reduce, and manage wildfire-related risk. It will improve data quality through the use and validation of centralized datasets. There will be a core set of re-usable, cloud-based data science workspaces and tools to enable sustainable and faster model creation and feedback loops that evaluate and validate the utility workload.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21884.0
Category: F. Data Governance
Category-Sub: 2. Advanced Analytics
Workpaper Group: 218840 - WMP ADVANCED ANALYTICS

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. This budget code does not have historical costs except for a partial year of development in 2021. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. This budget code does not have historical costs except for a partial year of development in 2021. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21884.0
Category: F. Data Governance
Category-Sub: 2. Advanced Analytics
Workpaper Group: 218840 - WMP ADVANCED ANALYTICS

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	347	327	327	0	0	0	347	327	327
Non-Labor	Zero-Based	5,721	3,668	3,667	0	0	0	5,721	3,668	3,667
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		6,068	3,995	3,994	0	0	0	6,068	3,995	3,994
FTE	Zero-Based	3.0	2.9	2.9	0.0	0.0	0.0	3.0	2.9	2.9

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21884.0
Category: F. Data Governance
Category-Sub: 2. Advanced Analytics
Workpaper Group: 218840 - WMP ADVANCED ANALYTICS

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	0	0	41
Non-Labor	0	0	0	0	887
NSE	0	0	0	0	0
Total	0	0	0	0	928
FTE	0.0	0.0	0.0	0.0	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	0	0	0	0	41
Non-Labor	0	0	0	0	887
NSE	0	0	0	0	0
Total	0	0	0	0	928
FTE	0.0	0.0	0.0	0.0	0.4
Vacation & Sick (Nominal \$)					
Labor	0	0	0	0	6
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	0	0	6
FTE	0.0	0.0	0.0	0.0	0.1
Escalation to 2021\$					
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 (Constant 2021\$)					
Labor	0	0	0	0	47
Non-Labor	0	0	0	0	887
NSE	0	0	0	0	0
Total	0	0	0	0	934
FTE	0.0	0.0	0.0	0.0	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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 21884.0
 Category: F. Data Governance
 Category-Sub: 2. Advanced Analytics
 Workpaper Group: 218840 - WMP ADVANCED ANALYTICS

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
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Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 218840**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21884.0
Category: F. Data Governance
Category-Sub: 2. Advanced Analytics
Workpaper Group: 218840 - WMP ADVANCED ANALYTICS
Workpaper Detail: 218840.001 - RAMP - WMP Advanced Analytics

In-Service Date: Not Applicable

Description:

WMP Advanced Analytics project will increase the capacity/skills to enable and develop advanced analytics/predictive use cases to support ongoing WMP and Risk Mgmt initiatives. Support the advancement of analytics capabilities for Wildfire Mitigation. Build out data lake and machine learning pipeline to leverage readily available cloud ML/AI capabilities.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	347	327	327
Non-Labor	5,721	3,668	3,667
NSE	0	0	0
Total	6,068	3,995	3,994
FTE	3.0	2.9	2.9

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21884.0
Category: F. Data Governance
Category-Sub: 2. Advanced Analytics
Workpaper Group: 218840 - WMP ADVANCED ANALYTICS
Workpaper Detail: 218840.001 - RAMP - WMP Advanced Analytics

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C38

RAMP Line Item Name: Centralized Repository for Data

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	933	6,068	3,995	3,994	14,057	56,578	69,150

Cost Estimate Changes from RAMP:

RAMP costs include two budget codes, 208910 and 218840. Combined budget codes are slightly below forecasted RAMP range due to a forecasted cost reduction associated with the Centralized Repository for Data (208910).

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

Supplemental Workpapers for Workpaper Group 218840

TY2024 GRC FORECAST - DETAILS

Budget Code:	21884
Estimated In Service Date:	Ongoing

21884 - Advanced Analytics					2022			2023			2024			Total Cost	Comments
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Metric (ea./ft./mile)	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost	Total Cost	
1	Internal Labor - Hours	Labor	RAMP	Hours	1,860	\$ 55	\$ 102,300	1,860	\$ 55	\$ 102,300	1,860	\$ 55	\$ 102,300	\$ 306,900	Product Owner (100%)
2	Internal Labor - Hours	Labor	RAMP	Hours	1,860	\$ 55	\$ 102,300	1,860	\$ 55	\$ 102,300	1,860	\$ 55	\$ 102,300	\$ 306,900	AI Engineer (100%)
3	Internal Labor - Hours	Labor	RAMP	Hours	1,860	\$ 55	\$ 102,300	1,860	\$ 55	\$ 102,300	1,860	\$ 55	\$ 102,300	\$ 306,900	Data Scientist (100%)
4	Internal Labor - Hours	Labor	RAMP	Hours	360	\$ 55	\$ 19,800	360	\$ 55	\$ 19,800	360	\$ 55	\$ 19,800	\$ 59,400	Group Product Manager (20%)
5	Internal Labor - Hours	Labor	RAMP	Hours	186	\$ 55	\$ 10,230			\$ -			\$ -	\$ -	Info Security Engineer (10%)
6	Internal Labor - Hours	Labor	RAMP	Hours	183	\$ 55	\$ 10,065			\$ -			\$ -	\$ -	Architect (10%)
7	Purchased Services - Contractors	Non-Labor	RAMP	ea	1	\$ 79,200	\$ 79,200	\$ 1	\$ 72,600	\$ 72,600	\$ 1	\$ 72,000	\$ 72,000	\$ 223,800	Project Support
8	Vendor Services - Logic2020	Non-Labor	RAMP	ea	1	\$ 1,572,000	\$ 1,572,000	1	\$ 1,572,000	\$ 1,572,000	1	\$ 1,572,000	\$ 1,572,000	\$ 4,716,000	Service for Machine Learning Implementation
9	Vendor Services - Accenture	Non-Labor	RAMP	ea	1	\$ 4,069,585	\$ 4,069,585	1	\$ 2,023,152	\$ 2,023,152	1	\$ 2,023,152	\$ 2,023,152	\$ 8,115,889	Service for Cloud Data Lake and Machine Learning Ops

Summary														
						\$ 346,995		\$ 326,700		\$ 326,700	\$ 1,000,395			
						\$ 5,720,785		\$ 3,667,752		\$ 3,667,152	\$ 13,055,689			
Subtotal RAMP						\$ 6,067,780		\$ 3,994,452		\$ 3,993,852	\$ 14,056,084			
						\$ -		\$ -		\$ -	\$ -			
						\$ -		\$ -		\$ -	\$ -			
Subtotal Non-RAMP						\$ -		\$ -		\$ -	\$ -			
Total Project Forecast						\$ 6,067,780		\$ 3,994,452		\$ 3,993,852	\$ 14,056,084			

Beginning of Workpaper Group
218770 - WMP Asset Investment Prioritization

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21877.0
Category: F. Data Governance
Category-Sub: 3. Asset Investment Prioritization
Workpaper Group: 218770 - WMP Asset Investment Prioritization

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	0	137	76	449	697	673
Non-Labor	Zero-Based	0	0	0	326	2,130	1,335	2,368	1,335
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	0	464	2,206	1,784	3,065	2,008
FTE	Zero-Based	0.0	0.0	0.0	1.2	0.7	3.1	4.8	4.6

Business Purpose:

The current Asset Investment Planning tool (REVEAL) has reached the end of its useful life therefore this project is to replcae REVEAL and implement a consistent value-based decision model approach, and in alignment with the Company's strategic plan using Copperleaf's Asset Investment Planning and Management (AIPM) tool, which will utilize the enterprise-level value framework to optimize the capital project portfolio for Electric Transmission , Substations, and Distribution. Copperleaf C55 Asset Investmant Prioritization application is a leading software solution for prioritizing capital investment across multiple industries and software of choice for the Utilities industry. This budget code is 35% allocated to wildfire mitigation with the rest being sponsored by the witness for Safety, Risk, and Asset Management Mr. Ken Deremer.

