

June 11, 2020

Wildfire Safety Division Action Statement on Pacific Gas and Electric Company's 2020 Wildfire Mitigation Plan

This Action Statement is the conditional approval of Pacific Gas and Electric Company's (PG&E's) 2020 Wildfire Mitigation Plan (WMP) and is presented to the California Public Utilities Commission (CPUC) for ratification, via the associated Resolution and Guidance Resolution.

Introduction

Wildfires have caused significant social, economic, and environmental damage on a global scale. In California, electric utilities are responsible for some of the most devastating wildfires in recent years. The Wildfire Safety Division (WSD) recognizes that the wildfire threat is only increasing, with utility-related ignitions responsible for a disproportionate share of wildfire-related consequences. To that end, the WSD has a vision of moving towards a sustainable California, with no catastrophic utility-related wildfires, that has access to safe, affordable, and reliable electricity. The WSD recognizes it is critical for utilities to act quickly to reduce utility-related wildfire risk effectively and prudently.

As utility wildfire mitigation has become an increasingly urgent priority, the California Legislature has passed several bills related to utility wildfire prevention and oversight. The main regulatory vehicle for the WSD to regulate utilities in reducing utility wildfire risk is the Wildfire Mitigation Plan (WMP), which was introduced in Senate Bill (SB) 1028 (Hill, 2016) and further defined in SB 901 (Dodd, 2018), Assembly Bill (AB) 1054 (Holden, 2019), and AB 111 (Committee on Budget, 2019). Investor-owned electric utilities are required to submit WMPs assessing their level of wildfire risk and providing plans for wildfire risk reduction. The first WMPs under the SB 901 framework were submitted by the utilities and evaluated by the CPUC in 2019.

AB 1054 and AB 111 transferred responsibility for evaluation and approval of WMPs to the WSD,¹ which, as of July 2021, will transfer and become the Office of Energy Infrastructure Safety within the California Natural Resources Agency. In this role, the WSD must ensure utility wildfire mitigation efforts sufficiently address increasing utility wildfire risk. To support its efforts, the WSD is developing a draft long-term strategy and roadmap. This strategy and roadmap will inform the WSD's

¹ With CPUC ratification of the WSD's actions.

work in updating the WMP process and guidelines, and the WSD's evaluation of the WMPs.

AB 1054 mandates that the WSD complete its evaluation of WMPs within 90 days of submission. The utilities submitted 2020 WMPs on February 7, 2020. Upon completion of the past 90 days of evaluation, the WSD recognizes that the utilities have made significant progress. Compared to their first submissions in 2019, the utilities utilize much more data and objective content in their 2020 WMP filings and share more critical information with key partners. However, while utilities are already undertaking wildfire mitigation activities and building capabilities subject to regulation, all utilities must continue to make meaningful progress. Utilities' activities need to incorporate longer-term thinking by focusing more systematically on increasing their maturity over time. All utilities should take a more robust strategic approach that leverages additional Risk Spend Efficiency (RSE) data to focus on the most impactful actions – all with a local lens. This statement outlines more specifically what the WSD sees as critical priorities for the upcoming year for PG&E and approves, with significant conditions, PG&E's 2020 WMP. Together, this statement, the associated Resolution and the Guidance Resolution represent the totality of the WSD's conditional approval of PGE's 2020 WMP.

Background

To ensure that utility wildfire mitigation efforts sufficiently address increasing utility wildfire risk, new WMP Guidelines, a Utility Survey and a Maturity Model were launched for 2020. Together, these tools represent a milestone in the evolution of utilities' wildfire mitigation efforts and ensure consistency with the WSD's enabling legislation.

2020 Guidelines

The 2020 WMP Guidelines implement several changes to further enhance the depth, comparability and quality of utility WMP submissions. Specifically, the WMP Guidelines require reporting of consistent metrics, ignitions, risk data and specific utility initiatives to reduce wildfire risk. Utilities have provided historical metrics and data as a baseline, which can be used to evaluate a utility's wildfire risk level and to assess whether the utility's initiatives sufficiently address this risk. These metrics and data will be used to track utility progress in mitigating the risk of catastrophic wildfire over time.

Maturity Model and Utility Survey

In order to enhance the focus on safety, ensure consistent goals and evaluate performance, the WSD has developed a model for evaluating current and projected wildfire risk reduction performance. It is important to note that this model is not designed to immediately penalize utilities for poor performance, but rather it is an effort by the WSD to work collectively with the utilities it regulates² to facilitate improvement by identifying best practices, current strengths and current weaknesses across the utility landscape. The WSD believes it is in the best interest of the utilities, ratepayers and other key stakeholders to take this collaborative, growth-oriented approach. While certain utilities are currently on the low end of the range for various categories of performance, the WSD is hopeful that providing clear review and evaluation of performance, including identifying such weaknesses, will help drive change in the utilities, allowing all regulated electric utilities in California to improve wildfire risk reduction performance.

As a consequence, the model results are best interpreted as levels – the results are not absolute scores. A utility, for example, could be on the borderline for level 2 in the model, but it would remain at level 1 until it completed 100% of the steps required to cross the threshold to level 2. In this example, the way the model works is the utility would get a result of 1, not 1.8. The purpose of the model is not to penalize the utility for achieving a result of 1 but to identify the specific actions it can take to reach level 2.

Summary of the WSD’s Assessment

An effective WMP should have three, overarching components in which utilities should be striving to be “world class.” First, the WMP should demonstrate an understanding of a utility’s unique risk. Each utility should measure outcome and progress metrics and use a sophisticated model to lay the foundation for safe operation within its service territory. Second, with a deep understanding of its risk, the utility should deploy a suite of initiatives designed to incrementally and aggressively reduce that risk. Finally, this deployment should be done with a key, strategic eye toward maximizing every scarce resource, whether it be direct costs, personnel, or time, to maximize its impact. The result should be that with each passing year California is safer from wildfire threats, with a significant reduction and eventual elimination of the need to use Public Safety Power Shutoffs (PSPS) as a mitigation action.

² The WSD (ultimately the Office of Energy Infrastructure Safety) and the CPUC have complementary regulatory roles to fill in ensuring a strong oversight in reducing the risk of ignition of wildfires from utility infrastructure. The WSD, CPUC, and other relevant agencies will work together to ensure roles are defined and regulatory outcomes are met.

The WSD evaluated 2020 WMPs considering the following factors:

- Completeness: The WMP is complete and comprehensively responds to the WMP requirements
- Technical feasibility and effectiveness: Initiatives proposed in the WMP are technically feasible and are effective in addressing the risks that exist in the utility's territory
- Resource use efficiency: Initiatives are an efficient use of utility resources
- Forward looking growth: The utility is targeting maturity growth

The WSD used the utilities' 2020 WMP submissions and subsequent updates, public comments, responses to the WSD's data requests, utility reported data and utility responses to the Utility Survey in its assessment of 2020 WMPs.

Upon completion of this review, the WSD then determined whether each utility's 2020 WMP should either be:

- Approved without conditions (Full Approval)
- Approved with conditions (Conditional Approval)
- Denied (Denial)

Pursuant to Public Utilities Code Section 8386.3(a), this Action Statement and the discussion found in the associated Resolutions is the outcome of the WSD's review of PG&E's WMP and input from the public and other governmental agencies. As stated previously, this Action Statement is the conditional approval of PG&E's WMP and is presented to the CPUC for ratification, via the associated Resolution and Guidance Resolution.

The conditions for approval of PG&E's WMP are designed to address the gaps identified in PG&E's WMP. Some of the key deficiencies for PG&E's WMP are summarized below. The associated Resolution and Guidance Resolution capture the WSD's comprehensive review of PG&E's WMP submission.

Discussion of WMP Assessment

Summary

PG&E has a large service territory, and significant portions of its grid are in High Fire-Threat District (HFTD) areas. For PG&E's plan to be most effective with its finite resources, strategic prioritization of initiatives geographically and by ignition driver to target the highest risk elements of PG&E's grid is crucial.

PG&E outlines improvements being made to its risk assessment tools, but it is unclear how these tools are used to drive prioritization of specific wildfire mitigation initiatives to minimize wildfire risk and PSPS. PG&E outlines various wildfire mitigation programs that address the major risk drivers in its territory. However, PG&E does not consistently describe these programs in detail at the initiative level, making it difficult to assess the effectiveness of some initiatives against their cost. PG&E also does not provide a detailed justification of how it determined its portfolio of planned initiatives to be the most effective use of its finite resources, nor adequately describes detailed coordination efforts with locally impacted jurisdictions.

Finally, based on the WSD's assessment of PG&E's responses to the Utility Survey against the Utility Wildfire Mitigation Maturity Model, PG&E's maturity is lower than peers and, appropriately, PG&E targets improvement across multiple wildfire mitigation capabilities within the 3-year WMP horizon to increase their maturity.

