

SAN DIEGO GAS & ELECTRIC COMPANY

Risk Assessment and Mitigation Phase

2025 Report

Chapter: SDG&E-Risk-2

Number: SDG&E-R02-WP

High Pressure Gas System O&M Workpapers

SAN DIEGO GAS & ELECTRIC COMPANY

May 15, 2025



2025 Risk Assessment & Mitigation Phase

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Risk Chapter 1OR02: SDG&E-RISK-2 HIGH PRESSURE GAS SYSTEM

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Summary of Risk Chapter: 1OR02 - SDG&E-Risk-2 High Pressure Gas System

In 2024 \$ (000s) Incurred Costs												
	Adjusted Recorded					Adjusted Forecast						
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Control/Mitigation	14,866	15,704	16,626	38,519	38,102	52,532	47,834	26,283	35,890	44,437	51,400	43,729
Alternative Mitigation	0	0	0	0	0	4,102	4,102	4,102	4,102	4,102	4,102	4,102
Units	See detailed pages for Units as the unit measure can vary for each mitigation.											

Note: Totals may include rounding differences.

Risk Chapter: **SDG&E-Risk-2 High Pressure Gas System**
Risk ID: **10R02**

In 2024 \$ (000s) Incurred Costs

Mitigation		Unit Measure	Adjusted Recorded					Adjusted Forecast						
ID	Name		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
A171	DIMP - High Pressure Pipeli	Miles of Pipi	0	0	0	0	0	4,102	4,102	4,102	4,102	4,102	4,102	4,102
C010	Pipeline Monitoring Technolo	FTEs	0	0	0	0	0	175	266	290	336	391	414	444
C013	Gas Transmission Safety Ru	Miles	0	0	0	0	0	18	18	18	18	18	18	18
C108	Cathodic Protection - Mainte	No feasible	108	80	75	78	135	135	135	135	135	135	135	135
C132	Pipeline Maintenance	No feasible	956	890	750	879	933	933	933	933	933	933	933	933
C142	Compressor Station - Mainte	No feasible	3,756	3,865	5,691	6,447	5,598	5,072	5,072	5,072	5,072	5,072	5,072	5,072
C155	Measurement & Instrumenta	No feasible	486	719	490	383	364	364	364	364	364	364	364	364
C171	Integrity Assessments & Rer	Miles of Pipi	9,560	10,150	9,620	30,732	31,072	45,835	41,046	19,471	29,032	37,524	44,464	36,763

Units

Mitigation		Unit Measure	Adjusted Recorded					Adjusted Forecast						
ID	Name		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
A171	DIMP - High Pressure Pipeli	Miles of Pipi	0	0	0	0	0	1	1	1	1	1	1	1
C010	Pipeline Monitoring Technolo	FTEs	0	0	0	0	0	1	1	1	1	1	1	1
C013	Gas Transmission Safety Ru	Miles	0	0	0	0	0	0	0	0	0	0	0	0
C108	Cathodic Protection - Mainte	No feasible	0	0	0	0	0	0	0	0	0	0	0	0
C132	Pipeline Maintenance	No feasible	0	0	0	0	0	0	0	0	0	0	0	0
C142	Compressor Station - Mainte	No feasible	0	0	0	0	0	0	0	0	0	0	0	0
C155	Measurement & Instrumenta	No feasible	0	0	0	0	0	0	0	0	0	0	0	0
C171	Integrity Assessments & Rer	Miles of Pipi	37	44	19	39	11	70	49	45	8	34	46	32

Note: Totals may include rounding differences.

Supplemental Workpapers

San Diego Gas & Electric Company

2025 RAMP

O&M Workpapers

PRIVILEGED AND CONFIDENTIAL/WORK PRODUCT

2025 RAMP
SDGE-Risk-2-Supplemental
Workpaper

SDGE DIMP - High Pressure Pipeline Assessments

Assumptions:

The DIMP High Pressure Pipeline Assessments identifies threats to high pressure pipelines; determines the risk posed by these threats; schedules prescribed assessments to evaluate the threats; collects information about the condition of the pipelines; and takes actions to minimize applicable threat and integrity concerns to reduce the risk of a pipeline failure.

Costs are based on estimated robotic ILI costs at \$5,000,00 per mile/project

Assumed 3 O&M digs and 2 capital digs based on SME experience

Labor and non-labor splits are assumed to be close to TIMP ILI at 16% and 84% respectively for SCG O&M and 5% and 95% for Capital

Forecast projected spend is before 16% V&S factor.

