

**2016 Risk Assessment Mitigation Phase
Investigation 16-10-015
Workpapers to
Cyber Security
(Chapter SDG&E-7-WP)**

January 2017



[illegible]

2016 Risk Assessment Mitigation Phase
SDGE-07-WP
Risk: Cyber Security (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	
25		Configuration Monitoring	Automated solution for compliance monitoring that detects changes to approved configuration	B	-	-	-	-	-	-	-	-	-	-	-	
26		Wired Network Access Control (NAC)	Manage device access to wired networks	B	-	-	-	-	-	-	-	-	-	-	-	
27		Boundary Defenses - Applications	Service-Oriented Architectures (SOA) Firewall/Gateway	B	-	-	-	-	-	-	-	-	-	-	-	
28		Critical Infrastructure Protection (CIP) Cybersecurity Infrastructure	Virtual Extensible Environment to support information security infrastructure for NERC CIP compliance	B	-	-	-	-	-	-	-	-	-	-	-	
29		SDG&E Transmission Communication (COMM) Reliability	SDG&E Transmission Communication (COMM) Reliability Phase 1	B	-	-	-	-	-	-	-	-	-	-	-	
30		North American Electric Reliability Corporation (NERC) CIP Information Technology (IT) Infrastructure Security	Capital projects to protect NERC CIP assets ¹	P						-	-	-	-	-	-	
31	Protect Subtotal				2,042	2,360	2,116	2,534	2,883	3,276	4,652	3,622	5,096	3,998	6,022	
32	Detect	O&M GRC - Historical	Base business historical information	B	332	342	316	729	883	-	-	-	-	-	-	
33		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	6	7	62	46	137	-	-	-	-	-	-	
34		O&M Non-Labor Forecast	Forecast for existing employees non-labor costs	B	-	-	-	-	-	330	963	619	1,297	329	683	Base Year
35		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	14	14	14	14	14	14	Base Year
36		O&M Labor Forecast	Forecast for existing employees labor costs	B	-	-	-	-	-	752	752	752	752	752	752	Base Year
37		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	124	124	124	124	124	124	Base Year
38		O&M new FTEs	Forecast for new FTEs	P						-	-	-	-	-	(150)	Base Year
39		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P						-	-	-	-	-	150	Base Year
40		O&M IS Associate Program	Forecast for new IS Associate Program	P						-	-	-	-	60	60	Base Year
41		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P						-	-	-	-	-	-	
42		Enterprise Logging Infrastructure - Electric	SDG&E log management system deployment	B	-	-	-	-	-	-	-	-	-	-	-	
43		Smart Log Management & Security Monitoring	Log management system implementation for SDG&E smart grid infrastructure	B	-	-	-	-	-	-	-	-	-	-	-	
44	Detect Subtotal				339	349	378	775	1,020	1,220	1,852	1,508	2,186	1,278	1,633	

2016 Risk Assessment Mitigation Phase
SDGE-07-WP
Risk: Cyber Security (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	
45	Respond	O&M GRC - Historical	Base business historical information	B	514	458	435	593	616	-	-	-	-	-	-	
46		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	14	92	97	102	196	-	-	-	-	-	-	
47		O&M Non-Labor Forecast	Forecast for existing employees non-labor costs	B	-	-	-	-	-	407	723	230	569	311	722	Base Year
48		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	86	86	86	86	86	86	Base Year
49		O&M Labor Forecast	Forecast for existing employees labor costs	B	-	-	-	-	-	429	429	429	429	429	429	Base Year
50		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	109	109	109	109	109	109	Base Year
51		O&M New FTEs	Forecast for new FTEs	P						-	-	-	150	-	-	Base Year
52		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P						-	-	-	-	-	150	Base Year
53		O&M IS Associate Program	Forecast for new IS Associate Program	P						-	60	-	60	-	-	Base Year
54		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P						-	-	-	-	-	-	
55	Respond Subtotal				528	550	532	694	812	1,031	1,407	854	1,403	935	1,496	
56	Recover	O&M GRC - Historical	Base business historical information	B	23	26	22	26	24	-	-	-	-	-	-	
57		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	0	27	32	34	49	-	-	-	-	-	-	
58		O&M Non-Labor Forecast	Forecast for existing employees non-labor costs	B	-	-	-	-	-	(13)	198	190	416	178	383	Base Year
59		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	21	21	21	21	21	21	Base Year
60		O&M Labor Forecast	Forecast for existing employees labor costs	B	-	-	-	-	-	21	21	21	21	21	21	Base Year
61		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	28	28	28	28	28	28	Base Year
62		O&M New FTEs	Forecast for new FTEs	P						-	-	-	-	-	-	
63		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P						-	-	-	-	-	-	
64		O&M IS Associate Program	Forecast for new IS Associate Program	P						-	-	-	-	-	(60)	Base Year
65		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P						-	-	-	-	-	60	Base Year
66	Recover Subtotal				23	54	54	60	73	57	268	260	486	248	453	
67	TOTAL				\$ 3,737	\$ 4,149	\$ 3,827	\$ 5,042	\$ 6,204	\$ 7,062	\$ 10,072	\$ 7,362	\$ 10,722	\$ 7,562	\$ 11,172	

