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March 29, 2021 VIA ELECTRONIC MAIL

Ms. Caroline Thomas Jacobs
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California Public Utilities Commission
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Transmittal to: wildfiresafetydivision@cpuc.ca.gov, CALFIREUtilityFireMitigationUnit@fire.ca.gov, and R.18-10-007 service list

RE: WILLIAM B. ABRAMS COMMENTS ON 2021 WILDFIRE MITIGATION PLANS

Dear Director Thomas Jacobs:

William B. Abrams serves these comments pursuant to Resolution WSD-011, which authorizes public comment on the 2021 Wildfire Mitigation Plans (WMPs) of the three major investor-owned utilities (IOUs) by March 17, 2021, and the Wildfire Safety Division's (WSD's) approval of the Joint Stakeholders' request for an extension setting a due date of March 29, 2021.

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I. Introduction

The utility Wildfire Mitigation Plan Updates (WMPs) are more thorough than in prior years and demonstrate advances in risk modeling and increased coordination with some stakeholder groups in key mitigation activities. The Pacific Gas and Electric Corporation (PG&E) plan is particularly weighty at nearly 1,000 pages and shows some marked improvements over prior years. However, there are still considerable disconnects between the methodology, the measurement and the on-the-ground reality associate with preparation and planning for wildfire risks. The primary reason for these sizeable gaps in the risk approaches of the Investor Owned Utilities (IOUs) seem to be a lack of recognition regarding recent failures and causes of recent catastrophic wildfires.

On the whole, these recent cascading and compounding IOU failures that created a wrath of wildfires from 2017 to today are by enlarge not even mentioned in their Wildfire Mitigation

Plans. As one of the many and growing number of wildfire survivors throughout our state, the fact that these IOU caused catastrophes and their causes are not even named and addressed in these plans is beyond troubling. However, the IOU patterns of financial risk avoidance being prioritized over our public safety is not a lapse in judgement but a demonstrated strategic tactic to distract the public and dissuade the commission from taking further actions to ensure a more targeted performance-based regulatory structure tied to IOU financials.

The failures associated with the Northern California Wildfires of 2017 through and including the recent swath of utility caused wildfires in 2020 must all be specifically mapped to IOU mitigation tactics if we are to justify any sense of progress represented in these plans. We cannot let the legal tactics of our IOUs and other parties who have large financial interests in avoiding liabilities allow us to disassociate these plans from the causes of wildfires. Indeed, as a wildfire survivor and claimant in the PG&E bankruptcy proceeding, I have a significant financial stake in ensuring that PG&E remains financially strong and able to pay out my claim and the claims of my neighbors throughout our impacted communities. However, no claimants want this security on the backs of future wildfire survivors who will pay the price in their homes, their lives and their livelihoods if we do not confront the causes of these wildfires head on.

II. Adherence to the Statutory Requirements

III. Actuals and Planned Spending for Mitigation Plans

I am not providing comments on sections 2 and 3 at this time but may provide reply comments. The following are my comments for sections 4 through 8 of the Wildfire Mitigation Plans:

IV. Comments: Lessons Learned and Risks Trends

This section should be important to the commission as an indication of how quickly their regulatory posture needs to move to a performance-based regulatory structure tied to IOU bottom-line financials. Within environments where lessons learned are self-investigated and self-identified there may be less of a need for a regulatory body to intercede with specific

performance-based measures tied to rates. However, it is clear from these submitted Wildfire Mitigation Plans that increased regulatory oversight and interventions from outside agencies will be required to ensure the utilities are taking a proactive rather than reactive stance. What is important to note about the "lessons learned" identified by the utilities is that they almost exclusively represent lessons they have been forced to learn by outside investigations such as those conducted by CAL Fire and those that have been publicly aired through commission proceedings or other court processes. Nowhere within these plans do the IOUs identify specific failures tied to these catastrophic wildfires and describe how they have incorporated those learnings into specific mitigation actions. It is not enough to generally state that increased vegetation management and hardening of the grid has occurred. We must tie specific asset failures and the business process failures that caused these recent fires to their mitigation activities. PG&E summarizes their lessons learned with the following statement on page 41 of their proposed WMP:

> *"The primary gaps identified and lessons learned from 2020 include risk prioritization of Enhanced Vegetation Management (EVM) work, prioritizing the scheduling and execution of system inspections, and the quality of vegetation management activities, as discussed below."*[1]

All of these lessons are those which PG&E was forced to confront through criminal, civil or regulatory actions. This section within their plan does not include any self-reflection beyond the failures that we already know about through outside investigations. Moreover, it doesn't even acknowledge any failures or learnings associated with the Tubbs Fire, Camp Fire, Kincade Fire, Zogg Fire, Glass Fire or any other wildfire in recent years that they caused. This PG&E approach of waiting until another court proves beyond a reasonable doubt is not a recipe for proactive wildfire mitigation and significantly impedes the efficacy of their plan and the safety of our communities.

No new information is provided within the WMPs not because there aren't other lessons to be learned beyond those identified by outside parties but because the utilities continue to be guided by a strategy of liability avoidance and not a higher corporate ethos focused on safety that would be marked by the self-identification of failures. While PG&E may be most egregious

[1] See Pacific Gas and Electric Company 2021 Wildfire Mitigation Plan Report, page 41

when it comes to this head-in-the-sand "lessons learned" approach, they are certainly not alone. As an example, nowhere within the Southern California Edison (SCE) proposed WMP does it acknowledge or address failures associated with the Woolsey Fire of 2018 or the Bobcat Fire of 2020 among many other wildfires they should own through their actions. Please, keep in mind that I am not arguing that these WMPs should be focused on criminal or civil culpability but rather that they need to identify and indicate lessons learned associated with these incidents if we are ever going to make real progress in terms of wildfire risk mitigation.

I urge the commission to make sure that each utility identifies failures for each and every wildfire where their equipment, business processes or decision-making has contributed to recent wildfires. We must be able to track how every utility has identified failures, lessons learned from those failures and the wildfire mitigation tactics that followed if we are going to have Wildfire Mitigation Plans that are based upon on-the-ground realities rather than focused on financial liability avoidance.

V. Comments: Inputs to the Plan and Directional Vision of Wildfire Risk Exposure

Unfortunately, the "directional vision" expressed in this section by the utilities is clouded by their inability or unwillingness to acknowledge lessons learned beyond those they have been forced to acknowledge by outside parties and court processes as described in the prior section. There are entire areas of their risk modeling that are skewed away from addressing very significant risks to avoid culpability or general association with past wildfires. Consider the following statement by Paul McGregor, Director EO Risk Management and Analytics from a recent CPUC workshop on February 22, 2021:

> *"As part of our wildfire mitigation plan and our model, there are a lot of Failure Modes Effects and Analysis (FMEA) that goes on and gets done. So, we are looking at components that we need to mitigate... Also, as you said with regards to the Kincade Fire… the particular piece of equipment that was suspected of being part of this was a jumper cable and that particular piece of analysis is NOT discussed in our Wildfire Mitigation Plan because our transmission wildfire risk model is currently in*

development... with regards to our planning models as far as transmission wildfire risk assessment, we are still building that process in there. So, we got a ways to go in that and is one of the things we are working on in 2021. Unfortunately, we are struggling with data on that... but we are making progress."[2]

Now, combine this with the statement the following day from Aaron Johnson, Vice President Wildfire Safety Public Engagement:

"We understand at a high-level that our equipment was responsible for that fire… So, we looked at what are the criteria… that was a very healthy piece of equipment that had been inspected multiple times, there were high definition cameras and nothing was identified. However, the fire conditions on the ground were quite extreme during that time, so we adopted something in our transmission protocols, called ***black swan criteria****."*[3]

This "black swan" reference seems to only be leveraged by PG&E to describe events and is referenced 17 times within their WMP as an excuse for why events were not considered because they were deemed as extremely rare but with severe consequences. This phrase and its application to risk modeling was developed by Nassim Nicholas Taleb but seems to be overused across the PG&E WMP and throughout their filed comments across proceedings including those filings in US District court as somehow a catch all phrase for the causes of recent fires.[4] This term has been used by PG&E to explain away failures associated with the Kincade Fire, Zogg Fire and other fires across their territory. It is used so often that it would seem that there is a bevy of black swans (wedge if in flight) plaguing PG&E risk modeling and it was just their bad luck that these instances were hoisted upon them. If we are amenable to this characterization by PG&E regarding these events, it will be important to note a warning Nassim Nicholas Taleb also states in reference to black swan events:

[2] See 2021 Wildfire Mitigation Plan Updates Technical Workshop, February 22, 2021 (admin monitor mark 2:00) http://www.adminmonitor.com/ca/cpuc/workshop/20210222/
[3] See 2021 Wildfire Mitigation Plan Updates Technical Workshop, February 23, 2021 (admin monitor mark 5:11) http://www.adminmonitor.com/ca/cpuc/workshop/20210223/
[4] See Attachment A: Response to Request for Follow Up by PG&E, Case No. 14-CR-00177-WHA, filed 11/18/2020

"Some business bets in which one wins big but infrequently, yet loses small but frequently, are worth making if others are suckers for them and if you have the personal and intellectual stamina."[5]

I suggest that the commission and parties to this proceeding not be played as "suckers" by this PG&E misuse and mischaracterization of these failures as "black swans" but rather understand that these failures are common white swans and deserving of more integration into the WMPs and to provide a broader "directional vision" to the wildfire mitigation plans. The alternative position is to believe that rusted C-hooks, jumper cables, misuse of wind sensor data, leaving abandoned infrastructure energized, poor de-energization decision making and a host of other utility ailments are all just unfortunate, rare and unavoidable occurrences that cannot be accounted for in risk mitigation efforts. The commission and communities across California should not be subjected to these utility diversion tactics. I urge the commission to make sure that these failures are incorporated into the utility Wildfire Mitigation Plans. We cannot wait on CAL Fire reports or Federal Monitors proving incidents were the fault of a utility before we ingrain learnings from past failures into these risk mitigation efforts. Similarly, we can't wait for these failures to be deemed statistically significant enough by the IOUs to warrant inclusion into their WMPs. **If a failure contributed to or directly caused a catastrophic wildfire, that should be enough of a reason for the WSD to require it to be addressed within the 2021 Wildfire Mitigation Plans.**

VI. Comments: Performance Metrics and Underlying Data

Undoubtedly, the underlying data is much improvement over past WMPs for the utilities but the commission should be careful not to assume this data supports "performance metrics" when they are not outcome-oriented and do not adequately describe the safety or wildfire mitigation performance of the utility. Throughout these plans, the utilities continue to conflate activity metrics with performance metrics and do not adequately incorporate common measures of risk or risk mitigation. Moreover, the plans seem to equate linear relationships between particular tactics and the risk reduction associated with their implementation as opposed to the compound

[5] The Black Swan: The Impact of the Highly Probable, Nassim Nicholas Taleb, Random House Pub., April, 2007

influences associated with the risks and tactics. It is the compound interrelationship of risk mitigation tactics that makes an effective risk mitigation strategy. The most effective operational tactics may be ineffectual if not considered in conjunction with other factors in a particular line segment, geography and/or across a utility territory.

