Risk Assessment Mitigation Phase (RAMP-A) Overview & Approach

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I. RAMP OVERVIEW

A. Introduction

San Diego Gas & Electric Company (SDG&E or Company) presents its 2019 Risk Assessment Mitigation Phase (RAMP) Report to the California Public Utilities Commission (Commission or CPUC) in the RAMP Order Instituting Investigation (OII) proceedings, I.19-11-011 (approved on November 7, 2019). This 2019 RAMP Report marks a significant milestone in the Company's risk-informed decision-making framework process and in the journey of the California investor-owned utilities' (IOUs) efforts over the past several years to incorporate in this Report the "quantitative approach to risk assessment and risk prioritization"[1] approved by the Commission in Decision (D.) 18-12-014, the Safety Model Assessment Proceeding (S-MAP) Settlement Agreement Decision (SA Decision). This Chapter provides an overview of the Company's 2019 RAMP Report and outlines the approach and guiding principles applied to this RAMP Report.

The RAMP is considered the first phase of the Company's next General Rate Case (GRC), Test Year (TY) 2022. The purpose of the RAMP is 'to examine the utility's assessment of its key risks and its proposed programs for mitigating those risks."[2] Consistent with this purpose, the 2019 RAMP Report focuses on the Company's key safety risks and the current and proposed activities to help mitigate those risks. Specifically, the RAMP Reports of Southern California Gas Company (SoCalGas) and SDG&E present 18 risk specific chapters; eight for SoCalGas, nine for SDG&E, and one joint SoCalGas/SDG&E chapter. These chapters are categorized into risks related to 1) gas assets, 2) electric assets, and 3) human systems (or cross-cutting) risks. Each identified RAMP risk is discussed in detail in the individual risk chapters associated to a particular Risk Event[3] and complies with the directives in the SA Decision.

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1 D.18-12-014 at 28.

2 D.14-12-025 at 31 (citation omitted).

3 Attachment A-1 provides a glossary of the terms used in this 2019 RAMP Report.

Although this is not the Company's first RAMP Report, it is the first RAMP Report that implements the methodology and processes adopted in the SA Decision;[4] including developing a new Multi-Attribute Value Function (MAVF).[5] This RAMP Report also reflects lessons learned from the Company's 2016 RAMP Report as well as from the RAMP filings of Pacific Gas and Electric Company (PG&E) and Southern California Edison Company (SCE).

B. Requirements for RAMP

This 2019 RAMP Report was developed in accordance with Commission guidance and the directives adopted in D.14-12-025, D.16-08-018, and the SA Decision. The SA Decision adopted the following minimum required elements:[6]

- Building a MAVF (Step 1A);
- Identifying Risks for Investor-Owned Utilities' Enterprise Risk Register (Step 1B);
- Risk Assessment and Risk Ranking in Preparation for RAMP (Step 2A);
- Selecting Enterprise Risks for RAMP (Step 2B); and
- Mitigation Analysis for Risks in RAMP (Step 3).

In addition to the above, the SA Decision also adopted modifications or enhancements of D.16-08-018 as follows:

- In the MAVF, establish a minimum 40% safety weight unless utilities can justify a lower weight based on their respective analyses;
- Enhance the current RAMP 10-major components;
- Update the risk lexicon; and
- Identify future matters for an Order Instituting Rulemaking that will explore lessons learned from the first S-MAP, adopt a Long-Term Road Map, and develop a scope and timeline for successive S-MAP applications.

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4 *See* D.18-12-014, which adopted the S-MAP Settlement Agreement with modifications and contains the minimum required elements to be used by the utilities for risk and mitigation analysis in the RAMP and GRC.

5 The MAVF is discussed further in Chapter RAMP-C.

6 D.18-12-014 at Attachment A, A-4.

A roadmap demonstrating compliance with the RAMP requirements, in particular the 10 components of RAMP filings, is provided further below.

In addition to the RAMP requirements set forth in various risk-related proceeding directives, the Company's TY 2019 GRC decision (D.19-09-051) included items to be addressed in this RAMP Report. One such directive requires inclusion of a re-testing implementation plan related to pipelines under Pipeline Safety Enhancement Plan (PSEP) Phase 2B as part of this 2019 RAMP filing, and provides specific items to be included in this plan.[7] The Company intends to present information, as required in D.19-09-051, in RAMP and GRC filings when the anticipated PSEP Phase 2B projects are within the applicable GRC period. At this time, the Company forecasts that its PSEP Phase 2B projects will begin after 2025, which is approximately two GRC cycles from now; clearly not in scope of the Company's 2019 RAMP Report or the TY 2022 GRC. Consistent with the foregoing, a letter to Executive Director, Alice Stebbins, was sent on October 31, 2019, requesting an extension of time to comply with this directive related to the PSEP Phase 2B implementation plan in D.19-09-051.[8] The extension was granted on November 18, 2019, and therefore the PSEP Phase 2B implementation plan ordered in D.19-09-051 is not included in this RAMP Report.

In addition, D.19-09-051 suggested that many of the recommendations put forth by the Office of the Safety Advocate (OSA) regarding enhancements to the Company's safety culture and safety management systems, in particular American Pipeline Institute (API) Recommended Practice (RP) 1173, are "better addressed in SoCalGas' next RAMP filing."[9] The Company includes supplemental information on safety culture and its safety management systems in Chapter RAMP-F of this RAMP Report and looks forward to continuing to work with stakeholders on these matters.

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7 D.19-09-051 at Ordering Paragraph 15.

8 SDG&E did not include PSEP forecasts in the TY 2019 GRC. While D.19-09-051 only ordered SoCalGas to complete the re-testing implementation plan, SDG&E also anticipates classifying pipeline segments as Phase 2B for inclusion in future GRC requests. Accordingly, both SoCalGas and SDG&E requested an extension to comply with what was ordered in D.19-09-051.

9 D.19-09-051 at 97.

II. RAMP APPROACH

A. General Approach

The Company's intent is to present a transparent and collaborative RAMP Report that advances utility risk-informed decision-making within the Commission's regulatory process. To accomplish this, the Company developed this RAMP Report in accordance with the SA Decision, with due consideration of feedback received from various stakeholder groups,[10] and incorporated lessons learned. Each are further discussed in this Section.

1. Roadmap of Compliance with RAMP Requirements

The approach adopted by the Company herein satisfies the following "Ten Major Components of RAMP Filings" as enhanced by the SA Decision.[11] Further, this approach, together with the enterprise risk management framework presented in Chapter RAMP-B, satisfies the Cycla ten-step evaluation process.

1. **Identify its top risks.** The Company identified its respective top risks as part of the 2018 Enterprise Risk Registry (ERR). The 2018 ERR was used as the starting point for RAMP. Consistent with the SA Decision, the risks presented within this 2019 RAMP Report include, at minimum, those risks that were the top 40% of risks identified in the Company's 2018 ERR with a safety score greater than zero.
2. **Describe the controls or mitigations currently in place.** Section V of each individual risk chapter describes the Company's current baseline controls and proposed mitigations as part of the Company's Proposed Risk Mitigation Plan. A Control, as defined by the Lexicon adopted in D.18-12-014, is a "[c]urrently established measure that is modifying risk."[12] Therefore, the Company generally considered Controls to be activities in place as of the end of 2018 and baseline

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[10] On January 9, 2019, the Company had a meeting with the Safety Enforcement Division (SED) regarding RAMP. On February 5, 2019, the Company provided SED with a preview of its showing for the March 5, 2019 workshop. On March 27, 2019, the Company had a follow-up discussion with The Utility Reform Network (TURN), SED, and OSA. SED and OSA met with the Company again on July 10, 2019.

[11] D.18-12-014 at 33-35.

[12] *Id.* at 16. A Mitigation is defined as a "[m]easure or activity proposed or in process designed to reduce the impact/consequences and/or likelihood/probability of an event." *Id*. at 17.

costs represent costs incurred for said Controls in 2018. The Controls currently in place are identified in each risk chapter in Section I.B and are further described in Section V of each risk chapter. Baseline and forecasted costs are identified within Section VII of each risk chapter.

3. **Present its plan for improving the mitigation of each risk.** The Company's proposed Risk Mitigation Plans, presented within each of the individual risk chapters, are plans that the Company believes are feasible to be executed and which it plans to put forth in the next GRC application, currently anticipated to be filed in September 2020. The proposed Risk Mitigation Plans are contingent on resource availability, permitting, operational compliance, and other factors, and therefore the Company's identified activities may be subject to constraints and/or delays.

