OFFICE OF ENERGY INFRASTRUCTURE SAFETY

DRAFT 10-YEAR ELECTRICAL UNDERGROUNDING PLAN GUIDELINES

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1. Executive Summary

This document sets forth the Office of Energy Infrastructure Safety's (Energy Safety's) 10-Year Electrical Undergrounding Plan (EUP) Guidelines.

1.1 Authority

Energy Safety has authority under Government Code section 15475.6 to "adopt guidelines setting forth the requirements, format, timing, and any other matters required to exercise its powers, perform its duties, and meet its responsibilities described in sections 326, 326.1, and 326.2 and Chapter 6 (commencing with section 8385) of Division 4.1 of the Public Utilities Code."

1.2 Purpose and Scope

Pursuant to Public Utilities Code section 8388.5,[1] a large electrical corporation can prepare and submit a 10-year plan for undergrounding electrical distribution infrastructure to Energy Safety for review and approval. The plan must satisfy the requirements of section 8388.5(d)(2) and contain all required components.

These EUP Guidelines (Guidelines) set forth substantive and procedural requirements for large electrical corporations[2] to prepare and submit plans. The Guidelines apply to large electrical corporations in the State of California.

[1] All statutory references are to the Public Utilities Code unless otherwise specified.

[2] Per statute, a large electrical corporation refers to an electrical corporation with at least 250,000 customer accounts. Section 8388.5(b) limits participation in the program to these entities.

2. Technical Guidelines

2.1 Overview of Electrical Undergrounding Plan (EUP) Required Elements

The elements of the EUP are described in the following sections of these Guidelines:

a. **Basic information** on the large electrical corporation, as described in Section 2.2 of these Guidelines.

b. **Demonstration of Substantial Risk Reduction**, including a Portfolio Mitigation Objective[3] and supporting objectives and targets, as described in Section 2.3 of these Guidelines.

c. **Project Acceptance Framework** that the large electrical corporation will use to create the list of Undergrounding Projects included in the EUP and to maintain the list of Undergrounding Projects throughout the EUP 10-year period, as outlined in Section 2.4 of these Guidelines.

d. **Timelines, Workforce Development, Costs and Benefits, and Non-Ratepayer Funding** addressing other statutory requirements such as project timelines and targets, workforce development, economies of scale, and securing additional funding, as described in Section 2.5 of these Guidelines.

e. **EUP Progress Report 0**, which includes the initial list of Undergrounding Projects and required data reporting, as described in Section 2.6 of these Guidelines.

f. Narrative description of the large electrical corporation's **Risk Modeling Methodology** and decision-making metrics, as described in Section 2.7 of these Guidelines.

g. **Reporting Metrics**, including Project-Level, Portfolio-Level, and System-Level reporting requirements, as described in Section 2.8 of these Guidelines.

2.2 Basic Information

The EUP must include basic information about the large electrical corporation, including, but not limited to:

a. The legal name of the large electrical corporation.

[3] "Portfolio Mitigation Objective" means the amount of change in risk (wildfire and reliability) that is necessary to meet the substantiality requirements of Section 8388.5(d)(2). See Appendix A (Definitions) for complete list of defined terms.

b. The number of customer accounts to show qualification as a large electrical corporation.

c. A list of the persons responsible for preparing the EUP, including executive-level owner with overall responsibility; program owners with responsibility for specific components; and the primary contact for Energy Safety and stakeholder general questions. Include names, titles, areas of responsibility, and contact information.

2.3 Demonstration of Substantial Risk Reduction

Pursuant to 8388.5(d)(2), the EUP can only be approved if (1) it will substantially increase electrical reliability by reducing the use of public safety power shutoffs, enhanced powerline safety settings, deenergization events, and any other outage programs, and (2) it will substantially reduce the risk of wildfire. To support this, the EUP must include the Portfolio Mitigation Objective, and specific objectives and targets as described below.

2.3.1 Portfolio Mitigation Objective

The Portfolio Mitigation Objective is the amount of change in risk (wildfire and reliability) that will meet the requirement of section 8388.5(d)(2).

The large electrical corporation must set a Portfolio Mitigation Objective for the EUP and provide supporting narrative and data in the EUP demonstrating how the EUP will achieve the Portfolio Mitigation Objective. In order to achieve the Portfolio Mitigation Objective, the large electrical corporation will select projects (consisting of individual isolatable Circuit Segments) during the 10-year program.

The narrative must address the following:

a. Explanation of the basis of the Portfolio Mitigation Objective.

b. The source for the risk and reliability scores used to set the Portfolio Mitigation Objective.

c. Overview of the implementation approach for the EUP (e.g., to reduce risk on the highest risk Circuit Segments first, or to select the most feasible for undergrounding first) and an explanation of how the implementation approach will achieve the Portfolio Mitigation Objective.

d. Overview of how the Project Acceptance Framework, Timelines, Workforce Development, Costs and Benefits, and Non-Ratepayer Funding, Progress Report 0, Risk Modeling, and Reporting Metrics all support the Portfolio Mitigation Objective (see Sections 2.4 – 2.8 of these Guidelines).

e. A concise summary and clear presentation of the metrics and standards for the Portfolio of Undergrounding Projects and supporting Project-Level metrics.

Instructions for developing and calculating these metrics are found in the Modeling Section (Section 2.7) of these Guidelines.

f. Explanatory graphs.

g. Specific cites to any other EUP content that supports the Portfolio Mitigation Objective.

2.3.2 Objectives and Targets

To track and evaluate progress toward the Portfolio Mitigation Objective, the EUP must also include specific plan objectives and targets. The objectives must be specific, measurable, achievable, realistic, and timely outcomes for the EUP and will be used to assess how the actual Portfolio of projects meets the Portfolio Mitigation Objective. The targets must consist of forward-looking, quantifiable measurements of work that will be used to assess progress toward the plan objectives. The plan objectives and associated targets will be utilized by the Independent Monitor during its assessment of a large electrical corporation's compliance with its plan and tracked in all Progress Reports pursuant to sections 8388.5(f)(3) and 8388.5(g).

2.4 Project Acceptance Framework

Pursuant to section 8388.5(c)(2), the large electrical corporation must identify Undergrounding Projects in its EUP. The Project Acceptance Framework is a multi-step process that the large electrical corporation must establish and use to determine which Circuit Segments can be considered Undergrounding Projects, and, if undergrounded, will substantially increase electrical reliability[4] and substantially reduce the risk of wildfire.

The large electrical corporation must list all Circuit Segments[5] in its service territory (the “All Circuit Segment List”), apply the Project Acceptance Framework to that list, and include the results in the EUP as described below. The large electrical corporation must demonstrate that projects successfully passing through the Project Acceptance Framework contribute to achieving the Portfolio Mitigation Objective.

The Project Acceptance Framework has four screens:

Screen 1: Circuit Segment Eligibility

[4] Increased reliability is measured through the reduction of the use of public safety power shutoffs, enhanced powerline safety settings, deenergization events, and any other outage programs, pursuant to section 8388.5(d)(2).

[5] For purposes of these Guidelines, “Circuit Segment” means an isolatable circuit segment, or a circuit protection zone (CPZ).

Screen 2: Project Information and Alternative Mitigation Comparison

Screen 3: Project Risk Analysis

Screen 4: Project Prioritization

Circuit Segments that are not located in a Wildfire Rebuild Area or a Tier 2 or 3 High Fire-Threat-District ("Out of Area Circuit Segments") will be eliminated in Screen 1 (Circuit Segment Eligibility). The Circuit Segments passing Screen 2 (Project Information and Alternative Mitigation Comparison) constitute the list of Undergrounding Projects identified in the EUP pursuant to section 8388.5(c)(2).

The EUP must apply Screen 1 (Circuit Segment Eligibility) and Screen 2 to all circuit segments at the time of EUP filing. The EUP must apply Screen 3 (Project Risk Analysis) and Screen 4 (Project Prioritization) to all circuit segments for which the large electrical corporation has sufficient information. Screen 3 (Project Risk Analysis) and Screen 4 (Project Prioritization) must be applied to a group of at least 25 individual Undergrounding Projects.

After the EUP is filed, the large electrical corporation can re-apply the screens to take into account new information (such as, project-specific information obtained through scoping and other project work) and model version and calibration changes (such as those detailed in Section 2.7.5.2) and changes made to the list of non-EUP Projects. These updates may result in additional circuit segments becoming eligible through Screen 1 (Circuit Segment Eligibility) and Screen 2 (Project Information and Alternative Mitigation Comparison). These updates may also result in some circuit segments becoming ineligible through Screen 1 (Circuit Segment Eligibility) and Screen 2 (Project Information and Alternative Mitigation Comparison). Once an Undergrounding Project has passed Screen 3 (Project Risk Analysis) it is considered a Confirmed Project and does not need to be removed from the program because of a change.

The large electrical corporation must detail the implementation approach it will use for each screen. The general requirements of each screen, including the minimum data and information requirements, are further described in the sections below.

2.4.1 Screen 1: Circuit Segment Eligibility

Screen 1 (Circuit Segment Eligibility) is the procedure within the Project Acceptance Framework that identifies relevant Circuit Segments and creates the List of Eligible Circuit Segments.

2.4.1.1 List of Circuit Segments

The large electrical corporation must identify all Circuit Segments in its service territory that are located in a Wildfire Rebuild Area or Tier 2 or 3 High Fire-Threat District ("In-Area Circuit Segments").

The EUP must include this list of In-Area Circuit Segments along with the following risk scores for each Circuit Segment: (i) Overall Utility Risk Score; (ii) Ignition Consequence Score; and (iii) Outage Program Reliability Score. Section 2.7.9 of these Guidelines details the requirements for these risk scores.

The EUP must contain three versions of the All Circuit Segment List, sorted by (i) Overall Utility Risk Score; (ii) Ignition Consequence Score; and (iii) Outage Program Reliability Score.

2.4.1.2 Circuit Segment Risk Reduction Levels

Screen 1 (Circuit Segment Eligibility) ensures that the EUP limits eligibility to higher risk Circuit Segments.

The large electrical corporation must follow the instructions in Section 2.7 of these Guidelines to set a range of values that will be used to categorize Circuit Segments into three types. The EUP must present the values in the description of the Project Acceptance Framework. Additional information on the required values is provided in Section 2.7.9 of these Guidelines. The three types of values to be applied to Circuit Segments are:

1. **Eligible Circuit Segment values**: the range of risk score values that will be used to identify higher risk Circuit Segments that are eligible for the 10-Year Electrical Undergrounding Program. [6]
2. **Ineligible Circuit Segment values**: the range of risk score values that will be used to identify lower risk Circuit Segments that are not eligible for the 10-Year Electrical Undergrounding Program. [7]
3. **Mitigated Circuit Segment values**: the range of risk score values that an Eligible Circuit Segment must reach to be considered sufficiently mitigated under the terms of the EUP. [8]

After determining these values, the large electrical corporation must evaluate the list of In-Area Circuit Segments to determine eligibility and minimum mitigation needs.

The results must be included in the EUP as follows:

a. The range of values for each of the three categories (in the EUP narrative);

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[6] A Circuit Segment qualifies as an Eligible Circuit Segment if it exceeds one of the Project-Level thresholds described in Section 2.7.9 (High-Risk Threshold, Ignition Tail Risk Threshold, High Frequency Outage Program Threshold).

[7] A Circuit Segment that is below the High-Risk, Wildfire Tail Risk and High Frequency Outage Program Thresholds described in Section 2.7.9 is an Ineligible Circuit Segment.

[8] A Mitigated Circuit Segment is an Eligible Circuit Segment that has been treated to mitigate risk to the required standard described in Section 2.7.9 (Risk Reduction Project Standard, Reliability Increase Project Standard, Tail Risk Mitigation Project Standard).

b. A list of Eligible Circuit Segments, by category, and the corresponding minimum Mitigated Circuit Segment values (Portfolio Coversheet and data submission); and
c. A list of In-Area Circuit Segments that are below the eligibility values (data submission).

The EUP narrative must include the Baseline per Section 2.7.5 of these Guidelines and list all alternative mitigations including covered conductor and other hardening alternatives, remote fault detection technologies, and vegetation management that will be used in the individual Project Comparisons.

2.4.2 Screen 2: Project Information and Alternative Mitigation Comparison

Screen 2 (Project Information and Alternative Mitigation Comparison) confirms there is sufficient information available on a circuit segment and requires comparison of undergrounding to alternative mitigations in order to determine which Eligible Circuit Segments can be treated as Undergrounding Projects.

For Screen 2 (Project Information and Alternative Mitigation Comparison), the large electrical corporation must conduct an analysis comparing undergrounding to alternative mitigations and provide the CPUC Cost Benefit Ratio (CBR) and all information in the CPUC Data Appendix 1[9] at the time the EUP is submitted to Energy Safety. The alternative mitigation comparison must include a comparison of at least two alternative mitigations. Section 2.8.7.1 and Appendix C.1.13 of these Guidelines set out the instructions for the Screen 2 Project Information Table and Appendix E of these Guidelines contains an example Screen 2 Project Information Table. No project can be considered for the 10-Year Electrical Undergrounding Program unless this information is available.

2.4.2.1 Common Set of Values and Assumptions

Screen 2 (Project Information and Alternative Mitigation Comparison) may use common values and assumptions to develop estimates for Circuit Segments when project-specific information is not available. Screen 2 (Project Information and Alternative Mitigation Comparison) includes calculation of risk and benefit scores; it applies to both undergrounding and alternative mitigations. The EUP must summarize assumptions underlying the values and explain metrics used in Screen 2 (Project Information and Alternative Mitigation Comparison). This summary must be clear, concise and comprehensive. At a minimum, this summary must include:

[9] CPUC Resolution SPD-15 (March 7, 2024), SB 884 Program: CPUC Guidelines, Appendix 1: SB 884 Project List Data Requirements-Preliminary (https://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&docid=526984185, accessed April 15, 2024).

a. Description of the metrics required by the CPUC Guidelines for the SB 884 Program.
b. Detailed description of alternative mitigations that the large electrical corporation will use for these comparisons. Explanation of why these alternative mitigations are being considered. Description of process for determining which alternative mitigations will be used for individual project comparisons. Description of processes and resources that will be used for deploying each alternative mitigation.
c. Description of any assumptions for scope, cost, extent, and wildfire risk reduction and reliability improvements that are common to multiple Undergrounding Projects. These descriptions must be provided for all activities (undergrounding and alternative mitigations).
d. Explanation of how the need for additional easements, permits, and CEQA review are accounted for in the assumptions for scope, cost, extent, and risk reduction and reliability improvements.

2.4.3 Screen 3: Project Risk Analysis

Screen 3 (Project Risk Analysis) is the procedure for evaluating an individual Undergrounding Project in the context of the Portfolio of projects and includes information obtained through the project development process. The Screen 3 (Project Risk Analysis) considers the wildfire reduction and reliability increase elements of the Portfolio Mitigation Objective of an Undergrounding Project and includes comparing risk metrics for undergrounding and alternative mitigations.

The large electrical corporation must prepare a Project Reference Sheet for each project for consideration under Screen 3 (Project Risk Analysis). Instructions for the Project Reference Sheet are in Section 2.8.7.2 of these Guidelines and an example is attached as Appendix E to these Guidelines.

Screen 3 (Project Risk Analysis) must be completed for each Undergrounding Project when the large electrical corporation has sufficient information to fulfill the modeling requirements in Section 2.7 for that Undergrounding Project. Screen 3 (Project Risk Analysis) can be applied to projects at any time after submitting the EUP, as detailed information becomes available. The Project Reference Sheet must be updated when new data is available; these updates will be part of the Progress Reports.

The EUP must contain a detailed Screen 3 (Project Risk Analysis) procedure and describe how the large electrical corporation will use the screen on individual Undergrounding Projects before and after implementation of the EUP begins. The information used for alternative mitigations chosen for the Screen 3 (Project Risk Analysis) must reflect current project-specific information. The procedure must include how the large electrical corporation will choose alternative mitigations for Screen 3 (Project Risk Analysis). Instructions on creating

and completing the Screen 3 Comparative Risk Metrics Table are in Section 2.8.7.4 of these Guidelines.

At the time of filing the EUP, there must be a Portfolio of at least 25 projects considered under Screen 3 (Project Risk Analysis).

An Undergrounding Project that has completed Screen 3 (Project Risk Analysis) can proceed to Screen 4 (Project Prioritization). Undergrounding Projects that have completed Screen 3 (Project Risk Analysis) are reported as Confirmed Projects on Project Reference Sheets and in Progress Reports.

2.4.4 Screen 4: Project Prioritization

Pursuant to section 8388.5(c)(2), the EUP must include a means of prioritizing undergrounding projects based on "wildfire risk reduction, public safety, cost efficiency, and reliability benefits."

For Screen 4 (Project Prioritization), the EUP must set forth a means of prioritization and its definition for each of the factors in section 8388.5(c)(2), i.e., wildfire risk reduction, public safety, cost efficiency and reliability benefits. In the context of this project prioritization, the large electrical corporation may define reliability benefits to include benefits not related to Outage Program Events. The EUP must describe how the factors will be applied to set priority Undergrounding Projects. The EUP must describe how the prioritization aligns with and supports the Portfolio Mitigation Objective. The EUP must include a narrative of the large electrical corporation's rationale and supporting data (e.g., KDMMs) for each definition and the means of prioritization included in Screen 4 (Project Prioritization).

The EUP must include a list of Confirmed Projects with the Screen 4 (Project Prioritization) prioritization applied.

2.4.5 Required Circuit Segment Information Lists

2.4.5.1 Instructions for Circuit Segment Information Lists

The EUP must include all the lists in the table below as part of Progress Report 0 (see Section 2.6).

The Circuit Segment Information Lists must include the modeled risk for each potential Undergrounding Project as of the date of EUP submission. If risks scores are not available for an individual Undergrounding Project or Circuit Segment, the large electrical corporation must provide an explanation. See details on modeling requirements in Section 2.7 of these Guidelines.

Circuit Segment Information Lists must be created using the large electrical corporation's most recent version and calibration of the Risk Modeling Methodology.

Where applicable, the Circuit Segment Information Lists must be organized into separate sublists grouped by Project Planning and Construction Phase as required by CPUC Data Appendix 1.

The Circuit Segment Information Lists must contain sufficient detail to allow analysis and must be updated regularly according to these Guidelines. For data submission purposes, the data for the majority of the Circuit Segment Information Lists will be collected as part of Table 5 (Circuit Segment Identification Table and Data Requirements) in Appendix C of these Guidelines.

Table 1. Circuit Segment Information Lists

Sublist Name	Description	Information for list creation	Instructions	EUP Form
All Circuit Segments List (all In-Area Circuit Segments and all Out of Area Circuit Segments in the service territory)	List of all circuit segments in service territory	• Unique Circuit IDs and Circuit Segment IDs • For each Circuit Segment, whether it is located in (i) a Tier 2 or 3 High Fire-Threat District or not in either; and/or (ii) a Wildfire Rebuild Area or not. • Circuit-Level Ignition Risk Score • Circuit-Level Outage Program Likelihood Score • Circuit-Level Ignition Consequence Score	Section 2.4 and Appendix C	Data Submission

Sublist Name	Description	Information for list creation	Instructions	EUP Form
Eligible Circuit Segments List	List of all In-Area Circuit Segments that are above a Project-Level Threshold and therefore eligible for the 10-Year Electrical Undergrounding Program.	• Project-Level Thresholds • Project-Level Standards • Project Variable Modifiers (see Section 2.7.6 of these Guidelines)	Section 2.4.1.2 and Appendix C	Portfolio Coversheet Project Index Table Data Submission
Undergrounding Projects List	List of all Eligible Circuit Segments for which there is sufficient Screen 2 information and indicate if the Circuit Segment is planned for mitigation outside of SB 884.	• CPUC Data Appendix completed • Project Reference Sheet (with any currently available information included) • CPUC CBR • Screen 2 Table	Section 2.4.2 and Appendix C	Portfolio Coversheet Project Reference Sheet Data Submission
Confirmed Projects List	List of Undergrounding Projects that have had project risk analysis completed in Screen 3	• Risk landscapes for separate, collective and ablation studies • Screen 3 Table	Section 2.4.3 and Appendix C	Portfolio Coversheet Project Reference Sheet Data Submission
Prioritized Projects List	List of Confirmed Projects, with each project prioritized using section	• List of Confirmed Projects sorted by priority	Section 2.4.4 and Appendix C-1	Portfolio Coversheet Data Submission

Sublist Name	Description	Information for list creation	Instructions	EUP Form
	8388.5(c)(2) prioritization	• Planning and Construction Phase Status		
Non-EUP Projects List	See Section 2.4.5.2 of these Guidelines	See Section 2.4.5.2 of these Guidelines	Section 2.4.5.2 and Appendix C-1	EUP Narrative Data Submission

2.4.5.2 Information on non-EUP Projects

The EUP must include information on any distribution undergrounding projects that are not included in the 10-Year Electrical Undergrounding Program that are funded or in the Planning and Construction Phases.

The large electrical corporation must also provide a brief overview of all non-EUP projects and programs aimed at reducing Ignition Risk and Outage Program Risk, including the timeline for completion of these projects, their Project Status, and their associated risk reduction. The overview must discuss how these other programs and the projects selected are different from the EUP and how they will be coordinated with the EUP.

The large electrical corporation must also include a narrative describing how these projects are accounted for in the Risk Modeling Methodology.

2.5 Timelines, Workforce Development, Costs and Benefits, and Non-Ratepayer Funding

The Timelines, Workforce Development, Costs and Benefits, and Non-Ratepayer Funding Components are the plan components required by sections 8388.5(c)(3), (c)(5), (c)(6) and (j).

2.5.1 Project Timelines and Targets

Section 8388.5(c)(3) requires an EUP to include, "[t]imelines for the completion of identified and prioritized undergrounding projects, and unit cost targets and mileage completion targets for each year covered by the plan." To fulfill this component, the EUP must contain:

a. A project management template that will be used to track and communicate a project's schedule and milestones. The project management template should include dates for scoping, planning/design, permitting/dependencies, pre-construction, construction, and completion.

b. A description of controls that will be in place to ensure the schedules are maintained.

c. A Plan Objective Table with the following information about the timelines for completion, unit cost targets, mileage targets, anticipated start and end dates, risk reduction and cost targets for each year of the EUP. Ignition Risk and Outage Program Risk must be reported as described in Section 2.8.5.1. The information must be in table format in the EUP narrative and included as an Excel workbook.

   i. Year of EUP;

   ii. Dates for year of EUP;

   iii. Underground mileage completion targets (per year and cumulative);

   iv. Miles of overhead line deenergized, mileage in the Pre-Construction Phase;

   v. Unit cost targets for each year covered by the EUP;

   vi. Risk reduction in instantaneous ignition risk for risk at year 10;

   vii. Cumulative Ignition Risk reduction[10] anticipated at the at the end of the expected lifetime (defined as 60 years) of the infrastructure;

   viii. Increase in instantaneous Outage Risk reliability for risk at year 10; and

   ix. Cumulative Outage Program reduction[11] anticipated at the at the end of the expected lifetime (defined as 60 years) of the infrastructure;

2.5.2 Workforce Development Plan

Section 8388.5(c)(5) requires the EUP to include a "plan for utility and contractor workforce development." To fulfill this component, the EUP must contain a description of how the large electrical corporation will successfully secure the resources required to implement the EUP for the full 10 years.

2.5.3 Costs and Benefits

Section 8388.5(c)(6) requires the EUP to include "an evaluation of project costs, projected economic benefits over the life of the assets, and any cost containment assumptions, including the economies of scale necessary to reduce wildfire risk and mitigation costs and

[10] The cumulative Ignition Risk reduction is defined as the difference between the cumulative collective Ignition Risk and Baseline cumulative Ignition Risk, measured at the System-Level, as detailed in Section 2.7.3 of these Guidelines.

[11] The cumulative Outage Program Risk reduction is defined as the difference between the cumulative collective Outage Program Risk and Baseline cumulative Outage Program Risk, measured at the System-Level, as detailed in Section 2.7.3 of these Guidelines.

establish a sustainable supply chain." To fulfill this component, the EUP must contain a narrative for each of the following:

a. Evaluation of project costs;
b. Projected economic benefits over the life of the assets;
c. Cost containment assumptions (including economies of scale necessary to reduce wildfire risk and mitigation costs); and
d. Strategy for achieving a sustainable supply chain and the economies of scale necessary to reduce costs over time.

2.5.4 Non-Ratepayer Funding Sources

Section 8388.5(j) requires the large electrical corporation participating in the program to "apply for available federal, state, and other nonratepayer moneys throughout the duration of its approved undergrounding plan" and use acquired funds to reduce the program's costs to ratepayers. To fulfill this component, the EUP must contain:

a. Existing funding opportunities.
b. A plan for identifying additional sources of funding and plans for tracking and applying for opportunities that may become available.
c. A plan for tracking funds received to ensure they are used to reduce ratepayer costs.

2.6 Progress Report 0

The EUP must include a report called "Progress Report 0" as an attachment. Progress Report 0 must show the status of circuit segments and other matters related to wildfire mitigation at the time of submission.

The large electrical corporation must submit an updated Progress Report 0 every six months during the period the EUP is evaluated by Energy Safety and the CPUC. During this time period, Energy Safety may direct the large electrical corporation to make changes to the format and content of Progress Report 0.

The EUP must contain a narrative explaining the large electrical corporation's choice of content and structure for Progress Report 0. The narrative must explain and confirm how Progress Report 0 meets the requirements in Sections 2.6.1 and 2.6.2 below.

2.6.1 Content of Progress Report 0

Progress Report 0 must be based on information and data available at the time of submission. For the Circuit Segment Information Lists, the Confirmed Projects List and the Prioritized Project List submitted in Project 0 must include at least 25 Undergrounding Projects to demonstrate that all of the screens are functional.

Progress Report 0 must, at a minimum, include the following sections:

a. Portfolio Coversheet,
b. Plan Objective Table,
c. A Project Index Table,
d. A Project Reference Sheet for each Undergrounding Project in the Portfolio,
e. Circuit Segment Information Lists and supporting data submissions, and
f. Any additional System-Level, Portfolio-Level and Project-Level information the large electrical corporation would like to be included in Progress Reports.

The large electrical corporation must submit data pursuant to Section 2.8, and Appendix C of these Guidelines to support the Portfolio Coversheet and the Project Reference Sheets at the same time as it submits its Progress Report 0.

2.6.2 Relation of Progress Report 0 to Statutory Progress Report Requirement

The content, format, and structure of Progress Report 0 will inform the requirements for future Progress Reports. Energy Safety may provide additional guidance regarding future Progress Report requirements at a later date.

2.7 Risk Modeling

This section describes the requirements for the Risk Modeling Methodology that the large electrical corporation will employ to establish the Portfolio Mitigation Objective and perform the analysis required in Screen 3 (Project Risk Analysis).

The large electrical corporation must justify its methodology in a narrative section of their EUP submission. This narrative must be organized into the following sections.

