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Appendix B

Transparency Pilot Guidelines (CLEAN)

PG&E Proposal to Address Transparency and Uncertainty in IOU's Risk-Based Filings as Modified

Pacific Gas and Electric Co. (PG&E), after consultation with the Technical Working Group (TWG), presents for the consideration of the Commission a framework to address transparency and uncertainty of assumptions and estimates for risk-based ("RDF") filings, consisting of the two Elements below, and an associated Implementation Schedule.

1. *Standard Workpaper Templates*; comprised of three (3) data tables per Risk, corresponding to the input parameters, output calculations and the list of models used in quantifying the Risk.
2. *Estimate Quality Criteria*; a set of criteria, to be developed by the TWG, to objectively assess the Estimate Quality associated with the information presented in the data tables above.

Table 1: Implementation Schedule for the Transparency Guidelines Proposal

Date	Milestone	Description
Q3-Q4, 2021	Decision on Phase 1, R.20-07-013.	Tentative expected decision on Phase 1 issues.
Q3-Q4, 2021	Updated Transparency Guidelines Proposal.	Reconvene TWG to discuss Cal Advocates' proposal and estimate ranges for sensitivity analysis. SPD to prepare updated Transparency Guidelines Proposal, as appropriate.
Q4, 2021 to Q2, 2022	SCE to test drive the Transparency Guidelines Proposal.	SCE to test drive the Transparency Guidelines Proposal using risks in SCE's 2022 RAMP to be filed in 2022.
Q2 to Q3-2022	TWG to discuss test drive results.	SPD to convene TWG meeting to discuss results of the test drive.
May 15th, 2024	PG&E files RAMP application implementing Transparency Guidelines Proposal.	PG&E files its risk analysis in RAMP implementing the Transparency Guidelines Proposal.
May 15th, 2025	Sempra files its RAMP application implementing Transparency Guidelines Proposal.	Sempra files its risk analysis in RAMP implementing the Transparency Guidelines Proposal.

Background

In the Assigned Commissioner's Scoping Memo and Ruling in R.20-07-013, Phase 1, Track 1 of the proceeding was established to "…consider whether there are discreet technical questions regarding the RDF that the Commission should clarify in the short term". While the ruling contained specific issues, it also noted, as Track 1: Clarifying RDF Technical Requirements, Item f. [1] "Other related clarifications as needed".

[1] R.20-07-013, Assigned Commissioner's Scoping Memo and Ruling, pp 4-5.

In PG&E's 2020 RAMP filing, A.20-06-012, Safety Policy Division (SPD), The Utility Reform Network (TURN) and other parties highlighted issues with understanding assumptions, calculations and outputs, and noted that the filing could benefit from increased transparency. PG&E likewise desires providing clarity and enabling parties to perform their own risk analyses using PG&E's data and outputs in order to produce more streamlined proceedings and reduce overhead surrounding each filing.

On March 10th, 2021, a session of the TWG was convened under Phase 1, Track 1 of R.20-07-013 in which TURN presented on "Transparency of Estimates and Assumptions". The presentation reiterated the Safety Model Assessment Proceeding (S-MAP) Settlement Agreement requirements, provided guidelines for addressing transparency and uncertainty, and proposed a "Streamlined Format for Reporting Estimates and Assumptions".

On the topic of uncertainty, while PG&E agrees in principle with TURN's approach to quantify it rigorously and mathematically, it is concerned that the necessary data and consistent policies to do so are lacking. Whether such an approach can be scaled up to deal with the large amount of information, technical computation feasibility, and interpretation of results are also areas of concern. Furthermore, PG&E agrees with Dr. Schulman's comment in the TWG meeting that in the process of quantifying too soon, many organizations end up losing information; and that the process of understanding uncertainty must begin not with formal numbers, but with narratives. The proposal in this document keeps with this approach and supplements it with the inclusion of a quantitative Sensitivity calculation to help parties understand the importance of specific assumptions to the risk analysis.

Transparency Proposal Element #1: *Standard Workpaper Templates*

In the aforementioned TWG meeting, PG&E agreed to pilot the use of TURN's Streamlined Format on one of the existing Risks from its 2020 RAMP report. Based on this experience, PG&E recommends that Standard Workpaper Templates be developed as relational data tables, consisting of a Risk Results table, a Risk Sensitivity Analysis, and a Model Listing table. These tables would be amenable to analysis with Excel Pivot Tables or Filter to generate the report envisioned in pages 10 & 11 of TURN's presentation, as well as other reports.

