Appendix A

Risk-Based Decision-Making Framework (CLEAN)

Risk-Based Decision-Making Framework Regarding Required Elements for Risk and Mitigation Analysis in the Risk Assessment Mitigation Phase (RAMP) and General Rate Case (GRC) Applications

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Definitions

- Alternative Analysis: Evaluation of different alternatives available to mitigate Risk.

- Asset: A retirement unit as defined by Federal Energy Regulatory Commission (FERC) Uniform System of Accounts (USOA) that exhibits risk.[1]

- 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 a Cost-Benefit Approach should cover the reasons that a utility would undertake risk mitigation activities.

- Backcast: Use updated inputs (e.g., new RRUs, new risk models) to recalculate Benefit-Cost Ratios, pre-mitigated risk, post-mitigated risk or other data points as required by the RDF, Commission Ruling or Commission Decision. The goal of a Backcast is to establish a bridge between the prior inputs and the new inputs, which ensure an "apples-to-apples" comparison.

- Baseline: A reference point in time at the start of the new General Rate Case (GRC) cycle.

- Baseline Cost Forecast: An estimate of the expenditures for all RAMP-related Mitigation and Control Programs for which an IOU is seeking approval and/or funding in its RAMP or current GRC application. The Baseline Forecast is used to estimate the Budget Scenario for the Enterprise Portfolios.

- Baseline Risk: The amount of Residual Risk evaluated at the Baseline (i.e. at the start of the new GRC cycle) after taking into account all risk reduction Benefits from all risk mitigation activities projected to have been performed by the start of the new GRC cycle. The projected risk mitigation activities include those that are classified by the Investor-Owned Utilities (IOU) as Controls, as well as all mitigation activities for which the IOUs are seeking approval and/or funding in the current or upcoming Risk Assessment Mitigation Phase (RAMP) and GRC applications.

- Benefit: The reduction in Risk, as measured by the changes in Attribute levels, that would occur when a program or set of activities are implemented.

- Benefit-Cost Ratio (BCR): Calculated by dividing the dollar value of Mitigation Benefit by the Mitigation cost estimate.

- Bow Tie: A tool that consists of the Risk Event in the center, a listing of Drivers on the

[1] For the FERC USOA, see 18 CFR Part 101 https://www.ecfr.gov/current/title-18/chapter-I/subchapter-C/part-101

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.

- Budget Scenario: A scenario of expenditures for RAMP-related Mitigation and Control Programs to be used for portfolio optimization.

- Consequence (or Impact): The effect of the occurrence of a Risk Event. Consequences affect Attributes of a Cost-Benefit Approach and can be represented in the natural units of the Attribute and monetized. Consequence is represented as a probability distribution, from which an expected value or tail risk value can be calculated. The probability distribution of the CoRE is the probability distribution of the sum of the monetized Attributes.

- Control: Currently established measure that is modifying Risk.

- CoRE: Estimated dollar value of the Consequences of a Risk Event.

- Cost-Benefit Approach: A decision-analysis tool for comparing the monetized Benefits of a program, or set of activities, against the costs of the program, or set of activities, to create a measurement of value.

- 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 Portfolio: A collection of activities within a specified Budget Scenario reflecting all of the RAMP-related Mitigation and Control Programs to be funded in the utility's General Rate Case. The Enterprise Portfolio will include a Risk Mitigation Portfolio for every Enterprise Risk presented in a RAMP. Costs, Benefits, and Benefit-Cost Ratios can be calculated for each Enterprise Portfolio created for a Budget Scenario sensitivity analysis, and Enterprise Portfolios can be compared to one another.

- 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 is not intended to be static as risks are dynamic in nature. As such, 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.

- Exposure: The measure that indicates the scope of the Risk, e.g., miles of transmission pipeline, number of 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.

- Foundational Activities, Elements, or Programs: Initiatives that support or enable two or more Mitigation programs or two or more Risks but do not directly reduce the Consequences or reduce the Likelihood of safety Risk Events.

- Frequency: The number of events generally defined per unit of time. (Frequency is not synonymous with Probability or Likelihood.)

- Hierarchy: A utility's organizational hierarchy, such as an Electric Distribution Division or a Gas Distribution Division as well as other ways of categorizing high risk assets and systems (e.g., High-Fire Threat Districts, circuits, regions, etc.)

- Inherent Risk: The level of Risk that exists without risk Controls or Mitigations.

- Levels (of an Attribute): The potential Outcomes or Consequences of a Risk Event on an Attribute. For instance, if a Risk Event results in 5 fatalities, "5" would be the Level of the Safety Attribute.

- 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 a Risk Event.

- Mitigation/Control Program: A CPUC jurisdictional effort within Electric Operations or Gas Operations consisting of multiple risk reporting units with a defined scope that is intended to meet a specific objective.

- Monetized Levels of an Attribute: E.g., Monetized Levels of Safety Attribute. The representation, in dollars, of the potential Outcomes that an Attribute is exposed to, obtained by converting from the Natural Units of the Attribute Levels using an appropriate conversion factor or function.