As an example, Southern California Edison (SCE) describes "risk buy down" and states on page 10 of their WMP the following:

> *"We have performed risk-reduction and risk-spend efficiency (RSE) calculations using the granular approach mentioned in Risk Assessment and Mapping above. This provides a more accurate understanding of relative risk buy down with any WMP activity and enables us to more consistently evaluate the relative risk-reduction benefits of our portfolio of WMP activities."*

The use of this buy-down approach is described on page 51 of their plan with the following table:

Table SCE 4-2
Risk Illustrative Example

Asset ID	Probability of Ignition (%)	Consequence (risk points)	Total Risk
Asset A	50%	100	50
Asset B	10%	10,000	1,000

This "buy down" approach is effective if it is applied to the compound effects of the given assets and tactics but if used as a linear measure this methodology can lead to unintended consequences and over inflate the degree of risk mitigation. In this example, Asset A may demonstrate a total risk of 50 in one environment but if not within close proximity of Asset B may actually have a much higher risk. I believe it is this overuse of linear rather than compound risk assessment that has led to poor decision-making for many of the utilities and I will illustrate it here with the use of the Kincade Fire as an example which is nowhere mentioned within the PG&E WMP:

- **Kincade Fire Negligent Risk Calculation:** PG&E has indicated that the primary reason that they did not de-energize the transmission line which was a significant cause of the Kincade Fire is because it presented a low probability of wildfire risk

(i.e. black swan). It is this same negligent miscalculation that has led them to not incorporate these same risks (jumper cable failures, mismatched de-energization protocols, etc.) into their 2021 WMP as that they are deemed "low probability events." However, this infrastructure DOES pose a much higher risk when in close proximity of other assets. Jumper wire and clearances or spaces are determined by considering the sag length of the jumper wire so as to create distance between the tower or arms. The swinging movement of the jumper wire or the movements of the power transmission line itself can dramatically increase the interdependent risks of these component parts on the transmission line. Therefore, it is desirable to have the jumper in a more rigid state where conditions are likely to cause more swinging (exp. high wind events). Further compounding these risks is the catenary angle of the conductor and the insulated string which may cause extreme temperature variations and movements such as sleet-jumping and galloping.

- **PG&E Mitigation Mismanagement:** If these compound risks were considered by PG&E then perhaps they would have not drawn the wrong-headed linear conclusion that transmission lines are low risk. Instead, they may have identified those transmission lines that are more exposed to wind and measured the rigidity of jumper configurations. The transmission lines that have less rigid jumper configurations in higher wind conditions might be moved up on the priority list when the de-energization decisions were made on October 23rd, 2019 leading to the largest wildfire in Sonoma County history. In addition to these types of mitigations for the asset risks, there are operational and process specific mitigations that could and should have occurred. As an example, the practice of cutting the jumper wire in the field might be substituted with a process that determines the jumper arrangement (including wire size) at the manufacturing facility where more precise and consistent tensions and tolerances can be assured.

Now, the purpose of this example is not to define the mitigations that were necessary to prevent the PG&E Kincade Fire but only to point out that the linear methodology that PG&E uses within their WMP is negligent in its simplified application and often times just plain wrong.

The linear assessments of risk levels that is the default approach for these WMPs leads to unintended consequences at best and at worst exacerbates and increases risks due to a lack of foresight and consideration of compound risk factors. These compound risk factors must be considered within the Wildfire Mitigation Plans particularly in those cases where catastrophic wildfires are the result.

Similarly, the Zogg Fire is another example of the catastrophic consequences when PG&E negligently applies linear risk factors. It is not just that they did not have the right quality controls in place for their vegetation management on certain line segments that ignited the Zogg Fire. It is the failed decision-making processes that led to an over-reliance on inapplicable wind sensors and de-energization assessments plus many other interrelated and unreported factors that led to the Zogg Fire. Nowhere within the PG&E WMP are these inter-related risk factors identified or considered to improve the mitigation tactics and strategies deployed.

VII. Comments: Mitigation Initiatives and Wildfire Mitigation Strategy

Yes, these 2021 wildfire mitigation strategies proposed by the utilities are more thorough but are too often based upon oversimplified metrics and linear calculations of probability and consequence for particular assets or line segments. More troubling is the fact that these mitigation strategies do not recognize or directly address the catastrophic failures that have occurred in recent years. Nowhere within their WMP does SCE address their failures that led to the 2017 Thomas Fire, the 2018 Woolsey Fire or the 2020 Bobcat Fire. Similarly, the constant and consistent failures of PG&E (2017 Tubbs Fire, 2018 Camp Fire, 2019 Kincade Fire, 2020 Zogg Fire and Glass Fire, etc.) are not even addressed within their WMP except for recognizing the financial liabilities and regulatory penalties that might result. This head-in-the-sand approach does not benefit the utilities or the commission. It may benefit shareholders that bank on short-term yield but it certainly does not bode well for the longer-term prospects of our California residents that live among the lines.

Also, noticeably missing from the utility wildfire mitigation strategies is any mention or integration with the Community Wildfire Protection Plans (CWPPs) that stretch across

California at the local-level. We will never have effective utility wildfire mitigation strategies if they are not deliberately and strategically integrated with our CWPPs. Moreover, through this strategic integration we can share best-practices and resources to develop more comprehensive strategies. How can we leverage these combined strategies to create fire breaks and fuel breaks? How can we leverage shared wildfire mitigation resources to improve vegetation management, infrastructure hardening and to better prepare our residents in high fire threat districts (HFTDs)? How might we crowd-source the identification of tree, animal and balloon contacts with line segments if we collaborated around these type of solutions? There are many advantages that could be realized through the strategic integration of WMPs and CWPPs and we should require this integrated approach in these 2021 WMPs and not wait until another year of catastrophic wildfires.

VIII. Public Safety Power Shutoff (PSPS)

I am very concerned that these WMPs are not considering the phase 3 de-energization guidelines that are now being considered by the commission within Rulemaking 18-12-005. Prior to approving these WMPs we should ensure that the finalized guidelines are reflected in these plans especially considering that PSPS events are often considered the mitigations of last resort. There are a number of areas that need considerable improvement in those de-energization guidelines and in these WMPs prior to approval. This includes how our Community Resource Centers (CRCs), Emergency Operation Centers (EOCs), critical Infrastructures and de-energization exercises are treated along with improvements to how IOUs conduct outreach particularly to our Access and Functional Needs (AFN) populations. My comments for improvements to the WMPs are much the same as the improvements that should be made in the de-energization guidelines so I will reemphasize and highlight them here.

Our CRCs need specific customer engagement strategies incorporated into Service Level Agreements and provided to the "respective local governments and health agencies." Service Level Agreements are readily used by our utilities to manage vendors and they should not be abandoned here as a tool to promote public safety. All the utilities should identify measurable levels of service for these activities beyond the measurements provided within their WMPs

which are simply counts of the services and supplies provided. We need to ensure the QUALITY of the services by identifying the quality attributes and the quality controls (tools and measures) that will ensure a high-level of service particularly for these populations that are disproportionately at risk during de-energization events.

Moreover, simply using AQI as the only environmental benchmark for determining the suitability of indoor vs. outdoor CRCs is insufficient. The other factors which are common during these events coinciding with high wildfire threat levels include high heat and high wind. The WMPs should include these measures when determining whether indoor CRCs should be required. The National Weather Service defines an "Excessive Heat Warning" as having "a heat index of 105 °F or greater that will last for 2 hours or more" and I recommend that the WMPs also include this as a threshold.[6] Similarly, the National Weather Service defines a "high wind warning" when there are "sustained winds or 40 mph or higher for one hour or more OR wind gusts of 58 mph or higher for any duration."[7] These three measures (temperature, wind and air quality) could be used to set an interdependent threshold or be used as independent criteria for when CRCs should be required to move indoors. The WMPs should also consider the fact that our elderly populations are particularly vulnerable to these adverse conditions and are often overrepresented at these centers during peak usage times.[8]

This typical 24-hour timeframe identified by the utilities is insufficient notice regarding the location of these CRC locations. These CRC locations should rarely change and both the outdoor and indoor alternatives should be communicated to resident ratepayers prior to wildfire season (March/April timeframe) so they can prepare and plan accordingly. Waiting until the adverse conditions are heaped upon a community is the wrong time to be providing this information. Many residents will need to identify alternate means of transportation and rely upon the accessibility of these sites for their health, safety and general peace-of-mind. Primary and backup locations should be pre-identified within the WMPs if a utility in coordination with local agencies determines that is prudent for public safety. We have pre-defined evacuation

[6] See National Weather Service, Heat Watch vs. Heat Warning, https://www.weather.gov/safety/heat-ww
[7] See National Weather Service, Wind Warnings, Watches & Advisories, https://www.weather.gov/safety/wind-ww
[8] See Sacramento Bee, "It being 95 degrees in our house… what it's like at Placerville PG&E power shutoff center", October 26, 2020, https://www.sacbee.com/news/local/article245585740.html

routes and shelters for all sorts of disaster scenarios (exp. tornado shelters, hurricane/flood evacuation routes, etc.) and should do so with these IOU events.

Moreover, these WMPs should include maps of "sectionalization devices" and a functional description of these devices. In the 2018 and 2019 timeframe, the utilities and the commission have focused on the number of "reclosers" as indicative of the degree to which de-energization events might be limited for a particular utility or community. Now, our IOUs leverage the broad term "sectionalization devices" more often in their communications to describe and in many cases to inflate their progress on being able to manage and limit these events. The result of this definitional conflation is that public officials, emergency managers and others often use these terms interchangeably which leads to a significant gaps in understanding regarding our capabilities to manage these events.

The commission should require that pre-season reports contain maps with the location of these devices and associated device descriptions. This would enable our local agencies to have the information necessary to provide recommendations regarding the use of these devices to limit the scale and scope of these events. As an example, emergency managers in collaboration with others might be able to advise on how our telecommunication infrastructure might be safeguarded so our communities have more options to stay connected during these events. Without this information, the public is kept in the dark and disconnected from the true capabilities of our utilities to guard against the significant public safety and financial implications of these events. If this information was shared transparently, it would also help build public trust in the prudent use of these de-energization tactics. Moreover, this information will help us better understand the balance between the risks associated with de-energization and the wildfire risks they are designed to mitigate.

Similarly, the mapped location of wind sensors and weather stations should also be supplied in pre-season reports and within the WMPs. Recent investigations and associated reporting have revealed that poor utility decision-making regarding where not to de-energize was in part due to the misuse of wind data far from the impacted locations. This was particularly true with the recent 2020 Zogg Fire where an investigation revealed "*PG&E ran a complicated algorithm*

designed to gauge the risk of a wind-sparked wildfire starting in each grid square on its map without knowing the actual wind conditions in each square."[9] Of course, the fact that utilities work with incomplete and often times inconclusive data is not the point. It is the transparency of this information which must be incorporated into these WMPs so that the public understands the limitations of this information and can help guide decision-making.

If Shasta County Emergency Managers and other public officials understood where PG&E was sampling this wind data, might they have advised against this application of the data given their local knowledge of their county conditions? Might this have led to different decisions and perhaps avoided the Zogg Fire ignition? If this wind sensor map was provided to Shasta County officials prior to the 2020 wildfire season, might they have advocated to ensure an additional inexpensive wind sensor was positioned closer to their location? We must not let the lack of disclosure around the Zogg Fire investigation or other undisclosed reports limit our ability to improve these de-energization standards within the WMPs. We need to push for the evidentiary record in these official reports AND until these reports are released to the public we need to work with the investigative reporting that provides us a strong indication of likely causes. This information must inform how we improve these WMPs or we may misfocus our attention away from the types of improvements that will really make a positive impact on how these de-energization events are managed.

