Risk Assessment Mitigation Phase
(RAMP-B)
Enterprise Risk Management Framework

November 27, 2019

TABLE OF CONTENTS

I. INTRODUCTION

This chapter discusses the risk management framework for San Diego Gas & Electric Company (SDG&E or Company). For purpose of RAMP, the Company has integrated the directives established in Decision (D.) 18-12-014 and the Settlement Agreement adopted therein (SA Decision) into the Company's existing enterprise risk management (ERM) framework. This chapter describes in detail the current ERM framework utilized by the Company.

II. ENTERPRISE RISK MANAGEMENT FRAMEWORK

As described in the direct testimony of Risk Management and Policy witness Diana Day in the Test Year 2019 General Rate Case,[1] the Company's risk framework:

> is modeled after ISO [International Organization for Standardization] 31000, an internationally recognized risk management standard. This framework consists of an enterprise risk management governance structure, which addresses the roles of employees at various levels ranging up to the Companies' Board of Directors, as well as risk processes and tools. One such process is the six-step enterprise risk management process.

Figure 1 below describes the Company's enterprise risk management process, by which the Company identifies, manages, and mitigates enterprise risks, and aims to provide consistent, transparent, and repeatable results.

[1] A.17-10-007/-008 (cons.), Exhibit (Ex.) 03 (SCG/SDG&E Day/Flores/York Revised Direct) at DD-8.

Figure 1: Enterprise Risk Management Process

The process illustrated in Figure 1 aligns with Cycla Corporation's 10-step evaluation method, which was adopted by the Commission in 2016 "as a common yardstick for evaluating maturity, robustness, and thoroughness of utility Risk Assessment and Mitigation Models and risk management frameworks."[2] While the lexicon used by Cycla differs slightly from that of the Company, the content is largely aligned. Table 1 below provides a side-by-side comparison of the steps in the Company's ERM process to the Cycla method sections.

Table 1: ERM Process Alignment with the Cycla Method

Steps in Cycla[3]	Corresponding Risk Step in Enterprise Risk Management Process
Step 1: Identify Threats	1. Risk Identification

[2] D.16-08-018 at Ordering Paragraph (OP) 4.

[3] *Id.* at 17, referencing Evaluation of PG&E's 2014 Gas Distribution General Rate Case (GRC) Filing, by Cycla Corporation, Attachment 3, page 2, Figure 3-1.

Step 2: Characterize Sources of Risk; Step 3: Identify Candidate Risk Control Measures (RCMs)	2. Risk Analysis
Step 4: Evaluate the Anticipated Risk Reduction for Identified RCM	3. Risk Evaluation & Prioritization
Step 5: Determine Resource Requirements for Identified RCMs; Step 6: Select RCMs Considering Resource Requirements and Anticipated Risk Reduction	4. Risk Mitigation Plan Development & Documentation
Step 7: Determine Total Resource Requirement for Selected RCMs; Step 8: Adjust the Set of RCMs to be Presented in Rate Case Considering Resource Constraints; Step 9: Adjust RCMs for Implementation following CPUC Decision on Allowed Resources	5. Risk Informed Investment Decisions and Risk Mitigation Implementation
Step 10: Monitor the Effectiveness of RCMs	6. Monitoring and Review

The Company performs its ERM process annually, resulting in an enterprise risk registry (ERR). The ERR contains each of the Company's identified enterprise-level risks. Each risk is assigned to one or more risk owner(s), a member of the senior management team who is ultimately responsible and accountable for the risk, and one or more risk manager(s) responsible for ongoing risk assessments and overseeing the implementation of risk plans. The ERM organization facilitates sessions amongst the Company's risk owners to identify, evaluate, and prioritize risks, and to review mitigation plans and consider how investments align with risk priorities.