4. **Present two alternative mitigation plans that it considered.** Section VIII within each of the individual risk chapters present at least two considered alternative mitigations with associated costs and Risk Spend Efficiencies (RSEs). The Company's alternative mitigation plans presented herein are defined as specific individual activities that were considered in the process of determining the Company's risk management efforts but are not currently proposed at this time. Although an increase/decrease in scope of activities may be a feasible approach to alternatives, the individual risk chapters (with the exception of the Cybersecurity risk chapter) do not take this approach, based on feedback from the Commission's Safety and Enforcement Division (SED).

5. **Present an early stage "risk mitigated to cost ratio" or related optimization.** For each Control or Mitigation activity where an RSE analysis is performed, the Company includes a post-mitigation analysis, which includes a Likelihood of Risk Event (LoRE) and Consequence of Risk Event (CoRE), within Section VI of each individual risk chapter. In addition, Appendix D-1 provides a ranking of the Company's Controls and Mitigations by RSE, where an RSE analysis is

performed, consistent with the SA Decision.[13] Controls and mitigations with RSEs are listed in descending order.

6. **Identify lessons learned in the current round to apply in future rounds.** As the first utilities to prepare a RAMP Report under the current S-MAP framework, "lessons learned" are discussed in Chapter RAMP-G.

7. **Move toward probabilistic calculations, to the maximum extent possible.** This 2019 RAMP Report applies the probabilistic analysis required by the SA Decision. The Company will continue working toward a more probabilistic analysis in future RAMP reports, as further discussed in Chapter RAMP-C.

8. **For those business areas with less data, improve the collection of data and provide a timeframe for improvement**. The Company will position itself to continually improve data collection efforts and therefore improve the risk assessment process. Further discussion on data collection can be found in Chapter RAMP-G.

9. **Describe the company's safety culture, executive engagement, and compensation policies.** Chapter RAMP-F is dedicated to describing the Company's safety culture, executive engagement, and compensation policies.

10. **Respond to immediate or short-term crises outside of the RAMP and GRC process.** Although this 2019 RAMP Report identifies the Company's key safety risks, the Company responds to immediate or short-term needs outside of this RAMP effort and continually manages risk.

B. RAMP Workshop Requirement

The SA Decision requires the Company to host a publicly noticed workshop in preparation for the RAMP filing (Pre-RAMP Workshop). The Company's Pre-RAMP Workshop was properly noticed and held on March 5, 2019.[14] The intent of the Pre-RAMP Workshop was to gather input from stakeholders to inform the determination of the final list of

[13] *Id.* at Attachment A, A-14 (Mitigation Strategy Presentation in the RAMP and GRC).

[14] The presentation provided for the Pre-RAMP workshop may be accessed on the California Public Utilities Commission, Utility Risk Assessment and Safety Advisory website (Major Proceedings), *available at* https://www.cpuc.ca.gov/riskassessment/.

risks to be included in the 2019 RAMP Report. Accordingly, the Company provided the following information to the interested parties on February 19, 2019, in advance of the workshop:

- their preliminary list of RAMP risks;
- the Safety Risk Score for each risk in the ERR; and
- the Multi-Attribute Risk Score for the top ERR risks.

Representatives from the SED and Energy Division, The Utility Reform Network (TURN), OSA, and Indicated Shippers attended the Company's Pre-RAMP Workshop. The Company appreciates the input received during the Pre-RAMP Workshop,[15] had subsequent discussions with the above-noted stakeholders and has incorporated or otherwise addressed such feedback, as described below, in this 2019 RAMP Report.

1. Use of National Data for Determining the Risk Quantification Score

During the Pre-RAMP Workshop, TURN raised concerns that the use of national data could potentially overestimate the safety implications of a given risk and may undermine strides and investments that have been made in California to improve safety. The Company appreciates TURN's feedback on the use of national level data. As noted above, the methods implemented in this RAMP Report, which were adopted in the SA Decision, are more quantitative than before, making the use of data, as well as subject matter expertise, necessary. That said, many of the risks included in the Company's ERRs are low frequency, high consequence events (e.g., high pressure pipeline incidents) for which there is minimal available data related to the Company's systems. Because relying solely on the Company's own data would limit the available data set, national data was appropriately applied to inform the risk assessments in this RAMP Report. When national or external data was used, the Company supplemented its analysis with subject matter expertise, consistent with the SA Decision,[16] to confirm certain portions of the risk assessment, including the applicability of the data to the Company. Additionally, the Company

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[15] The Company made its determination of the final list of risks to be addressed in the RAMP Report based on the input received from SED and other interested parties. *See* D.18-12-014 at Attachment A, A-10.

[16] *Id.* at Attachment A, A-8 – A-9 (Identification of Potential Consequences of Risk Event, Identification of the Frequency of the Risk Event).

primarily used national data to estimate an incident rate in the pre-mitigation risk score. The incident rate was then scaled to the characteristics of the Company's system or service territory.

Moreover, the use of external data is not new. External data is often used to determine potential outcomes of a risk event and the magnitude of the impacts. References to industry incidents has been informative in helping the Company determine the potential severity of the risks. Chapter RAMP-C further discusses the Risk Quantification Framework and expands on the use of national data. Further discussion on the Company's data collection efforts are included in Chapter RAMP-G.

2. Consideration of Mitigation Effectiveness

During the Pre-RAMP Workshop, SED asked how the Company planned to address mitigation effectiveness in the 2019 RAMP Report. The Company replied by explaining that estimated risk reduction benefits would be addressed in the individual risk chapters. Subject Matter Experts (SME) for each respective risk developed risk reduction benefit percentages for each Control and Mitigation where an RSE analysis was performed. Estimated risk reduction benefits are an input to each RSE. The overall methodology for determining risk reduction benefits is addressed in Chapter RAMP-D and within Section VI of each risk chapter.

As for reporting of mitigation effectiveness, *the Phase Two Decision Adopting Risk Spending Accountability Report Requirements and Safety Performance Metrics for Investor-Owned Utilities and Adopting a Safety Model Approach for Small and Multi-Jurisdictional Utilities*[17] defers approval of specific reporting requirements for the Risk Mitigation Accountability Report, contemplated in D.14-12-025, and the identification and benchmarking of industry risk-based decision-making practices to a subsequent S-MAP. The Company looks forward to collaborating with the Commission and other stakeholders on developing operative methodologies for further determining mitigation effectiveness.

3. Scoping of Risks

During the Pre-RAMP Workshop, the scope of risks and the potential overlap between risks were addressed. Based on this feedback, the Company reviewed its risks to clarify the scope of each in this RAMP Report and refined it as necessary to align with the data that was

[17] D.19-04-020.

used to determine the pre-mitigation risk score. For details regarding the calculation of pre-mitigation risk scores, please refer to Chapter RAMP-C. Additional information is also included in Chapter RAMP-G.

4. Changes Compared to the Pre-RAMP Workshop

The pre-mitigation risk scores presented at the Pre-RAMP Workshop were the result of a preliminarily MAVF.[18] The Company notes that the SA Decision permits adjustments to a MAVF over time. The Company communicated the preliminary state of its Risk Quantification Framework at the Pre-RAMP Workshop and stated that its Risk Quantification Framework may evolve prior to filing the RAMP Report.

Following the Pre-RAMP Workshop, the Company revised certain aspects of its Risk Quantification Framework. The attributes themselves (Safety, Reliability, and Financial) have not changed. The scaled units for the Safety attribute have been refined and are in accordance with MAVF Principle 5 of the SA Decision. These revisions to the Risk Quantification Framework result in modifications to the pre-mitigation risk scores as compared to the information served in preparation for the Pre-RAMP Workshop. In addition, after the Pre-RAMP Workshop, the Company added a 100,000 multiplier to the Risk Quantification Framework risk score for purposes of readability. While the multiplier changed the Risk Quantification Framework numbers, the presence of the multiplier did not in itself change the underlying math. Rather, it simply changed the position of the decimal (*e.g.*, 17.2 instead of 0.000172). Appendix A-2 provides a summary of changes to the materials presented for the Pre-RAMP Workshop using this revised Risk Quantification Framework. The rationale for the Company's Risk Quantification Framework is discussed in Chapter RAMP-C.

5. Incorporation of Lessons Learned

As mentioned above, this RAMP Report is the first instance in which the new S-MAP methodology will be applied to and presented in RAMP and GRC filings. While the Company has experienced one full RAMP/GRC process (*i.e.*, filing the first-ever RAMP Report in November 2016, incorporating the RAMP results into its TY 2019 GRC, and getting a final decision in the TY 2019 GRC that reflected RAMP), this RAMP Report differs from the

[18] The Company refers to its MAVF herein as the Risk Quantification Framework.