- Natural Unit of an Attribute: The way the Level of an Attribute is measured or expressed. For example, the Natural Unit of a Safety Attribute may be fatalities. Natural Units are chosen for convenience and ease of communication and are distinct from Monetized Levels of Attributes.

- Optimized (Enterprise or Risk Mitigation) Portfolio: A portfolio that is optimized using an optimization model where the objective to be maximized is risk reduction, the constraint is a given budget level in dollars, and the decision variable (i.e., what is selected by the optimization algorithm to maximize the objective function) is whether a given mitigation is included in the portfolio or not.

- Outcome: The final resolution or end result of a Risk Event.

- Overall Residual Risk: All the risk on the utility's assets or systems for a given enterprise risk presented in the RAMP filing after taking account of the historical progress of risk reduction since the utility's first RAMP filing.

- Planned or Forecasted Residual Risk: Risk remaining after implementation of proposed mitigations.

- Probability Distribution: The assignment of a probability to each of the possible events that can occur as the outcome of an uncertain situation.

- Residual Risk: Risk remaining after application of Mitigations, including Mitigations classified as Controls for a given GRC cycle.

- Risk: The potential for the occurrence of an event that would be desirable to avoid, expressed in terms of a combination of various Outcomes of an adverse event and their associated Probabilities. Risk is the product of LoRE and CoRE and represented as a probability distribution, from which an expected value or tail risk value can be calculated.

- Risk-Adjusted Levels of an Attribute: Obtained by applying a Risk Attitude Function to the Monetized Levels of an Attribute.

- Risk-Adjusted Attribute Value: A numerical quantity derived from the Risk-Adjusted Levels of an Attribute, e.g., by taking the mathematical expectation of the Levels.

- 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 Mitigation Portfolio: A collection of one or more risk Mitigation/Control Programs with a specified Budget Scenario for reducing the risk of a given enterprise risk. Costs, Benefits, and Benefit-Cost Ratios can be calculated for each Risk Mitigation Portfolio created for a Budget Scenario sensitivity analysis, and Risk

Mitigation Portfolios can be compared to one another.

- Risk Reporting Unit (RRU): A CPUC jurisdictional effort within Electric Operations or Gas Operations that simultaneously removes or mitigates the risk associated with a group of contiguous assets or systems that exhibit high levels of risk. The RRU must include common elements that must include, but are not limited to Consequence Attributes, Risk level, line-item costs, Benefit-Cost Ratios, Work Units and time. The RRU can be aggregated along several dimensions based on unique identifiers that include, but are not limited to, Hierarchy, Scenario, Version, Risk Event, Tranche, and mitigation type.

- Risk Scaling Function: A function or formula that specifies an attitude towards different magnitudes of Outcomes including capturing aversion to extreme Outcomes or indifference over a range of Outcomes.

- 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.

- System: A regularly interacting or interdependent group of items forming a unified whole that exhibits risk and cannot be classified as a retirement unit.

- Tranche: A logical disaggregation of a group of assets (physical or human) or systems into subgroups with like characteristics for purposes of risk assessment.

- Version: The risk model or methodology used to generate calculations for a given mitigation at a specific point in time.

- Work Unit: A metric used to quantify the scope of a program and to understand utility risk spending (e.g., circuit miles).

Summary

The provisions of this document, the Risk-Based Decision-Making Framework, constitute the minimum required elements applicable to risk and risk mitigation analysis in RAMP and GRC proceedings. The minimum required elements apply to the following steps in the risk and mitigation analysis for RAMP and GRC proceedings, which are set forth in detail in this Appendix:

- Building a Cost-Benefit Approach– Step 1A
- Identifying Risks for the Enterprise Risk Register – Step 1B
- Risk Assessment and Risk Ranking in Preparation for RAMP – Step 2A
- Selecting Enterprise Risks for RAMP – Step 2B
- Mitigation Analysis for Risks in RAMP – Step 3

Also included herein are several "Global Items" setting forth additional minimum requirements applicable to the risk and mitigation analysis addressed herein. In addition, Row 28 of this Appendix sets forth the conditions under which each of the Investor-Owned Utilities (IOU)[2] will engage in the "Step 3" Mitigation Analysis for certain programs (as delineated herein) proposed in the utility's GRC to mitigate safety or reliability risks not otherwise addressed in the utility's RAMP submission.

[2] Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE) Company, and Southern California Gas Company (SoCalGas) and San Diego Gas & Electric Company (SDG&E) (collectively the Sempra companies) are collectively known as investor-owned utilities or IOUs.