Risk Assessment

PG&E's initiatives are targeted to major risk drivers at a high level, but PG&E could do more to prioritize wildfire risk reduction. Given the growing wildfire risk brought on by climate change, all utilities must move away from traditional prioritization practices to ones informed and prioritized by risk. PG&E must rigorously apply a risk-based prioritization lens to its portfolio of initiatives to reduce wildfire risk and minimize PSPS incidents. The risk assessment deficiencies that the WSD cites in its evaluation all point toward an effort to build PG&E into a modern utility.

PG&E has made improvements in fire weather modeling and claims to score circuits by risk in order to prioritize implementation of initiatives, but PG&E provides little description of how risk assessment and mapping are used to select mitigation measures and prioritize their deployment at the circuit or asset level.

For example, PG&E does not describe in a granular way where asset remediation, vegetation management, and grid hardening initiatives are most necessary, how it prioritizes deployment of those initiatives, nor how it coordinates prioritization with local jurisdictions. Further, while PG&E has started conducting fire spread simulations, it is unclear how these simulations will influence PG&E's deployment of initiatives. As a result, more information is required to determine whether PG&E is deploying initiatives based on coordinated risk prioritization.

Initiatives

PG&E's initiatives, which are the actions and programs PG&E will take to reduce wildfire risk, address the major risk factors that PG&E faces. The utility outlines several priority programs and various improvements to its asset and vegetation management programs. PG&E plans to spend 28% of its total budget on vegetation management and 53% of its total budget on system hardening work, including overhead hardening, and undergrounding. However, PG&E reports hardening programs in large bundles, reducing the WSD's visibility into the scale of planned activities (e.g. undergrounding, covered conductor are both grouped into a single system hardening program). Similarly, PG&E has implemented enhanced inspection programs, but it is unclear from PG&E's description how effective these are and how they differ from traditional inspections.

While PG&E's approach to piloting innovative technologies to detect system problems that can lead to ignitions is promising, PG&E does not describe in detail a concise review period to determine if these technologies are effective and scalable or outline a detailed plan for deploying these technologies at scale. The WSD expects the 2021 WMP update to include a detailed report on the status of these initiatives. It is imperative that PG&E makes a meaningful reduction in the scale and scope of PSPS for the 2020 fire season and beyond. While PSPS cannot be eliminated before this year's fire season, PG&E claims to reduce the size and scope of PSPS by a combination of programs and improved re-energization protocols. However, PG&E does not articulate quantitatively how it expects hardening to increase PSPS thresholds for individual circuits, thus impeding the WSD's ability to determine how the \$5.3 billion in hardening work will affect the probability of a PSPS in communities in California.

Finally, the plan lacks significant details for the WSD to be fully convinced that PG&E will be able to execute on its plan fully and on time. A good example is PG&E's statement that it intends to replace 625 fuse cut-outs over the next seven years. A more robust plan would indicate which fuses will be replaced when, prioritized by greatest risk reduction, outline how PG&E would access the necessary personnel to conduct the work, and state how it might proceed on an expedited timeline.

PG&E's targeted maturity growth reflects a desire to improve wildfire mitigation capabilities, and PG&E must work diligently to achieve this targeted growth.

Resource Allocation Methodology

While the WSD's assessment of the 2020 WMP does not approve cost recovery for its initiatives, which will be addressed in each utility's General Rate Case, the assessment does consider the effective use of resources to reduce wildfire ignition risk. Overall, PG&E does not demonstrate sufficiently that it is allocating finite

resources to initiatives that most effectively reduce wildfire risk and PSPS incidents. The 2020 Guidelines required utilities to provide RSE estimates for all initiatives, yet, PG&E provided estimates for only 4 initiatives. As mentioned above, some initiatives were aggregated into "programs," making it difficult to assess the cost of individual initiatives within a larger program.

This is unacceptable given the breadth of initiatives included in PG&E's WMP. PG&E does not adequately explain why it failed to provide the required information and has not provided other forms of evidence or a discussion to support its allocation of resources among the selected wildfire initiatives or explain why its chosen initiatives are more effective than alternatives. During the WMP workshops conducted in February 2020, PG&E committed to improving its analysis in the future, but that does not excuse its lack of responsiveness this year. The WSD is imposing conditions to address this major gap.

A detailed discussion of the above concerns, as well as, further analysis of PG&E's WMP is articulated in the associated Resolutions, including a complete list of deficiencies and conditions in Appendix A of the associated Resolution for PG&E.

Conclusion

Catastrophic wildfires remain a serious threat to the health and safety of Californians. Electric utilities, including PG&E, must continue to make progress toward reducing utility-related wildfire risk. Through the conditional approval granted for its 2020 WMP submission, the WSD will ensure PG&E is held accountable to successfully executing the wildfire risk reduction initiatives articulated in its 2020 WMP and required updates. The WSD expects PG&E to meet the commitments in its 2020 WMP and fully comply with the conditions listed in Appendix A of its associated Resolution to ensure it is driving meaningful reduction of utility-related wildfire risk within its service territory.

Sincerely,

/s/ CAROLINE THOMAS JACOBS

Caroline Thomas Jacobs
Director, Wildfire Safety Division
California Public Utilities Commission

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Resolution WSD-003
Wildfire Safety Division
June 11, 2020

R E S O L U T I O N

RESOLUTION WSD-003 Resolution Ratifying Action of the Wildfire Safety Division on Pacific Gas and Electric Company's 2020 Wildfire Mitigation Plan Pursuant to Public Utilities Code Section 8386.

This Resolution ratifies the attached action of the Wildfire Safety Division (WSD) pursuant to Public Utilities Code Section 8386. The California Public Utilities Commission's (Commission) and the WSD's most important responsibility is ensuring the safety of Californians. Since several catastrophic wildfires in the San Diego area in 2007, the equipment of large electric utilities the Commission regulates has been implicated in the most devastating wildfires in our state's history. California's Legislature enacted several legislative measures requiring electrical corporations to submit, and the Commission and the WSD to review, approve or otherwise act on Wildfire Mitigation Plans (WMPs) designed to reduce the risk of utility-caused catastrophic wildfire. Key among the legislative measures are Senate Bill 901 (2018), Assembly Bill 1054 (2019), and Assembly Bill 111, discussed in detail below.

This Resolution (along with several others concurrently being issued with regard to all Commission-regulated electric utilities and independent transmission owners), acts on the WMP submitted on February 7, 2020, of Pacific Gas and Electric Company (PG&E, filer, or electrical corporation), pursuant to Public Utilities Code section 8386.3(a). PG&E's WMP responds to a list of 22 requirements set forth in Public Utilities Code 8386 and focuses on measures the electrical corporation will take over the next three years to reduce the risk of, and impact from, a catastrophic wildfire caused by its electrical infrastructure and equipment.

Electrical infrastructure and equipment pose ongoing risks of starting wildfires due to the presence of electric current. There are three elements required to start a fire: fuel (such as dry vegetation), oxygen, and an ignition source (heat). A spark from electrical infrastructure and equipment can provide the ignition point from which a wildfire can spread and cause catastrophic harm to life, property, and the environment.

WMPs contain an electrical corporation's detailed plans to reduce the risk of its equipment, operations or facilities igniting a wildfire. This Resolution ratifies the attached action of the WSD, which has conditionally approved PG&E's 2020 WMP in its Action Statement. In doing so, this Resolution analyzes the extent to which PG&E's wildfire mitigation efforts objectively reduce wildfire risk, drive improvement, and act as cost effectively as possible. In conducting this evaluation, the Commission considers and incorporates input from the Wildfire Safety Advisory Board, the public and other stakeholders.

PROPOSED OUTCOME:

- Ratifies the attached action of the WSD to approve the 2020 WMP of PG&E, with conditions designed to ensure PG&E's WMP decreases risk of catastrophic wildfire in California.
- A list of conditions of approval is provided in Appendix A
- Evaluates the maturity of PG&E's WMP using the WSD's new Utility Wildfire Mitigation Assessment, as represented in the Utility Wildfire Mitigation Maturity Model. Final maturity model outputs should be viewed as levels or thresholds – they are not absolute scores.
- Requires PG&E to file an update to its WMP in 2021 according to a forthcoming schedule to be released by the WSD.
- Does not approve costs attributable to WMPs, as statute requires electrical corporations to seek cost recovery and prove all expenditures are just and reasonable at a future time in their General Rate Cases (GRC) or an appropriate application. Nothing in this Resolution nor the WSD's Action Statement should be construed as approval of any WMP-related costs.
- Does not establish a defense to any enforcement action for a violation of a Commission decision, order, or rule.

