



Order Instituting Investigation into the November) Investigation 19-11-011
2019 Submission of San Diego Gas & Electric)
Company's Risk Assessment and Mitigation Phase.)

RISK ASSESSMENT MITGATION PHASE

WORKPAPERS TO

CHAPTER SDG&E-3

EMPLOYEE SAFETY

November 27, 2019

Employee Safety- SDGE

Model Inputs

Incident Rates		
	Injury Rate	Fatality Rate
SDGE-Electric	0.927	0.175
SDGE-Gas	0.166	0.032
Incident rates per year		1.30

Fatality Incident Rate

Total Fatalities	2009	2010	2011	2012	2013	2014	2015	2016	AVG
	25	42	60	37	40	33	39	47	40.375
2211 Electric Power Generation, transmission, and distribution	11	25	31	23	24	21	17	27	22.375
2212 Natural gas distribution	5	3	6	1	3	2	4	4	3.5
2213 Water, sewage, and other systems	8	14	22	13	12	10	18	16	14.125
Total Employees									
2211 Electric Power Generation, transmission, and distribution	401,700	395,300	401,000	395,200	392,000	393,000	395,700	392,400	394,883
2212 Natural gas distribution	109,000	107,600	109,900	111,300	110,600	116,000	116,000	112,400	112,700
Fatality Rate (Death/Total employees)									
2211 Electric Power Generation, transmission, and distribution									0.006%
2212 Natural gas distribution									0.003%

	Employee	Rate
SDGE	4116	
SDGE Elect	3087	0.175
SDGE Gas	1029	0.032

2017 Common Account Allocations- General and Admin Expense

ELECTRIC 75%
GAS 25%

Injury Incident Rate

Average Incident Rate, All Employment Sizes	2009	2010	2011	2012	2013	2014	2015	2016	AVG
221 Utilities									
Total Recordable Incidence									
2211 Electric Power Generation, transmission, and distribution	3.0	2.8	3.2	2.5	1.8	2.1	1.9	1.7	2.4
2212 Natural gas distribution	4.2	3.7	4.0	2.9	3.0	2.6	2.4	2.8	3.2
Rate Per 1 FTE									
2211 Electric Power Generation, transmission, and distribution	0.03	0.028	0.032	0.025	0.018	0.021	0.019	0.017	0.02375
2212 Natural gas distribution	0.042	0.037	0.04	0.029	0.03	0.026	0.024	0.028	0.032
Total Employees									
2211 Electric Power Generation, transmission, and distribution	401,700	395,300	401,000	395,200	392,000	393,000	395,700	392,400	394,883
2212 Natural gas distribution	109,000	107,600	109,900	111,300	110,600	116,000	116,000	112,400	112,700
Total Recordable Incidence									
2211 Electric Power Generation, transmission, and distribution	12,051	11,068	12,832	9,880	7,056	8,253	7,518	6,671	
2212 Natural gas distribution	4,578	3,981	4,396	3,228	3,318	3,016	2,784	3,147	
Total Hospitalization & Amputation									
2211 Electric Power Generation, transmission, and distribution	152	140	162	125	89	104	83	96	
2212 Natural gas distribution	23	20	22	16	17	15	13	17	
2211 Electric Power Generation, transmission, and distribution									1.262%
2212 Natural gas distribution									0.506%
Severe Injury Rate									
2211 Electric Power Generation, transmission, and distribution									0.006%
2212 Natural gas distribution									0.003%