Company's prior RAMP Report by implementing both the requirements set forth in the SA Decision and also by implementing lessons learned. Not only does the Company have its own experience to draw from, it has also learned from PG&E's 2017 RAMP filing, SCE's 2018 RAMP filing, and the resulting feedback from SED and other parties.

For instance, a "lessons learned" from its prior RAMP filing is that the Company attempts to show activities and corresponding cost forecasts in this 2019 RAMP Report either within a single risk chapter and/or allocated between risks. In the 2016 RAMP filing, the Company did not attempt to split or apportion the costs of mitigation to each risk. Rather, costs for activities that provided risk mitigation across multiple risks were included in all applicable risk chapters. Additionally, in this 2019 RAMP Report, the Third Party Dig-in risk has been addressed in two separate risk chapters, Third Party Dig-in on a High Pressure Pipeline and Third Party Dig-in on a Medium Pressure, for additional granularity and alignment of Controls and Mitigations (compared with one chapter addressing all Third Party Dig-ins in the Company's 2016 RAMP Report).

Further, there were risk chapters that were included in the 2016 RAMP Report that are now identified as Drivers/Triggers instead of Risk Events that warrant distinct risk chapters. These items (*e.g.*, climate change) are discussed within the individual risk chapters and assessed as Drivers/Triggers that may contribute to an identified Risk Event (*e.g.,* asset failure). Additional lessons learned are discussed in Chapter RAMP-G.

C. Guiding Principles

The Company strives to provide transparency and uniformity of its risk presentation. This is demonstrated by also providing detailed workpapers submitted concurrently with this RAMP Report. In addition, there are several assumptions and decisions that the Company applied broadly in developing the 2019 RAMP Report. This section outlines these main assumptions and guiding principles that were globally applied throughout the 2019 RAMP Report.[19] Many of these global assumptions resulted from lessons learned and are therefore also discussed in Chapter RAMP-G.

[19] Unless otherwise noted throughout the 2019 RAMP Report, these global assumptions and parameters apply to all risk areas.

1. The 2018 Enterprise Risk Registry Served as a Starting Point

The Company used its 2018 ERR as a starting point for selecting the risks to be addressed in the 2019 RAMP Report consistent with the requirements called forth in the SA Decision.[20] Although the 2018 ERR was based on the Company's 7x7 matrix, all the risks in the 2018 ERR were re-assessed within the new quantitative assessment for RAMP and the assessments in this Report reflect the implementation of the new methodology.[21] These risks were then evaluated using the process and methods approved in the SA Decision. SoCalGas' and SDG&E's 2018 ERR each identified 24 risks. Of those risks, 11 risks for SoCalGas and 12 risks for SDG&E had a safety score greater than zero. Therefore, using the processes adopted in the SA Decision, there were five risks in the top 40% for the Company that required further analysis. The result, after consulting with stakeholders, is that SoCalGas selected eight risks, SDG&E selected nine risks, and there is one risk shared between SoCalGas and SDG&E that are included in this 2019 RAMP Report.[22] Further discussion regarding the ERR-related processes are provided in Chapter RAMP-B.

The 2018 ERR was the basis for the selection of RAMP risks, based on the data used for purposes of performing the quantitative analysis, including the pre-mitigation risk score. However, the risk definitions and scope for a given risk may slightly differ from the 2018 ERR.

2. The Risk Quantification Framework Generally Excluded Secondary Impacts from the Assessment

As discussed in Chapter RAMP-C, secondary impacts were generally excluded from the risk quantification assessments; only direct impacts of a risk event were evaluated for purposes of determining the pre-mitigation risk score. Accounting for secondary impacts is particularly challenging as the impacts would span across multiple risk areas and an improved methodology and data collection is needed to determine how to best account for risk reduction benefits that may indirectly mitigate other risks.

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

[21] The SA Decision was issued in December 2018 after the Company's 2018 ERRs were finalized.

[22] D.18-12-014 at Attachment A, A-10 (Risk Selection Process for RAMP) (Based on input received from SED, other interested CPUC staff, and interested parties, the utility will make its determination of the final list of risks to be addressed in its RAMP.).

The Company recognizes that not capturing indirect impacts may underestimate the magnitude of certain risks. Although secondary impacts are managed daily, and these impacts certainly present additional risks, there are a number of hypothetical events, considerable assumptions, and limited data that may be relied upon for quantifying such impacts with a reasonable degree of confidence. An example of an event with a secondary impact is a prolonged power outage which leads to inoperable traffic lights that could result in an automobile accident, the consequences of which may include a serious injury and/or fatality. The Company will continue collaborating with the other California IOUs and stakeholders to continue to refine the process and develop improved methodologies for capturing data to support quantifying secondary impacts.

3. Cost Information Presented in RAMP

The purpose of RAMP is not to request funding. Any funding requests will be made in the Company's TY 2022 GRC application, currently anticipated to be filed in September 2020. The range of costs presented in this 2019 RAMP Report are those costs which the company anticipates requesting recovery for in the TY 2022 GRC. For this 2019 RAMP Report, the baseline costs of Controls and Mitigations are the costs incurred in 2018. This is because at the time of this RAMP Report, the last available recorded annual financial data is 2018. The cost forecasts presented herein include forecasts for anticipated capital expenditures over the forecast years of the next GRC cycle (2020-2022) and estimated operations and maintenance (O&M) cost forecasts for TY 2022. The 2019 RAMP Report presents capital costs as a sum of the years 2020, 2021 and 2022 as a three-year total; whereas O&M costs are presented for TY 2022. All dollars are presented in direct, constant 2018 thousands of dollars. This approach is anticipated to be consistent with the Company's GRC presentation. Section VII of each risk Chapter presents a summary of the baseline and forecasted costs for each Control and Mitigation by tranche.

a. RAMP Cost Forecasts are Presented in Ranges

The Company has developed cost estimates for the 2020-2022 GRC period for each Control and Mitigation, unless otherwise noted. The Company presents these cost forecasts, for both O&M and capital, in 2018 direct dollars. Using reasonable efforts, the Company has developed estimated forecast costs in ranges. It is important to note that these costs are estimates

at this point in time. The Company's TY 2022 GRC will further refine the cost estimates shown in this RAMP Report with supporting testimony.

b. Cost Forecast Methodologies

The Company generally applied a forecast methodology (*e.g.*, base year, historical average, zero-based) to identify forecast cost estimates, consistent with how costs are presented in the GRC. The Company's accounting systems are not configured to capture all costs by the level or type of risk-management activities as anticipated by the RAMP process – costs are tracked by cost center (O&M) and budget code (capital). Therefore, estimates, assumptions, and available accounting data were provided by SMEs where feasible. For Controls and Mitigations funded through capital expenditures, the Company generally does not include associated O&M expense, which typically amounts to less than 2-3% of the capital spend. As the exclusion does not materially change the risk analysis, the Company will address such expenses in its TY 2022 GRC.

c. TY 2019 Authorized Funding

The Company's test year for its prior GRC application was 2019, for which the CPUC recently issued a final decision on September 26, 2019.[23] The Company is thus expeditiously moving forward with many of the programs authorized in that decision. Because this RAMP has a base year of or identifies baseline costs for 2018, if no historical spend was recorded in 2018 or prior, an activity was denoted as a Mitigation, rather than a Control. Many of the activities authorized in the TY 2019 GRC are underway and have recorded costs in 2019. This will be shown in the TY 2022 GRC. Therefore, if funding was authorized in the TY 2019 GRC, it may still be labeled as a Mitigation, even though the Company is actively performing such activities in 2019.

d. Exclusions

For the 2019 RAMP Report, internal labor for certain baseline controls (*e.g.*, internal labor to attend training, adhering to internal protocols or standards, internal time spent at meetings, etc.) is generally excluded from the O&M baseline and forecasted cost estimates. Forecasting internal labor requires the use of cost assumptions (*e.g.*, x number of employees, x

[23] *See* D.19-09-051.

length of training, x average hourly wage). As the Company moves towards a more probabilistic approach, it was determined that cost estimates for internal labor that are not specifically accounted for in that manner should not be explicitly identified in RAMP. Further, internal labor costs are not currently tracked in such a manner which would impede accountability reporting requirements. In the spirit of the SA Decision, the Company aims to demonstrate progress toward "probabilistic calculations" for RSEs and thus attempted to eliminate assumptions, such as internal labor cost estimates, as an input to those calculations where possible. The Company points out that the exclusion of internal labor costs in this RAMP Report resulted in decreased O&M cost forecasts in some instances, particularly those related to employee, contractor, and customer and public safety.