SAFETY CONSIDERATIONS:

Mitigation of catastrophic wildfires in California is among the most important safety challenges the Commission-regulated electrical corporations face. Comprehensive WMPs are essential to safety because:

- WMPs list all of an electrical corporation's proposed actions to reduce utility-related wildfire risk and prevent catastrophic wildfires caused by utility infrastructure and equipment. By implementing measures such as vegetation management, system hardening (such as insulating overhead lines and removing or

upgrading equipment most likely to cause fire ignition), improving inspection and maintenance, situational awareness (cameras, weather stations, and use of data to predict areas of highest fire threat), improving community engagement and awareness, and other measures, utility-caused catastrophic wildfire risk should be reduced over time.

- The WSD's and Commission's substantive and procedural changes for evaluations of electrical corporations' 2020 WMPs will enhance California's ability to mitigate catastrophic wildfire risk related to utilities. Below is a summary of the key, new requirements in the 2020 process, required of all WMP filers:
 - A WMP template and format so WMPs are standardized and include similar information in the same format.
 - Standard data submissions, in spatial, non-spatial and tabular format, which grounds the WMPs in specific data. Data submissions will continue throughout the WMP 3-year horizon and be used to measure compliance and performance to program, progress and outcome metrics.
 - A new Utility Survey that objectively assesses the electrical corporation's maturity across 52 capabilities in 10 categories. The resulting Maturity Matrix quantitatively presents the progressive impact of the electrical corporation's wildfire mitigation plan activities over the WMP 3-year horizon.

ESTIMATED COST:

- Nothing in this Resolution should be construed as approval of the costs associated with the WMP mitigation efforts.
- For illustrative purposes, Table 1 below contains filer's estimates of its projected costs for the wildfire mitigation efforts in its 2020 WMP.
- PG&E may not record the same costs more than once or in more than one place, seek duplicative recovery of costs, or record or seek to recover costs in the memorandum account already recovered separately. All electrical corporations should ensure they carefully document their expenditures in these memorandum accounts, by category, and be prepared for Commission review and audit of the accounts at any time.

Table 1: Proposed WMP costs

Proposed WMP costs

Total costs 2020-2022	\$9.54 billion
Subtotal: 2020	\$3.17 billion
Subtotal: 2021	\$3.13 billion
Subtotal: 2022	\$3.24 billion

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Appendix D – Definition of Mitigation Initiatives

Resolution WSD-008 WSD/CTJ/gp2

Appendix E – Public Utilities Code Section 8386

Appendix F – Glossary of Terms

SUMMARY

This Resolution acts on the attached Wildfire Safety Division's (WSD) approval of the Wildfire Mitigation Plan (WMP) submitted by Pacific Gas and Electric (PG&E) on February 7, 2020. The Resolution finds that PG&E is in compliance, subject to many conditions, with the requirements for WMPs set forth in Assembly Bill (AB) 1054, codified at Public Utilities (Pub. Util.) Code Section 8386(c) and the WMP Guidelines issued by the Commission to electrical corporations. Section 8386 requires that electrical corporations' WMPs contain 22 elements; the full list of elements appears in Appendix E to this Resolution.

There are three possible actions for the WSD and Commission in response to any electrical corporation's WMP: approval, denial, or approval with conditions. In the case of the WMP resolved here, we ratify the WSD's action to approve the WMP with conditions. To the extent the WSD does not impose conditions on elements of the WMP, those elements are approved as plan components. This approval does not relieve the electrical corporation from any and all otherwise applicable permitting, ratemaking, or other legal and regulatory obligations.

A list of all conditions imposed on the approval of PG&E's WMP is provided in Appendix A. A detailed summary and comparison of performance metrics, current state of utility service territories, and resource allocation is provided in Appendix B.

1. BACKGROUND

Catastrophic wildfires in 2017-19 led the California Legislature to pass Senate Bill (SB) 901 in 2018 and its successor AB 1054 in 2019, as well as AB 111. SB 901 and AB 1054 contain detailed requirements for electrical corporations' WMPs and provide a 90-day review cycle of WMPs by the WSD. AB 111 establishes a new division, the WSD, within the Commission. The duties of the WSD are contained in Pub. Util. Code Section 326(a), including to evaluate, oversee and enforce electrical corporations' compliance with wildfire safety requirements, and develop and recommend to the Commission performance metrics to achieve maximum feasible wildfire risk reduction. SB 901 required a formal Commission proceeding for WMP review in 2019, and to that end the Commission reviewed the 2019 WMPs in Rulemaking (R.) 18-10-007. The decisions dispensing of the 2019 WMPs also added additional requirements for the 2020 WMPs.

After the Commission issued its WMP decisions on May 30, 2019,³ the Legislature enacted AB 1054. AB 1054 contains similar WMP requirements to SB 901 but allows

³ Decisions (D.) 19-05-036, 19-05-037, D.19-05-038, D.19-05-039, D.19-05-040 and D.19-05-041 (May 30, 2019).

WMPs a three-year rather than one-year duration. AB 1054 also requires the WSD to review and approve, deny or approve with conditions the electrical corporations' WMPs, with Commission ratification to follow thereafter. AB 1054 also requires establishment of a Wildfire Safety Advisory Board (WSAB), with appointees from the California Governor and Legislature, to provide comment on the 2020 WMPs and develop and make recommendations related to the metrics used to evaluate WMPs in 2021 and beyond.⁴

Building on lessons learned from the WMP review process in 2019, the WSD developed and required all electrical corporations to conform their WMPs to a set of new WMP Guidelines starting in 2020.⁵ For 2020, the WMP Guidelines add requirements on detail, data, and other supporting information. The WMP Guidelines are designed 1) to increase standardization of information collected on electrical corporations' wildfire risk exposure, 2) enable systematic and uniform review of information each electrical corporation submits, and 3) move electrical corporations toward an effective long-term wildfire mitigation strategy, with systematic tracking of improvements over time.

The Commission adopted Resolution WSD-001 setting forth the process for WSD and Commission review of the 2020 WMPs. The resolution called for electrical corporations to submit their 2020 WMPs on February 7, 2020. PG&E submitted its WMP on that date.

Shortly after electrical corporations filed their WMPs, the WSD held two sets of all-day workshops over four days, on February 18, 19, 24 and 25, 2020. The February 18-19, 2020 informational workshops called for the electrical corporations to present to stakeholders and the public details on their WMPs, and for stakeholders to ask questions, raise concerns, and otherwise comment on the WMPs' contents. The February 24-25, 2020 technical workshops focused more in depth on key provisions of the WMPs: vegetation management, system hardening, risk-spend efficiency emerging technology and reduction of the scale and scope of Public Safety Power Shutoff (PSPS) events. Again, stakeholder and public input was offered.⁶

⁴ Pub. Util. Code § 8386.3 (Wildfire Safety Division), § 326.1 (Wildfire Safety Advisory Board).

⁵ A ruling issued on December 19, 2019 in proceeding R.18-10-007 described and attached all of the material electrical corporations were required to use in submitting their 2020 WMPs.

⁶ Presentations, agendas and other details of the workshops appear on the Commission's WMP homepage, located at www.cpuc.ca.gov/wildfiremitigationplans/.

Stakeholders were also allowed to submit comments on the WMP, to which the electrical corporation replied. Stakeholders and members of the public commented on the WMPs by April 7, 2020, and the electrical corporations responded to those comments by April 16, 2020.

2. NOTICE

In accordance with Pub. Util. Code § 8386(d), notice of PG&E's WMP was given by posting of the WMP on the WSD's webpage, at www.cpuc.ca.gov/wildfiremitigationplans, on February 7, 2020, in accordance with the requirements of Pub. Util. Code Section 8386(d). Further, the electrical corporation served its 2020 WMP on the Commission's existing WMP formal proceeding (R.18-10-007) service list, as Resolution WSD-001 provided. Resolution WSD-001 also required the filer to post all data request responses, as well as any document referenced in its WMP, on its own website and update the website with notice to the R.18-10-007 on a weekly basis.

3. WILDFIRE SAFETY DIVISION ANALYSIS OF WMP

To reach a conclusion about each WMP, the WSD reviewed each electrical corporation's 2020 WMP (including updates and Geographic Information System (GIS) data), public and WSAB input, responses to the WSD data requests, and responses to the maturity model survey questions. For PG&E, the WSD issued three sets of data requests for missing information, clarification, and supplementation where necessary. Upon completion of this review, the WSD determined whether each utility's 2020 WMP should either approved without conditions, approved with conditions, or denied.