Physical Description:

Copperleaf C55 asset investment planning and management application is a cloud based solution hosted by Copperleaf Technologies. C55 is a leading Asset Investment Planning and Management decision-support software solution. The project team will conduct multiple work shops with the business subject matter experts to configure the C55 tool to meet SDG&E's specific requirements. The solution will be fully tested and end users will be trained.

Project Justification:

The current Asset Investment Planning tool (REVEAL) has reached the end of its useful life and is lacking in capabilities required for upcoming regulatory requirements (RAMP/S-MAP). This tool will allow for more transparency and accountability in capital spending including wildfire mitigation initiatives.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21877.0
Category: F. Data Governance
Category-Sub: 3. Asset Investment Prioritization
Workpaper Group: 218770 - WMP Asset Investment Prioritization

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. This budget code does not have historical costs except prior to 2020. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. This budget code does not have historical costs except prior to 2020. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21877.0
Category: F. Data Governance
Category-Sub: 3. Asset Investment Prioritization
Workpaper Group: 218770 - WMP Asset Investment Prioritization

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	449	697	673	0	0	0	449	697	673
Non-Labor	Zero-Based	1,335	2,368	1,335	0	0	0	1,335	2,368	1,335
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		1,784	3,065	2,008	0	0	0	1,784	3,065	2,008
FTE	Zero-Based	3.1	4.8	4.6	0.0	0.0	0.0	3.1	4.8	4.6

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21877.0
Category: F. Data Governance
Category-Sub: 3. Asset Investment Prioritization
Workpaper Group: 218770 - WMP Asset Investment Prioritization

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	0	115	66
Non-Labor	0	0	0	312	2,130
NSE	0	0	0	0	0
Total	0	0	0	427	2,196
FTE	0.0	0.0	0.0	1.0	0.6
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	0	0	0	115	66
Non-Labor	0	0	0	312	2,130
NSE	0	0	0	0	0
Total	0	0	0	427	2,196
FTE	0.0	0.0	0.0	1.0	0.6
Vacation & Sick (Nominal \$)					
Labor	0	0	0	16	10
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	0	16	10
FTE	0.0	0.0	0.0	0.2	0.1
Escalation to 2021\$					
Labor	0	0	0	6	0
Non-Labor	0	0	0	14	0
NSE	0	0	0	0	0
Total	0	0	0	20	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	0	137	76
Non-Labor	0	0	0	326	2,130
NSE	0	0	0	0	0
Total	0	0	0	464	2,206
FTE	0.0	0.0	0.0	1.2	0.7

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21877.0
Category: F. Data Governance
Category-Sub: 3. Asset Investment Prioritization
Workpaper Group: 218770 - WMP Asset Investment Prioritization

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
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Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 218770**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 21877.0
 Category: F. Data Governance
 Category-Sub: 3. Asset Investment Prioritization
 Workpaper Group: 218770 - WMP Asset Investment Prioritization
 Workpaper Detail: 218770.001 - RAMP - WMP Asset Investment Prioritization
 In-Service Date: 09/30/2022
 Description:

The current Asset Investment Planning tool (REVEAL) has reached the end of its useful life therefore this project is to replace REVEAL and implement a consistent value-based decision model approach, and in alignment with the Company's strategic plan using Copperleaf's Asset Investment Planning and Management (AIPM) tool, which will utilize the enterprise-level value framework to optimize the capital project portfolio for Electric Transmission, Substations, and Distribution.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	449	0	0
Non-Labor	1,335	0	0
NSE	0	0	0
Total	1,784	0	0
FTE	3.1	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21877.0
Category: F. Data Governance
Category-Sub: 3. Asset Investment Prioritization
Workpaper Group: 218770 - WMP Asset Investment Prioritization
Workpaper Detail: 218770.001 - RAMP - WMP Asset Investment Prioritization

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-CFF-1 Asset Management

RAMP Line Item ID: 1

RAMP Line Item Name: Asset Management

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	2,205	1,784	3,065	2,008	6,857	0	0

Cost Estimate Changes from RAMP:

New project since 2021 RAMP.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

No Feasible Units.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

No RSE calculated for this activity.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 21877.0
 Category: F. Data Governance
 Category-Sub: 3. Asset Investment Prioritization
 Workpaper Group: 218770 - WMP Asset Investment Prioritization
 Workpaper Detail: 218770.002 - RAMP - Asset Investment Prioritization Phase 2 (Same RAMP item as 218770.001)
 In-Service Date: 09/30/2023
 Description:

The current Asset Investment Planning tool (REVEAL) has reached the end of its useful life therefore this project is to replace REVEAL and implement a consistent value-based decision model approach, and in alignment with the Company's strategic plan using Copperleaf's Asset Investment Planning and Management (AIPM) tool, which will utilize the enterprise-level value framework to optimize the capital project portfolio for Electric Transmission, Substations, and Distribution.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		0	697	0
Non-Labor		0	2,368	0
NSE		0	0	0
Total		0	3,065	0
FTE		0.0	4.8	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 21877.0
 Category: F. Data Governance
 Category-Sub: 3. Asset Investment Prioritization
 Workpaper Group: 218770 - WMP Asset Investment Prioritization
 Workpaper Detail: 218770.003 - RAMP - Asset Investment Prioritization Phase 3 (Same RAMP item as 218770.001)
 In-Service Date: 12/31/2024
 Description:

The current Asset Investment Planning tool (REVEAL) has reached the end of its useful life therefore this project is to replcae REVEAL and implement a consistent value-based decision model approach, and in alignment with the Company's strategic plan using Copperleaf's Asset Investment Planning and Management (AIPM) tool, which will utilize the enterprise-level value framework to optimize the capital project portfolio for Electric Transmission , Substations, and Distribution.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	0	0	673
Non-Labor	0	0	1,335
NSE	0	0	0
Total	0	0	2,008
FTE	0.0	0.0	4.6

Note: Totals may include rounding differences.

Supplemental Workpapers for Workpaper Group 218770

TY2024 GRC FORECAST - DETAILS

Budget Code:

Estimated In Service Date:

21877
3 Phases: 9/30/2022, 9/30/2023, 9/30/2024

21877 -						2022		2023		2024				Comments
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Metric (ea./ft./mile)	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost	
1	Internal Labor - Business PM	Labor	RAMP	Hr	2,688	\$ 60	\$ 161,280	4,032	\$ 60	\$ 241,920	4,032	\$ 60	\$ 241,920	Project Manager Representing the Business Units
2	Internal Labor - Product Owner	Labor	RAMP	Hr	4,864	\$ 60	\$ 291,840	7,296	\$ 60	\$ 437,760	7,296	\$ 60	\$ 437,760	Product Owner interfaces with Business & Solution development team.
3	Internal Labor - SME's	Labor	RAMP	Hr	5,984	\$ 60	\$ 359,040	8,976	\$ 60	\$ 538,560	8,976	\$ 60	\$ 538,560	Subject Matter Expert provide business input to the solution
4	Internal Labor - BSA	Labor	RAMP	Hr	1,344	\$ 60	\$ 80,640	2,016	\$ 60	\$ 120,960	2,016	\$ 60	\$ 120,960	Business Systems Analyst determines and defines the solution requirements
5	Internal Labor - BSA	Labor	RAMP	Hr	2,368	\$ 60	\$ 142,080	3,552	\$ 60	\$ 213,120	3,552	\$ 60	\$ 213,120	Business Systems Analyst determines and defines the solution requirements
6	Internal Labor - Basis / Security	Labor	RAMP	Hr	384	\$ 60	\$ 23,040	576	\$ 60	\$ 34,560	576	\$ 60	\$ 34,560	Basis & Security support the software environments and access
7	Internal Labor - Change Management	Labor	RAMP	Hr	640	\$ 60	\$ 38,400	960	\$ 60	\$ 57,600	960	\$ 60	\$ 57,600	Change Management support business readiness and training
8	Internal Labor - Integrations Developer	Labor	RAMP	Hr	-	\$ 60	\$ -	960	\$ 60	\$ 57,600	-	\$ 60	\$ -	Developer to support development of integrations between other applications and the Copperleaf software
9	Accenture-Solution Integrator	Non-labor	RAMP	ea	1	\$ 2,200,000	\$ 2,200,000	1	\$ 3,300,000	\$ 3,300,000	1	\$ 2,200,000	\$ 2,200,000	Accenture team provides expertise in investment prioritization and project oversight and project management
10	Copperleaf-Software developer	Non-labor	RAMP	ea	1	\$ 1,040,000	\$ 1,040,000	1	\$ 1,560,000	\$ 1,560,000	1	\$ 1,040,000	\$ 1,040,000	Copperleaf is the software provider and required to design and configure the software to the Business requirements
11	Cap Gemini-Testing	Non-labor	RAMP	ea	1	\$ 256,000	\$ 256,000	1	\$ 384,000	\$ 384,000	1	\$ 256,000	\$ 256,000	Cap Gemini represent ITQA to provide testing skills to test the solution
12	Osceola-IT PM	Non-labor	RAMP	ea	1	\$ 72,000	\$ 72,000	1	\$ 108,000	\$ 108,000	1	\$ 72,000	\$ 72,000	IT Project Manager manages project plans and costs and coordinates resolving technical issues
13	Kissinger-Specialist	Non-labor	RAMP	ea	1	\$ 224,000	\$ 224,000	1	\$ 336,000	\$ 336,000	1	\$ 224,000	\$ 224,000	Kissinger provides expertise in investment prioritization and works with the business on solution design and requirements
14	Osceola-AIM Support	Non-labor	RAMP	ea	1	\$ 23,200	\$ 23,200	1	\$ 34,800	\$ 34,800	1	\$ 23,200	\$ 23,200	Osceola resources assist with change management and training development and end user training
15	Accenture-Business System Analysts - 2	Non-labor	RAMP	ea	-	\$ -	\$ -	1	\$ 432,000	\$ 432,000	-	\$ -	\$ -	Accenture will provide a Business Analyst to development requirements for the integrations between other applications and the Copperleaf application
16	Copperleaf-Developers - 2	Non-labor	RAMP	ea	-	\$ -	\$ -	1	\$ 432,000	\$ 432,000	-	\$ -	\$ -	Copperleaf will provide a Business Analyst to development requirements for the integrations between other applications and the Copperleaf application
17	Accenture -Developers - 1	Non-labor	RAMP	ea	-	\$ -	\$ -	1	\$ 180,000	\$ 180,000	-	\$ -	\$ -	The Developer provide the technical expertise to develop the interface for the integrations between other applications and the Copperleaf application
18	Labor - V&S	Labor	RAMP	V&S	1	\$ 186,594	\$ 186,594	1	\$ 289,694	\$ 289,694	1	\$ 279,890	\$ 279,890	
19						\$ -	\$ -		\$ -	\$ -		\$ -	\$ -	
20						\$ -	\$ -		\$ -	\$ -		\$ -	\$ -	

*Costs should be reported in direct costs only (no overheads)

Summary														
	Labor	Non-Labor	RAMP		\$ 1,282,914		\$ 1,991,774		\$ 1,924,370		\$ 5,199,058			
					\$ 3,815,200		\$ 6,765,800		\$ 3,815,200		\$ 14,397,200			
Subtotal RAMP					\$ 5,098,114		\$ 6,758,574		\$ 5,739,570		\$ 19,596,258			
	Labor	Non-Labor	Non-RAMP		\$ -		\$ -		\$ -		\$ -			
Budget Code is 35% WMP					\$ -		\$ -		\$ -		\$ -			
Total WMP Project Forecast					\$ 1,784,340		\$ 3,065,501		\$ 2,008,850		\$ 6,858,690			

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Category: G. Emergency Planning and Preparedness
Workpaper: VARIOUS

Summary for Category: G. Emergency Planning and Preparedness

	In 2021\$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2021	2022	2023	2024
Labor	440	1,029	1,407	626
Non-Labor	3,082	6,273	22,507	1,870
NSE	0	0	0	0
Total	3,522	7,302	23,914	2,496
FTE	3.8	8.9	11.8	6.0

218790 Emergency Management Operations

Labor	298	412	500	626
Non-Labor	1,612	1,477	1,470	1,870
NSE	0	0	0	0
Total	1,910	1,889	1,970	2,496
FTE	2.6	4.0	4.8	6.0

218820 DIGITAL FORTRESS

Labor	140	602	540	0
Non-Labor	1,453	4,090	3,990	0
NSE	0	0	0	0
Total	1,593	4,692	4,530	0
FTE	1.2	4.8	4.3	0.0

197800 Wildfire and Climate Resilience Center

Labor	2	15	367	0
Non-Labor	17	706	17,047	0
NSE	0	0	0	0
Total	19	721	17,414	0
FTE	0.0	0.1	2.7	0.0

Note: Totals may include rounding differences.

Beginning of Workpaper Group
218790 - Emergency Management Operations

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21879.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 1. Emergency Management Operations
Workpaper Group: 218790 - Emergency Management Operations

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	5	368	298	412	500	626
Non-Labor	Zero-Based	0	0	65	1,888	1,612	1,477	1,470	1,870
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	70	2,257	1,910	1,889	1,970	2,496
FTE	Zero-Based	0.0	0.0	0.0	3.0	2.6	4.0	4.8	6.0

Business Purpose:

WebEOC supports mission-critical functions in the Emergency Operations Centers (EOCs) of SoCal Gas, SDG&E and Gas Operations for tracking, managing and reporting incidents. Implemented more than eight years ago, WebEOC has fallen behind current information technology advancements and cannot be integrated with other mission critical systems such as GIS, HR, and Microsoft Active Directory, and is limited in its ability to expand and adapt to changing business, regulatory, and technical requirements. The Noggin core 2.0 system was implemented in 2020 to replace WebEOC for the Emergency Management group with the digitization of incident report forms, situational awareness dashboard, SMS/email notifications, and compliance reporting.

Physical Description:

The project will expand the current capabilities of the Noggin 2.0 system with additional digitization of incident forms, workflow configuration, SMS/email notifications of events, and additional compliance and situational awareness reports to migrate about existing 500 end users from WebEOC to Noggin.

Project Justification:

Updating the Noggin platform will allow it to be the central repository for all emergency events and incidents to ensure collection and dissemination of information for situation awareness and satisfy safety and state reporting mandates.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21879.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 1. Emergency Management Operations
Workpaper Group: 218790 - Emergency Management Operations

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. This budget code has minimal costs prior to 2020. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. This budget code has minimal costs prior to 2020. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21879.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 1. Emergency Management Operations
Workpaper Group: 218790 - Emergency Management Operations

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	412	500	626	0	0	0	412	500	626
Non-Labor	Zero-Based	1,477	1,470	1,870	0	0	0	1,477	1,470	1,870
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		1,889	1,970	2,496	0	0	0	1,889	1,970	2,496
FTE	Zero-Based	4.0	4.8	6.0	0.0	0.0	0.0	4.0	4.8	6.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21879.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 1. Emergency Management Operations
Workpaper Group: 218790 - Emergency Management Operations

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	4	308	259
Non-Labor	0	0	59	1,806	1,612
NSE	0	0	0	0	0
Total	0	0	63	2,114	1,871
FTE	0.0	0.0	0.0	2.6	2.2
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	0	0	4	308	259
Non-Labor	0	0	59	1,806	1,612
NSE	0	0	0	0	0
Total	0	0	63	2,114	1,871
FTE	0.0	0.0	0.0	2.6	2.2
Vacation & Sick (Nominal \$)					
Labor	0	0	1	44	39
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	1	44	39
FTE	0.0	0.0	0.0	0.4	0.4
Escalation to 2021\$					
Labor	0	0	0	16	0
Non-Labor	0	0	6	83	0
NSE	0	0	0	0	0
Total	0	0	6	99	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	5	368	298
Non-Labor	0	0	65	1,888	1,612
NSE	0	0	0	0	0
Total	0	0	70	2,257	1,910
FTE	0.0	0.0	0.0	3.0	2.6