Step 1A – Building a Cost-Benefit Approach

No.	Element Name	Element Description and Requirements
1.	Cost-Benefit Approach	A utility's Cost-Benefit Approach should be constructed by following these six principles (see Rows 2-7, below). The Cost-Benefit Approach is required to be built once but the utility may adjust its Cost-Benefit Approach over time. Any changes to the Cost-Benefit Approach must adhere to the principles of construction set forth in Rows 2 through 7 below.
2.	Cost-Benefit Approach Principle 1 – Attribute Hierarchy	Attributes are combined in a hierarchy, such that the primary Attributes are typically labels or categories and the sub-Attributes are observable and measurable.
3.	Cost-Benefit Approach Principle 2 – Measured Observations	Each sub-Attribute has Levels expressed in Natural Units that are observable during ordinary operations and as a Consequence of the occurrence of a Risk Event.
4.	Cost-Benefit Approach Principle 3 – Comparison	Use a measurable proxy for an Attribute that is logically necessary but not directly measurable. This principle only applies when a necessary Attribute is not directly measurable. For example, a measure of the number of complaints about service received can be used as a proxy for customer satisfaction.
5.	Cost-Benefit Approach Principle 4 – Risk Assessment	When Attribute Levels that result from the occurrence of a Risk Event are uncertain, assess the uncertainty in the Attribute Levels by using expected value or percentiles, or by specifying well-defined probability distributions, from which expected values and tail values can be determined. Monte Carlo simulations or other similar simulations (including calibrated subject expertise modeling), among other tools, may be used to satisfy this principle.

6.	Cost-Benefit Approach Principle 5 – Monetized Levels of Attributes	Apply a monetized value to the Levels of each of the Attributes using a standard set of parameters or formulas, from other government agencies or industry sources, as determined by the *Phase II Decision Adopting Modifications to the Risk-Based Decision-Making Framework Adopted in D.18-12-014 and Directing Environmental and Social Justice Pilots* in Rulemaking (R.) 20-07-013. A utility may deviate from the agreed upon standard set of parameters or formulas by submitting a detailed explanation as to why the use of a different value would be more appropriate. The use of a different set of parameters or formulas to determine the Monetized Levels of Attributes requires an analysis comparing the results of its "equivalent or better" set of parameters or formulas against the results of the agreed upon standard set of parameters or formulas.
7.	Cost-Benefit Approach Principle 6 – Risk-Adjusted Attribute Levels	Apply a Risk Scaling Function to the Monetized Levels of an Attribute or Attributes (from Row 6) to obtain Risk-Adjusted Attribute Levels. The Risk Scaling Function is an adjustment made in the risk model due to different magnitudes of Outcomes, which can capture aversion or indifference towards those Outcomes. The Risk Scaling Function can be linear or convexly non-linear. For example, the Risk Scaling Function is linear to express indifference if avoiding a given change in the Monetized Attribute Level does not depend on the Attribute Level. Alternatively, the Risk Scaling Function is convexly non-linear to express aversion if a change in the Attribute level results in an increasing rate of change in the Risk-Adjusted Monetized Attribute Level as the Level of the Attribute increases. When completing Rows 5 and 24 in the RDF, if a utility chooses to address tail risk using the power law or other statistical approach and chooses to present Risk-Adjusted Attribute Levels by relying on a convex scaling function, then it must supplement its analysis by also presenting Risk-Adjusted Attribute Levels by relying on a linear scaling function.

Step 1B – Identify Risks for the Enterprise Risk Register

No.	Element Name	Element Description and Requirements
8.	Risk Identification and Definition	Utilities' risks are defined in their respective Enterprise Risk Registers. The Enterprise Risk Register is the starting point for identifying the risks that will be included in the RAMP. The process for determining these risks will be described in the RAMP. The RAMP will consider risks using the same risk definitions as in the ERR. Each RAMP filing will highlight any changes to the ERR from the previous RAMP or GRC filings.

Step 2A – Risk Assessment and Risk Ranking in Preparation for RAMP

No.	Element Name	Element Description and Requirements
9.	Risk Assessment	Using the Cost-Benefit Approach developed in accordance with Step 1A, for each Risk included in the Enterprise Risk Register, the utility will compute a monetized Safety Risk Value using only the Safety Attribute. The utility will sort its ERR Risks in descending order by the monetized Safety Risk Value. For the top 40% of ERR risks with a Safety Risk Value greater than zero dollars, the utility will compute a monetized Risk Value using at least the Safety, Reliability and Financial Attributes to determine the output for Step 2A. The output of Step 2A, along with the input from stakeholders described in Row 12 below, will be used to decide which risks will be addressed in the RAMP. The output of Step 2A must include a calculation of Overall Residual Risk for a given risk presented in the RAMP filing, along with a diagram and supporting workpapers demonstrating the change of Overall Residual Risk since the utility's first RAMP filing. Diagrams and supporting workpapers must also include a disaggregation of the Overall Residual Risk values based on the Consequence Attributes, both in natural units and dollar values, as well as display the Likelihood of those Consequence Attributes. The output of Step 2A must include a summary of the Risk Mitigation Accountability Report Reporting Phase for each risk the utility intends to address in its RAMP application. This summary must include a copy of the utility's Monetized Outcomes Flow Table by Attribute for each Risk Event and Monetized Outcomes Stock Table by Attribute for each Risk Event. A narrative description must accompany these tables explaining any discrepancies between the modeled risk and the monetized outcomes recorded during the previous GRC Cycle. The Risk Assessment in preparation for RAMP will follow the steps in Rows 10 and 11.

