

**2016 Risk Assessment Mitigation Phase
Investigation 16-10-015
Workpapers to
Catastrophic Damage Involving a
High-Pressure Gas Pipeline Failure
(Chapter SDG&E-10-WP)**

January 2017



2016 Risk Assessment Mitigation Phase
SDGE-10-WP
Risk: Catastrophic Damage Involving a High-Pressure Gas Pipeline Failure (O&M)

Line No.	Mitigation	Project/Program	Project/Program Description	Status	Recorded (Directs, 2015 \$000)					Forecast Range (Directs, 2015 \$000)						Forecast Methodology
					2011	2012	2013	2014	2015	2017 Low	2017 High	2018 Low	2018 High	2019 Low	2019 High	
1	Maintenance	Meter Inspections & Maintenance	Inspect high pressure meters for corrosion, leaks, or other potential issues	B	\$ 1,048	\$ 996	\$ 1,047	\$ 1,051	\$ 1,114	\$ 998	\$ 1,104	\$ 998	\$ 1,104	\$ 998	\$ 1,104	5-Year Average
2		Pipeline Patrol	Patrol pipelines for leaks on the ground	B/P	30	17	13	27	20	20	22	20	22	20	22	5-Year Average
3		Maximo Work Order Tracking	Maintain compliance through maximo work order tracking	B	27	27	27	27	27	26	28	26	28	26	28	Zero Based
4	Maintenance Subtotal				1,105	1,040	1,087	1,105	1,161	1,044	1,154	1,044	1,154	1,044	1,154	
5	Qualifications of Pipeline Personnel	Transmission Operator Qualification Instructor and Materials	Certification and training that is required for all transmission employees to work on company assets. This is mandated by the Federal Code of Regulation (CFR) 49 Part 192 Subpart N	B	91	91	91	91	91	86	116	83	113	102	138	Zero Based
6		Transmission Pipeline Technician Training	Certification and training that is required for all transmission employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	5	5	5	5	5	8	9	7	9	10	14	Zero Based
7		Transmission Compressor Station Operative Training	Certification and training that is required for all transmission employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	4	4	4	4	4	4	5	4	6	10	14	Zero Based
8		Transmission Instrument Control Technicians	Certification and training that is required for all transmission employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	2	2	2	2	2	6	7	3	5	11	15	Zero Based
9	Qualifications of Pipeline Personnel Subtotal				102	102	102	102	102	103	137	98	132	133	181	
10	Requirements for Corrosion Control	Transmission Cathodic Protection	Install cathodic protection (anodes, rectifiers, etc.) to protect high pressure pipelines	B	48	48	48	48	48	46	50	46	50	46	50	5-Year Average
11	Requirements for Corrosion Control Subtotal				48	48	48	48	48	46	50	46	50	46	50	
12	Operations	Utility Conflict Review	Review of right of way and other conflicts and resolve such matters	B/P	2	3	2	3	32	30	34	30	34	30	34	Zero Based
13		Operator Qualification Program Administration and Development	Qualification program to ensure operators/employees are trained properly in accordance to CFR 49	B	3	3	3	10	10	10	11	10	11	10	11	Zero Based
14		Gas Standards Review	All Procedures in Gas Standards are reviewed yearly for updated regulator information and updating standard procedures	B	2	2	3	3	3	3	3	3	3	3	3	Zero Based
15		Pipeline Safety and Compliance	Compliance audit preparation	B	2	2	2	2	2	2	2	2	2	2	2	Zero Based
16		Quality Assurance Quality Control (QAQC)	Material inspection and quality control	B	56	56	56	56	56	53	59	53	59	53	59	Zero Based
17		Odorization	Engineering Analysis Center (EAC) develops odorant techniques for system	B	-	-	-	-	-	-	-	-	-	-	-	
18	Operations Subtotal				65	66	66	74	103	98	108	98	108	98	108	

2016 Risk Assessment Mitigation Phase
SDGE-10-WP
Risk: Catastrophic Damage Involving a High-Pressure Gas Pipeline Failure (O&M)

