



A  Sempra Energy utility®

Order Instituting Investigation into the November ) Investigation 19-11-010  
2019 Submission of Southern California Gas )  
Company's Risk Assessment and Mitigation Phase. )

**RISK ASSESSMENT MITGATION PHASE**

**WORKPAPERS TO**

**CHAPTER SCG-2**

**EMPLOYEE SAFETY**

**November 27, 2019**

**Employee Safety- SCG**

**Model Inputs**

Incident Rates			
	Injury Rate	Fatality Rate	
<b>SCG</b>	1.216	0.237	1.45
<small>Incident rates per year</small>			

**Fatality Incident Rate**

Total Fatalities	2009	2010	2011	2012	2013	2014	2015	2016	AVG
2212	5	3	6	1	3	2	4	4	3.5
<b>Total Employees</b>									
2212 Natural gas distribution	109,000	107,600	109,900	111,300	110,600	116,000	116,000	112,400	112,700
<b>Fatality Rate (Death/Total employees)</b>									
2212 Natural gas distribution									0.003%

	Employee	Rate
SCG	7546	0.237

**Injury Incident Rate**

Average Incident Rate, All Employment Sizes		2009	2010	2011	2012	2013	2014	2015	2016	AVG
<b>221 Utilities Total Recordable Incidence</b>										
2212 Natural gas distribution										3.2
<b>Rate Per 1 FTE</b>										
2212 Natural gas distribution										0.032
<b>Total Employees</b>										
2212 Natural gas distribution	109,000	107,600	109,900	111,300	110,600	116,000	116,000	112,400	112,700	
<b>Total Recordable Incidence</b>										
2212 Natural gas distribution	4,578	3,981	4,396	3,228	3,318	3,016	2,784	3,147		
<b>Total Hospitalization &amp; Amputation</b>										
2212 Natural gas distribution	23	20	22	16	17	15	13	17		0.5%
<b>Severe Injury Rate</b>										
2212 Natural gas distribution										0.016%

	Employee	Rate
SCG	7546	1.216

**Utility Industry NAICS Code Structure**  
<https://www.census.gov/econ/isp/sampler.php?naicscode=221&naicslevel=3>  
 National data was filtered on NAICS subsector code 2212 Natural Gas Distribution to represent the SCG gas business

**Employment Data**  
<https://www.bls.gov/web/empsit/ceseeb1b.htm>  
<https://www.bls.gov/opub/ee/archive.htm>

Chapter	SCG-2
Risk	Employee Safety

ID	Activity	Project Life In Years	Cost Forecast (O&M, \$M)			Cost Forecast (Capital, \$M)			Pre-Mitigation Single Point		% risk reduction (use if % risk addressed not available) (%)	RSE		Post-Mitigation Single Point	
			2022	2020	2021	2022	LORE	CORE	Single Point	LORE		CORE			
			SCG-2-C3	Wellness Programs	1	3.17	0.00	0.00	0.00	1.45		765.29	0.33%	1.10	1.46
SCG-2-C5	Safe Driving Programs	1	0.90	0.00	0.00	0.00	1.45	765.29	0.33%	3.90	1.46	765.29			
SCG-2-C7	Near Miss, Stop the Job and jobsite safety programs	1	0.28	0.00	0.00	0.00	1.45	765.29	0.33%	12.48	1.46	765.29			
SCG-2-C8	Safety Culture	1	0.52	0.00	0.00	0.00	1.45	765.29	0.33%	6.69	1.46	765.29			
SCG-2-C9	Utilizing Occupational Safety and Health Administration (OSHA) and industry best practices and industry benchmarking	1	1.11	0.00	0.00	0.00	1.45	765.29	0.33%	3.15	1.46	765.29			
SCG-2-M1	OSHA 30-hour construction certification training	1	0.09	0.00	0.00	0.00	1.45	765.29	0.06%	6.47	1.45	765.29			
SCG-2-M2	Industrial hygiene program refresh	1	0.32	0.00	0.00	0.00	1.45	765.29	0.06%	1.80	1.45	765.29			
SCG-2-M3	Establish proactive monitoring for indoor air quality (IAQ) and chemicals of concern	1	0.06	0.00	0.00	0.00	1.45	765.29	0.06%	9.71	1.45	765.29			
SCG-2-M4	Safety video library	1	0.05	0.00	0.00	0.00	1.45	765.29	0.06%	11.65	1.45	765.29			
SCG-2-M5	Expanded Safety Congress and expanded Executive Safety Council	1	0.04	0.00	0.00	0.00	1.45	765.29	0.06%	16.64	1.45	765.29			
SCG-2-M6	Expanded Safety Culture Assessments	1	0.05	0.00	0.00	0.00	1.45	765.29	0.06%	11.65	1.45	765.29			
SCG-2-A1	Develop internal expertise for expanded safety culture assessment	1	0.22	0.00	0.00	0.00	1.45	765.29	0.06%	2.89	1.45	765.29			
SCG-2-A2	OSHA Voluntary Protection Program	1	0.35	0.00	0.00	0.00	1.45	765.29	0.06%	1.81	1.45	765.29			
SCG-2-A3	Additional Industrial Hygienist	1	0.10	0.00	0.00	0.00	1.45	765.29	0.06%	6.03	1.45	765.29			

