2016 Risk Assessment Mitigation Phase Investigation 16-10-016 Workpapers to Catastrophic Damage Involving a High-Pressure Gas Pipeline Failure (Chapter SCG-4-WP)

January 2017

2016 Risk Assessment Mitigation Phase
SCG-04-WP
Risk: Catastrophic Damage Involving High-Pressure Pipeline Failure (O&M)

				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	Forecast Methodology
1	Maintenance	Bridge & Span Inspections	Inspect pipelines on bridges and spans for issues	B	$ 1	$ 2	$ 4	$ 6	$ 5	$ 6	$ 6	$ 6	$ 6	$ 6	$ 6	Base Year
2		Meter Inspections & Maintenance	Inspect high pressure meters for corrosion, leaks, or other potential issues	B	1,652	1,142	2,143	2,600	1,259	1,268	1,402	1,268	1,402	1,268	1,402	Base Year
3		Valve Maintenance and Installation (Transmission)	Maintain valves with lubrication and servicing, and replace or install valves required for compliance	B	545	7	355	224	1,686	1,698	1,876	1,698	1,876	1,698	1,876	Base Year
4		Valve Maintenance and Installation (Distribution High Pressure)	Maintain valves with lubrication and servicing, and replace or install valves required for compliance	B	3	22	59	57	57	58	64	58	64	58	64	Base Year
5		Regulator Station Inspection and Maintenance	Inspect regulators to confirm overpressure protection is in place and maintained	B	773	833	970	950	834	840	928	840	928	840	928	Base Year
6		Pipeline Patrol/Leak Survey	Patrol pipelines for leaks on the ground	B/P	357	424	447	459	467	470	520	470	520	470	520	Base Year
7		Maintenance of High Pressure Storage Lines	Maintenance of high pressure storage lines	B	3,094	4,376	3,107	2,626	2,733	2,752	3,042	2,752	3,042	2,752	3,042	Base Year
8		Condition Based Maximo Work Orders	Maintain compliance through maximo work order tracking	B	-	-	-	28	627	596	659	596	659	596	659	Base Year
9	**Maintenance Subtotal**				**6,425**	**6,805**	**7,085**	**6,950**	**7,670**	**7,688**	**8,497**	**7,688**	**8,497**	**7,688**	**8,497**	
10	Qualifications of Pipeline Personnel	Transmission Pipeline Technician Training	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	86	88	92	141	194	195	215	195	215	195	215	Base Year
11		Transmission Pipeline Specialist 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	-	-	-	-	-	-	-	-	-	-	-	
12		Transmission Welding Specialist 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	34	34	40	60	61	62	68	62	68	62	68	Base Year
13		Transmission Cathodic Protection Specialist Training (and Senior)	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	1	1	1	1	1	1	1	1	1	1	1	Base Year
14		Welding Non-Labor	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	25	25	25	25	25	23	31	23	31	23	31	Base Year
15		Distribution Construction Technician Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	57	83	110	95	96	97	107	97	107	97	107	Base Year
16		Distribution Energy Technician Distribution Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	4	3	5	4	5	5	5	5	5	5	5	Base Year

