



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 MITIGATION PHASE

WORKPAPERS TO

CHAPTER SDG&E-5

CUSTOMER & PUBLIC SAFETY

November 27, 2019

FARS and GES Incident Rates

Fatal accidents_FARS

Medium Heavy duty	2013	2014	2015	2016
Total Fatal crash accidents (excl. bus and motorcycles):	242	272	280	307
Total Fatal crash accidents involving third parties	216	251	254	275
VMT (100 million)	3305	3335	3353	3386
% of VMT - Medium Heavy duty	9%	9%	9%	9%
CA Fatal accident rate (per 100 Million VMT):	0.814	0.906	0.928	1.007
SDG&E VMT (100 million)	0.055	0.052	0.048	0.048
SDG&E Fatal accidents	0.045	0.047	0.045	0.048
SDG&E Fatal accidents involving third parties	0.040	0.043	0.041	0.043

Auto, compact, light duty

	2013	2014	2015	2016
Total Fatal crash accidents (excl. bus and motorcycles):	2557	2536	2817	3184
Total Fatal crash accidents involving third parties	1661	1624	1861	2091
VMT (100 million)	3305	3335	3353	3386
% of VMT - Auto, compact, light duty	89%	89%	89%	89%
CA Fatal accident rate:	0.869	0.854	0.944	1.057
SDG&E VMT (100 million)	0.133	0.131	0.116	0.113
SDG&E Fatal accidents	0.116	0.112	0.109	0.119
SDG&E Fatal accidents involving third parties	0.075	0.072	0.072	0.078

Nonfatal incidents

Medium Heavy duty	2013	2014	2015
Total nonfatal crash accidents with serious injury (excl. bus and motorcycles):	14	22	13
VMT (100 million)	6582	6687	6836
% of VMT - Medium Heavy duty	9%	9%	9%
West nonfatal accident rate with serious injury:	0.024	0.037	0.021
SDG&E VMT (100 million)	0.055	0.052	0.048
SDG&E nonfatal accidents with serious injury	0.001	0.002	0.001

Auto, compact, light duty

	2013	2014	2015
Total nonfatal crash accidents with serious injury (excl. bus and motorcycles):	994	1066	1058
VMT (100 million)	6582	6687	6836
% of VMT - Auto, compact, light duty	89%	89%	89%
West nonfatal accident rate:	0.170	0.179	0.174
SDG&E VMT (100 million)	0.133	0.131	0.116
SDG&E nonfatal accidents with serious injury	0.023	0.023	0.020

Chapter	SDG&E-5
Risk	Customer and Public Safety

ID	Activity	Project Life In Years	Cost Forecast (O&M, \$M) 2022	Cost Forecast (Capital, \$M)			Pre-Mitigation Single Point		% risk reduction (use if % risk addressed not available) (%)	% Risk Reduction									RSE Single Point	Post-Mitigation Single Point	
				2020	2021	2022	LORE	CORE		Safety			Reliability			Financial (\$M)				LORE	CORE
				% addressed	% scope	% of effectiveness	% addressed	% scope		% of effectiveness	% addressed	% scope	% of effectiveness	% addressed	% scope	% of effectiveness	Single Point	LORE		CORE	
SDG&E-5-C2	Field & Public Safety (CSF/AMO Quality Assurance Program)	1	0.15	0.00	0.00	0.00	0.18	1835		11.0%	12.0%	100.0%	0.0%	0.0%	0.0%	41.0%	12.0%	100.0%	28.24	0.18	1836.29
SDG&E-5-A2	Modernization of CSF Training Materials	1	0.12	0.00	0.00	0.00	0.18	1835		11.0%	0.1%	100.0%	0.0%	0.0%	0.0%	41.0%	0.1%	100.0%	0.30	0.18	1834.81
SDG&E-5-A1	Post-training Follow Up Field Evaluation	1	0.03	0.00	0.00	0.00	0.18	1835		11.0%	0.1%	100.0%	0.0%	0.0%	0.0%	41.0%	0.1%	100.0%	1.42	0.18	1834.81

Low Alternative

ID	Activity	Project Life In Years	Cost Forecast (O&M, \$M) 2022	Cost Forecast (Capital, \$M)			Pre-Mitigation Low Alternative		% risk reduction (use if % risk addressed not available) (%)	% Risk Reduction									RSE Low Alternative	Post-Mitigation Low Alternative	
				2020	2021	2022	LORE	CORE		Safety			Reliability			Financial (\$M)				LORE	CORE
				% addressed	% scope	% of effectiveness	% addressed	% scope		% of effectiveness	% addressed	% scope	% of effectiveness	% addressed	% scope	% of effectiveness	Low Alternative	LORE		CORE	
SDG&E-5-C2	Field & Public Safety (CSF/AMO Quality Assurance Program)	1	0.15	0.00	0.00	0.00	0.18	220.67		11.0%	12.0%	100.0%	0.0%	0.0%	0.0%	41.0%	12.0%	100.0%	4.83	0.18	222.14
SDG&E-5-A2	Modernization of CSF Training Materials	1	0.12	0.00	0.00	0.00	0.18	220.67		11.0%	0.1%	100.0%	0.0%	0.0%	0.0%	41.0%	0.1%	100.0%	0.05	0.18	220.66
SDG&E-5-A1	Post-training Follow Up Field Evaluation	1	0.03	0.00	0.00	0.00	0.18	220.67		11.0%	0.1%	100.0%	0.0%	0.0%	0.0%	41.0%	0.1%	100.0%	0.24	0.18	220.66

