PACIFIC GAS AND ELECTRIC COMPANY
10 Year Electrical Undergrounding Plan (EUP)
Data Response

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Requester DR No.:	Energy Safety-DR-EUP-26-06
Requesting Party:	Office of Energy Infrastructure Safety
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QUESTION 001

KDMM Calculations

a. Climate Escalation
   a. Provide Baseline Wildfire Risk, Baseline EPSS Risk, and Baseline PSPS Risk without climate factors for each Circuit Segment from 2025 to 2092.
   b. Provide the Wildfire Risk, PSPS Risk and EPSS Risk climate factors for each Circuit Segment from 2025 to 2092.
   c. Provide the baseline KDMMs with climate factors applied for each Circuit Segment from 2025 to 2092.
   d. Are there different values for each HFTD tier/county/Circuit Segment?
   e. Does climate impact to Fire Weather Index (FWI) affect both EPSS and PSPS or just PSPS? Core Capability 4 states just PSPS, however WP006 states PSPS and EPSS.
   f. Provide a sample calculation to demonstrate how Climate Factors are calculated with Fire Weather Index (FWI) and Heat Day multipliers.
   g. Which KDMMs is climate escalation applied to (Likelihood/Consequence/Risk)?
b. Inflation Escalation
   a. Which KDMMs is inflation escalation applied to (Likelihood/Consequence/Risk)?
c. Plan Tracking Objectives
   a. Do the risk reduction targets represent instantaneous risk reduction for all projects completed in the given year including inflation and climate escalation up to that year? If not, what do they represent?
   b. Are values in the Plan Tracking Objectives presented in nominal values for the given year or in year 2028 present value?

d. Target/Timeline Table

   a. Footnote (d) indicates that risk values represent unmitigated and residual risk for all projects completed in a given year, however the risk columns are labeled as Change In Instant/Cumulative Risk. Are the Change in Risk columns reporting pre/post mitigation risk or risk reduction for all projects in a given year?

   b. Do the change in Instantaneous Wildfire and Outage Program Risk columns represent risk reduction for all projects completed in a given year, including climate and inflation escalation up to year 10? If not, what do they represent?

   c. Are the change in Wildfire and Outage Program Risk columns presented in nominal values or in year 2028 present value?

e. Risk Model Impact Factor

   a. Do KDMM calculations in Tables 5, 8, 11, 12, 13 or 15 and the Model Risk Landscape JSON incorporate the Risk Model Impact Factor?

   b. How is the Risk Model Impact Factor applied?

      i. Is it applied to baseline KDMMs prior to calculations or to final values?

      ii. Provide an explanation and examples to demonstrate at what stage the Risk Model Impact Factor adjustment is applied to the following calculations if applicable: PMO, Plan Tracking Objectives, Target Timeline Table, etc.

ANSWER 001

a. Climate Escalation

   a. Please see the "Baseline Risks – Q001a.a" tab in the provided attachment "*EUP-PhI_DR_OEIS_Q001Atch01.xlsx*".

   b. Please see the "Climate Escalations - Q001.a.b" tab in the provided attachment "*EUP-PhI_DR_OEIS_Q001Atch01.xlsx*" for the Wildfire Risk, PSPS Risk and EPSS Risk climate factors from 2025 through 2092.

   c. Please see the "KDMMs – Q001.a.c" tab in the provided attachment "*EUP-PhI_DR_OEIS_Q001Atch01.xlsx"* for the Overall Utility Risk, Ignition Risk, Ignition Consequence, Ignition Likelihood, Outage Program Risk, Outage Program Consequence, and Outage Program Likelihood values from 2025 through 2092.

   d. Yes. Climate escalation factors are circuit-segment specific and are not assigned uniformly by HFTD tier or county. Consequently, different circuit segments may have different climate escalation factors.

   e. Climate impact to Fire Weather Index (FWI) affects Wildfire, and both EPSS and PSPS as stated in WP006. The text regarding Core Capability 4 at Chapter 7, Section G.4.c, will be updated as part of errata to indicate that FWI affects Wildfire, PSPS, and EPSS.

   f. As discussed via email with Energy Safety, PG&E will submit the response to Question 1af on October 23, 2026.

g. Climate escalation is applied to Wildfire Risk, Wildfire Consequence, Outage Program Risk, and Outage Program Likelihood. Inflation escalation is applied to Wildfire Risk, Wildfire Consequence, Outage Program Risk and Outage Program Consequence. Please see a detailed breakdown below of how climate escalation and inflation escalation is applied to each Key Decision-Making Metric (KDMM).

