



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-3

CONTRACTOR SAFETY

November 27, 2019

Model Inputs

Incident Rates

Injury	0.734
Fatality	0.319
	1.053

Sector	Injury Incident Rate	Sector	Fatality Incident Rate
11	0.000873	11	0.002694
21	0.039998	21	0.012258
22	0.053160	22	0.012726
23	0.620038	23	0.285373
31-33	0.011243	31-33	0.000911
42	0.001635	42	0.000519
44	0.000059	44	0.000021
48-49	0.000855	48-49	0.000758
53	0.000083	53	0.000065
54	0.002692	54	0.001251
56	0.003274	56	0.002106
81	0.000421	81	0.000412
	0.734332		0.319095

List of NAICS Sectors included in model

- 11-Agriculture, Forestry, Fishing and Hunting
- 21-Mining, Quarrying, and Oil and Gas Extraction
- 22-Utilities
- 23-Construction
- 32-Manufacturing
- 33-Manufacturing
- 42-Wholesale Trade
- 44-Retail Trade
- 48-Transportation and Warehousing
- 49-Transportation and Warehousing
- 53-Real Estate and Rental and Leasing
- 54-Professional, Scientific, and Technical Services
- 56-Administrative and Support and Waste Management and Remediation Services
- 81-Other Services (except Public Administration)

Chapter	SCG-3
Risk	Contractor Safety

Single Point

ID	Activity	Project Life	Cost Forecast (O&M, \$M)	Cost Forecast (Capital, \$M)			Pre-Mitigation		% risk reduction (use if % risk addressed not available) (%)	RSE	Post-Mitigation	
							Single Point				Single Point	
		In Years	2022	2020	2021	2022	LORE	CORE		Single Point	LORE	CORE
SCG-3-C1	Contractor Oversight Program (e.g., policy and procedures, contractual requirements, construction inspections and contractor safety performance reviews, audits, enforcement, and oversight committee).	1	1.77	0.00	0.00	0.00	1.05	983.99	1.8%	10.12	1.07	983.99
SCG-3-C4	Third Party administration tools	1	0.04	0.00	0.00	0.00	1.05	983.99	0.9%	207.00	1.06	983.99
SCG-3-C5	Contractor Engagement	1	0.04	0.00	0.00	0.00	1.05	983.99	0.9%	242.07	1.06	983.99
SCG-3-M1	Expanded contractor safety resources (7 FTEs)	1	0.83	0.00	0.00	0.00	1.05	983.99	1.8%	21.52	1.03	983.99
SCG-3-A1	Use internal resources and tools to vet contractors for safety	1	0.51	0.00	0.00	0.00	1.05	983.99	0.3%	5.92	1.05	983.99
SCG-3-A2	Use a different third-party administration tool to vet contractors for safety	1	0.03	0.00	0.00	0.00	1.05	983.99	0.3%	94.04	1.05	983.99

Low Alternative

ID	Activity	Project Life	Cost Forecast (O&M, \$M)	Cost Forecast (Capital, \$M)			Pre-Mitigation		% risk reduction (use if % risk addressed not available) (%)	RSE	Post-Mitigation	
							Low Alternative				Low Alternative	
		In Years	2022	2020	2021	2022	LORE	CORE		Low Alternative	LORE	CORE
SCG-3-C1	Contractor Oversight Program (e.g., policy and procedures, contractual requirements, construction inspections and contractor safety performance reviews, audits, enforcement, and oversight committee).	1	1.77	0.00	0.00	0.00	1.05	103.53	1.8%	1.06	1.07	103.53
SCG-3-C4	Third Party administration tools	1	0.04	0.00	0.00	0.00	1.05	103.53	0.9%	21.78	1.06	103.53
SCG-3-C5	Contractor Engagement	1	0.04	0.00	0.00	0.00	1.05	103.53	0.9%	25.47	1.06	103.53
SCG-3-M1	Expanded contractor safety resources (7 FTEs)	1	0.83	0.00	0.00	0.00	1.05	103.53	1.8%	2.26	1.03	103.53
SCG-3-A1	Use internal resources and tools to vet contractors for safety	1	0.51	0.00	0.00	0.00	1.05	103.53	0.3%	0.62	1.05	103.53
SCG-3-A2	Use a different third-party administration tool to vet contractors for safety	1	0.03	0.00	0.00	0.00	1.05	103.53	0.3%	9.89	1.05	103.53