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.

2016 Risk Assessment Mitigation Phase
SDGE-07-WP
Risk: Cyber Security (Capital)

Line No.	Mitigation	Project/Program	Project/Program Description	Status	Recorded (Directs, 2015 \$000)					Forecast Range (Directs, 2015 \$000)								
					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
45	Respond	O&M GRC - Historical	Base business historical information	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
46		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
47		O&M Non-Labor Forecast	Forecast for existing employees non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
48		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
49		O&M Labor Forecast	Forecast for existing employees labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
50		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
51		O&M New FTEs	Forecast for new FTEs	P						-	-	-	-	-	-	-	-	
52		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P						-	-	-	-	-	-	-	-	
53		O&M IS Associate Program	Forecast for new IS Associate Program	P						-	-	-	-	-	-	-	-	
54		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P						-	-	-	-	-	-	-	-	
55	Respond Subtotal				-	-	-	-	-	-	-	-	-	-	-	-	-	
56	Recover	O&M GRC - Historical	Base business historical information	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
57		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
58		O&M Non-Labor Forecast	Forecast for existing employees non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
59		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
60		O&M Labor Forecast	Forecast for existing employees labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
61		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	
62		O&M New FTEs	Forecast for new FTEs	P						-	-	-	-	-	-	-	-	
63		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P						-	-	-	-	-	-	-	-	
64		O&M IS Associate Program	Forecast for new IS Associate Program	P						-	-	-	-	-	-	-	-	
65		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P						-	-	-	-	-	-	-	-	
66	Recover Subtotal				-	-	-	-	-	-	-	-	-	-	-	-	-	
67	TOTAL				\$ 3,674	\$ 7,289	\$ 1,905	\$ 1,194	\$ 1,826	\$ 1,000	\$ 3,000	\$ 1,000	\$ 3,000	\$ 1,000	\$ 3,000	\$ 3,000	\$ 9,000	

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.