To reach its conclusion, the WSD reviewed the WMPs for compliance with every aspect of the WMP Guidelines and AB 1054 and requirements of the 2019 WMP Decisions. The WSD designed the WMP Guidelines to require that each filer have a comprehensive WMP that contains all elements required by AB 1054. Thus, for example, every WMP must contain plans for vegetation management, system hardening, inspections of assets and vegetation, situational awareness, a plan to reduce and manage PSPS events, customer and first responder outreach and coordination, risk analysis, GIS data, a short- and long-term vision, analysis of causes of ignition, and many other elements. To evaluate WMPs, the WSD assessed each plan for its completeness, the technical feasibility and effectiveness of its initiatives, whether proposed initiatives were an efficient use of resources, and for demonstration of a sufficiently growth-oriented approach to reducing utility-related wildfire risk over time.

A conditional approval explains each missing or inadequate component in the WMP. The 2020 WMP Resolutions for each electrical corporation contain a set of “Deficiencies” and associated “Conditions” to remedy those deficiencies. Each deficiency is categorized into one of the following categories, with Class A being the most serious:

1. Class A – aspects of the WMP are lacking or flawed
2. Class B – insufficient detail or justification provided in WMP
3. Class C – gaps in baseline or historical data, as required in 2020 WMP Guidelines.

Class A deficiencies are of the highest concern and require an electrical corporation to develop and submit to the WSD within 45 days of Commission ratification of this Resolution, a Remedial Compliance Plan (RCP) to resolve the identified deficiency. Class B deficiencies are of medium concern and require reporting by the electrical corporation to provide missing data or update its progress in its quarterly report. Such reporting will be either on a one-time basis or ongoing as set forth in each condition. Class C deficiencies require the electrical corporation to submit additional detail and information or otherwise come into compliance in its 2021 annual WMP update. Detailed descriptions of the RCP and quarterly reports are contained in Resolution WSD-002, the Guidance Resolution on 2020 Wildfire Mitigation Plans.

The WSD identified a number of deficiencies in PG&E’s WMP, which can be found in Appendix A.

4. WILDFIRE SAFETY ADVISORY BOARD INPUT

The WSAB provided recommendations on the WMPs of PG&E, Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E) on April 15, 2020. The WSD has considered the WSAB’s recommendations, and this Resolution incorporates the WSAB’s input throughout.

The WSAB focused its recommendations on high-level input and identification of shortcomings in the 2020 WMPs to inform upcoming wildfire mitigation efforts. WSAB recommendations focused on the following areas: vegetation management and inspection; grid design and system hardening; resource allocation methodology; and PSPS preparation, including communication with the community, planning, and recovery after PSPS events.

5. PUBLIC AND STAKEHOLDER COMMENT

The following individuals and organizations submitted comments on April 7, 2020 on PG&E WMP and made the points listed below. Many stakeholders found the

utility WMPs lacking in specific and complete data, especially related to Risk Spend Efficiency (RSE). Generally, stakeholders also found comparing utilities difficult due to inconsistent reporting across utilities. The utilities received some appreciation for the general expansion of programs, with some stakeholders noting specific improvements in situational awareness. Many also reiterated that approval of the WMPs neither approves the scope or portfolio of programs nor authorizes rate recovery. This Resolution reflects the input of all commenters.

California Environmental Justice Alliance

- The electrical corporations address socioeconomic risk factors inconsistently across programs, which risks leaving vulnerable populations behind.
- The electrical corporations should conduct more analysis to determine the effectiveness of inspections.
- PG&E should update its WMP to reflect the in-language, survey and other community engagement requirements adopted in D.20-03-004.
 - Note: PG&E and all other electrical corporations are bound by D.20-03-004 regardless of what is in their WMPs.

Kevin Collins

- The WMPs are too vague and lack clear commitments, dates for completion and other performance targets.
- PG&E makes promising proposals for fault detection and situational awareness but does not provide enough information about when and where it will install the measures or expand their use.

East Bay Municipal Utility District

- PSPS mitigation should be included as a criterion for distribution system hardening efforts.
- PG&E should prioritize hardening in areas where there is critical infrastructure, such as hospitals or water treatment plants, which may potentially adversely impact the health and safety of a large number of customers in the event of PSPS
- PG&E's coordination with public safety partners should include a commitment to meetings before, during, and after a wildfire.

Energy Producers and Users Coalition

- PG&E does not provide RSE information to determine which mitigation it should prioritize or the cost effectiveness of each mitigation.

Green Power Institute

- PG&E provides a summary of its S-MAP analysis but not the information to connect the analysis to proposed WMP activities.
- Despite conducting Enhanced Vegetation Management (EVM) on approximately 4,300 line-miles from 2019–2020, PG&E predicts a relatively small proportional decrease (approximately 12 percent) in system-wide vegetation contact through 2022.
- The electrical corporations show large differences in risk reduction and RSE values for similar vegetation management activities. PG&E's normalized EVM costs may be the highest of the electrical corporations at \$257,000 per line-mile.
- PG&E should better document the efficacy of its EVM with data.

Joint Local Governments

- PG&E should share its improved situational awareness information with local governments and public safety partners.
- Supports PG&E's plans to reduce future PSPS events, such as an updated EVM that focuses on low-voltage transmission lines and increased sectionalization of distribution and transmission lines.
- Supports PG&E's commitment to improve communication and information-sharing with local governments.

Mussey Grade Road Alliance

- PG&E must remedy deficiencies in its WMP as a condition of approval.
- PG&E should report ignitions, not wildfires, in the same manner as SDG&E and SCE.
- PG&E should be required to provide a more granular breakdown of its programs in RSE and resource allocation.

Orange County Fire Authority

- PG&E, SDG&E, and SCE should allocate resources to jointly fund the Fire Integrated Real Time Intelligence System (FIRIS) program.

Perimeter Solutions

- The electrical corporations do not discuss the use of fire-retardant products.

Public Advocates Office (California Office of Public Advocates)

- PG&E's normalized values cannot be compared to the other electrical corporations, and PG&E should submit a supplement using the normalization protocol set forth in the 2020 WMP Guidelines. Overall, PG&E's normalization methodology makes sense and future Guidelines should use PG&E's modifications.
- PG&E should explain the need for the Process Quality Group and how its role differs from other groups responsible for plan implementation quality assurance.
- PG&E should revise Table 23 to provide the number of circuit-miles to be hardened using covered conductor and the number miles to be undergrounded
- PG&E calculates RSE for only four wildfire risk mitigation programs and should be required to calculate RSEs for all wildfire risk mitigation strategies.
- Electrical corporations should submit a supplement demonstrating the accuracy of their wildfire models.
- The utilities are not sufficiently transparent about how resource and operational constraints affect their decision-making.
- Electrical corporations should provide a detailed justification of why undergrounding is an acceptable hardening strategy in locations where it is proposed.

Rural Counties of California Representatives

- Concerned that PG&E has only completed one-third of the needed inspections in Tier 2 High Fire Threat District in 2020.
- Supportive of PG&E's use of back-up generators at substations for system resiliency.
- PG&E appears to be applying uniform trimming and clearances in its EVM without regard to species or characteristics.
- More information is needed to better understand the extent the utilities will be able to scale back the use of PSPS events over time.
- Multi-channel communications are essential and electrical corporations should be cautious in assuming that customers can easily "click through" a hyperlink for more information.

- Support PG&E's commitment to communicate with state, local, and tribal governments.
- WMPs lack details that are necessary to ensure vulnerable populations are protected.
- A tool should be developed to compare the cost/benefit across utilities.

Santa Clara County

- The numbers that PG&E report in Table 2 do not meet the requirements because they are not normalized for all events that occur within its entire service territory.
- PG&E should clarify how its answers in Section 5.3.1.4 address PSPS risk-reduction, rather than wildfire risk impact.
- PG&E's discussion regarding the costs of system hardening to customers does not adequately respond to the requirements of the WMP Guidelines.
- PG&E should specify which customer and community outreach efforts will be implemented in 2020 and beyond.

Alan Stein

- The COVID-19 shutdown has invalidated timelines in the WMPs, and the plans should be revised and resubmitted.
- The Commission should determine whether it would be cheaper in one fell swoop to cut all the limbs off a tree threatening a line than to patrol, inspect, and trim over the life of the tree. The Commission should choose the least cost for the most good in the shortest amount of time and abandon continued risk analysis.

The Utility Reform Network

- PG&E's RSE showings are deficient and do not provide a basis for approving the WMP.
- The Commission should not allow electrical corporations to track costs in the wildfire mitigation memorandum account simply because the electrical corporation claims the program is new or incremental.
- The Commission should not allow electrical corporations to include costs of traditional maintenance inspection and repair compliance programs in their wildfire mitigation memorandum accounts because they are not new programs.

In addition, a significant number of members of the public submitted input commenting on concerns they have with PG&E's 2019 PSPS actions, vegetation management, and general behavior. This Resolution addresses these comments as well.

In reply to the foregoing party comments, PG&E asserts the following:

General

- These WMP Resolutions are not the venue to review the details of every specific proposed mitigation project.
- PG&E's 2020 WMP is consistent with the WMP Guidelines and Commission direction and the Commission should reject recommendations to submit additional information.
- PG&E collaborates with the other utilities to share best practices and understand the use of mitigation measures and emerging technologies.