High Alternative

ID	Activity	Project Life In Years	Cost Forecast (O&M, \$M) 2022	Cost Forecast (Capital, \$M)			Pre-Mitigation High Alternative		% risk reduction (use if % risk addressed not available) (%)	% Risk Reduction									RSE High Alternative	Post-Mitigation High Alternative	
				2020	2021	2022	LORE	CORE		Safety			Reliability			Financial (\$M)				LORE	CORE
				% addressed	% scope	% of effectiveness	% addressed	% scope		% of effectiveness	% addressed	% scope	% of effectiveness	% addressed	% scope	% of effectiveness	High Alternative	LORE		CORE	
SDG&E-5-C2	Field & Public Safety (CSF/AMO Quality Assurance Program)	1	0.15	0.00	0.00	0.00	0.18	4525		11.0%	12.0%	100.0%	0.0%	0.0%	0.0%	41.0%	12.0%	100.0%	67.24	0.18	4526.55
SDG&E-5-A2	Modernization of CSF Training Materials	1	0.12	0.00	0.00	0.00	0.18	4525		11.0%	0.1%	100.0%	0.0%	0.0%	0.0%	41.0%	0.1%	100.0%	0.71	0.18	4525.07
SDG&E-5-A1	Post-training Follow Up Field Evaluation	1	0.03	0.00	0.00	0.00	0.18	4525		11.0%	0.1%	100.0%	0.0%	0.0%	0.0%	41.0%	0.1%	100.0%	3.38	0.18	4525.07

SDG&E-5-C2 Field & Public Safety (CSF/AMO Quality Assurance Program)									
Attribute	Risk Reduction			Formula	Basis			Reference	Project Life
			Total		Scope	Effectiveness	Risk Addressed		
Safety	% Scope	12%	3%	<i>based on QA data</i>	portion of the risk due to the after-meter incidents	based on QA data	after-meter risk based on SME Estimate motor vehicle risk based on national data	Fatality Analysis Reporting System (FARS) General Estimates System (GES) National Automotive Sampling System (NASS) Department of Transportation (DOT) National Highway Traffic Safety Administration (NHTSA) Federal Highway Administration (FHA) utility QA data	1
	% Effectiveness	100%							
	% Risk Addressed	11%							
Reliability	% Scope	n/a	n/a						
	% Effectiveness	n/a							
	% Risk Addressed	n/a							
Financial	% Scope	12%	8%						
	% Effectiveness	100%							
	% Risk Addressed	41%							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	0.2		
	CoRE	221	1835	4525
	Risk Score	39	323	796
Post-Mitigation	LoRE	0.2		
	CoRE	222	1836	4527
	Risk Score	40	327	807
	RSE	5	28	67

SDG&E-5-A1 Post-training Follow Up Field Evaluation									
Attribute	Risk Reduction			Formula	Basis			Reference	Project Life
			Total		Scope	Effectiveness	Risk Addressed		
Safety	% Scope	0.1%	0.02%	<i>SME Estimate</i>	portion of the risk due to the after-meter incidents	SME based on incident data	after-meter risk based on SME Estimate; motor vehicle risk based on national data	Fatality Analysis Reporting System (FARS); General Estimates System (GES); National Automotive Sampling System (NASS); Department of Transportation (DOT); National Highway Traffic Safety Administration (NHTSA); Federal Highway Administration (FHA); utility QA data	1
	% Effectiveness	100%							
	% Risk Addressed	11%							
Reliability	% Scope	n/a	n/a						
	% Effectiveness	n/a							
	% Risk Addressed	n/a							
Financial	% Scope	0.1%	0.06%						
	% Effectiveness	100%							
	% Risk Addressed	41%							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	0.2		
	CoRE	221	1835	4525
	Risk Score	39	323	796
Post-Mitigation	LoRE	0.2		
	CoRE	221	1835	4525
	Risk Score	39	323	796
	RSE	0.1	1.4	3.3

SDG&E-5-A2 Modernization of CSF Training Materials									
Attribute	Risk Reduction			Formula	Basis			Reference	Project Life
			Total		Scope	Effectiveness	Risk Addressed		
Safety	% Scope	0.1%	0.02%	<i>SME Estimate</i>	portion of the risk due to the after-meter incidents	SME based on incident data	after-meter risk based on SME Estimate motor vehicle risk based on national data	Fatality Analysis Reporting System (FARS) General Estimates System (GES) National Automotive Sampling System (NASS) Department of Transportation (DOT) National Highway Traffic Safety Administration (NHTSA) Federal Highway Administration (FHA) utility QA data	1
	% Effectiveness	100%							
	% Risk Addressed	11%							
Reliability	% Scope	n/a	n/a						
	% Effectiveness	n/a							
	% Risk Addressed	n/a							
Financial	% Scope	0.1%	0.06%						
	% Effectiveness	100%							
	% Risk Addressed	41%							

		Low Alternative	Single Point	High Alternative
Pre-Mitigation	LoRE	0.2		
	CoRE	221	1835	4525
	Risk Score	39	323	796
Post-Mitigation	LoRE	0.2		
	CoRE	221	1835	4525
	Risk Score	39	323	796
	RSE	0.03	0.30	1