Line No.	Mitigation	Project/Program	Project/Program Description	Status	Recorded (Directs, 2015 \$000)					Forecast Range (Directs, 2015 \$000)						Forecast Methodology
					2011	2012	2013	2014	2015	2017 Low	2017 High	2018 Low	2018 High	2019 Low	2019 High	
19	Gas Transmission Pipeline Integrity Management	In-Line Inspection (ILI) ¹	Assessment of transmission pipelines	B	1,031	737	2,679	2,655	1,368	3,800	4,200	3,800	4,200	3,800	4,200	Zero-based
20		External Corrosion Direct Assessment (ECDA) ¹	Assessment of transmission pipelines	B	2,447	1,328	961	1,631	1,738	1,140	1,260	1,140	1,260	1,140	1,260	Zero-based
21		Preventative and Mitigation Measures ¹	Post assessment mitigation of transmission pipelines	B	589	1,380	360	49	387	-	-	-	-	-	-	No forecast
22		Records Search & Management ¹	Record search for high-pressure pipelines	B	100	690	(38)	433	329	-	-	-	-	-	-	No forecast
23		Data File Management	Pipeline database which encompasses all pipelines in the system	B	54	54	54	54	54	31	35	31	35	31	35	Zero Based
24	Gas Transmission Pipeline Integrity Management Subtotal				4,221	4,189	4,016	4,822	3,876	4,971	5,495	4,971	5,495	4,971	5,495	
25	Pipeline Safety Enhancement Program (PSEP): High Pressure Testing and Replacement ²	Transmission Pipeline Replacement	Replacement of High Consequence Area (HCA) pipelines - Transmission	B	-	-	-	-	-	-	-	-	-	-	-	
26		Distribution High Pressure Pipeline Replacement	Replacement of HCA pipelines - Distribution	B	-	-	-	-	-	-	-	-	-	-	-	
27		Distribution High Pressure Pipeline Hydrotesting	Hydrostatic pressure testing of HCA pipelines - Distribution	B	-	88	2,308	1,727	4,453	-	-	-	-	-	-	
28	PSEP: High Pressure Testing and Replacement, Valve Automation and Replacement Subtotal				-	88	2,308	1,727	4,453	-	-	-	-	-	-	
29	TOTAL				\$ 5,541	\$ 5,533	\$ 7,627	\$ 7,878	\$ 9,743	\$ 6,262	\$ 6,944	\$ 6,257	\$ 6,939	\$ 6,292	\$ 6,988	

Notes:

- Baseline (B) and Proposed (P).
- Numbers in risk chapter tables may differ due to rounding.
- The purpose of Risk Assessment Mitigation Phase (RAMP) is not to request funding. Any funding requests will be made in the General Rate Case (GRC). The forecasts for mitigations are not for funding purposes, but are rather to provide a range for the future GRC filing. This range will be refined with supporting testimony in the GRC.

¹ Controls/Mitigations for which numbers in risk chapter tables may differ due to calculation errors.

² SDG&E does not have PSEP Phase 2A work (i.e., work in less populated areas).

2016 Risk Assessment Mitigation Phase
SDGE-10-WP
Risk: Catastrophic Damage Involving a High-Pressure Gas Pipeline Failure (Capital)