Further, the Company expects to include the costs presented herein in its TY 2022 GRC applications. While non-GRC costs are not included herein, the Company provides in this RAMP Report a complete narrative description of the activities being proposed in the respective risk chapters' Risk Mitigation Plans, even though costs for such activities may not be specifically identified or included. This approach is necessary because, in computing RSEs, the Company found that in one instance the risk reduction was estimated for the program in its entirety, not limited to those presented in GRCs. Therefore, on a piloted basis, in the Electric Infrastructure Integrity risk chapter (Chapter SDG&E-4), SDG&E included the costs applicable to the program (GRC and non-GRC costs) to match the estimated total program benefits.

The determination of treatment of costs in this 2019 RAMP Report was highly influenced through lessons learned from the Company's 2016 RAMP Report, the TY 2019 GRC, new spending accountability reporting requirements, and overall configuration of internal accounting and tracking systems. The Company will continue to implement lessons learned and refine the process.

4. Treatment of Risk Mitigating Activities Presented in Risk Chapters

In a few cases within this RAMP Report, a Control or Mitigation may help mitigate multiple risks. For example, a safe driving training program helps mitigate employee safety risk but also helps mitigate customer and public safety. A Control or Mitigation may address multiple risks, but the full cost for those Controls and/or Mitigations that address multiple risks are presented in a single risk chapter, unless otherwise noted. While the costs may reside within

the risk chapter of primary benefit, other risk chapters may qualitatively discuss how the mitigation affects the risk in the chapter receiving the benefit. As an additional "lessons learned" from its prior RAMP filing, the Company attempts to show cost forecasts either within a single risk Chapter and/or allocated between risks. In the 2016 RAMP filing, costs for activities that provided risk mitigation across multiple risks were included in all applicable risk chapters. As the Company continues to move towards probabilistic RSE calculations, the Company aims to present costs in a single instance, even though these activities may provide risk mitigation benefits to multiple risks. Chapter RAMP-D contains further discussion on this topic.

Given that risks are dynamic and cross-cutting in nature, there are activities in this 2019 RAMP Report that contribute to mitigating other risks. This is outlined in Appendix A-3. The Company notes that for purposes of funding, these activities will only be requested once in the GRC.

This RAMP Report provides analysis of activities in scope of the risk description (as required by the SA Decision) and provides a qualitative discussion of certain risk mitigation activities that are otherwise out-of-scope due to the risk definition, to aid the Commission and stakeholders in developing a more complete understanding of the breadth and quality of the Company's mitigation activities. For example, emissions reduction activities in compliance with Senate Bill (SB) 1371 that could result in collateral safety benefits are discussed in the Medium Pressure Pipeline Incident risk chapter. This additional qualitative information is provided in the interest of full transparency and understandability, consistent with guidance from Commission staff and stakeholder discussions. These distinctions are discussed in the applicable narratives within the individual risk chapters, in Section VI. Similarly, a narrative discussion of certain activities and their associated costs is provided for certain activities and programs that may indirectly address the risk at issue, even though the scope of the risk as defined in the RAMP Report may technically exclude the mitigation activity from the RAMP analysis.

5. RSE Analysis

The SA Decision directs the Company to provide a Step 3 analysis of mitigations.[24] As further discussed in Chapter RAMP-D, RSE Methodology, where costs are not identified or not

[24] D.18-12-014 at Attachment A, A-11 – A-13.

available for a given Control/Mitigation, such as with non-GRC jurisdictional or certain internal labor costs, no RSE calculation is provided. Additionally, the Company did not perform RSE calculations on certain mandated activities. Mandated activities are defined in this RAMP Report as activities conducted in order to meet a mandate or law, such as a Code of Federal Regulation (CFR), Public Utilities Code statute, or General Order.[25] Activities with no RSE score are identified within Section VI of the individual risk chapters. Lastly, the RSEs are generally expressed in ranges.[26]

III. RAMP REPORT OVERVIEW

A. Selection of RAMP Risks

As discussed above, SoCalGas and SDG&E held a Pre-RAMP Workshop on March 5, 2019. Per the SA Decision,[27] the Company will make its determination of the final list of risks to be addressed in the RAMP based on the input received from SED and other interested parties. After considering feedback from the Pre-RAMP Workshop and subsequent discussions with interested parties, 18 separate risk chapters are being presented in this RAMP Report: eight for SoCalGas, nine for SDG&E, and one joint SoCalGas/SDG&E chapter.

The Company actively manages several other risks that are not part of the 2019 RAMP Report but are integral to daily operations and are reflected in the ERR. For example, the Company continuously monitors risks related to reliability and resiliency of the system as well as risks related to technology applications and business resumption. Consistent with the SA Decision, a supplemental analysis will be conducted in the GRC for programs not included in this RAMP Report that meet certain criteria, including those associated with ERR risks that were not included in RAMP.

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[25] For purposes of this report, the Company uses the term "mandated" in place of compliance. However, the term mandated is defined consistently with how compliance is described in Row 28 of the SA Decision. *Id.* at Attachment A, A-14 – A-17 (Step 3 Supplemental Analysis in the GRC).

[26] Risk mitigation activities with no direct safety impact will not have a range in scoring since only the safety attribute weighting contributes to the ranges.

[27] D.18-12-014 at Attachment A, A-10 (Risk Selection Process for RAMP).

B. Report Overview

This 2019 RAMP Report focuses on the Company's key safety risks and the current and proposed activities to help mitigate those risks. Each risk is discussed in detail in the individual chapters associated with a particular Risk Event. The Company also presents the following chapters, which set the foundation of this filing:[28]

- RAMP-A: Overview & Approach
- RAMP-B: Enterprise Risk Management (ERM) Framework
- RAMP-C: Risk Quantification Framework
- RAMP-D: Risk Spend Efficiency (RSE) Methodology
- RAMP-E: A Discussion on the Use of Risk Spend Efficiencies
- SCG RAMP-F: Safety Culture, Executive Engagement, and Compensation Policies
- SDG&E RAMP-F: Safety Culture, Executive Engagement, and Compensation Policies
- RAMP-G: Lessons Learned

SoCalGas' 2019 RAMP Report comprises the following risk chapters:

Chapter	Risk
SCG-1	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)
SCG-2	Employee Safety
SCG-3	Contractor Safety
SCG-4	Customer and Public Safety
SCG-5	High Pressure Gas Pipeline Incident (Excluding Dig-in)
SCG-6	Third Party Dig-in on a Medium Pressure Pipeline
SCG-7	Third Party Dig-in on a High Pressure Pipeline
SCG-8	Storage Well Integrity Event
SCG-9/ SDG&E-10	Cybersecurity

SDG&E's 2019 RAMP Report comprises the following risk chapters:

[28] Chapters RAMP-A through RAMP-E and RAMP-G contain largely the same content; however, Chapter RAMP-F is Company-specific as denoted by SCG RAMP-F and SDG&E RAMP-F.

Chapter	Risk
SDG&E-1	Wildfires involving SDG&E Equipment (including Third Party Pole Attachments)
SDG&E-2	Contractor Safety
SDG&E-3	Employee Safety
SDG&E-4	Electric Infrastructure Integrity
SDG&E-5	Customer and Public Safety
SDG&E-6	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline
SDG&E-8	High Pressure Gas Pipeline Incident (Excluding Dig-in)
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline
SCG-9/ SDG&E-10	Cybersecurity

The chapter number associated with the RAMP risk chapters identified above (*e.g.*, SDG&E-1) were assigned based on each Company's ERR risks sorted in descending order by the Safety risk score as presented at the Pre-RAMP Workshop.[29]

C. Risk Chapter Overview

In each individual risk chapter, the Company presents each risk's baseline Controls, identifies new and/or incremental proposed Mitigations to address these risks, and presents at least two alternative mitigation plans for each risk.[30] The process for selecting the risks presented in the 2019 RAMP Report is further detailed in Chapter RAMP-B.

The Company presents the following sections in each chapter:

1. Introduction
2. Risk Overview – This section provides context to the given risk including background and why this is a risk in the Company's ERR.
3. Risk Assessment – In accordance with the SA Decision,[31] this section describes the Risk Bow Tie, possible Drivers/Triggers, and Potential Consequences of each identified risk.

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

[30] Compliance requirements are further addressed in Section II herein.

[31] D.18-12-014 at 33 and Attachment A, A-11 (Bow Tie).