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21879.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 1. Emergency Management Operations
Workpaper Group: 218790 - Emergency Management Operations

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
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Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 218790**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 21879.0
 Category: G. Emergency Planning and Preparedness
 Category-Sub: 1. Emergency Management Operations
 Workpaper Group: 218790 - Emergency Management Operations
 Workpaper Detail: 218790.001 - RAMP - EMO Noggin Phase 3
 In-Service Date: 11/30/2022
 Description:

Migrate existing IMS WEB EOC users to Noggin and to provide long-term EOC landscape resiliency and future state modernization through the implementation and use of a cloud environment for the Tier 1 EOC Applications and Dashboards. Enable a multi-region/multi-zone High Availability resilient environment. Establish DevOps processes and tools to reduce cycle time and improve quality. Reduce manual processes.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	412	0	0
Non-Labor	1,477	0	0
NSE	0	0	0
Total	1,889	0	0
FTE	4.0	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21879.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 1. Emergency Management Operations
Workpaper Group: 218790 - Emergency Management Operations
Workpaper Detail: 218790.001 - RAMP - EMO Noggin Phase 3

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-CFF-4 Foundational Technology Systems

RAMP Line Item ID: C41

RAMP Line Item Name: Emergency Management Operations

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	1,910	1,889	1,970	2,496	6,355	10,101	12,346

Cost Estimate Changes from RAMP:

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

No Feasible Units.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

An RSE was not calculated for this activity.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 21879.0
 Category: G. Emergency Planning and Preparedness
 Category-Sub: 1. Emergency Management Operations
 Workpaper Group: 218790 - Emergency Management Operations
 Workpaper Detail: 218790.002 - RAMP - EMO Noggin Phase 4 (Same RAMP item as 218790.001)
 In-Service Date: 12/31/2024
 Description:

The project will expand the current functionalities of the Noggin 2.0 system to accommodate the requirements of the SDG&E's service dispatch and ARSO teams with the digitization of new forms , workflows, SMS/text notifications, and compliance reporting with multiple government agencies as well as integration with multiple internal systems for streamlined processes to support the migration of the remaining end users from WebEOC .

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	0	500	626
Non-Labor	0	1,470	1,870
NSE	0	0	0
Total	0	1,970	2,496
FTE	0.0	4.8	6.0

Note: Totals may include rounding differences.

Supplemental Workpapers for Workpaper Group 218790

TY2024 GRC FORECAST - DETAILS

Budget Code:

21879

Estimated In Service Date:

11/30/2022

(If this is an ongoing blanket or program, please input "ongoing")

Lag (months)

21879 - Phase 3							
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Metric (ea./ft./mile)	# of units	Cost per unit*	Total cost
1	FTE's	Labor	Non-RAMP	Hours	8,240	\$ 50	\$ 412,000
2	Contractors (3 BSAs)	Non-Labor	Non-RAMP	Hours	5,280	\$ 105	\$ 554,400
3	Contractors (Noggin 3 contractors)	Non-Labor	Non-RAMP	Hours	1,200	\$ 350	\$ 420,000
4	Contractors (ITQA)	Non-Labor	Non-RAMP	Hours	11,682	\$ 43	\$ 502,326
							\$ -
Total							\$ 1,888,726

21879 - Phase 4								2024		
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Metric (ea./ft./mile)	# of units	Cost per unit*	Total cost	# of units	Cost per unit	Total cost
1	FTE's	Labor	Non-RAMP	Hours	9,994	\$ 50	\$ 499,700	12,515	\$ 50	\$ 625,750
3	Contractors (Noggin 3 contractors)	Non-Labor	Non-RAMP	Hours	2,026	\$ 350	\$ 709,100	2,997	\$ 350	\$ 1,048,800
4	Contractors (ITQA)	Non-Labor	Non-RAMP	Hours	7,000	\$ 43	\$ 301,000	8,400	\$ 43	\$ 361,200
5	Developers (Noggin)	Non-Labor	Non-RAMP	EA	7	\$ 55,000	\$ 385,000	7	\$ 55,000	\$ 385,000
6	Developers (KorTerra)	Non-Labor	Non-RAMP	EA	1	\$ 75,000	\$ 75,000	1	\$ 75,000	\$ 75,000
							\$ -			\$ -
Total							\$ 1,969,800			\$ 2,495,750

**Beginning of Workpaper Group
218820 - DIGITAL FORTRESS**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21882.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 2. Digital Fortress
Workpaper Group: 218820 - DIGITAL FORTRESS

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	0	0	140	602	540	0
Non-Labor	Zero-Based	0	0	0	0	1,453	4,090	3,990	0
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	0	0	1,593	4,692	4,530	0
FTE	Zero-Based	0.0	0.0	0.0	0.0	1.2	4.8	4.3	0.0

Business Purpose:

The purpose of this project is to migrate Tier 1 EOC Applications and Dashboards to a cloud-based environment. EOC operations provide risk mitigation of wildfires, PSPS, and other weather-related events. Currently, applications used to make de-energization decisions are housed on-premise and are subject to network outages, leading to lost availability and performance issues.

Physical Description:

This project will enable a multi-region, multi-zone, high availability resilient environment for Tier 1 EOC applications in a cloud-based environment. This project will establish DevOps processes and tools to reduce cycle time, improve quality, and reduce manual processes. The application code will be modernized to utilize the cloud environment so more efficiency can be gained. Reporting and analytics data will be decoupled with transactional data through a dedicated EOC data platform.

Project Justification:

The EOC is essential to managing the response and coordinating personnel during emergencies. By migrating EOC Applications to a cloud-based environment, a multi-region, high-availability resilient environment is enabled and the risk of an outage is considerably lowered. In addition, DevOps processes and tools will be established which will reduce cycle time, improve quality, and reduce manual processes.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21882.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 2. Digital Fortress
Workpaper Group: 218820 - DIGITAL FORTRESS

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. This budget code has no historical costs prior to 2021. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. This budget code has no historical costs prior to 2021. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21882.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 2. Digital Fortress
Workpaper Group: 218820 - DIGITAL FORTRESS

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	602	540	0	0	0	0	602	540	0
Non-Labor	Zero-Based	4,090	3,990	0	0	0	0	4,090	3,990	0
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		4,692	4,530	0	0	0	0	4,692	4,530	0
FTE	Zero-Based	4.8	4.3	0.0	0.0	0.0	0.0	4.8	4.3	0.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21882.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 2. Digital Fortress
Workpaper Group: 218820 - DIGITAL FORTRESS

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	0	0	122
Non-Labor	0	0	0	0	1,453
NSE	0	0	0	0	0
Total	0	0	0	0	1,575
FTE	0.0	0.0	0.0	0.0	1.0
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	122
Non-Labor	0	0	0	0	1,453
NSE	0	0	0	0	0
Total	0	0	0	0	1,575
FTE	0.0	0.0	0.0	0.0	1.0
Vacation & Sick (Nominal \$)					
Labor	0	0	0	0	18
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	0	0	18
FTE	0.0	0.0	0.0	0.0	0.2
Escalation to 2021\$					
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 (Constant 2021\$)					
Labor	0	0	0	0	140
Non-Labor	0	0	0	0	1,453
NSE	0	0	0	0	0
Total	0	0	0	0	1,593
FTE	0.0	0.0	0.0	0.0	1.2

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21882.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 2. Digital Fortress
Workpaper Group: 218820 - DIGITAL FORTRESS

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
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Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 218820**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 21882.0
 Category: G. Emergency Planning and Preparedness
 Category-Sub: 2. Digital Fortress
 Workpaper Group: 218820 - DIGITAL FORTRESS
 Workpaper Detail: 218820.001 - RAMP - EMO Digital Fortress
 In-Service Date: Not Applicable
 Description:

Enable a multi-region/multi-zone High Availability resilient environment. Establish DevOps processes and tools to reduce cycle time and improve quality. Reduce manual processes. Create automatic DR failover. Modernize the application code to utilize the cloud environment so that more efficiency can be gained. Decouple reporting and analytics data with transactional data through a dedicated EOC data platform and possibly data lake setup.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	602	540	0
Non-Labor	4,090	3,990	0
NSE	0	0	0
Total	4,692	4,530	0
FTE	4.8	4.3	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21882.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 2. Digital Fortress
Workpaper Group: 218820 - DIGITAL FORTRESS
Workpaper Detail: 218820.001 - RAMP - EMO Digital Fortress

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-CFF-4 Foundational Technology Systems

RAMP Line Item ID: C41

RAMP Line Item Name: Emergency Management Operations

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	1,593	4,692	4,530	0	9,222	10,101	12,346

Cost Estimate Changes from RAMP:

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

Supplemental Workpapers for Workpaper Group 218820

TY2024 GRC FORECAST - DETAILS

Budget Code:

Estimated In Service Date:

Digital Fortress

21882
ongoing

21882 -					2022			2023			Comments
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Metric (ea./ft./mile)	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost	
1	FTE's	Labor	RAMP	hours	10,040	\$ 60	\$ 602,400	\$ 9,000	\$ 60	\$ 540,000	Utilize internal resources (Product Manager, Software Engineer Cloud Architect, Business Analyst, ITQA, CyberSecurity) to work on migrating EOC applications to the cloud and configure the environment to be highly available, redundant, and resilient to ensure the Emergency Operations applications are always available for EOC Activations.
2	Contractors	Non-Labor	RAMP	hours	20,450	\$ 200	\$ 4,090,000	\$ 19,950	\$ 200	\$ 3,990,000	Engage AWS Cloud resources (AWS Engineer, AWS Data Engineer, Scrum Master, Developers, Delivery Oversight) to migrate EOC Applications to an AWS Cloud environment, configure environment to be redundant and resilient with High Availability and DR failover to ensure the Emergency Operations applications are always available for EOC Activations.
3											
4											
Total							\$ 4,692,400			\$ 4,530,000	

Beginning of Workpaper Group
197800 - Wildfire and Climate Resilience Center

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19780.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 3. Wildfire and Climate Resilience Center (WCRC)
Workpaper Group: 197800 - Wildfire and Climate Resilience Center

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	24	148	2	15	367	0
Non-Labor	Zero-Based	0	0	175	515	17	706	17,047	0
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	199	664	20	721	17,414	0
FTE	Zero-Based	0.0	0.0	0.2	1.2	0.0	0.1	2.7	0.0

Business Purpose:

Rapidly changing climate conditions affect the way SDG&E maintains and operates the electric system, and the Wildfire and Climate Resilience Center (WCRC) will be a physical space committed to the climate resilience of our organization and the communities we serve. This includes housing the Emergency Operation Center (EOC) as well as the Wildfire Science and Innovation Lab which collaborates with academia to advance climate science. The WCRC will be a resilience center focused on fostering community partnerships and educating stakeholders in the wildfire and climate community. SDG&E will also use this facility as a training center for safety and emergency preparedness. Importantly, this space will house the primary EOC and will be the central response hub when emergencies occur. Lastly, the WCRC will serve as a centralized work space for all employees in Wildfire Mitigation, Emergency Management, and Fire Science and Climate Adaptation, increasing employee collaboration and innovation.

Physical Description:

This project budget covers the design, construction, logistics, and project management for the buildout of the WCRC. Design includes all costs from programming through closeouts. Construction includes pre-construction, demolition, installation of furniture, AV such as a direct view LED wall in the Situation Room, branding, graphics, security systems, and a green wall. Move management includes the move-out and reoccupation post construction. The WCRC will have an updated Situation Room organized by response teams, a larger policy room with a connected RMC, the Wildfire Science and Innovation lab, and workstations and offices for team members that require direct adjacencies to the Situation Room. The space will also provide branding and communications to illustrate the work of the EOC as partners within the larger San Diego and California community.

Project Justification:

Existing EOC and support spaces do not currently function optimally for the requirements of emergency situations. It also limits growth and the implementation of innovative techniques that keep us on the leading edge of emergency management and climate resilience. Climate resilience is becoming a central pillar to our overall corporate strategy and we need our campus and actions to reflect this corporate shift. From wildfire to affordability to community resilience, having a physical space to educate our employees, customers, and communities will be paramount to future success. Reallocating space and redesigning the inefficiencies will complement the companies growing demand.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19780.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 3. Wildfire and Climate Resilience Center (WCRC)
Workpaper Group: 197800 - Wildfire and Climate Resilience Center

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The minimal historical costs 2019 through 2021 associated with preliminary design do not accurately represent the expected construction costs in 2023. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. The minimal historical costs 2019 through 2021 associated with preliminary design do not accurately represent the expected construction costs in 2023. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19780.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 3. Wildfire and Climate Resilience Center (WCRC)
Workpaper Group: 197800 - Wildfire and Climate Resilience Center

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	15	367	0	0	0	0	15	367	0
Non-Labor	Zero-Based	706	17,047	0	0	0	0	706	17,047	0
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		721	17,414	0	0	0	0	721	17,414	0
FTE	Zero-Based	0.1	2.7	0.0	0.0	0.0	0.0	0.1	2.7	0.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19780.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 3. Wildfire and Climate Resilience Center (WCRC)
Workpaper Group: 197800 - Wildfire and Climate Resilience Center

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	19	124	2
Non-Labor	0	0	159	493	17
NSE	0	0	0	0	0
Total	0	0	178	617	19
FTE	0.0	0.0	0.2	1.0	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	19	124	2
Non-Labor	0	0	159	493	17
NSE	0	0	0	0	0
Total	0	0	178	617	19
FTE	0.0	0.0	0.2	1.0	0.0
Vacation & Sick (Nominal \$)					
Labor	0	0	3	18	0
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	3	18	0
FTE	0.0	0.0	0.0	0.2	0.0
Escalation to 2021\$					
Labor	0	0	2	6	0
Non-Labor	0	0	15	23	0
NSE	0	0	0	0	0
Total	0	0	18	29	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	24	148	2
Non-Labor	0	0	175	515	17
NSE	0	0	0	0	0
Total	0	0	199	664	20
FTE	0.0	0.0	0.2	1.2	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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 19780.0
 Category: G. Emergency Planning and Preparedness
 Category-Sub: 3. Wildfire and Climate Resilience Center (WCRC)
 Workpaper Group: 197800 - Wildfire and Climate Resilience Center

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
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Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 197800**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19780.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 3. Wildfire and Climate Resilience Center (WCRC)
Workpaper Group: 197800 - Wildfire and Climate Resilience Center
Workpaper Detail: 197800.001 - RAMP Emergency Operations Center Improvements

In-Service Date: 11/30/2023

Description:

Rapidly changing climate conditions are changing the way we maintain and operate the electric system, and the WCRC will be a physical space that is committed to the climate resilience of our organization and the communities we serve. This includes housing the Wildfire Science and Innovation Lab which collaborates with academia to advance climate science, and this will also be a resilience center focused on fostering community partnerships and educating stakeholders in the wildfire and climate community. This facility will also serve as a great venue to train SDG&E employees on the importance of wildfire safety, emergency preparedness, sustainability and climate resilience. Importantly, this space will also house the primary EOC for the organization and will be the central response hub for the organization when emergencies occur. Lastly, this will serve as a centralized workspace for all employees working in Wildfire Mitigation, Emergency Management, Fire Science and Climate Adaptation, increasing employee collaboration and innovation in this space.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	15	367	0
Non-Labor	706	17,047	0
NSE	0	0	0
Total	721	17,414	0
FTE	0.1	2.7	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 19780.0
Category: G. Emergency Planning and Preparedness
Category-Sub: 3. Wildfire and Climate Resilience Center (WCRC)
Workpaper Group: 197800 - Wildfire and Climate Resilience Center
Workpaper Detail: 197800.001 - RAMP Emergency Operations Center Improvements

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C41

RAMP Line Item Name: Emergency Management Operations

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	19	721	17,414	0	18,135	10,101	12,346

Cost Estimate Changes from RAMP:

The GRC forecast is outside the RAMP range due to increased scope and costs associated with the construction of the Wildfire and Climate Resiliency Center.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

No Feasible Units.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

An RSE was not calculated for this activity.

