

PACIFIC GAS AND ELECTRIC COMPANY
Wildfire Mitigations Plans Discovery 2026-2028
Data Response

PG&E Data Request No.:	SPD_006-Q001Supp02
PG&E File Name:	WMP-Discovery2026-2028_DR_SPD_006-Q001Supp02
Request Date:	May 20, 2025
Requester DR No.:	SPD-PGE-WMP2026- 006
Requesting Party:	Safety Policy Division
Requester:	Edwin Schmitt
Date Sent:	May 22, 2025 (Original) Supp02: June 2, 2025

(SUBJECT: FOLLOW-UP 2026-2028 BASE WMP DATA REQUESTS (SPD-PGE-WMP2026-006))

QUESTION 001

The following questions are all related to PG&E's first response to SPD-PGE-WMP2026-SPD-004 Question 5.

- a. In the 2024 RAMP Tranche, PG&E has listed 630 circuit segments as “#NA”. Provide an Excel workbook that lists the WDRM v.4 Circuit Segment Name for each of the 630 circuit segments in the first column. The second column should explain why this circuit segment was listed as #NA, such as this circuit segment was split from a larger circuit segment in WDRM v.3 due to the addition of a recloser. The third column should list the name of the previous circuit segment as it was used in WDRM v.3 and presented in *PGE_2023_WMP_R0_Section_642_Atch01.xlsx*. If this is a newly constructed circuit segment, the response in the third column must be “New”.

2026-2028 Base WMP WDRM v.4 Circuit Segment Name	Explanation for #NA	2024 RAMP WDRM v.3 Circuit Segment Name
CAMP EVERS 2106737512		

- b. Explain why PG&E in its 2026-2028 Base WMP did not include a file similar to *PGE_2023_WMP_R0_Section_642_Atch01.xlsx* in its submission.
- i. For each mitigation listed below, explain why it is now impossible for PG&E to unitize the mitigation by circuit mile (as it was in *PGE_2023_WMP_R0_Section_642_Atch01.xlsx*):
- a) Expulsion Fuse Replacement
 - b) Surge Arrestor Replacement
 - c) Aerial Inspection
 - d) Ground Inspection

- e) Non-Pole Backlog
 - f) Tree Removal
 - g) Down Conductor Detection (DCD)
 - h) Line Sensors
 - i) Pole Backlog
 - j) Pole Clearing
- ii. For each mitigation listed above, explain why PG&E was able to complete the corresponding “% of Segment” field in the TopRisk_Table Worksheet of PGE_2023_WMP_R0_Section_642_Atch01.xlsx.¹
- c. For the years 2023-2025, PG&E states that it is unable to determine actual expenditure and present value cost of specific work done on a circuit segment for each of the mitigations listed in Question 1.b.i., but PG&E can provide the average cost to complete one unit of the mitigation program. For each of the mitigations listed in Question 1.b.i., provide an explanation for why PG&E is unable to determine the actual expenditure and present value cost of specific work done on a circuit segment.
- i. Since PG&E is unable to determine the actual expenditures, provide a step-by-step method PG&E used to estimate the average cost to complete one unit of each of the mitigations listed in Question 1.b.i. Be sure to include the unit cost and the range of the unit cost for each mitigation in your response.
 - ii. PG&E’s SAP system allows for the presentation of monthly detail of undergrounding projects by using the Analyses for Office (AO) report PROJ002-PS Monthly Detail function.² Explain how PG&E records cost-related data in SAP for orders related to each of the mitigations listed in Question 1.b.i.
 - a) Can PG&E use Analyses for Office (AO) report PROJ002-PS Monthly Detail function to generate a report similar to EUP_DR_SPD_013_Q001Atch02CONF.xlsx for each of the mitigations listed in Question 1.b.i.?
 - a. If so, provide a copy of the report for an order associated with the CORNING 110185152 circuit segment for each of the mitigations listed in Question 1.b.i.
 - b. If not, explain why not.
- d. Table 8-1 in PG&E’s 2026-2028 Base WMP states that PG&E intends to install 200 service breakaway connectors in 2026, 1,400 in 2027 and 1,400 in 2028. Explain why PG&E in response to SPD-PGE-WMP2026-SPD-004 Question 5 stated that it does not track any information related to breakaway connector installations.