10.	Identification of Potential Consequences of Risk Event	The identified potential Consequences of a Risk Event should reflect the unique characteristics of the utility and will be represented as a probability distribution, from which an expected value or tail risk value can be calculated. For each enterprise risk, the utility will use actual results, available and appropriate data (e.g., Pipeline and Hazardous Materials Safety Administration data), and/or Subject Matter Experts (SMEs) to identify potential Consequences of the Risk Event, consistent with the Cost-Benefit Approach developed in Step 1A. The utility should use utility specific data, if available. If data that is specific to the utility is not available, the utility must supplement its analysis with subject matter expertise. Similarly, if data reflecting past results are used, that data must be supplemented by SME judgment that takes into account the Benefits of any Mitigations that are expected to be implemented prior to the GRC period under review in the RAMP submission. For each enterprise risk, the utility must explain how it derived the probability distribution for Consequence of a Risk Event.
11.	Identification of the Frequency of the Risk Event	The identified Frequency of a Risk Event should reflect the unique characteristics of the utility. For each enterprise risk, the utility will use actual results and/or SME input to determine the annual Frequency of the Risk Event. The utility should use utility specific data, if available. If data that is specific to the utility is not available, the utility must supplement its analysis with subject matter expertise. In addition, if data reflecting past results are used, that data must be supplemented by SME judgment that takes into account the Benefits of any Mitigations that are expected to be implemented prior to the GRC period under review in the RAMP submission. The utility will take into account all known relevant Drivers when specifying the Frequency of a Risk Event. Drivers should reflect current and/or forecasted conditions and may include both external actions as well as characteristics inherent to the asset. For example, where applicable, Drivers may include: the presence of corrosion, vegetation, dig-ins, earthquakes, windstorms or the location of a pipe in an area with a higher likelihood of dig-ins.

Step 2B – Selecting Enterprise Risks for RAMP

No.	Element Name	Element Description and Requirements
12.	Risk Selection Process for RAMP	Using the analysis performed in Step 2A, the utility will preliminarily select risks to be included in the RAMP. The utility will host a publicly noticed workshop, to be appropriately communicated to interested parties and at a minimum, should include the CPUC's Safety Policy Division (SPD), to gather input from SPD, other interested CPUC staff, and interested parties to inform the determination of the final list of risks to be included in the RAMP. At least 14 days in advance of the workshop, the utility will provide to SPD and interested parties at least the following information: (1) its preliminary list of RAMP risks; and (2) the monetized Safety Risk Value for each risk in the ERR and the monetized Risk Value for the top ERR risks identified through the process in Row 9. The utility will make its best effort to timely respond to reasonable requests for additional information prior to the workshop. Based on input received from SPD, 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 rationale for taking or disregarding input during the workshop will be addressed in the utility's RAMP.

Step 3 – Mitigation Analysis for Risks in RAMP

No.	Element Name	Element Description and Requirements
13.	Calculation of Risk	For purposes of the Step 3 analysis for each enterprise risk assessed in the RAMP, pre- and post-mitigation risk will be calculated by multiplying the Likelihood of a Risk Event (LoRE) by the probability distribution of Consequences of a Risk Event (CoRE) and be represented as a probability distribution, from which an expected value or tail risk value can be calculated. The CoRE is the sum of each of the Attribute Values' probability distributions monetized using the utility's full Cost-Benefit Approach.

14.	Definition of Risk Events and Tranches	Detailed pre- and post-mitigation analysis of Mitigations and Controls will be performed for each risk selected for inclusion in the RAMP. The utility will endeavor to identify all asset groups or systems subject to the risk and each Risk Event associated with the risk. For example, if Steps 2A and 2B identify wildfires associated with utility facilities as a RAMP Risk Event, the utility will identify all Drivers that could cause a wildfire and each group of assets or systems that could be associated with the wildfire risk, such as overhead wires and transformers. For each Risk Event, the utility will subdivide the group of assets or the system associated with the risk into Tranches. Risk reductions from Mitigation and Control Programs and Benefit-Cost Ratios will be determined at the Tranche level, which gives a more granular view of how Mitigations and Control Programs will reduce Risk. The utility will identify which Risk Reporting Units are responsible for reducing risk in each tranche. The determination of Tranches will generally be based on how the risks, as a product of LoRE and CoRE, and assets are managed by each utility, data availability and model maturity, and strive to achieve as deep a level of granularity as reasonably possible. The rationale for the determination of Tranches, or for a utility's judgment that no Tranches are appropriate for a given Risk Event, will be presented in the utility's RAMP submission. For the purposes of the risk analysis, all of the elements (i.e., assets or system) that are scoped for a given RAMP and GRC Application and contained within the identified Tranche would be considered to have homogeneous risk profiles, meaning they should have the same LoRE and CoRE. The best practice for determining the homogeneity of risk profiles in reporting Tranches is the use of quintiles of LoRE and quintiles of CoRE, resulting in 25 reporting tranches. The utility can and should submit more granular data in workbooks included with RAMP and GRC filings if it is available. If the assets or system associated with a given risk are less than 25 in number, the utility may use an alternative means of determining homogeneity of risk profiles, including quartiles or other smaller divisions of LoRE and CoRE, but this alternative means must be described in detail in the RAMP filing. If a utility desires to use an alternative determination of Tranches not reflecting 25 homogenous risk profiles based on LoRE and CoRE, or they wish to use a percentile ranking approach that would result in more than 25 reporting Tranches, the utility must submit a White Paper describing