2016 Risk Assessment Mitigation Phase
SDGE-07-WP
Risk: Cyber Security (GRC Total - O&M)

Line No.	Mitigation	Project/Program	Project/Program Description	Status	Recorded (Directs, 2015 \$000)						Non-GRC 2015	O&M Total 2015	Forecast Range (Directs, 2015 \$000)								
					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	Non-GRC 2019 Low	Non-GRC 2019 High	O&M Total 2019 Low	O&M Total 2019 High
1	Identify	O&M General Rate Case (GRC) - Historical	Base business historical information	B	\$ 767	\$ 670	\$ 608	\$ 767	\$ 776	\$ -	\$ 776	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	-	-	-	-	-	640	640	-	-	-	-	-	-	-	-	-	-
3		O&M Non-Labor Forecast	Forecast for existing employees' non-labor costs	B	-	-	-	-	-	-	-	218	481	(83)	199	(99)	158	-	-	(99)	158
4		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	347	347	347	347	
5		O&M Labor Forecast	Forecast for existing employees' labor costs	B	-	-	-	-	-	-	-	561	561	561	561	561	561	-	-	561	561
6		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	293	293	293	293	
7		O&M New Full Time Equivalents (FTEs)	Forecast for new FTEs	P							-	-	150	-	150	-	-	-	-	-	-
8		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P							-	-	-	-	-	-	-	-	150	-	150
9		O&M Information Security (IS) Associate Program	Forecast for new IS Associate Program	P							-	60	60	-	-	-	-	-	-	-	-
10		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P							-	-	-	-	-	-	-	60	-	-	60
11		2011 Security Compliance Management	System deployment for Smart Grid compliance, governance and reporting. This solution provides a common tool to manage the processes and workflows related to Risk Management and Compliance	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Identify Subtotal				767	670	608	767	776	640	1,416	839	1,253	478	910	463	719	640	850	1,103	1,569
13	Protect	O&M GRC - Historical	Base business historical information	B	1,950	1,958	1,649	2,067	2,057	-	2,057	-	-	-	-	-	-	-	-	-	-
14		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	-	-	-	-	-	826	826	-	-	-	-	-	-	-	-	-	-
15		O&M Non-Labor Forecast	Forecast for existing employees non-labor costs	B	-	-	-	-	-	-	-	808	2,184	1,094	2,569	1,531	3,404	-	-	1,531	3,404
16		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	282	282	282	282	
17		O&M Labor Forecast	Forecast for existing employees labor costs	B	-	-	-	-	-	-	-	1,642	1,642	1,642	1,642	1,642	1,642	-	-	1,642	1,642
18		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	544	544	544	544	
19		O&M New FTEs	Forecast for new FTEs	P							-	-	-	-	-	-	150	-	-	-	150
20		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P							-	-	-	-	-	-	-	-	-	-	-
21		O&M IS Associate Program	Forecast for new IS Associate Program	P							-	-	-	60	60	-	(60)	-	-	-	(60)
22		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P							-	-	-	-	-	-	-	60	-	-	60
23		Private Field Network Expansion	Communication technology for SDG&E to support field area network devices	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24		Electric Generation Boundary Defense	Deploy Intrusion Defense Systems (IDS)/Intrusion Prevention Systems (IPS) and firewalls at SDG&E Generation sites	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25		Configuration Monitoring	Automated solution for compliance monitoring that detects changes to approved configuration	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26		Wired Network Access Control (NAC)	Manage device access to wired networks	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27		Boundary Defenses - Applications	Service-Oriented Architectures (SOA) Firewall/Gateway	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28		Critical Infrastructure Protection (CIP) Cybersecurity Infrastructure	Virtual Extensible Environment to support information security infrastructure for NERC CIP compliance	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29		SDG&E Transmission Communication (COMM) Reliability	SDG&E Transmission Communication (COMM) Reliability Phase 1	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30		North American Electric Reliability Corporation (NERC) CIP Information Technology (IT) Infrastructure Security	Capital projects to protect NERC CIP assets ¹	P							-	-	-	-	-	-	-	-	-	-	-
31	Protect Subtotal				1,950	1,958	1,649	2,067	2,057	826	2,883	2,449	3,826	2,795	4,270	3,172	5,135	826	886	3,998	6,022