	Employee	Rate
SDGE	4116	
SDGE Electric	3087	0.927
SDGE Gas	1029	0.166

Utility Industry NAICS Code Structure

<https://www.census.gov/econ/isp/sampler.php?naicscode=221&naicslevel=3>

Employment Data

<https://www.bls.gov/web/empsit/ceseeb1b.htm>

<https://www.bls.gov/opub/ee/archive.htm>

2017 Common Account Allocations- General and Admin Expense

ELECTRIC 75%
GAS 25%

Chapter	SDG&E-3
Risk	Employee 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	
SDG&E-3-M1	Enhanced Mandatory Employee Training (OSHA)	1	0.03	0.00	0.00	0.00	1.30	835.67	0.1%	37.91	1.30	835.67
SDG&E-3-C3	Safety Culture	1	0.31	0.00	0.00	0.00	1.30	835.67	1.2%	39.24	1.31	835.67
SDG&E-3-C4	Employee Behavior Based Safety (BBS) program	1	0.73	0.00	0.00	0.00	1.30	835.67	1.5%	21.18	1.32	835.67
SDG&E-3-M2	Safety In Action Enhancement Program	1	0.48	0.00	0.00	0.00	1.30	835.67	1.5%	32.33	1.28	835.67
SDG&E-3-C7	Employee Wellness Programs	1	0.73	0.00	0.00	0.00	1.30	835.67	0.8%	11.22	1.31	835.67
SDG&E-3-C8	OSHA Voluntary Protection Program (VPP) assessments	1	0.04	0.00	0.00	0.00	1.30	835.67	0.3%	73.12	1.30	835.67
SDG&E-3-M4	Implementing findings from VPP program assessments	1	0.30	0.00	0.00	0.00	1.30	835.67	1.0%	34.12	1.29	835.67
SDG&E-3-M3	Enhanced employee safe driving training (Vehicle Technology Programs)	1	0.05	2.00	0.00	0.00	1.30	835.67	1.2%	17.14	1.28	835.67
SDG&E-3-C9	Safe Driving Programs	1	0.30	0.00	0.00	0.00	1.30	835.67	0.5%	16.95	1.31	835.67
SDG&E-3-C11	Near Miss, Stop the Job and jobsite safety programs	1	9.49	2.28	2.28	2.28	1.30	835.67	3.8%	3.30	1.35	835.67
SDG&E-3-M5	Energized Skills Training and Testing Yard	1	0.00	0.00	0.80	0.00	1.30	835.67	1.0%	12.79	1.29	835.67
SDG&E-3-C12	Utilizing OSHA and industry best practices and industry benchmarking	1	0.68	0.00	0.00	0.00	1.30	835.67	0.5%	7.53	1.31	835.67
SDG&E-3-A1	Alert Driving Pilot Program Deployment	1	5.00	0.00	0.00	0.00	1.30	835.67	0.5%	1.02	1.29	835.67
SDG&E-3-A2	Safety Standards/Presentations Refresh	1	0.12	0.00	0.00	0.00	1.30	835.67	0.1%	8.53	1.30	835.67

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	
SDG&E-3-M1	Enhanced Mandatory Employee Training (OSHA)	1	0.03	0.00	0.00	0.00	1.30	97.42	0.1%	4.42	1.30	97.42
SDG&E-3-C3	Safety Culture	1	0.31	0.00	0.00	0.00	1.30	97.42	1.2%	4.58	1.31	97.42
SDG&E-3-C4	Employee Behavior Based Safety (BBS) program	1	0.73	0.00	0.00	0.00	1.30	97.42	1.5%	2.47	1.32	97.42
SDG&E-3-M2	Safety In Action Enhancement Program	1	0.48	0.00	0.00	0.00	1.30	97.42	1.5%	3.77	1.28	97.42
SDG&E-3-C7	Employee Wellness Programs	1	0.73	0.00	0.00	0.00	1.30	97.42	0.8%	1.31	1.31	97.42
SDG&E-3-C8	OSHA Voluntary Protection Program (VPP) assessments	1	0.04	0.00	0.00	0.00	1.30	97.42	0.3%	8.52	1.30	97.42
SDG&E-3-M4	Implementing findings from VPP program assessments	1	0.30	0.00	0.00	0.00	1.30	97.42	1.0%	3.98	1.29	97.42
SDG&E-3-M3	Enhanced employee safe driving training (Vehicle Technology Programs)	1	0.05	2.00	0.00	0.00	1.30	97.42	1.2%	2.00	1.28	97.42
SDG&E-3-C9	Safe Driving Programs	1	0.30	0.00	0.00	0.00	1.30	97.42	0.5%	1.98	1.31	97.42
SDG&E-3-C11	Near Miss, Stop the Job and jobsite safety programs	1	9.49	2.28	2.28	2.28	1.30	97.42	3.8%	0.39	1.35	97.42
SDG&E-3-M5	Energized Skills Training and Testing Yard	1	0.00	0.00	0.80	0.00	1.30	97.42	1.0%	1.49	1.29	97.42
SDG&E-3-C12	Utilizing OSHA and industry best practices and industry benchmarking	1	0.68	0.00	0.00	0.00	1.30	97.42	0.5%	0.88	1.31	97.42
SDG&E-3-A1	Alert Driving Pilot Program Deployment	1	5.00	0.00	0.00	0.00	1.30	97.42	0.5%	0.12	1.29	97.42
SDG&E-3-A2	Safety Standards/Presentations Refresh	1	0.12	0.00	0.00	0.00	1.30	97.42	0.1%	0.99	1.30	97.42