Low Alternative

ID	Activity	Project Life In Years	Cost Forecast (O&M, \$M)			Cost Forecast (Capital, \$M)			Pre-Mitigation Low Alternative		% risk reduction (use if % risk addressed not available) (%)	RSE		Post-Mitigation Low Alternative	
			2022	2020	2021	2022	LORE	CORE	Low Alternative	LORE		CORE			
			SCG-2-C3	Wellness Programs	1	3.17	0.00	0.00	0.00	1.45		80.25	0.33%	0.12	1.46
SCG-2-C5	Safe Driving Programs	1	0.90	0.00	0.00	0.00	1.45	80.25	0.33%	0.41	1.46	80.25			
SCG-2-C7	Near Miss, Stop the Job and jobsite safety programs	1	0.28	0.00	0.00	0.00	1.45	80.25	0.33%	1.31	1.46	80.25			
SCG-2-C8	Safety Culture	1	0.52	0.00	0.00	0.00	1.45	80.25	0.33%	0.70	1.46	80.25			
SCG-2-C9	Utilizing Occupational Safety and Health Administration (OSHA) and industry best practices and industry benchmarking	1	1.11	0.00	0.00	0.00	1.45	80.25	0.33%	0.33	1.46	80.25			
SCG-2-M1	OSHA 30-hour construction certification training	1	0.09	0.00	0.00	0.00	1.45	80.25	0.06%	0.68	1.45	80.25			
SCG-2-M2	Industrial hygiene program refresh	1	0.32	0.00	0.00	0.00	1.45	80.25	0.06%	0.19	1.45	80.25			
SCG-2-M3	Establish proactive monitoring for indoor air quality (IAQ) and chemicals of concern	1	0.06	0.00	0.00	0.00	1.45	80.25	0.06%	1.02	1.45	80.25			
SCG-2-M4	Safety video library	1	0.05	0.00	0.00	0.00	1.45	80.25	0.06%	1.22	1.45	80.25			
SCG-2-M5	Expanded Safety Congress and expanded Executive Safety Council	1	0.04	0.00	0.00	0.00	1.45	80.25	0.06%	1.74	1.45	80.25			
SCG-2-M6	Expanded Safety Culture Assessments	1	0.05	0.00	0.00	0.00	1.45	80.25	0.06%	1.22	1.45	80.25			
SCG-2-A1	Develop internal expertise for expanded safety culture assessment	1	0.22	0.00	0.00	0.00	1.45	80.25	0.06%	0.30	1.45	80.25			
SCG-2-A2	OSHA Voluntary Protection Program	1	0.35	0.00	0.00	0.00	1.45	80.25	0.06%	0.19	1.45	80.25			
SCG-2-A3	Additional Industrial Hygienist	1	0.10	0.00	0.00	0.00	1.45	80.25	0.06%	0.63	1.45	80.25			

High Alternative

ID	Activity	Project Life In Years	Cost Forecast (O&M, \$M)			Cost Forecast (Capital, \$M)			Pre-Mitigation High Alternative		% risk reduction (use if % risk addressed not available) (%)	RSE		Post-Mitigation High Alternative	
			2022	2020	2021	2022	LORE	CORE	High Alternative	LORE		CORE			
			SCG-2-C3	Wellness Programs	1	3.17	0.00	0.00	0.00	1.45		1907.02	0.33%	2.75	1.46
SCG-2-C5	Safe Driving Programs	1	0.90	0.00	0.00	0.00	1.45	1907.02	0.33%	9.72	1.46	1907.02			
SCG-2-C7	Near Miss, Stop the Job and jobsite safety programs	1	0.28	0.00	0.00	0.00	1.45	1907.02	0.33%	31.10	1.46	1907.02			
SCG-2-C8	Safety Culture	1	0.52	0.00	0.00	0.00	1.45	1907.02	0.33%	16.66	1.46	1907.02			
SCG-2-C9	Utilizing Occupational Safety and Health Administration (OSHA) and industry best practices and industry benchmarking	1	1.11	0.00	0.00	0.00	1.45	1907.02	0.33%	7.85	1.46	1907.02			
SCG-2-M1	OSHA 30-hour construction certification training	1	0.09	0.00	0.00	0.00	1.45	1907.02	0.06%	16.13	1.45	1907.02			
SCG-2-M2	Industrial hygiene program refresh	1	0.32	0.00	0.00	0.00	1.45	1907.02	0.06%	4.48	1.45	1907.02			
SCG-2-M3	Establish proactive monitoring for indoor air quality (IAQ) and chemicals of concern	1	0.06	0.00	0.00	0.00	1.45	1907.02	0.06%	24.19	1.45	1907.02			
SCG-2-M4	Safety video library	1	0.05	0.00	0.00	0.00	1.45	1907.02	0.06%	29.03	1.45	1907.02			
SCG-2-M5	Expanded Safety Congress and expanded Executive Safety Council	1	0.04	0.00	0.00	0.00	1.45	1907.02	0.06%	41.46	1.45	1907.02			
SCG-2-M6	Expanded Safety Culture Assessments	1	0.05	0.00	0.00	0.00	1.45	1907.02	0.06%	29.02	1.45	1907.02			
SCG-2-A1	Develop internal expertise for expanded safety culture assessment	1	0.22	0.00	0.00	0.00	1.45	1907.02	0.06%	7.21	1.45	1907.02			
SCG-2-A2	OSHA Voluntary Protection Program	1	0.35	0.00	0.00	0.00	1.45	1907.02	0.06%	4.51	1.45	1907.02			
SCG-2-A3	Additional Industrial Hygienist	1	0.10	0.00	0.00	0.00	1.45	1907.02	0.06%	15.02	1.45	1907.02			