Table 2. Narrative Requirements Supporting Risk Modeling Methodology

Section Name	Narrative Requirements	Maximum Length of Narrative Section	Required Tables and Figures	Table Requirements
Overview	See 2.7.1	5 Pages	Enterprise Diagram(s)	See 2.7.3.1
Reports on Sub-models	See 2.7.2	4 Pages per Sub-Model	None	None

Section Name	Narrative Requirements	Maximum Length of Narrative Section	Required Tables and Figures	Table Requirements
Core Capabilities	See 2.7.5	2 Pages per Capability	None	None
Model Inputs	See 2.7.5.1	1 Page per Input Category	Model Risk Landscape Variables Table	See 2.8.5.1
Project Variable Modifiers	See 2.7.6	1 Page per Project Variable Modifier	Project Variable Modifiers Inputs Table Project Variable Modifiers Outputs Table	See 2.8.5.2
Calibration and Versioning	See 2.7.5.2	2 Pages	None	None
Key Decision-Making Metrics	See 2.7.3	3 Pages for required KDMMs and up to 1 Page each for up to 5 additional KDMMs	None	None
Portfolio Standards	See 2.7.8	2 Pages	None	None
Project Thresholds	See 2.7.9	2 Pages	None	None
Project Standards	See 2.7.9	2 Pages	None	None

2.7.1 Overview of Risk Modeling Methodolgy

The large electrical corporation must provide an overview narrative that explains the key elements of its risk modeling approach and definitions. The narrative must detail how the large electrical corporation will compare the potential wildfire risk and reliability impacts of undergrounding to alternative mitigations. The overview must describe the methodology and underlying intent of the large electrical corporation's risk assessment in no more than five pages, inclusive of all narratives, bullet point lists, and any graphics.

2.7.2 Reports on Sub-Models

The large electrical corporation must present a report on each of the sub-models used in the Risk Modeling Methodology. Sub-models are defined as a distinct part of the larger Risk Modeling Methodology that has explainable units. These distinctions must be at least as granular as in the enterprise diagram described in Section 2.7.3.1 of these Guidelines.

For each sub-model, the large electrical corporation must describe the methodology and numerical calculations involved at a level of detail that would allow for verification and replication. Each sub-model report must be no more than four pages, inclusive of all narratives, bullet point lists, and any graphics. A sub-model report may reference additional documents.

Each sub-model report must be formatted into the following subsections addressing different aspects of the modeling methodology and implementation.

a. **Model Usage**: This section must describe the model's scope, how often the model is utilized, what aspects of the electrical system's risk profile are evaluated by this model, and specifically identify what risk or risk component the model is evaluating.
b. **Model Type**: This section must describe the model's taxonomy (e.g., physics simulation, mathematical model, machine learning classification).
c. **Key Inputs**: This section must describe the data that is fed into a calibrated model, including a description of the original data collection when applicable.
d. **Model Solution**: This section must describe the method used to calibrate, train, simulate, optimize, or implement the model from a mathematical standpoint. The model solution must include relevant information. For example:
    i. If the model is based on an historical frequency table, briefly describe the data procurement and weighting of the decision function.
    ii. If the model is based on a general linear model, Bayesian regression or other under-parameterized model, describe the training data and validation accuracy of the model.
    iii. If the model is based on solving a non-convex problem, briefly describe the optimization procedure and potential pitfalls of local-minima.

iv. If the model is based on an overparameterized learning algorithm, briefly describe the optimization procedure, including the number of learnable parameters and size and origin of the training data.

v. If the model is based on a physical simulation, describe the simulation evolution algorithm, spatial and temporal resolution, and any subgrid effects considered.

vi. If the model is based on Monte Carlo simulations, describe the assumptions made to build the component distributions and the outcome uncertainties.

e. **Model Outputs**: This section must describe how the data produced by the model is fed into other models or used by the large electrical corporation to make risk-related decisions. The large electrical corporation must describe the mathematical type of output (e.g., distribution, average value, score, probability), the spatial resolution (e.g., per circuit, per segment, per county) and temporal resolution (e.g., per day, per season, per year).

f. **Uncertainty**: This section must describe the amount by which a calculated value might differ from the actual value when the input parameters are known. This section will address any methods the large electrical corporation uses to account for missing input data in its Risk Modeling Methodology. This section will address the sensitivity analysis used to determine the relationships between the uncertainty in the inputs used in an analysis and the uncertainty in the resultant dependent variables due to numerical instability or stiffness of the underlying equations.

g. **Toy Problems**: This section must describe three examples, specifying input and output values, using synthetic data. One input must lead to a low-risk (or low-probability, low-consequence) output, one for a medium-risk case, and one for a high-risk case. In each case, the large electrical corporation must describe the magnitude and units of the inputs and outputs as well as the prevalence of each scenario in real-word data.

h. **Shelf-life**: This section must describe the length or period the model is expected to be used. This section must describe if/how the model is expected to be updated, both regarding new calibration data and new project input data. This section must describe if/when the model is expected to be retired or replaced by an entirely new model. Sections 2.7.5.2 and 2.7.7 of these Guidelines detail further requirements for updating the Risk Modeling Methodology.

2.7.3 Key Decision-Making Metrics and Enterprise Diagrams

The Key Decision-Making Metrics (KDMMs) are defined to be the collection of top-level metrics that the large electrical corporation proposes to use to evaluate the efficacy of an Undergrounding Project. The KDMMs will be used for approximating risk at the System-Level, Portfolio-Level, and individual Circuit Segment-Level.

A large electrical corporation must include the seven mandatory KDMMs described below and has the option to include five additional KDMMs of its choosing.

a. The large electrical corporation must include the following KDMMs:
    i. **Overall Utility Risk:** A combined measure of Ignition Risk and Outage Program Risk that measures the total risk of wildfires and Outage Program Events related to wildfire risks. This is computed as the inner product of the likelihoods of adverse events and their consequences. This is an unweighted and unscaled calculation.
    ii. **Ignition Risk**: The measure of impacts from wildfire at a given location. This metric is the product of two factors: (1) the likelihood a wildfire will occur, and (2) the potential consequences of a wildfire originating from this location. This is an unweighted and unscaled calculation.
    iii. **Ignition Consequence:** The total anticipated adverse effects from a wildfire on each community it reaches. This metric considers the wildfire hazard intensity, the wildfire exposure potential, and the inherent wildfire vulnerabilities of communities at risk.
    iv. **Ignition Likelihood:** The likelihood of an ignition at a given location given a probabilistic set of environmental conditions.
    v. **Outage Program Risk:** The measure of reliability impacts from Outage Programs at a given location. This metric is the product of two factors: (1) the likelihood an Outage Program Event will be required due to environmental conditions exceeding design conditions, and (2) the potential consequences of the Outage Program for affected customers, considering exposure potential and vulnerability. This is an unweighted and unscaled calculation.
    vi. **Outage Program Consequence:** The total anticipated adverse effects from an Outage Program for a community. This considers the Outage Program exposure potential and inherent Outage Program vulnerabilities of communities at risk.
    vii. **Outage Program Likelihood:** The likelihood of a large electrical corporation an Outage Program given a probabilistic set of environmental conditions. This measure should capture both the probability of an Outage Program Events(s) being initiated at given time and the length of time of those outage(s).
b. Up to five additional KDMMs proposed by the large electrical corporation may also be included. For each additional KDMM:
    i. Provide a definition, numerical calculation, and units.
    ii. Explain each proposed KDMM, including how the KDMM contributes to measuring Ignition Risk and/or Outage Program Risk.

iii. Report the proposed KDMMs at the same resolution and frequency as the required KDMMs in all Coversheets and Project Reference Sheets.

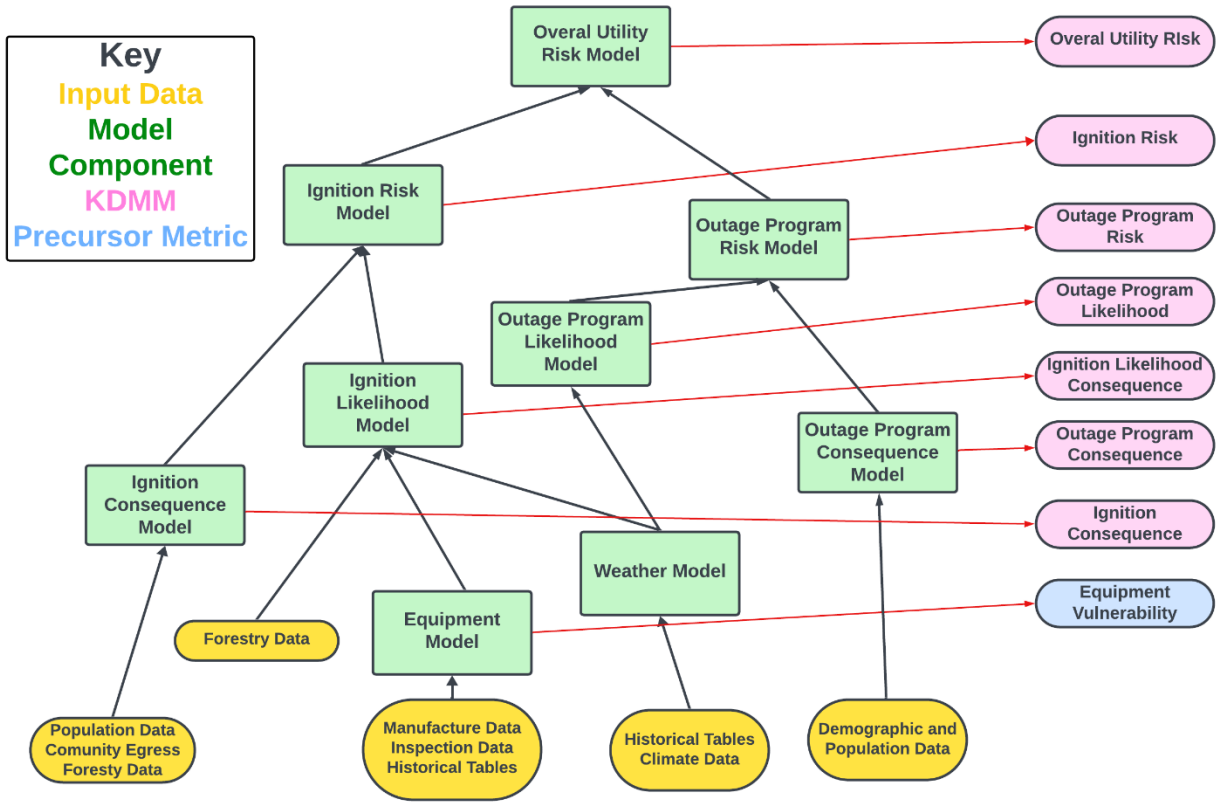
2.7.3.1 Enterprise Diagram

The large electrical corporation must provide one or more entity relation diagram(s) of the system(s) used for quantifying Ignition Risk and one or more entity relation diagram(s) of the system(s) used for quantifying Outage Program Risks.

Each diagram must show how input data feeds into independent submodules and identify the KDMMs, and all precursor calculations used in generating each KDMM. A precursor calculation is an intermediate modeling value with explainable meaning that is computed from the input data and determined in the process of computing the KDMM.

An example of an enterprise diagram for Ignition Risk, which identities other KDMMs and precursor metrics, is presented below. All sub-models must be clearly labeled with their inputs and outputs classified in a semantically meaningful way. KDMMs and precursors must be identified by color and shown on the right-hand side of the diagram.

Figure 1. Example Enterprise Diagram for Risk Modeling Methodology



2.7.4 Model Risk Landscape

The Model Risk Landscape is the collection of all inputs, outputs and intermediate calculations used in the Risk Modeling Methodology. This includes all KDMMs, their precursor calculations, and any additional numerical evidence that the large electrical corporation uses to evaluate or report the risk reduction of an Undergrounding Project or alternative mitigation.

All claims involving the comparative risks of individual Undergrounding Projects must be substantiated by numerical comparisons between Model Risk Landscapes using the same version and calibration of the Risk Modeling Methodology.

A Model Risk Landscape is determined by these four elements:

1. The model version must indicate a unique configuration of the sub-models as detailed in Section 2.7.5.2 of these Guidelines.
2. The calibration settings must uniquely identify the collection of non-project related input data fed into the models or used in historical tables.
3. The project list must refer to all projects that the model is considering in a specific evaluation for this measurement of Model Risk Landscape.
4. The forecast time must indicate what instantaneous time or accumulative period the model is evaluating.

2.7.5 Required Core Capabilities for Risk Modeling Methodology

Core capabilities are defined as a set of required use-cases that the large electrical corporation's Risk Modeling Methodology must be able to achieve to make quantitative arguments about the risk reduction of undergrounding and Alternative Mitigations. The large electrical corporation must detail the formal quantitative procedure for achieving each of the following core capabilities:

a. Project-Level Risk Analysis
b. Aggregate Risk Analysis
c. Ignition and Outage Program Risk as Separate and Collective Risks
d. Approximating Future Risks and Accumulating of Ignition Risk and Electrical Reliability over Time
e. Establishing Baselines and Historical Calibrations
f. Comparisons with Alternative Mitigation Strategies

The large electrical corporation must also list any additional workflows that are critical for evaluating the effectiveness and efficiency of its EUP.

For each capability, the large electrical corporation must provide a narrative description, explicit formulas, and example calculations demonstrating how the compatibility is achieved. These example calculations may use synthetic inputs, but all formulas, input/output scaling and user parameters must be the same as those used in the Risk Modeling Methodology.

Core Capability 1: Project-Level Risk Analysis

The large electrical corporation must demonstrate that its framework can analyze risk reduction of projects in its Portfolio both separately and collectively. For each project the large electrical corporation must conduct a Collective Analysis, a Separate Analysis, and an Ablation Analysis. Each study will report these results at the Portfolio-Level and Project-Level.

a. The Collective Analysis describes the risk reduction of a single Undergrounding Project in combination with the rest of the projects that are in the same Portfolio and details the effects on the specific circuit(s) in the project as well as the entire system. It is reported at the Portfolio-Level and Project-Level.
b. The Separate Analysis measures the risk reduction of this project if it was the only project in the Portfolio and is reported at the Portfolio-Level and Project-Level.
c. The Ablation Study details the effects if this project is NOT included in the Portfolio at both the at the Portfolio-Level and Project-Level.

The large electrical corporation must explicitly define any risk-scaling used in these calculations and provide examples of the computation.

Core Capability 2: Aggregate Risk Analysis

The large electrical corporation must detail in a narrative its method for evaluating risk metrics at the Portfolio-Level and System-Level. For each KDMM, the large electrical corporation must provide an explanation of its aggregation process. This narrative may include a summation of circuit/circuit segment risks, or may include weighed linear, or non-linear processes.

Core Capability 3: Ignition and Outage Program Risk as Separate and Collective Risks

The large electrical corporation must detail its method for evaluating Ignition Risk and Outage Program Risk through separated and combined metrics. The large electrical corporation must demonstrate its framework for performing separate and collective analysis of Ignition Risk reduction and reliability benefits. The large electrical corporation must demonstrate that its analysis for each of these metrics can be performed independently and collectively and detail the trade-off between the two.

Core Capability 4: Approximating Future Risks and Accumulating of Ignition Risk and Outage Program Risk over Time

The large electrical corporation must detail its method for evaluating Ignition Risk and electrical reliability at future dates and the accumulation of Ignition Risk and Outage Program Risk over time. The large electrical corporation must report instantaneous and cumulative risk and reliability scores at 0, 5, 10, 20, 30, 40, 50, 60 years into the future for all Confirmed Projects. Model Year 0 is defined to begin at the onset of the EUP, and subsequent times are measured from this date.

The large electrical corporation must describe how it uses estimated project timelines to model the reduction of risk and increase in reliability. The large electrical corporation must detail how these projections reflect its modeling of climate change.

If any discount rate sums are employed in the calculation of any KDMM, the large electrical corporation must list them and explain their origin. If the discount rate sums change over time, the large electrical corporation must explain how they change and why these changes are warranted and must be in line with the CPUC Risk-based Decision Making Framework Proceeding (Rulemaking R.20-07-013).

Core Capability 5: Establishing Baselines and Historical Calibrations

The large electrical corporation must demonstrate how it ensures that the Risk Modeling Methodology is evaluated with up-to-date information, and that comparisons between projects and alternatives are made on a statistically consistent scale. To do this, the large electrical corporation must develop a system to record Baselines, and historical model calibrations.

To establish a Baseline, the large electrical corporation must model the risk landscape assuming that no projects from this program are constructed. This Baseline modeling must include any projects outside of this program that the large electrical corporation plans to undertake. This modeling will attempt to account for climate change. Baselines must be measured and reported at the same cadence as other risk model landscape at 0, 5, 10, 20, 30, 40, 50 and 60 years.

Each Baseline must indicate the version of the modeling system, and the model calibration(s) that were used to evaluate it. The Baselines must also indicate the date the Baseline was created, and the naming scheme of the Baselines must be consistent across the lifetime of the EUP. Any comparison of an Undergrounding Project or Alternative Mitigation to a Baseline must indicate what Baseline the comparison is being made to.

Core Capability 6: Comparisons with Alternative Mitigation Strategies

The large electrical corporation must demonstrate its method for comparing Undergrounding Projects with Alternative Mitigations including covered conductor, remote fault detection technologies, enhanced vegetation management, installation of equipment related to

enhanced powerline safety settings, and combinations thereof. All reasonable combinations of these alternative mitigations must be considered, unless a reason is given for exclusion of a permutation (e.g., two incompatible strategies would be used). This must include at least two alternative mitigations. For each project, the large electrical corporation must evaluate its Model Risk Landscape, using the same versioning and calibration, to produce a Separate Alternative Analysis and a Collective Alternative Analysis.

The Separate Alternative Analysis measures the risk reduction of a given project if it were the only project and is compared to the Separate Analysis.

The Collective Alternative Analysis measures the risk reduction if this non-undergrounding project were inserted into the Portfolio instead of the Undergrounding Project that it replaces.

The Separate Alternative Analysis and the Collective Alternative Analysis must be reported at the Portfolio-Level and the Project-Level.

2.7.5.1 System Inputs and Considerations

The large electrical corporation must provide a comprehensive list of all model inputs used to compute every metric included in its Model Risk Landscape. This list includes all KDMMs, precursor calculations and any other metric reported in the Project Reference Sheet or Portfolio Coversheet.

For each input, the large electrical corporation must formally define the term, and describe the data sources and the purpose of including these factors in the overall Risk Modeling Methodology in a narrative format of at most one page per requirement.

At minimum, the model inputs must include:

a. **Equipment / Assets** (e.g., type, age, inspection, maintenance procedures, etc.)
b. **Topography** (e.g., elevation, slope, aspect, etc.)
c. **Weather** (at a minimum this must include statistically extreme conditions based on weather history and seasonal weather)
d. **Vegetation** (e.g., type/class/species/fuel model, canopy height/base height/cover, growth rates, moisture content, inspection, clearance procedures, etc.)
e. **Climate change** (e.g., long-term changes in seasonal weather; statistical extreme weather; impact of change on vegetation species, growth, moisture, etc.) at a minimum, this must include adaptations of historical weather data to current and forecasting future climate.
f. **Social vulnerability** (e.g., socioeconomic factors, etc.)
g. **Physical vulnerability** (e.g., people, structures, critical facilities/infrastructure, etc.)
h. **Coping capacities** (e.g., limited access/egress, etc.)

2.7.5.2 Version and Calibration Changes

The large electrical corporation must describe its anticipated schedule for updating its modeling system and methods for recording these changes in a narrative section of one page or less. Version changes are qualitative updates that substantially change the way that the risk model operates and must be accompanied by a new model verification report (see Section 2.7.7 of these Guidelines), the establishment of a new Baseline, and a backtest report (see Section 2.7.7 of these Guidelines). These changes must markedly improve the Risk Modeling Methodology. Calibration changes are smaller changes that do not significantly impact the Model Risk Landscape and only require the establishment of a new Baseline.

The EC must establish a naming system to track historical versions and calibrations.

Examples of qualitative updates that are large or significant enough to change the versioning of the modeling system include, but are not limited to:

a. Adding or removing any models to/from the system.
b. Replacing a model with an alternative.
c. Any update to a model which a 3rd party model developer employed by the large electrical corporation lists as a version update.
d. Retraining an overparameterized neural network on a new dataset.
e. Applying a new optimization procedure for a non-convex problem.
f. Implementation of a new methodology to compute a PMV.

Examples of qualitative updates that are not significant updates to the version changes, but do qualify as calibration updates, include, but are not limited to, the following:

a. Updating an existing historical actuarial table.
b. Fixing minor code errors.
c. Cleaning input data.
d. Any changes to the Project Variable Modifiers (PVMs).
e. Updating a PVM based on new data, using a process established in the application or previous Progress Report.

2.7.6 Project Variable Modifiers (PVMs)

A project variable modifier is defined as the set of changes that are made to variables in the risk Modeling Methodology to evaluate the effectiveness of a given project or set of projects and represents how the large electrical corporation values the efficacy of the Alternative Mitigations. The large electrical corporation must list its Project Variable Modifiers, explain how the PVMs were calculated, and if and how their use varies in different evaluations of the Model Risk Landscape. Specifically, this encapsulates what input variables to what calculations are changed, and what is the effect on the output variables and KDMMs.

The large electrical corporation must describe the formal numerical processes used to arrive at these PVM. If the large electrical corporation employs third-party studies to get to these PVM, it must cite the studies here. If the PVM are the result of internal studies, then the large electrical corporation must describe the datasets, and detail the formal calculations. The large electrical corporation must also make available to Energy Safety the third-party studies and data upon request.

2.7.7 Baselines, Backtesting and Model Retention

The large electrical corporation must establish model and calibration retention policies. The large electrical corporation must retain models and calibrations data for the lifetime of the program.

The large electrical corporation must describe its plan to update its Risk Modeling Methodology, including details regarding how and when model version updates and calibrations are planned. Any new calibration or versioning will require a new risk_model_id in the data submission. See Appendix C of these Guidelines for more details.

When a new model or model version is introduced to the Risk Modeling Methodology, the large electrical corporation must submit a model report (as described in Section 2.7.2 and 2.7.5.2 of these Guidelines) to Energy Safety as well as an historical backtest of the KDMM metrics for the past three years.

In each progress report the large electrical corporation must establish a new Baseline as detailed in Section 2.7.5 of these Guidelines.

The large electrical corporation must include information on modeling changes in a narrative section of at most two pages in Progress Reports.

2.7.8 Portfolio-Level Standards

The Portfolio is defined as a set of all Undergrounding Projects being considered at a point in time. The large electrical corporation must update the Portfolio as Undergrounding Projects are added, removed, or changed, and report these changes through Progress Reports. All Undergrounding Projects that have passed through Screen 3 (Project Risk Analysis), and have not been abandoned, must be included in the Portfolio.

The large electrical corporation must set an Ignition Risk Decrease Standard and a Reliability Increase Standard (collectively, Portfolio Standards). These Portfolio Standards determine the “substantial” decrease in Ignition Risk and increase in Reliability per section 8388.5(d)(2) and will be used to judge the overall efficacy and efficiency of the EUP.

a. **Ignition Risk Decrease Standard** is the minimum decrease in Ignition related metrics, as measured through formal calculations of the KDMMs across the entire system at both the System and Portfolio-Level, that the EUP must achieve to meet the required decrease in wildfire risk.

b. **Reliability Increase Standard** is the minimum decrease in Outage Program-related metrics, as measured through formal calculations of the KDMMs across the entire system at both the System and Portfolio-Level, that the EUP must achieve to meet the required increase in reliability.

The Portfolio Standards must ensure that at least 50% of circuits that exceed one or more of the Project-Level Thresholds outlined in Section 2.7.9 of these Guidelines and are not already addressed by another program are addressed through the EUP. The large electrical corporation must explain the Portfolio Standards using explicit calculations of the KDMMs.

The large electrical corporation must use KDMMs that represent the minimum reduction of Ignition Risk and Outage Program Risk, across its entire electrical distribution system, necessary for the EUP to be considered successful under the Portfolio Mitigation Objective.

2.7.9 Project-Level Thresholds and Standards

Project-Level Thresholds

The large electrical corporation must set and explain a High-Risk Threshold, Ignition Tail Risk Threshold, High Frequency Outage Program Threshold, and Mitigated Risk Threshold (collectively, Project-Level Thresholds), using a combination of the KDMMs to establish the need for mitigation on a Circuit Segment.

a. **High-Risk Threshold** is the Overall Utility Risk level above which a circuit segment is considered eligible for examination for expedited undergrounding.
b. **Ignition Tail Risk Threshold** is the measure of consequence above which a circuit segment is considered to have significant potential for catastrophic wildfire, that it merits special consideration. This threshold must represent less than 1% of circuit segments in the entire system by mile and no more than 10% of the wildfire consequence by score.
c. **High Frequency Outage Program Threshold** is the measure of likelihood above which is considered to have a significantly high likelihood of frequent or prolonged disruption of service to customers. This threshold must measure both likelihood of an Outage Program Event and its anticipated length. This threshold must represent less than 1% of circuit segments in the entire system by mile and no more than 10% of Outage Program Likelihood by score.
d. **Mitigated Risk Threshold** is the combined measure of Ignition Risk and Outage Program Risk below which a circuit segment is considered to be of acceptable risk.

2.7.9.1 Project-Level Standards

The large electrical corporation must set and explain Project-Level standards, using a combination of the KDMMs to determine the necessary level of risk reduction needed for a Circuit Segment.

The proposed standards, when considered in the context of the EUP and risk landscape, must ensure the EUP substantially increases electrical reliability by reducing the use of public safety power shutoffs, enhanced powerline safety settings, deenergization events, and any other outage programs, and substantially reduces the risk of wildfire.

a. **Risk Reduction Project Standard** is the minimum decrease in Ignition Risk and Outage Program Risk, that an Undergrounding Project must achieve to support the Portfolio Mitigation Objective. This reduction in wildfire risk and increase in reliability must, at minimum, reduce the risk of the circuit segment to below the Mitigated Risk Threshold.
b. **High Frequency Outage Program Mitigation Standard** is the minimum decrease in Outage Program Likelihood as measured through formal calculations of the KDMMs that any project considered under the High Frequency Outage Program must achieve to meet the required substantial increase in electrical reliability achieved by reducing the use of public safety power shutoffs, enhanced powerline safety settings, deenergization events, and any other outage programs.
c. **Tail Risk Mitigation Project Standard** is the minimum decrease in wildfire likelihood that any project considered under the Ignition Tail Risk Threshold must achieve to meet the required substantial reduction of the risk of wildfire.

2.8 Reporting Metrics

This section contains detailed instructions on how the large electrical corporation will report on its Risk Modeling Methodology, its Portfolio of Undergrounding Projects, individual Undergrounding Projects, development of new models and non-model-based projections. Template files for use by the large electrical corporation will be made available at the e-filing docket at Energy Safety's website.

2.8.1 Tabular Data Submission

Progress Report 0 and each subsequent Progress Report must include the following tables, and reflect the most current information as of each Progress Report submission:

a. A Plan Table identifying information about the large electrical corporation, the EUP, and thresholds. This Table is not modified during Progress Reports.
b. A KDMM Table listing all KDMMs used by the large electrical corporation in their EUP, with explanations. This Table is not modified during Progress Reports.
c. A Risk Model Circuit History Table listing and describing all iterations of the risk model versioning and calibration to date.
d. A Portfolio Table that summarizes the Undergrounding Projects at the System-Level and Portfolio-Level.
e. A Circuit Segment Identification Table that summarizes identifying information for each Circuit Segment in the utility service territory.

f. A Circuit Segment Risk Score Table that summarizes the risk values for each Circuit Segment in the utility service territory.

g. A Screen History Table tracking the progress of each Circuit Segment through the multiple screens required before an undergrounding project takes place.

h. A Project Table for each project, after passing Screen 2, that details each Undergrounding Project, including risk tranching, selection justification, and location at the county and division level.

i. A Screen 2 Table comparing the cost and benefit information for each project, after passing Screen 2, against multiple alternative mitigations.

j. A Screen 3 Table comparing the detailed risk modeling projections for each project, after passing Screen 3, against multiple alternative mitigations.

k. A Project Status Table for each project that tracks the scoping, modeling, and construction status for each project, after passing Screen 4.

l. A Project Construction Table for each project that tracks the project construction and completion status for each project, after reaching the "Ready For Construction" status in the Project Status Table.

m. A Project Index Table which summarizes the project information in an easily searchable format and references the Project Refence Sheet. See Section 2.8.7.1 and Appendix C.1.12 of these Guidelines for details.