As Ms. Day explained: "The enterprise risk management process is both a 'bottom-up' and 'top-down' approach, by taking input from the risk managers and the risk owners to ultimately finalize the risk registry. As with any useful risk assessment, the enterprise risk registry is not intended to be static; it must be refreshed on an annual basis. Risks are dynamic; risks that were consolidated together may be separated out, new risks may appear, and the level of the risk may change over time."[4]

Each of the steps in the ERM process are discussed further below.

A. Risk Identification

Risk identification is the process of finding, recognizing, and describing risks. As the first step in the risk management process, the ERM organization works with various business units to update existing risk information and identify enterprise-level risks that have emerged or accelerated since the prior assessment. This part of the process also includes the identification of risk events, their causes, and potential consequences. Figure 2 below provides a depiction of the Risk Bow Tie, which is a commonly-used tool for risk analysis. The risk Bow Tie is a way to systematically and consistently evaluate the Drivers/Triggers, possible outcomes, and Potential Consequences of a Risk Event. The left side of the Risk Bow Tie illustrates potential Drivers and/or Triggers that may lead to a Risk Event (center of the Risk Bow Tie) and the right side shows the Potential Consequences of a Risk Event.[5]

[4] Ex. 03 (SCG/SDG&E Day/Flores/York Revised Direct) at DD-9.

[5] This 2019 RAMP Report uses the SA Decision lexicon. Please refer to Appendix A-1 in Chapter RAMP-A for a glossary of terms.

Figure 2: Example of Risk Bow Tie

The Company breaks down risks into two groupings – operational risks and cross-cutting risks. Operational risks are those events that have operational implications and may result in damage to or loss of company or public assets, serious injury and/or fatality, and/or interruption of service to customers. An example of an operational risk is Third Party Dig-in on a Medium or High Pressure Pipeline Incident. Cross-cutting risks, while not specific to one asset or group of assets, may also have similar potential consequences to those of operational risks. An example of a cross-cutting risk is Employee Safety, since it focuses on human systems and cuts across all asset types.

The categorization of the 2019 RAMP Report's risks is outlined in Table 2 below. As discussed in RAMP-A, there are 18 separate risk chapters presented: eight for Southern California Gas Company (SoCalGas), nine for SDG&E, and one joint SoCalGas/SDG&E chapter.

Table 2: Categorization of Risks

Category	SoCalGas	SDG&E
Gas	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)	
	High Pressure Gas Pipeline Incident (Excluding Dig-in)	
	Third Party Dig-in on a Medium Pressure Pipeline	
	Third Party Dig-in on a High Pressure Pipeline	
	Storage Well Integrity Event	N/A
Electric	N/A	Wildfires involving SDG&E Equipment (including Third Party Pole Attachments)
	N/A	Electric Infrastructure Integrity
Cross-Cutting	Employee Safety	
	Contractor Safety	
	Customer and Public Safety	
	Cybersecurity	

B. Risk Analysis

Risk analysis is the process of understanding the risk and the degree of risk. Risk analysis provides a basis for risk evaluation and decisions about risk mitigation. Risk analysis is undertaken using varying methodologies, depending on the risk and the availability of data and resources. The Company utilizes a combination of qualitative (*e.g.*, calibrated subject matter expertise) and quantitative analyses (including external data) to analyze its risks.

C. Risk Evaluation and Prioritization

Using the information from the prior steps, an evaluation and prioritization is performed. The result of this step is pre-mitigation risk scores for each risk in the ERR and a relative ranking reflecting consensus around risk priorities. This step involves a discussion of each ERR risk, including changes in the risk frequency or impact, challenges, and elements of the previous assessment's implementation of mitigants. Arriving at a risk prioritization can be an iterative process; risks that may be very different are compared to one another to determine a relative ranking (for example, evaluating an IT risk in comparison with a customer service risk).

In 2018, the Company completed its ERR before year-end and in advance of the issuance of the SA Decision. The evaluation and prioritization process for the 2018 ERRs used the Company's 7x7 matrix, a risk tool that aids in developing the pre-mitigation risk score for ERR risks. Subsequently, the SA Decision was adopted in December 2018 and provided, among other things, a new methodology to be used as the basis of this RAMP Report, rather than the 7x7 matrix.