Wildfire Risk: Wildfire Risk is adjusted for both climate escalation and inflation escalation. Climate escalation is applied to account for the increased severity of wildfire impacts over time due to changing climate conditions. Inflation escalation is applied to account for the increasing monetary value of wildfire impacts over time.

Wildfire Likelihood: Wildfire Likelihood is not adjusted for climate escalation or inflation. PG&E does not assume climate change increases the frequency of ignitions. Instead, climate change is reflected through the severity of wildfire outcomes if an ignition occurs (i.e., consequence). Inflation escalation is not applied because Wildfire Likelihood is not a monetized metric.

Wildfire Consequence: Wildfire Consequence is impacted by both climate escalation and inflation. Climate increases the potential severity of wildfire impacts, while inflation increases the dollar value of those impacts over time. Wildfire Consequence is calculated as Wildfire Risk divided by Wildfire Likelihood. Because Wildfire Risk is adjusted for both climate escalation and inflation, while Wildfire Likelihood remains unchanged, the resulting Wildfire Consequence values inherently reflect both climate and inflation adjustments as a derived metric.

Outage Program Risk: Outage Program Risk is adjusted for both climate escalation and inflation. Climate escalation is applied to account for the expected impact of changing climate conditions on outage occurrence over time, while inflation is applied to account for increases in the monetary value of outage impacts over time

Outage Program Likelihood: Outage Program Likelihood is adjusted for climate escalation but is not adjusted for inflation escalation. Climate escalation is applied to reflect the expected impact of changing climate conditions on the frequency of outage events over time. Inflation escalation is not applied because Outage Program Likelihood is not a monetized metric.

Outage Program Consequence: Outage Program Consequence is adjusted for inflation but is not adjusted for climate escalation. Outage Program Consequence is calculated as Outage Program Risk divided by Outage Program Likelihood. Because both Outage Program Risk and Outage Program Likelihood are adjusted for climate escalation, the climate adjustment is captured in both the numerator and denominator and therefore does not adjust the resulting consequence value. However, inflation is applied to Outage Program Risk but not to Outage Program Likelihood. As a result, the inflation adjustment flows through to the derived Outage Program Consequence values, while the climate adjustment does not.

Overall Utility Risk: Overall Utility Risk is adjusted for both climate escalation and inflation because it is derived from the sum of Wildfire Risk and Outage

Program Risk. Since both Wildfire Risk and Outage Program Risk are climate- and inflation-adjusted, Overall Utility Risk also reflects the impacts of both climate escalation and inflation.

b. Inflation Escalation

a. Please refer to the response to question 1.a.g.

c. Plan Tracking Objectives

a. Yes. The risk reduction targets in the Plan Tracking Objectives represent instantaneous risk reduction, meaning the reduction in Overall Utility Risk (OUR) measured at a single point in time, specifically the year in which the project is estimated to be completed. For Projects completed in a future year, the associated OUR values are escalated from the 2028 base year using the applicable climate escalation and inflation assumptions through the project's completion year. As a result, the reported risk reduction reflects the nominal value of risk avoided in the year the project is completed, rather than in 2028 values.

b. The values in the Plan Tracking Objectives are presented in nominal values for the applicable year, not in 2028 present values. Accordingly, the associated Overall Utility Risk (OUR) values reflect the applicable inflation and climate escalation assumptions through the year in which the risk reduction is realized for each project.

d. Target/Timeline Table

a. The Change in Instantaneous Risk at year 10 and Change in Cumulative Risk over 55-year columns represents the change in risk at year 10 (2037) attributable to all projects completed in the specified Workplan Year. These values are calculated as pre-mitigation risk less residual (post-mitigation) risk and therefore quantify the avoided risk achieved by the mitigation, rather than reporting pre-mitigation or residual risk levels themselves. For an illustrative example of how the following risk metrics are calculated: Change Instantaneous Wildfire Risk at Year 10, Change in Cumulative Wildfire Risk Over 55 Years, Change Instantaneous Outage Program Risk at Year 10, and Change in Cumulative Outage Program Risk Over 55 Years, please refer to the "Q001e.b.ii" tab in “EUP-PhI_DR_OEIS_Q001Atch01.xlsx”.