Details about each table, the requirements for the submission, and other instructions are found in Appendix C.1 of these Guidelines.

2.8.2 JSON Data Submission

The large electrical corporation must submit the following JSON data in each Progress Report, including Progress Report 0:

a. A Project Variable Modifiers JSON as described in Section 2.8.5.2 and Appendix C of these Guidelines.

b. A Model Risk Landscape JSON, as described in Appendix C of these Guidelines, with information for each project after passing Screen 3.

These files must reflect the most current information as of each Progress Report submission. Further details on JSON submissions are in Section 3.11 of these Guidelines and in Appendix C.

The large electrical corporation must convert its JSON data submission into csv format and host the csv files on a publicly available web page dedicated to its EUP, as described in Section 3.9.1 of these Guidelines.

2.8.3 Spatial Data Reporting for Projects

The large electrical corporation must report additional modeling and Project-Level data though a geodatabase submission. This information will identify isolatable Circuit Segments, Undergrounding Projects, overhead lines that will be deenergized after completion of projects and critical pieces of infrastructure equipment. The large electrical corporation must update information reported in geodatabase submissions in each Progress Report.

The large electrical corporation must report in its geodatabase submission all Undergrounding Projects that have passed Screen 1 (Circuit Segment Eligibility). The large electrical corporation must indicate the right-of-way and current Planning and Construction Phase for all Confirmed Projects (projects that have passed Screen 3 (Project Risk Analysis)).

Further details about these submissions are in Appendix C.3.

2.8.4 Data Validation

Energy Safety will review and validate data and reject data submissions that do not meet the criteria in this section. If a submission fails the validation check and is rejected, the large electrical corporation must correct the errors and resubmit its data as directed by Energy Safety.

Energy Safety will review EUP data submissions according to the following validation criteria:

- **Data Consistency**: Data is properly labeled with unique integer identifiers, and labels remain consistent both within a submission and from one submission to another.
- **Structural Integrity**: Data conforms to the required types and modes, such that it can be ingested into Energy Safety data systems.
- **Completeness**: All required components are included in each submission.
- **Computational Accuracy**: All summations and other data aggregations within the submission are calculated accurately.

Additionally, when there is no data for a particular field, the large electrical corporation must leave the field null (empty), except where “N/A” is specified and the conditions for its use are met. A large electrical corporation must not place “Unknown”, “0”, empty spaces, or other placeholders into fields, or use the “Other, see comment” option, when no data are available.

2.8.5 Risk Modeling Methodology Verification Data

This section describes the numerical and visual elements that the large electrical corporation must submit to establish the veracity of its Risk Modeling Methodology.

2.8.5.1 Model Risk Landscape

The EUP must include a Model Risk Landscape Variables Table as referenced in Section 2.7 of these Guidelines, that lists each metric in the large electrical corporation's Model Risk Landscape per the example below and report values at the highest available resolution in the Project Reference Sheets. This table must include the numerical type of each metric, which risk factors that it addresses, the resolution of the modeling, indicate whether the metric is considered a KDMM and identify what other metric(s) it is a precursor for.

Table 3. Example Model Risk Landscape Variables Table

Field Name	Type	Addresses	Resolution	Is KDMM?	Precursor for
Ignition Risk	TBD	Ignition Risk	Per Circuit	Yes	None
Ignition Consequence	TBD	Ignition Risk	Per Area Unit	Yes	Ignition Risk Score
Ignition Likelihood	Prob-ability	Ignition Risk	Per Circuit Segment	No	Ignition Risk Score
Equipment Risk	TBD	Ignition Risk	Per Circuit Segment	No	Ignition Likelihood, Ignition Consequence, Ignition Risk score
Outage Program Risk	TBD	Outage Program Reliability	Per Circuit	Yes	None
Outage Program Likelihood	Prob-ability	Outage Program Reliability	Per Circuit	Yes	Outage Program Risk

An example table listing the metrics of a model risk landscape and explaining its key attributes.

2.8.5.2 Reporting Project Variable Modifiers

The EUP and each Progress Report (including Progress Report 0) must contain a table summarizing the PVMs as referenced in Section 2.7 and Section 2.8.6 of these Guidelines.

The “Project Type” column describes the nature of the work conducted in the project. The large electrical corporation must, at minimum, consider undergrounding, covered conductor and other hardening alternatives, enhanced vegetation management, fast trip systems and other remote sensing technologies, and line removal, but may include other alternative methods, or divide these types of projects into differentiable sub-types when appropriate.

The “Model” column indicates which models the PVM effects.

The “Inputs Modified” column describes which of the model inputs are changed.

The “Delta” column describes how the inputs are changed, and may be represented as percentages, changes in distribution, changes in category or any other changes to the inputs that the PVM accomplishes.

The “Other Notes” column contains narrative material that clarifies the way that the PVM affects the inputs.

Table 4. Example Project Variable Modifiers Inputs

Project Type	Model	Inputs Modified	Delta	Other Notes
Undergrounding	Equipment Model	Self-Combustion Likelihood	-94 +/- 3%	This PVM has a variable delta depending on the age of the equipment it is replacing
	Ignition Likelihood Model	Contact From Vegetation	-96%	
		Contact From Object	-94%	
Covered Conductor	Ignition Likelihood Model	Contact From Vegetation	-70%	
Enhanced Vegetation Management	Vegetation Growth Model	Vegetation Zone	-1 Zone	This PVM changes the classification of the growth zone. It effects the model at a hyperparameter level.

An example table listing the Project Variable Modifiers for different mitigation strategies. Note that the table includes what inputs to what models are changed and how they are changed. The Other Notes column allows for a short explanation of the change.

The large electric corporation must report the effects of applying these PVMs to its Portfolio. The large electrical corporation must compute the distribution of the changes to each KDMM, for each project type and report it in a table that will be attached to the Portfolio Coversheet. An example is given below:

Table 5. Example Project Variable Modifiers Outputs

Project Type	KDMM	Change	Variance
Undergrounding	Ignition Risk	-90%	+/-5%
	Ignition Likelihood	-90%	+/-5%
	PSPS Risk	-40%	+/-5%
Covered Conductor	Ignition Risk	-90%	+/-5%
	Ignition Likelihood	-90%	+/-5%
	PSPS Risk	-40%	+/-5%

An example table showing how the Project Variable Modifiers for different mitigation strategies effects KDMMs on average. It reports the mean and variance.

2.8.5.3 Verifying and Validating New Model Versions

If the large electrical corporation changes its Risk Modeling Methodology in a way that triggers a versioning update, it must backtest the new models using at least three years of historical data. These backtests must include a Project-Level analysis of each Confirmed Project that passed through Screen 3 (Project Risk Analysis) in the past three years.

These results of these tests must be submitted as an additional data submission following the data schema established in Appendix C.

These backtests must also be summarized in a series of Portfolio Coversheets corresponding to each calibration employed in the past three years.

2.8.6 Reporting a Portfolio of Undergrounding Projects

The large electrical corporation must establish a naming system to track the evolution of the Portfolio overtime. Adding or removing any project to the Portfolio constitutes a Portfolio update and will be indicated by incrementing some value(s) in name. Each plan must have one and only one Portfolio.

2.8.6.1 Portfolio Coversheet Overview

The Portfolio Coversheet is a text document which summarizes the macro-level impacts of the EUP. The large electrical corporation must submit the Portfolio Coversheet in Progress Report 0 and each subsequent Progress Report. The content of the Portfolio Coversheet must be updated with the most up-to-date information available in each Progress Report. An example Portfolio Coversheet is provided in Appendix D.

The figures and tables in the Portfolio Coversheet will summarize the most important aspects of the risk modeling at the System Level and Portfolio Level, and must be accompanied by a data submission as detailed in Appendix C.

The Portfolio Coversheet must in include a narrative section which details the formal definition and calculations of the Portfolio-Level Thresholds as directed in Section 2.7.8 of these Guidelines.

The Portfolio Coversheet must include a narrative of no more than one page explaining why any Circuit Segment in the top 5% of Overall Utility Risk by score was not included in the EUP.

The Portfolio Coversheet must include a table showing the instantaneous and cumulative values or scores for each KDMM for 0, 5, 10, 20, 30, 40, 50, and 60 years. The instantaneous values describe the risk at a single moment in time, while the cumulative values indicate the accumulation over a time. Values that do not accumulate over time, such as consequence scores, must be reported as a value at a given time.

2.8.6.2 System and Portfolio-Level Risk Matrices and Profiles for Key Decision-Making Metrics

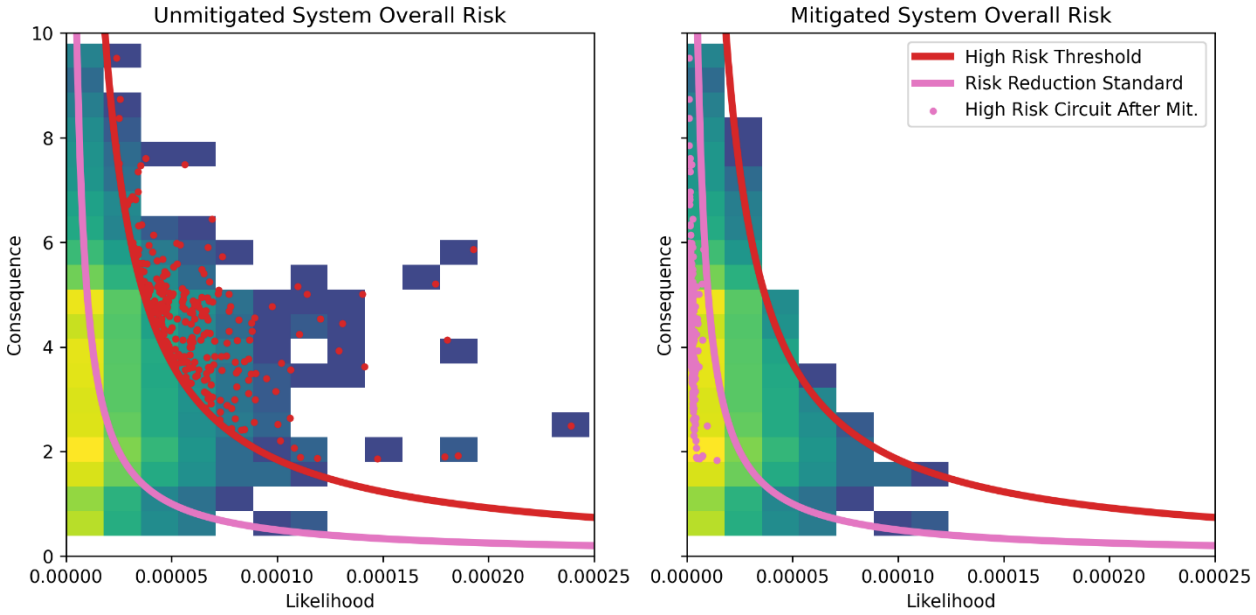
The EUP must include a series of visualizations and tables for each of the KDMMs showing the distribution both with and without the Portfolio's modeled mitigation. These visualizations will be included in the Portfolio Coversheet.

On the Portfolio Coversheet, each KDMM's distribution must be reported on both a system-wide and Portfolio-wide scale and emphasize the position of projects within the risk landscape. Every figure and table on the Portfolio Coversheet must include a caption explaining the figure.

Risk scores, the product of likelihood and consequence, must be reported as two-dimensional risk matrices. Risk scores can be weighted if appropriate. Two examples of risk score matrices for Ignition Risk are presented below (Figures 2-5), followed by another

example of a risk score matrix for Outage Program Risk (Figures 6-7). Note that the units and scales are not meant to be realistic and are for illustrative purposes only.

Figure 2. Example of Risk Score Matrix Demonstrating Substantial Improvements in Overall Utility Risk Expected due to EUP

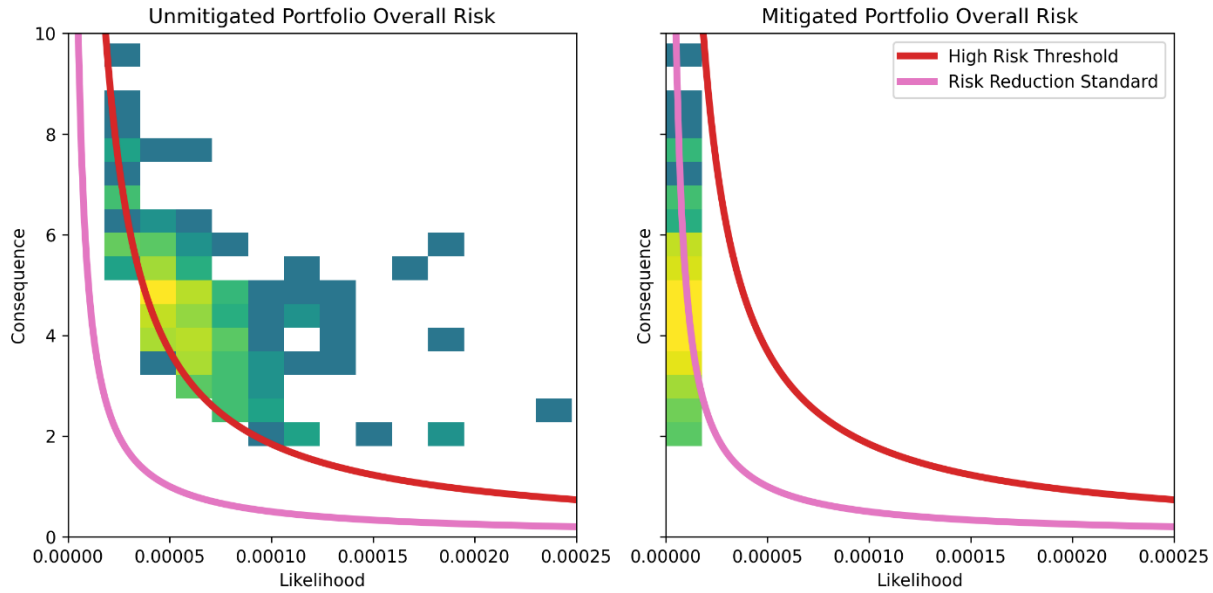


Demonstration of substantial improvements in Overall Utility Risk expected due to EUP, using only Overall Utility Risk as a KDMM. Each plot shows potential Adverse Event Consequence on the y-axis (in arbitrary units), and Adverse Event Likelihood on the x-axis (in arbitrary units), considering both Outage Program Risk and Ignition Risk. The distribution of a model system of Circuit Segments is shown using the heatmap in background. The red line shows the High-Risk Threshold used to identify projects to underground, and the pink line is the Overall Utility Risk Decrease Project Standard required for projects to reach after mitigation.

Left: Data for the electrical distribution system, before any EUP mitigations have taken place. The red points represent all Circuit Segments selected for undergrounding, which are selected because they are found above the red line.

Right: Data for the full system after undergrounding. The heatmap has changed to reflect the circuits moving to lower likelihood. Pink points represent the same selected circuits after mitigation.

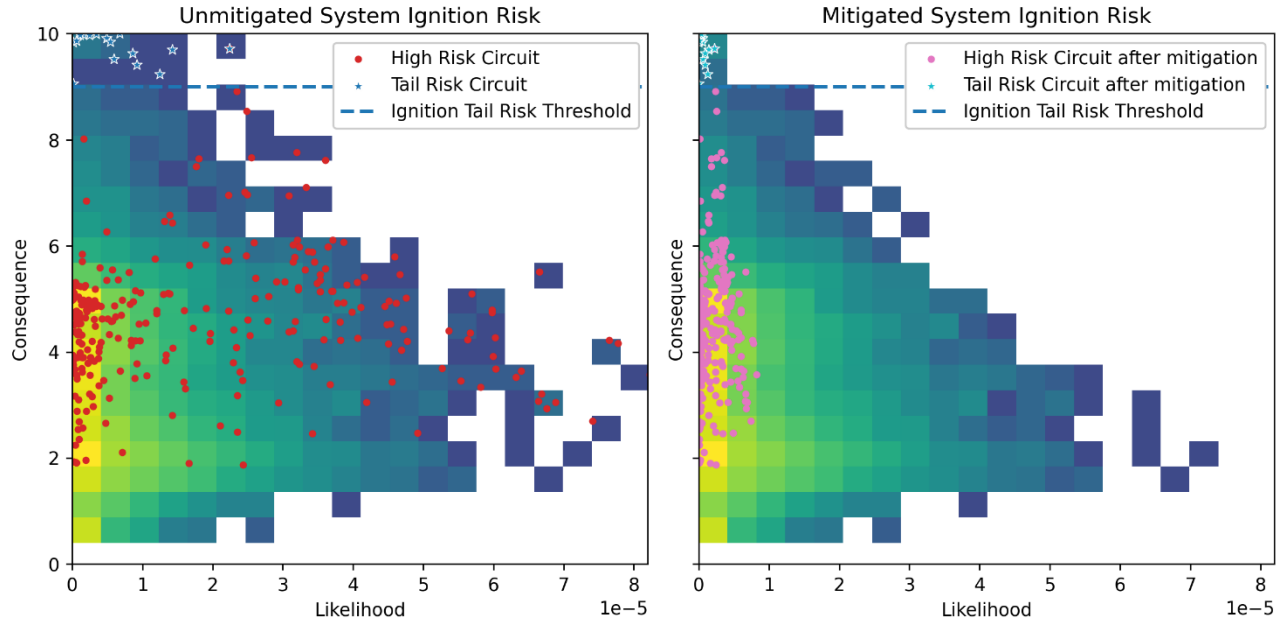
Figure 3. Example of Risk Score Matrix for Portfolio-Level Overall Utility Risk



Same as Figure 2, but only showing the heatmap of the Portfolio, not the full system.

Left: The Portfolio prior to mitigation. Right: The same Portfolio after mitigations is applied.

Figure 4. Example of Risk Score Matrix for Demonstration of Substantial Improvements in Ignition Risk

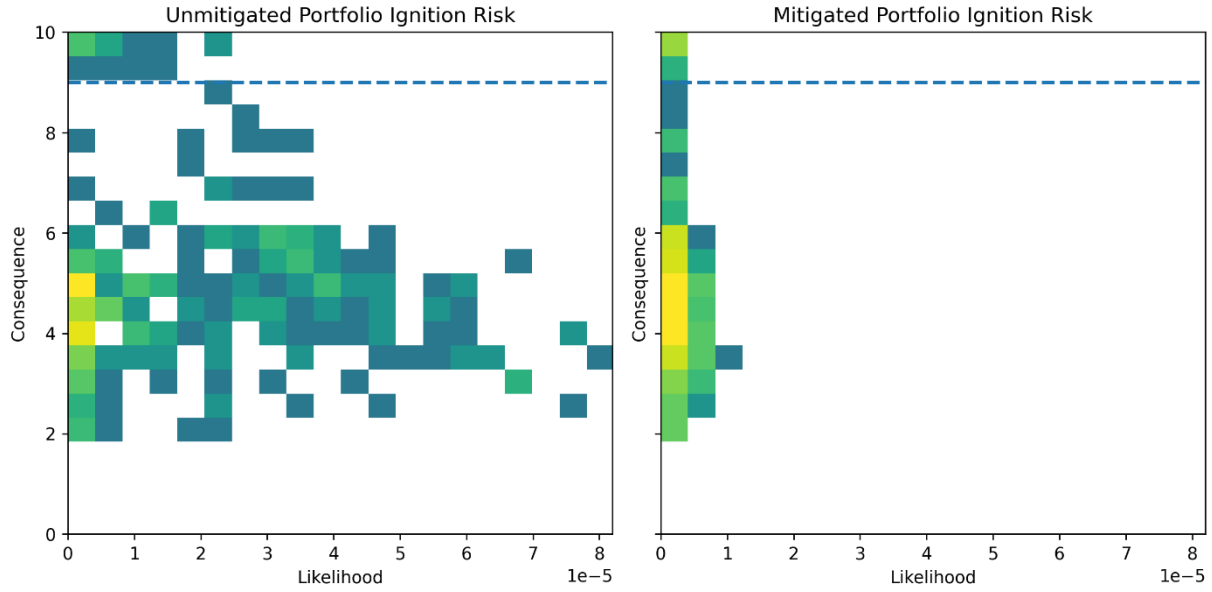


A demonstration of substantial improvements in Ignition Risk expected due to EUP, using overall risk (of Outage Programs and Ignition Risk), as well as wildfire consequence, as KDMMs. Each plot shows potential Ignition Consequence on the y-axis (in arbitrary units), and Ignition Likelihood on the x-axis (in arbitrary units). The distribution of a model system of Circuit Segments is shown using the heatmap in background, with the Ignition Tail Risk Threshold shown as a blue dotted line.

Left: Data for the electrical distribution system, before any EUP mitigations have taken place. The red points represent all circuits selected for undergrounding due to high overall risk, and blue stars represent the circuits selected for exceeding the Ignition Tail Risk Threshold.

Right: Data for the full system after undergrounding. The heatmap has changed to reflect the circuits moving to lower likelihood. Pink points and teal stars represent the same selected high-risk and tail-risk circuits, respectively, after mitigation.

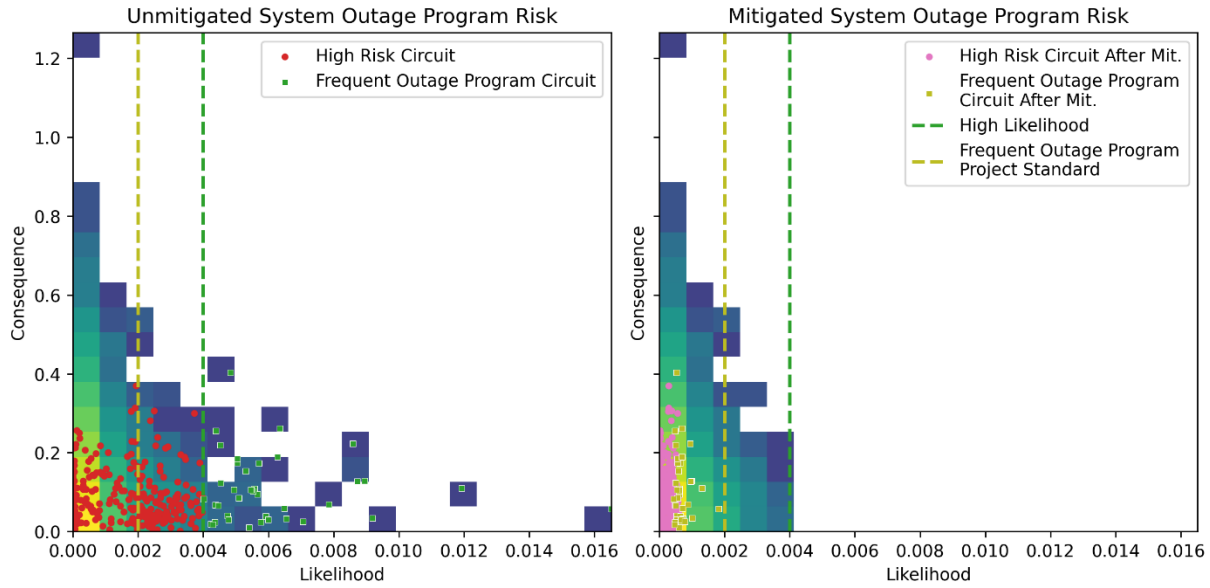
Figure 5. Example Risk Score Matrix for Portfolio-Level Ignition Risk



Same as Figure 4, but only showing the heatmap of the Portfolio of projects, not the full system.

Left: The Portfolio prior to mitigation. Right: The same Portfolio after mitigations is applied.

Figure 6. Example of Risk Score Matrix for Demonstration of Substantial Improvement in Outage Program Risk

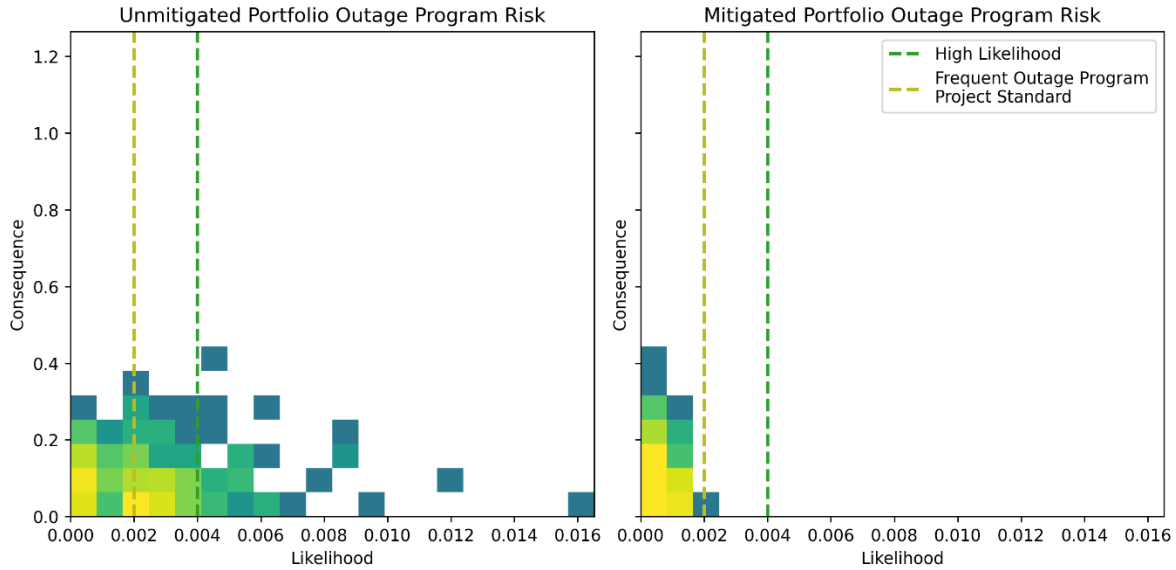


Demonstration of substantial improvement in Outage Program Risk expected due to EUP, using overall risk (of Outage Programs and Ignition Risk), as well as Outage Program Likelihood, as KDMMs. Each plot shows potential Outage Program Consequence on the y-axis (in arbitrary units), and Outage Program Likelihood on the x-axis (in arbitrary units). The distribution of a model system of Circuit Segments is shown using the heatmap in background, with the Frequent Outage Program Threshold shown as a green dotted line and High Frequency Outage Program Mitigation Standard is shown as an olive dotted line.

Left: Data for the electrical distribution system, before any EUP mitigations have taken place. The red points represent all circuits selected for undergrounding due to high overall risk, and green squares represent the circuits selected exceeding the Frequent Outage Program Threshold.

Right: Data for the full system after undergrounding. The heatmap has changed to reflect the circuits moving to lower likelihood. Pink points and olive squares represent the same selected high-risk and Frequent Outage Program circuits, respectively, after mitigation.