		their preferred method for determining Tranches and relevant workpapers to SPD no later than 45 days before their first pre-RAMP workshop and must serve the White Paper to the service list of R.20-07-013 or a successor proceeding as well as the service list of the utility's most recent RAMP application no later than 45 days before their first pre-RAMP workshop. Staff and parties may provide input on the IOU's White Paper within the 21 days of the submittal. The utility must also include the White Paper in its RAMP filing, clearly indicating any changes to the previously served version. An IOU may submit this White Paper without prejudice to the right of parties to the RAMP or GRC to challenge such alternative determination of tranches.
15.	Bow Tie	For each risk included in the RAMP, the utility will include a Bow Tie illustration. For each Mitigation presented in the RAMP, the utility will identify which element(s) of its associated Bow Tie the Mitigation addresses.
15.1	Define the Mitigation Risk Reporting Unit	A Risk Reporting Unit (RRU) will be defined for each mitigation. The RRU must be: (a) traceable through most, if not all, stages of a lifecycle, including but not limited to, scoping, designing, permitting, construction/implementation, post-construction, retirement/decommissioning. (b) forecastable to at least the third post-test year of a GRC cycle. (c) auditable in terms of timing, location, work units, cost, and risk reduction. (d) able to aggregate up to the Mitigation Program or Control Program. Once the level of granularity of an RRU for each risk is established, beginning with SCE's 2026 RAMP and Sempra Companies' 2028 GRC filings, that level of granularity for the RRU should be maintained for all future filings which include that risk. If a utility wishes to update an RRU's level of granularity it must clearly explain the method it chose to update the granularity and how the granularity of the new RRU differs from the granularity of the prior RRU. Additionally, the utility must provide a Backcast of post-mitigated risk, risk reduction and Benefit-Cost Ratios submitted to the previous cycles of RAMPs and GRCs that are impacted by an update to the RRU's level of granularity. The disaggregation of a Mitigation and Control Program to the RRU scale is not required for the following: 1. Public Safety Power Shutoffs 2. Protective Equipment Device Settings

		3. Mitigation and Control Programs that do not meet the following thresholds: a. For PG&E and SCE, $10 million; b. For SDG&E, for its electric and other operations, $5 million; c. For SDG&E, for its gas operations, $2.5 million; and, d. For SoCalGas, $5 million.
16.	Expressing Effects of a Mitigation	The effects of a Mitigation on a Tranche will be expressed as a change to the Tranche-specific pre-mitigation values for LoRE and/or CoRE. The utility will provide the pre- and post-mitigation values for LoRE and CoRE determined in accordance with this Step 3 for all Mitigations subject to this Step 3 analysis. Additionally, the utility must provide pre- and post-mitigation values for LoRE, CoRE, Monetized Risk Value, Risk Reduction, and Benefit-Cost Ratios for all Risk Reporting Units that aggregate up to the Mitigation Program subject to this Step 3 analysis.
17.	Determination of Pre-Mitigation LoRE by Tranche	The pre-mitigation LoRE is the probability that a given Risk Event will occur with respect to a single element of a specified Tranche over a specified period of time (typically a year) in the planning period, before a future Mitigation is in place.
18.	Determination of Pre-Mitigation CoRE	The pre-mitigation CoRE is the sum of each of the pre-mitigation Risk-Adjusted Attribute Values using the utility's full Cost-Benefit Approach. The CoRE is calculated using the full Cost-Benefit Approach tool constructed consistent with Step 1A above.
19.	Measurement of Pre-Mitigation Risk Value	The monetized pre-mitigation risk value will be calculated as the product of the pre-mitigation LoRE and the pre-mitigation CoRE for each Tranche subject to the identified Risk Event.
20.	Determination of Post-Mitigation LoRE	The post-mitigation LoRE calculation will be conducted at the same level of granularity as the pre-mitigation risk analysis within Step 3. The calculated value is the probability of occurrence of a Risk Event after the future Mitigation is in place.
21.	Determination of Post-Mitigation CoRE	The post-mitigation CoRE calculation will be conducted at the same level of granularity as the pre-mitigation risk analysis. The post-mitigation CoRE is the sum of each of the post-mitigation Risk-Adjusted Attribute Values using the utility's full Cost-Benefit Approach.