The WMPs contain some improvements in the quality of outreach and communications around de-energization but there is more improvements that should be required to move us beyond the quantity of communications as the sole measure of success and instead focused on the quality or effectiveness of these communications. This is particularly true for our AFN populations where WMPs seem not focus on communication methodology and prioritize process over product and results. The commission should not concern itself with HOW communications are managed by the utilities. Every communications tactic and strategy should be built upon

[9] See ABC10, "Investigation: PG&E made shutoff decisions on junk science", February 2, 2021, https://www.abc10.com/article/news/investigations/investigation-pge-shutoff-decisions-zogg-fire/103-273163f6-c0f6-4404-b36b-9053b2980d3d

driving measurable results which is nowhere mentioned within this section of the WMPs. I believe Mr. Vesey, Former PG&E CEO expressed this view quite clearly a year ago stating:

"the only arbiter of effectiveness of communications are those people who are supposed to be receiving the communications. I think that's the point you're getting. Effective communication is not just touching and getting a response that somebody's been communicated for. It's what has been communicated, was the message received, was it actionable. These are all very good points, and it's something that we have to really up our game in, because I will say that when I say there were failures in the way we executed the PSPS in the last fire season, it also comes down to coordination and communication with the parties outside of the company."[10]

Yes, the communication strategies should always be modified based upon the populations for which they target. Effective communications strategies and tactics are always modified based upon the targeted communities and audiences and certainly AFN populations will need different accommodations. However, I would advise the commission not to be concerned about the types of partnerships the IOUs build or the mode of those communications. I suggest that the WMPs be built upon surveys, focus groups and other means to measure the effectiveness of communications. Distinct surveys may be provided for specific medical baseline customer segments and AFN communities to measure the quality of de-energization communications. As an example, we might set the standard that 95% of ratepayers that rely upon electric-powered wheelchairs must be aware of where to charge their wheelchair during a de-energization event and how to get there.

Similar performance-based measures should be established to gauge the effectiveness of other utility PSPS protocols. We need to set quality targets for effective communications and effective operations for PSPS events. As an example, we might set a standard that 98% of ratepayers that rely on medical equipment must be aware of the utility defined process to receive a free backup battery and that a minimum of 95% of these ratepayers that request the battery must receive it within 30 days. The "how" should be at the discretion of the utility and whether

[10] Proceeding I.19-09-016 Hearing Transcript (vol. 3), February 27, 2020 (pgs. 440-443)

they manage this internally and/or through partners should not matter to the commission. Only results.

IX. Summary and Conclusion

The proposed wildfire mitigation plans are robust in size and scope but lack the specific integration that we need and largely do not address the on-the-ground conditions and internal systemic issues that will unfortunately lead to more catastrophic wildfires. They rely too heavily on linear risk measures when the lines that are the most at-risk lie within complex and interdependent environments where compound internal and external risk variables are present. We must not let the lack of disclosure by the utilities, CAL Fire and other entities regarding these events get in the way of important wildfire mitigation work that could be represented within these WMPs. This ongoing cycle of not releasing the evidentiary record associated with wildfire reporting, producing IOU mitigation plans that ignore systemic failures followed by more catastrophic wildfires needs to be curtailed within this 2021 WMP process. This vicious cycle prioritizes the tactical legal advantage of certain utility stakeholders and shareholders over the commission's mission to promote "SAFE, clean and affordable utility service." I urge the Wildfire Safety Division and the California Public Utilities Commission to take decisive actions so we can all move forward together with a unified strategy to address our shared wildfire and climate change adaptation challenges.

Dated:

March 29, 2021

Respectfully submitted,

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Attachment A: Response to Request for Follow Up by PG&E

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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

UNITED STATES OF AMERICA, Plaintiff, v. PACIFIC GAS AND ELECTRIC COMPANY, Defendant.	Case No. 14-CR-00175-WHA **RESPONSE TO REQUEST FOR FOLLOW UP BY PG&E CONCERNING ITS OCTOBER 26 SUBMISSION** Judge: Hon. William Alsup

Defendant Pacific Gas and Electric Company ("PG&E") respectfully submits this response to the Court's October 29, 2020 order requesting information based on PG&E's October 26, 2020 submission regarding the Zogg Fire. (Dkt. 1256.) The responses below address three main subjects, presented in the same order as the Court's questions:

First, PG&E's responses to Question 1-13 and 19 of the Court's October 29, 2020 order, in addition to the below supplement to Questions 1-3 of the Court's October 21, 2020 order, provide information relating to PG&E's September 27, 2020 Public Safety Power Shutoff ("PSPS") event.

Second, PG&E's responses to Questions 14-17 concern the specific tree apparently identified by CAL FIRE, and prior inspections and patrols of the area of interest.[1]

Third, PG&E's response to Question 18 provides further information as to why there was no separate Catastrophic Event Memorandum Account ("CEMA") inspection for the Zogg Mine Road area of the Girvan 1101 12 kV Distribution Circuit ("Girvan Circuit") between the routine inspections of the circuit in 2019 and 2020.

The Court asked that PG&E's responses be submitted under oath. (Dkt. 1256 at 5.) Attached to this submission as Exhibits A and B are two declarations addressing matters for which PG&E employees have personal knowledge. Other PG&E responses, such as those addressing actions by CAL FIRE or PG&E vegetation management contractors, are based on PG&E's investigation and review of relevant records, and are not based on the personal knowledge of PG&E employees. One response, to Question 14 concerning the history of vegetation management work performed in the area of interest following the Carr Fire, is preliminary given that PG&E's investigation is in its beginning stages. PG&E is continuing to investigate and will provide an updated response, along with a declaration or declarations as requested by the Court, once it has analyzed further records and advanced its investigation.

[1] When PG&E refers to the "area of interest", it is referring specifically to the vicinity of the three specific spans of line from which CAL FIRE collected evidence, not the entire Girvan 1101 12 kV Distribution Circuit ("Girvan Circuit") (which spans approximately 117 line miles). The area of interest is depicted in Exhibit C to PG&E's October 26, 2020 submission.

Supplement to PG&E's October 26, 2020 Submission Responding to Questions 1-3 of the Court's October 21, 2020 Order for Further Information Regarding the Zogg Fire

Since PG&E's October 26, 2020 submission, PG&E has consulted with PG&E personnel who were then "managing multiple Public Safety Power Shutoff ('PSPS') events" (Dkt. 1250 at 11), in order to clarify the role of the Distribution Large Fire Probability Model ("LFP_D") in PSPS events.

For distribution lines, the LFP_D model combines two key inputs: PG&E's Outage Producing Winds ("OPW") model and its Utility Fire Potential Index ("Utility FPI"). Based on the combination of the OPW and Utility FPI, the LFP_D model provides an initial meteorological footprint for a PSPS event by scoring geographic areas to determine whether they meet a threshold for de-energization set at 6.0. As discussed in more detail below, the conditions for inclusion of the Girvan Circuit were not close to bringing those areas within the scope of a PSPS event on September 27, 2020 based on the combination of the OPW and Utility FPI scoring less than 3.2.

Two additional methods are also considered for including areas in the PSPS footprint even where the LFP_D model scoring does not meet or exceed 6.0. *First*, PG&E's PSPS model looks to see whether additional areas meet "Black Swan" criteria, which focuses on the consequences of a potential fire without regard to its likelihood of occurring. If an area does, that geographic area is included in the initial meteorological footprint for a PSPS event. *Second*, if the results of the LFP_D and Black Swan for a given area are close to, but below, the threshold for de-energization, PG&E's meteorology team, led by PG&E's Meteorologist-In-Charge, may nonetheless decide to recommend to the Officer-In-Charge for the PSPS event that the lines running through that area should be de-energized because of the borderline results and because other data (such as other weather models that give information on broader geographic areas) suggest the probability that the weather event could be more severe than what the LFP_D model is predicting is relatively high.

It is the responsibility of the meteorology team to recommend areas for potential de-energization based on their assessment of the models, as well as other available meteorological data. If an area is not initially recommended for de-energization by the meteorology team, that determination will not be reviewed by other departments at PG&E, which do not have meteorological expertise.

The precise mechanics of the scoping process are described further herein in response to the Court's October 29, 2020 follow-up questions.

Question 1: With respect to PG&E's Large Fire Probability model identification, PG&E's description in Exhibit E states at page 14:

> PG&E's Large Fire Probability (LFP) model identification of areas on both PG&E's distribution and transmission systems with high wind-driven outage probability combined with high probability of a large fire if an ignition were to occur.
>
> > • On the distribution system, the Distribution Large Fire Probability Model (LFP_D) is a product of PG&E's Outage Producing Wind (OPW) model and FPI models. The LFP_D model provides hourly output at 2km model resolution and highlights locations with concurrence of a high probability for large fires and high probability of wind-related outages on PG&E's distribution system.
> >
> > • On the transmission system, the Transmission Large Fire Probability Model (LFP_T) is the product of PG&E's Transmission Operability Assessment (OA) model and FPI models. The LFP_T model provides hourly forecast outputs for each transmission structure. The model highlights locations with both an increased probability for large fires and high probability of wind-related failures on PG&E's transmission system.

Leading up to the Zogg Fire, how close did the Distribution Large Fire Probability model come to assessing specifically the Girvan Distribution Line? Describe all September 2020 assessments made for the smallest area that included the Girvan Line.

PG&E Response:

To determine the recommended de-energization scope, the PG&E meteorology department analyzes the meteorological conditions and fire potential for each portion of the

potential PSPS scope by breaking PG&E's service territory into preset grid cells of two kilometers-by-two kilometers, as described in further detail below.

The Girvan Circuit traverses 50 two kilometer-by-two kilometer grid cells and the LFP_D model specifically assessed each of these grid cells during the September 27, 2020 PSPS event. At no point in the lead up to the September 27, 2020 PSPS event did any grid cell traversed by the Girvan Circuit meet the 6.0 threshold for de-energization nor did any grid cell satisfy the Black Swan criteria. The highest two kilometer-by-two kilometer LFP_D output was less than 3.2 (compared to the requisite 6.0 for inclusion), and it was forecast for grid cell 142_377, which is located approximately 11 miles from the area of interest.[2]

While the primary initial driver of the scope of de-energization is the two-kilometer model, the model also assessed each of the 30 three kilometer-by-three kilometer grid cells traversed by the Girvan Circuit. The highest output of the LFP_D model for the three kilometer-by-three kilometer grid cells traversed by the Girvan Circuit was 4.76, and it was forecast for grid cell 89_245, which overlaps with grid cell 142_377 and is approximately 10.8 miles away from the area of interest.

As a result of the PG&E meteorology team's review of this weather data, the Girvan Circuit was not considered in scope for potential de-energization during the September 27, 2020 PSPS event.

PG&E is producing at Bates PGE-ZOGG-NDCAL-00009368 to PGE-ZOGG-NDCAL-00009371 each of the LFP_D model outputs that were run in September 2020 for the two kilometer-by-two kilometer grid cells traversed by the Girvan Circuit. PG&E is producing at Bates PGE-ZOGG-NDCAL-00009372 each of the LFP_D model outputs that were run in September 2020 for the three kilometer-by-three kilometer grid cells traversed by the Girvan

[2] When PG&E refers to distances in relation to grid cells in this submission, such distances are calculated from the mid-point of the grid cell.

Circuit.[3] The table in Appendix A lists the column headers for the output of the LFP_D model alongside a brief description of what each column header means.

Question 2: What were the specific ratings, scores and weightings considered by the PG&E team, broken out for each distribution line in Shasta County in the September PSPS?