4. Risk Quantification – This section provides an overview of the scope and methodologies applied for the purpose of risk quantification.
5. Risk Mitigation Plan – This section includes Controls that are expected to continue and proposed Mitigations for the period of the Company's TY 2022 GRC cycle.
6. Post-Mitigation Analysis of Risk Mitigation Plan – This section describes the Step 3 analysis performed for the identified Controls and Mitigations presented as part of the Risk Mitigation Plan pursuant to the terms of the SA Decision.
7. Summary of Risk Mitigation Plan Results – This section provides a summary table of the Risk Mitigation Plan, including Controls and proposed Mitigation activities, associated costs, and RSEs, by tranche.
8. Alternative Mitigation Plan Analysis – This section presents at least two alternative mitigation plans considered as part of the risk assessment process included forecasted costs and post-mitigation analysis.

In sum, this RAMP Report represents a significant step forward in how the Company thinks about, plans for, and mitigates its key safety risks. This RAMP Report will inform the safety-related funding requests that the Company will include in its TY 2022 GRC application, currently anticipated to be filed in September 2020.

Appendix A-1
Glossary of Terms

APPENDIX A-1

Glossary of Risk Terms

The following are terms used by the Company for purposes of the 2019 RAMP Report:

Term	Definition
Baseline Costs	Costs incurred for Controls in 2018.
Base Year	The last available year of recorded financial data. In the 2019 RAMP Report the Base Year is 2018.
High Alternative	Risk Quantification Framework that provides a narrower range of the Safety attribute compared to the Single Point method (*see* Chapter RAMP-C)
Low Alternative	Risk Quantification Framework that provides a wider range of the Safety attribute compared to the Single Point method (see Chapter RAMP-C).
Mandated	Activities conducted in order to meet a mandate or law, such as a Code of Federal Regulation (CFR), Public Utilities Code statute, or General Order. For purposes of the 2019 RAMP Report, SoCalGas and SDG&E use the term "mandated" synonymously with compliance. "Mandated" in this RAMP Report is defined consistently with "compliance" as described in Row 28 of the SA Decision.
Measurement Unit	The measured attribute, also analogous to "Natural Unit" per the SA Decision Lexicon.
Monte Carlo analysis (simulation or modeling)	A technique used to understand the impact of uncertainty related to a particular risk.
Non-GRC costs	Costs with forecasts and recovery sought in a separate CPUC proceeding (outside of the GRC) and/or outside the CPUC's jurisdiction.
Pre-Mitigation Risk Score	Risk score measuring the current state of the risks with the current controls in place.
Post-Mitigation Risk Score	Risk score after implementing the mitigation activity.
Risk Quantification Framework	The Company's Multi Attribute Value Function (MAVF) presented in this 2019 RAMP Report.
SA Decision	Commission Decision (D.) 18-12-014, Phase Two Decision Adopting Safety Model Assessment Proceeding (S-MAP) Settlement Agreement With Modifications
Secondary Impacts	Impacts that are "downstream" of the initial risk event; this includes indirect impacts from a risk event.
Serious Injury	Defined as an event that requires overnight hospitalization.
Single Point	Risk Quantification Framework presented in the RAMP as mandated by the Settlement Agreement that includes one range for each Attribute.

Term	Definition
Sub-Attribute	An observable and measurable attribute that, in an attribute hierarchy, relates to a higher-level attribute. Also referred to as a lower-level attribute.
Subject Matter Expert(s)	Individual(s) with special skills or knowledge on a topic.
Tail Risks	Risk events that have a small probability of occurring, typically measured by three standard deviations from the mean of a normal distribution. Sometimes referred to as low frequency, high consequence risk events.
Test Year	First year of a General Rate Case (GRC) cycle. The 2019 RAMP Report is prepared in anticipation of the Company's subsequent GRC – the Test Year (TY) 2022 GRC.

The risk lexicon adopted by the SA Decision was used in the 2019 RAMP Report and is included below for reference:[1]

Term	Definition
Alternative Analysis	Evaluation of different alternatives available to mitigate risk.
Attribute	An observable aspect of a risky situation that has value or reflects a utility objective, such as safety or reliability. Changes in the levels of attributes are used to determine the consequences of a Risk Event. The attributes in an MAVF should cover the reasons that a utility would undertake risk mitigation activities.
Bow Tie	A tool that consists of the Risk Event in the center, a listing of drivers on the left side that potentially lead to the Risk Event occurring, and a listing of Consequences on the right side that show the potential outcomes if the Risk Event occurs.
Consequence (or Impact)	The effect of the occurrence of a Risk Event. Consequences affect Attributes of a Multi Attribute Value Function (MAVF).
Control	Currently established measure that is modifying risk.
CoRE	Consequences of a Risk Event.
CPUC	California Public Utilities Commission
Driver	A factor that could influence the likelihood of occurrence of a Risk Event. A driver may include external events or characteristics inherent to the asset or system.
Enterprise Risk Register (also referred to as "risk registry" or "ERR")	An inventory of enterprise risks at a snapshot in time that summarizes (for a utility's management and/or stakeholders such as the CPUC) risks that a utility may face. The ERR must be refreshed on a regular basis and can reflect the changing nature of a risk; for example, risks that were consolidated together may be separated, new risks may be added, and the level of risks may change over time.

[1] D.18-12-014 at 16.

Term	Definition
Exposure	The measure that indicates the scope of the risk, e.g., miles of transmission pipeline, number or employees, miles of overhead distribution lines, etc. Exposure defines the context of the risk, i.e., specifies whether the risk is associated with the entire system, or focused on a part of it.
Frequency	The number of events generally defined per unit of time. (Frequency is not synonymous with probability or likelihood.)
General Rate Case (GRC)	A CPUC proceeding that is denominated a general rate case, as well as PG&E's Gas Transmission and Storage (GT&S) rate proceeding.
Inherent Risk	The level of risk that exists without risk controls or mitigations.
Likelihood or Probability	The relative possibility that an event will occur, quantified as a number between 0% and 100% (where 0% indicates impossibility and 100% indicates certainty). The higher the probability of an event, the more certain we are that the event will occur.
LoRE	Likelihood of a Risk Event.
Mitigation	Measure or activity proposed or in process designed to reduce the impact/consequences and/or likelihood/probability of an event.
Multi-Attribute Value Function (MAVF)	A tool for combining all potential consequences of the occurrence of a risk event, and creates a single measurement of value.
Natural Unit of an Attribute	The way the level of an attribute is measured or expressed. For example, the natural unit of a financial attribute may be dollars. Natural units are chosen for convenience and ease of communication and are distinct from scaled units.
Outcome	The final resolution or end result.
Planned or Forecasted Residual Risk	Risk remaining after implementation of proposed mitigations.
Range of the Natural Unit	Part of the specification of an Attribute. For an Attribute with a numerical natural unit, such as dollars, the smallest observable value of the Attribute is the low end of the range and the largest observable value is the high end of the range. Therefore, any Attribute level that results as a consequence of an event, or a risk mitigation action, or of doing nothing should be found within the range. For weighting purposes, the range of the natural units of an Attribute should be able to describe any mitigation action. For an Attribute with a categorical natural unit, such as corporate image, the range of the Attribute is from the least desirable level to the most desirable level.
Residual Risk	Risk remaining after current controls.
Risk	The potential for the occurrence of an event that would be desirable to avoid, often expressed in terms of a combination of various outcomes of an adverse event and their associated

Term	Definition
	probabilities. Different stakeholders may have varied perspectives on risk.
Risk Driver	Same as definition for Driver.
Risk Event	An occurrence or change of a particular set of circumstances that may have potentially adverse consequences and may require action to address. In particular, the occurrence of a Risk Event changes the levels of some or all of the Attributes of a risky situation.
Risk Score	Numerical representation of qualitative and/or quantitative risk assessment that is typically used to relatively rank risks and may change over time.
Risk Tolerance	Maximum amount of residual risk that an entity or its stakeholders are willing to accept after application of risk control or mitigation. Risk tolerance can be influenced by legal or regulatory requirements.
Scaled Unit of an Attribute: a value that varies from 0 to 100	The scaled unit is set to 0 for the most desirable level of natural unit in the range of natural units. The scaled unit is set to 100 for the least desirable level of natural unit in the range of natural units. For any level of attribute between the most desirable and the least desirable levels, the scale unit is between 0 and 100. The benefit achieved by changing the level of an Attribute in natural units is measured by the corresponding difference in scaled units. In the special case of moving from the least desirable level to the most desirable level, the benefit is equal to 100 scaled units.
Tranche	A logical disaggregation of a group of assets (physical or human) or systems into subgroups with like characteristics for purposes of risk assessment.
Settlement Agreement	The entirety of the agreement between Pacific Gas & Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas & Electric Company, The Utility Reform Network, Energy Producers and Users Coalition, Indicated Shippers, and the Public Advocate's Office of the Public Utilities Commission.