2016 Risk Assessment Mitigation Phase
SCG-04-WP
Risk: Catastrophic Damage Involving High-Pressure Pipeline Failure (O&M)

				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	Forecast Methodology
17		Distribution Lead Construction Technician Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	14	14	16	16	15	15	17	15	17	15	17	Base Year
18		Distribution System Protection Specialist Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	
19		Distribution Lead System Protection Specialist Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	
20	**Qualifications of Pipeline Personnel Subtotal**				**221**	**248**	**289**	**342**	**396**	**398**	**444**	**398**	**444**	**398**	**444**	
21	Requirements for Corrosion Control	Internal Corrosion Consultants	Internal corrosion enhancement	B	-	-	-	-	110	300	900	300	900	300	900	Zero-Based
22		Internal Corrosion Monitoring Equipment	Monitor internal corrosion conditions	B	-	-	-	-	-	-	-	-	-	-	-	
23		Transmission Cathodic Protection	Install cathodic protection (anodes, rectifiers, etc.) to protect high pressure pipelines	B	171	175	190	230	215	217	239	217	239	217	239	Base Year
24	**Requirements for Corrosion Control Subtotal**				**171**	**175**	**190**	**230**	**325**	**517**	**1,139**	**517**	**1,139**	**517**	**1,139**	
25	Operations	High Pressure Transmission Line Watch Dog	This remote monitoring unit (RMU) is designed primarily for monitoring of Cathodic Protection (CP) rectifiers and additional inputs of corrosion monitoring transmitters	B	-	-	-	114	43	43	47	43	47	43	47	Base Year
26		Right of Way	Maintenance of access roads and pipeline right of ways is critical so that compliance is maintained, pipelines can be accessed in a timely manner, third party pipeline damages can be minimized, wildfire damage can be prevented, and the safety of employees and the public are maintained	B/P	1,420	1,445	1,061	2,048	1,204	4,750	5,250	4,750	5,250	4,750	5,250	Base Year
27		High Consequence Area (HCA) Class Location	When a pipeline is operating "out of class" it needs to be remediated by either replacement or hydro-test because new pipeline installation has different testing requirements depending on the class location. HCAs for natural gas pipelines focus on populated areas which affects class location. HCA identification relies on pipeline-specific information regarding the location, size, and operating characteristics of the line, as well as the identification of structures, specified sites, and their intended usage along the pipeline right-of-way	B/P	10,485	12,580	4	182	1,248	1,900	2,100	5,700	6,300	11,400	12,600	Zero-Based
28		Utility Conflict Review	Review of right of way and other conflicts and resolve such matters	B	8	20	23	259	18	19	21	19	21	19	21	Base Year
29		Operations Emergency Preparedness	Operations emergency manual is reviewed yearly to provide quick response in emergency situations	B	253	313	427	402	327	327	361	327	361	327	361	5-Year Average
30		Quality Assurance Quality Control (QAQC)	Material inspection and quality control	B	747	788	3,191	2,188	849	1,475	1,631	1,475	1,631	1,475	1,631	5-Year Average
31		Odorization	Engineering Analysis Center (EAC) develops odorant techniques for system	B	316	114	2	134	12	110	122	110	122	110	122	5-Year Average
32	**Operations Subtotal**				**13,229**	**15,259**	**4,708**	**5,326**	**3,701**	**8,624**	**9,532**	**12,424**	**13,732**	**18,124**	**20,032**	

2016 Risk Assessment Mitigation Phase
SCG-04-WP
Risk: Catastrophic Damage Involving High-Pressure Pipeline Failure (O&M)

					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	Forecast Methodology
33	Gas Transmission Pipeline Integrity Management	In-Line Inspection (ILI)	Assessment of transmission pipelines	B	9,433	25,357	23,459	22,662	19,459	29,450	32,550	29,450	32,550	30,875	34,125	Zero-Based
34		External Corrosion Direct Assessment (ECDA)	Assessment of transmission pipelines	B	-	3,319	102	1	4,894	3,135	3,465	3,135	3,465	3,325	3,675	Zero-Based
35		Threat and Risk Assessment	Prioritizing and determining pipelines for the Transmission Integrity Management Program (TIMP)	B	288	1,499	3,885	1,965	2,813	2,744	3,032	2,744	3,032	2,744	3,032	3-Year Average
36		Integrity Assessments	Assessing the integrity of current high pressure pipelines through ILI data	B	3,430	6,099	7,035	8,041	2,622	5,604	6,194	5,604	6,194	5,604	6,194	3-Year Average
37		Preventative and Mitigation Measures	Post assessment mitigation of transmission pipelines	B	63	837	684	1,285	626	822	908	822	908	822	908	3-Year Average
38		High Pressure Pipeline Record Search	Record search for high-pressure pipelines subject to PSEP replacement/hydrostatic testing	B	25	1,161	1,485	0	-	-	-	-	-	-	-	
39		Data Integration - High Pressure Pipeline Database	Pipeline database which encompasses all pipelines in the system	B	2,705	2,272	1,759	1,302	1,545	1,555	1,719	1,555	1,719	1,555	1,719	Base Year
40	**Gas Transmission Pipeline Integrity Management Subtotal**				**15,944**	**40,544**	**38,409**	**35,255**	**31,960**	**43,310**	**47,868**	**43,310**	**47,868**	**44,925**	**49,653**	
41	Pipeline Safety Enhancement Program (PSEP): High Pressure Testing and Replacement, Valve Automation and Replacement	High Pressure Pipeline Replacement	Replacement of HCA pipelines	B	-	-	-	-	-	-	-	-	-	-	-	
42		High Pressure Pipeline Hydrotesting	Hydrostatic pressure testing of HCA pipelines	B	-	7,201	30,068	42,459	60,944	24,750	33,000	14,250	19,000	13,500	110,000	Zero-Based
43		Transmission Valve Automation and Replacement	High pressure pipeline valve automation to help improve response of valve shut-ins	B/P	-	-	-	-	-	-	-	-	-	-	-	
44	**PSEP: High Pressure Testing and Replacement, Valve Automation and Replacement Subtotal**				**-**	**7,201**	**30,068**	**42,459**	**60,944**	**24,750**	**33,000**	**14,250**	**19,000**	**13,500**	**110,000**	
45	**TOTAL**				**$ 35,990**	**$ 70,233**	**$ 80,750**	**$ 90,560**	**$ 104,996**	**$ 85,287**	**$ 100,480**	**$ 78,587**	**$ 90,680**	**$ 85,152**	**$ 189,765**	

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.