Accordingly, the analysis results for each Risk would be captured in separate data tables as listed:

- Risk Results Table
- Risk Sensitivity Analysis Table
- Risk Model Listing Table

It is envisioned that the three tables be produced for each Risk modeled by the IOU using the S-MAP Settlement Agreement framework.

Risk Results Table

The Risk Results Table collects the model outputs associated with a Risk. It also represents the epistemic uncertainty[2] (due to data quality, etc.) inherent in the calculations in the Estimate Quality field, which is

[2] "Epistemic uncertainties arise when making statistical inferences from data and, perhaps more significantly, from incompleteness in the collective state of knowledge ... The epistemic uncertainties relate to the degree of belief that the analysts possess regarding the representativeness or validity of the … model and in its predictions." *NUREG-1855, Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision making, pp 12. United States Nuclear Regulatory Commission.*

determined based on the criteria described in the Estimate Quality section below. The Risk Results table contains one row per Tranche-Year-Mitigation-Attribute-Result Type. The columns of the table are:

Table 2: Risk Results Table

Column	Description
Risk	Name of Risk
Tranche	Name of Tranche
Year	Year for which the Value pertains to; starts with January 1st
Mitigation	One of: • Name of Mitigation • "Baseline": The Values represent baseline estimates • "All": Values are for Post Mitigation estimates assuming all the proposed mitigations are in place.
Attribute	One of: • Name of MAVF Attribute: e.g., for PG&E, "Safety", "Electric Reliability" • "Overall": Values represent the overall MARS score, or are not related to Attributes (e.g., likelihood estimates are not related to Attributes)
Value	Numerical value
Result Type	See table below for valid Result Types
Estimate Quality	"High", "Medium", "Low". The qualitative degree of certainty/confidence associated with the output. See discussion in the Estimate Quality section below.
Justification	Tag that contains the criteria that lead to the Estimate Quality determination. See Estimate Quality section below. For data deemed to be of "low" quality, must include a description of how and when the utility plans to improve the estimate quality.
Reference	Text field providing data source for estimate. .
Confidence Interval	Quantitative confidence interval of estimate/calculation. This field is only populated with numerical values if such values are applicable and can be readily determined based on available data and established statistical principles, otherwise "N/A".

Result Types

PG&E proposes the following Result Types. Additional Result Types can be added as necessary.

Table 3: Illustrative example of Results Type proposed by PG&E.

Result Type	Description
Risk Before	MARS value, present valued, before proposed mitigations are applied. If the Mitigation column is set to "Baseline", the value represents the Baseline risk score, calculated as *Present-Value (Attribute Weight x Program Exposure x LoRE Before x CoRE Before)* for a given Risk-Tranche-Year-Mitigation-Attribute. If the Attribute is "Overall", the Value is the same as the sum of Risk Scores over all Attributes.
LoRE Before	Likelihood of Risk Event before proposed mitigations are applied. If the Mitigation column is set to "Baseline", the value represents the Baseline Likelihood.
CoRE Before	Expected Consequence in Scaled Units. If the Mitigation column is set to "Baseline", the value represents the Baseline CoRE.
Exposure Before	Total # of units (miles, etc.) for the Risk/Tranche/Year in the Baseline.
Risk After	MARS value, present valued, after Mitigation is applied. This result is only available if Mitigation column is not "Baseline". This is calculated as *Present-Value (Attribute Weight x Program Exposure x LoRE After x CoRE After)* for a given Risk-Tranche-Year-Mitigation-Attribute. If the Attribute is "Overall", the Value is the sum of Risk Scores over all Attributes.
LoRE After	Likelihood after Mitigation is applied. This result is only available if Mitigation column is not "Baseline". Note that the LoRE here is different from Tranche LoRE when the mitigation is not implemented for the entire tranche.
CoRE After	CoRE after Mitigation is applied. This result is only available if Mitigation column is not "Baseline".
Exposure After	Total # of units (miles, etc.) for the Risk/Tranche/Year after Mitigation is applied.
Mitigation Program Exposure Scope	The # of units (miles, etc.) for the Risk/Tranche/Year that the Mitigation will be applied to.
Cost	Present valued expected cost for the Year.

An example with illustrative values is provided in the Excel file titled "pge_std_wp_proposal_2.xlsx". Note that not all combinations of Mitigation, Attribute, and Result Type are valid. For example, the combination of "Baseline", "Safety", and "LoRE Before" is not valid and will not be reported, because the likelihood of a risk event is separate from the consequence in the S-MAP Settlement Agreement framework.