In particular, the SA Decision established a multi-attribute value function (MAVF).[6] For purposes of this RAMP Report, the Company developed a new MAVF consistent with the SA Decision. Using this MAVF, the Company conducted a secondary analysis on each risk that was identified in its 2018 ERR, which resulted in new pre-mitigation risk scores. This process, methodology, and calculations for the pre-mitigation risk scores are further discussed in Chapter RAMP-C.

D. Risk Mitigation Plan Development & Documentation

Based on the analysis and evaluation of risks in the prior steps, risk owners and managers develop, and document risk mitigation plans to capture the state of the risk given current control activities and any additional mitigations. On an annual basis, the ERM organization facilitates the risk mitigation planning session where risk owners present their key risk mitigation plans and alternatives considered to the senior management team and discuss the feasibility and prudence of those plans. This risk mitigation planning session helps shape the Company's priorities going into the annual investment planning process and helps identify gaps and/or areas of overlap in risk mitigation plans.

E. Risk-Informed Investment Decisions and Risk Mitigation Implementation

The capital planning process is the Company's current annual process for prioritizing funding based on risk informed priorities and input from operations. The capital allocation planning sessions begin with input from functional capital committees that comprise subject matter experts who perform high level assessments of the capital requirements based on achieving the highest risk mitigation at the lowest attainable costs. These requirements are

[6] D.18-12-014 at Attachment A, A-8 (Risk Assessment).

presented to a cross-functional team representing each functional area with capital requests. This committee reviews the resource requirement submissions from all functional areas, and projects are evaluated against priority by assessing a variety of metrics including safety, cost effectiveness, reliability, security, environmental, strategic, and customer experience. Recommendations for capital spending are then presented to an executive committee for approval. Once the capital allocations are approved, each individual operating organization is chartered to manage their respective capital needs within the capital allotted by the plan. This includes re-prioritizations as necessary to address imminent safety concerns as they arise. Similar to the Company's risk evaluation processes, the capital planning process is continuing to evolve as the Company endeavors to achieve the goal of determining more quantitatively the risk reduction per dollar invested.

F. Monitoring and Review

Monitoring and reviewing the aspects of risk management supports the Company's efforts to continuously improve their risk management practices. Periodic reviews of the ERR are performed to keep the register current and facilitate discussions on any emerging new risks that the Company could face. In addition to using risk scores to monitor changes in risks, the Company leverages risk metrics similar to those identified in the S-MAP to hold parties accountable and improve risk oversight.

III. CONTINUOUS IMPROVEMENT OF RISK MANAGEMENT PRACTICES

The Company's risk management practices continue to mature. This is evidenced through the implementation of the processes and methodologies in the SA Decision, as well as other steps the Company is taking for advancement. The TY 2019 GRC presented a vision related to integrating risk, asset, and investment management to be accomplished over future GRC cycles.[7] The Company is moving on that trajectory, further integrating risk, asset, and investment management into the Company's culture.

While the Company's risk practices to date have largely focused on expressing risks in terms of risk events, there is a growing interest in aligning risks with asset management

[7] Ex. 03 (SCG/SDG&E Day/Flores/York Revised Direct) at Figure DD-4.

practices. Accordingly, there are considerable efforts underway to provide additional granularity of risks and asset health.

One effort demonstrating additional granularity is the development of operating unit risk registries. As explained by Ms. Day, "[t]he operating unit risk registries are intended to provide each operating unit with a tool to capture its specific risks and enable a more structured management of lower consequence risks that occur more frequently and are dealt with at the operating unit levels. As the operating unit risk registries evolve and mature, they will inform the assessment of risks at the enterprise level and provide improved risk quantification and granularity across the Company."[8] The Company continues to work on developing operating unit risk registries in different operating areas of the Company and refining the process. The Company is leveraging the operating unit risk registries to inform internal asset management strategies to continue the integration of risk and asset management.