PG&E Response:

PG&E does not have any "specific ratings, scores and weightings . . . broken out for each *distribution line* in Shasta County" but rather has such data for *each geographic grid cell* in Shasta County. PG&E determines the scope of de-energization for distribution circuits by analyzing the LFP_D model outputs and related forecast meteorological conditions of two kilometer-by-two kilometer geographic regions called grid cells, which then leads to the creation of the de-energization polygon. After the de-energization polygon is created, PG&E determines which distribution lines, if any, traverse that polygon.

In response to the Court's question, PG&E has therefore identified the two kilometer-by-two kilometer and three kilometer-by-three kilometer grid cells traversed by each of the 39 distribution circuits in Shasta County. For the grid cells traversed by each of these distribution circuits, PG&E is producing at Bates PGE-ZOGG-NDCAL-00009373 the LFP_D model output for the run immediately prior to PG&E's final scoping decision based on the two kilometer-by-two kilometer grid cells and at Bates PGE-ZOGG-NDCAL-00009374 for the three kilometer-by-three kilometer grid cells. PG&E refers the Court to the table in Appendix A that describes what each column of the LFP_D output represents.

PG&E runs the LFP_D model four times each day—initialized at 00:00, 06:00, 12:00 and 18:00 UTC. Bates PGE-ZOGG-NDCAL-00009373 and Bates PGE-ZOGG-NDCAL-

[3] PG&E is providing these LFP_D model outputs, as well as the other data referred to in response to Questions 2, 6, 7 and 8, on the same thumb drive that it is delivering to the Court in response to Question 19. Appendix B contains an index of the Bates-stamped data.

00009374 contain the September 27, 2020 00:00 UTC model run because it was the latest model run that informed the final PSPS scope.[4]

Question 3: To what extent, if at all, did the Distribution Large Fire Probability model take into account the extent to which vegetation had been cleared or trimmed or not cleared or trimmed in the immediate vicinity of a specific distribution line?

PG&E Response:

The LFP_D model is not based on the extent to which vegetation had been cleared or trimmed. Even in a perfectly trimmed area, severe wind conditions are capable of causing catastrophic fires by causing healthy trees and limbs to make contact with a line or by causing equipment failures. PG&E determines the scope of de-energization for distribution circuits by analyzing the forecast meteorological and fuel conditions of two kilometer-by-two kilometer geographic regions called grid cells. The specific factors and data inputs for the LFP_D model are discussed in response to Question 9, below.

Thus, even when PG&E has patrolled a line and worked trees prior to fire season, PG&E will still consider such lines for de-energization. Vegetation is dynamic, such that vegetation that did not qualify for removal during PG&E's latest patrol may have changed by the time of a PSPS event. Vegetation management patrols rely on trained and qualified arborists, but as with any process that involves subjective human judgment, may not be executed perfectly. Additionally, there are potential sources of wildfire ignition other than hazard trees and limbs. For example, extreme weather presents the risk of high winds causing a healthy tree or limb to break and make contact with a line; in the case of a limb, the limb could be carried some distance before it strikes the line. Moreover, high winds could cause a piece of equipment to fail, such as a pole that is blown over, or cause lines to slap together. Lastly, PG&E's power lines could be struck by other objects, such as metallic balloons or other airborne debris carried by the wind.

[4] As explained in the response to Question 9, PG&E's meteorology department may also consider earlier model runs at any point in the process or to see the evolution of scores. PG&E does not keep a record of when earlier model runs are reviewed by meteorologists.

Question 4: To what extent, if at all, did the Distribution Large Fire Probability model take into account the fire threat tier level through which a specific distribution line ran?

PG&E Response:

The LFP_D model is run only with respect to PG&E's High Fire Risk Area, which includes the CPUC-defined High Fire-Threat Districts ("HFTD"). Beyond that, whether the area is Zone 1 or Tiers 2 or 3 is not itself directly relevant to the analysis, though the meteorological and fuel conditions, which in the long-term inform Tier determination, are factored into the model for each individual cell. The specific factors and data inputs for the LFP_D model are discussed below in PG&E's response to Question 9.

Question 5: Did the Distribution Large Fire Probability model take into account the difficulty or ease with which residents would be able to evacuate on short notice in the event of a wildfire?

PG&E Response:

The LFP_D model did not take into account the difficulty or ease with which residents would be able to evacuate on short notice in the event of a wildfire, which would vary based on the location of each resident and the circumstances of individual fires and shifting winds. The specific factors and data inputs for the LFP_D model are discussed below in PG&E's response to Question 9.

Question 6: For the smallest region that included the Girvan Line, what were PG&E's ratings and/or assessments in days and hours leading up to the late September PSPS with respect to (see page 14 of Exh. E):

(a) Fuel moisture;

(b) Humidity;

(c) Wind speed;

(d) Air temperature;

(e) Land type; and

(f) Historical fire occurrences.

PG&E Response:

PG&E's ratings and/or assessments of the fuel moisture, humidity, wind speed and air temperature values for each grid cell traversed by the Girvan Circuit are located in the LFP_D model outputs produced in response to Question 1. PG&E refers the Court to the table in Appendix A, which describes what each column of the LFP_D output represents.

PG&E is producing its ratings and/or assessments of the "land type" for each two kilometer-by-two kilometer grid cell traversed by the Girvan Circuit at Bates PGE-ZOGG-NDCAL-00009375 and for each three kilometer-by-three kilometer grid cell at Bates PGE-ZOGG-NDCAL-00009376. As seen therein, the land type for such grid cells is a combination of Forests, Shrublands and Grass-Savannas.

Neither the Utility FPI nor the LFP_D models consider whether a given grid cell or distribution line has experienced historical fires. But historical fire occurrences are used as a data input to develop the Utility FPI model, and the output thereof is incorporated into the LFP_D model, as discussed below in response to Question 9. Thus, instead of looking to whether a given area has experienced fires in the past, PG&E correlates decades of historical fire data and related weather conditions to develop a model that predicts the likelihood that in a given area, under the input weather, fuel and related conditions, a 40-acre fire will grow to 1,000 acres. By relying on a comparison to the weather and related conditions of past fires, PG&E is able to provide forecasts applicable across its service territory. The two historical fire datasets used to develop the Utility FPI model are the U.S. Forest Service's Fire Program Analysis—Fire-Occurrence Database and a database compiled by PG&E of large fires and their associated perimeters from the Visible Infrared Imaging Radiometer Suite.

Question 7: How did those assessments compare specifically to the smallest region that included the de-energized line nearest the Girvan Line?

PG&E Response:

For the September 27, 2020 PSPS event, PG&E's meteorology department recommended de-energizing a polygon through which three distributions circuits traversed (the

Deschutes 1101, Volta 1101 and Volta 1102 Distribution Circuits) and which was comprised of 95 two kilometer-by-two kilometer grid cells. The nearest de-energized circuit to the Girvan Circuit is the Deschutes 1101 Distribution Circuit (the "Deschutes Circuit").

The two kilometer-by-two kilometer grid cell that comprises part of the de-energization polygon nearest the Girvan Circuit that contains a de-energized portion of the Deschutes Circuit is 157_377. PG&E's ratings and/or assessments of the fuel moisture, humidity, wind speed and air temperature values for each two kilometer-by-two kilometer grid cell comprising the de-energization polygon (including grid cell 157_377) are located in the LFP_D model outputs for those grid cells, which PG&E is producing at Bates PGE-ZOGG-NDCAL-00009377 to PGE-ZOGG-NDCAL-00009380.

The three kilometer-by-three kilometer grid cell that comprises part of the de-energization polygon nearest the Girvan Circuit that contains a de-energized portion of the Deschutes Circuit is 99_245. PG&E is producing the LFP_D model outputs for the three kilometer-by-three kilometer grid cells traversed by the de-energization polygon (including grid cell 95_245) at Bates PGE-ZOGG-NDCAL-00009381 to PGE-ZOGG-NDCAL-00009384.

PG&E refers the Court to the table in Appendix A that describes what each column of the LFP_D output represents.[5]

Question 8: Explain specifically why some lines in Shasta County were de-energized but the Girvan Line in Shasta County was not. How close were any de-energized lines to the Girvan Line and what specifically accounted for the difference?

PG&E Response:

Three distribution circuits in Shasta County were de-energized as part of the September 27, 2020 PSPS event (the Deschutes 1101, Volta 1101 and Volta 1102 Distribution Circuits). The decision to de-energize the polygon traversed by those three circuits and not to

[5] PG&E is also producing its ratings and/or assessments of the "land type" for each two kilometer-by-two kilometer grid cell traversed by the de-energization polygon at Bates PGE-ZOGG-NDCAL-00009385 and for each three kilometer-by-three kilometer grid cell at Bates PGE-ZOGG-NDCAL-00009386.

de-energize the Girvan Circuit was due to differences in the forecast weather conditions for their respective grid cells. As discussed above in response to Question 1, none of the two kilometer-by-two kilometer or three kilometer-by-three kilometer grid cells traversed by the Girvan Circuit exceeded the de-energization guidance values of the LFP_D model or Black Swan criteria.

The forecast weather conditions inside the de-energized polygon through which the three de-energized distribution lines traversed were significantly more severe than those forecast to face the Girvan Circuit. While none of the two kilometer-by-two kilometer grid cells in the de-energization polygon exceeded the de-energization guidance values of the LFP_D model or Black Swan criteria, 26 of the three kilometer-by-three kilometer grid cells did exceed the 6.0 de-energization guidance values of the LFP_D model, with values as high as 15.3. And so, in light of the relatively more severe forecast weather in the polygon, and based on the available data and their subject matter expertise, PG&E's meteorology team recommended that the polygon should be de-energized.

The two kilometer-by-two kilometer grid cell nearest the Girvan Circuit that contains a de-energized portion of each of three distribution circuits in Shasta County that were de-energized as part of the September 27, 2020 PSPS event, and the grid cell's distance from the Girvan Circuit, is listed below:

- For the Deschutes Circuit, grid cell 157_377 is approximately 18.9 miles from the Girvan Circuit.
- For the Volta 1101 Circuit, grid cell 158_374 is approximately 20.5 miles from the Girvan Circuit.
- For the Volta 1102 Circuit, grid cell 157_377 is approximately 18.9 miles from the Girvan Circuit.[6]

[6] PG&E notes that each of these three circuits have de-energized spans that are nearer to the Girvan Circuit than are the grid cells listed in response to Question 8 but that such spans fell outside of the de-energization polygon. These spans were de-energized only because they were connected to spans located inside the de-energization polygon. PG&E does not interpret the Court's request to be focused on these outside-the-polygon grid cells and so PG&E is not producing detail or data concerning such spans or their grid cells.

LFP_D model outputs for the grid cells traversed by the Girvan Circuit were produced in response to Question 1, and LFP_D model outputs for the grid cells traversed by the de-energization polygon were produced in response to Question 7. PG&E is also producing the LFP_D model outputs for each of the two kilometer-by-two kilometer grid cells traversed by the Deschutes 1101, Volta 1101 and Volta 1102 Circuits at Bates PGE-ZOGG-NDCAL-00009387 to PGE-ZOGG-NDCAL-00009390 and for each such three kilometer-by-three kilometer grid cell at Bates PGE-ZOGG-NDCAL-00009391 to PGE-ZOGG-NDCAL-00009394.