Figure 7. Example Risk Matrix for Portfolio-Level Outage Program Risk

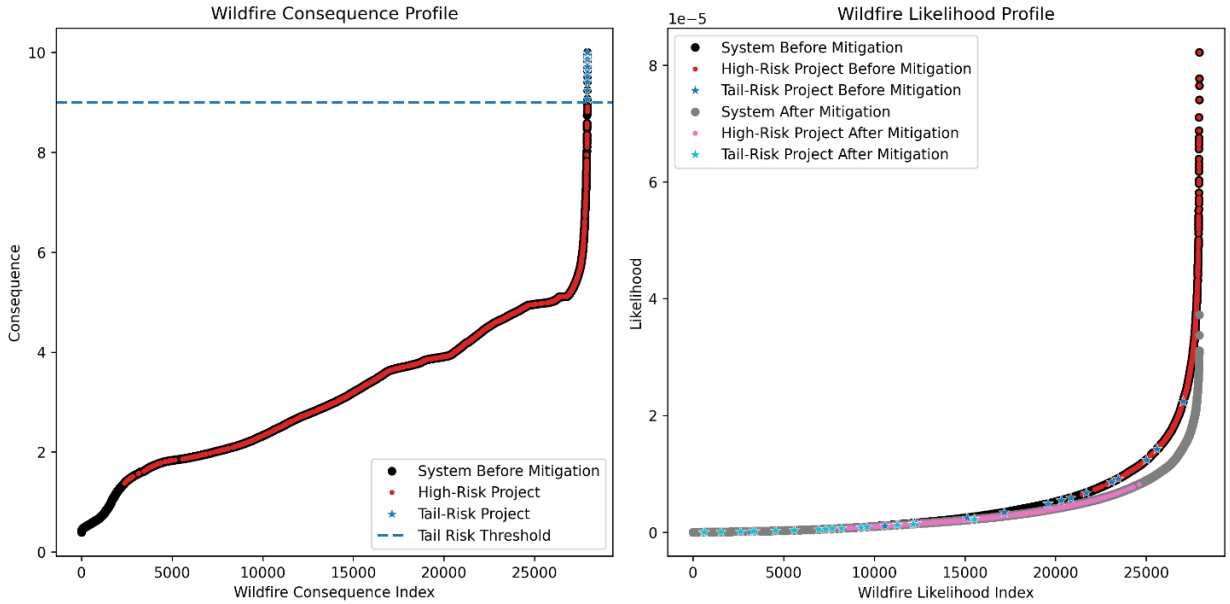


Same as Figure 6, but only showing the heatmap of the Portfolio of projects, not the full system.

Left: The Portfolio prior to mitigation. Right: The same Portfolio after mitigations is applied. Ignition Likelihood and Ignition Consequence are reported as profiles, ranked in ascending order. The Ignition Consequence Profile must indicate the large electrical corporation's Ignition Tail Risk Threshold. Outage Program Likelihood and Outage Program Consequence must be reported similarly to Ignition Likelihood and Consequence. The System Outage Program Likelihood Profile must indicate the large electrical corporation's High Frequency Outage Program Threshold and High Frequency Outage Program Mitigation Standard.

Examples are given below. Note that the units and scales are not meant to be realistic and are for illustrative purposes only.

Figure 8. Example of Ignition Consequence and Likelihood Profiles

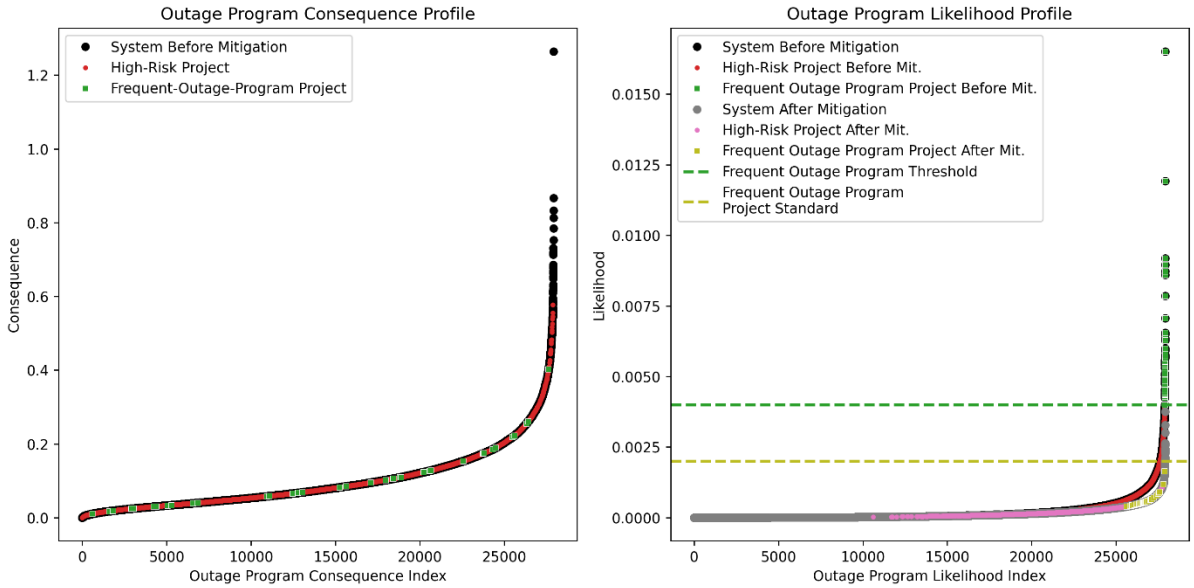


Ignition Consequence and Likelihood Profiles, showing selected circuits using Ignition Risk and wildfire consequence as KDMMs.

Left: All circuit segments within the system ordered from lowest to highest consequence, with the y-axis showing consequence scores (arbitrary units). The blue line is the Tail Risk Threshold for selection via Ignition Consequence, and blue stars are circuit segments above this line. Red dots indicate High-Risk Projects, selected due to high Ignition Risk. Because the mitigations considered here can only impact likelihood and not consequence of wildfire, there is no change to this graph after mitigation.

Right: All circuit segments within the system ordered from lowest to highest Ignition Likelihood, with the y-axis showing likelihood scores (arbitrary units). Red points and blue stars are the same circuits as in the leftmost plot, though they are not ranked in the same order. Plotted over this is the system after mitigation (grey points), with the pink points and cyan stars showing the undergrounded high-risk (red points) and tail-risk (blue stars) circuits, respectively.

Figure 9. Example Outage Program Consequence and Likelihood Profiles



Outage Program Consequence and Likelihood Profiles showing selected circuits using Outage Program Risk and Outage Program Consequence as KDMMs.

Left: All circuit segments within the system ordered from lowest to highest consequence, with the y-axis showing consequence scores (arbitrary units). Green squares are Undergrounding Projects selected because their Outage Program Likelihood exceeds the Frequent Outage Program Threshold (see right-side plot). Red dots indicate High-Risk Projects, selected due to high Outage Program Risk. Because the mitigations considered here can only impact likelihood and not consequence of Outage Programs, there is no change to this graph after mitigation.

Right: All circuit segments within the system ordered from lowest to highest Outage Program Likelihood, with the y-axis showing likelihood scores (arbitrary units). The green line is the Frequent Outage Program Threshold for selection via Outage Program Likelihood, and the olive line is the standard for likelihood reduction. Green squares are circuit segments above the green line, and olive squares are the same segments after mitigation, which will fall below the olive line. Red points and green squares are the same circuits as in the leftmost plot, though they are not ranked in the same order. Plotted over this is the system after mitigation (grey points), with the pink points and olive stars showing the undergrounded High-Risk and Frequent Outage Program circuits, respectively.

The large electrical corporation must report other KDMMs similarly. The visualizations must demonstrate the distribution of the metric over the entire system and within the scope of the Portfolio separately. Additionally, the visualizations must illustrate the large electrical corporation's approximation of its risk profile both before and after the proposed mitigations. Note that these visualizations are not meant to be a comprehensive examination of the EUP, but rather a summary of the most critical metrics.

The large electrical corporation must indicate how it computes the integration, summation, quadrature, or likelihood estimation used to compute this accumulation in its definition of these terms (See Section 2.7.6 of these Guidelines more details).

This discussion will include any discount rates, risk-attitude weights or other user parameters used to model the accumulation of risk over time.

Each of these metrics must be reported for both the Baseline regime and the Portfolio at the System-Level and Portfolio-Level as a part of the Portfolio Coversheet. Below is an example of an acceptable table to report for Ignition Risk.

Table 6. Example of table for Ignition Risk: Portfolio-Level

Metric	Setting	0 Year	5 Year	10 Year	20 Year	30 Year	40 Year	50 Year	60 Year
Instantaneous Ignition Risk	Mitigated	7.0	5.0	4.0.	3.0	2.0	2.0	2.0	2.0
Cumulative Ignition Risk	Mitigated	0	35	60	100	130	150	170	190
Instantaneous Ignition Risk	Baseline	7.0	7.0	8.0	8.0	8.0	8.0	8.0	8.0
Cumulative Ignition Risk	Baseline	0	35	70	150	220	300	380	460

An example table showing Portfolio-Level Ignition Risk in both instantaneous and cumulative measurements.

Note that the numbers in Table 6 reflect a linear accumulation model with piecewise constant risk value that changes at each interval. These properties are used for illustrative purposes only.

2.8.6.3 Portfolio Development

The large electrical corporation must detail its system for tracking the change in the Portfolio of Undergrounding Projects over time as well as the consistency of its modeling updates.

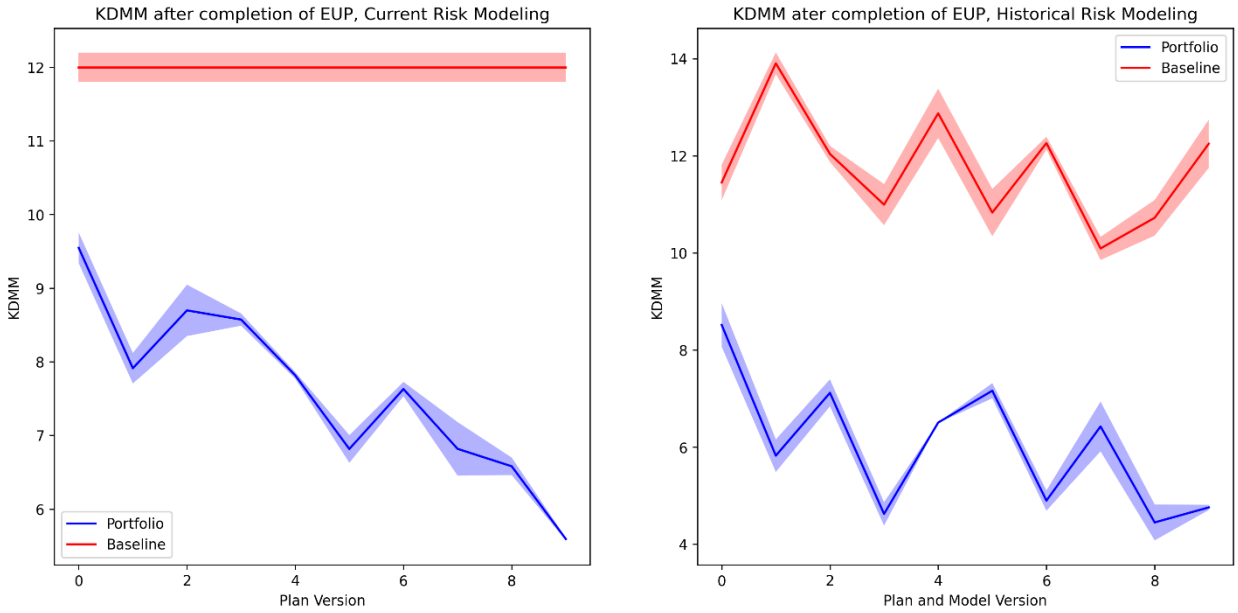
The large electrical corporation must track how its Portfolio of Undergrounding Projects has changed over the duration of the EUP by applying the most up-to-date modeling system version and calibration to each of the historical Portfolios considered during the lifetime of the EUP.

The large electrical corporation must summarize this information in each Progress Report, including Progress Report 0, by creating two plots for each KDMM showing their mean value and first standard variation, measured over the total Portfolio footprint. The total Portfolio footprint is defined as the union of all Circuit Segments included in any Portfolio.

The first plot must show the instantaneous value of the KDMM after the EUP has been completed, as measured by the most recent version and calibration of Risk Modeling Methodology, compared to the Baseline at the beginning of the plan, as measured by the most recent version of the Risk Modeling Methodology.

The second plot must show the same metrics, but measured by the version of the Risk Modeling Methodology used at the time that Portfolio was foremost. An example of a KDMM graph is shown below:

Figure 10. Example KDMM Development

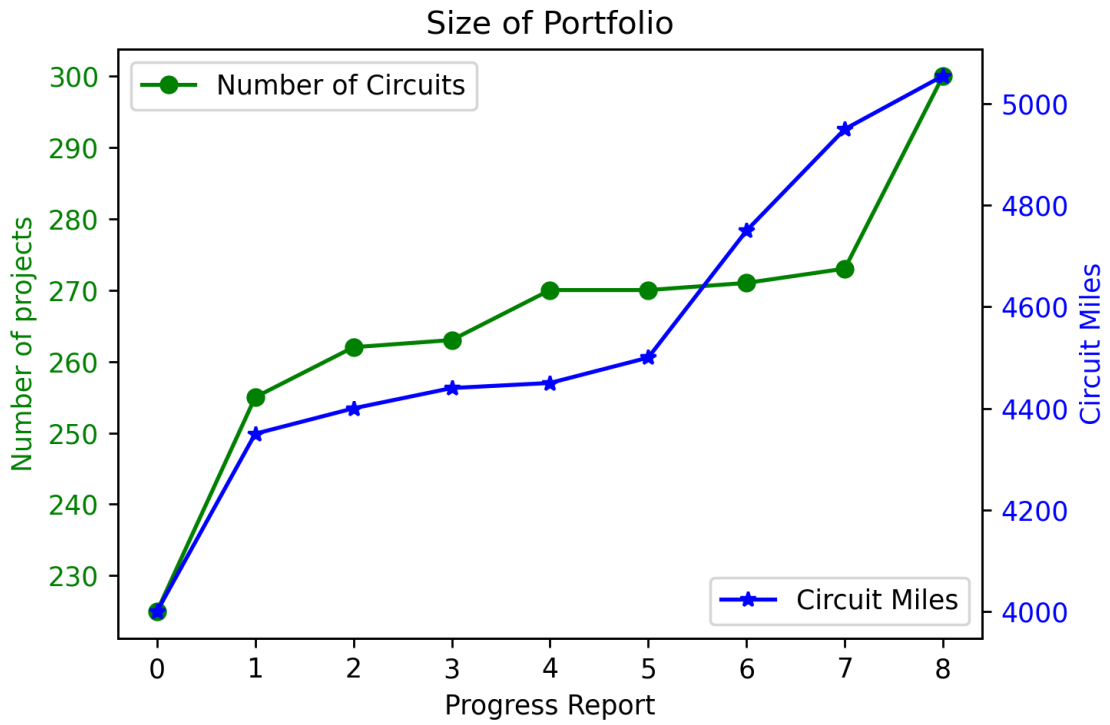


Left: A plot showing a KDMM's Baseline (red) and modeled value after EUP mitigation (blue) using the most recent version of the model evaluation. The x-axis denotes a different version of the Portfolio.

Right: A plot showing a KDMM's Baseline (red) and modeled value after EUP mitigation (blue) using the version of the Risk Modeling Methodology which was most recent at the time the Portfolio was updated.

The large electrical corporation must report a graph showing the size of each Portfolio as measured in total Undergrounding Projects and total circuit-miles. The graph must include representations of complete and ongoing Undergrounding Projects.

Figure 11. Example Portfolio Development Over Progress Reports



An example figure showing the size of the Portfolio over different progress reports. The left y-axis shows the number of project (green line), and the right y-axis shows circuit miles.

2.8.6.4 Portfolio Coversheet Organization

The Portfolio Cover sheet must be organized as follows:

Section	Requirements
Narrative Justification	See Section 2.8.6.1 of these Guidelines
Key Decision-Making Metrics Profiles	See Section 2.8.6.2 of these Guidelines
Project Variable Modifiers	See Section 2.7.6 of these Guidelines
Portfolio Development	See Section 2.8.6.3 of these Guidelines

2.8.7 Reporting Individual Undergrounding Projects

2.8.7.1 Project Index Table

The large electrical corporation must develop a project index table which summarizes the Screen 2 information for each Undergrounding Project in an easily accessible and searchable format. This table must be included in each progress report and is described in further detail in Appendix C.1.13.

2.8.7.2 Project Reference Sheet Overview

The large electrical corporation must develop a Project Reference Sheet for each Undergrounding Project. The Project Reference Sheet is a text document which summarizes the Project-Level impacts of the EUP and is supported by the data submission as detailed in Appendix C. Each Project Reference Sheet must be submitted in Progress Report 0 and each subsequent Progress Report.

Each Project Reference Sheet must:

a. Establish a reduction of risk in a clear and concise manner.
b. Display the most recent evaluation.
c. Begin with an identification of the isolatable circuit segment, including a summary of its unmitigated risk scores.
d. Indicate whether any communications companies or other third parties have equipment on the poles where the circuit is currently located.
e. Contain a table reporting all KDMMs and other metrics that would be important to a stakeholder when evaluating a project from a risk-management perspective as detailed in Section 2.8.6 of these Guidelines.
f. Contain risk modeling information about comparable alternative mitigations as detailed in Section 2.7.5 of these Guidelines.
g. Contain a short narrative section explaining: (i) the selection of the alternative mitigations for comparison for the specific Undergrounding Project; (ii) the selection of undergrounding as the preferred mitigation; and (iv) a timeline of the estimated completion dates. Every figure and table on the Project Reference Sheet must include a caption explaining the figure.

The Project Reference Sheet must summarize the most critical metrics that substantiate an Undergrounding Project. These metrics include, but are not limited to, all the KDMMs, cost-benefit calculations as well as additional supporting metrics that the large electrical corporation intends to use to justify the project. The Project Reference Sheet must also show the same metrics for at least two comparable alternative mitigations and the Baseline values using the same model version and calibration.

The large electrical corporation must summarize its evaluation of the project, referencing only metrics reported in data submission. This table must contain a description of the work type and alternative mitigations, an indication of whether the project meets the appropriate Project-Level standard, and all the KDMMs. Additional Model Risk Landscape metrics can be added to these tables to justify the work. If the project has passed Screen 2 (Project Information and Alternative Mitigation Comparison), the table must also include costs, benefits and the information for the CPUC CBR. The benefits calculation should be separated into safety, reliability, and financial contributors as defined in CPUC Decision 22-12-027.

The narrative evaluation of the project is limited to one page.

At the same time as the submission of the Project Reference Sheets, the large electrical corporation must submit a detailed data submission pursuant to Appendix C.

An example Project Reference Sheet is presented in Appendix E. The numbers in the tables presented there are for illustrative purposes only.

2.8.7.3 Identifying Information

Each project must be given a unique Project ID which identifies the project. The Project Reference Sheets must identify the following fields for each project in a table similar to the Example Undergrounding Project Identifying Information table below.

Table 7. Example Undergrounding Project Identifying Information

Field	Description
Circuit Segment Id	See Data appendix
Project ID	Unique Project Identification Number
Project Category	Identifying if this circuit segment is eligible for consideration under Screen 1, and if so, how. Possible values are the following: • High-Risk • Ignition Tail Risk • High Frequency Outage Program
HFTD Tier	CPUC High Fire-Threat District Tier as per R.15-05-006. Possible Values: • Tier 2 • Tier 3

Field	Description
	• Wildfire Rebuild
Risk Tranche[12]	Risk tranches include a group of assets, a geographic region, or other grouping that is intended to have a similar risk profile such as having the same likelihood or consequence of risk events.
Feasibility Score by Project[13]	Cost multiplier indicating the difficulty of undergrounding the Project based on presence of hard rock, water crossing, and gradient. The scale ranges from 1 to 3, with 3 being most challenging. The Phase 2 Application shall define each level of the scale.
Risk Rank[14]	Results of the applicable risk model where Projects are ranked on a 1 to N basis, where 1 is the highest risk Project, and N is the lowest risk.
Overall Risk Score Rank	Overall Risk Score Rank among eligible circuits
Ignition Consequence Rank	Ignition Consequence Rank among eligible circuits
Outage Program Likelihood Rank	Outage Program Likelihood Rank among eligible circuits

2.8.7.4 Comparative Metrics

For each Undergrounding Project, the large electrical corporation must evaluate at least two comparable alternative mitigations, including covered conductor and covered conductor with some type of fast trip system/setting. Any combinations of alternative mitigations that meet the Project-Level Standards must be reported in their least expensive configuration in addition to any other combinations that the large electrical corporation wishes to report.

[12] As per Appendix 1 of the Public Utilities Commission's SB-884 Program Guidelines adopted March 7, 2024.

[13] As per Appendix 1 of the Public Utilities Commission's SB-884 Program Guidelines adopted March 7, 2024.

[14] As per Appendix 1 of the Public Utilities Commission's SB-884 Program Guidelines adopted March 7, 2024.

If the project has passed Screen 2 (Project Information and Alternative Mitigation Comparison), the large electrical corporation must report the following information in a table in the Project Reference Sheet for the Undergrounding Project and at least two comparable alternatives.

An example table is given in Appendix E of these Guidelines.

Table 8. Example Screen 2 Project Information Table

Field	Description
Work Type	Description of the type of mitigation.
Reliability Benefits	Reliability Benefits of the Undergrounding Project per D.22-12-027
Financial Benefits	Financial Benefits of the Undergrounding Project per D.22-12-027
Risk Reduction	Risk Reduction of the Undergrounding Project per D.22-12-027.
Unit Cost Per Overhead Mile Deenergized[15]	Project Unit Cost per Mile of Overhead Exposure
Unit Cost Per Underground Mile Energized[16]	Project Unit Cost per Mile of Undergrounding
Total Costs[17]	Total Undergrounding Project Cost

[15] As per Appendix 1 of the Public Utilities Commission's SB-884 Program Guidelines adopted March 7, 2024.

[16] As per Appendix 1 of the Public Utilities Commission's SB-884 Program Guidelines adopted March 7, 2024.

[17] As per Appendix 1 of the Public Utilities Commission's SB-884 Program Guidelines adopted March 7, 2024.

Field	Description
Cost-Benefit Ratio[18]	Cost-Benefit Ratio of the Undergrounding Project per D.22-12-027. Benefits must relate to the mitigation of overhead line miles not miles of undergrounding.

If the project has passed Screen 3 (Project Risk Analysis), the large electrical corporation must report the following information for the Baseline, the project and two comparable alterative at the Project-Level in a table on the Project Reference Sheet. An example table is given in Appendix E.

Table 9. Example Screen 3 Comparative Risk Metrics Table

Field	Description
Fulfills Project- Level Standard?	Does the proposed mitigation achieve the associated Project-Level Standard?
Cumulative Overall Utility Risk in year 60	The cumulative Overall Utility Risk experienced at this location, accounting for the proposed construction timeline for under grounding and a realistic timeline for alternative mitigations.
Cumulative Ignition Risk in Year 60	The cumulative Ignition Risk experienced at this location, accounting for the proposed construction timeline for under grounding and a realistic timeline for alternative mitigations.
Cumulative Outage Program Risk in Year 60	The cumulative Outage Program Risk experienced at this location, accounting for the proposed construction timeline for under grounding and a realistic timeline for alternative mitigations.
Mean Ignition Consequence in first 10 Years of Program	The mean wildfire consequence score at this location, evaluated over the first 10 years of the program, accounting for the proposed construction timeline for under grounding and a realistic timeline for alternative mitigations.

[18] As per Appendix 1 of the Public Utilities Commission's SB-884 Program Guidelines adopted March 7, 2024.

Field	Description
Mean Outage Program Likelihood in first 10 years of Program	The mean outage program likelihood at this location, evaluated over the first 10 years of the program, accounting for the proposed construction timeline for under grounding and a realistic timeline for alternative mitigations.

For each alternative, it must compute a Separate Alternative Analysis and a Collective Alternative Comparison and report them in the risk landscape JSONs as described in Section 2.8.2 of these Guidelines.

2.8.7.5 Project Reference Sheet Organization

The Project Reference Sheet must be organized as follows:

Section	Requirements
Identification	See Section 2.8.7.2 of these Guidelines
Narrative Justification	See Section 2.8.7.1 of these Guidelines
Other Utilities	See Section 2.8.7.1 of these Guidelines
Project Information	See Section 2.8.7.3 of these Guidelines
Project Risk Analysis	See Section 2.8.7.4 of these Guidelines
Project Timeline	See Section 2.8.7.1 of these Guidelines
Additional Metrics	See Section 2.8.7.1 of these Guidelines

3. Process and Evaluation

This section sets forth the procedural direction and evaluation process for an EUP that is submitted to Energy Safety pursuant to section 8388.5.

3.1 Plan Pre-Submission Review

3.1.1 Purpose of Pre-Submission Review

Energy Safety will first assess the large electrical corporation's EUP for completeness based on the statutory requirements and these Guidelines. The EUP pre-submission must, at a minimum, contain each of the required components outlined in section 8388.5 and these Guidelines as described below in the pre-submission checklist.

The pre-submission review is a review for completeness and conformity to Guideline requirements; the substantive review of the EUP content occurs during the EUP evaluation process.

3.1.2 Pre-Submission Review Process

Ten business days prior to transmitting an EUP to Energy Safety for pre-submission review, the large electrical corporations must notify Energy Safety of its intent to submit an EUP for a pre-submission review by sending a letter to the Deputy Director and an e-mail to ElectricalUndergroundingPlans@energysafety.ca.gov.

After notifying Energy Safety that it will be submitting an EUP for a pre-submission review, the large electrical corporation is required to meet and confer with Energy Safety staff to discuss the contents of the forthcoming EUP pre-submission.

Energy Safety uses the Pre-Submission Checklist below to confirm that all content required by section 8388.5 and these Guidelines is included and that each item appropriately cross-references the relevant section(s)/ or sub-section(s) of the EUP. If information for an item on the Pre-Submission Checklist is not included in the EUP pre-submission, Energy Safety marks this element as incomplete.

The Pre-Submission Checklist includes the following.

a. The EUP has provided a narrative for each section and sub-section in the EUP. If the EUP contains a blank section, an inapplicable cross reference, or insufficient detail, Energy Safety marks this element incomplete.
b. The EUP has addressed all components of the EUP that have been identified in section 8388.5(c).
c. The EUP has addressed the requirements outlined in section 8388.5(d)(2).

d. The EUP has addressed the requirements related to the inclusion of a Project Acceptance Framework.
e. The EUP includes the objectives and targets developed by the large electrical corporation for tracking and evaluation purposes.
f. The EUP has included the list of Undergrounding Projects.
g. The EUP has responded to requirements related to data and modeling submissions, including model versioning and calibration.
h. The EUP has submitted all required Project Reference Sheets and Portfolio Coversheets.
i. The large electrical corporation must include a pre-submission review cover sheet that documents the page number(s) of where each component of the pre-submission checklist can be found in the submitted EUP. The pre-submission review cover sheet may not reference internal cross-references and must reference the direct page number.

Energy Safety makes a determination and informs the large electrical corporation of its findings.

a. If a large electrical corporation's EUP satisfies the pre-submission review, Energy Safety will instruct the large electrical corporation to submit its EUP as-is, with no changes.
b. If a large electrical corporation's EUP does not satisfy the pre-submission review, Energy Safety will notify the large electrical corporation as to the missing or incomplete information (i.e., incomplete, not fully referenced, or unsubstantiated statutory compliance checklist).