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	
SDG&E-3-M1	Enhanced Mandatory Employee Training (OSHA)	1	0.03	0.00	0.00	0.00	1.30	2066.09	0.1%	93.73	1.30	2066.09
SDG&E-3-C3	Safety Culture	1	0.31	0.00	0.00	0.00	1.30	2066.09	1.2%	97.03	1.31	2066.09
SDG&E-3-C4	Employee Behavior Based Safety (BBS) program	1	0.73	0.00	0.00	0.00	1.30	2066.09	1.5%	52.36	1.32	2066.09
SDG&E-3-M2	Safety In Action Enhancement Program	1	0.48	0.00	0.00	0.00	1.30	2066.09	1.5%	79.92	1.28	2066.09
SDG&E-3-C7	Employee Wellness Programs	1	0.73	0.00	0.00	0.00	1.30	2066.09	0.8%	27.73	1.31	2066.09
SDG&E-3-C8	OSHA Voluntary Protection Program (VPP) assessments	1	0.04	0.00	0.00	0.00	1.30	2066.09	0.3%	180.77	1.30	2066.09
SDG&E-3-M4	Implementing findings from VPP program assessments	1	0.30	0.00	0.00	0.00	1.30	2066.09	1.0%	84.36	1.29	2066.09
SDG&E-3-M3	Enhanced employee safe driving training (Vehicle Technology Programs)	1	0.05	2.00	0.00	0.00	1.30	2066.09	1.2%	42.38	1.28	2066.09
SDG&E-3-C9	Safe Driving Programs	1	0.30	0.00	0.00	0.00	1.30	2066.09	0.5%	41.90	1.31	2066.09
SDG&E-3-C11	Near Miss, Stop the Job and jobsite safety programs	1	9.49	2.28	2.28	2.28	1.30	2066.09	3.8%	8.17	1.35	2066.09
SDG&E-3-M5	Energized Skills Training and Testing Yard	1	0.00	0.00	0.80	0.00	1.30	2066.09	1.0%	31.63	1.29	2066.09
SDG&E-3-C12	Utilizing OSHA and industry best practices and industry benchmarking	1	0.68	0.00	0.00	0.00	1.30	2066.09	0.5%	18.61	1.31	2066.09
SDG&E-3-A1	Alert Driving Pilot Program Deployment	1	5.00	0.00	0.00	0.00	1.30	2066.09	0.5%	2.53	1.29	2066.09
SDG&E-3-A2	Safety Standards/Presentations Refresh	1	0.12	0.00	0.00	0.00	1.30	2066.09	0.1%	21.09	1.30	2066.09

SDG&E-3-M1: Enhanced Mandatory Employee Training (OSHA)							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.1%	<i>SME Estimate</i>	SME Estimate	SME Estimate	SME Estimate	SME Estimate	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.57	1085.65	2684.13
Post-Mitigation	LoRE	1.32		
	CoRE	97.42	835.67	2066.09
	Risk Score	128.46	1101.94	2724.39
	RSE	2.47	21.18	52.36

SDG&E-3-C3: Safety Culture							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	1.2%	<i>SME Estimate based on year-over-year reduction in OSHA reportables</i>	SME Estimate	SME Estimate	SME Estimate	OSHA Reportables	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre- Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.57	1085.65	2684.13
Post- Mitigation	LoRE	1.31		
	CoRE	97.42	835.67	2066.09
	Risk Score	128.08	1098.68	2716.34
	RSE	4.58	39.24	97.03

SDG&E-3-C4: Employee Behavior Based Safety Program							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	1.5%	<i>SME Estimate based on year-over-year reduction in safety incidents</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety incidents	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.57	1085.65	2684.13
Post-Mitigation	LoRE	1.32		
	CoRE	97.42	835.67	2066.09
	Risk Score	128.46	1101.94	2724.39
	RSE	2.47	21.18	52.36

SDG&E-3-M2: Safety In Action Enhancement Program							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	1.5%	<i>SME Estimate based on year-over-year reduction in safety incidents</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety incidents	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre- Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.57	1085.65	2684.13
Post- Mitigation	LoRE	1.28		
	CoRE	97.42	835.67	2066.09
	Risk Score	124.67	1069.37	2643.87
	RSE	3.77	32.33	79.92