2016 Risk Assessment Mitigation Phase
SCG-04-WP
Risk: Catastrophic Damage Involving High-Pressure 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
1	Maintenance	Bridge & Span Inspections	Inspect pipelines on bridges and spans for issues	B	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
2		Meter Inspections & Maintenance	Inspect high pressure meters for corrosion, leaks, or other potential issues	B	72	23	0	239	167	168	186	168	186	168	186	504	558	Base Year
3		Valve Maintenance and Installation (Transmission)	Maintain valves with lubrication and servicing, and replace or install valves required for compliance	B	858	508	1,264	2,561	5,390	5,427	5,999	5,427	5,999	5,427	5,999	16,282	17,996	Base Year
4		Valve Maintenance and Installation (Distribution High Pressure)	Maintain valves with lubrication and servicing, and replace or install valves required for compliance	B	6	28	20	5	21	21	23	21	23	21	23	63	69	Base Year
5		Regulator Station Inspection and Maintenance	Inspect regulators to confirm overpressure protection is in place and maintained	B	94	63	374	112	175	176	194	176	194	176	194	527	583	Base Year
6		Pipeline Patrol/Leak Survey	Patrol pipelines for leaks on the ground	B/P	-	-	-	-	-	-	-	-	-	-	-	-	-	
7		Maintenance of High Pressure Storage Lines	Maintenance of high pressure storage lines	B	2,010	2,696	3,283	6,663	7,133	7,183	7,939	7,183	7,939	7,183	7,939	21,549	23,817	Base Year
8		Condition Based Maximo Work Orders	Maintain compliance through maximo work order tracking	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
9	**Maintenance Subtotal**				**3,042**	**3,318**	**4,941**	**9,580**	**12,885**	**12,975**	**14,341**	**12,975**	**14,341**	**12,975**	**14,341**	**38,925**	**43,023**	
10	Qualifications of Pipeline Personnel	Transmission Pipeline Technician Training	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	-	-	-	-	-	-	-	-	-	-	-	-	-	
11		Transmission Pipeline Specialist 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	-	-	-	-	-	-	-	-	-	-	-	-	-	
12		Transmission Welding Specialist 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	-	-	-	-	-	-	-	-	-	-	-	-	-	
13		Transmission Cathodic Protection Specialist Training (and Senior)	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	-	-	-	-	-	-	-	-	-	-	-	-	-	
14		Welding Non-Labor	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	-	-	-	-	-	-	-	-	-	-	-	-	-	
15		Distribution Construction Technician Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
16		Distribution Energy Technician Distribution Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	

2016 Risk Assessment Mitigation Phase
SCG-04-WP
Risk: Catastrophic Damage Involving High-Pressure 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
17		Distribution Lead Construction Technician Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
18		Distribution System Protection Specialist Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
19		Distribution Lead System Protection Specialist Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
20	**Qualifications of Pipeline Personnel Subtotal**				**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	
21	Requirements for Corrosion Control	Internal Corrosion Consultants	Internal corrosion enhancement	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
22		Internal Corrosion Monitoring Equipment	Monitor internal corrosion conditions	B	-	-	-	-	-	280	420	280	420	840	1,260	1,400	2,100	Zero-Based
23		Transmission Cathodic Protection	Install cathodic protection (anodes, rectifiers, etc.) to protect high pressure pipelines	B	700	433	462	390	504	507	561	507	561	507	561	1,522	1,682	Base Year
24	**Requirements for Corrosion Control Subtotal**				**700**	**433**	**462**	**390**	**504**	**787**	**981**	**787**	**981**	**1,347**	**1,821**	**2,922**	**3,782**	
25	Operations	High Pressure Transmission Line Watch Dog	This remote monitoring unit (RMU) is designed primarily for monitoring of Cathodic Protection (CP) rectifiers and additional inputs of corrosion monitoring transmitters	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
26		Right of Way	Maintenance of access roads and pipeline right of ways is critical so that compliance is maintained, pipelines can be accessed in a timely manner, third party pipeline damages can be minimized, wildfire damage can be prevented, and the safety of employees and the public are maintained	B/P	-	-	-	-	-	-	-	-	-	-	-	-	-	
27		High Consequence Area (HCA) Class Location	When a pipeline is operating "out of class" it needs to be remediated by either replacement or hydro-test because new pipeline installation has different testing requirements depending on the class location. HCAs for natural gas pipelines focus on populated areas which affects class location. HCA identification relies on pipeline-specific information regarding the location, size, and operating characteristics of the line, as well as the identification of structures, specified sites, and their intended usage along the pipeline right-of-way	B/P	1	-	-	1,987	8,005	4,750	5,250	4,750	5,250	4,750	5,250	14,250	15,750	Zero-Based
28		Utility Conflict Review	Review of right of way and other conflicts and resolve such matters	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
29		Operations Emergency Preparedness	Operations emergency manual is reviewed yearly to provide quick response in emergency situations	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
30		Quality Assurance Quality Control (QAQC)	Material inspection and quality control	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
31		Odorization	Engineering Analysis Center (EAC) develops odorant techniques for system	B	-	-	-	51,962	-	10	11	10	11	10	11	29	32	5-Year Average
32	**Operations Subtotal**				**1**	**-**	**-**	**53,949**	**8,005**	**4,760**	**5,261**	**4,760**	**5,261**	**4,760**	**5,261**	**14,279**	**15,782**	