O&M Forecast

	2025	2026	2027	2028	2029	2030	2031
Miles Assessed	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Project	1	1	1	1	1	1	1
O&M Projected Spend	\$ 5,000,000	\$ 5,000,000	\$ 5,000,000	\$ 5,000,000	\$ 5,000,000	\$ 5,000,000	\$ 5,000,000

O&M Forecast Cost Breakdown

	2025	2026	2027	2028	2029	2030	2031
Estimated robotic ILI cost per mile	\$ 5,000,000	\$ 5,000,000	\$ 5,000,000	\$ 5,000,000	\$ 5,000,000	\$ 5,000,000	\$ 5,000,000
O&M digs per project (assuming 1 project for 0.5 miles with 3 digs each)	\$1,500,000	\$1,500,000	\$1,500,000	\$1,500,000	\$1,500,000	\$1,500,000	\$1,500,000
Forecasted Miles	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Projected Cost	\$ 4,000,000	\$ 4,000,000	\$ 4,000,000	\$ 4,000,000	\$ 4,000,000	\$ 4,000,000	\$ 4,000,000

Labor/Non-Labor

	2025	2026	2027	2028	2029	2030	2031
Labor at 16%	\$ 640,000	\$ 640,000	\$ 640,000	\$ 640,000	\$ 640,000	\$ 640,000	\$ 640,000
Non-Labor at 84%	\$ 3,360,000	\$ 3,360,000	\$ 3,360,000	\$ 3,360,000	\$ 3,360,000	\$ 3,360,000	\$ 3,360,000
Total Projected Cost	\$ 4,000,000	\$ 4,000,000	\$ 4,000,000	\$ 4,000,000	\$ 4,000,000	\$ 4,000,000	\$ 4,000,000

Capital Forecast Breakdown

	2025	2026	2027	2028	2029	2030	2031
O&M digs per project (assuming 2 digs per project)	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000
Projects	1	1	1	1	1	1	1
Projected Cost	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000

Labor/Non-Labor

	2025	2026	2027	2028	2029	2030	2031
Labor at 5%	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Non-Labor at 95%	\$ 1,900,000	\$ 1,900,000	\$ 1,900,000	\$ 1,900,000	\$ 1,900,000	\$ 1,900,000	\$ 1,900,000
Total Projected Cost	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000

C010 SDG&E - O&M Summary

HCA Methane Total	2025	2026	2027	2028	2029	2030	2031
Labor	\$ 164.49	\$ 5,521.33	\$ 14,232.76	\$ 24,003.04	\$ 35,327.82	\$ 40,806.97	\$ 52,103.90
Non-Labor	\$ -	\$ 81,519.24	\$ 99,448.58	\$ 116,177.92	\$ 132,907.25	\$ 149,636.59	\$ 166,365.93
Total	\$ 164.49	\$ 87,040.57	\$ 113,681.34	\$ 140,180.96	\$ 168,235.07	\$ 190,443.57	\$ 218,469.83

OPM Station Total	2025	2026	2027	2028	2029	2030	2031
Labor	\$ 97,496.70	\$ 99,953.17	\$ 101,897.90	\$ 105,377.84	\$ 109,369.53	\$ 109,369.53	\$ 109,369.53
Non-Labor	\$ 61,813.85	\$ 61,981.70	\$ 55,149.55	\$ 69,317.40	\$ 90,485.25	\$ 90,485.25	\$ 90,485.25
Total	\$ 159,310.55	\$ 161,934.87	\$ 157,047.45	\$ 174,695.24	\$ 199,854.78	\$ 199,854.78	\$ 199,854.78

HCA & OPM Total	2025	2026	2027	2028	2029	2030	2031
Labor	\$ 97,661	\$ 105,474	\$ 116,131	\$ 129,381	\$ 144,697	\$ 150,176	\$ 161,473
V&S*	\$ 15,626	\$ 16,876	\$ 18,581	\$ 20,701	\$ 23,152	\$ 24,028	\$ 25,836
Total Labor	\$ 113,287	\$ 122,350	\$ 134,712	\$ 150,082	\$ 167,849	\$ 174,205	\$ 187,309
Non-Labor	\$ 61,814	\$ 143,501	\$ 154,598	\$ 185,495	\$ 223,393	\$ 240,122	\$ 256,851
Total	\$ 175,101	\$ 265,851	\$ 289,310	\$ 335,577	\$ 391,241	\$ 414,327	\$ 444,160

	2025	2026	2027	2028	2029	2030	2031
FTE	0.8	0.9	1.0	1.1	1.2	1.3	1.3

*V&S assumed to be 16%

CCM - High Consequence Area (HCA) Methane Sensors - OM

Unit Count

	2025	2026	2027	2028	2029	2030	2031
Total Installations	24	21	21	21	21	21	18
Total Cumulative Units	24	45	66	87	108	129	147