¹ For instance, on the OAKHURST 110310140 circuit segment, PG&E stated that Tree Removal occurred on 42.3% of the circuit segment in 2023, on 24.5% of the circuit segment in 2024 and on 14.4% of the circuit segment in 2025.

² See SPD-PGE-SB884-013 (PG&E Ref. DRU14491-Case-EUP-SB 884), Question 1c. and EUP_DR_SPD_013_Q001Atch02CONF.xlsx.

- i. What is the MAT Code for this mitigation activity (GM-14) that PG&E used in its 2027 Test Year GRC Application?
 - ii. How will PG&E calculate the risk reduced by service breakaway connectors if the location of service breakaway connectors and identify future locations for work if the location of the service breakaway connector is not tracked?
- e. Figure PG&E 5-2-5 in PG&E's 2026-2028 Base WMP presents the EORM Risk Model as contributing to the calculation of Wildfire Consequence (i.e., WFC v4). Pg. 71 of PG&E's 2026-2028 Base WMP states that "Ignition Risk (WDRM v4) for distribution is determined for equipment asset locations for each risk driver causal model LoRE, p(i), and CoRE, WFC." Table 5-4 states that Ignition/Wildfire Risk (WDRM/WTRM) provides a key output of "Circuit Segment Risk". In response to SPD-PGE-WMP2026-SPD-004 Question 5 PG&E states that it is impossible to provide circuit segment EORM Values because "PG&E's EORM values are not calculated to the circuit segment level, but at the "tranche" level." Explain how PG&E uses tranche level EORM values to develop the key output of "Circuit Segment Risk" from the WDRM.
- i. Provide a step-by-step calculation of "circuit segment risk." At each stage PG&E must explain what is the scale of analysis (i.e., tranche, circuit segment, etc.) and must clearly note the units (i.e. dollars, number of deaths, CMI etc.).³ This step-by-step calculation must include a description of
 - a) what CalFire Fire Data is input into the EORM Risk Model
 - b) How the CalFire Fire Data is used within the EORM Risk Model to develop the MAVf intermediate results
 - c) How the MAVf intermediate results are used within the Wildfire Consequence Model to generate the output of Consequence Pixel Values
 - d) How the Consequence Pixel Values are used to calculate Ignition Risk
 - ii. Explain how the EORM and WDRM methods differ.
 - iii. SPD understands that PG&E scales the WDRM v4 risk values to the predicted risk dollar amount from the CBRs (see Table PG&E-6.2.1.2-2). What are the benefits/drawbacks from scaling a bottoms-up relative risk model to the top-down EORM model?
 - a) For instance, it appears that WDRM v4 predicts more risk outside of the HFTD than the EORM model does – is this type of discrepancy reconciled in the model?
 - b) How does the EORM predicted values in tranches (safety, reliability, financial, combined) compare to a risks from WDRM v4 when combined at the tranche level?
 - iv. Use the calculation of Ignition Risk on CORNING 110185152 circuit segment to create a concrete example of the step-by-step calculation of "circuit segment risk" provided in PG&E's response to Question 1.e.i

³ 3 Please note, tables such as PG&E-6.2.1.2-4 are confusing because it is not clear what the scale of analysis is in the example, nor is it clear which units are used for each number in the example.