Appendix A-2
SoCalGas and SDG&E
Risk Quantification Framework Comparison

APPENDIX A-2
SoCalGas' 2019 RAMP Report Risk Quantification Framework
Compared to the Pre-RAMP Workshop Presentation

Risk	Risk Scores Presented at the Pre-RAMP Workshop[1]				Risk Scores Presented in the 2019 RAMP Report					
	Safety	Reliability	Financial	MAVF	Safety	Reliability	Financial	Single Point Risk Score	Low Alternative	High Alternative
SCG-1 Medium Pressure Gas Pipeline Incident (Excluding Dig-in)	0.71	0.005	3.9	0.073	0.70	0.005	3.8	1581	315	3692
SCG-2 Employee Safety	0.55	0	0.3	0.055	0.55	0	0.3	1112	117	2771
SCG-3 Contractor Safety	0.52	0	0.3	0.052	0.52	0	0.3	1037	109	2582
SCG-4 Customer and Public Safety	0.37	0	1.2	0.037	0.37	0	1.2	765	98	1875
SCG-5 High Pressure Gas Pipeline Incident (Excluding Dig-in)	0.15	0.00001	1.1	0.015	0.15	0.00001	1.1	321	51	772
SCG-6 Third Party Dig-in on a Medium Pressure Pipeline	0.148	Not Presented During the Pre-RAMP Workshop			0.13	0.02	15.1	936	698	1333
SCG-7 Third Party Dig-in on a High Pressure Pipeline	0.04				0.04	0.00001	0.1	78	9	194
SCG-8 Storage Well Integrity Event	0.005				0.005	0	16.9	348	339	363
SCG-9/SDG&E-10 Cyber Security	0				0.013	0.04	3.7	920	897	958

[1] This is consistent with what the Company presented during the Pre-RAMP Workshop on March 5, 2019 and reflects changes as discussed in Chapter RAMP-C.

APPENDIX A-2
SDG&E's 2019 RAMP Report Risk Quantification Framework
Compared to the Pre-RAMP Workshop Presentation

Risk	Risk Scores Presented at the Pre-RAMP Workshop[1]				Risk Scores Presented in the 2019 RAMP Report					
	Safety	Reliability	Financial	MAVF	Safety	Reliability	Financial	Single Point Risk Score	Low Alternative	High Alternative
SDG&E-1 Wildfires involving SDG&E Equipment (including Third Party Pole Attachments)	0.98	0.04	280	0.162	0.96	0.04	225	7215	5493	10085
SDG&E-2 Contractor Safety	0.65	0	5	0.66	0.65	0	5	1408	231	3371
SDG&E-3 Employee Safety	0.53	0	1	0.054	0.53	0	1	1086	127	2684
SDG&E-4 Electric Infrastructure Integrity	0.3	0.15	6	0.061	0.3	0.15	6	3720	3180	4620
SDG&E-5 Customer and Public Safety	0.16	0	0.2	0.016	0.16	0	0.4	323	39	796
SDG&E-6 Medium Pressure Gas Pipeline Incident (Excluding Dig-in)	0.11	Not Presented During the Pre-RAMP Workshop			0.11	0.001	0.7	252	47	594
SDG&E-6 Third Party Dig-in on a Medium Pressure Pipeline	0.03				0.03	0.004	1.7	172	125	250
SDG&E-7 High Pressure Gas Pipeline Incident (Excluding Dig-in)	0.01				0.02	0.000001	0.04	31	4	77
SDG&E-8 Third Party Dig-in on a High Pressure Pipeline	0.002				0.002	0.0000004	0.01	4	1	11
SCG-9/SDG&E-10 Cyber Security	0				0.013	0.04	3.7	920	897	958

[1] This is consistent with what the Company presented during the Pre-RAMP Workshop on March 5, 2019 and reflects changes as discussed in Chapter RAMP-C.

Appendix A-3
Cross-Cutting Overlap

Risks are dynamic and cross-cutting in nature and the controls and mitigations presented in the 2019 RAMP Report may contribute to mitigating other risk areas as shown below.[1]

Chapter	RAMP Risk	Control/Mitigation ID	Control/Mitigation Name	Other Risk(s) Addressed by the Control/Mitigation
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C1	Operating Conditions	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C2	Recloser Protocols	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C3	Other Special Work Procedures	SDG&E-3 Employee Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C4	Distribution System Inspections – Corrective Maintenance Program	SDG&E-4 Electric Infrastructure Integrity
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C5	Distribution System Inspections – Quality Assurance/Quality Control	SDG&E-4 Electric Infrastructure Integrity
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C6	Substation System Inspections	
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C7	Transmission System Inspections	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C8	Overhead Transmission and Distribution Fire-Hardening (Wood to Steel)	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C9	Cleveland National Forest Fire-Hardening	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C10 / M5	Fire Risk Mitigation	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C11 / M6	Pole Risk Mitigation and Engineering	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C12 / M9	Wire Safety Enhancement	SDG&E-4 Electric Infrastructure Integrity SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C13 / M11	Fire Threat Zone Advanced Protection	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C14 / M14	Replacement and Reinforcement	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C15	Tree Trimming	SDG&E-4 Electric Infrastructure Integrity SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C16	Pole Brushing	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C17	Fire Science & Climate Adaptation Department	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C18 / M21	Wildfire Risk Reduction Model – Operational System (WRRM – Ops) and Fire Science Enhancements	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C19 / M22	Camera Networks and Advanced Weather Station Integration	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C20 / M23	High-Performance Computing Infrastructure	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C21/M25	Asset Management	SDG&E-4 Electric Infrastructure Integrity SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C22	Strategy for Minimizing Public Safety Risk During High Wildfire Conditions, PSPS and Re-Energization Protocols	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C23 / M30	Communication Practices	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C24	Mitigating the Public Safety Impact of PSPS Protocols	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C25 / M31	Emergency Management Operations	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C26	Disaster and Emergency Preparedness Plan	SDG&E-3 Employee Safety SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C27	Customer Support in Emergencies	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C28 / M32	Wildfire Infrastructure Protection Teams (Contract Fire Resources)	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C29 / M33	Aviation Firefighting Program	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C30	Industrial Fire Brigade	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-C31 / M34	Wireless Fault Indicators	SDG&E-4 Electric Infrastructure Integrity SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M1	Distribution System Inspections – Infrared/Corona	SDG&E-4 Electric Infrastructure Integrity SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M2	Distribution System Inspections – Drone Inspections	SDG&E-4 Electric Infrastructure Integrity SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M3	Distribution System Inspections – Circuit Ownership	SDG&E-4 Electric Infrastructure Integrity SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M4	Strategic Undergrounding	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M7	Expulsion Fuse Replacement	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M8	Hotline Clamps	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M10	Covered Conductor	SDG&E-4 Electric Infrastructure Integrity SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M12	LTE Communication Network	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M13	Public Safety Power Shutoff Engineering Enhancements	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M15	Backup Power for Resilience – Generator Grant, Critical Infrastructure, and HPWREN	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M16	Backup Power for Resilience – Microgrids	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M17	Lightning Arrester Removal/Replacement Program	SDG&E-5 Customer and Public Safety