Labor

	2025	2026	2027	2028	2029	2030	2031
Inspections	\$ -	\$ 4,271.77	\$ 8,072.71	\$ 15,394.64	\$ 20,324.31	\$ 25,213.75	\$ 7,536.06
Follow On Work	\$ -	\$ 889.95	\$ 1,681.81	\$ 3,207.22	\$ 4,234.23	\$ 5,252.86	\$ 244.80
Battery Replacements (every 2 years)	\$ -	\$ -	\$ 3,946.66	\$ 4,490.10	\$ 9,636.53	\$ 8,988.23	\$ 44,228.60
Field Alarm Response	\$ 21.76	\$ 47.56	\$ 70.31	\$ 120.50	\$ 149.82	\$ 178.84	\$ 18.50
Minor Damages	\$ 17.55	\$ 38.38	\$ 56.73	\$ 97.24	\$ 120.89	\$ 144.31	\$ 4.98
Major Damages/Pole & Equipment Replacement	\$ 125.17	\$ 273.66	\$ 404.53	\$ 693.34	\$ 862.03	\$ 1,028.98	\$ 70.97
Total Labor Cost	\$ 164.49	\$ 5,521.33	\$ 14,232.76	\$ 24,003.04	\$ 35,327.82	\$ 40,806.97	\$ 52,103.90

Non-Labor

	2025	2026	2027	2028	2029	2030	2031
Inspections	\$ -	\$ 80,640.00	\$ 88,200.00	\$ 95,760.00	\$ 103,320.00	\$ 110,880.00	\$ 118,440.00
Battery Replacement	\$ -	\$ -	\$ 9,600.00	\$ 18,000.00	\$ 26,400.00	\$ 34,800.00	\$ 43,200.00
Minor Damages	\$ -	\$ 293.08	\$ 549.53	\$ 805.97	\$ 1,062.42	\$ 1,318.86	\$ 1,575.31
Major Damages/Pole & Equipment Replacement	\$ -	\$ 586.16	\$ 1,099.05	\$ 1,611.94	\$ 2,124.84	\$ 2,637.73	\$ 3,150.62
Total Non-Labor Cost	\$ -	\$ 81,519.24	\$ 99,448.58	\$ 116,177.92	\$ 132,907.25	\$ 149,636.59	\$ 166,365.93

O&M Forecast

	2025	2026	2027	2028	2029	2030	2031
Total Labor	\$ 164.49	\$ 5,521.33	\$ 14,232.76	\$ 24,003.04	\$ 35,327.82	\$ 40,806.97	\$ 52,103.90
Total Non-Labor	\$ -	\$ 81,519.24	\$ 99,448.58	\$ 116,177.92	\$ 132,907.25	\$ 149,636.59	\$ 166,365.93
Total	\$ 164.49	\$ 87,040.57	\$ 113,681.34	\$ 140,180.96	\$ 168,235.07	\$ 190,443.57	\$ 218,469.83

Assumptions

The CCM HCA Methane Sensor project was proposed as part of enhanced pipeline safety to enhance the monitoring and response along its high-pressure pipeline routes in high consequence areas.
See 16% V&S addition on the Summary Supplemental Workpaper
All activities include time for work management system entry, perimeter setup, and drive time
Battery replacements include solar panel cleaning
Inspections include bump testing (the process of briefly exposing sensors to an expected concentration of calibration gas in order to validate that the sensor is responding and the alarm is functioning)
Inspections also include mirror/sensor cleaning

SDGE - Optical Pipeline Monitoring (OPM) Stations

Labor

	2025	2026	2027	2028	2029	2030	2031
Planned - OPM Station	\$ 1,220.82	\$ 1,221.55	\$ 735.26	\$ 1,710.37	\$ 3,175.64	\$ 3,175.64	\$ 3,175.64
Planned - Hand Holes	\$ 17,377.20	\$ 17,954.57	\$ 18,527.57	\$ 19,114.26	\$ 19,705.21	\$ 19,705.21	\$ 19,705.21
Locate and Mark	\$ 67,548.90	\$ 69,161.12	\$ 70,755.93	\$ 72,402.23	\$ 74,063.36	\$ 74,063.36	\$ 74,063.36
Unplanned - Hand Holes	\$ 8,207.98	\$ 8,472.24	\$ 8,734.43	\$ 9,003.06	\$ 9,273.68	\$ 9,273.68	\$ 9,273.68
Field Alarm Response	\$ 3,141.81	\$ 3,143.69	\$ 3,144.71	\$ 3,147.92	\$ 3,151.63	\$ 3,151.63	\$ 3,151.63
Total Labor Cost	\$ 97,496.70	\$ 99,953.17	\$ 101,897.90	\$ 105,377.84	\$ 109,369.53	\$ 109,369.53	\$ 109,369.53