22.	Measurement of Post-Mitigation Monetized Risk Value	The monetized post-mitigation risk value will be calculated as the product of the post-mitigation LoRE and post-mitigation CoRE for each Tranche subject to the identified Risk Event.
23.	Measurement of Risk Reduction Provided by a Mitigation	The risk reduction provided by a risk mitigation will be measured as the difference between the values of the monetized pre-mitigation risk value and the monetized post-mitigation risk value.
24.	Use of Expected Value for CoRE; Supplemental Calculations	The utility will use expected value for the Cost-Benefit Approach-based measurements and calculations of CoRE in Rows 13, 18, 19, 21, 22, and 23. If a utility chooses to present Alternative Analysis of monetized pre- and post-mitigation CoRE using a computation in addition to the expected value of the Cost-Benefit Approach, such as tail value, it does so without prejudice to the right of parties to the RAMP or GRC to challenge such Alternative Analysis. In the case of wildfire risks, if the utility choose to present an Alternative Analysis regarding tail value, the utility: (a) should use a truncated power law distribution method as a best practice by conducting multiple tests of truncation values to determine goodness of fit to existing data and then include the results in their RAMP application; and, (b) may use an alternative modeling method to the truncated power law, and submit to SPD and serve to the service list of R.20-07-013, or a successor proceeding, and the utility's most recent RAMP application proceeding a White Paper and related workpapers clearly justifying its approach no later than 45 days before its first pre-RAMP workshop. Staff and parties may provide input on the IOU's White Paper within 21 days of the submittal. The utility must also include the White Paper in its RAMP filing, clearly indicating any modifications to the earlier served version.

25.	Benefit-Cost Ratios Calculation	The Benefit-Cost Ratio calculation should be calculated by dividing the dollar value of Mitigation Benefit by the Mitigation cost estimate. The values in the numerator and denominator should be present values to ensure the use of comparable measurements of Benefits and costs. The Benefits should reflect the full set of Benefits that are the results of the incurred costs. Specifically, when calculating BCRs for each mitigation, the IOUs must provide the following three scenarios: a) Societal Discount Rate Scenario b) Weighted-Average Cost of Capital Discount Rate Scenario, and c) Hybrid Discount Rate Scenario For capital programs, the costs in the denominator should include incremental expenses made necessary by the capital investment.
25.1	Optimized Enterprise Portfolio	The utility will construct four Optimized Enterprise Portfolios with differing Budget Scenarios. The Budget Scenario for the Enterprise Portfolios will be based on the Baseline Cost Forecast. The specified four Budget Scenarios will be based on the Baseline Cost Forecast according to the following structure: Scenario 1: eighty-five percent of the Baseline Cost Forecast, Scenario 2: ninety percent of the Baseline Cost Forecast, Scenario 3: ninety-five percent of the Baseline Cost Forecast and, Scenario 4: the Baseline Cost Forecast. Optimized Enterprise Portfolios shall show the Risk Mitigation Portfolios that result for each enterprise risk presented in the RAMP based on the enterprise-level optimization. Optimized Enterprise Portfolios shall account for the interrelationships among mitigations and controls, as described in Row 25.2.

25.2	Optimized Risk Mitigations Portfolios	In addition to the Optimized Enterprise Portfolios required by Row 25.1, utilities may construct Optimized Risk Mitigation Portfolios for each Risk as identified in Row 8 with a specified Budget Scenario based on a different allocation of costs among risks than result under the corresponding Optimized Enterprise Portfolio. For each of Scenarios 1 through 4 in Row 25.1, the Budget Scenario for each Optimized Risk Mitigation Portfolio will be some proportion chosen by the utility of the Enterprise Portfolio Budget Scenario. The utility shall justify why the proportion of the Enterprise Portfolio Budget Scenario was chosen for each Optimized Risk Mitigation Portfolio. Mitigations and Controls in each Optimized Risk Mitigation Portfolio shall account for interrelationships between them, such as mutual exclusivity, synergies, and diminishing returns. Mutually exclusive Mitigations and Controls must be avoided, only one or the other can address the same asset or system that exhibits risk in the same portfolio. Synergies and diminishing returns can be captured by combining two or more mitigations to address risk on a given asset or system, called a Mitigation Group. Synergies or diminishing returns can be calculated for the Mitigation Group. For example, a wildfire mitigation portfolio could include for a given circuit segment: covered conductor as a mitigation, vegetation management as a mitigation, or covered conductor with vegetation management as a mitigation—but not covered conductor and vegetation management as separate mitigations since their benefits are not additive (re: may exhibit diminishing returns).

