PACIFIC GAS AND ELECTRIC COMPANY
Wildfire Mitigation Plans Discovery 2022
Data Response

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Request Date:	March 28, 2022	Requester DR No.:	MGRA-PGE-WMP22_DataRequest3
Date Sent:	March 31, 2022	Requesting Party:	Mussey Grade Road Alliance
PG&E Witness:		Requester:	Joseph Mitchell

SUBJECT: WILDFIRE RISK MODELING

QUESTION 01

Please explain technically how PG&E's WDRM applies a conditional probability or makes any other adjustment to account for the fact the Technosylva consequence model is run on "worst weather days", while the Probability of Ignition model analyzes all ignitions whether they are on worst weather days or not.

ANSWER 01

The 2021 Wildfire Distribution Risk Model (WDRM) v2 consequence model drew upon acres burned, structures impacted, flame length and rate of spread returned (with FL and ROS combined by Technosylva into a 1-5 Fire Behavior Index, called FBI) by Technosylva simulations, determining fire severity via thresholds of those values (i.e. large fire as greater than 300 acres) for every day of weather simulated. Each day's severity for each simulation location was assigned a consequence consistent with MAVF CoRE and the results were averaged over all simulation days to produce expected dangerous day consequence values for each simulation location.

The 2022 WDRM v3 consequence model draws upon 4 sources of data: the same physical outputs from 2021 updated simulations from Technosylva, satellite detected fires from VIIRS (infrared satellite), CalFire data on fire outcomes correlated to VIIRS fires (used to assign MAVF CoRE values), and daily estimates of the 1-5 scaled R-score produced for every 2x2km square in the territory on a daily basis by the models behind PSPS events. For the 2022 WDRM v3, fire severity for a given day is assessed for "destructive potential" vs. not, where destructive potential is assessed using Technosylva outputs of flame length and rate of spread (with threshold values that provide full recall of historically destructive fires) for historically worst weather and R-scores (4 and above) for all days in the June through November fire season. If either approach evaluates to destructive potential, the day/location is considered to have consequences consistent with the expectation value of MAVF CoRE assigned to fires from the VIIRS data set that also are flagged with destructive potential. The use of R-score allows for the marginalization of consequence values across the entire fire season, not just the worst weather days.

The 2022 WDRM v3 model now trains on outage data, producing P(outage) results with 100x100m resolution (and asset level predictions for support structures and

transformers). These results provide fire season probabilities of outages occurring. These are multiplied through by the probability of an ignition given an outage, P(ignition|outage), to produce P(ignition) estimates. The P(ignition|outage) model is trained on all outage and event data using the actual conditions at the time/location of every outage/ignition event and is therefore based on site/day location fuel and wind conditions, among other variables, so its estimates are variable in space and time. As such, they answer the question "if there were an outage of this particular cause/equipment involved at this particular time/location, what are the odds that it would result in an ignition?".

The seasonal P(ignition) value are the result of marginalizing daily P(ignition|outage) values across days from historic fire seasons (i.e. based on daily weather and fuel conditions) to produce a seasonal value derived from daily estimates. In practice, marginalization, amounts to weighting the predictions for each day by the count of outages experience on that day, resulting in greater emphasis being placed on predictions from days that produced a higher count of outages. This calculation is performed separately for each "subset" of outages, so the weights used for vegetation caused outages, for example, are drawn from the historical count of vegetation outages.