2016 Risk Assessment Mitigation Phase
SDGE-07-WP
Risk: Cyber Security (GRC Total - O&M)

Line No.	Mitigation	Project/Program	Project/Program Description	Status	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		
					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									
32	Detect	O&M GRC - Historical	Base business historical information	B	332	342	316	729	883	-	883	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	-	-	-	-	-	137	137	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34		O&M Non-Labor Forecast	Forecast for existing employees non-labor costs	B	-	-	-	-	-	-	-	330	963	619	1,297	329	683	-	-	-	-	329	683	-	-	-
35		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	14	14	-	-	-	14	14	-	-	-
36		O&M Labor Forecast	Forecast for existing employees labor costs	B	-	-	-	-	-	-	-	752	752	752	752	752	752	-	-	-	-	752	752	-	-	-
37		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	124	124	-	-	-	124	124	-	-	-
38		O&M new FTEs	Forecast for new FTEs	P							-	-	-	-	-	(150)	-	-	-	-	-	-	(150)	-	-	-
39		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P							-	-	-	-	-	-	-	150	-	-	-	-	150	-	-	-
40		O&M IS Associate Program	Forecast for new IS Associate Program	P							-	-	-	-	60	60	-	-	-	-	-	60	60	-	-	-
41		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42		Enterprise Logging Infrastructure - Electric	SDG&E log management system deployment	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43		Smart Log Management & Security Monitoring	Log management system implementation for SDG&E smart grid infrastructure	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	Detect Subtotal				332	342	316	729	883	137	1,020	1,082	1,715	1,371	2,049	1,141	1,345	137	287	1,278	1,633					
45	Respond	O&M GRC - Historical	Base business historical information	B	514	458	435	593	616	-	616	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	-	-	-	-	-	196	196	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47		O&M Non-Labor Forecast	Forecast for existing employees non-labor costs	B	-	-	-	-	-	-	-	407	723	230	569	311	722	-	-	-	-	311	722	-	-	-
48		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	86	86	-	-	-	86	86	-	-	-
49		O&M Labor Forecast	Forecast for existing employees labor costs	B	-	-	-	-	-	-	-	429	429	429	429	429	429	-	-	-	-	429	429	-	-	-
50		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	109	109	-	-	-	109	109	-	-	-
51		O&M New FTEs	Forecast for new FTEs	P							-	-	-	-	150	-	-	-	-	-	-	-	-	-	-	-
52		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P							-	-	-	-	-	-	-	150	-	-	-	-	150	-	-	-
53		O&M IS Associate Program	Forecast for new IS Associate Program	P							-	-	60	-	60	-	-	-	-	-	-	-	-	-	-	-
54		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55	Respond Subtotal				514	458	435	593	616	196	812	835	1,212	659	1,208	740	1,150	196	346	935	1,496					
56	Recover	O&M GRC - Historical	Base business historical information	B	23	26	22	26	24	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	-	-	-	-	-	49	49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
58		O&M Non-Labor Forecast	Forecast for existing employees non-labor costs	B	-	-	-	-	-	-	-	(13)	198	190	416	178	383	-	-	-	-	178	383	-	-	-
59		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	21	21	-	-	-	21	21	-	-	-
60		O&M Labor Forecast	Forecast for existing employees labor costs	B	-	-	-	-	-	-	-	21	21	21	21	21	21	-	-	-	-	21	21	-	-	-
61		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	28	28	-	-	-	28	28	-	-	-
62		O&M New FTEs	Forecast for new FTEs	P							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
63		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
64		O&M IS Associate Program	Forecast for new IS Associate Program	P							-	-	-	-	-	(60)	-	-	-	-	-	-	(60)	-	-	-
65		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P							-	-	-	-	-	-	-	60	-	-	-	-	60	-	-	-
66	Recover Subtotal				23	26	22	26	24	49	73	8	219	211	437	199	344	49	109	248	453					
67	TOTAL				\$ 3,586	\$ 3,454	\$ 3,030	\$ 4,181	\$ 4,356	\$ 1,848	\$ 6,204	\$ 5,214	\$ 8,224	\$ 5,514	\$ 8,874	\$ 5,714	\$ 8,694	\$ 1,848	\$ 2,478	\$ 7,562	\$ 11,172					

Notes:

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

2016 Risk Assessment Mitigation Phase
SDGE-07-WP
Risk: Cyber Security (GRC Total - Capital)

Line No.	Mitigation	Project/Program	Project/Program Description	Status	Recorded (Directs, 2015 \$000)						Non-GRC 2015	O&M Total 2015	Forecast Range (Directs, 2015 \$000)						Non-GRC 2017-2019 Low	Non-GRC 2017-2019 High	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)		
1	Identify	O&M General Rate Case (GRC) - Historical	Base business historical information	B	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3		O&M Non-Labor Forecast	Forecast for existing employees' non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5		O&M Labor Forecast	Forecast for existing employees' labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7		O&M New Full Time Equivalents (FTEs)	Forecast for new FTEs	P								-												-	
8		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P								-												-	
9		O&M Information Security (IS) Associate Program	Forecast for new IS Associate Program	P								-												-	
10		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P								-												-	
11		2011 Security Compliance Management	System deployment for Smart Grid compliance, governance and reporting. This solution provides a common tool to manage the processes and workflows related to Risk Management and Compliance	B	2,443	2,171	1,538	211	(1)	-	(1)	(1)	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Identify Subtotal				2,443	2,171	1,538	211	(1)	-	(1)	(1)	-	-	-	-	-	-	-	-	-	-	-	-	-
13	Protect	O&M GRC - Historical	Base business historical information	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15		O&M Non-Labor Forecast	Forecast for existing employees non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17		O&M Labor Forecast	Forecast for existing employees labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19		O&M New FTEs	Forecast for new FTEs	P								-												-	
20		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P								-												-	
21		O&M IS Associate Program	Forecast for new IS Associate Program	P								-												-	
22		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P								-												-	
23		Private Field Network Expansion	Communication technology for SDG&E to support field area network devices	B	-	-	-	-	468	-	468	468	-	-	-	-	-	-	-	-	-	-	-	-	-
24		Electric Generation Boundary Defense	Deploy Intrusion Defense Systems (IDS)/Intrusion Prevention Systems (IPS) and firewalls at SDG&E Generation sites	B	-	-	33	446	(2)	-	(2)	(2)	-	-	-	-	-	-	-	-	-	-	-	-	-
25		Configuration Monitoring	Automated solution for compliance monitoring that detects changes to approved configuration	B	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
26		Wired Network Access Control (NAC)	Manage device access to wired networks	B	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27		Boundary Defenses - Applications	Service-Oriented Architectures (SOA) Firewall/Gateway	B	1,210	1,702	273	(12)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28		Critical Infrastructure Protection (CIP) Cybersecurity Infrastructure	Virtual Extensible Environment to support information security infrastructure for NERC CIP compliance	B	-	-	-	-	729	-	729	729	-	-	-	-	-	-	-	-	-	-	-	-	-
29		SDG&E Transmission Communication (COMM) Reliability	SDG&E Transmission Communication (COMM) Reliability Phase 1	B	-	-	-	-	627	-	627	627	-	-	-	-	-	-	-	-	-	-	-	-	-
30		North American Electric Reliability Corporation (NERC) CIP Information Technology (IT) Infrastructure Security	Capital projects to protect NERC CIP assets ¹	P								-												-	
31	Protect Subtotal				1,231	1,702	306	433	1,823	1	1,824	1,824	-	-	-	-	-	-	3,000	9,000	3,000	9,000	3,000	9,000	3,000