Supplemental Workpapers for Workpaper Group 197800

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

2015-000097 CP2 Resilience Center TI - Preliminary Action Plan

Project Definition and Budget Assumptions

Item Description/ or Phase of Work	CAPITAL		
	Unit Cost (or Lump Sum)	Quantity (or One)	Subtotal
Architectural and Engineering			
Architectural and Engineering	1,175,203	1.00	1,175,203
Specialty Consulting Services - AV Consultant	65,217	1.00	65,217
Specialty Consulting Services - Construction Management	78,056	1.00	78,056
Reprographics	4,157	1.00	4,157
Pre-Construction Services	30,857	1.00	30,857
Permitting/Planning/Inspections			
Plan Checks & Permits	46,767	1.00	46,767
Testing & Inspections	15,589	1.00	15,589
Construction			
Construction Services (Specialty Space)	4,023,250	1.00	4,023,250
Construction Services (General Office Space)	2,474,698	1.00	2,474,698
Removal - Pre-Construction Services	18,305	1.00	18,305
Low Voltage Cabling	119,579	1.00	119,579
Construction Services - Phase 3 (Restroom)	240,929	1.00	240,929
Environmental & Safety Services			
Asbestos and Lead Sampling/Analysis	25,610	1.00	25,610
Removal			
Asbestos and Lead Abatement	10,393	1.00	10,393
Real Estate & Planning			
Furniture (incl. Trash Cans, Display Cases, Tack Boards, etc.)	1,054,505	1.00	1,054,505
Interior Plants	9,743	1.00	9,743
Move Implementation	6,547	1.00	6,547
Signage (Interior)	128,662	1.00	128,662
IT, Audio Visual & Security			
IT Consulting Services	139,145	1.00	139,145
IT Equipment	101,095	1.00	101,095
Room Schedulers	16,410	1.00	16,410
Telecom	25,982	1.00	25,982
Audio Visual Equipment	3,615,319	1.00	3,615,319
Security & Surveillance (access control / Surveillance)	23,106	1.00	23,106
Subtotal			13,449,124
Contingency @ 30%			4,034,737
Scoping Escalation from 2020 @ 6.5%			874,193
Construction Cost Totals			18,358,054
Company CPM Labor			297,180
Company Support Labor			230,332
Contracted Labor			84,808
PM, Labor Cost Totals			612,319
Project Total			18,970,373

2015-000097 CP2 Resilience Center TI - Preliminary Action Plan

Item Description/ or Phase of Work	CAPITAL		
	Unit Cost (or Lump Sum)	Hours (or One)	Subtotal
Company CPM Labor			
Program Management (Company)	85	407.96	47,766
Design Project Management (Company)	65	320.00	35,494
Construction Project Management (Company)	65	480.00	53,241
Planning & Design Management (Company)	65	600.00	66,551
Project Analyst (Company)	75	407.96	42,147
Business Analyst (Company)	75	203.98	21,073
Facilities Specialist (Company)	55	407.96	30,908
Company Support Labor			
Facility Mgr. (Company)	65	912.60	72,736
Environmental Site Rep. (Company)	65	152.10	12,123
Safety Site Rep. (Company)	65	1,825.20	145,473
Contracted Labor			
Project Coordination (Outside Labor)	75	795.52	59,664
Document Control (Outside Labor)	65	152.98	9,944
Planning & Design Management (Outside Labor)	95	160.00	15,200
Subtotal			612,319

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Category: H. Stakeholder Cooperation and Community Engagement
Workpaper: VARIOUS

Summary for Category: H. Stakeholder Cooperation and Community Engagement

	In 2021\$ (000)			
	Adjusted-Recorded	Adjusted-Forecast		
	2021	2022	2023	2024
Labor	240	387	279	261
Non-Labor	4,777	6,487	3,082	2,870
NSE	0	0	0	0
Total	5,017	6,874	3,361	3,131
FTE	1.7	2.8	2.1	2.0

208900 WMP PSPS MOBILE AND ENS ENHANCEMENTS

Labor	229	351	279	261
Non-Labor	4,260	5,276	3,082	2,870
NSE	0	0	0	0
Total	4,489	5,627	3,361	3,131
FTE	1.6	2.6	2.1	2.0

218860 PSPP ENHANCEMENT

Labor	11	36	0	0
Non-Labor	517	1,211	0	0
NSE	0	0	0	0
Total	528	1,247	0	0
FTE	0.1	0.2	0.0	0.0

Note: Totals may include rounding differences.

Beginning of Workpaper Group
208900 - WMP PSPS MOBILE AND ENS ENHANCEMENTS

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20890.0
Category: H. Stakeholder Cooperation and Community Engagement
Category-Sub: 1. PSPS Mobile and ENS Enhancements
Workpaper Group: 208900 - WMP PSPS MOBILE AND ENS ENHANCEMENTS

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	120	170	229	351	279	261
Non-Labor	Zero-Based	0	0	710	5,292	4,260	5,276	3,082	2,870
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	830	5,462	4,488	5,627	3,361	3,131
FTE	Zero-Based	0.0	0.0	0.9	1.3	1.6	2.6	2.1	2.0

Business Purpose:

The purpose of the Enterprise Notification System (ENS) project is to enhance and update the functionality of the Emergency Notification System (ENS), a critical Tier 1 business operations application used in notifying customers of both planned and unplanned outages across the service territory. Updates to the ENS application are required to meet regulatory requirements by sending appropriate customer communications during PSPS events and supporting both internal and external reporting requirements.

Physical Description:

The ENS project includes a robust solution architecture that will be implemented to support the high-resiliency requirement due to the criticality of the system, integrations with other critical internal systems, and performance improvements to ensure the system can support mass customer communications and internal and external reporting requirements.

Project Justification:

It is essential that SDG&E communicate with customers regarding outages and emergencies. The ENS system is a critical communication tool used to reach customers and relay important information regarding planned and unplanned outage events, Public Safety Power Shutoffs, and other system emergencies on both the gas and electric systems. The ENS system can contact customers via email, text, and voice messages. During wildfire or PSPS events, these notifications are required to meet CPUC regulations. The ENS system can also track these communications for required post-event PSPS reporting. The solution architecture needs to be enhanced to ensure it can be highly resilient to support this vital business need.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20890.0
Category: H. Stakeholder Cooperation and Community Engagement
Category-Sub: 1. PSPS Mobile and ENS Enhancements
Workpaper Group: 208900 - WMP PSPS MOBILE AND ENS ENHANCEMENTS

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20890.0
Category: H. Stakeholder Cooperation and Community Engagement
Category-Sub: 1. PSPS Mobile and ENS Enhancements
Workpaper Group: 208900 - WMP PSPS MOBILE AND ENS ENHANCEMENTS

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	351	279	261	0	0	0	351	279	261
Non-Labor	Zero-Based	5,276	3,082	2,870	0	0	0	5,276	3,082	2,870
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		5,627	3,361	3,131	0	0	0	5,627	3,361	3,131
FTE	Zero-Based	2.6	2.1	2.0	0.0	0.0	0.0	2.6	2.1	2.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20890.0
Category: H. Stakeholder Cooperation and Community Engagement
Category-Sub: 1. PSPS Mobile and ENS Enhancements
Workpaper Group: 208900 - WMP PSPS MOBILE AND ENS ENHANCEMENTS