Global Items

No.	Element Name	Element Description and Requirements
26.	Portfolio and Mitigation Strategy Presentation in the RAMP and GRC	The utility's RAMP filing will provide a ranking of all RAMP Mitigation and Control Programs by Benefit-Cost Ratios. The utility's RAMP filing will include a dataset of Risk Reporting Units for each Mitigation and Control Program and rank each Risk Reporting Unit by Benefit-Cost Ratio. Additionally, the utility must present the set of Optimized Enterprise Portfolios required by Row 25.1 and may present an alternative set of Optimized Risk Mitigation Portfolios within each Enterprise Portfolio in accordance with Row 25.2. Mitigation/Control Groups defined in Row 25.2 can also be ranked within each portfolio. The utility must justify the portfolio selection, optimization, and structure of Mitigation/Control Groups. In the GRC, the utility will provide a ranking of Mitigation and Control Programs by Benefit-Cost Ratios, as follows: (1) For any dataset of Risk Reporting Units submitted with the RAMP, the utility will provide an update of the dataset, if any is required, and provide an explanation of any differences from its RAMP filing and a justification for why the dataset from the RAMP filing required to be updated; (2) For Mitigation and Control Programs addressed in the RAMP, the utility will use risk reduction estimates, including any updates, and updated costs to calculate Benefit-Cost Ratios and explain any differences from its RAMP filing; (3) For Mitigation and Control Programs that require Step 3 analysis under and consistent with Row 28, the utility will include the Benefit-Cost Ratios, calculated in accordance with Step 3, in the ranking of Mitigations by Benefit-Cost Ratios. In the GRC, the utility will provide an updated presentation of the set of Optimized Enterprise Portfolios required by Row 25.1 and the optional set of Optimized Risk Mitigation Portfolios within each Enterprise Portfolio in accordance with Row 25.2 if an update is necessary. Any differences in these Optimized Portfolios from the RAMP filing must be clearly explained by the utility in its GRC filing. In the GRC, the utility will provide an update of the calculations of Overall Residual Risk and associated diagrams and workpapers previously provided in the RAMP in accordance with Row 9. In the RAMP and GRC, the utility will clearly and transparently explain its rationale for selecting Mitigation and Control Programs for each enterprise risk presented in the RAMP and for its selection and optimization of its portfolio of Mitigation and Control Programs for

		each enterprise risk presented in the RAMP. The utility must explain how the budget scenario and other constraints factored into the utility's portfolio selection. In the RAMP and GRC, the utility will clearly and transparently explain its rationale for prioritizing Risk Reporting Units for each Mitigation and Control Program. The utility's proposed Enterprise Portfolio, including its Mitigation and Control Programs selection, Risk Reporting Unit prioritization, and Risk Mitigation Portfolio optimization can be influenced by Benefit-Cost Ratios and other factors including, but not limited to, funding, labor resources, technology, planning and construction lead time, compliance requirements, Risk Tolerance thresholds, operational and execution considerations, and modeling limitations and/or uncertainties affecting the analysis. In the RAMP and GRC, the utility will explain whether and how any such factors affected the utility's proposed Enterprise Portfolio, including its Mitigation and Control Program selections and Risk Reporting Unit prioritization. GRC Post-Test Year Reporting: All Controls and Mitigation programs must include Benefit-Cost Ratios in each of the GRC post-test years as well as an aggregate Benefit-Cost Ratio for the entire post-test year period and the entire GRC period, by Tranche.
27.	Dynamic Analysis	If LoRE or CoRE is expected to change substantially over time due to factors such as asset age, asset condition, and varying effect of Mitigation over time, these changes should be specified and incorporated into the calculation of monetized pre- and post-mitigation risk values and Benefit-Cost Ratios. One means of incorporating these changes is by the use of the dynamic analysis demonstrated by the Joint Intervenors in the test drive problems for high pressure gas pipelines for PG&E and SoCalGas/SDG&E in Phase 2 of A.15-05-002 et al.

28.	Step 3 Supplemental Analysis in the GRC	(1) Except as provided in (2), the utility will conduct a Step 3 analysis in the GRC of any program included in the GRC Application that meets all of the following criteria: (a) the program was not addressed in the RAMP; (b) the utility justifies the program primarily on the basis of reducing a safety or reliability risk; the program is associated with the portion of the electric system under CPUC jurisdiction ("Electric Operations") or with the natural gas transmission or distribution pipeline system or storage facilities ("Gas Operations"); and (d) the CPUC jurisdictional forecast cost of the program in the GRC equals or exceeds the following thresholds: (i) For PG&E, SCE, and SoCalGas: cumulative $100 million over four years for capital programs, and $20 million in the test year for expense programs; (ii) For SDG&E, cumulative $50 million over four years for capital programs and $10 million in the test year for expense programs. (2) A Step 3 analysis is not required for the following: (a) administrative and general programs; (b) work requested by others programs; (c) a program that meets a compliance obligation under applicable law, or regulation, (including but not limited to any general orders), provided that this exclusion shall not apply if the utility chooses to exceed the minimum requirements of the compliance obligation or if the terms of the compliance obligation allow the utility to exercise discretion regarding the pace or scope of the program to meet the obligation; (d) a program that is justified solely or primarily as necessary to satisfy the utility's obligation to serve or to fulfill a mandatory customer request or load growth, provided that this exclusion shall not apply if the utility chooses to exceed the obligation to serve or customer request or if the terms of the obligation or customer request give the utility discretion regarding the pace or scope of the program to meet the obligation to serve; or (e) an expense program that is associated with routine operations and maintenance or restoring service after events such as emergency conditions, storms, and unplanned outages. (3) For any program for which a Step 3 analysis is required under the foregoing provisions, the results of the analysis will be provided in the utility's GRC showing.