Risk Sensitivity and Scenario Analysis Table

The purpose of the Risk Sensitivity and Scenario Analysis Table is to collect all the assumptions and input parameters used in Risk calculations. It also represents the epistemic uncertainty (due to data quality, etc.) inherent in the parameter in the Estimate Quality field, which is determined based on the criteria described in the Estimate Quality section below. Parameters are described in the "Parameter" field. If a probability distribution is not readily available, the following should be used to estimate the parameter's distribution:

- Measured data distributions
- Monte Carlo generated distributions
- SME best estimates of risk distributions

Sensitivity Analysis

Sensitivity Analysis is a change in a parameter of the risk model, such as by changing the expected value of the parameter by a positive 1% or utilizing the value found at the 10th or 90th percentile of the distribution of the parameter. For conducting the sensitivity analysis, it is assumed that the reporting parameter will be allowed to change while other parameters will be held constant. Parameters are and grouped into two general types, Baseline or Mitigation Program, depending on whether they are used to calculate Baseline Risk Scores, or represent the effectiveness of mitigation programs (e.g., the amount of reduction, in percentages, that a mitigation will reduce the mean by) that impact the calculation of cost-benefit ratios (CBR). In addition to the expected value of a reported parameter, a sensitivity analysis will record three other test values:

- A small perturbation;
- An upper test value; and
- A lower test value

The calculated Risk score or CBR at the expected value, small perturbation, upper test value and lower test value are also provided. These are obtained by determining the small perturbation, Upper Test Value and Lower Test Value for the parameter (e.g., 10th or 90th percentile of the range of the parameter) and calculating the Risk Score or CBR using these values.[3]:

φ: The reported parameter

φ_{E}: The expected value of the reported parameter

$\varphi_{\mathrm{E}+1}$: Small perturbation is the expected value of the reported parameter +1% of range

φ_u: Upper test value for the reported parameter is 90th percentile of range

φ_l: Lower test value for the reported parameter is 10th percentile of range

λ_1,λ_2,...: Other parameters used to calculate the Risk score or CBR

$R(\varphi, \lambda_1, \lambda_2, \dots)$: Calculated Risk score or CBR

$R(\varphi_{\mathrm{E}}, \lambda_1, \lambda_2, \dots)$: Calculated Risk score or CBR at the expected value

$R(\varphi_{\mathrm{E}+1}, \lambda_1, \lambda_2, \dots)$: Calculated Risk score at the expected value of the reported parameter +1% of

[3] If a party wishes to derive slope at any of the test values, they can do this by subtracting the risk score or CBR at the expected value of the parameter from these resulting test value risk scores or CBRs, and normalize the difference in Scores

range

$R(\varphi_u, \lambda_1, \lambda_2, \dots)$: Calculated Risk score or CBR at the upper test value

$R(\varphi_l, \lambda_1, \lambda_2, \dots)$: Calculated Risk score or CBR at the lower test value

Scenario Analysis

The Scenario Analysis addresses the question of the impact to risk scores or CBRs if multiple Parameters at the portfolio/mitigation level are changed based on a set of "high" and "low" case assumptions. This analysis is done at the portfolio/mitigation level and not calculated for each individual risk driver combination. The high scenario analysis would calculate the Risk score or CBR when multiple Parameters at the portfolio/mitigation level are all increased to the 90th percentile of the range of each Parameter. The low scenario analysis would calculate the Risk score or CBR when multiple Parameters at the portfolio/mitigation level are all decreased to the 10th percentile of the range of each Parameter.

Table 4: Risk Sensitivity Table

Column	Description
Risk	Name of Risk
Tranche	Name of Tranche
Outcome	Outcome or "Overall"
Attribute or Driver/Sub-Driver	One of: • Name of MAVF Attribute: e.g., for PG&E it can be "Safety", "Reliability – Electric" • "Overall": Values represent the overall MARS score, • Driver/Sub-Driver: Name of Driver/Sub-Driver
Year	Year for which the Value pertains to and starts with January 1st
Mitigation	One of: • Name of Mitigation • "Baseline": The Values represent baseline estimates
Distribution	E.g., "Poisson", "Log-normal", "N/A" If a probability distribution is not readily available, the following should be used to estimate the parameter's distribution: • Measured data distributions • Monte Carlo generated distributions • SME best estimates of risk distributions
Parameter	The type of parameter and what it applies to: • Baseline LoRE mean • Baseline CoRE mean • Baseline CoRE stdev • Mitigation LoRE Effectiveness • Mitigation CoRE Effectiveness • Etc.
Expected Value	Expected value of the Parameter