After Energy Safety affirms that the pre-submission contains the required contents, Energy Safety will open a docket for the EUP, and the large electrical corporation can submit the EUP for evaluation.

Energy Safety will not accept public comments on the pre-submission review.

3.2 Large Electrical Corporation EUP Submission

Appendix B to these Guidelines contains specific instructions for narrative and other content. A large electrical corporation may submit all documents referenced in the EUP, to the docket established for that large electrical corporation's EUP. In addition, the large electrical corporation must mail five hard copies, including appendices, of the EUP to:

Office of Energy Infrastructure Safety
Attn: Deputy Director
715 P Street, 20th Floor
Sacramento, CA 95814

Data submissions must be made following the data requirements in these Guidelines including Appendix C.

The nine-month statutory period for Energy Safety to review the EUP starts on the date the EUP is filed for evaluation.

Five business days prior to submitting an EUP for evaluation the large electrical corporation must notify Energy Safety of its intent to submit by sending an e-mail to the Deputy Director and ElectricalUndergroundingPlans@energysafety.ca.gov.

3.2.1 Confidentiality

The submission process for submitting confidential information is set forth in section 29200 of Title 14 of the California Code of Regulations.

3.2.2 Format

Every document submitted to Energy Safety must comply with the formatting requirements below.

a. Electronically filed documents shall be word searchable and accessible as prescribed in these Guidelines.
b. Paper documents must be:
    i. Typewritten or otherwise mechanically printed;
    ii. On paper 11 inches long and 8 ½ inches wide;
    iii. Printed on both sides of the page if feasible; and
    iv. Bound securely.
c. Both electronic and paper documents must:
    i. Be in a clear, easily readable font of at least 11 points;
    ii. Have consecutively numbered pages; and
    iii. Include the following information on the first page:
        - Name of the docket;
        - Number of the docket; and
        - Title of the document.
d. For electronic documents, signatures may be electronic.[19]

[19] Gov. Code, § 16.5.

3.3 Evaluation of Plan

Energy Safety will evaluate the EUP pursuant to the requirements of sections 8388.5(c) and (d)(2) and may approved or deny an EUP or issue a Modification Notice (see Section 3.5 below) if there are deficiencies in the EUP or supporting documents.

An EUP has met the requirements of sections 8388.5(c) and (d)(2) when Energy Safety determines that the large electrical corporation has demonstrated that the EUP will substantially increase electrical reliability by reducing the use of public safety power shutoffs, enhanced powerline safety settings, deenergization events, and any other outage programs, and substantially reduce of the risk of wildfire.

To make a determination of whether the EUP has met the requirements, Energy Safety will consider the following.

a. The EUP responds to the requirements contained in section 8388.5(c) and (d)(2) and these EUP Guidelines.
b. The EUP is supported by the risk profiles reported by the large electrical corporation in the initial Baseline and other data sources.
c. The EUP is supported by results from modeling and data analytics provided pursuant to statutory and guidelines requirements.
d. Project Acceptance Framework is feasible and effective.
e. The plan objectives and targets are adequate for tracking progress and compliance beginning on the start date of the 10-year period for the EUP.

To assess the EUP, Energy Safety may rely upon the following:

a. The large electrical corporation's EUP, including errata;
b. Public and stakeholder comments;
c. Current and past WMPs;
d. The large electrical corporation's data submissions;
e. The large electrical corporation's responses to data requests; and
f. Any other information Energy Safety may require for the evaluation of the large electrical corporation's EUP.

3.4 Errata

An erratum is a correction of published text and does not include modifications required by Energy Safety as part of the Modification Notice process.

A large electrical corporation may submit an errata as follows:

Substantive Errata: If within the first 10 days after the date on which the large electrical corporation submitted its complete EUP, the large electrical corporation may submit the substantive errata directly to the docket. After that time, the large electrical corporation must request permission through written request to the Deputy Director prior to filing a substantive erratum.

Nonsubstantive Errata: Nonsubstantive errata are minor corrections to fix typographical and clerical errors, and other obvious, inadvertent errors and omissions. If within the first 30 days after the date on which the large electrical corporation submitted its complete EUP, the large electrical corporation may submit nonsubstantive errata directly to the docket. After 30 days, the large electrical corporation must request permission through written request to the Deputy Director prior to filing a nonsubstantive errata.

Classification of errata as substantive or nonsubstantive is solely within the discretion of Energy Safety.

When submitting errata or a request to submit errata to the Deputy Director, the large electrical corporation must include the following:

a. A cover letter with a summary of the corrections, including:
    i. Whether the large electrical corporation asserts its errata submission is substantive or nonsubstantive,
    ii. The EUP page number, section number, and table or figure number (if applicable) of the corrections,
    iii. A description of the corrections, and
    iv. Reason for the corrections; and
b. A redline of the page or pages of the EUP showing the corrections.

If a large electrical corporation submits errata to its EUP, and Energy Safety approves the EUP, the large electrical corporation must submit a final version of its EUP to the docket that includes all previously submitted errata within 10 days of Energy Safety's decision approving the EUP. This final version must also include changes resulting from a Modification Notice, as further discussed below. A large electrical corporation must not include any other changes in its final version of its EUP, unless otherwise directed by Energy Safety.

Energy Safety may allow for stakeholder comments on substantive errata filed more than 10 days after the date on which the large electrical corporation submitted its complete EUP.

3.5 Modification Notice

Section 8388.5(d)(2) states, "[b]efore approving the plan, the office may require the large electrical corporation to modify the plan." Energy Safety effectuates this provision by issuing

a Modification Notice. The purpose of a Modification Notice is to ensure the large electrical corporation addresses plan deficiencies prior to completion of Energy Safety's evaluation.

3.5.1 Examples Warranting a Modification Notice

Energy Safety may issue a Modification Notice after the EUP has been filed. Examples of when Energy Safety may choose to issue a Modification Notice include, but are not limited to, the following issues:

a. The large electrical corporation's submission does not meet the evaluation criteria listed in Section 3.3 of these Guidelines.
b. The large electrical corporation did not provide sufficient information on risk and outage modeling for Energy Safety to determine whether the plan meets the standard outlined in section 8388.5(d)(2).
c. The proposed EUP is not technically feasible within, or proposes timelines beyond, a 10-year planning horizon.
d. The large electrical corporation proposes a Project Acceptance Framework that includes projects that are not located in a Tier 2 or 3 High Fire-Threat District or Wildfire Rebuild Areas.
e. The EUP does not contain a sufficient explanation of common values, assumptions and metrics used for alternative mitigation comparisons.
f. One or more proposed threshold, standard, or other metric, when considered in the context of the EUP and risk landscape as a whole, does not satisfy the Portfolio Mitigation Objective.
g. Correction of EUP content for clarity.

3.5.2 Modification Notice Process

The Modification Notice process is set forth as follows:

a. Energy Safety determines a large electrical corporation's EUP contains one or more deficiencies that warrant a Modification Notice.
b. Energy Safety issues a Modification Notice to the large electrical corporation. The Modification Notice will contain a list of deficiencies the large electrical corporation must address in its Modification Notice Response and applicable schedule or updates to existing schedule.
c. Pursuant to the applicable schedule, the large electrical corporation must resubmit its entire EUP or sections therein, in a redline copy and a clean copy, as directed by the Modification Notice, and provide written responses to each issue delineated in the Modification Notice (Modification Notice Response).
d. If Energy Safety issues a Decision approving the large electrical corporation's EUP after issuing one or more Modification Notice, the large electrical corporation must

submit to the docket a final version of the EUP that includes changes resulting from all Modification Notices, no later than 10 days after the decision issued. This final version must also include previously submitted errata, as discussed in Section 3.4 of these Guidelines, but must not include any other changes, unless otherwise directed by Energy Safety.

3.6 Public Participation

3.6.1 Docket Access

Persons who wish to receive service of the EUPs, comments on the EUPs, and EUP decisions may enroll by visiting: https://public.govdelivery.com/accounts/CNRA/subscriber/new?topic_id=CNRA_579.

Additional information on Energy Safety's service lists and detailed instructions for signing up can be found at https://energysafety.ca.gov/events-and-meetings/how-to-participate-in public-events/.

3.6.2 Public Comments

Energy Safety will accept opening and reply comments on submitted EUPs. In its discretion Energy Safety may accept public comment on other submissions or products. Should Energy Safety elect to accept public comment on a product or submission, it will publish a comment schedule and associated procedures.

EUP Submissions: Opening comments must be submitted to the corresponding docket no later than 30 days after the date on which the large electrical corporation submitted its complete EUP. Reply comments are due 15 days after the deadline for the submission of opening comments.

Modification Notice Responses: Opening comments must be filed with the corresponding docket no later than 10 days after the Modification Notice Response has been filed. Reply comments are due 5 days after the deadline for the submission of opening comments.

Draft EUP Decisions: Opening comments are due 10 days after the draft decision is filed in the corresponding docket. Reply comments are due 5 days after the deadline for opening comments.

The scope of opening comments must focus on information contained in the document subject to the comment period. Opening comments are limited to 30 pages. The scope of reply comments is limited to the issues raised in opening comments. New information not directly related to issues presented in opening comments will not be considered. Reply comments are limited to 20 pages. Energy Safety may reject comments submitted after the due dates provided within a schedule or comments that are not within the scope as described in this section.

Any person or entity seeking an extension to a public comment due date may email a request to Energy Safety at ElectricalUndergroundingPlans@energysafety.ca.gov. The request must include:

a. Original deadline,
b. Document subject to the comment period,
c. Good cause for the extension, and
d. Proposed new deadline in lieu of the original.

Any extension request must be received by Energy Safety by 5:00 p.m. Pacific time two days prior to the original comment due date.

For any technical issues encountered that may affect the timeliness of a public comment submission, the person or entity submitting the comment must immediately contact efiling@energysafety.ca.gov and ElectricalUndergroundingPlans@energysafety.ca.gov.

Energy Safety will consider public comments before issuing a decision. When a comment is received, it becomes public record and will be made available to the public on the Energy Safety docket. The comments will be posted as received without redaction of personal information. Energy Safety is not required to respond to public comments directly.

3.6.3 Submitting Public Comments

Public comments must conform to the following requirements:

a. Comments must be submitted to the related docket on Energy Safety's e-filing system.
b. Comments on a large electrical corporation's EUP shall be named according to the naming convention set forth in these Guidelines. However, comments shall include the organization or person's name followed by "Opening Comments" or "Reply Comments" and then the relevant abbreviations.
c. See Section 3.9 of these Guidelines for document accessibility requirements.
d. The submission process for confidential information is set forth in section 29200 of Title 14 of the California Code of Regulations.

3.7 Data Requests

3.7.1 Data Requests from Energy Safety

Energy Safety may obtain any information from a large electrical corporation that is relevant to a matter within the scope of Energy Safety's authority, or is likely to lead to the discovery of relevant information, via a data request.

The following applies to data requests:

a. Data requests from Energy Safety staff to a large electrical corporation may come from ElectricalUndergroundingPlans@energysafety.ca.gov or from individual Energy Safety staff e-mail addresses. All responses to Energy Safety data requests must be submitted to the appropriate EUP docket. A large electrical corporation must endeavor to submit one file per data request to the docket (as opposed to a file for every question in the data request).

b. The "Data Request Response Period" for an EUP begins on the date a large electrical corporation submits its EUP for the pre-submission check and continues until issuance of a decision for the large electrical corporation. The "Data Request Response Period" for Progress Reports is the initial 60 days after a large electrical corporation submits a progress report.

c. Data requests issued by Energy Safety during the Data Request Response Period are subject to a three-business day response period. Data requests issued by Energy Safety outside of the Data Request Response Period are subject to a 10-calendar day response period unless a different response period is provided by Energy Safety.

d. For data requests submitted by 5:00 p.m. on a business day, the date of submission is Day 0. For data requests submitted after 5:00 p.m. or on a Saturday, or holiday (including all Sundays) as defined in Government Code section 6700, the next business day is Day 0.

e. Unless a different response time is provided by Energy Safety, a large electrical corporation must respond to all data requests by 5:00 p.m., on day three, with each business day counted as one day.

    i. Extension Requests

        - If a large electrical corporation seeks a longer response period than provided in this section or as provided by Energy Safety, the large electrical corporation must request an extension by sending an extension request to ElectricalUndergroundingPlans@energysafety.ca.gov and to the assigned Energy Safety staff lead for the large electrical corporation's EUP evaluation.

    ii. An extension request must include:

        - The data request or portion of the data request requiring an extension;
        - Good cause for the extension; and
        - A proposed date of response in lieu of the original deadline.

    iii. Any extension request must be received by Energy Safety by 5:00 p.m. Pacific time one business day prior to the original data request response due date.

3.7.2 Data Requests from Data Request Stakeholders

A Data Request Stakeholder may obtain, through a data request to the large electrical corporation, information related to any EUP docket matter with a comment period specified in these Guidelines or for which Energy Safety has published a comment schedule.

Prior to issuing a data request, a person or entity must seek and obtain designation as a Data Request Stakeholder pursuant to these Guidelines. A person or entity may submit public comments without designation as a Data Request Stakeholder.

3.7.2.1 Data Request Stakeholder Designation

Any person or entity must submit a request for and receive designation as a Data Request Stakeholder prior to sending data requests. The request must be made within ten days after the large electrical corporation submits a EUP. Energy Safety may grant late requests for designation as a Data Request Stakeholder only on a showing of good cause by the interested person or entity.

A request for designation as a Data Request Stakeholder must include:

a. The docket matter (Docket #) the person or entity intends to participate in (e.g., #2024-EUPs),
b. The position and interest of the person in the EUP docket matter,
c. Disclosure of the persons or entities on whose behalf the person may be seeking the designation, if any,
d. The large electrical corporation for which the person or entity seeks data request stakeholder status, and
e. The name, mailing address, e-mail address, and telephone number of the person or entity designee.

A request for designation as a Data Request Stakeholder will be considered approved five business days after submission without any further correspondence from Energy Safety unless the person or entity seeking the designation is otherwise notified by Energy Safety during that time. Once granted designation as a Data Request Stakeholder, a person or entity retains that designation until Energy Safety has issued a decision on the EUP.

3.7.2.2 Data Request Process for Data Request Stakeholders

The following applies to data requests from Data Request Stakeholders:

a. Data Request Stakeholders may issue data requests to a large electrical corporation beginning on the date on which the large electrical corporation submitted its complete EUP and ending when Energy Safety has issued a decision.
b. A large electrical corporation must respond to all stakeholder data requests within three-business days of the request, unless a different response period is mutually

agreed upon by the stakeholder making the data request and the large electrical corporation.

c. Extension Requests
    i. Prior to seeking an extension from Energy Safety to respond to a data request, a large electrical corporation must first make a good-faith effort to ask the stakeholder making the request to agree to the extension.
    ii. If a large electrical corporation cannot reach an agreement with the stakeholder making the request, the large electrical corporation must request an extension by sending an extension request to ElectricalUndergroundingPlans@energysafety.ca.gov.
    iii. An extension request must include:
        - A showing of a good-faith effort by the large electrical corporation to ask the stakeholder to agree to the extension and the result of such effort,
        - The data request or portion of the data request requiring an extension,
        - Good cause for the extension, and
        - A proposed date of response in lieu of the original deadline.
    iv. Any extension request must be received by Energy Safety by 5:00 p.m. Pacific time one business day prior to the date the data request response is due.

3.7.2.3 Data Request Requirements for Data Request Stakeholders

a. Data requests must seek information relevant to the pending docket matter and be designed to facilitate the stakeholder's ability to make an informed public comment.
b. Stakeholders submitting data requests must consider the volume and nature of the data being requested when negotiating response deadlines. In the event that the information requested is already available in WMP filings, the large electrical corporation may choose to refer the stakeholder to the specific part of the WMP record where the information can be found.
c. Prior to submitting data requests, the Data Request Stakeholder must make a reasonable effort to determine if the information is already available, or has already been requested, through any of the following:
    i. Contained in the large electrical corporations' EUP or WMP submission, or
    ii. Previously requested by Energy Safety, or
    iii. Previously requested by other Data Request Stakeholders.

Data Request Stakeholders may view prior data requests and responses in each large electrical corporation's Data Request Log, available on the large electrical corporation's website.

3.7.2.4 Request to Compel or Limit Data Request Stakeholder Data Requests

Data Request Stakeholders and the large electrical corporation must endeavor to resolve all data request disputes amongst themselves. For data request disputes that cannot be resolved, parties to the dispute may seek relief in accordance with the process below:

a. Prior to filing a request to compel or limit data requests, the parties to the dispute must have previously met and conferred in a good faith effort to informally resolve the dispute.
b. The party seeking to compel or to limit data requests bears the burden of proving the reasons why Energy Safety should compel or limit the data request.
c. A request to compel or limit a data request must include:
    i. Facts showing a good faith attempt at an informal resolution of the data request dispute presented by the request,
    ii. The data request or portion of the data request at issue,
    iii. Basis to compel or limit the data request, and
    iv. A proposed determination that clearly indicates the relief requested.
d. A response from a Data Request Stakeholder or large electrical corporation must be submitted within three-business days of the date that the request was submitted to Energy Safety. If no response is submitted to a request to compel or limit a data request, then the request will be deemed granted. Energy Safety will take requests to compel or limit a data request under consideration and will issue a determination on a request to compel or limit a data request after the request and response have been submitted. Energy Safety may request clarification or additional information from the parties to the dispute prior to issuing a determination. Responses to such requests for clarification or additional information must be submitted within three business days of the date of the request.

All filings for a request to compel or limit data requests must be submitted to Energy Safety at ElectricalUndergroundingPlans@energysafety.ca.gov and served to all parties to the dispute.

3.8 Document Maintenance

3.8.1 Document Postings

When submitting an EUP, the large electrical corporation must post its EUP, all documents referenced in its EUP, and any subsequent versions of the EUP and documents on a EUP-

specific website in an easy-to-follow format. This will be in addition to the posting of EUPs on Energy Safety's docket and website. A large electrical corporation must include the website address in a cover letter to its EUP submission. All documents submitted to the Energy Safety docket, including responses to data requests, must be machine readable and searchable.

3.8.2 Data Request Log

Each large electrical corporation that submits an EUP must post an EUP Data Request Log on its website. The EUP Data Request Log must be posted and maintained beginning on the date on which the large electrical corporation submitted its complete EUP and ending upon the completion of each participating large electrical corporation's 10-Year Electrical Undergrounding Program. Each participating large electrical corporation must also submit to Energy Safety a Data Request Log weekly for the same period. The large electrical corporation is not required to submit a weekly Data Request Log to Energy Safety if there is no new information to report. The requirements for each Data Request Log are set forth as follows.

a. Each large electrical corporation must update its EUP Data Request Log and post all data requests and responses issued to-date weekly each Thursday by 5:00 p.m. Pacific time.
b. Each large electrical corporation must submit to Energy Safety its EUP Data Request Log each Thursday by 5:00 p.m. Pacific time to the appropriate EUP docket.
c. The website or portion of webpage pertaining to data requests must be titled "[EC corporate name] Electrical Undergrounding Plan Data Requests."
d. The Data Request Log must be in the form of a searchable online table that contains all data requests, responses for each data request received, and links to relevant documents.
e. The Data Request Log must indicate:
    i. The attachment number of any additional attachments related to the data request,
    ii. The relevant sections of the EUP, and
    iii. A thematic category and subcategory of the data request.

3.9 Accessibility

It is the policy of the State of California that electronic information be accessible to people with disabilities. Each person who submits information through the Office's e-filing system must ensure that the information complies with the accessibility requirements set forth in

Government Code section 7405. The Office will not accept any information submitted through the e-filing system that does not comply with these requirements.[20]

3.10 Computation of Time and Scheduling

When requirements referenced in these Guidelines set a time limit for performance of an act, the time is computed by excluding the first day (i.e., the day of the act or event from which the designated time begins to run) and including the last day. If the last day falls on a Saturday, Sunday, holiday, or other day when Energy Safety offices are closed, the time limit is extended to include the first day thereafter. If an act occurs after 5:00 p.m. Pacific time, it is deemed as having been performed on the next day.

Energy Safety may modify any schedule outlined in these Guidelines by issuing further scheduling guidance. Additional schedule guidance will take precedent over any scheduling included in these Guidelines.

3.11 Submission Instructions, Locations and Naming Conventions

Electronic file names for the EUPs and associated text documents and narrative reports must follow the standardized electronic naming convention illustrated in Table 10 below. The electronic file name must include, in order, the naming convention identified in each column (without quotation marks), with an underscore between the character string of each column. All text files must be submitted in portable document format (pdf).

See examples below.

Examples:

a. First Version of an EUP Submission: “2025-02-05_PGE_2023_EUP_R0.pdf”, which would refer to an EUP submitted by PG&E on February 05, 2025, first version.
b. Updated submission in response to Energy Safety Modification Notices: “2025-06-05_SDGE_23_MNR_R1”, which would refer to a Modification Notice Response submitted by SDG&E on June 5, 2025, mod 1.

[20] References to laws and regulations related to digital accessibility are available at https://dor.ca.gov/Home/DisabilityLawsandRegulations. Resources on constructing accessible electronic contents are available at https://dor.ca.gov/Home/HowToCreateAccessibleContent.

Table 10. Electronic File Naming Convention for Text Files with Examples

Date Submitted (Year-Month-Day)	Electrical Corporation Abbreviated Name	Document Year	Document Type	Modification Number
"2023-02-05"	• "PGE" (Pacific Gas and Electric Company) • "SDGE" (San Diego Gas & Electric Company) • "SCE" (Southern California Edison Company)		• "EUPPRE" (Electrical Undergrounding Plan Submission for Pre Submission Review) • "EUP" (Electrical Undergrounding Plan Submission) • "PR#" (Semi-Annual Progress Report) • "MNR" (Mod Notice Response) • "DRLOG" (Data Request Log) • "MR" (Model Report) • "EUPOC" (Electrical Undergrounding Plan Opening Comments) • "EUPRC" (Electrical Undergrounding Plan Reply Comments)	• R0 (First Version) • R1 (Mod 1) • R2 (Mod 2)

Date Submitted (Year-Month-Day)	Electrical Corporation Abbreviated Name	Document Year	Document Type	Modification Number
			• "EUPDDOC" (Electrical Undergrounding Plan Draft Decision Opening Comments) • "EUPDDRC" (Electrical Undergrounding Plan Draft Decision Reply Comments) • "EUPERR" (Electrical Undergrounding Plan Errata) • "EUPERRC" (Electrical Undergrounding Plan Errata Comments)	

Electronic file names for the associated tabular and special data submissions must follow the standardized electronic naming convention illustrated in Table 11 below. More detail on the data submissions can be found in Appendix C.

Table 11. Electronic File Naming Convention for Data Submissions

Submission Type	File Type	Submission Location	Naming Convention
Initial Tabular Data	CSV	eFiling	"[Electrical Corporation Abbreviation]_Intial_Date_R#", *for example:* "PGE_ Initial_2024-01-01_R0.csv"
Progress Report Tabular Data	CSV	eFiling	"[Electrical Corporation Abbreviation]_ PR#_Date_R#", *for example:* "PGE_ PR1_2025-01-01_R0.csv"
Project Variable Modifiers Information	JSON	eFiling	"[Electrical Corporation Abbreviation]_ PR#_Date_PMV_R#", *for example:* "PGE_ PR1_2025-01-01_PMV_R0.json"
Model Risk Landscapes for Projects	JSON	eFiling	"[Electrical Corporation Abbreviation]_ PR#_Date_R#", *for example:* "PGE_ PR1_2025-01-01_Projects_R0.json"
Initial Geodatabase Submission	Zip	Assigned SharePoint	"[Electrical Corporation Abbreviation]_Intial_Date_R#", *for example:* "PGE_Initial_2024-01-01_R0.gdb.zip"
Progress Report Geodatabase Submission	Zip	Assigned SharePoint	"[Electrical Corporation Abbreviation]_PR#_Date_R#", *for example:* "PGE_PR1_2025-01-01_R0.gdb.zip"

4. Compliance

4.1 Progress Reports and Independent Monitor Report

Section 8388.5(f) requires that, once an EUP is approved by Energy Safety and the CPUC, the large electrical corporation must file a Progress Report with Energy Safety and the CPUC every six months. Additionally, each year the EUP is in effect, the independent monitor must provide an annual report to Energy Safety by submitting the annual report to the related docket.

These Guidelines contain some requirements for content and updates to Progress Reports. Energy Safety will issue additional Guidelines on this topic and other post-approval matter

DATA DRIVEN FORWARD-THINKING INNOVATIVE SAFETY FOCUSED

OFFICE OF ENERGY INFRASTRUCTURE SAFETY
A California Natural Resources Agency
www.energysafety.ca.gov

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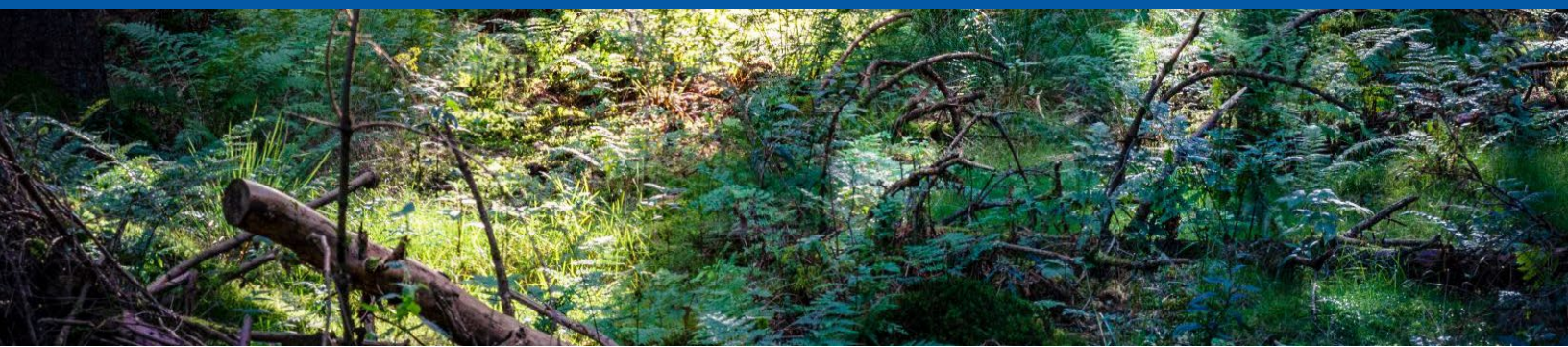
APPENDICES



Appendix A. Definitions

Unless otherwise expressly stated, the following words and terms, for the purposes of these Guidelines, have the meanings shown in this section.

"10-Year Electrical Undergrounding Program" means "an expedited utility distribution infrastructure undergrounding program" established by the CPUC pursuant to section 8388.5(a).

"Ablation Analysis" means the effects of a portfolio if a single project is taken out of the portfolio. It reports these effects at both the circuit and Portfolio-Level.

"Alternative Mitigation" means a mitigation strategy, other than undergrounding, used to reduce the consequence or likelihood of wildfires and Outage Program Events on a particular circuit segment.

"Baseline" means the expected risk and reliability profile of the large electrical corporation's distribution system during the asset life cycle. The Baseline includes all previously approved undergrounding projects, system-hardening projects, and similar mitigation activities.

"Circuit Segment" means an isolatable circuit segment, or a circuit protection zone (CPZ). Unless otherwise indicated "circuit segment" also refers to an isolatable circuit segment.