2016 Risk Assessment Mitigation Phase
SCG-04-WP
Risk: Catastrophic Damage Involving High-Pressure 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
33	Gas Transmission Pipeline Integrity Management	In-Line Inspection (ILI)	Assessment of transmission pipelines	B	95,338	75,772	59,081	37,614	42,839	40,000	60,000	40,000	60,000	44,000	66,000	124,000	186,000	Zero-Based
34		External Corrosion Direct Assessment (ECDA)	Assessment of transmission pipelines	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
35		Threat and Risk Assessment	Prioritizing and determining pipelines for the Transmission Integrity Management Program (TIMP)	B	-	-	28	9	0	-	-	-	-	-	-	-	-	
36		Integrity Assessments	Assessing the integrity of current high pressure pipelines through ILI data	B	443	42	49	1,029	138	306	374	306	374	306	374	918	1,122	5-Year Average
37		Preventative and Mitigation Measures	Post assessment mitigation of transmission pipelines	B	37	1	-	1	8	-	-	-	-	-	-	-	-	
38		High Pressure Pipeline Record Search	Record search for high-pressure pipelines subject to PSEP replacement/hydrostatic testing	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
39		Data Integration - High Pressure Pipeline Database	Pipeline database which encompasses all pipelines in the system	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
40	**Gas Transmission Pipeline Integrity Management Subtotal**				**95,818**	**75,815**	**59,159**	**38,652**	**42,985**	**40,306**	**60,374**	**40,306**	**60,374**	**44,306**	**66,374**	**124,918**	**187,122**	
41	Pipeline Safety Enhancement Program (PSEP): High Pressure Testing and Replacement, Valve Automation and Replacement	High Pressure Pipeline Replacement	Replacement of HCA pipelines	B	-	1,551	21,409	188,922	328,570	40,500	67,500	12,750	21,250	148,500	247,500	201,750	336,250	Zero-Based
42		High Pressure Pipeline Hydrotesting	Hydrostatic pressure testing of HCA pipelines	B	-	-	5,063	15,159	7,331	-	-	-	-	-	-	-	-	
43		Transmission Valve Automation and Replacement	High pressure pipeline valve automation to help improve response of valve shut-ins	B/P	-	-	-	18,496	53,814	55,500	92,500	55,500	92,500	52,500	87,500	163,500	272,500	Zero-Based
44	**PSEP: High Pressure Testing and Replacement, Valve Automation and Replacement Subtotal**				**-**	**1,551**	**26,473**	**222,577**	**389,715**	**96,000**	**160,000**	**68,250**	**113,750**	**201,000**	**335,000**	**365,250**	**608,750**	
45	**TOTAL**				**$ 99,560**	**$ 81,118**	**$ 91,035**	**$ 325,149**	**$ 454,094**	**$ 154,828**	**$ 240,956**	**$ 127,078**	**$ 194,706**	**$ 264,388**	**$ 422,796**	**$ 546,294**	**$ 858,458**	