Grid Hardening and Inspections

- PG&E cannot estimate the number of circuit miles intended for overhead hardening versus undergrounding because the figure will change.
- System hardening is intended to prevent wildfires that impact all communities, whether disadvantaged or not. PG&E's approach is to reduce overall wildfire risk, which benefits all customers.
- PG&E generally agrees with EBMUD that reducing PSPS should be a factor in prioritizing system hardening.
- PG&E's 2020 WMP provides general system hardening cost information as required by the WMP Guidelines. References to other proceedings where costs are specifically addressed are provided in Table 23.
- PG&E agrees with Mr. Collins that many emerging technologies require further review and testing.
- PG&E will continue to evaluate the benefits, collection, and use of LiDAR data.

Vegetation Management and Inspections

- PG&E does not consider healthy trees to be candidates for removal under the hazard tree removal program as TURN implies.
- It is unnecessary to address TURN's suggested analysis for disproportionate number of tree trims between utilities.

- In its 2021 WMP, PG&E plans to incorporate CEJA's recommendation of additional analysis on the effectiveness of different inspection techniques.
- The Process Quality Group provides near real time inspection quality monitoring and is not duplicative of internal audit or existing groups.
- In 2019, PG&E inspected all assets in HFTD Tiers 2 and 3 and it is reasonable to spread the next inspection of Tier 2 assets over the 2020 – 2022 timeframe.

Cost

- Costs recorded to the wildfire mitigation memorandum account will be reviewed and addressed in a separate cost recovery filing.

RSE

- Controls and foundational initiatives do not require RSE calculations because the initiatives are already accounted for in the baseline risk score or do not result in stand-alone risk reduction.
- It is reasonable that the risk rankings would change between the modeling for the 2020 GRC and the 2020 WMP due to new data and modeling techniques, and it is unnecessary to update the models to be comparable.
- The judgment of subject matter experts is currently the best information available and using them is consistent with S-MAP approved methodology.
- TURN's request for more granular RSE analysis is not a reason to find a deficiency in the 2020 WMP but should be considered for future WMPs.

PSPS

- Many suggestions regarding PSPS are more appropriately addressed in R.18-12-005, and the Commission should not require further specific PSPS measures in the 2020 WMPs.
- PG&E continues to assess how best to manage the limited space in the Emergency Operations Center to ensure accessibility for critical personnel while also allowing engagement with stakeholders.
- PG&E has been incorporating community feedback in preparation for potential 2020 PSPS events and has been submitting bi-weekly reports on PSPS corrective actions including outreach efforts in R.18-10-005 and Investigation 19-11-013.
- PG&E is working with local governments to incorporate feedback and determine the best approach for Community Resource Centers.

- As part of 2020 PSPS improvements, PG&E is considering how to improve communication with local governments and public safety partners including providing more granular and accurate information more quickly.
- Generally, PG&E considers much of 2020 WMP efforts to represent measures that reduce the need for PSPS in addition to reducing wildfire risk.
- Some information shared with local governments such as customer information and critical energy infrastructure information must be protected by non-disclosure agreements.
- Microgrids are one way to mitigate the impact of PSPS and are being addressed in R.19-09-009.

Data

- PG&E oppose Santa Clara County's request to have normalized data over the entire service territory, the appropriate methodology is to normalize by HFTD area.
- PG&E opposes the recommendation from the Public Advocates Office to require the resubmittal of normalized data using a different methodology than PG&E's 2020 WMP.

6. DISCUSSION

The Commission has reviewed the actions taken by the WSD pursuant to Pub. Util. Code Section 8386, the recommendations of the WSAB, stakeholder comments served on the R.18-10-007 service list, the underlying documents, and other public input. The following aspects of PG&E's WMP raise the greatest concern; they include vegetation management, grid hardening, its calculation of RSE (where to channel mitigation for the greatest reduction in wildfire risk), modeling of ignitions as a basis for deciding on mitigation measures, and PG&E's approach to PSPS:

- 1) *Vegetation management.* Twenty-five percent of PG&E's ignitions result from vegetation contact; as such vegetation management is an important aspect of PG&E's WMP. PG&E's reporting on the quality of its enhanced vegetation management work indicates there may be a problem with the quality of its work, as reflected by low pass rates of quality assurance checks of its enhanced vegetation management program. Further, PG&E provides little rationale for conducting vegetation management initiatives in the same location as other WMP initiatives, such as grid hardening. PG&E indicates difficulties in finding sufficient personnel to conduct its current vegetation management work. Finally, with PG&E's increased focus on vegetation management efforts for transmission assets, it is unclear what impact this

may have on PG&E's vegetation management efforts for distribution assets, which are more frequently involved with ignitions.

- 2) *Grid hardening.* In light of catastrophic wildfires and the natural gas pipeline tragedy in San Bruno, PG&E must continually document and prove that it is adequately maintaining its electrical lines and equipment, thus making its grid safer. In addition, PG&E's responses to the Utility Survey indicate that its electrical lines and equipment are not consistently maintained at required condition over multiple circuits. Given the state of PG&E's grid and the massive size of its service territory, prioritization of work based on risk is critical for mitigating its wildfire risk in the near-term. PG&E provides little analysis demonstrating that it is prioritizing grid hardening initiatives to achieve the greatest risk reduction. PG&E also does not break out its grid hardening programs into initiatives. For example, PG&E does not separately report undergrounding from overall \$5.1 billion system hardening planned spend, making it impossible to determine how much PG&E spends on undergrounding and difficult to assess the various initiatives within this program.
- 3) *Risk analysis and resource allocation.* PG&E's RSE evaluation is very weak. It analyzes only four programs, one of which is PSPS. PG&E stated during the workshop that PSPS will score highest even though PG&E includes no external costs to the community impacted by the power shutoffs and assumes 100 percent wildfire mitigation where power is shut off. PG&E shall not continue to rely on this calculation to justify PSPS. Also, PG&E does not sufficiently analyze alternatives to its chosen WMP programs and initiatives or prove that chosen initiatives are the most effective use of resources. PG&E expresses advancement in risk modeling capabilities; however, it has not sufficiently explained how it utilizes these capabilities to prioritize its WMP programs and initiatives.
- 4) *PSPS.* PG&E explains its plan to reduce the scope and frequency of PSPS events using the slogan "smarter, shorter and smaller" and promises a 30 percent reduction in the number of customers affected by PSPS. However, PG&E has not provided enough detail in its WMP for the WSD to assess whether PG&E can achieve its goal of reduced deployment of PSPS in 2020. PG&E has provided such PSPS input in other contexts, including the Commission's formal PSPS proceeding, R. 18-12-005, but it is required to reflect that information in its WMP.

Therefore, the WSD's approval of PG&E's WMP is conditioned on PG&E's compliance with each of the conditions set forth in Appendix A and the conditions in the Guidance Resolution.

The following sections discuss in detail the WMP, its contents, required changes, and conditions imposed on approval in detail. They follow the template provided in WMP Guidelines attached to the R.18-10-007 Administrative Law Judge's December 16, 2019 ruling as Attachment 1.

6.1. PERSONS RESPONSIBLE FOR EXECUTING THE PLAN

This section of the WMP requires that the filer designate a company executive with overall responsibility for the plan, and program owners specific to each component of the plan. The section also requires a senior officer to verify the contents of the plan, and the filer to designate key personnel responsible for major areas of the WMP.

PG&E provides the required information.

6.2. METRICS AND UNDERLYING DATA

The metrics and underlying data section of the WMP represents an innovation over the 2019 WMP requirements in that all filers are required to report standardized and normalized data on many aspects, including their performance metrics, conditions in their service territories, grid topology, and wildfire mitigation efforts. To remedy a concern with the 2019 plans, the 2020 WMP Guidelines disallow the practice of filers characterizing only "program targets" (*e.g.*, number of miles of covered conductor installed or trees trimmed) as the "metrics" required by the statute. For 2020, the WMP Guidelines require filers to group metrics and program targets as follows.

- *Progress metrics* track how much electrical corporation wildfire mitigation activity has managed to change the conditions of an electrical corporation's wildfire risk exposure in terms of drivers of ignition probability.
- *Outcome metrics* measure the performance of an electrical corporation and its service territory in terms of both leading and lagging indicators of wildfire risk, PSPS risk, and other direct and indirect consequences of wildfire and PSPS, including the potential unintended consequences of wildfire mitigation work.
- *Program targets* measure tracking of proposed wildfire mitigation activities against the scope and pace of those activities as laid out in the WMPs but do not track the efficacy of those activities. The primary use of these program targets in 2020 will be to gauge electrical corporation follow-through on WMPs.

