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

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Requesting Party:	Office of Energy Infrastructure Safety
Requester:	Nathan Poon
Date Sent:	April 16, 2025

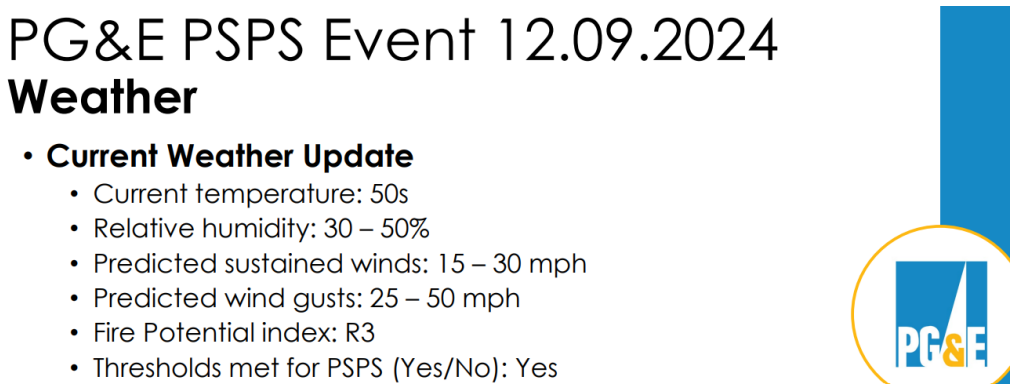
SUBJECT: REGARDING FIRE POTENTIAL INDEX FOR PSPS INITIATION

QUESTION 001

PG&E states on page 168 of its 2026-2028 Base WMP that "The number of PSPS events is driven by weather, in particular wind speed and fuel conditions, both of which are difficult to reduce. However, PG&E is continuously improving our risk model sensitivity to weather, vegetation, and fuel conditions through the adoption of changes in our FPI, Ignition Probability Weather, and Operability Assessment models."

PG&E shows in Table 10.6.1-1 FPI Class Breakpoints on page 476 of the 2026-2028 Base WMP, that there are 4 tiers of FPI Breakpoints categorized as "Small, Large, Critical, and Catastrophic" based on potential fire acreage size.

In the PSPS State Executive Briefings Slide Deck utilized on the December 9, 2024, PSPS briefing (slide 2), PG&E shows the Fire Potential Index as "R3".



a. Provide the following information regarding the Fire Potential Index Breakpoints and how they are used in the initiation of PSPS events:

   i. Clarification of the Fire Potential Index naming conventions used between the WMP submission and those utilized on the State Executive Briefings.

Describe how “Small, Large, Critical, and Catastrophic” designations relate to the R1, R2, R3, etc. designations.

ii. A detailed description of what weather conditions are associated with each level of the FPI Breakpoints (i.e. Small, Large, Critical, Catastrophic).

iii. The initiation criteria for PSPS events for each of the FPI Breakpoints (i.e. Small, Large, Critical, Catastrophic).

Answer 001

a.

i. The FPI model is based on a multi-classification balanced random forest framework, a state-of-the-art open-source machine learning model based on decision trees. FPI is trained on the novel fire occurrence dataset developed by Sonoma Technology (McClure *et. al.,* 2023) that combines agency fire information with satellite fire detections. Fire detections are derived from satellite infrared data and provide information on the location, intensity and time of fires. FPI was trained on this historical dataset using defined classes that separate small, moderate, critical, and catastrophic defined fires. These classes are determined by both fire spread and intensity. For example, a slow moving, low intensity fire would be defined as small, while a fast moving, intense fire would be defined as catastrophic. These small to catastrophic definitions described here only apply to the FPI. The FPI model was trained using historical weather, fuels and topography data to be able to forecast the probability of small to catastrophic fires in both space and time. The actual FPI model outputs the conditional probability from 0 – 100% fire growth or intensity will align to the small, moderate, critical or catastrophic classes described in the WMP. The probability of the critical and catastrophic classes combined is translated into a fire danger rating scale from R1 (low) to R5 (extreme) based on climatological breakpoints and calibration with historical incidents. This method mirrors industry standards; for example, how unitless, relativistic numeric outputs of Energy Release Component or Burning Index from the Federal National Fire Danger Rating System (NFDRS) are translated to fire danger ratings from low, medium, high, very high and extreme (https://www.nwcg.gov/publications/pms437/fire-danger/nfdrs-system-inputs-and-outputs). The NFDRS fire danger rating scale versus FPI is shown below; moving up the scale from R1 to R5 increases the forecasted conditional probability of critical or catastrophic growth or intensity according to the FPI classifications described above. We use the R (Rating) scale and not the NFDRS scale based on a historical request from agencies.

Table 1. Fire potential index scale versus NFDRS rating and color scale

NFDRS SCALE	PG&E FPI SCALE
Low	R1
Medium	R2
High	R3
Very High	R4
Extreme	R5

ii. 32 model features were selected in the final FPI model for operations, which are summarized below. These model features are combined in both space and time to output the probability of fires across the classes described above. In general, the drier the fuel conditions, the windier the weather, lower the RH and more rugged the terrain, the FPI will increase probabilities in the critical class.

The FPI 5.0 model features include:

- weather features of wind speed, turbulence, temperature, and vapor pressure deficit,
- new NDVI herbaceous fuel moisture model and enhanced existing dead, herbaceous and woody fuel moisture models,
- topography features including terrain ruggedness and slope,
- new soil moisture and solar radiation features,
- improved fuel categories,
- new fuel properties features including fuel bed depth and fuel complexity.
- The fuel categories, fuel properties and topography features are aggregated to the 0.7km$_2$ hexagons from the underlying 30m resolution.

iii. The minimum criterion for FPI is >0.22 probability in the catastrophic fire class; however, PSPS could be initiated at lower values based on other factors considered like federal forecasts and external forecasts. This value was established from a historical review of past fires near ignition time and location (see figure below).