Line No.	Mitigation	Project/Program	Project/Program Description	Status	Recorded (Directs, 2015 \$000)					Forecast Range (Directs, 2015 \$000)						2017-2019 Low (Sum)	2017-2019 High (Sum)	Forecast Methodology
					2011	2012	2013	2014	2015	2017 Low	2017 High	2018 Low	2018 High	2019 Low	2019 High			
1	Maintenance	Meter Inspections & Maintenance	Inspect high pressure meters for corrosion, leaks, or other potential issues	B	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2		Pipeline Patrol	Patrol pipelines for leaks on the ground	B/P	-	-	-	-	-	-	-	-	-	-	-	-	-	
3		Maximo Work Order Tracking	Maintain compliance through maximo work order tracking	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
4	Maintenance Subtotal				-	-	-	-	-	-	-	-	-	-	-	-	-	
5	Qualifications of Pipeline Personnel	Transmission Operator Qualification Instructor and Materials	Certification and training that is required for all transmission employees to work on company assets. This is mandated by the Federal Code of Regulation (CFR) 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
6		Transmission Pipeline Technician Training	Certification and training that is required for all transmission employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
7		Transmission Compressor Station Operative Training	Certification and training that is required for all transmission employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
8		Transmission Instrument Control Technicians	Certification and training that is required for all transmission employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
9	Qualifications of Pipeline Personnel Subtotal				-	-	-	-	-	-	-	-	-	-	-	-	-	
10	Requirements for Corrosion Control	Transmission Cathodic Protection	Install cathodic protection (anodes, rectifiers, etc.) to protect high pressure pipelines	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
11	Requirements for Corrosion Control Subtotal				-	-	-	-	-	-	-	-	-	-	-	-	-	
12	Operations	Utility Conflict Review	Review of right of way and other conflicts and resolve such matters	B/P	-	-	-	-	-	-	-	-	-	-	-	-	-	
13		Operator Qualification Program Administration and Development	Qualification program to ensure operators/employees are trained properly in accordance to CFR 49	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
14		Gas Standards Review	All Procedures in Gas Standards are reviewed yearly for updated regulator information and updating standard procedures	B	2	2	3	3	3	3	3	3	3	3	3	9	9	Zero Based
15		Pipeline Safety and Compliance	Compliance audit preparation	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
16		Quality Assurance Quality Control (QAQC)	Material inspection and quality control	B	316	316	316	316	316	300	332	300	332	300	332	901	995	Zero Based
17		Odorization	Engineering Analysis Center (EAC) develops odorant techniques for system	B	93	93	93	93	93	88	98	88	98	88	98	265	293	Zero Based
18	Operations Subtotal				411	411	412	412	412	391	433	391	433	391	433	1,174	1,298	

2016 Risk Assessment Mitigation Phase
SDGE-10-WP
Risk: Catastrophic Damage Involving a High-Pressure Gas Pipeline Failure (Capital)

				Recorded (Directs, 2015 \$000)						Forecast Range (Directs, 2015 \$000)								
Line No.	Mitigation	Project/Program	Project/Program Description	Status	2011	2012	2013	2014	2015	2017 Low	2017 High	2018 Low	2018 High	2019 Low	2019 High	2017-2019 Low (Sum)	2017-2019 High (Sum)	Forecast Methodology
19	Gas Transmission Pipeline Integrity Management	In-Line Inspection (ILI) ¹	Assessment of transmission pipelines	B	13	1	2,597	78	3,537	3,796	4,196	-	-	-	-	3,796	4,196	Zero-based
20		External Corrosion Direct Assessment (ECDA) ¹	Assessment of transmission pipelines	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
21		Preventative and Mitigation Measures ¹	Post assessment mitigation of transmission pipelines	B	11,499	31,499	21,827	7,809	3,537	3,796	4,196	3,796	4,196	3,796	4,196	11,389	12,587	Zero-based
22		Records Search & Management ¹	Record search for high-pressure pipelines	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
23		Data File Management	Pipeline database which encompasses all pipelines in the system	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
24	Gas Transmission Pipeline Integrity Management Subtotal				11,512	31,500	24,424	7,887	7,074	7,592	8,392	3,796	4,196	3,796	4,196	15,185	16,783	
25	Pipeline Safety Enhancement Program (PSEP): High Pressure Testing and Replacement ²	Transmission Pipeline Replacement	Replacement of High Consequence Area (HCA) pipelines - Transmission	B	-	531	1,256	3,550	9,814	4,950	6,050	90	110	-	-	5,040	6,160	Zero Based
26		Distribution High Pressure Pipeline Replacement	Replacement of HCA pipelines - Distribution	B	-	-	2,722	51,834	76,876	44,550	54,450	810	990	-	-	45,360	55,440	Zero Based
27		Distribution High Pressure Pipeline Hydrotesting	Hydrostatic pressure testing of HCA pipelines - Distribution	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
28		PSEP: High Pressure Testing and Replacement, Valve Automation and Replacement Subtotal				-	531	3,978	55,384	86,690	49,500	60,500	900	1,100	-	-	50,400	61,600
29	TOTAL				\$ 11,923	\$ 32,442	\$ 28,814	\$ 63,683	\$ 94,176	\$ 57,484	\$ 69,324	\$ 5,088	\$ 5,728	\$ 4,188	\$ 4,628	\$ 66,759	\$ 79,681	