Question 9: Describe with specificity and step-by-step how the "Distribution Large Fire Probability Model" works, how it weights various factors, and all other factors used and their weights in deciding which lines to de-energize. Is the decision done by algorithm or by subjective assessment? Please attach examples of any worksheets used for Shasta County in the late September PSPS.

PG&E Response:

Weather models inform many operational decisions throughout PG&E to prepare for forecast conditions and to mitigate fire risk, including PSPS. PG&E has tested and deployed high-resolution weather models and built high-resolution historical datasets by partnering with external experts. These high-resolution historical datasets and forecasts drive the OPW and Utility FPI models, which are the main inputs into the framework PG&E utilizes to make the decision to execute a PSPS event.

The 6.0 LFP_D threshold is the product of PG&E's OPW and Utility FPI models. The OPW and Utility FPI models are used together by the LFP_D model to understand both the probability of an outage and potential ignition together with the potential consequence of a resulting fire. These models were derived by analyzing historical PG&E outage events and the conditions that existed during the worst fires in California history.

The OPW model is based on an analysis of windspeeds for every unplanned sustained and momentary outage that occurred over the last decade and forecasts the probability of unplanned outages associated with wind events occurring in PG&E's service area. The OPW

model is driven by PG&E's high-resolution weather modeling output. The OPW model is trained through an analysis of wind speeds during approximately 400,000 outages on PG&E's distribution grid. For every sustained and momentary outage, the wind speed was extracted from PG&E's historical dataset based on the time and location that each event occurred. This extraction allowed PG&E data scientists to develop wind-outage relationships and models that can then be run in forecast-mode. The OPW model forecasts the probability for a wind-driven outage based on forecast windspeed for each grid cell for every hour of the forecast. Outage-producing winds vary across PG&E's system based on differences in topography, vegetation and climatological weather exposure in different parts of PG&E's service territory.

The Utility FPI model uses logistic regression to predict the probability of a 40-acre fire growing to 1,000 acres or more in a given geographic location based on three decades of meteorological data (including weather, fuel moisture and climatology data) and 26 years of historical wildfire data from the U.S. Forestry Service ("USFS") in PG&E's service territory. Similar to with the OPW model, PG&E extracted the weather data and dead and live fuel moisture data for each historical fire in the USFS fire occurrence dataset in California. PG&E's data scientists constructed over 4,000 Utility FPI model variants to determine the optimal combination of the fire weather parameters, dead and live fuel moisture, and other factors. The Utility FPI model takes the forecast meteorological and fuel conditions for each grid cell as an input and provides, for each forecast hour, the probability of a 40-acre fire growing to 1,000 acres or more.[7]

Using the outputs from the OPW and Utility FPI models as well as other criteria listed below, the LFP_D model indicates for each two kilometer-by-two kilometer and

[7] The output of the Utility FPI model for a given grid cell is shown by the below series of equations where LFM is the live fuel moisture percentage, DFM_{10hr} is the 10-hour dead fuel moisture percentage, FFWI is the Fosberg Fire Weather Index and $LU_{Shrublands}$ and LU_{Forest} are land-use variables. Each input is standardized using the mean and standard deviation of the historical fire dataset.

$$FPI = \frac{1}{1+e^{-y}}$$

$$y = -1.68 - 0.24 * LFM - 0.26 * DFM_{10hr} + 0.22 * FFWI + 0.06 * LU_{Shrublands} + 0.47 * LU_{Forest}$$

three kilometer-by-three kilometer grid cell each hour, a categorization relating to the probability of a large fire originating from PG&E distribution equipment, to which PG&E has pre-assigned a recommendation for de-energization. The LFP_D model categorizes each grid cell over the forthcoming 104-hour period into one of four categories (called "dx_conditions"):

- "Below_Guidance" indicates that the grid cell fails to meet minimum fire-potential conditions which are those minimum conditions present during the vast majority of large fires in California history based on the USFS fire occurrence data, and so the model does not recommend de-energization.[8]
- "Fire_Potential" indicates that the grid cell meets the minimum fire-potential conditions that must be exceeded for de-energization to be considered, but the product of the OPW and the Utility FPI models does not exceed 6.0, indicating that the forecast probability of a large fire occurring, while possible, is insufficient for the model to recommend de-energization based on the set threshold.
- "Dx_Fire_Potential" indicates that the grid cell meets the minimum fire-potential conditions and that the product of the OPW and the Utility FPI models exceeds 6.0, PG&E's threshold for recommending de-energization.
- "Black_Swan" indicates that the grid cell meets the minimum fire-potential conditions and the product of the OPW and the Utility FPI models does not exceed 6.0, but that the consequences of a fire igniting are severe enough that, regardless of the likelihood of such a fire, de-energization is recommended.[9]

[8] The LFP_D model defines minimum fire-potential conditions as satisfying all of the following criteria: Utility FPI greater than 0.2; sustained wind speed greater than 20 mph; relative humidity less than 30%; dead fuel moisture – 10-hour less than 8%; dead fuel moisture – 100-hour less than 10%; and dead fuel moisture – 1000-hour less than 14%.

[9] The LFP_D model defines Black Swan conditions as satisfying all of the following criteria: Utility FPI greater than 0.3; sustained wind speed greater than 30 mph; relative humidity less than 20%; dead fuel moisture – 10-hour less than 8%; dead fuel moisture – 100-hour less than 10%; and dead fuel moisture – 1000-hour less than 14%. Until mid-October 2020, the model inadvertently used a 40-mph wind speed criterion rather than the decided-upon 30 mph criterion for the Black Swan conditions. PG&E notes that the forecast sustained wind speed during the

The PG&E meteorology team is not limited to only analyzing or considering for de-energization the grid cells that meet the 6.0 LFP_D threshold or the Black Swan criteria. The PG&E meteorology team is able to review those grid cells that are below the recommended guidance and utilize their expertise and knowledge of past weather events to recommend grid cells that do not satisfy the 6.0 threshold or the Black Swan criteria for de-energization based on the totality of the meteorological data available. For example, the team is able to review earlier model run outputs because the LFP_D model is run four times a day—at 00:00, 06:00, 12:00 and 18:00 UTC. Due to the fact that weather forecasts constantly change, this look-back can identify areas that are not currently satisfying the criteria but that may have previously exceeded guidance or that may be on the cusp of satisfying the criteria and could exceed criteria if there are relatively small weather shifts. In addition, PG&E meteorologists utilize other public and proprietary weather forecast model data to help put the PG&E's weather forecast model in perspective and better understand the forecast uncertainty.

While the primary initial driver of the scope of a de-energization decision is the algorithmic output of the two kilometer-by-two kilometer LFP_D model and its application of the Black Swan criteria based on objective weather data, PG&E also considers additional factors in deciding on the recommended de-energization scope, and the decision is ultimately a judgment by the meteorology team based on all of the available data. These data include the LFP_D model run on three kilometer-by-three kilometer grid cells and weather forecasts generated by other weather models.

PG&E notes that the meteorology department cannot begin scoping specific areas for de-energization until approximately four days before a potential de-energization event when its high-resolution forecast model data become available. Once inside that time window, the meteorology department begins that process of analyzing the LFP_D model on each of those grid cells and analyzing the results on a grid cell-by-grid cell basis. The LFP_D model estimates the

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September 27, 2020 PSPS event for the two kilometer-by-two kilometer grid cells traversed by the Girvan Circuit did not exceed 26 mph.

probability of a large fire originating in each grid cell that traverses the geographical scope of a potential PSPS event. When the LFP_D model's output indicates that the forecast weather conditions in certain grid cells exceed guidance values, or when the output approaches those guidance values, PG&E's meteorology team considers whether to recommend de-energizing those grid cells and any surrounding area. To convey the geographical and temporal recommendation for the scope of de-energization, PG&E's meteorology department develops a polygon in its ArcGIS Pro mapping program and passes that map and associated metadata on to the PSPS Viewer Team, which determines which of PG&E's distribution assets traverse that area of the map—in essence, converting the geographical/temporal polygon into a list of distribution circuits to be de-energized. PG&E's meteorology team has to make its initial recommendation for the scope of any de-energization 72 hours in advance and again 24-48 hours in advance of the de-energization window because PG&E needs time to operationally prepare for the shut-off and the subsequent re-energization,[10] and because PG&E is required to notify public safety partners and affected customers in advance of an anticipated de-energization.

With respect to the Court's request for examples of "any worksheets used for Shasta County in the late September PSPS", PG&E refers the Court to the output of the LFP_D models produced herein, including in response to Question 2.

Question 10: At page 16 of Exhibit E, PG&E states:

> In light of the meteorological information indicating the potential for catastrophic wildfire and the customer impacts from mitigating that fire risk through de-energization, PG&E considered whether alternatives to de-energizing, such as additional vegetation management and disabling

[10] For example, after each PSPS event, PG&E patrols all de-energized lines for signs of damage before re-energization. In 2019, PG&E's target was to restore service after a PSPS event within 24 hours after the weather conditions cleared. In 2020, PG&E has substantially increased the resources necessary to quickly patrol power lines, and PG&E's 2020 Wildfire Mitigation Plan ("WMP") aimed for a 50% improvement in daylight restoration time, restoring power for 98% of customers within 12 daylight hours from the time the weather conditions clear. *See* WMP at 5-287. Throughout 2020, PG&E had five PSPS events and was able to restore power for 95.5% of customers within 12 daylight hours from the time the weather conditions cleared. PG&E notes that it was able to accomplish this notwithstanding the fact that smoke from wildfires prevented PG&E from flying helicopters in many locations to quickly inspect lines and restore power following the September 7, 2020 PSPS event.

automatic reclosers, could adequately reduce the risk of catastrophic wildfire to obviate the need for de-energization. PG&E determined that these measures alone did not reduce the risk of catastrophic wildfire in areas within the PSPS scope sufficiently to protect public safety.

- PG&E conducted hazard tree mitigation efforts on circuits potentially in PSPS scope in the days leading up to the event and continued up through the day of de-energization.
- PG&E conducted pre-patrols of circuits and equipment in de-energization scope in the days leading up to the time of de-energization.
- The company disabled automatic reclosing in Tier 2/Tier 3 areas.
- PG&E deployed Safety and Infrastructure Protection (SIP) crews for real-time observations and fire response.

With respect to this statement:

(a) What hazard tree mitigation efforts were done on the Girvan Circuit "in the days leading up to the event and continued up through the day of de-energization" Please append all pertinent reports, photographs and documents and name the people who made any such effort.

(b) What "pre-patrols" were done on the Girvan Circuit within the meaning of your statement in the run-up to the PSPS?

(c) Was the Girvan Circuit in Tier 2 or Tier 3 and were any of its automatic reclosers "disabled" within the meaning of your statement?

(d) Were any real-time crews deployed along the Girvan Circuit?

PG&E Response:

With respect to subquestion (c), the Girvan Circuit is in a Tier 2 HFTD. As part of PG&E's ongoing wildfire-mitigation efforts, PG&E disables automatic reclosing in Tier 2 and Tier 3 HFTDs at the start of fire season and, therefore, automatic reclosing was disabled on all reclosers on the Girvan Circuit throughout the September 27, 2020 PSPS event.

With respect to the remaining subquestions, each of these three wildfire safety measures were considered only "on circuits potentially in PSPS scope" and "in de-energization

scope" for the September 27, 2020 PSPS event in order to potentially avoid the necessity of a shut-off and to expedite re-energization of the de-energized lines. Exhibit E to PG&E's October 26 filing explains that "PG&E considered whether [these] alternatives to de-energizing . . . could adequately reduce the risk of catastrophic wildfire to obviate the need for de-energization" but "determined that these measures alone did not reduce the risk of catastrophic wildfire in areas within the PSPS scope sufficiently to protect public safety". (Dkt. 1250-5 at 18.)