Original Risk Score or CBR	Original value of the Risk Score or CBR when the expected value of the Parameter is used
Small Perturbation Sensitivity	Numerical value when the expected value of the Parameter is increased by an incremental amount of 1% of the range
Risk Score or CBR at Small Perturbation Sensitivity	Numerical value representing the change in Risk score or CBR when the Parameter is increased by an incremental amount of 1% of the range
Negative Sensitivity	Numerical value of the Parameter at the 10th percentile of the range
Risk Score or CBR at Negative Sensitivity	Numerical value representing the Risk score or CBR when the Parameter is decreased to the 10th percentile of the range
Positive Sensitivity	Numerical value of the Parameter at the 90th percentile of the range
Risk Score or CBR of Positive Sensitivity	Numerical value representing the Risk score or CBR when the Parameter is increased to the 90th percentile of the range
Risk Score or CBR of Low Scenario Analysis Value	Numerical value representing the Risk score or CBR when multiple Parameters at the portfolio/mitigation level are all decreased to the 10th percentile of the range of each Parameter.
Risk Score or CBR of High Scenario Analysis Value	Numerical value representing the Risk score or CBR when multiple Parameters at the portfolio/mitigation level are all increased to the 90th percentile of the range of each Parameter.
Estimate Quality	"High", "Medium", "Low". The degree of confidence associated with the estimate/calculation. See discussion in the Estimate Quality section below.
Justification	Tag that contains the criteria that lead to the Estimate Quality determination. E.g., "Quantitative-Limited Internal Data". See Estimate Quality section below. For data deemed to be of "low" quality, must include a description of how and when the utility plans to improve the estimate quality.
Reference	Text field providing data source for estimate.
Comments	Column for SME input to allow information not otherwise captured, to be captured and shared, if available. This could include references to narratives in workpapers. For example, this may include SME concerns about the best way to use the data, or its limits, or opportunities to gather more or improve the data or its use.

Confidence Levels	Quantitative levels of output expressed at 10th and 90th percentile confidence levels of the parameter. These fields are only populated with numerical values if such values are applicable and can be readily determined based on available data and established statistical principles, otherwise "N/A".

Risk Model Listing Table

PG&E presented its initial proposal in the TWG workshop on Transparency, held on April 14th, 2021. During this meeting Utility Consumers Action Network (UCAN) stressed that model uncertainty[4] should be captured in any proposal to address transparency and data quality. PG&E believes that this issue can be addressed by listing all models (e.g., statistical distributions used for consequences) used for each Risk in a table. If a probability distribution is not readily available, the following should be used to estimate the risk's distribution:

- Measured data distributions
- Monte Carlo generated distributions
- SME best estimates of risk distributions

If the utility believes that a probability distribution does not exist for this risk, in the narrative of their transparency proposal submission, they should provide a clear explanation of the evidence that demonstrates this risk lacks a probability distribution.

Table 5: Risk Model Listing Table

Column	Description
Risk	Name of Risk
Tranche	Name of Tranche
Outcome	Outcome or "Overall"
Attribute or Driver/Subdriver	One of: • Name of MAVF Attribute: e.g., for PG&E it can be "Safety", "Reliability – Electric", "Overall": Values represent the overall MARS score, or are not related to Attributes (e.g., likelihood estimates are not related to Attributes) • Name of Driver/sub-driver
Year	Year for which the Value pertains to and starts with January 1st
Distribution	"Log-normal", "normal", etc. If a probability distribution is not readily available, the following should be used to estimate the risk's distribution: • Measured data distributions • Monte Carlo generated distributions • SME best estimates of risk distributions
Description	E.g., "Distribution of Safety Consequences"
Estimate Quality	"High", "Medium", "Low". The degree of confidence associated with the data inputs. See discussion in the Estimate Quality section below
Justification	Tag that contains the criteria that lead to the Estimate Quality determination. E.g., "Industry Consensus Model"
Reference	Text field providing reference to further documentation.