SDG&E-3-C7: Employee Wellness Programs							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.8%	<i>SME Estimate based on year-over-year reduction in safety incidents</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety incidents	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.57	1085.65	2684.13
Post-Mitigation	LoRE	1.31		
	CoRE	97.42	835.67	2066.09
	Risk Score	127.58	1094.34	2705.60
	RSE	1.31	11.22	27.73

SDG&E-3-C8: OSHA Voluntary Protection Program (VPP) assessments							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.3%	<i>SME Estimate based on year-over-year reduction in OSHA reportables</i>	SME Estimate	SME Estimate	SME Estimate	OSHA Reportables	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.57	1085.65	2684.13
Post-Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.94	1088.91	2692.18
	RSE	8.52	73.12	180.77

SDG&E-3-M4: Implementing findings from VPP program assessments							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	1.0%	<i>SME Estimate based on historical safety performance results</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety incidents	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.57	1085.65	2684.13
Post-Mitigation	LoRE	1.29		
	CoRE	97.42	835.67	2066.09
	Risk Score	125.30	1074.80	2657.29
	RSE	3.98	34.12	84.36

SDG&E-3-M3: Enhanced employee safe driving training (Vehicle Technology Programs)							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	1.2%	<i>SME Estimate based on historical safety performance results</i>	SME Estimate	SME Estimate	SME Estimate	Historical data on employee driver behavior and employee follow up data	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.57	1085.65	2684.13
Post-Mitigation	LoRE	1.28		
	CoRE	97.42	835.67	2066.09
	Risk Score	125.05	1072.62	2651.92
	RSE	2.00	17.14	42.38

SDG&E-3-C9: Safe Driving Programs							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.5%	<i>SME Estimate based on year-over-year reduction in safety incidents</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety incidents	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre- Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.57	1085.65	2684.13
Post- Mitigation	LoRE	1.31		
	CoRE	97.42	835.67	2066.09
	Risk Score	127.20	1091.08	2697.55
	RSE	1.98	16.95	41.90

SDG&E-3-C11: 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	3.8%	<i>SME Estimate based on year-over-year reduction in safety incidents</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety incidents	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre- Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.57	1085.65	2684.13
Post- Mitigation	LoRE	1.35		
	CoRE	97.42	835.67	2066.09
	Risk Score	131.37	1126.91	2786.13
	RSE	0.39	3.30	8.17

SDG&E-3-M5: Energized Skills Training and Testing Yard							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	1.0%	SME Estimate based on year-over-year reduction in safety incidents	SME Estimate	SME Estimate	SME Estimate	Historical safety incidents	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.57	1085.65	2684.13
Post-Mitigation	LoRE	1.29		
	CoRE	97.42	835.67	2066.09
	Risk Score	125.30	1074.80	2657.29
	RSE	1.49	12.79	31.63

SDG&E-3-C12: Utilizing 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	0.5%	<i>SME Estimate based on year-over-year reduction in safety incidents</i>	SME Estimate	SME Estimate	SME Estimate	Historical safety incidents	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.57	1085.65	2684.13
Post-Mitigation	LoRE	1.31		
	CoRE	97.42	835.67	2066.09
	Risk Score	127.20	1091.08	2697.55
	RSE	0.88	7.53	18.61

SDG&E-3-A1: Alert Driving Pilot Program Deployment							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.5%	<i>SME Estimate based on year-over-year reduction in safety incidents</i>	SME Estimate	SME Estimate	SME Estimate	SME Estimate	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.57	1085.65	2684.13
Post-Mitigation	LoRE	1.29		
	CoRE	97.42	835.67	2066.09
	Risk Score	125.93	1080.22	2670.71
	RSE	0.12	1.02	2.53

SDG&E-3-A2: Safety Standards/Presentations Refresh							
Attribute	Risk Reduction	Formula	RSE Inputs and Basis			Reference	Project Life (Years)
	Total		Scope	Effectiveness	Risk Addressed		
Safety	0.5%	<i>SME Estimate based on year-over-year reduction in safety incidents</i>	SME Estimate	SME Estimate	SME Estimate	SME Estimate	1
Reliability							
Financial							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.57	1085.65	2684.13
Post-Mitigation	LoRE	1.30		
	CoRE	97.42	835.67	2066.09
	Risk Score	126.44	1084.57	2681.45
	RSE	0.99	8.53	21.09