As discussed above and in PG&E's October 26 submission, the Girvan Circuit was never in scope for the September 27, 2020 PSPS event. Because the Girvan Circuit was never in scope for the PSPS event, the measures undertaken to potentially avoid de-energization referenced in subquestions (a), (b) and (d) were not conducted on the Girvan Circuit in the days leading up to the September 27, 2020 PSPS event.

Question 11: At page 23, Exhibit E states:

> PG&E teams met to discuss the models trending weaker in TP8 (Kern county). Leaders decided to abort the TP8 PSPS event as the latest forecasts indicated that no areas exceeded PSPS guidance. By 1142 PDT, all areas de-energized in this event were given the Weather All Clear.

Specifically, please identify by name and position and role each member of the "PG&E Team" and each one of the "Leaders" referenced in this paragraph.

PG&E Response:

The members of the PG&E Team and the Leaders, along with their positions and roles, referenced in the paragraph quoted by the Court are identified in Exhibit C, which PG&E is filing under seal.

Question 12: In its PSPS program, has PG&E ever de-energized a distribution line even though it had been cleared of hazard trees and limbs? If so, please give examples and explain why it de-energized lines with no such risk?

PG&E Response:

As stated above in response to Question 3, the LFP_D model currently used by PG&E is not based on the extent to which vegetation has been cleared or trimmed. PG&E's PSPS determinations for distribution circuits are based on severe weather and fuel conditions, regardless of whether the lines in those areas have been cleared of vegetation per all requirements. A risk of electrically caused wildfires exists regardless of whether a particular segment of line has been cleared of hazard trees and limbs, as discussed above in response to Question 3.

Question 13: Why isn't the PSPS decision made by asking this simple question — Is the line safe to conduct power during high winds? If yes, then PG&E would leave it on. If not, then PG&E would turn it off during the storm. The balancing-of-factors approach that PG&E uses, according to its generalized description, leaves open the possibility that a line will remain powered up even though it's unsafe to do so in a windstorm (due to the presence of hazard trees or threatening limbs not yet fixed by PG&E).

PG&E Response:

PG&E's PSPS decision-making process is intended to answer the question whether it is safe for a line to conduct power during a forecast high-wind event. In particular, the process has been designed to put in place the appropriate tools and framework necessary to be able to forecast unsafe conditions in advance of severe weather events (*i.e.*, high winds, low humidity and dry fuels) with sufficient time to make the necessary notices and take the necessary preparatory operational steps. PG&E must make PSPS decisions across large geographic areas on a compressed timeline with changing forecast information, and it is not feasible for PG&E to do so without reliance on appropriate models that weigh the relevant factors to identify areas that exceed or approach the determined threshold risk for de-energization. That process has necessarily been designed to identify specific criteria that allow PG&E's decision-makers to translate what "safe" means into operationally consistent and executable real-world decisions of whether to de-energize a particular area.

Further, whether conducting power in a certain area based on forecast weather data is safe is not a question with an absolute answer but rather depends on a balancing of competing risks, as de-energization itself poses significant public safety risks. Thus, while PG&E could lower its thresholds for de-energization to reduce wildfire risk, that would lead to other consequences. As the CPUC notes, "a PSPS can leave communities and essential facilities without power, which brings its own risks and hardships, particularly for vulnerable communities and individuals".[11] De-energization impacts first responders, critical medical care and the provision of water, sewer and other essential services, including street lights and signals and communications systems. There are also significant economic costs to the affected community from de-energization.

Further still, hotter and drier weather, more severe droughts and stronger winds have created pervasive fire risk across large swaths of California for extended periods of time. In 2020 alone, thousands of wildfires have burned over four million acres in California from a variety of causes.[12] To eliminate all safety risk of wildfires from energized power lines, the level of outages that would be required would be pervasive and would carry an enormous level of adverse consequences that have been discussed by PG&E in greater detail in prior filings (*see, e.g.*, Dkt. 976), and PG&E believes would be unacceptable to its regulators and the public at large.

Within these boundaries, PG&E's PSPS decision-making process is designed and has allowed PG&E to systematically and in an operationally executable manner to identify areas where forecast weather conditions pose the greatest risk of leaving a line energized, and are therefore not "safe", and to execute de-energizations with the required notifications to customers and safety partners and the associated operational mobilizations.

[11] *See* CPUC, *Public Safety Power Shutoff (PSPS) / De-Energization*, https://www.cpuc.ca.gov/deenergization/ (last accessed Nov. 18, 2020).

[12] *See, e.g.*, CAL FIRE, *2020 Fire Season Outlook*, https://www.fire.ca.gov/incidents/ (last accessed Nov. 18, 2020).

Question 14 [Part 1]: With respect to Exhibit D, the first photograph shows a gray pine uphill from the distribution line looming in the direction of the transmission line. Is this the gray pine that was eventually recovered by CAL FIRE? Is that gray pine still there?

PG&E Response:

PG&E is attaching as Exhibit D annotated copies of the photographs included in Exhibit D to its October 26 submission, indicating the tree that PG&E currently believes to have been partially collected by CAL FIRE during its investigative process (the "Gray Pine of interest"). As PG&E indicated in its October 26, 2020 submission, only portions of the Gray Pine of interest appeared to have been collected by CAL FIRE, including one trunk section (which PG&E estimates may have been approximately eight feet long) and branches from higher up on the tree. As further indicated in its October 26 submission, PG&E is preserving the remainder of the Gray Pine of interest in an abundance of caution pending the outcome of CAL FIRE's investigation.

All portions of the Gray Pine of interest left behind by CAL FIRE (other than the root system) were collected by PG&E on November 4. Prior to the collection, PG&E gave notice of the collection to the CPUC, CAL FIRE, the Shasta County District Attorney and lawyers representing certain civil plaintiffs to provide them the opportunity to document the site beforehand and to observe the collection. As with the remainder of potential evidence collected from the area of interest, the Gray Pine of interest was collected and is being preserved by Fire Cause Analysis ("FCA"), a third-party evidence collection vendor retained by PG&E. Employees of FCA are International Association of Arson Investigators ("IAAI") Certified Evidence Collection Technicians and collect evidence in accordance with the standards of evidence collection established by the National Fire Protection Association ("NFPA") and ASTM International.

As the Court referenced in its November 6, 2020 order, the sections of the Gray Pine of interest collected on November 4 were removed by helicopter due to their size and

weight and the terrain in the area. All evidence collected in the field on November 4 was logged by FCA and affixed with evidence tags to identify its approximate location when removed and document the chain of custody.

PG&E is still in the process of coordinating the collection of parts of the root system of the Gray Pine of interest. Before it commences that collection, PG&E will provide notice to the CPUC, CAL FIRE, the Shasta County District Attorney and lawyers representing certain civil plaintiffs.

Question 14 [Part 2]: Is there specific evidence that this particular gray pine was trimmed or removed prior to the Zogg Fire? Was this tree identified for work by any patrol?

PG&E Response:

PG&E currently believes the Gray Pine of interest may have been identified for removal (but not removed) during restoration efforts following the Carr Fire in 2018, based on certain records recently reviewed by PG&E concerning that restoration work. What PG&E has learned so far in its investigation is set forth here. The information provided here is preliminary, as PG&E's investigation is incomplete and in its beginning stages, and PG&E's understanding of the facts may change as that investigation continues. PG&E will provide an updated response, along with a declaration or declarations attesting to that response as requested by the Court, once it has analyzed further records and furthered its investigation.

As PG&E noted in its prior response on November 3, records associated with post-Carr Fire vegetation management work in the area of interest are stored by a third party, Mountain G Enterprises, Inc. ("Mountain G"). Since PG&E's prior responses, Mountain G has provided PG&E with some records associated with that work. Other requests from PG&E to Mountain G for records associated with the work that Mountain G and its affiliates and subcontractors performed for PG&E remain outstanding. PG&E is also collecting and reviewing its own documents that relate to the post-Carr Fire vegetation management work in the area of interest. PG&E is providing the information below based on its preliminary review of records

and its investigation, which PG&E will share with CAL FIRE, the Shasta County District Attorney and the CPUC.

Following the Carr Fire in July 2018, PG&E engaged a number of contractors to perform vegetation management work in the Carr Fire footprint, which included the Zogg Mine Road area. As part of these efforts, Mountain G maintained a database of information generated during the post-Carr Fire vegetation management work. The database maintained by Mountain G is known as "ArcGIS".[13]

Vegetation management personnel, including pre-inspectors and Quality Control ("QC") inspectors were instructed to upload information to the ArcGIS database using a smartphone and computer tablet app called "Collector". During post-Carr Fire vegetation management work, pre-inspectors and QC inspectors would identify trees requiring work through the Collector app. The inspectors also would input information about the tree, including any additional location information, the tree species, and the removal class of the tree based on its size. The pre-inspectors were also asked to spray paint trees identified for removal so that the specific tree in question could be located by tree removal crews.

PG&E currently understands that Mountain G would subsequently assign the work to a tree removal contractor, which included contractors associated with a Mountain G affiliate (Mountain F Enterprises, Inc. ("Mountain F")) or one of Mountain F's subcontractors, as well as other tree removal contractors. PG&E currently understands that work was assigned directly through Collector or through paper work orders provided by Mountain G to the tree crew contractors. These work orders were completed by tree crew contractors and returned to Mountain G. PG&E currently understands that the tree removal contractor also had access to the Collector app and could note when work was completed on a given tree. PG&E currently understands that the post-Carr Fire restoration work was the first significant use of the Collector

[13] The ArcGIS database maintained by Mountain G to track the post-Carr Fire vegetation management work is different from the ArcGIS database used for PG&E's PSPS program described above.

app by PG&E for vegetation management work and that tree removal contractors were not consistent in recording completed trees in the app during this project.

In addition to pre-inspectors who performed patrols of the Girvan Circuit, PG&E also engaged another contractor, California Forestry and Vegetation Management ("CFVM"), to perform QC inspections of sample areas within the Carr Fire footprint. The area of interest was one of the areas subject to such a QC inspection in August 2018. Based on PG&E's review of records maintained by Mountain G in connection with the post-Carr Fire restoration work, the CFVM inspector who performed the QC inspection of the area of interest in August 2018 used the Collector app to identify for removal two Gray Pine trees that have a location consistent with the location of the Gray Pine from which CAL FIRE appears to have collected sections after the Zogg Fire. Due to the fact that there were three other Gray Pines near the Gray Pine collected by CAL FIRE, PG&E has been unable at this time to confirm whether either of the two Gray Pines identified for removal were the Gray Pine from which CAL FIRE appears to have collected portions after the Zogg Fire.

Following the CFVM QC inspector's identification of these trees for removal, Mountain G subsequently generated a work order that included the two Gray Pines identified by the CFVM QC inspector. PG&E has requested from Mountain G on a priority basis any further records associated with the work order that Mountain G or its affiliates have in their possession, including any transmittals of the work order by Mountain G, and is awaiting Mountain G's response.

PG&E's review of the ArcGIS records maintained by Mountain G indicates that these two trees, together with certain other trees in the area of interest, may not have been worked despite being identified for work by the CFVM QC inspector. Specifically, the "TC_WORKED" field—which PG&E understands stands for "Tree Crew Worked"—associated with these trees have "No" values in the ArcGIS database extract provided by Mountain G to PG&E. Further, the July 2019 photographs of the area of interest that PG&E previously

submitted to the Court do not appear to show any Gray Pines that had been felled in the immediate area of the tree from which CAL FIRE collected sections.