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	96	142	199
Non-Labor	0	0	647	5,061	4,260
NSE	0	0	0	0	0
Total	0	0	743	5,203	4,459
FTE	0.0	0.0	0.8	1.1	1.4
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	0	0	96	142	199
Non-Labor	0	0	647	5,061	4,260
NSE	0	0	0	0	0
Total	0	0	743	5,203	4,459
FTE	0.0	0.0	0.8	1.1	1.4
Vacation & Sick (Nominal \$)					
Labor	0	0	14	20	30
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	14	20	30
FTE	0.0	0.0	0.1	0.2	0.2
Escalation to 2021\$					
Labor	0	0	11	7	0
Non-Labor	0	0	63	231	0
NSE	0	0	0	0	0
Total	0	0	73	239	0
FTE	0.0	0.0	0.0	0.0	0.0
Recorded-Adjusted (Constant 2021\$)					
Labor	0	0	120	170	229
Non-Labor	0	0	710	5,292	4,260
NSE	0	0	0	0	0
Total	0	0	830	5,462	4,488
FTE	0.0	0.0	0.9	1.3	1.6

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 20890.0
 Category: H. Stakeholder Cooperation and Community Engagement
 Category-Sub: 1. PSPS Mobile and ENS Enhancements
 Workpaper Group: 208900 - WMP PSPS MOBILE AND ENS ENHANCEMENTS

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
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Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 208900**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 20890.0
 Category: H. Stakeholder Cooperation and Community Engagement
 Category-Sub: 1. PSPS Mobile and ENS Enhancements
 Workpaper Group: 208900 - WMP PSPS MOBILE AND ENS ENHANCEMENTS
 Workpaper Detail: 208900.001 - RAMP - PSPS Mobile and ENS Enhancements
 In-Service Date: Not Applicable
 Description:

Emergency Notification System (ENS) is a critical Tier 1 business operations application used in notifying customers of both planned and unplanned outages across the SDG&E service territory. Customers can be notified via email, text and voice messages. It is critical the ENS application is able to meet regulatory requirements, is available to respond to outage events by sending appropriate customer communications and can support internal & external reporting requirements. SDG&E also requests additional funding to meet CPUC requirements to establish the portal to provide PSPS details to parties.

Forecast In 2021 \$(000)				
Years		2022	2023	2024
Labor		261	261	261
Non-Labor		2,870	2,870	2,870
NSE		0	0	0
Total		3,131	3,131	3,131
FTE		2.0	2.0	2.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 20890.0
Category: H. Stakeholder Cooperation and Community Engagemen
Category-Sub: 1. PSPS Mobile and ENS Enhancements
Workpaper Group: 208900 - WMP PSPS MOBILE AND ENS ENHANCEMENTS
Workpaper Detail: 208900.001 - RAMP - PSPS Mobile and ENS Enhancements

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C42

RAMP Line Item Name: Communication Practices

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	4,164	5,627	3,361	3,131	12,119	2,781	3,399

Cost Estimate Changes from RAMP:

Additional scoping for PSPP mobile application and ENS enhancements identified after RAMP filing.

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

No Feasible Units.

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

An RSE was not calculated for this activity.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 20890.0
 Category: H. Stakeholder Cooperation and Community Engagement
 Category-Sub: 1. PSPS Mobile and ENS Enhancements
 Workpaper Group: 208900 - WMP PSPS MOBILE AND ENS ENHANCEMENTS
 Workpaper Detail: 208900.002 - RAMP - PSPP Mobile App (Same RAMP as 20890.001)
 In-Service Date: 09/30/2022
 Description:

Emergency Notification System (ENS) is a critical Tier 1 business operations application used in notifying customers of both planned and unplanned outages across the SDG&E service territory. Customers can be notified via email, text and voice messages. It is critical the ENS application is able to meet regulatory requirements, is available to respond to outage events by sending appropriate customer communications and can support internal & external reporting requirements. SDG&E also requests additional funding to meet CPUC requirements to establish the portal to provide PSPS details to parties.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	90	18	0
Non-Labor	2,406	212	0
NSE	0	0	0
Total	2,496	230	0
FTE	0.6	0.1	0.0

Note: Totals may include rounding differences.

Supplemental Workpapers for Workpaper Group 208900

TY2024 GRC FORECAST - DETAILS

Budget Code: 20890

Estimated In Service Date: Ongoing

20890 - WMP PSPS mobile and ENS Enhancements					2022				2023				2024								
1	FTE Labor	Labor	RAMP	hours	4,160	\$	63	\$	261,456	4,160	\$	63	\$	261,456	4,160	\$	63	\$	261,456	\$	784,368
2	Contracted Services	Non-Labor	RAMP	ea	-	\$	-	\$	2,870,000	-	\$	-	\$	2,870,000	-	\$	-	\$	2,870,000	\$	8,610,000
5	FTE Labor	Labor	RAMP	hrs	1,248	\$	72	\$	89,856	240	\$	72	\$	17,280	-	\$	-	\$	-	\$	207,136
6	Contracted Services	Non-Labor	RAMP	ea	1	\$	2,119,721	\$	2,119,721	1	\$	211,680	\$	211,680	\$	-	\$	-	\$	-	2,331,401
7	Contracted Services	Non-Labor	RAMP	ea	1	\$	286,196	\$	286,196	-	\$	-	\$	-	\$	-	\$	-	\$	-	286,196
8																					
9																					
10																					
11																					
12																					
13																					
14																					
15																					

Two FTEs supporting this initiative. One Senior Infrastructure Technologist (\$134k) and one Infrastructure Technologist (\$129.5k). Average salary of the two positions is \$130,728. ENS Enhancements project.
Costs include \$1,250k to support PSPS applications and \$1,620k to support ENS per year. ENS Enhancements project.
1) Project Manager, IT Architect and Sr. Software Developer, PSPP Mobile App.
Contract Scope PSPP Mobile App:
1) Design, Build and implement Mobile Application.
2) Implement technical hardening of the Mobile Application.
3) Develop technical documentation of the Mobile Application
Contract Scope PSPP Mobile App:
1) Design Test strategy, test scripts of the mobile application.
2) Conduct functional testing of the mobile application and assure quality of the application.
3) Conduct non-functional testing of the mobile application.

*Costs should be reported in direct costs only (no overheads)

Summary																
	Labor	RAMP				\$	351,312		\$	278,736		\$	261,456		\$	891,504
	Non-Labor	RAMP				\$	5,275,917		\$	3,081,680		\$	2,870,000		\$	11,227,523
Subtotal RAMP						\$	5,627,229		\$	3,360,416		\$	3,131,456		\$	12,119,027
	Labor	Non-RAMP				\$	-		\$	-		\$	-		\$	-
	Non-Labor	Non-RAMP				\$	-		\$	-		\$	-		\$	-
Subtotal Non-RAMP						\$	-		\$	-		\$	-		\$	-
Total Project Forecast						\$	5,627,229		\$	3,360,416		\$	3,131,456		\$	12,119,027

**Beginning of Workpaper Group
218860 - PSPP ENHANCEMENT**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21886.0
Category: H. Stakeholder Cooperation and Community Engagement
Category-Sub: 2. PSPP Enhancements
Workpaper Group: 218860 - PSPP ENHANCEMENT

Summary of Results (Constant 2021 \$ in 000s):

Forecast Method		Adjusted Recorded					Adjusted Forecast		
Years		2017	2018	2019	2020	2021	2022	2023	2024
Labor	Zero-Based	0	0	0	0	11	36	0	0
Non-Labor	Zero-Based	0	0	0	0	517	1,211	0	0
NSE	Zero-Based	0	0	0	0	0	0	0	0
Total		0	0	0	0	528	1,247	0	0
FTE	Zero-Based	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0

Business Purpose:

The purpose of the Public Safety Partner Portal (PSPP) enhancement project is to establish a secure online web portal where PSPS impact information is made available to select stakeholders in a secure manner. This is a CPUC mandate and is necessary to provide relevant PSPS information to required stakeholders. The project will also establish a secure mobile application with feature parity with the web portal where PSPS impact information is made available to select stakeholders in a secure manner. The application will have the capability to push user notifications and provide status updates on PSPS events.