Chapter	RAMP Risk	Control/Mitigation ID	Control/Mitigation Name	Other Risk(s) Addressed by the Control/Mitigation
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M18	SCADA Capacitors	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M19	Enhanced Vegetation Management	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M20	Fuel Management Program	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M24	Ignition Management Program	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M26	Monitoring and Correcting Deficiencies	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M27	Wildfire Mitigation Personnel	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M28	NMS Situational Awareness Upgrades	SDG&E-5 Customer and Public Safety
SDG&E-1	Wildfires Involving SDG&E Equipment	SDG&E-1-M29	Situational Awareness Dashboard	SDG&E-5 Customer and Public Safety
SDG&E-2	Contractor Safety	SDG&E-2-C1	Contractor Safety Oversight Program	SDG&E-5 Customer and Public Safety SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline
SDG&E-2	Contractor Safety	SDG&E-2-C2	Contractual Requirements	SDG&E-5 Customer and Public Safety SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline
SDG&E-2	Contractor Safety	SDG&E-2-C3	Third-Party Administration and Tools	SDG&E-3 Employee Safety SDG&E-5 Customer and Public Safety SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline
SDG&E-2	Contractor Safety	SDG&E-2-C4	Stop the Job	SDG&E-3 Employee Safety SDG&E-5 Customer and Public Safety SDG&E-6 Medium Pressure Gas Pipeline Incident SDG&E-8 High Pressure Pipeline Gas Incident SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline
SDG&E-2	Contractor Safety	SDG&E-2-C5	Near Miss/Close Call Reporting Program	SDG&E-3 Employee Safety SDG&E-5 Customer and Public Safety SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline
SDG&E-2	Contractor Safety	SDG&E-2-C6	Contractor Safety Summit and Quarterly Safety Meetings	SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline
SDG&E-2	Contractor Safety	SDG&E-2-M1	Expanded Contractor Oversight Program (Additional FTEs, enhance reporting software)	SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline
SDG&E-2	Contractor Safety	SDG&E-2-M2	Updated Class 1 Contractor Safety Manual, Development of Class 2 Contractor Safety Manual	SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline
SDG&E-2	Contractor Safety	SDG&E-2-M3	Near Miss/Close Call reporting portal/app. All contractor safety data from ISN and predictive solutions rolled up into real-time dashboard	SDG&E-3 Employee Safety SDG&E-5 Customer and Public Safety SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline
SDG&E-3	Employee Safety	SDG&E-3-C1	Mandatory employee health and safety training programs and standardized policies	SDG&E-5 Customer and Public Safety SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline
SDG&E-3	Employee Safety	SDG&E-3-C10	Personal protection equipment	SDG&E-5 Customer and Public Safety
SDG&E-3	Employee Safety	SDG&E-3-C11	Near Miss, Stop the Job and jobsite safety programs	SDG&E-2 Contractor Safety SDG&E-5 Customer and Public Safety SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline
SDG&E-3	Employee Safety	SDG&E-3-C12	Utilizing OSHA and industry best practices and industry benchmarking	SDG&E-5 Customer and Public Safety
SDG&E-3	Employee Safety	SDG&E-3-C2	Drug and alcohol testing program	SDG&E-5 Customer and Public Safety SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline
SDG&E-3	Employee Safety	SDG&E-3-C3	Safety culture	SDG&E-5 Customer and Public Safety SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline

Chapter	RAMP Risk	Control/Mitigation ID	Control/Mitigation Name	Other Risk(s) Addressed by the Control/Mitigation
SDG&E-3	Employee Safety	SDG&E-3-C4	Employee Behavior Based Safety (BBS) program	SDG&E-5 Customer and Public Safety SDG&E-6 Medium Pressure Gas Pipeline Incident SDG&E-8 High Pressure Pipeline Gas Incident
SDG&E-3	Employee Safety	SDG&E-3-C5	A comprehensive Environmental & Safety Compliance Management Program (ESCMP)	SDG&E-5 Customer and Public Safety
SDG&E-3	Employee Safety	SDG&E-3-C6	Employee safety training and awareness programs	SDG&E-5 Customer and Public Safety SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline
SDG&E-3	Employee Safety	SDG&E-3-C7	Employee wellness programs	SDG&E-2 Contractor Safety SDG&E-5 Customer and Public Safety
SDG&E-3	Employee Safety	SDG&E-3-C8	OSHA Voluntary Protection Program (VPP) assessments	SDG&E-2 Contractor Safety
SDG&E-3	Employee Safety	SDG&E-3-C9	Safe driving programs	SDG&E-5 Customer and Public Safety
SDG&E-3	Employee Safety	SDG&E-3-M1	Enhanced Mandatory Employee Training (OSHA): Certified Occupational Safety Specialist, Certified Utility Safety Professional, Certified Safety Professional	SDG&E-5 Customer and Public Safety
SDG&E-3	Employee Safety	SDG&E-3-M2	Safety in Action Program Enhancement	SDG&E-2 Contractor Safety SDG&E-5 Customer and Public Safety
SDG&E-3	Employee Safety	SDG&E-3-M3	Enhanced employee safe driving training (Vehicle Technology Programs)	SDG&E-5 Customer and Public Safety
SDG&E-3	Employee Safety	SDG&E-3-M4	Implementing findings from VPP program assessments	SDG&E-2 Contractor Safety
SDG&E-3	Employee Safety	SDG&E-3-M5	Energized Skills Training and Testing Yard	SDG&E-2 Contractor Safety SDG&E-4 Electric Infrastructure Integrity SDG&E-5 Customer and Public Safety
SDG&E-3	Employee Safety	SDG&E-3-M6	Employee Wildfire Smoke Protections – Cal/OSHA emergency regulation	SDG&E-2 Contractor Safety SDG&E-5 Customer and Public Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C1	GO165: Distribution Inspect and Repair program – Overhead	SDG&E-1 Wildfires SDG&E-5 Customer and Public Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C2	4 kV Modernization and System Hardening – Distribution	SDG&E-5 Customer and Public Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C3	Distribution Overhead Switch Replacement Program	SDG&E-3 Employee Safety SDG&E-5 Customer and Public Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C4	Management of Overhead Distribution Service (Non-CMP)	SDG&E-5 Customer and Public Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C5	Restoration of Service	SDG&E-5 Customer and Public Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C6	Underground Cable Replacement Program - Reactive	SDG&E-5 Customer and Public Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C7	Tee Modernization Program - Underground	SDG&E-3 Employee Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C8	Replacement of Underground Live Front Equipment – Reactive	SDG&E-3 Employee Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C9	DOE Switch Replacement – Underground	SDG&E-3 Employee Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C10	Vegetation Management (Non-HFTD)	SDG&E-5 Customer and Public Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C11	GO165: Distribution Inspect and Repair Program – Underground Capital Asset Replacement	SDG&E-3 Employee Safety SDG&E-5 Customer and Public Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C12	GO165: Distribution Inspect and Repair Program – Underground Structure Repair	SDG&E-3 Employee Safety SDG&E-5 Customer and Public Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C13	Management of Underground Distribution Service (Non-CMP)	SDG&E-5 Customer and Public Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C14	Field SCADA RTU Replacement	
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C15	Distribution Circuit Reliability	
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C16	Emergency Substation Equipment	
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C17	Reactive Substation Reliability and Repair for Distribution Components	
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C18	GO 174: Substation Relay Testing, Inspection and Repair Program	
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C19	Underground Cable Replacement Program – Proactive	
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-C20	Enterprise Asset Management – Substation	
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-M1	Overhead Public Safety (OPS) Program	SDG&E-5 Customer and Public Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-M2	Replacement of Underground Live Front Equipment – Proactive	SDG&E-3 Employee Safety
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-M3	Proactive Substation Reliability for Distribution Components	
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-M4	Substation Breaker Replacements – FLISR (Fault Locations, Isolation, and Restoration)	
SDG&E-4	Electric Infrastructure Integrity	SDG&E-4-M5	Enterprise Asset Management – Distribution	SDG&E-1 Wildfires involving SDG&E Equipment (including Third Party Pole Attachments)