PG&E is continuing to investigate why the two Gray Pines identified for work in the area where the Gray Pine of interest was located do not appear to have been worked. PG&E is aware that work in the Zogg Mine Road area was interrupted in October 2018 due to interactions with a resident of Zogg Mine Road, who believed that PG&E crews were cutting trees unnecessarily and had previously brandished a firearm to tree crews attempting to work in the area and was threatening to do so again. PG&E is also aware based on its records that inquiries were subsequently made in October 2018 about attempting to secure help from law enforcement to stand by and protect tree crews against the resident that had brandished a firearm. Among other things, PG&E is investigating what role, if any, that work interruption played in the two Gray Pines apparently not having been worked.[14]

As the Court is aware, the Camp Fire started on November 8, 2018. PG&E currently understands that at that point the post-Carr Fire response effort concluded and resources were shifted to the post-Camp Fire response. By then, based on records reviewed by PG&E, the vast majority of trees identified for work as part of the Carr Fire response had been completed, but PG&E understands, that some trees remained unworked due to customer refusals or other issues. Based on its investigation, PG&E understands that a PG&E vegetation management regional manager, perhaps with other regional vegetation management personnel

[14] Records from Mountain G indicate that four trees in the area of interest—defined, again, as the vicinity of the three specific spans of line from which CAL FIRE collected evidence—were removed following post-Carr Fire vegetation management efforts, including one Ponderosa Pine, one Valley Oak, one California Oak and one Gray Pine. Nine other trees in the area of interest were identified during post-Carr Fire pre-inspections or the August 2018 QC inspection, but have a value of "delisted" in the TC_WORKED field associated with database entries for them. PG&E understands "delisted" to mean that a tree had been evaluated prior to tree removal work and that a determination had been made that it did not need to be removed or trimmed at that time. As described above, there are also trees in the area of interest that have a "No" value in the TC_WORKED field, including the two Gray Pines discussed above, which suggests that they may have neither been worked nor delisted. In total in the area of interest, there are ten trees that have "No" value in the TC_WORKED field.

managing the post-fire response work, decided that the remaining trees should be left to be addressed by routine vegetation management patrols.

PG&E does not believe that the Gray Pine of interest was identified for removal or trimming as a result of any of the routine or CEMA vegetation management patrols of the Girvan Circuit that took place in the years preceding or following the Carr Fire. Specifically, in its November 3 supplemental response, PG&E produced a table summarizing tree work in the area of interest resulting from vegetation management patrols conducted by PG&E vegetation management contractors from 2015 to 2020.[15] As indicated by those records, 14 Gray Pines[16] in the area of interest were identified for work as a result of routine and separate CEMA patrols between 2015 and 2020. Of the 14 Gray Pines in the area of interest that were identified for work as a result of routine and CEMA vegetation management patrols between 2015 and 2020, 11 were identified for removal and subsequently removed. The remaining three Gray Pines were identified for trimming and subsequently trimmed. PG&E believes that the Gray Pine of interest was not one of the three trees identified for trimming as a result of routine and CEMA vegetation management patrols between 2015 and 2020.[17]

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[15] The table set forth on the second and third pages of PG&E's November 3 submission indicates the months during which CEMA and routine vegetation management patrols along the portion of the Girvan Circuit that includes the Zogg Mine Road area were performed. PG&E notes that some of the patrols along other portions of the Girvan Circuit began or ended in months other than those performed along the portion of the Girvan Circuit that includes the Zogg Mine Road area. PG&E also notes that the date and tree figures reported for the 2018 CEMA patrol apply only to the section of the Girvan Circuit that includes the Zogg Mine Road area. In total, approximately 20 trees were identified during CEMA patrols along the entire Girvan Circuit in 2018

[16] The table summarizing tree work in the area of interest provided in PG&E's November 3, 2020 submission indicated that four Ponderosa Pines and one Gray Pine were removed from the area of interest pursuant to CEMA patrols in 2016 and 2017, respectively. Following further checks of the underlying data, PG&E's current understanding is that only one tree—a Ponderosa Pine—was removed from the area of interest pursuant to the 2016 CEMA patrol, and that no trees were removed from the area of interest pursuant to the 2017 CEMA patrol.

[17] This belief is based on the estimated height difference between the three Gray Pines that were trimmed and the Gray Pine of interest, as well as the location of the these three trees as indicated by lat/long coordinates associated with the trees in PG&E's records.

Question 15: If this is not the tree taken by CAL FIRE, then do we have anywhere a pre-fire photograph of the tree that was taken?

PG&E Response:

PG&E refers to its response to Question 14.

Question 16: At page 8, lines 20–22, PG&E states that "work" was done on ten trees in the area of interest. What, specifically, was that work, tree by tree?

PG&E Response:

PG&E refers to the table set forth on the second and third pages of its November 3, 2020 submission. The work performed on each of the trees referenced in Question 16 is indicated under the "Type of Work" column.[18] An excerpt of the relevant portion of the table is reproduced below.

Patrol	Area of Interest (3 Spans)	
	Trees Identified	Type of Work
Apr. 2019 Routine	2 Live Oaks	Trimmed
	4 Gray Pines	Removed
	1 Black Oak	Removed
	1 Knobcone Pine	Removed
	3 Ponderosa Pines	Removed

Question 17: Same question for the "work" referenced at page 9, line 13.

PG&E Response:

PG&E refers to the table set forth on the second and third pages of its November 3, 2020 submission. The work performed on each of the trees referenced in

[18] As the Court notes, PG&E's October 26 submission identified ten trees in the area of interest that were worked as a result of the 2019 routine patrol. PG&E identified in its November 3 submission one additional tree in the area of interest (a Ponderosa Pine) that also was worked as a result of the 2019 routine patrol but was inadvertently omitted from its prior submission. Based on PG&E's current understanding of tree work in the area, PG&E interprets the Court's reference to "the ten [trees] referenced at page 8" as a reference to these 11 trees in the area of interest that were worked as a result of the 2019 routine patrol.

Question 16 is indicated under the "Type of Work" column.[19] An excerpt of the relevant portion of the chart is reproduced below.

Patrol	Area of Interest (3 Spans)	
	Trees Identified	Type of Work
Apr. 2018 CEMA	1 Gray Pine	Removed

Question 18 [Part 1]: Please provide all reports by PG&E or CNUC or Wright Tree Service regarding the March to April 2020 patrols and work referenced at page 8. Given that more than 2000 trees were identified for work on the Girvan Circuit, why were only ten trees worked? For the 2019 patrols and work, were additional trees identified for possible work beyond the ten referenced at page 8? Same question for the October 2018 patrol and April 2018 CEMA patrol. (PG&E's answers say that as a result of patrols, work was prescribed for certain trees and then done but this begs the question whether the patrols identified other potential problems for which work was not done.)

PG&E Response:

PG&E refers to Exhibit A to its November 3 submission, which contained reports by PG&E regarding the March to April 2020 vegetation management patrols and work referenced at page 8 of its October 26, 2020 submission.

Regarding the 2020 routine patrol and work, the nine[20] trees that PG&E described in connection with the 2020 routine patrol (and to which the Court appears to be referring) are

[19] PG&E's October 26 submission identified five trees in the area of interest that were worked as a result of both the 2018 CEMA patrol and 2018 routine patrol. PG&E identified in its November 3 submission one additional tree in the area of interest (a Live Oak) that also was worked as a result of the 2018 routine patrol but was inadvertently omitted from its prior submission.

[20] Although the Court refers to "ten trees worked" in connection with the 2020 routine patrol, PG&E's October 26 submission identified six trees in the area of interest that were worked as a result of the 2020 routine patrol. PG&E identified in its November 3 submission three additional trees in the area of interest (two Gray Pines and one Canyon Live Oak) that also were worked as a result of the 2020 routine patrol but were inadvertently omitted from its prior

those that were identified for work specifically in the area of interest. As stated in the November 3 submission, the data recorded in PG&E's Vegetation Management Database indicate that more than 2,000 trees along the entire Girvan Circuit were worked as a result of the routine patrol.

Regarding the 2019 patrols and work, the 11[21] trees that PG&E described in connection with the April 2019 routine patrol (and to which the Court appears to be referring) are those that were identified for work specifically in the area of interest. (Dkt. 1260 at 4.) As stated in the November 3 submission, PG&E's Vegetation Management Database indicates that more than 1,300 trees along the entire Girvan Circuit were worked as a result of the 2019 routine patrol.

Regarding the 2018 patrols and work, the six[22] trees described by PG&E in connection with the April 2018 CEMA patrol and October 2018 routine patrol (and to which the Court appears to be referring) are the trees that were identified for work specifically in the area of interest. As stated in the November 3 submission, PG&E's Vegetation Management Database indicates that approximately 1,630 trees along the entire Girvan Circuit were worked as a result of the 2018 routine patrol and CEMA patrol.

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submission. Based on PG&E's current understanding of tree work in the area, PG&E interprets the Court's reference to "ten trees worked" as a reference to these nine trees in the area of interest that were worked as a result of the 2020 routine patrol.

[21] As the Court notes, PG&E's October 26 submission identified ten trees in the area of interest that were worked as a result of the 2019 routine patrol. PG&E identified in its November 3 submission one additional tree in the area of interest (a Ponderosa Pine) that also was worked as a result of the 2019 routine patrol but was inadvertently omitted from its prior submission. Based on PG&E's current understanding of tree work in the area, PG&E interprets the Court's reference to "the ten [trees] referenced at page 8" as a reference to these 11 trees in the area of interest that were worked as a result of the 2019 routine patrol.

[22] PG&E's October 26 submission identified five trees in the area of interest that were worked as a result of both the 2018 CEMA patrol and 2018 routine patrol. PG&E identified in its November 3 submission one additional tree in the area of interest (a Live Oak) that also was worked as a result of the 2018 routine patrol but was inadvertently omitted from its prior submission.

Question 18 [Part 2]: Please explain why the area of interest was not subject to a separate CEMA patrol in 2019.

PG&E Response:

PG&E responded to this question in its November 3 submission. There, PG&E explained the facts known to PG&E regarding why the area of interest was not subject to a separate CEMA patrol in 2019, and PG&E refers the Court to that response. PG&E is now supplementing its November 3 submission based on further investigation to include facts PG&E has since learned regarding one issue described in that submission—specifically, the April 4, 2019 change in PG&E's Project Management Database ("PMD") to move the scheduled start date for the CEMA patrol of the Zogg Mine Road area from November 15, 2019 to February 15, 2019.

Beginning in 2019, management of PG&E's CEMA program was transferred from a centralized CEMA team to each of the local PG&E offices that managed routine vegetation management patrols. Also at this time, as previously noted, PG&E was moving to a risk-informed schedule for vegetation management work that prioritized routine patrols for high fire-risk circuits so that they occurred before fire season.

As described in PG&E's November 3 submission, on January 29, 2019, a database management specialist changed the scheduled start date for the routine patrol of the Zogg Mine Road area to May 27, 2019, consistent with changes to the risk-based schedule for 2019. Prior to 2019, the routine patrol of the Zogg Mine Road area had been conducted in October or November. On March 12, 2019, the same database management specialist changed the scheduled start date for the separate CEMA patrol of the Zogg Mine Road area to November 15, 2019, creating an approximate six-month offset from the new date for the routine patrol. The database management specialist who made these changes was based in the local office that had responsibility for the Zogg Mine Road area.