- f. Does PG&E intend to only present WDRM data in its Electrical Undergrounding Plan submission to Energy Safety?
 - i. If a party wished to know the EORM values for a circuit segment that PG&E includes in its Electrical Undergrounding Plan, is PG&E able to generate those values?
- g. In PG&E's response to SPD-PGE-WMP2026-SPD-001 Question 26, PG&E stated that in the 2026-2028 Base WMP Submission it used a preliminary version of the WBCA Tool to conduct mitigation effectiveness analysis. Since PG&E has stated that the post-mitigation values requested in SPD-PGE-WMP2026-SPD-004 Question 5 cannot be provided through the WDRM v.4 model, can PG&E provide these values through its use of the preliminary version of the WBCA tool?
 - i. If so, please complete the following variables that were included in Decision Tree Results by Circuit Segment.xlsx along with PG&E's response SPD-PGE-WMP2026-SPD-004 Question 5 on May 30th 2025:
 - a) Post-Mitigated LoRE
 - b) Unadjusted Post-Mitigated CoRE
 - c) Adjusted Post-Mitigated CoRE
 - d) Unadjusted Post-Mitigated Risk
 - e) Adjusted Post-Mitigated Risk
 - ii. If not, explain why not and in which dataset the five data points listed in Question 1.g.i is located. Provide SPD with that data along with PG&E's response to SPD- PGE-WMP2026-SPD-004 Question 5 on May 30th 2025.

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- c. Please see below for an explanation for why PG&E is unable to determine the actual expenditure and, consequently, present value cost of specific work done on a circuit segment:
 - *Expulsion Fuse Replacement:* While each expulsion fuse replacement job is charged to a separate PM order, divisions, at their discretion and for ease of accounting, may charge the entire amount of material stock (i.e. fuses) needed for their region to a single PM order. Disaggregation of bundled material costs would entail assumptions and estimates that would prevent final determination of "actual" cost.
 - *Surge Arrestor Replacement:* While each Surge Arrestor job is charged to a separate PM order, divisions, at their discretion and for ease of accounting, may charge the entire amount of material stock (i.e. surge arrestors) needed for their region to a single PM order. Disaggregation of bundled material costs would entail assumptions and estimates that would prevent final determination of "actual" cost.
 - *Aerial Inspection:* PG&E's aerial inspections are billed to PM orders on a map-by-map basis and the cost to inspect one specific unit is not able to be disaggregated from the total.

- *Ground Inspection:* PG&E's ground inspections are billed to PM orders on a map-by-map basis and the cost to inspect one specific unit is not able to be disaggregated from the total.
 - *Non-Pole Backlog:* Electric corrective notifications may be charged to a single PM order per notification, or may be bundled together with many other notifications in one PM order.
 - *Tree Removal:* PG&E's tree removal program records costs in one of two ways: unit cost, and under "time and materials." "Time and materials" cost cannot be linked to specific underlying work, which prevents PG&E from providing an "actual" expenditure at the circuit segment level.
 - *Down Conductor Detection (DCD):* PG&E's DCD program involves the installation of software on devices in the field. DCD "units" may be installed in one of three ways: (1) through PG&E's controller retrofit program; (2) through PG&E's substation relay replacement program, and; (3) in the course of other work in the field (e.g. a pole replacement that includes replacement of devices). With regard to units installed via the controller retrofit program and substation relay program, while each unit is charged to a separate PM order, the entire amount of material stock (i.e. controllers) needed for a set of jobs may be charged to a single PM order. Disaggregation of bundled material costs would entail assumptions and estimates that would prevent final determination of "actual" cost. With regard to DCD units installed via other work, the unit cost is \$0 and will be reported as such.
 - *Line Sensors:* PG&E generates a unique PM order for each location where sensors are installed. However, design and commissioning cost associated with each unit are not charged to the unique PM orders, and are instead charged at the program level. Those expenditures are a significant proportion of sensor unit costs and cannot be linked to specific units. This prevents PG&E from providing "actual expenditure" at the circuit segment level.
 - *Pole Backlog:* Electric corrective notifications may be charged to a single PM order per notification, or may be bundled together with many other notifications in one PM order.
 - *Pole Clearing:* Prior to 2025, the contractual structure for Pole Clearing was based upon a negotiated lump sum amount. As such it is not possible to trace an individual billed cost amount to an individual completed pole clearing unit.
- i. Please see below for an explanation of unit costs for each of the listed mitigations:
- *Expulsion Fuse Replacement:* PG&E will utilize the unit cost calculation provided for 2025 in its response to WMP-Discovery2026-2028_DR_SPD_001-Q021.
 - *Surge Arrestor Replacement:* PG&E will utilize the unit cost calculation provided for 2025 in its response to WMP-Discovery2026-2028_DR_SPD_001-Q021.
 - *Aerial Inspection:* PG&E will utilize the unit cost calculation provided for 2025 in its response to WMP-Discovery2026-2028_DR_SPD_001-Q021.