This section first requires filers to discuss how their plans have evolved since 2019, outline major themes and lessons learned from implementation of their 2019 plan

and discuss how the filers' performance against metrics used in their 2019 plans have informed their 2020 WMP. A series of tables then requires reporting of recent performance on predefined outcome and progress metrics, including numbers of ignitions, near misses, PSPS events, worker and public deaths and injuries, acreage affected, assets destroyed by fire, and critical infrastructure impacts, as well as additional metrics the filer proposes to use to ensure the effectiveness of its efforts in quantitatively mitigating the risk of utility-caused catastrophic wildfire.

This section also requires filers to detail their methodology for calculating or modeling potential impact of ignitions, including all data inputs used, data selection and treatment methodologies, assumptions, equations or algorithms used, and types of outputs produced. Finally, this section requires filers to provide a number of GIS files detailing spatial information about their service territory and performance, including recent weather patterns, location of recent ignitions, area and duration of PSPS events, location of lines and assets, geographic and population characteristics and location of planned initiatives. A detailed summary and comparison of performance metrics, current state of utility service territories and resource allocation is provided in Appendix B.

PG&E's metrics section first describes major themes and lessons learned from the 2019 WMP and from implementation of its 2019 wildfire mitigation initiatives. It states that key major themes and lessons learned from its 2019 WMP concern (1) "success[] in mitigating catastrophic wildfire in the PG&E service territory," 2) ignition reduction from 2018, 3) increased coverage of weather stations to improve accuracy and capabilities, 4) results of its 2019 PSPS events, which PG&E asserts "were highly effective at reducing the risk of vegetation or other flammable items contacting live wires and starting fires," and 5) increased appreciation of the burden PSPS places on affected customers and communities.⁷

The WMP Guidelines ask PG&E to explain how its plan evolved in 2020 as a result of 2019 lessons learned. PG&E states that it continued certain programs such as the 2019 Wildfire Safety Inspection Program (WSIP), which resulted in enhanced inspections in High Fire Threat District (HFTD) areas. On the other hand, PG&E modified the scope of its EVM program to "shift some EVM work from distribution to lower voltage transmission lines to reduce the impact of PSPS events."⁸

⁷ PG&E WMP at 2-3.

⁸ PG&E's PSPS activities are addressed in the Section entitled Grid Operations and Operating Protocols, including PSPS below.

The following analysis presents the highlights of PG&E's reported progress and outcome metrics in its 2020 WMP. Appendix B, Figure 2.2a depicts near misses normalized by circuit miles and Appendix B, Figure 2.3a depicts normalized ignitions. Appendix B, Figure 2.6a provides a detailed breakdown of ignitions by driver. It is important to consider these data together to understand the scope, frequency, and scale of the drivers of utility ignition. Improved understanding of the relationships between near misses and ignitions can better inform utility performance and track progress.

Over the past five years, PG&E's reported near misses per circuit mile have fluctuated year over year, showing no consistent trend. The largest increase in near miss incidents occurred from 2016 to 2017 when PG&E's reported near misses increased by approximately 38 percent, followed by a decrease of 33 percent in 2018, and then a 35 percent increase in 2019 to near-2017 peak levels. PG&E shows a similar year-over-year fluctuating pattern in reported ignitions, with a peak in 2017, although the annual fluctuations were generally smaller than for near misses. Compared to peer utilities, PG&E has approximately twice as many ignitions per circuit mile, primarily driven by equipment failure and contact from object ignitions.

Appendix B, Figure 2.7a displays the electrical corporations' actual ignitions from 2019 broken out by driver and compares to projected reduction in ignitions by driver at the end of the plan period (2022) resulting from implementation of planned WMP initiatives. PG&E projects a decrease in ignitions of approximately 5 percent over the plan period. PG&E projects to achieve these reductions primarily across its top three historical ignition drivers of vegetation contact, conductor failure, and animal contact.

PG&E experienced a large increase in inspection findings in 2019. In comparing PG&E with peer utilities, PG&E has far more drastic changes year over year in inspection findings, as outlined in Figure 2.1a of Appendix B. This finding may be reflective of poor historical inspection programs (*i.e.*, training of inspectors, thoroughness and frequency of inspections, etc.), increased inspection work in recent years, or both. PG&E did not provide data broken down by inspection type; thus the WSD cannot compare the rates of PG&E's findings resulting from specific inspection programs (patrol, detailed) across peer utilities.

Appendix B, Figure 1.5a shows the total annual Red Flag Warning (RFW) circuit mile days for each reporting year. This metric provides a means of differentiating fire weather potential (as a function of RFWs) year over year and across electrical corporations' service territories. Appendix B, Figure 2.9a shows values for acres burned, total and normalized, across the WMP-defined metric of RFW circuit mile

days. The intent of this normalizing metric is to account for varying fire weather conditions, both temporally and spatially, and the extent to which those conditions occur in areas where there is existing overhead electrical lines and equipment, using a common metric of RFWs. However, additional study and refinement are necessary, as it seems there are inconsistencies in how filers calculated this value.

As shown in Appendix B, Figure 2.9a, PG&E reported its highest acreage burned per RFW circuit mile day and total acres burned in 2017. In 2018 and 2019, both PG&E's acreage burned per RFW circuit mile day and total acres burned have steadily decreased.

Deficiencies and Conditions - Metrics and Underlying Data

The following is a list of deficiencies resulting from analysis of PG&E's metrics, along with next steps PG&E shall take as a condition of the WSD's approval of its 2020 WMP.

Deficiency (PGE-1, Class A): PG&E groups initiatives into programs and does not provide granular initiative detail.

PG&E groups initiatives into "programs," making it difficult to assess the effectiveness as well as the cost of individual initiatives within these programs. For example, PG&E does not separately report undergrounding from its overall \$5.1 billion system hardening planned spend, making it impossible to determine how much PG&E spends on undergrounding and difficult to assess the various initiatives within this program.

Furthermore, PG&E does not break down the outcomes or results of individual initiatives as required by the guidelines. For example, in Table 1, PG&E was required to break down results from inspections over the past five years into each of the following inspection types: Patrol inspections, Detailed inspections, and Other inspections. PG&E reported all inspection types together, providing no basis for comparison of PG&E to its peers by inspection type and making it difficult to determine the effectiveness of PG&E's various inspection types.

Condition (PGE-1, Class A): In addition to the requirements of the relevant Condition in the Guidance Resolution, PG&E shall develop and furnish an RCP that includes:

- i. A detailed break-down of its programs outlined in section 5.3 into individual initiatives, reporting planned spend on each individual initiative, describing the effectiveness of each initiative at reducing ignition risk, outlining outcomes (including providing results of detailed, patrol, and other inspections individually in Table 1, as required in the

WMP Guidelines), and providing the information required for each initiative as required in Section 5.3 of the Guidelines; and

- ii. If PG&E does not have the relevant data in its possession at the initiative level, it shall 1) explain the difference between what it reports and what the WMP Guidelines require, 2) explain why it cannot meet the WMP Guidelines, and 3) develop a plan including a detailed timeline to obtain and share the required information at the initiative level rather than the program level.

6.3. BASELINE IGNITION PROBABILITY AND WILDFIRE RISK EXPOSURE

The baseline ignition probability and wildfire risk exposure section of the WMP requires electrical corporations to report baseline conditions and recent information related to weather patterns, drivers of ignition probability, use of PSPS, current state of utility equipment, and summary data on weather stations and fault indicators. The section then requires the filer to provide information on its planned additions, removals, and upgrades of equipment and assets by the end of the 3-year plan term, in urban, rural and highly rural areas. The information must describe the scope of hardening efforts (*i.e.*, circuit miles treated), distinguish between efforts for distribution and transmission assets, and identify certain locational characteristics (*i.e.*, urban, rural and highly rural) of targeted areas. Filers must also report the sources of ignitions over the past five years due to ignition drivers outlined in the annual fire incident data collection report template adopted in D.14-02-015.

Considering that managing the potential sources of ignition from its infrastructure, operations, and equipment is the single most controllable aspect of utility wildfire risk, understanding the sources and drivers of near misses and ignitions is one of the most critical capabilities in reducing utility-caused wildfire risk. Moreover, it is important to consider these performance metrics relative to annual fluctuations in weather conditions (*i.e.*, incidence of RFW days, days with high wind conditions – 95th and 99th percentile winds, and high fire potential days measured relative to utility Fire Potential Indices (FPI) or other fire danger rating systems) to better gauge relationships and thresholds between weather and fire potential indicators and utility ignitions. As such, the discussion in this section focuses on recent weather patterns, key drivers of utility ignitions and frequencies of such ignitions, recent use of PSPS, the current baseline conditions of the utility’s service territory and equipment, and locations of planned utility upgrades.