Notes:
- Baseline (B) and Proposed (P).
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2016 Risk Assessment Mitigation Phase
SCG-04-WP
Risk: Catastrophic Damage Involving High-Pressure 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
1	Maintenance	Bridge & Span Inspections	Inspect pipelines on bridges and spans for issues	B	$ 1	$ 2	$ 4	$ 6	$ 5	$ -	$ 5	$ 6	$ 6	$ 6	$ 6	$ 6	$ 6	$ -	$ -	$ 6	$ 6
2		Meter Inspections & Maintenance	Inspect high pressure meters for corrosion, leaks, or other potential issues	B	1,652	1,142	2,143	2,600	1,259	-	1,259	1,268	1,402	1,268	1,402	1,268	1,402	-	-	1,268	1,402
3		Valve Maintenance and Installation (Transmission)	Maintain valves with lubrication and servicing, and replace or install valves required for compliance	B	545	7	355	224	1,686	-	1,686	1,698	1,876	1,698	1,876	1,698	1,876	-	-	1,698	1,876
4		Valve Maintenance and Installation (Distribution High Pressure)	Maintain valves with lubrication and servicing, and replace or install valves required for compliance	B	3	22	59	57	57	-	57	58	64	58	64	58	64	-	-	58	64
5		Regulator Station Inspection and Maintenance	Inspect regulators to confirm overpressure protection is in place and maintained	B	773	833	970	950	834	-	834	840	928	840	928	840	928	-	-	840	928
6		Pipeline Patrol/Leak Survey	Patrol pipelines for leaks on the ground	B/P	357	424	447	459	467	-	467	470	520	470	520	470	520	-	-	470	520
7		Maintenance of High Pressure Storage Lines	Maintenance of high pressure storage lines	B	3,094	4,376	3,107	2,626	2,733	-	2,733	2,752	3,042	2,752	3,042	2,752	3,042	-	-	2,752	3,042
8		Condition Based Maximo Work Orders	Maintain compliance through maximo work order tracking	B	-	-	-	28	627	-	627	596	659	596	659	596	659	-	-	596	659
9	**Maintenance Subtotal**				**6,425**	**6,805**	**7,085**	**6,950**	**7,670**	**-**	**7,670**	**7,688**	**8,497**	**7,688**	**8,497**	**7,688**	**8,497**	**-**	**-**	**7,688**	**8,497**
10	Qualifications of Pipeline Personnel	Transmission Pipeline Technician Training	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	86	88	92	141	194	-	194	195	215	195	215	195	215	-	-	195	215
11		Transmission Pipeline Specialist 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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12		Transmission Welding Specialist 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	34	34	40	60	61	-	61	62	68	62	68	62	68	-	-	62	68
13		Transmission Cathodic Protection Specialist Training (and Senior)	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	1	1	1	1	1	-	1	1	1	1	1	1	1	-	-	1	1
14		Welding Non-Labor	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	25	25	25	25	25	-	25	23	31	23	31	23	31	-	-	23	31
15		Distribution Construction Technician Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	57	83	110	95	96	-	96	97	107	97	107	97	107	-	-	97	107
16		Distribution Energy Technician Distribution Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	4	3	5	4	5	-	5	5	5	5	5	5	5	-	-	5	5

2016 Risk Assessment Mitigation Phase
SCG-04-WP
Risk: Catastrophic Damage Involving High-Pressure 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
17		Distribution Lead Construction Technician Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	14	14	16	16	15	-	15	15	17	15	17	15	17	-	-	15	17
18		Distribution System Protection Specialist Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19		Distribution Lead System Protection Specialist Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	**Qualifications of Pipeline Personnel Subtotal**				**221**	**248**	**289**	**342**	**396**	**-**	**396**	**398**	**444**	**398**	**444**	**398**	**444**	**-**	**-**	**398**	**444**
21	Requirements for Corrosion Control	Internal Corrosion Consultants	Internal corrosion enhancement	B	-	-	-	-	110	-	110	300	900	300	900	300	900	-	-	300	900
22		Internal Corrosion Monitoring Equipment	Monitor internal corrosion conditions	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23		Transmission Cathodic Protection	Install cathodic protection (anodes, rectifiers, etc.) to protect high pressure pipelines	B	171	175	190	230	215	-	215	217	239	217	239	217	239	-	-	217	239
24	**Requirements for Corrosion Control Subtotal**				**171**	**175**	**190**	**230**	**325**	**-**	**325**	**517**	**1,139**	**517**	**1,139**	**517**	**1,139**	**-**	**-**	**517**	**1,139**
25	Operations	High Pressure Transmission Line Watch Dog	This remote monitoring unit (RMU) is designed primarily for monitoring of Cathodic Protection (CP) rectifiers and additional inputs of corrosion monitoring transmitters	B	-	-	-	114	43	-	43	43	47	43	47	43	47	-	-	43	47
26		Right of Way	Maintenance of access roads and pipeline right of ways is critical so that compliance is maintained, pipelines can be accessed in a timely manner, third party pipeline damages can be minimized, wildfire damage can be prevented, and the safety of employees and the public are maintained	B/P	1,420	1,445	1,061	2,048	1,204	-	1,204	4,750	5,250	4,750	5,250	4,750	5,250	-	-	4,750	5,250
27		High Consequence Area (HCA) Class Location	When a pipeline is operating "out of class" it needs to be remediated by either replacement or hydro-test because new pipeline installation has different testing requirements depending on the class location. HCAs for natural gas pipelines focus on populated areas which affects class location. HCA identification relies on pipeline-specific information regarding the location, size, and operating characteristics of the line, as well as the identification of structures, specified sites, and their intended usage along the pipeline right-of-way	B/P	10,485	12,580	4	182	1,248	-	1,248	1,900	2,100	5,700	6,300	11,400	12,600	-	-	11,400	12,600
28		Utility Conflict Review	Review of right of way and other conflicts and resolve such matters	B	8	20	23	259	18	-	18	19	21	19	21	19	21	-	-	19	21
29		Operations Emergency Preparedness	Operations emergency manual is reviewed yearly to provide quick response in emergency situations	B	253	313	427	402	327	-	327	327	361	327	361	327	361	-	-	327	361
30		Quality Assurance Quality Control (QAQC)	Material inspection and quality control	B	747	788	3,191	2,188	849	-	849	1,475	1,631	1,475	1,631	1,475	1,631	-	-	1,475	1,631
31		Odorization	Engineering Analysis Center (EAC) develops odorant techniques for system	B	316	114	2	134	12	-	12	110	122	110	122	110	122	-	-	110	122
32	**Operations Subtotal**				**13,229**	**15,259**	**4,708**	**5,326**	**3,701**	**-**	**3,701**	**8,624**	**9,532**	**12,424**	**13,732**	**18,124**	**20,032**	**-**	**-**	**18,124**	**20,032**