- *Ground Inspection*: PG&E will utilize the unit cost calculation provided for 2025 in its response to WMP-Discovery2026-2028_DR_SPD_001-Q021.
 - *Non-Pole Backlog*: PG&E is still evaluating methods for providing unit cost for this mitigation due to the wide variety of conditions that may be addressed in an electric corrective notification.
 - *Tree Removal*: As noted above, PG&E's billing system includes two (2) types of billing for tree work: a) unit cost basis and b) time and materials. Unit cost billing can be linked to the underlying tree work to determine if it is related to tree removal, tree trimming or brush work. Time and Materials billing cannot be similarly linked to the underlying tree work. PG&E plans to estimate the total value of expenditures for Tree Removal as follows:
 - For 2023 – 2024, total expenditures reflect billed data (unit) increased by a T&M adder (based upon total program billings for all tree work), then multiplied by the units identified as trees worked per segment.
 - For 2025 – 2028, forecasted expenditures are being reported consistent with our 2027 GRC filing whereby a number of forecasted removals are multiplied by an average programmatic cost. Chapter 8, Exhibit PG&E-4, Workpaper Tables 8-7 (Annual/Routine Patrol Trim and Removal Work) & 8-9 (Hazard Parol)
 - *Down Conductor Detection (DCD)*: PG&E will utilize the unit cost calculation provided for 2025 in its response to WMP-Discovery2026-2028_DR_SPD_001-Q021.
 - *Line Sensors*: PG&E will utilize the unit cost calculation provided for 2025 in its response to WMP-Discovery2026-2028_DR_SPD_001-Q021.
 - *Pole Backlog*: PG&E is still evaluating methods for providing unit cost for this mitigation.
 - *Pole Clearing*: PG&E will utilize the pole clearing unit cost calculated in its 2027 GRC testimony to provide the specific Pole Clearing unit costs and apply that to circuit-segment pole clearing unit data.
- ii. Please see below for an explanation of how PG&E records cost-related data in SAP for orders related to each of the listed mitigations:
- *Expulsion Fuse Replacement*: As noted above, PG&E records cost-related data in SAP for this mitigation using a unique PM order for each unit. However, divisions, at their discretion and for ease of accounting, may charge the entire amount of material stock (i.e. fuses) needed for their region to a single PM order.
 - *Surge Arrestor Replacement*: As noted above, PG&E records cost-related data in SAP for this mitigation using a unique PM order for each unit. However, divisions, at their discretion and for ease of accounting,

may charge the entire amount of material stock (i.e. fuses) needed for their region to a single PM order.