"Collective Alternative Comparison" means risk reduction if an alternative mitigation were inserted into the Portfolio instead of an undergrounding project on the same circuit segment. These results are reported at both the Project-Level and System-Level.

"Collective Analysis" means the effects of a single project, in combination with the rest of the projects that are in the Portfolio. The Collective Analysis reports these effects on the specific circuit as well as the entire portfolio.

"Confirmed Project" means an Undergrounding Project that has completed Screen 3 (Project Risk Analysis).

"Core Capabilities" means the required use-cases that the large electrical corporation's Risk Modeling Methodology must be able to achieve in order to make quantitative arguments about the risk reduction of undergrounding and Alternative Mitigations.

"CPUC CBR" means the cost-benefit ratio produced by the cost-benefit approach adopted in the CPUC's Decision 22-12-027 or its successor.

"CPUC Data Appendix 1" means the final adopted version of "Appendix 1: SB 884 Project List Data Requirements-Preliminary" to the SB 884 Program CPUC Guidelines dated March 7, 2024 and adopted by the CPUC in Resolution SPD15.

"Data Request Response Period" means the period of time during which Energy Safety data requests automatically have a three-day response time unless otherwise specified by Energy Safety.

"**Data Request Stakeholder**" means a stakeholder who has requested and obtained Data Request Stakeholder in accordance with Section 3.7.2.

"Deenergization Event" has the meaning given in section 8385(a)(2) ("the proactive interruption of electrical service for the purpose of mitigating or avoiding the risk of causing a wildfire"). See also **"Outage Program."**

"Electrical corporation" has the same meaning as set forth in section 218.

"Electrical Undergrounding Plan" or **"EUP"** means a plan submitted pursuant to section 8388.5.

"Eligible Circuit Segment" means a Circuit Segment that falls within the risk score values that will be used to identify high risk Circuit Segments that are eligible for the 10-Year Electrical Undergrounding Program.

"HFTD" or **"High Fire-Threat District"** means areas of the state designated by the CPUC as having elevated wildfire risk, where each electrical corporation must take additional action to mitigate wildfire risk pursuant to Decision 17-01-009 or its successor.

High Frequency Outage Program Mitigation Standard is the minimum decrease in Outage Program Likelihood as measured through formal calculations of the Key Decision-Making Metrics that any project considered under the High Frequency Outage Program must achieve to meet the required substantial increase in electrical reliability achieved by reducing the use of public safety power shutoffs, enhanced powerline safety settings, deenergization events, and any other outage programs.

"High Frequency Outage Program Threshold" is the measure of likelihood above which is considered to have a significantly high likelihood of frequent or prolonged disruption of service to customers. This threshold must measure both likelihood of an Outage Program Event and its anticipated length. This threshold must represent less than 1% of circuit segments in the entire system by mile and no more than 10% of Outage Program Likelihood by score.

"High-Risk Threshold" means the Overall Utility Risk level above which a Circuit Segment is considered eligible for examination for expedited undergrounding.

"Ignition Consequence" means the total anticipated adverse effects from a wildfire on each community it reaches. This metric considers the wildfire hazard intensity, the wildfire exposure potential, and the inherent wildfire vulnerabilities of communities at risk.

"Ignition Likelihood" means the likelihood of an ignition at a given location given a probabilistic set of environmental conditions. This is an unweighted and unscaled calculation.

"Ignition Risk" means the measure of impacts from wildfire at a given location. This metric is the product of two factors: (1) the likelihood a wildfire will occur, and (2) the potential consequences of a wildfire originating from this location.

Ignition Risk Decrease Standard is the minimum decrease in Ignition related metrics, as measured through formal calculations of the Key Decision-Making Metrics across the entire system at both the System and Portfolio-Level that the EUP must achieve to meet the required decrease in wildfire risk.

"Ignition Tail Risk Threshold" is the measure of consequence above which a circuit segment is considered to have significant potential for catastrophic wildfire, that it merits special consideration. This threshold must represent less than 1% of circuit segments in the entire system by mile and no more than 10% of the wildfire consequence by score.

"In-Area Circuit Segment" means an isolatable circuit segment, or a circuit protection zone (CPZ), located within the large electrical corporation's service territory that is located in a Tier 2 or 3 High Fire-Threat District or a Wildfire Rebuild Area.

"Independent Monitor" means the independent monitor selected by Energy Safety and hired by the large electrical corporation per section 8388.5(f)(3).

"Key-Decision-Making Metric" or **"KDMM"** means the key decision-making metrics developed pursuant to Section 2.7.3 of these Guidelines.

"Large Electrical Corporation" has the meaning given in section 3280 ("an electrical corporation with 250,000 or more customer accounts within the state.")

"Mitigated Risk Threshold" is the combined measure of Ignition Risk and Outage Program Risk below which a circuit segment is considered to be of acceptable risk.

"Model Risk Landscape" or **"MRL"** means the model risk landscape defined for the EUP pursuant to Section 2.7.4 of these Guidelines.

"Modification Notice" means the notice issued by Energy Safety if Energy Safety requires changes to an EUP before approving an EUP.

"Modification Notice Response" means the written response of the large electrical corporation to a Modification Notice.

"Out of Area Circuit Segment" means a Circuit Segment located within the large electrical corporation's service territory that is not located in a Tier 2 or 3 High Fire-Threat District or a Wildfire Rebuild Area.

"Outage Program" means (i) any program that interrupts electrical service for the purpose of mitigating or avoiding the risk of causing a wildfire including Public Safety Power Shutoff (PSPS) programs, fast trip settings (including enhanced powerline safety settings, Fast Curve Settings, and Sensitive Relay Profile) and similar programs, and (ii) any program that could

result in a deenergization event. Outage Programs exclude maintenance outages and other outages not related to reducing wildfire risk.

"Outage Program Consequence" is the total anticipated adverse effects from an Outage Program for a community. This considers the Outage Program exposure potential and inherent Outage Program vulnerabilities of communities at risk.

"Outage Program Event" means an outage that results from an Outage Program.

"Outage Program Likelihood" is the likelihood of a large electrical corporation utilizing an Outage Program given a probabilistic set of environmental conditions.

"Outage Program Risk" is the measure of reliability impacts from Outage Programs at a given location. This metric is the product of two factors: (1) the likelihood an Outage Program Event will be required due to environmental conditions exceeding design conditions, and (2) the potential consequences of the Outage Program for affected customers, considering exposure potential and vulnerability. This is an unweighted and unscaled calculation.

"Overall Utility Risk" is defined as the combined measure of Ignition Risk and Outage Program Risk that measures the total risk of wildfires and Outage Program Events related to wildfire risks. This is computed as the inner product of the likelihoods of adverse events and their consequences. This is an unweighted and unscaled calculation.

"Plan for Workforce Development" means the plan for utility and contractor workforce development required by section 8388.5(c)(5).

"Portfolio" means the set of all Undergrounding Projects being considered or modeled at a point in time. A portfolio is a unique list of projects, and adding or removing projects from the list constitutes an update to the portfolio and must be indicated with a new portfolio ID.

"Portfolio-Level Metric" means a single measurement of risk-related quantities that takes into account all of the Project-Level Metrics for the entire portfolio.

"Portfolio Mitigation Objective" means the amount of change in risk (wildfire and reliability) that is necessary to meet the substantiality requirements of section 8388.5(d)(2).

"Portfolio Standards" means the Ignition Risk Decrease Standard and a Reliability Increase Standard.

"Predicted Change" means difference between Baseline as forecast on the date on which the large electrical corporation submitted its complete EUP and Portfolio Risk Landscape as forecast on the date on which the large electrical corporation submitted its complete EUP.

"Project Acceptance Framework" means the multi-step process, described in Section 2.4 of these Guidelines, that the large electrical corporation will use to create the list of Undergrounding Projects pursuant to section 8388.5(c)(2), to select Undergrounding Projects for construction, and to maintain and update the Circuit Segment Information Lists throughout the EUP 10-year period.

"**Project Completion Phase**" is the Project Planning and Construction Phase when the Undergrounding Project is completed and the overhead line is deenergized.

"Project Identification Phase" is the Project Planning and Construction Phase when an Undergrounding Project has been identified by the large electrical corporation.

"Project Planning and Construction Phases" means the status categories for projects as listed in CPUC Data Appendix 1. The five phases designated and defined by the CPUC are: (1) Project Scoping, (2) Project Designing/Estimating, (3) Project Permitting/Dependency, (4) Project Ready for Construction, and (5) Project Construction and two additional phases that Energy Safety has designated and defined: Project Identification Phase and Project Completion Phase.

"Project Standards" means the Risk Reduction Project Standard, the Reliability Increase Project Standard, the Tail Risk Mitigation Project Standard.

"Project-Level Metric" means a measurement of a risk-related quantity assigned to a single circuit or circuit segment. This measurement may take into account factors from circuits other than the assigned one.

"PSPS" means public safety power shutoff. See also **"Outage Program."**

"Reliability Increase Project Standard" is the minimum decrease in Outage Program Risk, as measured through formal calculations of the Key Decision-Making Metrics that any project considered under the High-Risk Threshold must achieve to meet the required substantial increase in electrical reliability achieved by reducing the use of public safety power shutoffs, enhanced powerline safety settings, deenergization events, and any other outage programs.

"Reliability Increase Standard" is the minimum decrease in Outage Program-related metrics, as measured through formal calculations of the Key Decision-Making Metrics across the entire system at both the System and Portfolio-level, that the EUP must achieve to meet the required increase in reliability.

"Risk Landscape" means the set of metrics the large electrical corporation uses to estimate the risks.

"Risk Modeling Methodology" means the collection of numerical models and algorithms that the large electrical corporation employs to approximate the likelihood and consequences of utility related wildfires and wildfire related Outage Programs.

"Risk Reduction Project Standard" is the minimum decrease in Ignition Risk and Outage Program Risk, that an Undergrounding Project must achieve to support the Portfolio Mitigation Objective. This reduction in wildfire risk and increase in reliability must, at minimum, reduce the risk of the circuit segment to below the Mitigated Risk Threshold.

"Separate Alternative Analysis" means the risk reduction of this project if it was the only one in the portfolio and required to report these effects at the Project-Level and Portfolio-Level.

“Separate Analysis” means the risk reduction of this project if it was the only one in the portfolio and required to report these effects at the Project-Level and Portfolio-Level.

“System-Level Metric” means a single measurement of risk-related quantities that takes into account risk over the entire electrical distribution system.

“Tail Risk Mitigation Project Standard” is the minimum decrease in wildfire likelihood that any project considered under the Ignition Tail Risk Threshold must achieve to meet the required substantial reduction of the risk of wildfire.

“Threshold Level” means the value of a risk score above which a Circuit Segment or CPZ warrants consideration for undergrounding. (see High-Risk Threshold, Ignition Tail Risk Threshold, High Frequency Outage Program Threshold, and Mitigated Risk Threshold).

“Undergrounding Project” means an Eligible Circuit Segment for which the EUP contains a Project Reference Sheet with the CPUC Data Appendix 1 information completed. See also “Confirmed Project.”

“Undergrounding” means actions taken to convert overhead electrical lines and/or equipment to underground electrical lines and/or equipment (i.e., located underground and in accordance with GO 128). Undergrounding does not include microgrids.

“Wildfire Rebuild Area” means a location where distribution infrastructure has been damaged by wildfire that qualifies as a rebuild area under section 8388.5.

“WMP” means the wildfire mitigation plan program and requirements mandated by sections 8385 through 8389.

Appendix B. Organization of EUP

The purpose of this appendix is to assist in the organization of an EUP. This appendix is not a comprehensive enumeration or a modification of existing requirements outlined in the EUP Guidelines.

B.1 Narrative Content

The EUP must include a main document, including narrative and tables, organized into chapters as follows and submitted to the docket following the instructions in Section 3 of the Guidelines.

Chapter 1 Basic Information

Required Content	Description of Required Narrative Content
Basic Information	See Section 2.2 of these Guidelines.

Chapter 2 Narrative Requirements for Demonstration of Substantial Risk Reduction

Required Content	Description of Required Narrative Content
Portfolio Mitigation Objective: Narrative and Implementation Approach	See Section 2.3.1 of these Guidelines.
Demonstration of Substantial Risk Reduction: Objectives and Targets	See Section 2.3.2 of these Guidelines.

Chapter 3 Narrative Requirements for Project Acceptance Framework

Required Content	Description of Required Narrative Content
Screen 1: Circuit Segment Eligibility	See Section 2.4.1 of these Guidelines See Circuit Segment Information Lists below for non-narrative requirements.

Required Content	Description of Required Narrative Content
Screen 2: Project Information and Alternative Mitigation Comparison	See Section 2.4.2 of these Guidelines See Circuit Segment Information Lists below for non-narrative requirements.
Screen 3: Project Risk Analysis	See Section 2.4.3 of these Guidelines See Circuit Segment Information Lists below for non-narrative requirements.
Screen 4: Project Prioritization	See Section 2.4.4 of these Guidelines See Circuit Segment Information Lists below for non-narrative requirements.

Chapter 4 Narrative Requirements for Circuit Segment Information Lists

Required Content	Description of Required Narrative Content
Narrative describing Circuit Segment Information Lists	See Section 2.4.5 of these Guidelines for content. See Circuit Segment Information Lists below for non-narrative requirements.

Chapter 5 Timelines, Workforce Development, Costs and Benefits, and Non-Ratepayer Funding

Required Content	Description of Required Narrative Content
Project Timeline and Targets	See Section 2.5.1 of these Guidelines; section 8388.5(c)(3)
Workforce Development Plan	See Section 2.5.2 of these Guidelines; section 8388.5(c)(5)
Costs and Benefits	See Section 2.5.3 of these Guidelines; section 8388.5(c)(6)
Non-Ratepayer Funding Sources	See Section 2.5.4 of these Guidelines

Chapter 6 Narrative Requirements for Progress Report 0

Required Content	Description of Required Narrative Content
Narrative about Progress Report 0 and in support of Progress Report 0	See Section 2.6 of these Guidelines

Chapter 7 Narrative Support for Risk Modeling Methodology

Section Name	Narrative Requirements	Maximum Length of Narrative Section	Required Tables and Figures	Table Requirements
Overview	See 2.7.1	5 Pages	Enterprise Diagram(s)	See 2.7.3.1
Reports on Sub-models	See 2.7.2	4 Pages per Sub-Model	None	NA
Core Capabilities	See 2.7.5	2 Pages per Capability	None	NA
Model Inputs	See 2.7.4.1	1 Page per Input Category	Model Risk Landscape Variables Table	See 2.8.5.1
Project Variable Modifiers	See 2.7.6	1 Page per Project Variable Modifier	Project Variable Modifiers Inputs Table Project Variable Modifiers Outputs Table	See 2.8.5.2
Calibration and Versioning	See 2.7.5.2 and 2.7.7	2 Pages	None	NA
Key Decision-Making Metrics	See 2.7.3	3 Pages for required KDMMs and up to 1 Page each for up to 5 additional KDMMs	None	NA

Section Name	Narrative Requirements	Maximum Length of Narrative Section	Required Tables and Figures	Table Requirements
Portfolio Standards	See 2.7.8	2 Pages	None	NA
Project Thresholds	See 2.7.9	2 Pages	None	NA
Project Standards	See 2.7.9.1	2 Pages	None	NA

Chapter 8 Narrative Requirements for Reporting Metrics

Required Content	Description of Required Narrative Content
Reporting Metrics	See Section 2.8. of these Guidelines

B.2 Progress Report 0

Progress Report 0 must be submitted as a separate attachment to the EUP.

Required Content	Description
Portfolio Coversheet	See 2.8.4 and 2.8.6 of these Guidelines
Project Reference Sheet completed for each Undergrounding Project	See 2.8.5 and 2.8.7 of these Guidelines
Circuit Segment Information Lists	See 2.4.5.1 of these Guidelines
Additional Content	Additional content that the large electrical corporation proposes to track in its Progress Reports

B.3 Data Submissions

Instructions on the format for data submissions are found in Appendix C of these Guidelines.

Appendix C. Data Organization & Structure

The purpose of this appendix is to summarize all the information needed for the data submission accompanying the EUP and during all Progress Reports.

C.1 Tabular Data Submissions

This appendix establishes the requirements for the tabular data submission. The submission of the tabular data must map to the submission of the spatial data for both the initial EUP submission and every subsequent Progress Report. The data submission accompanying the initial EUP submission will have the exact same format as the Progress Reports, so it is referred to in this document as Progress Report 0.

The submission of tabular data must encompass the tables set forth in this appendix. The requirements herein may necessitate multiple submissions of some of the tables such as the Project Table, Project Status Table, and Circuit Screens Table with each data submission. The large electrical corporation must use the template files provided by Energy Safety for data submission. Template files are available on Energy Safety's website.

Some tables require a JSON submission for a particular field. This is fully distinct from the submission of the two supplemental JSON files required in Section C.2 of these Guidelines. Instead, in these cases the "Data Type Requirements" column will show the keys and values associated with the JSON key-value structure. These are simply strings which follow JSON formatting, not links to external files or nested dictionaries.

C.1.1 Plan Table

This section establishes the requirements for a Plan Table. This table is submitted once in Progress Report 0.

The large electrical corporation must initially submit the Plan Table with its EUP. This table is not to be submitted with subsequent Progress Reports.

Table describes the construction and data requirements for the for the Plan Table.

Table C.1. Example Plan Table Construction and Data Requirements

Column Name	Field Description	Data Type	Data Type Requirements
plan_id	A unique value identifying the plan.	INT	Unique

Column Name	Field Description	Data Type	Data Type Requirements
utility_name	EC abbreviation. Acceptable values are the following: • PG& E • SDG&E • SCE	NVARCHAR(32)	Limited Options
plan_type	A categorical value representing the type of plan an EC is submitting. Acceptable values are the following: • 884	NVARCHAR(32)	Limited Options
name	The name of the plan.	NVARCHAR(255)	
start_date	Start date of the plan.	DATE	
end_date	End date of the plan.	DATE	
plan_submission_date	Date the plan was submitted to Energy Safety.	DATETIME	
narrative_submission	A text field to describe a plan.	TEXT	
high_risk_threshold	See "High-Risk Threshold" in Section 3.4.1.4, Thresholds and Project-Level Standards for definition.	REAL	
wf_tail_risk_threshold	See "Wildfire Risk Threshold" in Section 3.4.1.4, Thresholds and Project-Level Standards for definition.	REAL	

Column Name	Field Description	Data Type	Data Type Requirements
high_frequency_outage_program_threshold	See "High Frequency Outage Program Threshold" in Section 2.7.9, Thresholds and Project-Level Standards for definition.	REAL	

Additional requirements for a Plan Table are as follows:

a) The Plan Table has only a single row of data which designates static information regarding the submitted EUP. Values in this table cannot be modified. If any value needs to be modified, this requires submission of a new EUP.
b) The PLAN_ID is defined by the value in this table, and must remain consistent for all subsequent tables, including in future Progress Reports. However, the large electrical corporation must assign a new PLAN_ID, if an EUP is rejected and needs to be resubmitted.
c) The large electrical corporation must designate “884” as the value for PLAN_TYPE.

C.1.2 Key Decision-Making Metrics Table

This section establishes the requirements for a KDMM Table that the large electrical corporation must submit. The large electrical corporation must submit a KDMM Table in Progress Report 0, describing all KDMMs which they will use during application of the EUP.

Table C.2. describes the construction and data requirements for the KDMM Table.

Table C.2. Construction of the KDMM Table and Data Requirements

Column Name	Field Description	Data Type	Data Type Requirements
plan_id	A unique value identifying the plan.	INT	must match Plan Table
kdmm_name	The name of the KDMM (e.g., Overall Utility Risk, Ignition Consequence, etc.) Name must match those from the KDMM table in Section 2.7.3 of these Guidelines	NVARCHAR(255)	limited values

Column Name	Field Description	Data Type	Data Type Requirements
kdmm_number	For the seven required (and up to 5 optional) KDMMs, which number (1,2,3, etc.).	INTEGER	
temporal_type	Indicate whether the KDMM is "Cumulative" or “Non-Cumulative"	NVARCHAR(255)	limited values
kdmm_definition	An explanation of what this KDMM represents.	TEXT	

Additional requirements for a KDMM Table are as follows:

a) The large electrical corporation must use KDMM_NAME to map submissions of this table to the JSON data submissions.
b) This table is only to be submitted once, at the initial submission of the Plan. This table is not to be resubmitted or edited with future Progress Reports.
c) This table must include the same KDMMs as the EUP narrative and table submission.
d) The KDMM_NUMBER is defined by this table, and the project_variable_multiplier and risk_landscape JSON files must use the same KDMM_NUMBERS.

C.1.3 Risk Model Version History Table

This section establishes the requirements for a Risk Model Version History Table accompanying the submission of the project_variable_multiplier JSON file with the initial submission of the Project and all subsequent Progress Reports. Each row of this table is a unique calibration of the large electrical corporation’s Risk Modeling Methodology. This table must reflect the most current information as of each Progress Report submission.

Table 3 describes the construction and data requirements for the Risk Model Projections Table.

Table C.3. Example Construction of the Risk Model Versions Table and Data Requirements

Column Name	Field Description	Data Type	Data Type Requirements
plan_id	A unique value identifying the plan.	INT	must match Plan Table

Column Name	Field Description	Data Type	Data Type Requirements
risk_model_version_id	A unique value identifying the risk model versioning.	NVARCHAR(255)	must match JSON submission
version_date	Date this version was established.	DATETIME	
risk_model_calibration_id	A unique value identifying the calibration number for this risk model version	INT	must match JSON submission
calibration_date	Date this calibration was established.	DATETIME	
change_description	Text explaining what changes took place compared to the previous version/calibration. If only a calibration update, describe which modules were recalibrated and the topline effects. If a full version update, describe any new models or interactions, and topline outcome effects	Text	

Additional requirements for a Risk Model Versions Table are as follows:

a) This table is a historical record table, with rows to be added as new versions are created and calibrated. At least one row must be submitted alongside Progress Report 0, and this table is to be resubmitted with each Progress Report only if new rows are added. The final row of this table is presumed to be the large electrical corporation's current Risk Modeling Methodology.
b) A model's CALIBRATION_DATE is the date the model was finalized internally at the large electrical corporation, not the date of submission of this model in a subsequent Progress Report.
c) If multiple updates to the Risk Modeling Methodology are made at different times between Progress Reports, the large electrical corporation will add multiple new rows to the table.
d) Each new row of this table in each Progress Report will be accompanied by a submission of a PROJECT_VARIABLE_MULTIPLIERS JSON data file, even if this would require multiple new JSON file submissions. The RISK_MODEL_VERSION_ID and RISK_MODEL_CALIBRATION_ID must match those submitted in those files.

C.1.4 Portfolio Table

This section establishes the requirements for a Portfolio Table in Progress Report 0 and in every subsequent Progress Report. This table includes information on the current portfolio and Risk Modeling Methodology being used by the large electrical corporation.

Table 4 describes the construction and data requirements for the Portfolio Table.

Table C.4. Example Portfolio Table Construction and Data Requirements

Column Name	Field Description	Data Type	Data Type Requirements
plan_id	A unique value identifying the plan.	INT	must match Plan Table
portfolio_id	A unique value identifying the portfolio.	INT	unique
project_list	A comma delimited list of all projects in the portfolio, by their project_id.	TEXT	Must match the Project Table
total_circuit_segments_in_portfolio	Total number of circuit segments in portfolio.	INT	
start_date	Start date of the Plan.	DATE	
estimated_completion_date	Estimated completion date of final project in portfolio.	DATE	
baseline_MRL_metrics	MRL metrics, assuming no plan, reported at the Portfolio-Level and System-Level	JSON	Keys: Strings, names for MRL metrics Values: Floats, current-day value for each metric
risk_model_version_id	A unique value identifying the risk landscape.	INT	must match version in project_variable_multipliers.json file

Column Name	Field Description	Data Type	Data Type Requirements
risk_model_calibration_id	A unique model identifying the calibration number of the risk landscape	INT	must match calibration in project_variable_multipliers.json file

Additional requirements for a Portfolio Table are as follows:

a) The Portfolio Table is submitted as a single row of data.
b) The large electrical corporation must assign the Portfolio a unique integer ID, which is the unique identifier for the list of projects being considered for undergrounding. When this list of projects changes, so too does the PORTFOLIO_ID. However, changes to the individual details of a project (e.g., changing the cost estimate, undergrounded length, etc.) do not change the list of projects and therefore do not change the PORTFOLIO_ID
c) In Progress Reports, the large electrical corporation must update the Portfolio Table, including RISK_MODEL_VERSION_ID, RISK_MODEL_CALIBRATION_ID, and DESCRIPTION, if there are any modifications to the Risk Modeling Methodology. The version and calibration of the risk model are the current one as of the Progress Report submission, and the distinction between versioning and calibration is as described in Section 2.7.5.2 of the Guidelines.
d) START_DATE refers to the inception date of the Plan, not the start date of individual projects.
e) The large electrical corporation must submit a JSON file for the Portfolio with the risk model and again in any Progress Report with a risk model update. See JSON instructions (Section C.2) for requirements on the risk model JSON file.

C.1.5 Circuit Segment Identification Table

This section establishes the requirements for a Circuit Segment Identification Table, first submitted in Progress Report 0 and submitted again in every subsequent Progress Report. This table must reflect the most current information as of each Progress Report submission, this includes construction of new circuit segments, the splitting of circuit segments into smaller circuit segments or the merging of segments into larger segments.

Table C.5 describes the construction and data requirements for the Circuit Segment Identification Table.