In late March 2019, a review of PMD was conducted to attempt to confirm that the scheduled dates for all 2019 CEMA patrols were appropriately offset from the scheduled date

of the corresponding routine patrol. This review was conducted by comparing the quarter in which a routine patrol of a given circuit was scheduled to begin with the quarter in which the corresponding CEMA patrol was scheduled to begin. At the time of the March 2019 review, the routine patrol of the Zogg Mine Road area was scheduled to begin on May 27, 2019, a date in the third quarter of PG&E's pre-inspection calendar, and the CEMA patrol was scheduled for November 15, 2019, a date in the fourth quarter of PG&E's pre-inspection calendar.[23]

The data management specialist contractor conducting the March 2019 review identified entries in the PMD that did not have a two-quarter offset between routine and CEMA patrols for each circuit. PG&E understands that because the routine and CEMA patrols of the Zogg Mine Road area were scheduled to occur in consecutive quarters (Q3 and Q4), the database management specialist contractor conducting the March 2019 review changed, on April 4, 2019, the scheduled start date of the CEMA patrol for the Zogg Mine Road area from Q4 (November 15) to a date in Q1 (February 15) to create a two-quarter offset from the routine patrol that had been scheduled for May 27 (a date in Q3). Because Q1 had already passed by April 4, 2019, the CEMA patrol registered in PMD as overdue after this change. PG&E notes that the routine patrol conducted from March to April 2020 involved an assessment of the Zogg Mine Road area for dead, diseased or dying trees (as would a CEMA patrol), but is not regarded by PG&E as a separate CEMA patrol that counted toward PG&E's 2019 Wildfire Mitigation Plan target of 100% completion of CEMA patrols on in-scope line miles. As noted above, trees were identified for work and worked in the area of interest during the 2019 and 2020 routine patrols.

While the intent of the March 2019 review was to create an appropriate offset between the routine and CEMA patrols, the use of quarters to identify CEMA patrols that needed rescheduling did not account for the fact that the routine and CEMA patrols for the Zogg Mine

[23] PG&E's pre-inspection calendar begins approximately six weeks prior to the start of the calendar year, running from November 16 to November 15, as opposed to January 1 to December 31. Under this calendar, the beginning dates for each quarter are November 16, February 16, May 16 and August 16 for the first, second, third and fourth quarters, respectively.

Road area were already scheduled approximately six months apart, even though they were scheduled for consecutive quarters.

These mid-year scheduling adjustments to the CEMA patrols were unique to 2019, given the previously detailed transition in that year to risk-based reprioritization of routine patrols.

The fact that a separate CEMA inspection was not performed when the schedule would have caused it to be completed close in time to a routine patrol is consistent with guidance from PG&E's vegetation management team in 2019. Under that guidance, PG&E did not perform a separate CEMA inspection and closed the CEMA project in PG&E's PMD following commencement of the routine patrol in situations where, as a result of risk-based prioritization changes to the routine patrol schedule, the CEMA patrol (the scope of which is subsumed in a routine patrol) had been scheduled close in time to the routine patrol.

Question 19: Please attach in chronological order paper copies of all maps, charts, diagrams, reports, memos, text messages, emails, recordings, or other documents in your possession that refer to the Girvan Line or any PSPS in Shasta County that were consulted or prepared in the period from September 21 to September 30, 2020, in connection with the PSPS. Videos or recordings of Zoom or similar meetings may be provided by thumb drive along with a paper index of the drive's contents.

PG&E Response:

PG&E has delivered to the Court 12 indexed binders containing paper copies of the 1,422 documents bearing Bates PGE-ZOGG-NDCAL-00000001 to PGE-ZOGG-NDCAL-00009367 that PG&E has identified as potentially responsive to this request. Because certain potentially responsive Excel files and mapping files are not formatted to be conducive to easy printing, PG&E included slipsheets bearing the Bates numbers in lieu of such files in the binders and has provided such files on a thumb drive that PG&E has also delivered.

PG&E understands the phrase "any PSPS in Shasta County" in the Court's request to refer to the three circuits in Shasta County that were de-energized as part of the

September 27, 2020 PSPS event. To respond to the Court's document request in the time provided by the Court, PG&E has attempted to conduct a reasonable search for responsive documents by using the following parameters. PG&E identified a list of eight custodians (the "Custodians") likely to have documents responsive to the Question, including individuals who served during the September 27, 2020 PSPS event as the Officer-In-Charge, Emergency Operations Center ("EOC") Commander, Deputy EOC Commander, Meteorologist-In-Charge, Operations Chief, Planning Chief and Customer Strategy Officer. PG&E also identified the September 27, 2020 PSPS event folders (the "Folders") of three electronic repositories likely to have documents responsive to the request: the Emergency Operations Center SharePoint, the Emergency Operations Center Operations SharePoint and the Meteorology Shared Drive.

PG&E ran the following search terms against the Custodians' and Folders' documents: Girvan*, Shasta*, Deschutes*, Volta*, Time Place 6, TimePlace6, TimePlace 6, Time Place 06, TimePlace06, TimePlace 06, TP 6, TP6, TP 06 and TP06. Each of the Custodians' and Folders' documents dated between September 21 and September 30, 2020 that contained one or more of the Search Terms was reviewed and, if determined to be potentially responsive to the request, produced to the Court. Where applicable, PG&E has redacted portions of documents determined to be protected by attorney-client privilege or to constitute attorney work product.

PG&E notes that certain documents in the binders being produced to the Court contain confidential information, including employee-identifying information. PG&E is in the process of identifying and redacting such confidential information and, when it has done so, will file a motion to seal the documents provided to the Court on the docket with such redactions applied.

Dated: November 18, 2020

Respectfully Submitted,

JENNER & BLOCK LLP

By: /s/ Reid J. Schar
Reid J. Schar (*pro hac vice*)

CRAVATH, SWAINE & MOORE LLP

By: /s/ Kevin J. Orsini
Kevin J. Orsini (*pro hac vice*)

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By: /s/ Kate Dyer
Kate Dyer (Bar No. 171891)

Attorneys for Defendant PACIFIC GAS AND ELECTRIC COMPANY

Appendix A

Column Heading	Description
lfp_fpi_opwp	The product of the Utility FPI and OPW models
dx_conditions	Conclusion of model, either: • Below_Guidance • Fire_Potential • Dx_Fire_Potential • Black_Swan
pomms2km_we_sn **index_join**	Grid cell index identifier (two km-by-two km) Grid cell index identifier (three km-by-three km)
dt_local	The valid time for the forecast hour start (PDT)
model_run_id	Date/time the model run is initialized (UTC)
opwp_cmax	OPW model output
pomms_lat	Grid cell's mid-point latitude
pomms_long	Grid cell's mid-point longitude
ws_mph	Forecast sustained windspeed in miles per hour
ffwi	Fosberg Fire Weather Index
t2m	Temperature at 2m above ground (f)
rh2m	Relative humidity at 2m above ground (%)
fpi	Utility FPI model output
lfm	Live fuel moisture
dfm10hr	Dead fuel moisture - 10-hour
dfm100hr	Dead fuel moisture - 100-hour
dfm1000hr	Dead fuel moisture - 1000-hour
year	Date for when forecast model is initialized
month	Date for when forecast model is initialized
day	Date for when forecast model is initialized
circuit_name	The distribution circuit that passes through this instance of the grid cell[24]

[24] PG&E added this column to certain model outputs for the Court's ease, and because some grid cells may be traversed by more than one distribution circuit, duplicative instance for such grid cells will appear in the data.

Appendix B

Bates Number	Description[25]
PGE-ZOGG-NDCAL-00009368	2 km 00:00 LFP_D model output for the Girvan Circuit
PGE-ZOGG-NDCAL-00009369	2 km 06:00 LFP_D model output for the Girvan Circuit
PGE-ZOGG-NDCAL-00009370	2 km 12:00 LFP_D model output for the Girvan Circuit
PGE-ZOGG-NDCAL-00009371	2 km 18:00 LFP_D model output for the Girvan Circuit
PGE-ZOGG-NDCAL-00009372	3 km 00:00, 06:00, 12:00 and 18:00 LFP_D model outputs for the Girvan Circuit
PGE-ZOGG-NDCAL-00009373	2 km September 27, 2020 00:00 LFP_D model output for Shasta County Distribution Circuits
PGE-ZOGG-NDCAL-00009374	3 km September 27, 2020 00:00 LFP_D model output for Shasta County Distribution Circuits
PGE-ZOGG-NDCAL-00009375	2 km land type classifications for the Girvan Circuit
PGE-ZOGG-NDCAL-00009376	3 km land type classifications for the Girvan Circuit
PGE-ZOGG-NDCAL-00009377	2 km 00:00 LFP_D model output for the portions of distribution circuits inside the Shasta County de-energization polygon
PGE-ZOGG-NDCAL-00009378	2 km 06:00 LFP_D model output for the portions of distribution circuits inside the Shasta County de-energization polygon
PGE-ZOGG-NDCAL-00009379	2 km 12:00 LFP_D model output for the portions of distribution circuits inside the Shasta County de-energization polygon
PGE-ZOGG-NDCAL-00009380	2 km 18:00 LFP_D model output for the portions of distribution circuits inside the Shasta County de-energization polygon
PGE-ZOGG-NDCAL-00009381	3 km 00:00 LFP_D model output for the portions of distribution circuits inside the Shasta County de-energization polygon
PGE-ZOGG-NDCAL-00009382	3 km 06:00 LFP_D model output for the portions of distribution circuits inside the Shasta County de-energization polygon
PGE-ZOGG-NDCAL-00009383	3 km 12:00 LFP_D model output for the portions of distribution circuits inside the Shasta County de-energization polygon

[25] Except when otherwise noted, all LFP_D model run outputs are for model runs in September 2020.

PGE-ZOGG-NDCAL-00009384	3 km 18:00 LFP_D model output for the portions of distribution circuits inside the Shasta County de-energization polygon
PGE-ZOGG-NDCAL-00009385	2 km land type classifications for the portions of distribution circuits inside the Shasta County de-energization polygon
PGE-ZOGG-NDCAL-00009386	3 km land type classifications for the portions of distribution circuits inside the Shasta County de-energization polygon
PGE-ZOGG-NDCAL-00009387	2 km 00:00 LFP_D model output for Deschutes 1101, Volta 1101 and Volta 1102
PGE-ZOGG-NDCAL-00009388	2 km 06:00 LFP_D model output for Deschutes 1101, Volta 1101 and Volta 1102
PGE-ZOGG-NDCAL-00009389	2 km 12:00 LFP_D model output for Deschutes 1101, Volta 1101 and Volta 1102
PGE-ZOGG-NDCAL-00009390	2 km 18:00 LFP_D model output for Deschutes 1101, Volta 1101 and Volta 1102
PGE-ZOGG-NDCAL-00009391	3 km 00:00 LFP_D model output for Deschutes 1101, Volta 1101 and Volta 1102
PGE-ZOGG-NDCAL-00009392	3 km 06:00 LFP_D model output for Deschutes 1101, Volta 1101 and Volta 1102
PGE-ZOGG-NDCAL-00009393	3 km 12:00 LFP_D model output for Deschutes 1101, Volta 1101 and Volta 1102
PGE-ZOGG-NDCAL-00009394	3 km 18:00 LFP_D model output for Deschutes 1101, Volta 1101 and Volta 1102