- *Aerial Inspection*: As noted above, PG&E's aerial inspections are billed to PM orders on a map-by-map basis.
 - *Ground Inspection*: As noted above, PG&E's ground inspections are billed to PM orders on a map-by-map basis
 - *Non-Pole Backlog*: As noted above, Electric corrective notifications may be charged to a single PM order per notification, or may be bundled together with many other notifications in one PM order.
 - *Tree Removal*: Costs related to tree removal are recorded in SAP within Controlling Orders (CO orders) organized on a geographic division area for each mitigation program. Tree Removal costs are a subset of total tree work and are recognized based upon billed amounts from contractors both on a unit-billed and time & material basis.
 - *Down Conductor Detection (DCD)*: As explained in part (c), above, PG&E records costs related to DCD units in one of three ways: (1) units installed under the controller retrofit program have costs charged to a unique PM order in SAP⁴; (2) units installed under the substation relay replacement program have costs charged to a unique PM order in SAP; (3) units installed in the course of other work are not charged and have a unit cost of \$0.
 - *Line Sensors*: PM orders at location level, but labor and design not disaggregable to specific circuit segment.
 - *Pole Backlog*: As noted above, Electric corrective notifications may be charged to a single PM order per notification, or may be bundled together with many other notifications in one PM order.
 - *Pole Clearing*: Costs related to Pole Clearing are recorded in SAP within CO orders organized on geographic regional areas. Pole Clearing costs are recognized based upon billed amounts from contractors. Prior to 2025, these amounts were billed under a lump sum contract format.
- a) PG&E can use the Analyses for Office (AO) report PROJ002-PS Monthly Detail function to generate a report using PM orders. As a result, PG&E believes it can generate reports for specific PM orders or lists of PM orders using this function for the listed mitigations, though PG&E notes that the PROJ002-PS Monthly Detail function is not generally used in the normal course of business for these mitigations. However, PG&E is not able to do so with regard to Tree Removal and Pole Clearing.

⁴ Please note, however, that some units installed in 2025 are non-capital, and are charged at the program level and not to unique PM orders. Further, as noted above, instances arise in which larger volumes of material stock are charged to a single PM order and not to each individual order.

- a. PG&E cannot provide reports for orders associated with CORNING 110185152 until it has completed mapping units to the circuit segment list. At this time, PG&E is still determining the approximate time to complete that exercise. PG&E will supplement this response when able upon completion of unit mapping.
- b. PG&E is not able to generate a report using the Analyses for Office (AO) report PROJ002-PS Monthly Detail function for Tree Removal or Pole Clearing because PG&E's vegetation management costs are not recorded in SAP in a way that this report can capture. Please see our explanation of how PG&E records costs for these two mitigations in SAP, above.

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- b. PG&E provided the required data in Table 6-4 on the risk reduction activities for the top-risk circuits. PG&E was not required to update the file submitted for the 2023=2025 WMP cycle.
 - i. PG&E unitizes each of the mitigations listed in Question 1(b)(i) by a measure other than circuit mile and it is not possible to meaningfully convert PG&E's units into circuit miles. When PG&E submitted PGE_2023_WMP_R0_Section_642_Atch01.xlsx with its 2023-2025 Base WMP, PG&E was similarly unable to unitize these mitigations by circuit mile.
 - ii. The listed mitigations were not unitized by circuit mile in PGE_2023_WMP_R0_Section_642_Atch01.xlsx to the 2023-2025 Base WMP. PG&E provided data in the "% of Segment" field based on forecast estimates of the proportion of work possible to be performed and forecast estimates of the work performed or to be performed on a given segment. For example, if one fuse existed on a segment and it was subject to replacement under PG&E's WMP mitigation program, that segment was listed as 100% mitigated. This field does not purport to unitize non-circuit mile mitigations by circuit mile.
- c. Pursuant to agreement with SPD, PG&E will provide this response on June 2, 2025.
- d. PG&E does not currently track installation details or location of service breakaway connectors. However, PG&E is internally working to map service breakaway connectors in our system of record. Service breakaway connectors are newly approved equipment at PG&E, which mitigate ignition risk, so we chose to deploy opportunistic field installations immediately, instead of delaying, as we work through the mapping process. Additionally, as breakaway connectors are currently installed opportunistically, and not programmatically, PG&E lacks the means to forecast installation locations.
 - i. The MAT code for this mitigation activity used in the 2027 GRC is 08J.
 - ii. The team is internally working to map service breakaway connectors in our system of record, which will enable future risk reduction calculations.