Of the three largest California electrical corporations, PG&E has the largest overhead system - approximately 100,000 circuit miles - which is nearly twice that of SCE and more than 10 times that of SDG&E. Moreover, as shown in Figure 1.1a of Appendix B, a much larger percentage of PG&E’s total grid (84 percent) is comprised of

overhead infrastructure, as compared to SCE (62 percent) and SDG&E (42 percent). Additionally, while approximately one-third of PG&E's overhead circuits are in HFTD areas, as shown in Figure 1.4a of Appendix B, almost all of those overhead facilities are in sparsely populated HFTD areas.⁹ Considering both the volume of its overhead lines and that much of its grid is overhead, PG&E faces increased wildfire risk exposure.

Observations from PG&E's reported ignition data for its distribution and transmission lines reflect that contact from objects and equipment failures are the leading drivers of PG&E ignitions. It should be noted, however, that transmission line data sample sizes are small compared to distribution data sample sizes. Considering that utility-caused ignitions are already a relatively small subset (5-10 percent) of total wildfire ignitions, caution should be used in drawing substantive conclusions from transmission asset ignition data.

As shown in Figure 2.5a of Appendix B, of all PG&E ignitions on its distribution system over the past five years, 56 percent were due to contact from objects and 37 percent were due to equipment failures – accounting for over 90 percent of all reported ignitions. Moreover, when compared to the other large electrical corporations, PG&E reports nearly twice as many ignitions per overhead circuit mile.

Figure 2.6a of Appendix B shows that vegetation contact was the largest ignition driver representing 25 percent of all PG&E ignitions (45 percent of all contact from object ignitions). PG&E's second largest ignition driver was conductor failure, making up 19% of all ignitions. While these ignition drivers make up significant percentages of other large electrical corporation's ignitions, PG&E experiences these types of ignitions the most – especially when considering its higher rate of ignition per overhead circuit mile. Hence, PG&E may focus on vegetation management to measurably reduce the risks of vegetation contact drivers. Also, as discussed below, we require PG&E, as a condition of this WMP approval, to provide additional detail and explanation regarding its high rates of equipment failure ignitions.

Deficiencies and Conditions - Baseline Ignition Probability and Wildfire Risk Exposure

⁹ In accordance with the 2020 WMP Guidelines, "Rural" areas have a population of less than 1,000 persons per square mile and "Highly Rural" areas have a population of less than 7 persons per square mile.

Deficiency (PGE-2, Class B): Equipment failure.

Of all PG&E ignitions on its distribution system, 37 percent were caused by equipment failures over the last five years with the largest driver being conductor failures at 19 percent of total PG&E ignitions (or 53 percent of all equipment failure driven ignitions). Based on normalized data, this rate is almost 50 percent higher than other large electrical corporations and has a significant impact since PG&E has by far the most overhead conductor miles.

Condition (PGE-2, Class B): In its first quarterly report, PG&E shall:

- i. Explain why its equipment failure rate is so high compared to other large electrical corporations;
- ii. Explain how it expects grid hardening, asset management and other initiatives affect the probability of 1) near misses and 2) ignitions; and
- iii. Address whether its prior maintenance history is causing higher rates of equipment failure now. PG&E shall include in this report all instances where a court or other decision making body found fault with PG&E's historical equipment maintenance, either with regard to individual assets or its maintenance policies as a whole.

Deficiency (PGE-3, Class A): High incidence of conductor failure.

As shown in Appendix B, Figure 2.6a, PG&E has approximately 50 percent more conductor failure ignitions as a percentage of total ignitions, nearly 2.5 times the number of "conductor failure"-driven ignitions per overhead circuit mile compared to peer utilities. Since PG&E has the most overhead circuit miles and thus conductors compared to peer utilities, the high rate of conductor failure poses a serious risk.

Condition (PGE-3, Class A): In its RCP, PG&E shall present a plan for the following:

- i. Presenting the results of a study or analysis showing the root causes of conductor failures on its grid;
- ii. Listing the specific locations and assets that are most likely to experience conductor failure based on: (1) the root cause analysis, (2) attributes of PG&E's conductors (*i.e.*, age, type, condition, etc.) and (3) other relevant factors (*e.g.* peak wind speeds); and
- iii. Reporting the specific work plan that PG&E plans to undergo (including circuits being addressed, timeline, cost, etc.) to reduce incidents of

conductor failure, including the expected impact of this work plan on PSPS and wildfire risk reduction.

Deficiency (PGE-4, Class C): Capacitor bank failure.

PG&E capacitor bank failures on its distribution system cause 500 percent higher rates of ignition compared to other large electrical corporations. Although capacitor bank failures only comprise 2 percent of total PG&E ignitions, the average rate of ignition per incident is high at 15 percent. This means that 15 percent of the time a capacitor bank fails, the failure leads to an ignition.

Condition (PGE-4, Class C): In its 2021 WMP update, PG&E shall list and describe mitigation measures that it is undertaking to reduce the likelihood of a capacitor bank ignition.

6.4. INPUTS TO THE PLAN, INCLUDING CURRENT AND DIRECTIONAL VISION FOR WILDFIRE RISK EXPOSURE

This section of the WMP requires the filer to rank and discuss trends anticipated to exhibit the greatest change and have the greatest impact on ignition probability and wildfire consequence, within the filer's service territory, over the next 10 years. First, filers must set forth objectives over the following timeframes: Before the upcoming wildfire season, before the next annual update, within the next 3 years, and within the next 10 years.

Filers must describe how the utility assesses wildfire risk in terms of ignition probability and estimated wildfire consequence, using Commission adopted risk assessment requirements (for large electrical corporations) from the GRC Safety Model and Assessment Proceeding (S-MAP) and Risk Assessment Mitigation Phase (RAMP). The filer must describe how the utility monitors and accounts for the contribution of weather and fuel to ignition probability and wildfire consequence; identify any areas where the Commission's HFTD should be modified; and rank trends anticipated to have the greatest impact on ignition probability and wildfire consequence.

A key area which filers are required to address is PSPS events. In 2019, electrical corporations proactively shut off power to millions of customers for multiple days, resulting in numerous cascading consequences, including associated public safety concerns. The Commission has been clear in its judgement that those events were unacceptable and cannot be repeated. The new 2020 WMP Guidelines direct the electrical corporations to describe lessons learned from past PSPS events and quantify the projected decrease of circuits and customers affected by PSPS as a result of implementing wildfire mitigation programs and strategies contained in the WMP.

PG&E describes its WMP objective as follows:

The objective of PG&E's Wildfire Mitigation Plan (WMP) for 2020 and beyond is to reduce the risk and consequences of wildfires associated with utility electrical equipment, and thereby avoid catastrophic wildfires across central and northern California. PG&E is investing in many wildfire mitigation measures including enhanced vegetation management, asset inspection and repair, situational awareness, system hardening and system automation.¹⁰

We discuss specific aspects of the WMP in their respective sections below.

Deficiencies and Conditions - Inputs to the Plan

One overriding concern is PG&E's general lack of commitment to actual goals. Where appropriate, we add specific conditions in this Resolution to which PG&E is bound. We do not accept its failure to make commitments as binding on the Commission or the people of California. Approval of PG&E's WMP is conditioned upon its compliance with the many conditions set forth in this Resolution.

Lack of commitment to specific goals is not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

6.5. WILDFIRE MITIGATION ACTIVITY FOR EACH YEAR OF THE 3-YEAR WMP TERM, INCLUDING EXPECTED OUTCOMES OF THE 3-YEAR PLAN

This section of the WMPs is the heart of the plans and requires the filer to describe each mitigation measure it will undertake to reduce the risk of catastrophic wildfire caused by the utility's infrastructure, operations, and equipment. A description of each type of measure appears below, with elaboration in Appendix D to this Resolution.

First, the WMP Guidelines require a description of the overall wildfire mitigation strategy over the following timeframes: before the upcoming wildfire season, before the next annual update, within the next 3 years and within the next 10 years. The filer is required to describe its approach to determining how to manage wildfire risk (in terms of ignition probability and estimated wildfire consequence) as distinct from other safety risks. The filer is required to summarize its major investments over the past year, lessons learned, and changes planned for 2020-2022; describe

¹⁰ PG&E WMP at 4-1. See also *id.* at 4-19 – 4-21 for WMP overview.

challenges associated with limited resources; and outline how the filer expects new technologies to help achieve reduction in wildfire risk.

Next, Section 5 requires the filer to explain how it will monitor and audit the implementation of the plan and lay out the data the filer relies on in operating the grid and keeping it safe. It then requires detailed descriptions of specific mitigations or programs, in the following order:

- 1) Risk assessment and mapping
- 2) Situational awareness and forecasting
- 3) Grid design and system hardening
- 4) Asset management and inspections
- 5) Vegetation management and inspections
- 6) Grid operations and operating protocols, including PSPS
- 7) Data governance
- 8) Resource allocation methodology
- 9) Emergency planning and preparedness
- 10) Stakeholder cooperation and community engagement.