Physical Description:

A stand alone, secure portal and mobile application for use by Public Safety Partners during PSPS events.

Project Justification:

The CPUC issued phase three of the De-energization OIR on June 29, 2021, where a secure portal is a requirement to Public Safety Partners during PSPS events. This portal is mandatory for partners that need access to as much up-to-date information as possible, as efficiently as possible, to prepare for a potential PSPS event. Providing relevant information and data regarding potential PSPS events through a centralized secure portal not only enhances the safety of the public, but is a regulatory requirement.

The PSPP mobile application will meet additional functionality and accessibility requests made by external public safety partners in accordance with the CPUC's PSPS Phase III decision. The application will allow for push notifications and enhanced accessibility for field-centric partners. Additionally, the application is considered an industry best-practice.

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21886.0
Category: H. Stakeholder Cooperation and Community Engagement
Category-Sub: 2. PSPP Enhancements
Workpaper Group: 218860 - PSPP ENHANCEMENT

Forecast Methodology:

Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

Non-Labor - Zero-Based

The forecast method used is zero based. The forecast is based on cost estimates that were developed based on the specific scope of work for the project. Cost estimates are based on current construction labor rates, material costs, contract pricing/quotes, and other project specific details.

NSE - Zero-Based

Not applicable.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21886.0
Category: H. Stakeholder Cooperation and Community Engagement
Category-Sub: 2. PSPP Enhancements
Workpaper Group: 218860 - PSPP ENHANCEMENT

Summary of Adjustments to Forecast

In 2021 \$ (000)										
Forecast Method		Base Forecast			Forecast Adjustments			Adjusted-Forecast		
Years		2022	2023	2024	2022	2023	2024	2022	2023	2024
Labor	Zero-Based	36	0	0	0	0	0	36	0	0
Non-Labor	Zero-Based	1,211	0	0	0	0	0	1,211	0	0
NSE	Zero-Based	0	0	0	0	0	0	0	0	0
Total		1,247	0	0	0	0	0	1,247	0	0
FTE	Zero-Based	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0

Forecast Adjustment Details

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
2022 Total	0	0	0	0	0.0
2023 Total	0	0	0	0	0.0
2024 Total	0	0	0	0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21886.0
Category: H. Stakeholder Cooperation and Community Engagement
Category-Sub: 2. PSPP Enhancements
Workpaper Group: 218860 - PSPP ENHANCEMENT

Determination of Adjusted-Recorded:

	2017 (\$000)	2018 (\$000)	2019 (\$000)	2020 (\$000)	2021 (\$000)
Recorded (Nominal \$)*					
Labor	0	0	0	0	9
Non-Labor	0	0	0	0	517
NSE	0	0	0	0	0
Total	0	0	0	0	526
FTE	0.0	0.0	0.0	0.0	0.1
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	9
Non-Labor	0	0	0	0	517
NSE	0	0	0	0	0
Total	0	0	0	0	526
FTE	0.0	0.0	0.0	0.0	0.1
Vacation & Sick (Nominal \$)					
Labor	0	0	0	0	1
Non-Labor	0	0	0	0	0
NSE	0	0	0	0	0
Total	0	0	0	0	1
FTE	0.0	0.0	0.0	0.0	0.0
Escalation to 2021\$					
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 (Constant 2021\$)					
Labor	0	0	0	0	11
Non-Labor	0	0	0	0	517
NSE	0	0	0	0	0
Total	0	0	0	0	528
FTE	0.0	0.0	0.0	0.0	0.1

* 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.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21886.0
Category: H. Stakeholder Cooperation and Community Engagement
Category-Sub: 2. PSPP Enhancements
Workpaper Group: 218860 - PSPP ENHANCEMENT

Summary of Adjustments to Recorded:

In Nominal \$(000)					
Years	2017	2018	2019	2020	2021
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

<u>Year</u>	<u>Labor</u>	<u>NLbr</u>	<u>NSE</u>	<u>Total</u>	<u>FTE</u>
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Note: Totals may include rounding differences.

**Beginning of Workpaper Sub Details for
Workpaper Group 218860**

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
 Witness: Jonathan Woldemariam
 Budget Code: 21886.0
 Category: H. Stakeholder Cooperation and Community Engagement
 Category-Sub: 2. PSPP Enhancements
 Workpaper Group: 218860 - PSPP ENHANCEMENT
 Workpaper Detail: 218860.001 - RAMP - Public Safety Partner Portal Enhancement
 In-Service Date: 06/30/2022
 Description:

Establish a secure online web portal where PSPS impact information is made available to select stakeholders in a secure manner. This is a CPUC mandate and is necessary to provide relevant public safety power shut off information to required stakeholders.

Forecast In 2021 \$(000)			
Years	2022	2023	2024
Labor	36	0	0
Non-Labor	1,211	0	0
NSE	0	0	0
Total	1,247	0	0
FTE	0.2	0.0	0.0

Note: Totals may include rounding differences.

San Diego Gas & Electric Company
2024 GRC - REVISED
Capital Workpapers

Area: WILDFIRE MITIGATION & VEGETATION MANAGEMENT
Witness: Jonathan Woldemariam
Budget Code: 21886.0
Category: H. Stakeholder Cooperation and Community Engagemen
Category-Sub: 2. PSPP Enhancements
Workpaper Group: 218860 - PSPP ENHANCEMENT
Workpaper Detail: 218860.001 - RAMP - Public Safety Partner Portal Enhancement

RAMP Item # 1

RAMP Activity

RAMP Chapter: SDG&E-Risk-1 Wildfire Involving SDG&E Equipment

RAMP Line Item ID: C42

RAMP Line Item Name: Communication Practices

Tranche(s): Tranche1: N/A

GRC Forecast Cost Estimates (\$000)

	2021 Historical Embedded Costs (2021 \$)	2022 Forecast (2021 \$)	2023 Forecast (2021 \$)	2024 Forecast (2021 \$)	2022 to 2024 Forecast (2021 \$)	2022 to 2024 RAMP Range (2020 Incurred \$)	
						Low	High
Tranche 1 Cost Estimate	527	1,247	0	0	1,247	2,781	3,399

Cost Estimate Changes from RAMP:

RAMP data includes two budget codes, 218860 and 208900. Combined budget codes are above RAMP range due to additional scope associated with PSPS Mobile and ENS Enhancements (208900).

GRC Work Unit/Activity Level Estimates

Unit of Measure	2021 Historical Embedded Activities	2022 Forecast Activities	2023 Forecast Activities	2024 Forecast Activities	2022 to 2024 Forecast Activities	2022 to 2024 RAMP Range Activities	
						Low	High
Tranche 1 No Feasible Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Unit Changes from RAMP:

Risk Spend Efficiency (RSE)

	GRC RSE	RAMP RSE
Tranche 1	0.000	0.000

RSE Changes from RAMP:

Supplemental Workpapers for Workpaper Group 218860

TY2024 GRC FORECAST - Public Safety Partner Portal Enhancement

21886 - PSPP Enhancement					2022			
Line Item	Unit Description	Labor/Non-Labor	RAMP/Non-RAMP	Unit Metric (ea./ft./mile)	# of units	Cost per unit*	Total cost	Comments
1	FTE Labor	Labor	Non-RAMP	hrs	480	\$ 75.00	\$ 36,000	Project Manager, Sr. Business System Analyst - PSPP Enhancement
2	Contracted Services	Non-Labor	Non-RAMP	ea	1	\$ 1,211,094.00	\$ 1,211,094	Contract Scope for PSPP Enhancement: 1) Design, Build, Test and implement Web Portal following functions: a) Add "Urgent News Module" b) Add Community resource center info c) Add Outage map d) Add Critical Facilities counts (Potential & currently affected) and Critical Facility list e) Automate data feed to the portal f) Add community status by sectional devices 2) Develop technical documentation of the Web Portal 3) Conduct functional and non-functional testing of the Web Portal and assure quality of the application
Total							\$ 1,247,094	