Notes:

- Baseline (B) and Proposed (P).
 - Numbers in risk chapter tables may differ due to rounding.
 - The purpose of Risk Assessment Mitigation Phase (RAMP) is not to request funding. Any funding requests will be made in the General Rate Case (GRC). The forecasts for mitigations are not for funding purposes, but are rather to provide a range for the future GRC filing.
- This range will be refined with supporting testimony in the GRC.

¹ Controls/Mitigations for which numbers in risk chapter tables may differ due to calculation errors.

² SDG&E does not have PSEP Phase 2A work (i.e., work in less populated areas).

2016 Risk Assessment Mitigation Phase
SDGE-10-WP
Risk: Catastrophic Damage Involving a High-Pressure Gas Pipeline Failure (GRC Total - O&M)

Line No.	Mitigation	Project/Program	Project/Program Description	Recorded (Directs, 2015 \$000)								Non-GRC 2015	O&M Total 2015	Forecast Range (Directs, 2015 \$000)						Non-GRC 2019 Low	Non-GRC 2019 High	O&M Total 2019 Low	O&M Total 2019 High
				Status	GRC 2011	GRC 2012	GRC 2013	GRC 2014	GRC 2015	GRC 2017 Low	GRC 2017 High			GRC 2018 Low	GRC 2018 High	GRC 2019 Low	GRC 2019 High						
1	Maintenance	Meter Inspections & Maintenance	Inspect high pressure meters for corrosion, leaks, or other potential issues	B	\$ 1,048	\$ 996	\$ 1,047	\$ 1,051	\$ 1,114	\$ -	\$ 1,114	\$ 998	\$ 1,104	\$ 998	\$ 1,104	\$ 998	\$ 1,104	\$ -	\$ -	\$ 998	\$ 1,104		
2		Pipeline Patrol	Patrol pipelines for leaks on the ground	B/P	30	17	13	27	20	-	20	20	22	20	22	20	22	-	-	20	22		
3		Maximo Work Order Tracking	Maintain compliance through maximo work order tracking	B	27	27	27	27	27	-	27	26	28	26	28	26	28	-	-	26	28		
4	Maintenance Subtotal				1,105	1,040	1,087	1,105	1,161	-	1,161	1,044	1,154	1,044	1,154	1,044	1,154	-	-	1,044	1,154		
5	Qualifications of Pipeline Personnel	Transmission Operator Qualification Instructor and Materials	Certification and training that is required for all transmission employees to work on company assets. This is mandated by the Federal Code of Regulation (CFR) 49 Part 192 Subpart N	B	91	91	91	91	91	-	91	86	116	83	113	102	138	-	-	102	138		
6		Transmission Pipeline Technician Training	Certification and training that is required for all transmission employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	5	5	5	5	5	-	5	8	9	7	9	10	14	-	-	10	14		
7		Transmission Compressor Station Operative Training	Certification and training that is required for all transmission employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	4	4	4	4	4	-	4	4	5	4	6	10	14	-	-	10	14		
8		Transmission Instrument Control Technicians	Certification and training that is required for all transmission employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	2	2	2	2	2	-	2	6	7	3	5	11	15	-	-	11	15		
9	Qualifications of Pipeline Personnel Subtotal				102	102	102	102	102	-	102	103	137	98	132	133	181	-	-	133	181		
10	Requirements for Corrosion Control	Transmission Cathodic Protection	Install cathodic protection (anodes, rectifiers, etc.) to protect high pressure pipelines	B	48	48	48	48	48	-	48	46	50	46	50	46	50	-	-	46	50		
11	Requirements for Corrosion Control Subtotal				48	48	48	48	48	-	48	46	50	46	50	46	50	-	-	46	50		
12	Operations	Utility Conflict Review	Review of right of way and other conflicts and resolve such matters	B/P	2	3	2	3	32	-	32	30	34	30	34	30	34	-	-	30	34		
13		Operator Qualification Program Administration and Development	Qualification program to ensure operators/employees are trained properly in accordance to CFR 49	B	3	3	3	10	10	-	10	10	11	10	11	10	11	-	-	10	11		
14		Gas Standards Review	All Procedures in Gas Standards are reviewed yearly for updated regulator information and updating standard procedures	B	2	2	3	3	3	-	3	3	3	3	3	3	3	-	-	3	3		
15		Pipeline Safety and Compliance	Compliance audit preparation	B	2	2	2	2	2	-	2	2	2	2	2	2	2	-	-	2	2		
16		Quality Assurance Quality Control (QAQC)	Material inspection and quality control	B	56	56	56	56	56	-	56	53	59	53	59	53	59	-	-	53	59		
17		Odorization	Engineering Analysis Center (EAC) develops odorant techniques for system	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
18	Operations Subtotal				65	66	66	74	103	-	103	98	108	98	108	98	108	-	-	98	108		