Additionally, the Company is committed to developing a Safety Management System (SMS),[9] which, according to the Office of Safety Advocate (OSA), is "a key tool for achieving safety goals, managing risks and opportunities, and meeting requirements and expectations."[10] A prudent SMS will further integrate risk, safety, and asset management under one framework. SMS is further discussed in Chapter RAMP-F.[11]

The Company continually seeks to implement metrics into its risk-based decision-making processes. Risk metrics span risk, asset, and investment management, in that they help evaluate and monitor asset health and potentially inform and demonstrate progress related to investments. D.19-04-020 approved safety performance metrics, which are reportable on an annual basis beginning in March 2020. The Company's data collection efforts and the metrics themselves will continue to support risk-based decision-making. Further, metrics are tied to investments in that the Company will provide an explanation in its annual Risk Spending Accountability

---

8 *Id.* at DD-23.

9 A.17-10-007/008 (cons.), Ex. 90 (SCG/SDG&E Buczkowski/Geier Rebuttal) at DLB/DLG-5.

10 A.17-10-007/008 (cons.), Ex. 442 (OSA Contreras Prepared Testimony) at 2-20.

11 Chapter RAMP-F is Company-specific as denoted by SCG RAMP-F and SDG&E RAMP-F.

Reports of how the reported safety metric data reflects progress against the safety goals in the Company's RAMP and GRC. In addition to CPUC-reportable metrics, the Company is in the process of identifying ways in which to quantify and track effectiveness related to its mitigations from this 2019 RAMP Report.

IV. EVOLUTION OF RISKS IN THE ERR COMPARED TO 2016 RAMP AND TY 2019 GRC

The SA Decision requires that the RAMP Report highlight changes to the ERR from previous RAMP or GRC filings.[12] Pursuant to this requirement, Appendix B-1 puts forth a comparison of the risks in this 2019 RAMP Report compared to those that were presented in the Company's 2016 RAMP Report, which was integrated into the TY 2019 GRC, and the 2018 ERR.

The primary driver for changes in the risks selected for the 2019 RAMP Report is related to the assessment methodology as established by the SA Decision. Essentially, in using the more quantitative method for risk assessment from the SA Decision[13] compared to the Company's prior risk analysis tools (*i.e.*, the 7x7 matrix), certain risks' scores in the Safety attribute changed (*e.g.*, Workplace Violence). The Company notes that the risks are dynamic; accordingly, risks in the ERR may change annually based on the ERM process identified above. Some risks that the Company manages, while important, did not rise to the enterprise-level to be included in the 2018 ERR. In addition, as discussed in Chapter RAMP-A, the Company generally excluded secondary impacts from its quantitative analysis when identifying risks for this 2019 RAMP Report. Additionally, as explained in Chapter RAMP-A, for this 2019 RAMP Report, some risks from the Company's 2016 RAMP Report are no longer presented as distinct risk chapters, but rather are identified as Drivers/Triggers to other risks. Examples of these include records management and climate change. Because the Company's ERRs are risk-event based, meaning generally risks in the ERR are identified as risk events, capturing risks such as records management and climate change as Drivers/Triggers to other risks is aligned with the

[12] D.18-12-014 at Attachment A, A-7 (Risk Identification and Definition).

[13] *See id.* at Attachment A, A-8 – A-9 (Step 2A).

Company's enterprise risk management framework. Records management and climate change adaptation are further discussed below.

A. Records Management

Records management-related risks were captured in the Company's 2018 ERRs as mitigations related to risks supporting the Company's efforts to construct, operate, and maintain the system safely and prudently as well as satisfy regulatory compliance requirements and data retention policies. A number of risks presented in the 2019 RAMP Report have records management related Drivers/Triggers associated with them. For example, the Medium Pressure Pipeline Incident risks (SCG-1 and SDG&E-6) have an "Incorrect/inadequate asset records" Driver/Trigger incorporated into their respective Bow Ties. Although there are some Controls and Mitigations that directly mitigate this risk, there may be additional efforts by the Company to target this risk that are not presented in the 2019 RAMP Report. Maintaining asset records, having adequate systems and processes in place for capturing changes in asset information, and executing projects that improve data automation and validation are critical to the Company's operations.