2016 Risk Assessment Mitigation Phase
SCG-04-WP
Risk: Catastrophic Damage Involving High-Pressure 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
33	Gas Transmission Pipeline Integrity Management	In-Line Inspection (ILI)	Assessment of transmission pipelines	B	9,433	25,357	23,459	22,662	19,459	-	19,459	29,450	32,550	29,450	32,550	30,875	34,125	-	-	30,875	34,125
34		External Corrosion Direct Assessment (ECDA)	Assessment of transmission pipelines	B	-	3,319	102	1	4,894	-	4,894	3,135	3,465	3,135	3,465	3,325	3,675	-	-	3,325	3,675
35		Threat and Risk Assessment	Prioritizing and determining pipelines for the Transmission Integrity Management Program (TIMP)	B	288	1,499	3,885	1,965	2,813	-	2,813	2,744	3,032	2,744	3,032	2,744	3,032	-	-	2,744	3,032
36		Integrity Assessments	Assessing the integrity of current high pressure pipelines through ILI data	B	3,430	6,099	7,035	8,041	2,622	-	2,622	5,604	6,194	5,604	6,194	5,604	6,194	-	-	5,604	6,194
37		Preventative and Mitigation Measures	Post assessment mitigation of transmission pipelines	B	63	837	684	1,285	626	-	626	822	908	822	908	822	908	-	-	822	908
38		High Pressure Pipeline Record Search	Record search for high-pressure pipelines subject to PSEP replacement/hydrostatic testing	B	25	1,161	1,485	0	-	-	-	-	-	-	-	-	-	-	-	-	-
39		Data Integration - High Pressure Pipeline Database	Pipeline database which encompasses all pipelines in the system	B	2,705	2,272	1,759	1,302	1,545	-	1,545	1,555	1,719	1,555	1,719	1,555	1,719	-	-	1,555	1,719
40	**Gas Transmission Pipeline Integrity Management Subtotal**				**15,944**	**40,544**	**38,409**	**35,255**	**31,960**	**-**	**31,960**	**43,310**	**47,868**	**43,310**	**47,868**	**44,925**	**49,653**	**-**	**-**	**44,925**	**49,653**
41	Pipeline Safety Enhancement Program (PSEP): High Pressure Testing and Replacement, Valve Automation and Replacement	High Pressure Pipeline Replacement	Replacement of HCA pipelines	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42		High Pressure Pipeline Hydrotesting	Hydrostatic pressure testing of HCA pipelines	B	-	-	-	-	-	60,944	60,944	-	-	-	-	13,500	30,000	-	80,000	13,500	110,000
43		Transmission Valve Automation and Replacement	High pressure pipeline valve automation to help improve response of valve shut-ins	B/P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	**PSEP: High Pressure Testing and Replacement, Valve Automation and Replacement Subtotal**				**-**	**-**	**-**	**-**	**-**	**60,944**	**60,944**	**-**	**-**	**-**	**-**	**13,500**	**30,000**	**-**	**80,000**	**13,500**	**110,000**
45	**TOTAL**				**$ 35,990**	**$ 63,032**	**$ 50,682**	**$ 48,102**	**$ 44,052**	**$ 60,944**	**$ 104,996**	**$ 60,537**	**$ 67,480**	**$ 64,337**	**$ 71,680**	**$ 85,152**	**$ 109,765**	**$ -**	**$ 80,000**	**$ 85,152**	**$ 189,765**

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.