2016 Risk Assessment Mitigation Phase
SDGE-10-WP
Risk: Catastrophic Damage Involving a High-Pressure Gas Pipeline Failure (GRC Total - O&M)

				Recorded (Directs, 2015 \$000)										Forecast Range (Directs, 2015 \$000)							
Line No.	Mitigation	Project/Program	Project/Program Description	Status	GRC 2011	GRC 2012	GRC 2013	GRC 2014	GRC 2015	Non-GRC 2015	O&M Total 2015	GRC 2017 Low	GRC 2017 High	GRC 2018 Low	GRC 2018 High	GRC 2019 Low	GRC 2019 High	Non-GRC 2019 Low	Non-GRC 2019 High	O&M Total 2019 Low	O&M Total 2019 High
19	Gas Transmission Pipeline Integrity Management	In-Line Inspection (ILI) ¹	Assessment of transmission pipelines	B	1,031	737	2,679	2,655	1,368	-	1,368	3,800	4,200	3,800	4,200	3,800	4,200	-	-	3,800	4,200
20		External Corrosion Direct Assessment (ECDA) ¹	Assessment of transmission pipelines	B	2,447	1,328	961	1,631	1,738	-	1,738	1,140	1,260	1,140	1,260	1,140	1,260	-	-	1,140	1,260
21		Preventative and Mitigation Measures ¹	Post assessment mitigation of transmission pipelines	B	589	1,380	360	49	387	-	387	-	-	-	-	-	-	-	-	-	-
22		Records Search & Management ¹	Record search for high-pressure pipelines	B	100	690	(38)	433	329	-	329	-	-	-	-	-	-	-	-	-	-
23		Data File Management	Pipeline database which encompasses all pipelines in the system	B	54	54	54	54	54	-	54	31	35	31	35	31	35	-	-	31	35
24	Gas Transmission Pipeline Integrity Management Subtotal				4,221	4,189	4,016	4,822	3,876	-	3,876	4,971	5,495	4,971	5,495	4,971	5,495	-	-	4,971	5,495
25	Pipeline Safety Enhancement Program (PSEP): High Pressure Testing and Replacement ²	Transmission Pipeline Replacement	Replacement of High Consequence Area (HCA) pipelines - Transmission	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26		Distribution High Pressure Pipeline Replacement	Replacement of HCA pipelines - Distribution	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27		Distribution High Pressure Pipeline Hydrotesting	Hydrostatic pressure testing of HCA pipelines - Distribution	B	-	-	-	-	-	-	4,453	4,453	-	-	-	-	-	-	-	-	-
28		PSEP: High Pressure Testing and Replacement Subtotal				-	-	-	-	-	4,453	4,453	-	-	-	-	-	-	-	-	-
29	TOTAL				\$ 5,541	\$ 5,445	\$ 5,319	\$ 6,151	\$ 5,290	\$ 4,453	\$ 9,743	\$ 6,262	\$ 6,944	\$ 6,257	\$ 6,939	\$ 6,292	\$ 6,988	\$ -	\$ -	\$ 6,292	\$ 6,988