B. Climate Change Adaptation

Climate Change Adaptation was included in the Company's 2018 ERRs. The risk of Climate Change Adaptation remains a significant issue globally and here in California. The Company has several programs in place and takes the risk of climate change very seriously. The Company views climate change as a driver and/or trigger to some of the top-identified safety risks included herein. To address the risk of climate change, the Company's RAMP Report focuses on the drivers of climate change and the potential resulting impacts, which in turn yielded the adaptation assessment and mitigation efforts presented in the risk chapters of this 2019 RAMP Report. Therefore, Climate Change Adaptation is not included as an individual risk chapter within this 2019 RAMP Report but is addressed within the risk chapters, including Wildfire (Chapter SDG&E-1), Electric Infrastructure Integrity (SDG&E-4), Medium Pressure

Pipeline Incident (SCG-1 and SDG&E-6) and High Pressure Pipeline Incident (SCG-5 and SDG&E-8),[14] as a driver/trigger.

[14] In certain risk chapters, such as the High Pressure Pipeline Incident, the Driver/Trigger "Natural forces (natural disasters, fires, earthquakes)," includes effects of climate change such as earth movement, earthquakes, landslides, subsidence, heavy rains/floods, lightning, temperature, thermal stress, frozen components, wildfires and high winds.

Appendix B-1
SoCalGas and SDG&E
Risk Comparison

SoCalGas		
2016 RAMP Risks Integrated into TY 2019 GRC	**2018 ERR**	**2019 RAMP Risk[1]**
Catastrophic Damage involving Medium-Pressure Pipeline Failure	Medium Pressure Gas Pipeline Incident (Excluding Dig-in) that Leads to Catastrophic Damage	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)
Employee, Contractor, Customer and Public Safety	Employee Safety	Employee Safety
	Contractor Safety	Contractor Safety
	Customer and Public Safety	Customer and Public Safety
Catastrophic Damage involving High-Pressure Pipeline Failure	High Pressure Gas Pipeline Incident (Excluding Dig-in) that Leads to Catastrophic Damage	High Pressure Gas Pipeline Incident (Excluding Dig-in)
Catastrophic Damage Involving Third Party Dig-Ins	Third Party Dig-in on a Medium Pressure Pipeline that Leads to Catastrophic Damage	Third Party Dig-in on a Medium Pressure Pipeline
	Third Party Dig-in on a High Pressure Pipeline that Leads to Catastrophic Damage	Third Party Dig-in on a High Pressure Pipeline
Catastrophic Event related to Storage Well Integrity	Storage Well Integrity Event that Leads to Catastrophic Damage	Storage Well Integrity Event
Cyber Security	Cyber Security	Cybersecurity
Workplace Violence	Workplace Violence	n/a
Physical Security of Critical Gas Infrastructure	Physical Security of Critical Gas Infrastructure	n/a
Workforce Planning	Workforce Planning	n/a
Records Management	Inadequate Asset Records for High Pressure Gas that Lead to Catastrophic Damage	n/a
	Inadequate Asset Records for Medium Pressure Gas that Lead to Catastrophic Damage	n/a
Climate Change Adaptation	Climate Change Adaptation	n/a
Other Risks in the SoCalGas 2018 ERR[2]		
System Reliability Impacts Due to Loss of a Storage Field		
Insufficient Supply to the Natural Gas Transmission System		
Southern System Reliability		
Inability to Recover Technology and Applications		
Gas Pipeline Safety Regulatory Compliance		

[1] Each risk presented in the 2019 RAMP Report was part of the 2018 ERR; however, risk names as presented in the 2019 RAMP Report may be modified slightly in comparison to the 2018 ERR to align with the risk definition applied for purposes of the 2019 RAMP Report. Per the SA Decision, "[t]he [ERR] is the starting point for identifying the risks that will be included in the RAMP." (D.18-12-014, Attachment A, at Item No. 8.)