2016 Risk Assessment Mitigation Phase
SDGE-07-WP
Risk: Cyber Security (GRC Total - Capital)

Line No.	Mitigation	Project/Program	Project/Program Description	Status	Recorded (Directs, 2015 \$000)					Non-GRC 2015	O&M 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		
32	Detect	O&M GRC - Historical	Base business historical information	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34		O&M Non-Labor Forecast	Forecast for existing employees non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36		O&M Labor Forecast	Forecast for existing employees labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38		O&M new FTEs	Forecast for new FTEs	P								-	-	-	-	-	-	-	-	-	-	-	-
39		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P							-	-	-	-	-	-	-	-	-	-	-	-	-
40		O&M IS Associate Program	Forecast for new IS Associate Program	P							-	-	-	-	-	-	-	-	-	-	-	-	-
41		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P							-	-	-	-	-	-	-	-	-	-	-	-	-
42		Enterprise Logging Infrastructure - Electric	SDG&E log management system deployment	B	-	-	-	549	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-
43		Smart Log Management & Security Monitoring	Log management system implementation for SDG&E smart grid infrastructure	B	-	3,415	61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	Detect Subtotal				-	3,415	61	549	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-
45	Respond	O&M GRC - Historical	Base business historical information	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47		O&M Non-Labor Forecast	Forecast for existing employees non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49		O&M Labor Forecast	Forecast for existing employees labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51		O&M New FTEs	Forecast for new FTEs	P							-	-	-	-	-	-	-	-	-	-	-	-	-
52		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P							-	-	-	-	-	-	-	-	-	-	-	-	-
53		O&M IS Associate Program	Forecast for new IS Associate Program	P							-	-	-	-	-	-	-	-	-	-	-	-	-
54		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P							-	-	-	-	-	-	-	-	-	-	-	-	-
55	Respond Subtotal				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56	Recover	O&M GRC - Historical	Base business historical information	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57		O&M Non-GRC - Historical	Base business historical information typically recovered through other mechanisms than the GRC	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
58		O&M Non-Labor Forecast	Forecast for existing employees non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59		O&M Non-GRC Non-Labor Forecast	Forecast for existing employees' non-GRC non-labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60		O&M Labor Forecast	Forecast for existing employees labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61		O&M Non-GRC Labor Forecast	Forecast for existing employees' non-GRC labor costs	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62		O&M New FTEs	Forecast for new FTEs	P							-	-	-	-	-	-	-	-	-	-	-	-	-
63		O&M New Non-GRC FTEs	Forecast for new non-GRC FTEs	P							-	-	-	-	-	-	-	-	-	-	-	-	-
64		O&M IS Associate Program	Forecast for new IS Associate Program	P							-	-	-	-	-	-	-	-	-	-	-	-	-
65		O&M Non-GRC IS Associate Program	Forecast for new non-GRC IS Associate Program	P							-	-	-	-	-	-	-	-	-	-	-	-	-
66	Recover Subtotal				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	TOTAL				\$ 3,674	\$ 7,289	\$ 1,905	\$ 1,194	\$ 1,825	\$ 1	\$ 1,826	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,000	\$ 9,000	\$ 3,000	\$ 9,000

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