Notes:

- Baseline (B) and Proposed (P).
- Numbers in risk chapter tables may differ due to rounding.
- The purpose of Risk Assessment Mitigation Phase (RAMP) is not to request funding. Any funding requests will be made in the General Rate Case (GRC). The forecasts for mitigations are not for funding purposes, but are rather to provide a range for the future GRC filing. This range will be refined with supporting testimony in the GRC.

¹ Controls/Mitigations for which numbers in risk chapter tables may differ due to calculation errors.

² SDG&E does not have PSEP Phase 2A work (i.e., work in less populated areas).

2016 Risk Assessment Mitigation Phase
SDGE-10-WP
Risk: Catastrophic Damage Involving a High-Pressure Gas Pipeline Failure (GRC Total - Capital)

				Recorded (Directs, 2015 \$000)										Forecast Range (Directs, 2015 \$000)											
Line No.	Mitigation	Project/Program	Project/Program Description	Status	GRC 2011	GRC 2012	GRC 2013	GRC 2014	GRC 2015	Non-GRC 2015	Capital Total 2015	GRC 2017 Low	GRC 2017 High	GRC 2018 Low	GRC 2018 High	GRC 2019 Low	GRC 2019 High	GRC 2017-2019 Low (Sum)	GRC 2017-2019 High (Sum)	Non-GRC 2017-2019 Low	Non-GRC 2017-2019 High	Capital Total 2017-2019 Low	Capital Total 2017-2019 High		
1	Maintenance	Meter Inspections & Maintenance	Inspect high pressure meters for corrosion, leaks, or other potential issues	B	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	-	
2		Pipeline Patrol	Patrol pipelines for leaks on the ground	B/P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3		Maximo Work Order Tracking	Maintain compliance through maximo work order tracking	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4	Maintenance Subtotal				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
5	Qualifications of Pipeline Personnel	Transmission Operator Qualification Instructor and Materials	Certification and training that is required for all transmission employees to work on company assets. This is mandated by the Federal Code of Regulation (CFR) 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
6		Transmission Pipeline Technician Training	Certification and training that is required for all transmission employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
7		Transmission Compressor Station Operative Training	Certification and training that is required for all transmission employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
8		Transmission Instrument Control Technicians	Certification and training that is required for all transmission employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
9	Qualifications of Pipeline Personnel Subtotal				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
10	Requirements for Corrosion Control	Transmission Cathodic Protection	Install cathodic protection (anodes, rectifiers, etc.) to protect high pressure pipelines	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11	Requirements for Corrosion Control Subtotal				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12	Operations	Utility Conflict Review	Review of right of way and other conflicts and resolve such matters	B/P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13		Operator Qualification Program Administration and Development	Qualification program to ensure operators/employees are trained properly in accordance to CFR 49	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
14		Gas Standards Review	All Procedures in Gas Standards are reviewed yearly for updated regulator information and updating standard procedures	B	2	2	3	3	3	3	-	3	3	3	3	3	3	3	9	9	-	-	9	9	
15		Pipeline Safety and Compliance	Compliance audit preparation	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
16		Quality Assurance Quality Control (QAQC)	Material inspection and quality control	B	316	316	316	316	316	-	316	300	332	300	332	300	332	901	995	-	-	901	995	995	
17		Odorization	Engineering Analysis Center (EAC) develops odorant techniques for system	B	93	93	93	93	93	93	-	93	88	98	88	98	88	98	265	293	-	-	265	293	
18	Operations Subtotal				411	411	412	412	412	-	412	391	433	391	433	391	433	1,174	1,298	-	-	1,174	1,298	1,298	