b. Yes, the Change in Instantaneous Wildfire Risk at Year 10 and Change in Instantaneous Outage Program Risk at Year 10 columns represent the risk reductions for the respective years, including inflation and climate escalation. For example, the Change in Instantaneous Wildfire Risk at Year 10 and Change in Instantaneous Outage Program Risk at Year 10 columns for Year 2 in the Target Timeline Table (or 2029) represent the change in risk attributed to the projects which have been slated for 2029. Please note that the projects that have been selected and used to develop the Target Timeline Table are forecasted and will change as projects have been scoped. For an illustrative example of how the following risk metrics are calculated: Change Instantaneous Wildfire Risk at Year 10, Change in Cumulative Wildfire Risk Over 55 Years, Change Instantaneous Outage Program Risk at Year 10, and Change in Cumulative Outage Program Risk Over 55 Years, please refer to the "Q001e.b.ii" tab in “*EUP-PhI_DR_OEIS_Q001Atch01.xlsx*”.

c. The values presented in the Wildfire and Outage Program Risk columns are nominal values.

e. Risk Model Impact Factor

a. No, KDMM calculations in Tables 5, 8, 11, 12, 13 or 15 and the Model Risk Landscape JSON do not incorporate the Risk Model Impact Factor.

b. As described in Chapter 2 at Section D.1.a.1, PG&E applies the Risk Model Impact Factor as a 20 percent reduction to the projected Ignition and Outage Program Risk reductions calculated using the risk models available at the time of filing. The Risk Model Impact Factor is applied to the Plan Mitigation Objective (PMO) and associated planning and tracking metrics, including the Plan Tracking Objectives (PTOs) and Target/Timeline Table (TTT) risk values.

i. The Risk Model Impact Factor is applied to final risk values; specifically, final risk reduction values for Wildfire Risk and Outage Program Risk.

ii. The Risk Model Impact Factor is applied to the instantaneous Wildfire Risk and Outage Program Risk reduction values after inflation, climate escalation, and mitigation effectiveness have been applied. Accordingly, the adjustment is applied to the project's nominal-year risk reduction values (e.g., a project completed in 2034 would use the corresponding 2034 risk reduction values rather than 2028 values). The adjusted Wildfire Risk and Outage Program Risk reduction values are then summed to derive the final Overall Utility Risk (OUR) reduction used in the calculation of the Plan Mitigation Objective (PMO), Plan Tracking Objectives (PTOs), and Target Timeline Table (TTT). This methodology is applied consistently across all PMO, PTO, and TTT calculations. The Risk Model Impact Factor is not applied to any other risk metrics presented in the EUP filing.

Please refer to the illustrative example in the “Q001e.b.ii” tab of “EUP-PhI_DR_OEIS_Q001Atch01.xlsx”, which demonstrates the process used to calculate the wildfire and outage risk reduction values, apply the Risk Model Impact Factor adjustment, and derive the final OUR reduction incorporated into the PMO, PTO, and TTT calculations for a representative circuit segment.

ANSWER 001 SUPPLEMENTAL 01

a. Climate Escalation

f. Sample calculation for “Climate_Risk_Score_Multiplier” for Wildfire Risk for circuit segment ALTO 1124432 for 2027:

The Climate Risk Score Multiplier scales baseline 2025 wildfire risk for a distribution circuit segment to reflect projected climate change. It is the product of two multipliers:

- FWI_Multiplier accounts for the projected change in the annual number of days with a Fire Weather Index (FWI) above the historical 95th percentile. It is applied only to the portion of distribution wildfire risk that occurs on Red Flag Warning (RFW) days.

- Heat_Day_Multiplier accounts for the projected change in the frequency of continued heat events, which increase equipment failure rates. It is applied only to the portion of the circuit segment's wildfire risk that comes from equipment-related causes.