Table C.5. Example Circuit Segment Identification Table and Data Requirements

Column Name	Field Description	Data Type	Data Type Requirements
circuit_segment_id	A unique value identifying the circuit segment ID.	NVARCHAR(255)	unique, CPZ ID or isolated Circuit Segment ID
circuit_id	A unique value identifying the circuit.	NVARCHAR(255)	unique, must match circuit_id provided in QDR spatial submission files
project_id	A unique value identifying the project.	INT	must match project_id from one Project Table if this circuit is has passed through Screen 2 and has been assigned a project_id, otherwise leave blank
plan_id	A unique value identifying the plan.	INT	must match Plan Table
qdr_circuit_segment_id	A unique ID matching circuit_segment_id used in special quarterly data report (QDR)	NVARCHAR(255)	must match a circuit_segment_id provided in QDR
external_funding	If undergrounding of this Circuit Segment is already funded through the General Rate Case or other funding, describe that program here.	TEXT	Leave blank if Circuit Segment is not planned for undergrounding, or if funding for undergrounding is only expected to come from the EUP.
screen_number	A unique value identifying the next screen to be applied to the Circuit Segment. Enter value between 1 and 4.	INT	

Column Name	Field Description	Data Type	Data Type Requirements
screen_name	Provide the name of the next screen. • Screen 1: Circuit Segment Eligibility • Screen 2: Project Information and Alternative Mitigation Comparison • Screen 3: Project Risk Analysis • Screen 4: Project Prioritization	NVARCHAR(255)	
circuit_segment_length	The length of the circuit segment.	REAL	
is_eligible_circuit_segment	Whether this Circuit Segment has passed Screen 1 and is on the Eligible Circuit Segments List	Boolean	
Is_undergrounding_project	Whether this Circuit Segment has passed Screen 2 and is on the Undergrounding Projects List	Boolean	
is_confirmed_project	Whether this Circuit Segment has passed Screen 3 and is on the Confirmed Projects List	Boolean	
is_prioritized_project	Whether this Circuit Segment has passed Screen 4 and is on the Prioritized Projects List	Boolean	

Additional requirements for a Circuit Segment Identification Table are as follows:

a) In the initial submission, the large electrical corporation must provide each Circuit Segment within its territory as a separate row. This must be a comprehensive list including all Circuit Segments in the utility territory, even ones which do not qualify for undergrounding under the proposed EUP.
b) When this table is submitted in Progress Reports, the Circuit Segments must remain the same, unless they have been newly created, merged, or split, as described above. With the proposal of a new Project in the Project Table (Table 8 below), a link must be established between the PROJECT_ID and CIRCUIT_SEGMENT_ID, and this link must

remain unchanged throughout the Plan duration. If a project is abandoned and a new project is later proposed on that Circuit Segment, it will be proposed with a new PROJECT_ID.

c) Each Project is associated with only a single Circuit Segment. For example, any proposed undergrounding which takes place on e.g., two adjacent circuit segments must be considered as two individual projects. Conversely, all proposed undergrounding work on a single Circuit Segment will be considered one project and share the same PROJECT_ID.

d) The SCREEN_NAME and SCREEN_NUMBER fields refer to the "next" screen this segment would need to pass through to be considered for undergrounding. E.g., a Circuit Segment that has passed screen 2 would have entries "Screen 3: Project Development Evaluation" and "3" for these fields, while a project which is not eligible for undergrounding under the EUP because it is not in a High Fire Threat District or Rebuild Area, would have entries "Screen 1: Circuit Eligibility" and "1," respectively.

e) The four "Boolean" variables at the end confirm whether that row (i.e., Circuit Segment) has passed through the screens, they should be False until the project has reached the relevant stage, and True afterwards, even as the project advances through further screens. The lists generated by filtering this table by each stage must be the same as the lists submitted in the EUP, for example filtering this list by "IS_CONFIRMED_PROJECT" being TRUE should have identical projects as the Confirmed Projects List in the Portfolio Coversheet.

The large electrical corporation must submit associated spatial data with each Progress Report (Section C.4 below). The CIRCUIT_ID and CIRCUIT_SEGMENT_ID in the Circuit Segment Identification Table must map to the associated IDs in that submission. Additionally, the QDR_CIRCUIT_SEGMENT_ID must also map to a circuit segment in the spatial data provided in the Wildfire Mitigation Plan Quarterly Data Report.

C.1.6 Circuit Segment Risk Score Table

This section establishes the requirements for a Circuit Segment Risk Score Table. The large electrical corporation must submit a Circuit Segment Risk Score Table for each Undergrounding Project at the initial submission of that project and with each Progress Report. This table must reflect the most current information as of each Progress Report submission.

Table C.6 describes the construction and data requirements for the Circuit Segment Risk Score Table.

Table C.6. Example Construction of Circuit Segment Risk Score Table and Data Requirements

Column Name	Field Description	Data Type	Data Type Requirements
circuit_id	A unique value identifying the circuit.	NVARCHAR(255)	unique, must match Project Table circuit_id and QDR spatial submission circuit_id
circuit_segment_id	A unique value identifying the circuit segment ID.	NVARCHAR(255)	unique, CPZ ID or isolated circuit segment_id
project_id	A unique value identifying the project.	INT	must match project_id from Project Table if this circuit passes Screen 2, otherwise leave blank
risk_model_version_id	A unique value identifying the current version of the Risk Model	NVARCHAR(255)	Must match last row of Risk Model Version History Table
risk_model_calibration_id	A unique value identifying the current calibration of the Risk Model	INT	Must match last row of Risk Model Version History Table
risk_category	Identifying if this circuit segment is eligible for consideration under Screen 1, and if so, how. Possible values are the following: • High-Risk • Ignition Tail Risk • High Frequency Outage Program • None	NVARCHAR(255)	String of one of the available options. If a circuit segment qualifies under multiple categories, list all categories separated by commas.
overall_utility_risk_score	Utility risk score from the WMP.	REAL	
ignition_consequence	Ignition consequence score from WMP.	REAL	

Column Name	Field Description	Data Type	Data Type Requirements
outage_program_likelihood	Outage Program likelihood.	REAL	
overall_utility_risk_rank_system	Rank of the risk within the system.	INT	
overall_utility_risk_rank_portfolio	Rank of the risk within the portfolio.	INT	Leave blank if not included in the portfolio
ignition_consequence_rank_system	Rank within the wildfire consequence.	INT	
ignition_consequence_rank_portfolio	Rank within the wildfire consequence.	INT	Leave blank if not included in the portfolio
outage_program_likelihood_rank_system	Rank within the wildfire consequence.	INT	
outage_program_likelihood_rank_portfolio	Rank within the wildfire consequence.	INT	Leave blank if not included in the portfolio

Additional requirements for a Circuit Segment Risk Score Table are as follows:

a) In the initial submission, the large electrical corporation must provide each Circuit Segment within its territory as a separate row. This must be a comprehensive list including all Circuit Segments in the utility territory, even ones which do not qualify for undergrounding under the proposed EUP.
b) The Circuit Segments here must match those submitted in the Circuit Segment Risk Score Table.
c) With each Progress Report, the values in this table will update if the risk model changes. Use the current risk model outputs at the circuit segment level. This does not require projects to pass through screens again, even if the new risk model scores would not pass through the existing screens.

C.1.7 Screen History Table

This section establishes the requirements for a Screen History Table. The large electrical corporation must submit a Screen History Table in Progress Report 0 and in every subsequent Progress Report. This table must reflect the most current information as of each Progress

Report submission. Multiple screens may be applied between Progress Reports. The large electrical corporation must submit each applied screen as a new row.

Table C.7 describes the construction and data requirements for the Screen History Table.

Table C.7. Example Construction of the Screen History Table and Data Requirements

Column Name	Field Description	Data Type	Data Type Requirements
circuit_segment_id	A unique value identifying the circuit segment ID.	NVARCHAR(255)	unique, CPZ ID or isolated Circuit Segment ID
circuit_id	A unique value identifying the circuit.	NVARCHAR(255)	unique, must match circuit_id provided QDR spatial submission files
project_id	A unique value identifying the project.	INT	must match a Portfolio Table, may be blank if not being used
order__number	California Public Utility Commission Order Number	NVARCHAR(255)	Must match CPUC Guidelines for SB 844 Program Appendix 1
portfolio_id	A unique value identifying the portfolio.	INT	must match a Portfolio Table, may be blank if not being used
is_active	Is the project active?	BOOLEAN	
screen_number	A unique value identifying the screen. Enter value between 1 and 4. Every time the screen is applied to the circuit segment, update this field and the remaining fields in this table.	INT	

Column Name	Field Description	Data Type	Data Type Requirements
screen_name	Provide the name of the screen. • Screen 1: Circuit Segment Eligibility • Screen 2: Project Information and Alternative Mitigation Comparison • Screen 3: Project Risk Analysis • Screen 4: Project Prioritization	NVARCHAR(255)	
passed_date	Date at which this screen was applied.	DATE	

Additional requirements for a Screen History Table are as follows:

a) In the initial submission, the large electrical corporation must provide a row for each screen applied to each Circuit Segment, e.g., if a particular Circuit Segment has already passed Screen 3, it must have a row for when that segment was passed through each of Screen 1, Screen 2, and Screen 3, with the dates those screens were applied (which may be before submission of the EUP). Consequently, Circuit Segments which have not passed Screen 1 will not be included in this table.
b) In each subsequent Progress Report, additional rows will be added to the table to reflect additional screens that individual Circuit Segments have passed through. Prior rows should not be modified, however the order of rows (append all new updates to end, grouping all updates for a particular project together, etc.) will be left up to the large electrical corporation.
c) If a Project is abandoned on a Circuit Segment and a new Project is proposed on that same Circuit Segment, the new project must pass through all the screens again, and that progress must be reflected as new rows on this table with a new PROJECT_ID, without overwriting or removing the progress of the earlier Project.

C.1.8 Project Table

This section establishes the requirements for a Project Table. The large electrical corporation must submit a Project Table which contains information on each Undergrounding Project as an individual row. Projects must be included in this table once they have passed through Screen 2 (Project Information and Alternative Mitigation Comparison). This table must reflect the most current information as of each Progress Report submission, so any changes to the information in this table for a particular Project will be reflected in future submissions. The

large electrical corporation will update and submit all Project Tables with each Progress Report, even if no update was made to an individual project.

Table C.8 describes the construction and data requirements for the Project Table.

Table C.8. Example Project Table Construction and Data Requirements

Column Name	Field Description	Data Type	Data Type Requirements
project_id	A unique value identifying the project.	INT	unique
circuit_id	A unique value identifying the circuit.	NVARCHAR(255)	unique, must match circuit_id provided in QDR spatial submission files
circuit_segment_id	A unique value identifying the circuit segment.	NVARCHAR(255)	unique, CPZ ID or isolated circuit segment ID
plan_id	A unique value identifying the plan.	INT	must match Plan submission
portfolio_ids	A list of all Portfolios this project was included in	STRING	Comma-delimited list of strings
cpuc_project_code	A code that identifies a grouping of undergrounding projects associated with a certain activity. Examples include the following: • O8W - System Hardening Wildfire Resiliency Projects • 3UG - Targeted Undergrounding • 95F - Electric Distribution Major Emergency	NVARCHAR(255)	Leave blank if does not apply.

Column Name	Field Description	Data Type	Data Type Requirements
initiative_type_name	A categorical value for the initiative type. Acceptable values are the following: • Undergrounding	NVARCHAR(255)	limited values
project_category	The category of the project. Acceptable values are: • High Risk Project • Ignition Tail Risk Project • High Frequency Outage Program Project	NVARCHAR(255)	limited values
division	Division of the service territory in which the project will take place.	NVARCHAR(255)	
fips_county_codes	A Federal Information Processing Standards code used to uniquely identify U.S. counties and their equivalents.	JSON	Keys: Int, 5-digit code for each county the project resides in Values: String, corresponding county name
hftd	An integer value representing the CPUC High Fire-Threat District (HFTD) area. Below are the integer values with the associated meaning. Acceptable values are the following: • HFTD Tier 2 • HFTD Tier 3 • Non-HFTD	NVARCHAR(32)	limited values

Column Name	Field Description	Data Type	Data Type Requirements
rebuild	A categorical value signifying whether a project is in a Wildfire Rebuild Area or not. Below are the possible values: • Not in Wildfire Rebuild Area • In a Wildfire Rebuild Area	BOOLEAN	
customer_count	Number of customers served by project, as defined by CPUC Data Appendix 1	INT	
feasibility_score	Cost multiplier indicating the difficulty of undergrounding the project based on presence of hard rock, water crossing, and gradient. The scale ranges from 1 to 3, with 3 being most challenging.	INT	limited values
risk_model_version_id	A unique value identifying the risk model version under which this project was selected.	NVARCHAR(255)	must match an entry in the Risk Model Versions Table
risk_model_calibration_id	A unique value identifying the risk model calibration under which this project was selected.	NVARCHAR(255)	must match an entry in the Risk Model Versions Table
selection_justification	For every circuit segment, a justification using the MRLs of why it was selected.	TEXT	
wmp_circuit_overlap_current	Is this circuit included in a current WMP initiative?	BOOLEAN	

Column Name	Field Description	Data Type	Data Type Requirements
utiliy_initiative_tracking_id	Provide any associated utility initiative tracking ID.	NVARCHAR(255)	Could be blank
wmp_circuit_overlap_historical	Is this circuit included in a WMP historical initiative?	BOOLEAN	
risk_tranches	CPUC defined "risk tranches". Tranches include a group of assets, a geographic region, or other grouping that is intended to have a similar risk profile, such as having the same likelihood or consequence of risk events.	TEXT	comma-delimited list

Additional requirements for a Project Table are as follows:

a) PROJECT_IDs are defined by this table and must remain consistent over time and not be altered during updates. A Project must be added to this table when it has passed through Screen 2. A Project is identified with a Circuit Segment, so a single project cannot encompass multiple Circuit Segments, nor can a single Circuit Segment have multiple Projects. However, if a Project is abandoned and a new Project is proposed on that Circuit Segment, the new Project will be considered with a new PROJECT_ID, leaving the abandoned Project in the list. The PROJECT_IDs must map one-to-one to the “ORDER” category as defined in the CPUC guidelines.

b) In each Progress Report, any newly proposed projects (along with new CIRCUIT_SEGMENTS) must be included with new PROJECT_IDs. All previously included Projects must still be included, however the order of rows (append, move defunct projects to end, grouping by prioritization, etc.) will be left up to the large electrical corporation.

c) Each Project’s PORTFOLIO_IDS table will include the PORTFOLIO_ID of all Portfolios whose Project List includes this project. For example, if a project is included in Portfolio 0, then PORTFOLIO_IDS will be “0”. If that same project is included again in Portfolio 1, then PORTFOLIO_IDS will be “0,1”. If a project has passed Screen 2 but has not yet passed Screen 3, then it will not yet be included in any Portfolio. In this case, this field is to be left blank. If, on the other hand a project is removed from the

Portfolio, it will still be submitted in this table with information on the portfolios it was included in.

d) The RISK_MODEL_VERSION_ID and RISK_MODEL_CALIBRATION_ID refer to the version and calibration under current use when this project was originally selected for undergrounding and passed Screen 2. If the version or calibration changes in future Progress Reports, this field is not to be updated for existing projects.

C.1.9 Screen 2 Table

This section establishes the requirements for a Screen 2 Table that the large electrical corporation must submit for each project which has passed Screen 2. The large electrical corporation must submit a Screen 2 table at the initial EUP submission and with each Progress Report. This table must reflect the most current information as of each Progress Report submission.

Table C.9 describes the construction and data requirements for the Screen 2 Table.

Table C.9. Construction for the Screen 2 Table and Data Requirements

Column Name	Field Description	Data Type	Data Type Requirements
project_id	A unique value identifying the project.	INT	must match Project Table
alternative_mitigation_number	A value identifying the alternative mitigation considered	INT	use 0 for underground project, then 1, 2, etc. for each alternative considered.
portfolio_id	A unique value identifying the portfolio.	INT	must match Portfolio Table
circuit_id	A unique value identifying the circuit.	NVARCHAR(255)	must match Project table
circuit_segment_id	A unique value identifying the circuit segment ID.	NVARCHAR(255)	must match Project table
work_type	Must match one of the alternatives	NVARCHAR(255)	limited values

Column Name	Field Description	Data Type	Data Type Requirements
	described in Chapter 7		
work_type_description	Description of the type of mitigation.	Text	
reliability_benefits	Reliability Benefits of the mitigation per D.22-12-027.	REAL	Dollarized Value
financial_benefits	Financial Benefits of the mitigation per D.22-12-027.	REAL	Dollarized Value
safety_benefits	Safety Benefits of the mitigation D.22-12-027.	REAL	Dollarized Value
total_risk_reduction	Risk Reduction of the mitigation per D.22-12-027.	REAL	Dollarized Value
unit_cost_per_ overhead_ mile_deenergized	Project Unit Cost per Mile of Overhead Exposure. Leave blank for non-Undergrounding Projects	REAL	Dollarized Value
unit_cost_per_ circuit_mile_ energized	Project Unit Cost per Mile of Undergrounding for Undergrounding Project **or** Project Unit Cost per Circuit Mile for Alternative Mitigation.	REAL	Dollarized Value
total_costs	Total mitigation cost.	REAL	Dollarized Value
cost_benefit_ratio	Cost-Benefit Ratio of the Undergrounding Project per D.22-12-027. Benefits must relate to the	REAL	

Column Name	Field Description	Data Type	Data Type Requirements
	mitigation of overhead line miles not miles of undergrounding.		

Additional requirements for a Screen 2 Table are as follows:

a) Each row of this table is a considered project, or an alternative mitigation. The large electrical corporation is required to consider at least two alternative mitigation types, as well as undergrounding, for each project. The PROJECT_IDs are to remain the same for all considered mitigations, with different ALTERNATIVE_MITIGATION_IDs. For example, if the first project in this table was named Project 1, the first three rows could be
    - PROJECT_ID 1, ALTERNATIVE_MITIGATION_ID 0, WORK_TYPE "undergrounding"
    - PROJECT_ID 1, ALTERNATIVE_MITIGATION_ID 1, WORK_TYPE "Covered Conductor"
    - PROJECT_ID 1, ALTERNATIVE_MITIGATION_ID 2, WORK_TYPE "Enhanced Vegetation Management"
b) The WORK_TYPE field must match one of the alternatives described in Chapter 7 of the approved EUP.
c) All projects in the Project Table must appear here.
d) The order of rows in this table must keep all alternatives to the same project together, in order of ALTERNATIVE_MITIGATION_ID.
e) This table must be updated and the values recalculated if the CPUC definitions of any of the above terms are changed or updates to the Risk Model Version would change their values.

C.1.10 Screen 3 Table

This section establishes the requirements for a Screen 3 Table that the large electrical corporation must submit for each project which has passed Screen 3. The large electrical corporation must submit a Screen 3 table at the initial submission and with each Progress Report. This table must reflect the most current information as of each Progress Report submission.

Table C.10 describes the construction and data requirements for the Screen 3 Table.

Table C.10. Construction for the Screen 3 Table and Data Requirements

Column Name	Field Description	Data Type	Data Type Requirements
project_id	A unique value identifying the project.	INT	must match Plan submission
alternative_mitigation_number	A value identifying the alternative mitigation	INT	use 0 for underground project
portfolio_id	A unique value identifying the portfolio.	INT	must match current Portfolio Table
circuit_id	A unique value identifying the circuit.	NVARCHAR(255)	must match Project table
circuit_segment_id	A unique value identifying the circuit segment ID.	NVARCHAR(255)	must match Project table
work_type	Must match one of the alternatives described in Chapter 7	NVARCHAR(255)	limited values
work_type_description	Description of the type of mitigation.	Text	
fulfills_project_ level_standard	Does the proposed mitigation fulfill the Project-Level Standard?	Boolean	
cumulative_overall utility_risk_in_year_60	The cumulative Overall Utility Risk experienced at this location, accounting for the proposed construction timeline for undergrounding and a realistic timeline for alternative mitigations.	REAL	

Column Name	Field Description	Data Type	Data Type Requirements
cumulative_wildfire _risk_in_year_60	The cumulative Ignition Risk experienced at this location, accounting for the proposed construction timeline for undergrounding and a realistic timeline for alternative mitigations.	REAL	
cumulative_outage_ program_risk_in_ year_60	The cumulative Outage Program Risk experienced at this location, accounting for the proposed construction timeline for undergrounding and a realistic timeline for alternative mitigations.	REAL	
mean_ignition_ consequence_in_ first_ 10_years_of_ program	The mean Ignition Consequence score at this location, evaluated over the first 10 years of the program, accounting for the proposed construction timeline for undergrounding and a realistic timeline for alternative mitigations.	REAL	
mean_outage_ program_likelihood_ in_ first_10_years_ of_ program	The mean Outage Program Likelihood at this location, evaluated over the first 10 years of the program, accounting for the proposed construction timeline	REAL	

Column Name	Field Description	Data Type	Data Type Requirements
	for undergrounding and a realistic timeline for alternative mitigations.		

Additional requirements for a Screen 3 Table are as follows:

a) Each row of this table is a considered project, or an alternative mitigation. The large electrical corporation is required to consider at least two alternative mitigation types, as well as undergrounding, for each project. The PROJECT_IDs are to remain the same for all considered mitigations, with different ALTERNATIVE_MITIGATION_IDs. For example, if the first project in this table was named Project 1, the first three rows could be:
   - PROJECT_ID 1, ALTERNATIVE_MITIGATION_ID 0, WORK_TYPE "undergrounding"
   - PROJECT_ID 1, ALTERNATIVE_MITIGATION_ID 1, WORK_TYPE "Covered Conductor"
   - PROJECT_ID 1, ALTERNATIVE_MITIGATION_ID 2, WORK_TYPE "Enhanced Vegetation Management"

b) The WORK_TYPE field must match one of the alternatives described in Chapter 7 of the approved EUP. The alternative mitigations considered must match the ones considered in the Screen 2 Table.

c) Projects are considered to have passed Screen 3 when all the information in this table has been calculated. Therefore, there may be Projects which do not appear in this Table but which appeared in the Project Table.

d) This table must be updated and the values recalculated if the CPUC definitions of any of the above terms are changed or updates to the Risk Model Version would change their values.

e) This table must agree with the PROJECT_RISK_LANDSCAPES JSON file submission, which includes this information among other KDMMs. Each row in this table must be accompanied by an entry in the JSON file and vice versa.

C.1.11 Project Status Table

This section establishes the requirements for a Project Status Table. The large electrical corporation must submit a Project Status Table for each Project which has passed Screen 4. This table must reflect the most current information as of each Progress Report submission.

Table C.11 describes the construction and data requirements for the Project Status Table.

Table C.11. Example Construction of the Project Status Table and Data Requirements

Column Name	Field Description	Data Type	Data Type Requirements
project_id	A unique value identifying the project.	INT	must match Project table
circuit_id	A unique value identifying the circuit.	NVARCHAR(255)	must match Project table
circuit_segment_id	A unique value identifying the circuit segment ID.	NVARCHAR(255)	must match Project table
plan_id	A unique value identifying the plan.	INT	must match Plan table
portfolio_id	A unique value identifying the portfolio.	INT	must match current entry in Portfolio table
prioritization_level	The category of prioritization of the project. See SCREEN 4 of these Guidelines for details.	NVARCHAR(255)	must match scheme established in Screen 4
start_date	The start date of the project.	DATE	
est_date_next_status_change	Estimated completion date to reach the next status.	DATE	
est_full_project_completion_date	Estimated date of completion (Overhead De-energization) of this project in the Portfolio.	DATE	

Column Name	Field Description	Data Type	Data Type Requirements
status_current	Current project status. Possible options are given by CPUC defined categories. Acceptable values are the following: • Scoping • Designing • Permitting • Ready for Construction • Construction In Progress • Construction Completed • Overhead De-energization	NVARCHAR(255)	limited values
status_change_date	The date the project was moved to its current status	DATE	

Additional requirements for a Project Status Table are as follows:

a) Each row of this table is a considered project.
b) The projects in this table must all be included in the current Portfolio. If a project is removed from the Portfolio of projects, it is also removed from this table.
c) If a project moves “backwards” in the project status field, e.g., goes from “Permitting” back to “Designing”, the STATUS_CHANGE_DATE still refers to the date it was moved to the current status, e.g., “Designing”.
d) After completion of the Project, EST_FULL_PROJECT_COMPLETION_DATE should show the final completion date of the Project.

C.1.12 Project Construction Table

This section establishes the requirements for a Project Construction Table. The large electrical corporation must submit a Project Construction Table for each project, with each Progress Report, once that project has passed all screens and reached the “Ready For Construction” stage. This table will be updated and resubmitted with each subsequent Progress Report until Plan completion, even if the project finishes construction or

construction is abandoned. This table must reflect the most current information as of each Progress Report submission.

The large electrical corporation must provide a Project Construction Table for every project or subproject with all applied screens. The large electrical corporation must update and submit the Project Construction Table in subsequent progress reports when information therein changes.

Table C.12 describes the construction and data requirements for the Constructed Project Table.

Table C.12. Construction for the Project Construction Table and Data Requirements

Column Name	Field Description	Data Type	Data Type Requirements
project_id	A unique value identifying the project.	INT	must match Project Table
circuit_id	A unique value identifying the circuit.	NVARCHAR(255)	unique, must match circuit_id provided QDR spatial submission files
circuit_segment_id	A unique value identifying the circuit segment ID.	NVARCHAR(255)	unique, CPZ ID or isolated Circuit Segment ID
wmp_plan_circuit	Is there a plan initiative associated with this circuit?	BOOLEAN	
utility_initiative_tracking_ID	Utility initiative tracking ID (if applicable).	NVARCHAR(255)	unique
wmp_plan_info	If the circuit is associated with a past, current, or future WMP submission, please provide the applicable WMP date ranges. Possible values include the following: • 2019 • 2020-2022 • 2023-2025 • 2026-2028	JSON	key: string, one of the possible values given in left column value: Int, first year of the WMP submission (e.g., “2020-2022” would map to 2020. Leave blank if wmp_plan_circuit is False.

Column Name	Field Description	Data Type	Data Type Requirements
	• 2029-2031 • 2031-2033		
is_active	Is the project active?	BOOLEAN	
is_abandoned	Is the project abandoned?	BOOLEAN	
historical_line_id	Map to geo-spatial submission.	NVARCHAR(255)	
new_alignment_id	Map to geo-spatial submission.	NVARCHAR(255)	
length_of_constructed_project	Length of undergrounded line in feet.	REAL	
est_full_project_completion_date	Estimated date of completion (Overhead De-energization) of this project in the Portfolio.	DATE	

Additional requirements for a Project Construction Table are as follows:

a) Within this table, a large electrical corporation must provide WMP details pertaining to the Circuit Segment incorporated within the project.
b) With this data submission, there is an associated spatial data submission. The IDs for the NEW_ALIGNMENT and HISTORICAL_LINE_ID must match all spatial data submissions.
c) The large electrical corporation must give the constructed project a unique integer ID under the CONSTRUCTED_PROJECT_ID field. This ID must remain consistent with all future submissions.

C.1.13 Project Index

This section establishes the requirements for a Project Index that the large electrical corporation must submit for each project which has passed Screen 2. This table includes information found in the Screen 2 table and other tables and reported data must be

compatible with the information submitted elsewhere in the data submission. This table must reflect the most current information as of each Progress Report submission.

Table C.13 describes the construction and data requirements for the Project Index.

Table C.13. Construction for the Project Index and Data Requirements

Column Name	Field Description	Data Type	Data Type Requirements
project_id	A unique value identifying the project.	INT	must match Project Table
portfolio_id	A unique value identifying the portfolio.	INT	must match current Portfolio Table
circuit_id	A unique value identifying the circuit.	NVARCHAR(255)	must match Project table
circuit_segment_id	A unique value identifying the circuit segment ID.	NVARCHAR(255)	must match Project table
fips_county_codes	A Federal Information Processing Standards code used to uniquely identify U.S. counties and their equivalents.	JSON	Keys: Int, 5-digit code for each county the project resides in Values: String, corresponding county name
project_category	The category of the project. Acceptable values are: • High Risk Project • Ignition Tail Risk Project • High Frequency Outage Program Project • None	NVARCHAR(255)	limited values

Column Name	Field Description	Data Type	Data Type Requirements
hftd	An integer value representing the CPUC High Fire-Threat District (HFTD) area. Below are the integer values with the associated meaning. Acceptable values are the following: • HFTD Tier 2 • HFTD Tier 3 • Non-HFTD	NVARCHAR(32)	limited values
project_risk_reduction	Risk Reduction of the Undergrounding Project per D.22-12-027.	REAL	Dollarized Value
project_unit_cost_per_ overhead_mile_deenergized	Project Unit Cost per Mile of Overhead Exposure.	REAL	Dollarized Value
project_unit_cost_per_ underground_mile_energized	Project Unit Cost per Mile of Undergrounding.	REAL	Dollarized Value
project_total_costs	Total Undergrounding Project Cost.	REAL	Dollarized Value
project_cost_benefit_ratio	Cost-Benefit Ratio of the Undergrounding Project per D.22-12-027. Benefits must relate to the mitigation of overhead line miles not miles of undergrounding.	REAL	
Then, for each of the alternative mitigations considered, the following columns.			
alt_#_work_type	Description of the type of mitigation.	NVARCHAR(255)	limited values

Column Name	Field Description	Data Type	Data Type Requirements
alt_#_risk_reduction	Risk Reduction of the Undergrounding Project per D.22-12-027.	REAL	Dollarized Value
alt_#_project_unit_cost_per_overhead_mile_deenergized	Project Unit Cost per Mile of Overhead Exposure.	REAL	Dollarized Value
alt_#_project_unit_cost_per_underground_mile_energized	Project Unit Cost per Mile of Undergrounding.	REAL	Dollarized Value
alt_#_project_total_costs	Total Undergrounding Project Cost.	REAL	Dollarized Value
alt_#_project_cost_benefit_ratio	Cost-Benefit Ratio of the Undergrounding Project per D.22-12-027. Benefits must relate to the mitigation of overhead line miles not miles of undergrounding.	REAL	

Additional requirements for the Project Index are as follows:

a) The rows of this table are every project which has passed Screen 2.
b) For each alternative mitigation considered for this project, six additional columns are added, describing what alternative is being considered, and repeating the analysis for costs and benefits. The "#" character in the column names is to be replaced by an integer, e.g. ("alt_1_project_unit_cost_per_overhead_ mile_deenergized).
c) This table must be updated and the values recalculated if the CPUC definitions of any of the above terms are changed or updates to the Risk Model Version would change their values.