Chapter	RAMP Risk	Control/Mitigation ID	Control/Mitigation Name	Other Risk(s) Addressed by the Control/Mitigation
SDG&E-5	Customer and Public Safety	SDG&E-5-C1	Public Safety Communications	SDG&E-1 Wildfires involving SDG&E Equipment (including Third Party Pole Attachments) SDG&E -6 Medium Pressure Gas Pipeline Incident SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-8 High Pressure Gas Pipeline Incident SDG&E-9 Third Party Dig-in on a High-Pressure Pipeline
SDG&E-5	Customer and Public Safety	SDG&E-5-C2	Field & Public Safety	SDG&E-1 Wildfires involving SDG&E Equipment (including Third Party Pole Attachments) SDG&E -6 Medium Pressure Gas Pipeline Incident SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-8 High Pressure Gas Pipeline Incident SDG&E-9 Third Party Dig-in on a High-Pressure Pipeline
SDG&E-5	Customer and Public Safety	SDG&E-5-C3	First Responder Outreach & Training	SDG&E-1 Wildfires involving SDG&E Equipment (including Third Party Pole Attachments) SDG&E-6 Medium Pressure Gas Pipeline Incident SDG&E-8 High Pressure Gas Pipeline Incident
SDG&E-5	Customer and Public Safety	SDG&E-5-M1	Expansion of Utility Incident Command	SDG&E-1 Wildfires involving SDG&E Equipment (including Third Party Pole Attachments) SDG&E -6 Medium Pressure Gas Pipeline Incident SDG&E-8 High Pressure Gas Pipeline Incident
SDG&E-5	Customer and Public Safety	SDG&E-5-M2	Expanded Public Safety Communications	SDG&E-1 Wildfires involving SDG&E Equipment (including Third Party Pole Attachments) SDG&E -6 Medium Pressure Gas Pipeline Incident SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-8 High Pressure Gas Pipeline Incident SDG&E-9 Third Party Dig-in on a High-Pressure Pipeline
SDG&E-6	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-6-C1	Cathodic Protection	SDG&E-5 Customer and Public Safety
SDG&E-6	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-6-C2	Assessment of Buried Piping in Vaults	SDG&E-8 High Pressure Gas Pipeline Incident
SDG&E-6	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-6-C3	Regulator & Valve Inspections and Maintenance	SDG&E-5 Customer and Public Safety
SDG&E-6	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-6-C4	Plastic Pipe Replacement	SDG&E-5 Customer and Public Safety
SDG&E-6	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-6-C5	Leak Repair	SDG&E-5 Customer and Public Safety
SDG&E-6	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-6-C6	Pipeline Monitoring: Leak Mitigation, Bridge & Span Inspections, Unstable Earth Inspections, Pipeline Patrol.	SDG&E-5 Customer and Public Safety
SDG&E-6	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-6-C7	Utility Conflict Review (Right of Way)	SDG&E-8 High Pressure Gas Pipeline Incident SDG&E-7 Third Party Dig-in on a Medium Pressure Pipeline SDG&E-9 Third Party Dig-in on a High Pressure Pipeline
SDG&E-6	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-6-C8	Meter Inspection and Maintenance	SDG&E-5 Customer and Public Safety SDG&E-8 High Pressure Gas Pipeline Incident
SDG&E-6	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-6-M1	Early Vintage Program (Pipeline)	SDG&E-5 Customer and Public Safety
SDG&E-6	Medium Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-6-M2	Early Vintage Program (Fittings)	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C1	Locate and Mark Training	SDG&E-3 Employee Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C2	Locate and Mark Activities	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C3	Locate and Mark Annual Refresher Training and Competency Program	SDG&E-3 Employee Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C4	Locate and Mark Operator Qualification	SDG&E-3 Employee Safety

Chapter	RAMP Risk	Control/Mitigation ID	Control/Mitigation Name	Other Risk(s) Addressed by the Control/Mitigation
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C5	Locate & Mark Quality Assurance Program	SDG&E-3 Employee Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C6	Damage Prevention Analyst Program	SDG&E-6 Medium Pressure Gas Pipeline Incident SDG&E-2 Contractor Safety SDG&E-3 Employee Safety SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C7	Prevention and Improvements-Refreshed Laptops	SDG&E-6 Medium Pressure Gas Pipeline Incident SDG&E-2 Contractor Safety SDG&E-3 Employee Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C8	Public Awareness Compliance	SDG&E-6 Medium Pressure Gas Pipeline Incident SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C9	Increase Reporting of Unsafe Excavation	SDG&E-6 Medium Pressure Gas Pipeline Incident SDG&E-2 Contractor Safety SDG&E-3 Employee Safety SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C10	Public Awareness - Secure Greater Enforcement through Legislation and California State Digging Board	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C11	Public Awareness - Meet with Cities with Highest Damage Rates	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C12	Public Awareness - Remain Active Members of the California Regional Common Ground Alliance	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C13	Continue to Participate in the Gold Shovel Standard Program	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C14	Locating Equipment	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-C15	Remain Active Members of the 811 California One-Call Centers	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-M1	Automate Third Party Excavation Incident Reporting	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-M2	Establish a program to address the area of continual excavation	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-M3	Recording photographs for each locate and mark ticket visited by locator	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-M4	Utilize electronic positive response	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-M5	Enhance process to utilize and leverage emerging excavation technology to help with difficult locates	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-M6	Promote process and system improvements in USA ticket routing and monitoring	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-M7	Leverage data gathered by locating equipment	SDG&E-5 Customer and Public Safety
SDG&E-7	Third Party Dig-in on a Medium Pressure Pipeline	SDG&E-7-M8	Install warning mesh above buried company facilities	SDG&E-2 Contractor Safety SDG&E-3 Employee Safety SDG&E-5 Customer and Public Safety
SDG&E-8	High Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-8-C1	Cathodic Protection	SDG&E-5 Customer and Public Safety
SDG&E-8	High Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-8-C2	Valve Maintenance	SDG&E-5 Customer and Public Safety
SDG&E-8	High Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-8-C3	Pipeline Safety Enhancement Plan – Pipeline Replacement	SDG&E-5 Customer and Public Safety
SDG&E-8	High Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-8-C4	Transmission Integrity Management Program (TIMP)	SDG&E-5 Customer and Public Safety
SDG&E-8	High Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-8-C5	Pipeline Maintenance	SDG&E-5 Customer and Public Safety
SDG&E-8	High Pressure Gas Pipeline Incident (Excluding Dig-in)	SDG&E-8-C6	Pipeline Safety Enhancement Plan – Pressure Testing	SDG&E-5 Customer and Public Safety

Chapter	RAMP Risk	Control/Mitigation ID	Control/Mitigation Name	Other Risk(s) Addressed by the Control/Mitigation
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C1	Locate & Mark Training	SDG&E-3 Employee Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C2	Locate & Mark Activities	SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C3	Locate & Mark Annual Refresher Training & Competency Program	SDG&E-3 Employee Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C4	Locate & Mark Operator Qualification	SDG&E-3 Employee Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C5	Locate & Mark Quality Assurance Program	SDG&E-3 Employee Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C6	Damage Prevention Analyst Program	SDG&E-6 Medium Pressure Gas Pipeline Incident SDG&E-2 Contractor Safety SDG&E-3 Employee Safety SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C7	Prevention & Improvements-Refreshed Laptops	SDG&E-8 High Pressure Gas Pipeline Incident SDG&E-2 Contractor Safety SDG&E-3 Employee Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C8	Public Awareness Compliance	SDG&E-8 High Pressure Gas Pipeline Incident SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C9	Increase Reporting of Unsafe Excavation	SDG&E-8 High Pressure Gas Pipeline Incident SDG&E-2 Contractor Safety SDG&E-3 Employee Safety SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C10	Public Awareness - Secure Greater Enforcement through Legislation and California State Digging Board	SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C11	Public Awareness - Meet with the Cities with the Highest Damage Rates	SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C12	Public Awareness - Remain Active Members of the California Regional Common Ground Alliance	SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C13	Continue to Participate in the Gold Shovel Standard Program	SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C14	Locating Equipment	SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C15	Remain Active Members of the 811 California One-Call Centers	SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-C16	Install warning mesh above buried company facilities	SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-M1	Automate Third Party Excavation Incident Reporting	SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-M2	Establish A Program To Address The Area Of Continual Excavation	SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-M3	Recording Photographs For Each Locate & Mark Ticket Visited By Locator	SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-M4	Utilize Electronic Positive Response	SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-M5	Enhance Process To Utilize And Leverage Emerging Excavation Technology To Help With Difficult Locates	SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-M6	Promote Process And System Improvements In USA Ticket Routing And M onitoring	SDG&E-5 Customer and Public Safety
SDG&E-9	Third Party Dig-in on a High Pressure Pipeline	SDG&E-9-M7	Leverage Data Gathered By Locating Equipment	SDG&E-2 Contractor Safety SDG&E-3 Employee Safety SDG&E-5 Customer and Public Safety
SCG-9/SDG&E-10	Cybersecurity	SCG-10-C1	Perimeter Defenses	SDG&E-4 Electric Infrastructure Integrity SDG&E -6 Medium Pressure Gas Pipeline Incident SDG&E-8 High Pressure Gas Pipeline Incident
SCG-9/SDG&E-10	Cybersecurity	SCG-10-C2	Internal Defenses	SDG&E-4 Electric Infrastructure Integrity SDG&E -6 Medium Pressure Gas Pipeline Incident SDG&E-8 High Pressure Gas Pipeline Incident
SCG-9/SDG&E-10	Cybersecurity	SCG-10-C3	Sensitive Data Protection	
SCG-9/SDG&E-10	Cybersecurity	SCG-10-C4	Operational Technology (OT) Cybersecurity	SDG&E-3 Employee Safety SDG&E-4 Electric Infrastructure Integrity SDG&E-5 Customer and Public Safety SDG&E-6 Medium Pressure Gas Pipeline Incident SDG&E-8 High Pressure Gas Pipeline Incident
SCG-9/SDG&E-10	Cybersecurity	SCG-10-C5	Obsolete Information Technology (IT) Infrastructure and Application Replacement	

Chapter	RAMP Risk	Control/Mitigation ID	Control/Mitigation Name	Other Risk(s) Addressed by the Control/Mitigation

1 This table does not present an exhaustive list of risks that may be addressed by the controls and mitigations presented in this 2019 RAMP Report.