Non-Labor

	2025	2026	2027	2028	2029	2030	2031
Planned	\$ 14,229.60	\$ 14,235.00	\$ 7,240.40	\$ 21,245.80	\$ 42,251.20	\$ 42,251.20	\$ 42,251.20
Unplanned	\$ 47,584.25	\$ 47,746.70	\$ 47,909.15	\$ 48,071.60	\$ 48,234.05	\$ 48,234.05	\$ 48,234.05
Total Non-Labor Cost	\$ 61,813.85	\$ 61,981.70	\$ 55,149.55	\$ 69,317.40	\$ 90,485.25	\$ 90,485.25	\$ 90,485.25

O&M Forecast

	2025	2026	2027	2028	2029	2030	2031
Total Labor	\$ 97,496.70	\$ 99,953.17	\$ 101,897.90	\$ 105,377.84	\$ 109,369.53	\$ 109,369.53	\$ 109,369.53
Total Non-Labor	\$ 61,813.85	\$ 61,981.70	\$ 55,149.55	\$ 69,317.40	\$ 90,485.25	\$ 90,485.25	\$ 90,485.25
Total	\$ 159,310.55	\$ 161,934.87	\$ 157,047.45	\$ 174,695.24	\$ 199,854.78	\$ 199,854.78	\$ 199,854.78

Assumptions

Planned Maintenance includes: Hand hole inspection (annual), Locate/Mark, General monitoring stations maintenance (annual), and standby support.
 Unplanned maintenance: Repairs or replacements to damage hand hole lids or casing, leak investigation/response.
 First two years include one time tool costs
 Unplanned cable damage scope will ONLY include standby support for Transmission; does not include cable splicing. Cable splicing to be preformed by approved contractor or Gas Engineering.
 Monitoring station analyzer/server maintenance managed by Gas Engineering via authorized 3rd party vendors
 Battery replacement is needed every 5 years from the initial installation date
 Assumed 3% of hand hole lids will need to be replaced per year due to damage or theft per year
 Assumed 1% of hand holes will need full replacement per year
 Unplanned cable & site repairs removed because they are categorized as capital spend
 Omnisens annual maintenance costs not included
 Assumed 42 locate and mark events happening per mile per year (based on 2021's ~159,467 L/M tickets and ~3715 miles of pipeline across both SCG & SDGE combined)
 See 16% V&S addition on the Summary Supplemental Workpaper

Appendix A: Forecast Methodology

Mitigation ID	Mitigation Name	Labor	Non-Labor	NSE	Units
A171	DIMP - High Pressure Pipeline In-Line Inspections	Zero-Based	Zero-Based	Zero-Based	Zero-Based
C010	Pipeline Monitoring Technologies	Zero-Based	Zero-Based	Zero-Based	Zero-Based
C013	Gas Transmission Safety Rule - MAOP Reconfirmation	Base YR Rec	Base YR Rec	Base YR Rec	Base YR Rec
C108	Cathodic Protection - Maintenance	Base YR Rec	Base YR Rec	Base YR Rec	Base YR Rec
C132	Pipeline Maintenance	Base YR Rec	Base YR Rec	Base YR Rec	Base YR Rec
C142	Compressor Station - Maintenance	5-YR Average	5-YR Average	5-YR Average	5-YR Average
C155	Measurement & Instrumentation Maintenance	Base YR Rec	Base YR Rec	Base YR Rec	Base YR Rec
C171	Integrity Assessments & Remediation	Base YR Rec	Base YR Rec	Base YR Rec	Base YR Rec

Risk Chapter: **SDG&E-Risk-2 High Pressure Gas System**
Risk ID: **1OR02**

Appendix B: Unit Measure

Mitigation ID	Mitigation Name	Unit Measure
A171	DIMP - High Pressure Pipeline In-Line Inspections	Miles of Pipe
C010	Pipeline Monitoring Technologies	FTEs
C013	Gas Transmission Safety Rule - MAOP Reconfirmation	Miles
C108	Cathodic Protection - Maintenance	No feasible units
C132	Pipeline Maintenance	No feasible units
C142	Compressor Station - Maintenance	No feasible units
C155	Measurement & Instrumentation Maintenance	No feasible units
C171	Integrity Assessments & Remediation	Miles of Pipe