C.2 Description of JSON Data Submissions

This section establishes the requirements for JSON Data Submissions. As part of Progress Report 0 and with each Progress Report, the large electrical corporation must submit two required JSON files. The required format is set forth in Energy Safety's template files, which are available on Energy Safety's website.

C.2.1 Project Variable Modifiers JSON

The first JSON file is for the Portfolio Table and must include all estimates pertaining to undergrounding and other mitigation efforts. The required format for this JSON file is as follows:

At the top level, the JSON structure comprises the RISK_MODEL_VERSION_ID, RISK_MODEL_CALIBRATION_ID, and the creation date, alongside each type of mitigation considered, including undergrounding and all alternatives outlined in Section 2.8.5.2

- For each type:

  At the second level, the large electrical corporation must separate the two variable classifications: "Model Input Variables" and "Model Output Variables."

- For each classification:

  At the third level, the large electrical corporation must incorporate the sub-models earmarked for modification, such as the Ignition Likelihood Model or equipment model, as specified by the large electrical corporation. Regarding outputs, the large electrical corporation must simplify the structure by using the single key "Model Output."

- For each sub-model:

  The fourth level consists of the unique SUBMODEL_ID of the model, and the key "Variables." For "Model Output," the SUBMODEL_ID remains "null." The value for the key "Variables" must be each variable affected by the mitigation procedure. On the input side, the large electrical corporation must provide only the inputs influenced by this mitigation, not the entire list. On the output side, the variables must mirror the list of KDMMs provided in the body of the Plan.

- For each variable:

  The fifth level must include the keys "Type of Change" and "Explanation," containing strings representing a quantitative change and a qualitative explanation, respectively. These explanations must be detailed enough for reviewers without access to the full modeling procedure to understand. For output variables, if no change occurs, these values must be "null." Additionally, output variables may include uncertainties indicated by a "+/-" character or another measurement of uncertainty.

Figure C.1 shows an example JSON file for Project Variable Modifiers and includes comments on the individual elements to be submitted for illustrative purposes. The large electrical corporation must omit the comments in its submission.

Figure C.1. Commented Example JSON file for Project Variable Modifiers

```
{
    //For each update to the risk model, new risk_model tracking IDs will be given for use in backtesting etc.
    "risk_model_version_id": "1.2",
    "risk_model_calibration_id": 1,
    //This shows the date this risk model was finalized.
    "Last Update Date": "1/1/2025",
        //KDMMs: This is the set of KDMMs used by the utility in evaluating this project.
        //There are at least 7 KDMMs, and must include Wildfire Risk, Wildfire Consequence,
        //Wildfire Likelihood, Outage Program Risk, Outage Program Consequence,
        //Outage Program Likelihood, and Overall Risk
        //These must match the KDMMs proposed in the Plan submission
        //In this example, only three are given for brevity.
    "KDMMs": "Risk Score,Wildfire Consequence,Outage Program Likelihood",
    //For all mitigation types, e.g. undergrounding, covered conductor, etc. Add more to this as needed
    "Undergrounding": {
        //For each of two classifications of variables, model inputs and model outputs:
        "Model Input Variables": {
            //For each submodel that has an input affected by this mitigation (may be one or more):
            //Example with two models effected, 'Equipment Model' and 'Ignition Likelihood Model'
            "Equipment Model": {
                //Give the submodel id, which must match a submodel used in the Plan submission
                "Submodel_id": 29303952,
                //Give the key 'Variables'
                "Variables": {
                    //For all input variables affected by this mitigation (may be one or more)
                    "Self-Combustion Likelihood": {
                        //Give quantitative effect on this variable, including confidence interval if known
                        "Type of Change": "-94% +/- 3%",
                        //Give text explanation of the quantitative effect above.
                        "Explanation": "It affects the model at a hyperparameter level."
                    }
                }
            },
            "Ignition Likelihood Model": {
                "Submodel_id": 29939992,
                "Variables": {
                    //Example with two affected input variables in a single model
                    "Contact From Vegetation": {
                        "Type of Change": "-96%",
                        "Explanation": "It affects the model at a hyperparameter level."
                    },
                    "Contact From Object": {
                        "Type of Change": "-94%",
                        "Explanation": "It affects the model at a hyperparameter level."
                    }
                }
            }
        },
        "Model Output Variables": {
            //There is only one 'submodel' here, it is called 'Model Output' and is fixed.
            "Model Output": {
                //This does not have a submodel id.
                "Submodel_id": null,
                //Give the key 'Variables'
                "Variables": {
                    //In this case, the effected variables are the KDMMs. All KDMMs listed at
                    //the top level must be included here. If one is not effected by this change,
                    //list it as 'null'.
                    "Risk Score": {
                        "Type of Change": "-90% +/- 5%",
                        "Explanation": "Project-level percentage change in risk-score"
                    },
                    //Example where the KDMM is not affected by this mitigation strategy.
                    "Wildfire Consequence": {
```

```
                        "Type of Change": null,
                        "Explanation": null
                    },
                    "Outage Program Likelihood": {
                        "Type of Change": "-40% +/- 5%",
                        "Explanation": "Project-level percentage multiplier for risk-score"
                    }
                }
            }
        }
    },
    "Covered Conductor": {
        "Model Input Variables": {
            "Ignition Likelihood Model": {
                "Submodel_id": 19329332,
                "Variables": {
                    "Contact From Vegetation": {
                        "Type of Change": "-70%",
                        "Explanation": "It affects the model at a hyperparameter level."
                    }
                }
            }
        },
        "Model Output Variables": {
            "Model Output": {
                "Submodel_id": null,
                "Variables": {
                    "Risk Score": {
                        "Type of Change": "-90% +/- 5%",
                        "Explanation": "Project-level percentage change in risk-score"
                    },
                    "Wildfire Consequence": {
                        "Type of Change": null,
                        "Explanation": null
                    },
                    "Outage Program Likelihood": {
                        "Type of Change": "-40% +/- 5%",
                        "Explanation": "Project-level percentage multiplier for risk-score"
                    }
                }
            }
        }
    },
    "Enhanced Vegetation Management": {
        "Model Input Variables": {
            "Vegetation Growth Model": {
                "Submodel_id": 19329335,
                "Variables": {
                    "Vegetation Zone": {
                        "Type of Change": "-1",
                        "Explanation": "This PVM changes the classification of the growth zone. It affects the model at a hyperparameter level."
                    }
                }
            }
        },
        "Model Output Variables": {
            "Model Output": {
                "Submodel_id": null,
                "Variables": {
                    "Risk Score": {
                        "Type of Change": "-50% +/- 5%",
                        "Explanation": "Project-level percentage change in risk-score"
                    },
                    "Wildfire Consequence": {
```

```
                    "Type of Change": "-30% +/- 5%",
                    "Explanation": "Percent decrease in expected average monetary consequence of wildfire ignitions"
                },
                "Outage Program Likelihood": {
                    "Type of Change": "-10% +/- 1%",
                    "Explanation": "Project-level percentage multiplier for risk-score"
                }
            }
        }
    }
}
```

C.2.2 Risk Landscape JSON

The Risk Landscape JSON contains the array of Key Decision-Making Metrics (KDMMs) utilized by the large electrical corporation to assess the impact of the Undergrounding Project. It must include the seven required KDMMs: Ignition Risk, Ignition Consequence, Ignition Likelihood, Outage Program Risk, Outage Program Consequence, Outage Program Likelihood, and Overall Risk.

The Risk Landscape JSON file is for modeling all KDMMs affected by individual projects, projected over the years specified in Section 2.4 of these Guidelines. The required format for this JSON file is as follows:

At the top level, the JSON file must be an array of JSON objects, one for each proposed project. The objects must encompass all essential details: PROJECT_ID, reporting years (these must be the same as those required by Section 2.4), utilized KDMMs (both cumulative and non-cumulative), and the RISK_MODEL_VERSION_ID and RISK_MODEL_CALIBRATION_ID. The JSON file must also include various project types tracked: "Baseline" (no project), "Undergrounding" (the proposed project), "Alternative_1," and "Alternative_2" (two comparable undergrounding alternatives), and additional alternatives as used in the Screen 2 Table. The alternatives must match those considered in the Screen 2 Table. The main body of each JSON object in this file must be nested as follows.

- For each project type:

  At the second level, there must be a description of the type, which is vital if Alternatives 1 and Alternative 2 differ in mitigation strategies. It also must include two analysis scopes: "Project-level" and "Portfolio-level."

- For each scope:

  The third level must incorporate three studies: "Separate" (impact of the project alone), "Collective" (impact of the full proposed portfolio), and "Ablation" (impact without this project).

- For each study:

The fourth level must contain the tracked KDMMs, matching those presented at the top level.

- For each KDMM:

  The fifth and final level must be comprised of the modeled data. If the KDMM is cumulative, two entries must exist: "Instantaneous" and "Cumulative" with comma-separated floating-point numbers for each. If non-cumulative, there is a single entry: "Value" with the same comma-separated string of data values.

The large electrical corporation must submit a single JSON file for the full suite of projects in its portfolio. Figure C.2 shows an example JSON file and includes comments on the individual elements to be submitted for illustrative purposes. The large electrical corporation must omit the comments in its submission.

Figure C.2. Example JSON File with Commented Explanation

```
[
  {
    /*
      note: this is being submitted as a JSON with comments for clarity.
      In the actual submission, refrain from using comments.
    */
    //project_id is the individual unique name for the project
    "project_id": 123456,
    //Years: This is the set of years given for the projection.
    //These years must be equal to the set of years given in the Guidelines.
    "Years": "0,5,10,20,30,40,50,60",
    //KDMMs: This is the set of KDMMs used by the utility in evaluating this project.
    /*
      There are at least 7 KDMMs, and must include Wildfire Risk, Wildfire Consequence,
      Wildfire Likelihood, Outage Program Risk, Outage Program Consequence,
      Outage Program Likelihood, and Overall Risk.
      If you add additional KDMM past the intial 7, please use consistent naming and
      numbering with the KDMM tabular submission and this JSON file
      These must match the KDMMs proposed in the Plan submission
      In this example, only two are given for brevity and to show the difference between
      'Cumulative' and 'Non-cumulative' KDMMs.
    */
    "KDMMs": "KDMM1,KDMM2",
    //Include KDMM names that match the KDMM tabular submission. This must have the
    //same number of entries as 'KDMMs' above.
    "KDMM_names":  "Wildfire Risk,Wildfire Consequence"
    //Risk_model_id: This is the id of the risk model used in calculating these KDMMs.
    //It must match an existing risk_model_id entry in the project_variable_multipliers JSON
    "risk_model_id": 1,
    //KDMM_is_cumulative: This is a JSON of each KDMM and whether it is considered cumulative.
    /*
      Cumulative variables include likelihoods and products of likelihoods, non-cumulative
      variables include consequence scores and other quantities where the product of the value
      by time is not meaningful. All KDMMs need to be represented here.
    */
    "KDMM_is_cumulative": {
      "KDMM1": true,
      "KDMM2": false
    },
    "risk_model_version_id":"1.1",
    "risk_model_calibration_id":1
    //For each project, four scenarios are presented: 'Baseline',
    //'Undergrounding', 'Alternative_A' and 'Alternative_B.'
    //The names of these are fixed.
    "Baseline": {
      //The baseline values will be the values of the existing infrastructure.
      //At the portfolio level, this means the baseline will be the same for all
      //projects. At the project level, this is for the individual project.
      //This description is fixed for the baseline.
      "Description": "No project done",
      //For each scenario, two scopees are considered, project-level and portfolio-level
      //At the project-level, only report KDMM values on this circuit segment. At the
      //portfolio-level, report KDMM values for the entire portfolio.
      "Project-level": {
        //For each scope, three studies are considered: separate (no other projects done),
        //collective (all projects done), and ablation (all projects done except this one)
        "Separate": {
          //For each study, all KDMMs are reported.
          "KDMM1": {
            /*
              If the KDMM is cumulative, two rows are included in the data, one for
              instantaneous values and one for cumulative values. The final output
              is a comma-delineated string of the value at each year in the 'years'
              variable above. Must have same number of values as the years variable.
```

```
            */
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
        },
        "KDMM2": {
            //If the KDMM is non-cumulative, one row is included in the data.
            //The final output is a comma-delineated string of the value at each
            //year in the 'years' variable above. Must have same number of values
            //as the years variable.
            "Value": "0,5,10,20,30,40,50,60"
        }
    },
    "Collective": {
        "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
        },
        "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
        }
    },
    //In the Baseline scenario, 'ablation' values should be equal to 'separate'.
    //Still, both should be included.
    "Ablation": {
        "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
        },
        "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
        }
    }
},
"Portfolio-level": {
    "Separate": {
        "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
        },
        "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
        }
    },
    "Collective": {
        "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
        },
        "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
        }
    },
    "Ablation": {
        "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
        },
        "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
        }
    }
}
},
"Undergrounding": {
```

```
      //This description is fixed for the undergrounding project
      "Description": "Proposed Undergrounding",
      "Project-level": {
        "Separate": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        },
        "Collective": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        },
        "Ablation": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        }
      },
      "Portfolio-level": {
        "Separate": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        },
        "Collective": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        },
        "Ablation": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        }
      }
    },
    "Alternative_A": {
      "Description": "Covered conductor",
      "Project-level": {
```

```
        "Separate": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        },
        "Collective": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        },
        "Ablation": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        }
      },
      "Portfolio-level": {
        "Separate": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        },
        "Collective": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        },
        "Ablation": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        }
      }
    },
    "Alternative_B": {
      "Description": "Covered conductor + fast-trip",
      "Project-level": {
        "Separate": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        },
        "Collective": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        },
        "Ablation": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        }
      },
      "Portfolio-level": {
        "Separate": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        },
        "Collective": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        },
        "Ablation": {
          "KDMM1": {
            "Instantaneous": "0,5,10,20,30,40,50,60",
            "Cumulative": "0,5,10,20,30,40,50,60"
          },
          "KDMM2": {
            "Value": "0,5,10,20,30,40,50,60"
          }
        }
      }
    }
  },
  {
    "Project_ID": "proj456",
    "etc.": "same rows as other proj"
  }
]
```

C.3 Spatial Data Submissions

The large electrical corporation must include spatial data for their projects with every Progress Report as described below. The large electrical corporation must use the template files provided by Energy Safety for data submission. Template files are available on Energy Safety's website.

Technical requirements for spatial data submissions are as follows:

a. Submit data in a single geodatabase (GDB).
b. Submit GDB files that are interoperable and compatible with standard industry practices.
c. Ensure all data attributes follow the schema required in Section 2.8.3.
d. Customize metadata as needed to follow the requirements in this document.
e. Use the WGS 1984 California (Teale) Albers (US Feet) projected coordinate system (WKID Esri 102599) for all data submitted.
f. Delete any feature classes and/or tables not used (do not submit empty feature classes or tables), unless the field is specified as required in the schema.
g. Compress the GDB into a zipped folder and submit that folder to Energy Safety's SharePoint file transfer portal. Each large electrical corporation will have a designated folder on Energy Safety's SharePoint site for this purpose.
h. Name the GDB according to the following convention:
    i. "[Electrical Corporation Abbreviation]PR#_Date_R#",
        1. *for example:* "PGE_PR1_2025-01-01_R0.gdb.zip"

The large electrical corporation must ensure location accuracy in its GIS data submissions, including, but not limited to:

a. All records in feature classes must include geometry.
b. Horizontal locations reported in feature classes must be within 20 meters of actual locations as established using a commercially available GNSS receiver in the current epoch of the WGS84 datum under conditions where the receiver's estimated horizontal positional error is 5 meters or less.
c. All records must be for assets located at least partially within California state boundaries, except where assets outside California boundaries are being relied upon by the large electrical corporation for operations within California. For example, electrical corporation cameras or weather stations installed on mountain tops in another state that are observing conditions within California would be included in the data submission.

C.4 GIS Data Schema

The large electrical corporation must report its geospatial data in accordance with the data schema provided herein.

C.4.1 Overhead Conductor (Line Feature Class)

A large electrical corporation must report overhead project circuit segments identified for removal/undergrounding.

Table C.14. Overhead Conductor GIS Data

Field Name	Field Description
utility_name	Large electrical corporation abbreviation. Acceptable values are the following: • PG&E • SDG&E • SCE This field is required.
plan_id	Unique value identifying the plan. Must match ID in plan. This field is required.
project_id	A unique value identifying the project. Must match ID used in Project Table. This field is required.
portfolio_id	Unique value identifying the portfolio. Must match Portfolio Table. This field is required.
line_class	Classification of line asset. Possible values: • Transmission • Primary Distribution • Secondary Distribution This field is required.
segment_id	Unique ID of circuit segment. Must be a unique value that identifies this portion of the circuit and a traceable stable ID within the electrical corporation's operations/processes. This field is required. A segment may be anything more granular than a circuit, including a single span.
circuit_id	Unique ID for a specific circuit. Must be a traceable stable ID within the electrical corporation's operations/processes. Primary Key for the feature class if the electrical

Field Name	Field Description
	corporation does not uniquely identify segments with persistent IDs. This field is required.
status_current	CPUC defined categories. Acceptable values are the following: • Scoping • Designing • Permitting • Ready for Construction • Construction • Completed This field is required.
status_change_date	The last date the record's status was changed. This field is required.
active	Is the portion of a project represented by the line planned for undergrounding? Acceptable values: • Yes • No This field is required.
abandoned_date	Date the portion of a project represented by the line was abandoned. This field is required if the line segment is no longer planned for undergrounding.

C.4.2 Overhead Assets (Point Feature Class)

The large electrical corporation must report some overhead assets other than conductor identified for removal/undergrounding: capacitor banks, fuses, switches/reclosers, and transformers.

Table C.15. Overhead Assets GIS Data

Field Name	Field Description
plan_id	Unique value identifying the plan. Must match ID in plan. This field is required.
project_id	A unique value identifying the project. Must match ID used in Project Table. This field is required.
portfolio_id	Unique value identifying the portfolio. Must match Portfolio Table. This field is required.

Field Name	Field Description
segment_id	Unique ID of circuit segment. Must be a unique value that identifies this portion of the circuit and a traceable stable ID within the electrical corporation's operations/processes. This field is required IF the electrical corporation has persistent stable IDs for circuit segments. A segment may be anything more granular than a circuit, including a single span.
circuit_id	Unique ID for a specific circuit. Must be a traceable stable ID within the electrical corporation's operations/processes. Primary Key for the feature class if the electrical corporation does not uniquely identify segments with persistent IDs. This field is required.
asset_type	Type of asset represented. Acceptable values: • Capacitor bank • Fuse • Switchgear • Transformer This field is required.
status_current	CPUC defined categories. Acceptable values are the following: • Scoping • Designing • Permitting • Ready for Construction • Construction • Completed This field is required.
status_change_date	The last date the record's status was changed. This field is required.
active	Is the asset represented by the point planned for undergrounding? Acceptable values: • Yes • No This field is required.
abandoned_date	Date the portion of a project represented by the line was abandoned. This field is required if the line segment is no longer planned for undergrounding.

C.4.3 Underground Alignment (Line Feature Class)

The large electrical corporation must identify the alignment of new underground conductor.

Table C.16. Underground Alignment GIS Data

Field Name	Field Description
PlanID	Unique value identifying the plan. Must match ID in plan. This field is required.
project_id	A unique value identifying the project. Must match ID used in Project Table. This field is required.
portfolio_id	Unique value identifying the portfolio. Must match Portfolio Table. This field is required.
segment_id	Unique ID of circuit segment. Must be a unique value that identifies this portion of the circuit and a traceable stable ID within the electrical corporation's operations/processes. Primary Key for the feature class unless the electrical corporation does not uniquely identify segments with persistent IDs. This field is required if the electrical corporation has persistent stable IDs for circuit segments. A segment may be anything more granular than a circuit, including a single span.
circuit_id	Unique ID for a specific circuit. Must be a traceable stable ID within the electrical corporation's operations/processes. Primary Key for the feature class if the electrical corporation does not uniquely identify segments with persistent IDs. This field is required.
line_class	Classification of line asset. Possible values: • Transmission • Primary Distribution • Secondary Distribution This field is required.
status_current	CPUC defined categories. Acceptable values are the following: • Scoping • Designing • Permitting • Ready for Construction • Construction • Completed This field is required.

Field Name	Field Description
status_change_date	The last date the record's status was changed. This field is required.
active	Is the portion of a project represented by the line planned for undergrounding? Acceptable values: • Yes • No This field is required.
abandoned_date	Date the portion of a project represented by the line was abandoned. This field is required if the line segment is no longer planned for undergrounding.

C.4.4 Underground Asset Points (Point Feature Class)

The large electrical corporation must identify new underground installations of the following assets: capacitor banks, fuses, switches/reclosers, and transformers.

Table C.17. Underground Asset Points GIS Data

Field Name	Field Description
plan_id	Unique value identifying the plan. Must match ID in plan. This field is required.
project_id	A unique value identifying the project. Must match ID used in Project Table. This field is required.
portfolio_id	Unique value identifying the portfolio. Must match Portfolio Table. This field is required.
asset_type	Type of asset represented. Acceptable values: • Capacitor bank • Fuse • Switchgear • Transformer This field is required.
segment_id	Unique ID of circuit segment. Must be a unique value that identifies this portion of the circuit and a traceable stable ID within the electrical corporation's operations/processes. Primary Key for the feature class unless the electrical corporation does not uniquely identify segments with persistent IDs. This field is required IF the electrical

Field Name	Field Description
	corporation has persistent stable IDs for circuit segments. A segment may be anything more granular than a circuit, including a single span.
circuit_id	Unique ID for a specific circuit. Must be a traceable stable ID within the electrical corporation's operations/processes. Primary Key for the feature class if the electrical corporation does not uniquely identify segments with persistent IDs. This field is required.
line_class	Classification of line asset. Possible values: • Transmission • Primary Distribution • Secondary Distribution This field is required.
status_current	CPUC defined categories. Acceptable values are the following: • Scoping • Designing • Permitting • Ready for Construction • Construction • Completed This field is required.
status_change_date	The last date the record's status was changed. This field is required.
active	Is the asset represented by the point planned for undergrounding? Acceptable values: • Yes • No This field is required.
abandoned_date	Date the portion of a project represented by the line was abandoned. This field is required if the line segment is no longer planned for undergrounding

Appendix D. Portfolio Coversheet

Narrative Justification

The large electrical corporation must provide a narrative explanation here pursuant to the requirement in Section 2.8.6.1 of the EUP Guidelines

Key Decision-Making Metrics

The large electrical corporation must provide visualizations and tables here pursuant to the requirement in Sections 2.7.3 and 2.8.6.2 of the EUP Guidelines.

Project Variable Modifiers

The large electrical corporation must provide tables here pursuant to the requirement in Section 2.7.6 and 2.8.5.2 of the EUP Guidelines.

Portfolio Development

The large electrical corporation must provide visualizations and tables here pursuant to the requirement in Section 2.8.6.3 of the EUP Guidelines.

Appendix E. Project Reference Sheet

The large electrical corporation must complete Parts 1 - 3 of this Project Reference Sheet when Screen 3 is applied.

Part 1:

Identification and Context

The large electrical corporation must provide a narrative here pursuant to the requirement in Section 2.8.7.3 of the EUP Guidelines.

Table E.1. Example Project Identification Table

Circuit Segment ID	Project ID	Project Category	CPUC Risk Tranche	County
Feasibility Score by Project[1]	**CPUC Risk Rank[2]**	**Overall Risk Score Rank**	**Ignition Consequence Rank**	**Outage Program Likelihood Rank**
Customers Served	**HFTD Tier**	**Wildfire Rebuild Area**	**Work Category Type**	
			Targeted UG	

Narrative Explanation

The large electrical corporation must provide a narrative here pursuant to the requirement in Section 2.8.7.2 of the EUP Guidelines.

Other Utilities

The large electrical corporation must identify any third-parties pursuant to Section 2.8.7.2 of the EUP Guidelines.

Project Timeline

[1] Optional: See CPUC 884 Guidelines

[2] Optional: See CPUC 884 Guidelines

In this section the large electrical corporation must include current information on the timeline for the project using a table. An example table is below.

Table E.2. Example Project Timeline

Phase	Scoping	Designing	Permitting	Ready for Construction	Construction	Completed	Overhead Line Deenergized
Estimated Date							
Completed Date							

Part 2: Screen 2 (Project Information and Alternative Mitigation Comparison) Requirements

Screen 2 (Project information and Alternative Mitigation Comparison) requires a project comparison be completed for all projects pursuant to the requirement in Section 2.8.7.4 of the EUP Guidelines.

Below is an example Screen 2 Project Information Table.

Table E.3. Example Screen 2 Project Information Table

Basic Info	Project	Alternative 1	Alternative 2
Work Type	Undergrounding	Covered Conductor	Covered Conductor + Fast Trip
Safety Benefits			
Reliability Benefits			
Financial Benefits			
Risk Reduction			
Unit Cost Per Overhead Mile Deenergized			
Unit Cost Per Underground Mile Energized			

Basic Info	Project	Alternative 1	Alternative 2
Total Costs			
Cost-Benefit Ratio			

Part 3: Screen 3 (Project Risk Analysis) Requirements

Screen 3 (Project Risk Analysis) requires that if a project has completed Screen 2 (Project Information and Alternative Mitigation Comparison), and there is sufficient information to complete Screen 3 (Project Risk Analysis), the following information must be provided in a table format. Below is an example Screen 3 Comparative Risk Metrics Table.

Table E.4. Example Screen 3 Comparative Risk Metrics Table

Basic Info	Baseline	Project	Alternative 1	Alternative 2
Work Type	Baseline 1	Undergrounding	Covered Conductor + Fast Trip	Line Removal/Remote Grid
Fulfills Project- Level Standard?	**N/A**			
Cumulative Overall Utility Risk in year 60				
Cumulative Wildfire Risk in Year 60				
Cumulative Outage Program Risk in Year 60				
Mean Ignition Consequence in first 10 Years of Program				
Mean Outage Program Likelihood in first 10 years of Program				

Part 4: Additional Metrics

The large electrical corporation can complete Part 4 of the Project Reference Sheet at any time. In this section the large electrical corporation may include any other numerical evidence important to the understanding of the modeling of this project.