SCG-2-C3: Employee Wellness Programs							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.33%	<i>SME Estimate based on historical safety performance results.</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety performance	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.58	1111.83	2770.58
Post-Mitigation	LoRE	1.46		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.97	1115.54	2779.81
	RSE	0.12	1.10	2.75

SCG-2-C5: Safe Driving Programs							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.33%	<i>SME Estimate based on historical safety performance results.</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety performance	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre- Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.58	1111.83	2770.58
Post- Mitigation	LoRE	1.46		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.97	1115.54	2779.81
	RSE	0.41	3.90	9.72

SCG-2-C7: Near Miss, Stop the Job and jobsite safety programs							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.33%	<i>SME Estimate based on historical safety performance results.</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety performance	1
Reliability							
Financial							



		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.58	1111.83	2770.58
Post-Mitigation	LoRE	1.46		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.97	1115.54	2779.81
	RSE	1.31	12.48	31.10

SCG-2-C8: Safety Culture							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.33%	<i>SME Estimate based on historical safety performance results.</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety performance	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.58	1111.83	2770.58
Post-Mitigation	LoRE	1.46		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.97	1115.54	2779.81
	RSE	0.70	6.69	16.66

SCG-2-C9: Utilizing Occupational Safety and Health Administration (OSHA) and industry best practices and industry benchmarking							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.33%	<i>SME Estimate based on historical safety performance results.</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety performance	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.58	1111.83	2770.58
Post-Mitigation	LoRE	1.46		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.97	1115.54	2779.81
	RSE	0.33	3.15	7.85

SCG-2-M1: OSHA 30-hour construction certification training							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.06%	<i>SME Estimate based on historical safety performance results.</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety performance	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.58	1111.83	2770.58
Post-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.52	1111.21	2769.04
	RSE	0.68	6.47	16.13

SCG-2-M2:Industrial hygiene program refresh							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.06%	<i>SME Estimate based on historical safety performance results</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety performance	1
Reliability							
Financial							



		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.58	1111.83	2770.58
Post-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.52	1111.21	2769.04
	RSE	0.19	1.80	4.48

SCG-2-M3: Establish proactive monitoring for indoor air quality (IAQ) and chemicals of concern							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.06%	<i>SME Estimate based on historical safety performance results</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety performance	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre- Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.58	1111.83	2770.58
Post- Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.52	1111.21	2769.04
	RSE	1.02	9.71	24.19

SCG-2-M4: Safety video library							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.06%	<i>SME Estimate based on historical safety performance results</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety performance	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.58	1111.83	2770.58
Post-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.52	1111.21	2769.04
	RSE	1.22	11.65	29.03

SCG-2-M5: Expanded Safety Congress and expanded Executive Safety Council							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.06%	<i>SME Estimate based on historical safety performance results</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety performance	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.58	1111.83	2770.58
Post-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.52	1111.21	2769.04
	RSE	1.74	16.64	41.46

SCG-2-M6: Expanded Safety Culture Assessments							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.06%	<i>SME Estimate based on historical safety performance results</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety performance	1
Reliability							
Financial							



		Low Alternative	Single Point	High Alternative
Pre- Mitigation	LoRE	1.45		
	CoRE	80.25	<b>765.29</b>	1907.02
	Risk Score	116.58	<b>1111.83</b>	2770.58
Post- Mitigation	LoRE	1.45		
	CoRE	80.25	<b>765.29</b>	1907.02
	Risk Score	116.52	<b>1111.21</b>	2769.04
	RSE	1.22	<b>11.65</b>	29.03

SCG-2-A1: Develop internal expertise for expanded safety culture assessment							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.06%	<i>SME Estimate based on historical safety performance results</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety performance	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.58	1111.83	2770.58
Post-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.51	1111.16	2768.91
	RSE	0.30	2.89	7.21

SCG-2-A2: OSHA Voluntary Protection Program							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.06%	<i>SME Estimate based on historical safety performance results</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety performance	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre- Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.58	1111.83	2770.58
Post- Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.51	1111.16	2768.91
	RSE	0.19	1.81	4.51

SCG-2-A3: Additional Industrial Hygienist							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.06%	<i>SME Estimate based on historical safety performance results</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety performance	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.58	1111.83	2770.58
Post-Mitigation	LoRE	1.45		
	CoRE	80.25	765.29	1907.02
	Risk Score	116.51	1111.16	2768.91
	RSE	0.63	6.03	15.02