2016 Risk Assessment Mitigation Phase
SDGE-10-WP
Risk: Catastrophic Damage Involving a High-Pressure Gas Pipeline Failure (GRC Total - Capital)

Line No.	Mitigation	Project/Program	Project/Program Description	Status	Recorded (Directs, 2015 \$000)					Non-GRC 2015	Capital Total 2015	Forecast Range (Directs, 2015 \$000)										Capital Total 2017-2019 Low	Capital Total 2017-2019 High
					GRC 2011	GRC 2012	GRC 2013	GRC 2014	GRC 2015			GRC 2017 Low	GRC 2017 High	GRC 2018 Low	GRC 2018 High	GRC 2019 Low	GRC 2019 High	GRC 2017-2019 Low (Sum)	GRC 2017-2019 High (Sum)	Non-GRC 2017-2019 Low	Non-GRC 2017-2019 High		
19	Gas Transmission Pipeline Integrity Management	In-Line Inspection (ILI) ¹	Assessment of transmission pipelines	B	13	1	2,597	78	3,537	-	3,537	3,796	4,196	-	-	-	-	3,796	4,196	-	-	3,796	4,196
20		External Corrosion Direct Assessment (ECDA) ¹	Assessment of transmission pipelines	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21		Preventative and Mitigation Measures ¹	Post assessment mitigation of transmission pipelines	B	11,499	31,499	21,827	7,809	3,537	-	3,537	3,796	4,196	3,796	4,196	3,796	4,196	11,389	12,587	-	-	11,389	12,587
22		Records Search & Management ¹	Record search for high-pressure pipelines	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23		Data File Management	Pipeline database which encompasses all pipelines in the system	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	Gas Transmission Pipeline Integrity Management Subtotal				11,512	31,500	24,424	7,887	7,074	-	7,074	7,592	8,392	3,796	4,196	3,796	4,196	15,185	16,783	-	-	15,185	16,783
25	Pipeline Safety Enhancement Program (PSEP): High Pressure Testing and Replacement ²	Transmission Pipeline Replacement	Replacement of High Consequence Area (HCA) pipelines - Transmission	B	-	-	-	-	-	9,814	9,814	-	-	-	-	-	-	-	-	5,040	6,160	5,040	6,160
26		Distribution High Pressure Pipeline Replacement	Replacement of HCA pipelines - Distribution	B	-	-	-	-	-	76,876	76,876	-	-	-	-	-	-	-	-	45,360	55,440	45,360	55,440
27		Distribution High Pressure Pipeline Hydrotesting	Hydrostatic pressure testing of HCA pipelines - Distribution	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	PSEP: High Pressure Testing and Replacement Subtotal				-	-	-	-	-	86,690	86,690	-	-	-	-	-	-	-	-	50,400	61,600	50,400	61,600
29	TOTAL				\$ 11,923	\$ 31,911	\$ 24,836	\$ 8,299	\$ 7,486	\$ 86,690	\$ 94,176	\$ 7,984	\$ 8,824	\$ 4,188	\$ 4,628	\$ 4,188	\$ 4,628	\$ 16,359	\$ 18,081	\$ 50,400	\$ 61,600	\$ 66,759	\$ 79,681

Notes:

- Baseline (B) and Proposed (P).
- Numbers in risk chapter tables may differ due to rounding.
- The purpose of Risk Assessment Mitigation Phase (RAMP) is not to request funding. Any funding requests will be made in the General Rate Case (GRC). The forecasts for mitigations are not for funding purposes, but are rather to provide a range for the future GRC filing. This range will be refined with supporting testimony in the GRC.

¹ Controls/Mitigations for which numbers in risk chapter tables may differ due to calculation errors.

² SDG&E does not have PSEP Phase 2A work (i.e., work in less populated areas).