[2] These risks were part of the 2018 ERR but were not included in the 2016 RAMP Report or the 2019 RAMP Report.

Ability to Continue to Procure Insurance
Environmental Compliance
Failure of Disaster Recovery / Business Resumption
Capacity Restrictions or Disruptions to the Natural Gas Transmission System

SDG&E		
2016 RAMP Risks Integrated into TY 2019 GRC	**2018 ERR**	**2019 RAMP Risk[1]**
Wildfires Caused by SDG&E Equipment	Wildfires involving SDG&E Equipment (including Third Party Pole Attachments)	Wildfires involving SDG&E Equipment (including Third Party Pole Attachments)
Employee, Contractor and Public Safety	Contractor Safety	Contractor Safety
	Employee Safety	Employee Safety
	Customer and Public Safety	Customer and Public Safety
Electric Infrastructure Integrity	Electric Infrastructure Integrity	Electric Infrastructure Integrity
Catastrophic Damage Involving Medium-Pressure Pipeline Failure	Medium Pressure Gas Pipeline Incident (Excluding Dig-ins) that Leads to Catastrophic Damage	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)
Catastrophic Damage involving Third Party Dig-Ins	Third Party Dig-in on a Medium Pressure Pipeline that Leads to Catastrophic Damage	Third Party Dig-in on a Medium Pressure Pipeline
	Third Party Dig-in on a High Pressure Pipeline that Leads to Catastrophic Damage	Third Party Dig-in on a High Pressure Pipeline
Catastrophic Damage involving High-Pressure Gas Pipeline Failure	High Pressure Gas Pipeline Incident (Excluding Dig-ins) that Leads to Catastrophic Damage	High Pressure Gas Pipeline Incident (Excluding Dig-in)
Cyber Security	Cyber Security	Cybersecurity
Major Disturbance to Electrical Service (Blackout)	Electric Grid Failure and Restoration (Blackout/ Failure to Black Start)	n/a
Fail to Black Start		
Aviation Incident	Aviation Incident	n/a
Unmanned Aircraft System (UAS) Incident		
Workplace Violence	Workplace Violence	n/a
Records Management	Inadequate Asset Records for High Pressure Gas that Lead to Catastrophic Damage	n/a

[1] Each risk presented in the 2019 RAMP Report was part of the 2018 ERR; however, risk names as presented in the 2019 RAMP Report may be modified slightly in comparison to the 2018 ERR to align with the risk definition applied for purposes of the 2019 RAMP Report. Per the SA Decision, "[t]he [ERR] is the starting point for identifying the risks that will be included in the RAMP." (D.18-12-014, Attachment A, at Item No. 8.)

	Inadequate Asset Records for Electric	n/a
Climate Change Adaptation	Climate Change Adaptation	n/a
Distributed Energy Resources (DER)	n/a	n/a
Public Safety Event – Electric[2]	n/a	n/a
Workforce Planning	n/a	n/a
Other Risks in the SDG&E 2018 ERR[3]		
Capacity Restrictions or Disruptions to the Natural Gas Transmission System		
Ability to Continue to Procure Insurance		
Negative Customer Impacts Caused by Outdated Customer Information Systems		
Insufficient Supply to the Natural Gas Transmission System		
Inability to Recover Technology and Applications		
Physical Security of Critical Electric Infrastructure		
Environmental Compliance		
Massive Smart Meter Outage		

[2] Elements of this risk (*e.g.*, controls) are now included in other risks in the 2018 ERR.
[3] These risks were part of the 2018 ERR but were not included in the 2016 RAMP Report or the 2019 RAMP Report.