2016 Risk Assessment Mitigation Phase
SCG-04-WP
Risk: Catastrophic Damage Involving High-Pressure 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	Bridge & Span Inspections	Inspect pipelines on bridges and spans for issues	B	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2		Meter Inspections & Maintenance	Inspect high pressure meters for corrosion, leaks, or other potential issues	B	72	23	0	239	167	-	167	168	186	168	186	168	186	504	558	-	-	504	558
3		Valve Maintenance and Installation (Transmission)	Maintain valves with lubrication and servicing, and replace or install valves required for compliance	B	858	508	1,264	2,561	5,390	-	5,390	5,427	5,999	5,427	5,999	5,427	5,999	16,282	17,996	-	-	16,282	17,996
4		Valve Maintenance and Installation (Distribution High Pressure)	Maintain valves with lubrication and servicing, and replace or install valves required for compliance	B	6	28	20	5	21	-	21	21	23	21	23	21	23	63	69	-	-	63	69
5		Regulator Station Inspection and Maintenance	Inspect regulators to confirm overpressure protection is in place and maintained	B	94	63	374	112	175	-	175	176	194	176	194	176	194	527	583	-	-	527	583
6		Pipeline Patrol/Leak Survey	Patrol pipelines for leaks on the ground	B/P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7		Maintenance of High Pressure Storage Lines	Maintenance of high pressure storage lines	B	2,010	2,696	3,283	6,663	7,133	-	7,133	7,183	7,939	7,183	7,939	7,183	7,939	21,549	23,817	-	-	21,549	23,817
8		Condition Based Maximo Work Orders	Maintain compliance through maximo work order tracking	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	**Maintenance Subtotal**				**3,042**	**3,318**	**4,941**	**9,580**	**12,885**	**-**	**12,885**	**12,975**	**14,341**	**12,975**	**14,341**	**12,975**	**14,341**	**38,925**	**43,023**	**-**	**-**	**38,925**	**43,023**
10	Qualifications of Pipeline Personnel	Transmission Pipeline Technician Training	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11		Transmission Pipeline Specialist 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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12		Transmission Welding Specialist 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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13		Transmission Cathodic Protection Specialist Training (and Senior)	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14		Welding Non-Labor	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15		Distribution Construction Technician Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16		Distribution Energy Technician Distribution Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

2016 Risk Assessment Mitigation Phase
SCG-04-WP
Risk: Catastrophic Damage Involving High-Pressure 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
17		Distribution Lead Construction Technician Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18		Distribution System Protection Specialist Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19		Distribution Lead System Protection Specialist Training	Certification and training that is required for all distribution employees to work on company assets. This is mandated by CFR 49 Part 192 Subpart N	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	**Qualifications of Pipeline Personnel Subtotal**				**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
21	Requirements for Corrosion Control	Internal Corrosion Consultants	Internal corrosion enhancement	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22		Internal Corrosion Monitoring Equipment	Monitor internal corrosion conditions	B	-	-	-	-	-	-	-	280	420	280	420	840	1,260	1,400	2,100	-	-	1,400	2,100
23		Transmission Cathodic Protection	Install cathodic protection (anodes, rectifiers, etc.) to protect high pressure pipelines	B	700	433	462	390	504	-	504	507	561	507	561	507	561	1,522	1,682	-	-	1,522	1,682
24	**Requirements for Corrosion Control Subtotal**				**700**	**433**	**462**	**390**	**504**	**-**	**504**	**787**	**981**	**787**	**981**	**1,347**	**1,821**	**2,922**	**3,782**	**-**	**-**	**2,922**	**3,782**
25	Operations	High Pressure Transmission Line Watch Dog	This remote monitoring unit (RMU) is designed primarily for monitoring of Cathodic Protection (CP) rectifiers and additional inputs of corrosion monitoring transmitters	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26		Right of Way	Maintenance of access roads and pipeline right of ways is critical so that compliance is maintained, pipelines can be accessed in a timely manner, third party pipeline damages can be minimized, wildfire damage can be prevented, and the safety of employees and the public are maintained	B/P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27		High Consequence Area (HCA) Class Location	When a pipeline is operating "out of class" it needs to be remediated by either replacement or hydro-test because new pipeline installation has different testing requirements depending on the class location. HCAs for natural gas pipelines focus on populated areas which affects class location. HCA identification relies on pipeline-specific information regarding the location, size, and operating characteristics of the line, as well as the identification of structures, specified sites, and their intended usage along the pipeline right-of-way	B/P	1	-	-	1,987	8,005	-	8,005	4,750	5,250	4,750	5,250	4,750	5,250	14,250	15,750	-	-	14,250	15,750
28		Utility Conflict Review	Review of right of way and other conflicts and resolve such matters	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29		Operations Emergency Preparedness	Operations emergency manual is reviewed yearly to provide quick response in emergency situations	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30		Quality Assurance Quality Control (QAQC)	Material inspection and quality control	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31		Odorization	Engineering Analysis Center (EAC) develops odorant techniques for system	B	-	-	-	51,962	-	-	-	10	11	10	11	10	11	29	32	-	-	29	32
32	**Operations Subtotal**				**1**	**-**	**-**	**53,949**	**8,005**	**-**	**8,005**	**4,760**	**5,261**	**4,760**	**5,261**	**4,760**	**5,261**	**14,279**	**15,782**	**-**	**-**	**14,279**	**15,782**