Formula

Climate_Risk_Score_Multiplier (Base year 2025) = FWI_Multiplier × Heat_Day_Multiplier

= (RFW Multiplier × % Risk in RFW + 1 − % Risk in RFW) × (Heat Multiplier × % Risk from Equipment + 1 − % Risk from Equipment)

where:

RFW Multiplier = ratio of days above the historical 95th-percentile FWI in the given year to 2025 (circuit segment level)

% Risk in RFW = share of distribution wildfire risk occurring on RFW days (system-wide)

Heat Multiplier = ratio of the frequency of continued heat events in the given year to 2025 (division level)

% Risk from Equipment = share of the circuit segment's wildfire risk attributable to equipment-related causes

Step 1: RFW Multiplier (2027)

Days per year above the historical 95th-percentile FWI for ALTO 1124432

Year	Days above historical 95th-percentile FWI
2004 (historical baseline, center of the 1995–2014 period)	19.8
2030 (projection)	23.0
2050 (projection)	20.2
2080 (projection)	23.6

Values for years without data are estimated by straight-line interpolation between the nearest available years. For 2025 and 2027 those are 2004 and 2030:

- Change in days from 2004 to 2030 = 23.0 − 19.8 = 3.2 days
- Years from 2004 to 2030 = 2030 − 2004 = 26 years

FWI days (2025) = 19.8 + 3.2 × (2025 − 2004) / 26 = 19.8 + 3.2 × 21/26 = 22.384615

FWI days (2027) = 19.8 + 3.2 × (2027 − 2004) / 26 = 19.8 + 3.2 × 23/26 = 22.630769

RFW Multiplier (2027) = FWI days (2027)/ FWI days (2025) = 22.630769 / 22.384615 = **1.010997**

Step 2: % Risk in RFW

- Distribution wildfire risk on RFW days = 13,936.6178
- Total distribution wildfire risk = 16,535.6850

% Risk in RFW = 13,936.6178 / 16,535.6850 = **0.842821** (84.28%)

FWI_Multiplier = (RFW Multiplier × % Risk in RFW + 1 − % Risk in RFW) = 1.010997 × 0.842821 + 1 − 0.842821 = **1.009268**

Step 3: Heat Multiplier (2027)

ALTO 1124432 is in the North Bay division. The Heat Multiplier is provided at the division level.

Heat Multiplier (North Bay, 2027, relative to 2025) = **1.024047**

Step 4: % Risk from Equipment

Source: WDRM model, circuit segment level.

The table below gives wildfire risk by driver for ALTO 1124432.

Driver	Wildfire risk	Equipment-related
capacitor_bank_equipment_cause	0.003645	Yes
dpd_equipment_cause	0.002603	Yes
fuse_equipment_cause	0.026557	Yes
other_equipment_type	0.048546	Yes
primary_conductor_line_slap_cause	0.016993	Yes
primary_conductor_other_cause	0.042813	Yes
primary_conductor_wire_down_cause	0.068880	Yes
secondary_conductor	0.021563	Yes
support_structure_electrical_cause	0.073128	Yes
support_structure_equipment_cause	0.027033	Yes
switch_equipment_cause	0.004463	Yes

Driver	Wildfire risk	Equipment-related
transformer_equipment_cause	0.059927	Yes
transformer_equipment_leaking	0.000210	Yes
voltage_regulator_equipment_cause	0.000000	Yes
animal_bird	0.016637	No
animal_other	0.004242	No
animal_squirrel	0.025397	No
third_party_balloon	0.003381	No
third_party_other	0.030997	No
third_party_vehicle	0.031164	No
vegetation_branch	0.346376	No
vegetation_other	0.209073	No
vegetation_trunk	0.607067	No
Equipment-related total*	**0.396362**	
All drivers total*	**1.670700**	

*Totals are computed from unrounded values

% Risk from Equipment = 0.396362 / 1.670700 = **0.237244** (23.72%)

Heat_Day_Multiplier = (Heat Multiplier × % Risk from Equipment + 1 − % Risk from Equipment) = 1.024047 × 0.237244 + 1 − 0.237244 = **1.005705**

Step 5: Climate Risk Score Multiplier (2027)

Climate_Risk_Score_Multiplier = FWI_Multiplier × Heat_Day_Multiplier

= (RFW Multiplier × % Risk in RFW + 1 − % Risk in RFW) × (Heat Multiplier × % Risk from Equipment + 1 − % Risk from Equipment)

= (1.010997 × 0.842821 + 1 − 0.842821) × (1.024047 × 0.237244 + 1 − 0.237244)

= 1.009268 × 1.005705

= **1.015026**