		(4) For purposes of determining whether a program in the GRC falls below the dollar thresholds in (1)(d), the utility shall not break up the program into component parts in order to avoid performance of the Step 3 analysis. For purposes of this row, "program" is defined as a CPUC jurisdictional effort within Electric Operations or Gas Operations consisting of projects, activities, and/or functions with a defined scope that is intended to meet a specific objective. Program will be specifically defined for each utility as follows: • **PG&E:** For PG&E's gas operations and electric distribution operations, programs are defined at the Maintenance Activity Type (MAT) level and not at levels that further subdivide activities within the MAT. For example, if the MAT includes two sets of activities, both activities together comprise a program for purposes of Row 28. Any existing MAT codes for a capital or expense program are subject to change as new programs or projects are developed and previous programs or projects are discontinued or modified. • **SCE:** Programs are defined at the GRC Activity and Work Breakdown Structure (WBS) levels for expense and capital, respectively, as shown in pages 1 to 19 in the workpapers for SCE-01 in its 2018 GRC Application, A.16-09-001, and not at levels that further subdivide activities within the GRC Activity code and the WBS level. For example, if the GRC Activity code or WBS includes two sets of activities, both activities together comprise a program for purposes of Row 28. The activities in each GRC may be different from the ones noted here as new programs or projects are developed and previous programs or projects are discontinued or modified. • **SoCalGas/SDG&E:** ▪ **Capital Programs:** Capital programs are defined at the budget code level and not at levels that further subdivide activities within the budget code. For example, if the budget code includes two sets of activities, both activities together comprise a program for purposes of Row 28. Sometimes a capital program is presented as a series of budget codes. If a capital program is represented by multiple budget codes, SoCalGas and SDG&E will add the sum total of the budget codes for each of the respective capital programs to determine applicability under the capital program dollar threshold in Row 28.

		▪ **Expense Programs:** An expense program is presented by workpaper, which typically contains a single cost center or a group of cost centers. For purposes of determining applicability under Row 28 for an expense program, SoCalGas and SDG&E will respectively review the Test Year request for each workpaper for each utility and if the total expense for the workpaper meets the applicable expense threshold in Row 28, SoCalGas and SDG&E will then determine whether any amounts within the selected workpaper relate to activities that are not required to undergo Step 3 analysis in accordance with the exclusions in Row 28. Such amounts will be deducted from the total Test Year costs for the workpaper for purposes of determining whether the dollar threshold in Row 28 is met. (c) **General:** Any existing budget codes or workpapers for a capital or expense program are subject to change as new programs or projects are developed and previous programs or projects are discontinued or modified.

29.	Transparency in RAMP and GRC – Results can be understood	Inputs and computations for the Steps described in this document should be clearly stated and defined in RAMP and, when applicable, the GRC. The sources of inputs should be clearly specified. When SME judgment is used, the process that the SMEs undertook to provide their judgment should be described. Any questionnaire or document used to solicit SME judgment will be made available to the CPUC and parties upon request. The utility should specify all information and assumptions that are used to determine both monetized pre- and post-mitigation risk values. The methodologies used by the utility should be mathematically correct and logically sound. The mathematical structure should be transparent. All algorithms should be identified. All calculations should be repeatable by third parties using utility data and assumptions recognizing that, dependent on the models used, some variation of result may occur. This requirement is subject to practicality and feasibility constraints of sharing data and models (such as confidentiality, critical energy infrastructure data, volume of information and proprietary models). If these constraints arise, the utility will walk through the calculations in detail when requested by intervenors or the CPUC staff.
30.	Sensitivity Analysis	The utility will identify critical parameters and assumptions made in performing the risk analysis and explain why such parameters are critical. The utility will be prepared to complete a sensitivity analysis of its results when requested. Intervenors may request sensitivity analyses via the discovery process.

31.	Data Support and Data Sources	All estimates should be based on data whenever practical and appropriate. However, the available data should not restrict the application of the risk assessment methodologies. SME judgment should be used if the methodologies require use of data that is not available. Over time, SME judgment should be increasingly supplemented by data analysis as the methodologies mature. Data can include company-specific data or industry data. Whether use of a type of data is appropriate depends on the issue under consideration. If a utility relies on industry data, the utility will provide justification for applying those data to the specific circumstances of the utility. Data can be combined with SME judgment to provide inputs to the risk methodology. Data can be information derived from, but not limited to, observations, models, records, analysis, or measurements.
32.	Implementation	The methodology and agreed-upon items herein will be implemented by the IOUs beginning on January 1, 2026 and continuing with subsequent filings.
33.	Minimum Requirements	This document outlines the minimum requirements for the RAMP and the Mitigations presented in the GRC for which Step 3 analysis is required under Row 28. The utilities may provide additional data and information as they see fit and/or view as necessary to justify their GRC request. Parties reserve the right to challenge the sufficiency of the justification for risk-justified projects or programs proposed in the GRC for which the utility elects not to conduct a quantitative analysis of risk reduction and Benefit-Cost Ratios.

(END OF APPENDIX A)