2016 Risk Assessment Mitigation Phase
SCG-04-WP
Risk: Catastrophic Damage Involving High-Pressure 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
33	Gas Transmission Pipeline Integrity Management	In-Line Inspection (ILI)	Assessment of transmission pipelines	B	95,338	75,772	59,081	37,614	42,839	-	42,839	40,000	60,000	40,000	60,000	44,000	66,000	124,000	186,000	-	-	124,000	186,000
34		External Corrosion Direct Assessment (ECDA)	Assessment of transmission pipelines	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35		Threat and Risk Assessment	Prioritizing and determining pipelines for the Transmission Integrity Management Program (TIMP)	B	-	-	28	9	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-
36		Integrity Assessments	Assessing the integrity of current high pressure pipelines through ILI data	B	443	42	49	1,029	138	-	138	306	374	306	374	306	374	918	1,122	-	-	918	1,122
37		Preventative and Mitigation Measures	Post assessment mitigation of transmission pipelines	B	37	1	-	1	8	-	8	-	-	-	-	-	-	-	-	-	-	-	-
38		High Pressure Pipeline Record Search	Record search for high-pressure pipelines subject to PSEP replacement/hydrostatic testing	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39		Data Integration - High Pressure Pipeline Database	Pipeline database which encompasses all pipelines in the system	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	**Gas Transmission Pipeline Integrity Management Subtotal**				**95,818**	**75,815**	**59,159**	**38,652**	**42,985**	**-**	**42,985**	**40,306**	**60,374**	**40,306**	**60,374**	**44,306**	**66,374**	**124,918**	**187,122**	**-**	**-**	**124,918**	**187,122**
41	Pipeline Safety Enhancement Program (PSEP): High Pressure Testing and Replacement, Valve Automation and Replacement	High Pressure Pipeline Replacement	Replacement of HCA pipelines	B	-	-	-	-	-	328,570	328,570	40,500	67,500	12,750	21,250	8,500	107,500	61,750	196,250	140,000	140,000	201,750	336,250
42		High Pressure Pipeline Hydrotesting	Hydrostatic pressure testing of HCA pipelines	B	-	-	-	-	-	7,331	7,331	-	-	-	-	-	-	-	-	-	-	-	-
43		Transmission Valve Automation and Replacement	High pressure pipeline valve automation to help improve response of valve shut-ins	B/P	-	-	-	-	-	53,814	53,814	3,000	4,000	3,000	4,000	52,500	87,500	58,500	95,500	105,000	177,000	163,500	272,500
44	**PSEP: High Pressure Testing and Replacement, Valve Automation and Replacement Subtotal**				**-**	**-**	**-**	**-**	**-**	**389,715**	**389,715**	**43,500**	**71,500**	**15,750**	**25,250**	**61,000**	**195,000**	**120,250**	**291,750**	**245,000**	**317,000**	**365,250**	**608,750**
45	**TOTAL**				**$ 99,560**	**$ 79,567**	**$ 64,562**	**$ 102,572**	**$ 64,379**	**$ 389,715**	**$ 454,094**	**$ 102,328**	**$ 152,456**	**$ 74,578**	**$ 106,206**	**$ 124,388**	**$ 282,796**	**$ 301,294**	**$ 541,458**	**$ 245,000**	**$ 317,000**	**$ 546,294**	**$ 858,458**

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.