[4] "Model uncertainty is related to an issue for which no consensus approach or model exists and where the choice of approach or model is known to have an effect on the … model." *NUREG-1855, Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision making, pp 15. United States Nuclear Regulatory Commission.*

Recommended Approach for Standard Workpaper Templates

PG&E recommends the adoption of the tables described above, subject to technical, computability implementation concerns that might arise due to the Sensitivity (or other) calculation(s). This is addressed by a Prototyping period (incorporated into the Implementation Schedule) where the calculations will be developed and tested, and the results, together with modifications to calculations, if any, will be issued.

Transparency Framework Element #2: Estimate Quality

PG&E proposes the use of a qualitative Estimate Quality to describe the uncertainty inherent in Risk models, calculations and input parameters. This is a valid incremental step towards a more rigorous treatment of data and modeling uncertainty and will provide parties with valuable experience and perspective for developing a more comprehensive and quantitative-based methodology. Accordingly, each input parameter, risk calculation, and model will be categorized as having a "High", "Medium", or "Low" Estimate Quality, based on pre-established, transparent, and objective criteria as described below.

Discussion

In the aforementioned TWG workshop on Transparency, PG&E proposed the following sets of criteria for input parameters and risk calculations.

Table 6: PG&E's Original Proposed Criteria for Input Parameters

Overall, How Parameter was Determined	Detailed Description of Method Used	Estimate Quality
Quantitative	Bayesian or other formal analysis incorporating industry data with internal data.	High
	Internal data only, no available industry data or industry data was not used.	High
	Limited internal data.	Medium
SME-Judgment	Multiple SMEs with consensus utilizing proxy data.	High
	Multiple SMEs with uncertainty, or single SME with high confidence in proxy data.	Medium
	Single SME with uncertainty or high level of interpretation of proxy data.	Low

PG&E also envisioned that the criteria could be expanded by IOUs to incorporate other methods used to determine parameters.

Parties commented that PG&E's proposal would require refinement. For example, Dr Schulman pointed out that retrospective accident data shows that companies have been deceived by their own internal data, and hence using only Internal data should not necessarily warrant a High Estimate Quality, per PG&E's proposal. PG&E agrees that refinement is needed and believes that instead of its original proposal, the objective criteria used to attribute the Estimate Quality to input parameters should be developed by the TWG. PG&E also subsequently supplemented the Standard Workpaper Templates to include a Risk Model Listing table (as documented above), which also includes an Estimate Quality categorization for all the models used for quantifying a Risk. This approach would entail a corresponding set of criteria to use in determining the Estimate Quality for models.

PG&E's Proposed Criteria for Risk Calculations

PG&E's original proposal noted that the Estimate Quality of calculations that depend on input parameters are directly related to the Estimate Quality of the input parameters themselves. For example, if the CoRE of a Risk uses input parameters that have a Low Estimate Quality, the CoRE will have a Low Estimate Quality itself, i.e., the Estimate Quality of the CoRE will be the same as the lowest Estimate Quality of its input parameters. For Post-Mitigated Risk scores, the Estimate Quality depends on both the Mitigation program input parameters and the Baseline risk distribution parameters and is set to the lowest Estimate Quality of its inputs, as follows.

Table 7: PG&E's Proposed Criteria for Risk Calculations

Estimate Quality of Post-Mitigated Risk Scores	**Type: Mitigation Parameter Estimate Quality**		
Type: Driver or Baseline Parameter Estimate Quality	**High**	**Medium**	**Low**
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Low

PG&E did not receive comments during the TWG session on its approach for output/calculations. Nevertheless, it recognizes that its approach here could require modifications based on how the development of criteria for inputs proceeds.

Recommended Approach for Estimate Quality

Based on the discussion above, PG&E recommends that the Commission, in adopting the Estimate Quality proposal, establish future TWG working sessions to develop separate sets of criteria to categorize Estimate Quality associated with:

- Inputs
- Calculations; and
- Models.

The in-depth topics to be covered in such workshop(s) include, but are not limited to:

- Understanding the different ways in which input parameters are developed.
- Recognizing the limitations and pitfalls associated with the different ways that parameters are developed.
- Considering practices adopted by other industries, and situations that are specific only to the IOUs, if any.
- Whether to adopt the criteria PG&E proposed for determining the Estimate Quality *for calculations* based on the Estimates for the inputs. If not, to develop an alternative.
- Consider what factors (e.g., degree of industry adoption,) should be used to determine the Estimate Quality *for models*.
- Developing flow-charts, questionnaires, etc. to be used in the Estimate Quality determination.