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- a. Pursuant to agreement with SPD, PG&E will provide this response on June 5, 2025.
- b. Pursuant to agreement with SPD, PG&E will provide this response on May 28, 2025.
- c. Pursuant to agreement with SPD, PG&E will provide this response on May 28, 2025.
- d. Pursuant to agreement with SPD, PG&E will provide this response on May 28, 2025.
- e. In Figure PG&E-5-2-5, the MAVf intermediate result as depicted in the procedural schematic is the delivery of the MAVf by EORM for the completing the development of the WFC v4 model.
 - i. Please see PG&E's responses to parts (a), (b), (c), and (d), below, as well as PG&E's WDRM documentation suite, which includes: "Wildfire Distribution Risk Model Version 4(WDRM v4) Documentation". "Distribution Event Probability Models Version 4 (DEPM v4) Documentation", "Wildfire Consequence Model Version 4 (WFC v4) Documentation", and "RaDA Modeling Algorithms and Methodologies Version 1 Documentation".
 - a) Cal Fire data are not used in developing the MAVF which feeds into the WFC v4 model.
 - b) Please see the answer to part a).
 - c) The MAVf used by the Enterprise Risk Models is used to determine consequence values for asset locations location as detailed in Sections 3 and 4 of the "Wildfire Consequence Model Version 4 (WFC v4) Documentation". A procedural overview of the consequence modeling process is provided in Figure PG&E-5.2.2-1 on page 68 of the "PG&E Wildfire Mitigation Plan R0 2026-2028 | volume 1 of 2".
 - d) The Wildfire (Ignition) Risk calculation using consequence pixels for distribution is explained in Sections 3.1 and 4 of the "Wildfire Distribution Risk Model v4 Documentation".
 - ii. Simply, the EORM risk model develops the MAVf function that transforms burned acreage, structure loss, and potential fatalities into a single consequence value, while the WFC v4 uses MAVf function to estimate seasonal consequence values for all distribution asset locations.
 - iii. The benefits/drawbacks from scaling a bottoms-up relative risk model to the top-down EORM model (Wildfire Risk Bowtie Model) are as follows:
 - The grouping of circuit segments into tranches and the relative risk value among tranches in the top-down Wildfire Risk Bowtie Model model are informed by the bottoms-up circuit-segment level risk model, and hence more predictive than simply summarizing historical data.
 - The scaling is needed to enable the cost and benefit of wildfire risk mitigations with non-wildfire risk mitigations, e.g. reliability risk mitigation.
 - a) Yes. Wildfire Risk Bowtie Model scales the non-HFTD/HFRA risk so that the percentage of risk from non-HFTD/HFRA is the same as that predicted by WDRM v4.

- b) The Wildfire Risk Bowtie Model's risk values for combined attributes in tranches are the product of a scaling factor and those from WDRM v4 when combined at the tranche level. The scaling factor is calculated as the ratio of the Wildfire Risk Bowtie Model's total distribution baseline risk over the total WDRM v4 risk, and the same scaling factor applies to every tranche.

The split of total risk by safety, reliability and financial can be different between two models. For example, the choice of groupings of fires and their associated modeled frequency and consequence per event, as well as the historical fires used in the modeling are different. Although there is a great overlap between historical fires used in both models, especially destructive fires, WFC v4 uses NASA Visible Infrared Imaging Radiometer Suite (VIIRS) data in addition to PG&E ignition data, Cal Fire data and CPUC Safety and Enforcement Division (SED) reports.

- iv. Pursuant to agreement with SPD, PG&E will provide this response on June 5, 2025.
- f. PG&E intends to use WDRM v4 as the basis for ignition data in the Electrical Undergrounding Plan.
 - i. PG&E's EORM values are not calculated at the circuit segment level, but at the tranche level. If desired, as an alternative, PG&E can provide tranche-level values which will be identical for all circuit segments in the same tranche.
- g. PG&E believes we can provide the requested values through use of the preliminary version of the WBCA tool, dependent on completion of mapping of mitigation activities to the given list of circuit segments.