High Alternative

ID	Activity	Project Life	Cost Forecast (O&M, \$M)	Cost Forecast (Capital, \$M)			Pre-Mitigation		% risk reduction (use if % risk addressed not available) (%)	RSE	Post-Mitigation	
							High Alternative				High Alternative	
		In Years	2022	2020	2021	2022	LORE	CORE		High Alternative	LORE	CORE
SCG-3-C1	Contractor Oversight Program (e.g., policy and procedures, contractual requirements, construction inspections and contractor safety performance reviews, audits, enforcement, and oversight committee).	1	1.77	0.00	0.00	0.00	1.05	2451.43	1.8%	25.22	1.07	2451.43
SCG-3-C4	Third Party administration tools	1	0.04	0.00	0.00	0.00	1.05	2451.43	0.9%	515.70	1.06	2451.43
SCG-3-C5	Contractor Engagement	1	0.04	0.00	0.00	0.00	1.05	2451.43	0.9%	603.08	1.06	2451.43
SCG-3-M1	Expanded contractor safety resources (7 FTEs)	1	0.83	0.00	0.00	0.00	1.05	2451.43	1.8%	53.63	1.03	2451.43
SCG-3-A1	Use internal resources and tools to vet contractors for safety	1	0.51	0.00	0.00	0.00	1.05	2451.43	0.3%	14.76	1.05	2451.43
SCG-3-A2	Use a different third-party administration tool to vet contractors for safety	1	0.03	0.00	0.00	0.00	1.05	2451.43	0.3%	234.27	1.05	2451.43

SCG-3-C1: Contractor Oversight Program (e.g., policy and procedures, contractual requirements, construction inspections and contractor safety performance reviews, audits, enforcement, and oversight committee).

Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	1.8%	<i>SME estimate based on Kinder Morgan study on contractor safety and oversight.</i>	SME Estimate	SME Estimate	SME Estimate	Kinder Morgan study	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.05		
	CoRE	103.53	983.99	2451.43
	Risk Score	109.06	1036.56	2582.40
Post-Mitigation	LoRE	1.07		
	CoRE	103.53	983.99	2451.43
	Risk Score	111.06	1055.60	2629.84
	RSE	1.06	10.12	25.22

SCG-3-C4: Third Party Administration Tools							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.3%	SME estimate based on Kinder Morgan study on contractor safety and oversight.	SME Estimate	SME Estimate	SME Estimate	Kinder Morgan study	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.05		
	CoRE	103.53	983.99	2451.43
	Risk Score	109.06	1036.56	2582.40
Post-Mitigation	LoRE	1.06		
	CoRE	103.53	983.99	2451.43
	Risk Score	110.06	1046.08	2606.12
	RSE	21.78	207.00	515.70

SCG-3-C5: Contractor Engagement							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.9%	<i>SME estimate based on Kinder Morgan study on contractor safety and oversight.</i>	SME Estimate	SME Estimate	SME Estimate	Kinder Morgan study	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.05		
	CoRE	103.53	983.99	2451.43
	Risk Score	109.06	1036.56	2582.40
Post-Mitigation	LoRE	1.06		
	CoRE	103.53	983.99	2451.43
	Risk Score	110.06	1046.08	2606.12
	RSE	25.47	242.07	603.08

SCG-3-M1: Expanded contractor safety resources (7 FTEs)							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	1.8%	SME estimate based on Kinder Morgan study on contractor safety and oversight.	SME Estimate	SME Estimate	SME Estimate	Kinder Morgan study	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.05		
	CoRE	103.53	983.99	2451.43
	Risk Score	109.06	1036.56	2582.40
Post-Mitigation	LoRE	1.03		
	CoRE	103.53	983.99	2451.43
	Risk Score	107.05	1017.52	2534.97
	RSE	2.26	21.52	53.63

SCG-3-A1: Use internal resources and tools to vet contractors for safety							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.3%	SME estimate based on Kinder Morgan study on contractor safety and oversight.	SME Estimate	SME Estimate	SME Estimate	Kinder Morgan study	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.05		
	CoRE	103.53	983.99	2451.43
	Risk Score	109.06	1036.56	2582.40
Post-Mitigation	LoRE	1.05		
	CoRE	103.53	983.99	2451.43
	Risk Score	108.72	1033.39	2574.50
	RSE	0.62	5.92	14.76

SCG-3-A2: Use a different third-party administration tool to vet contractors for safety							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.3%	SME estimate based on Kinder Morgan study on contractor safety and oversight.	SME Estimate	SME Estimate	SME Estimate	Kinder Morgan study	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.05		
	CoRE	103.53	983.99	2451.43
	Risk Score	109.06	1036.56	2582.40
Post-Mitigation	LoRE	1.05		
	CoRE	103.53	983.99	2451.43
	Risk Score	108.72	1033.39	2574.50
	RSE	9.89	94.04	234.27