PG&E's key cause of ignitions historically is contact from vegetation and equipment failures. Hence, PG&E's wildfire risk mitigation efforts have included and will continue to include vegetation management, inspections of electrical distribution and transmission facilities, system hardening, and improvement of its PSPS program supported by situational awareness capabilities. PG&E's key goals are 1) reducing the potential for fires to be started by utility assets, 2) reducing the potential for fires to spread, and 3) minimizing the frequency, scope and duration of PSPS events.¹¹

Below, this Resolution evaluates the mitigations (or initiatives) PG&E proposes for each of the 10 foregoing categories. After identifying each proposed mitigation or group of mitigations, the Resolution discusses concerns with the proposal, and identifies any conditions imposed. Provided in Section 1.3 of Appendix B, for illustrative purposes, are summaries of the filer's projected costs across highest total cost initiatives as well as projected costs across the highest category initiatives.

¹¹ PG&E WMP at 5-1 – 5-2.

6.5.1. RISK ASSESSMENT AND MAPPING

This section of the WMP requires the filer to discuss the risk assessment and mapping initiatives implemented to minimize the risk of its equipment causing wildfires. Filers must describe initiatives related to maps and modelling of overall wildfire risk, ignition probability, wildfire consequence, risk-reduction impact, match-drop simulations, and climate/weather driven risks. This section also requires the electrical corporation to provide data on spending, miles of infrastructure treated, spend per treated line mile, ignition probability drivers targeted, projected risk reduction achieved from implementing the initiative, risk spend efficiency, and other (*i.e.*, non-ignition) risk drivers addressed by the initiative.

The parameters of risk assessment and resource allocation to reduce wildfire risk derive from the S-MAP and RAMP of GRCs. The risk assessment methodology that governs the three large electrical corporations was determined via a joint Settlement Agreement (Settlement) among parties and approved in D.18-12-014. The process is being refined with each new RAMP/GRC cycle. At present, PG&E is in a pre-RAMP process.¹²

The S-MAP/RAMP RSE methodology applies to all identified safety risks, not just wildfires, although utility-caused wildfires are considered the top safety risk for each of the electric distribution utilities and therefore a big component of the risk assessment program. The WMP is an opportunity to put the S-MAP/RAMP process into practice for all covered utilities.

Each large electrical corporation is at a different stage in using the Settlement methodology approved in D.18-12-014. Going forward each is supposed to employ uniform processes and scoring methods to assess current risk, estimate risk reduction attributable to its proposed mitigations, and establish an RSE score for each mitigation by dividing the risk reduction by the total cost of the mitigation program.

PG&E is behind the curve in risk assessment as compared to SDG&E, for example. Unlike SDG&E's current use of climate modeling tools to assess ignition risk, PG&E states that it plans to review changes to the HFTD map on the basis of re-analysis of 30 year climatology data and completion of the first phase of industry and Commission models. In response to a WSD data request, PG&E states that it does not use recent data for modeling and relies instead on historical trends to account for

¹² PG&E will submit its 2020 RAMP report to the Commission in June 2020. PG&E WMP at 5-4.

climate change.¹³ This means PG&E lacks insight on the current effects of climate change, since today's fires are unprecedented in terms of size and spread. More accurate models of the impact of climate change require more recent data, especially given the size of PG&E area wildfires in 2017, 2018 and 2019.

PG&E's work in this area is largely unsatisfactory, as discussed below. Approval of its WMP is conditioned upon PG&E meeting each of the conditions set forth below. The key deficiencies include the failure to provide RSEs for most initiatives, inappropriate reliance on RSE to justify PSPS because the actual costs of PSPS are not included in the calculation, failure to give budgets by initiative, poor comparison to SDG&E in risk assessment, and a large number of lower risk (Level 3) findings, as explained in Section 6.5.4 below, which call into question how PG&E is categorizing findings.

Deficiencies and Conditions – Risk Assessment and Mapping

RSE is a tool to allocate resources toward actions that offer the greatest risk reduction. In accordance with the Settlement, electrical corporations are supposed to conduct this analysis at the asset level as a way to compare effectiveness of certain mitigations to alternatives. PG&E's WMP lacks this alternatives analysis even though the Commission required it in its January 11, 2020 WMP Clarification Document, as PG&E acknowledges.¹⁴

Lack of alternatives analysis is not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

PG&E's WMP fails to provide risk reduction and RSE data for the majority of its initiatives.

Lack of risk reduction and RSE data is not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

PG&E's plan does not clearly reflect more sophisticated decision-making, for example, based on risk models.

Lack of sophisticated decision-making based on risk-based models is not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

¹³ WSD Data Request number 43895-C-319.

¹⁴ PG&E WMP at 5-35.

PG&E provides little discussion of whether or how it uses wildfire risk modeling to prioritize initiatives. PG&E is less mature than peer utilities, has a large service territory with significant HFTD areas, and reports that it has low redundancy in its circuits. For PG&E's plan to be effective, strategic prioritization of initiatives geographically and by ignition driver to target the highest risk portions of PG&E's grid is crucial.

Although less developed than its peers in this area, lack of strategic prioritization of initiatives geographically and by initiative is not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

PG&E provides little detail on how risk mapping and models help PG&E better understand the extent to which a PSPS event is needed and how it uses risk models and mapping to minimize PSPS scope, frequency or impact. While PG&E implies that it has mapped risks, it does not explain how it uses this mapping to actually reduce that risk.

Deficiencies such as these are not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Deficiency (PGE-5, Class B): PG&E provides little discussion of how it uses the results of relative risk scoring method.

On p. 5-274 of its WMP, PG&E provides Figure PG&E 5-26, which depicts relative risk scores as a function of system hardening in HFTD. The figure and supporting narrative indicate that 95 percent of PG&E's wildfire risk pertains to approximately 5,500 circuit miles in HFTD areas. PG&E's WMP lacks detail and discussion regarding: (1) how this information was used to prioritize WMP initiatives, (2) how this information was used to target where to implement WMP initiatives, and (3) which and what portion/percentage of its 2020 WMP initiatives are targeted toward these identified 5,500 circuit miles.

Condition (PGE-5, Class B): In its first quarterly report, PG&E shall detail:

- i) Where each of these 5,500 miles are located within its grid, including supporting GIS files;
- ii) How this information was used to prioritize WMP initiatives;
- iii) How this information was used to target where to implement WMP initiatives;
- iv) What percentage of its total planned spend for each of the years 2020-2022 are targeted toward these identified 5,500 circuit miles comprising 95 percent of PG&E's wildfire risk;

- v) What percentage of total vegetation management personnel hours are targeted toward these identified 5,500 circuit miles comprising 95 percent of PG&E's wildfire risk; and
- vi) Its rationale for this level of spend and resource allocation to these 5,500 circuit miles and whether PG&E expects to change its allocation of spend and resources from these 5,500 circuit miles.

Deficiency (PGE-6, Class B): Discrepancy between ignition reduction projections.

In its WMP, PG&E estimates a 10 percent reduction in vegetation-caused equipment failure and animal-caused ignitions from 2019 levels due to its planned system hardening, EVM, and "Tag Repair" work (repair of asset problems discovered during inspections) for 2020 and beyond. It anticipates the same 10 percent trend in 2021 and 2022. PG&E anticipates approximately an 8 percent reduction for all HFTD ignitions, year over year, for 2020, 2021 and 2022.¹⁵ However, on p. 5-274 of its WMP, PG&E indicates expectations that its overhead system hardening efforts will reduce ignitions by 56 percent. Additionally, Table 31 of PG&E's WMP, which reports projected ignitions over the plan period, only reflects a projected 2 percent annual reduction in ignitions over the plan term assuming 5-year historical average weather. PG&E must explain these discrepancies.

Condition (PGE-6 Class B): In its first quarterly report, PG&E shall detail:

- i) How it arrived at each of these estimates; and
- ii) How these estimates can be reconciled.

Deficiency (PGE-7, Class B): It is not clear if PG&E's line risk scoring sufficiently incorporates all risks that cause ignition and PSPS.

PG&E appears to primarily rely on outage data and asset condition to conduct line risk scoring. It is therefore not clear whether PG&E's line risk scoring sufficiently incorporates all factors that cause ignition and impact the consequences of a given ignition.

Condition (PGE-7, Class B): PG&E shall in a first quarterly report:

- i) List and describe the inputs to its line risk scoring and summary risk map;
- ii) If PG&E primarily relies on outage data and asset condition, PG&E shall outline other risks that it does not include; and

¹⁵ PG&E WMP at 4-22.

- iii) PG&E shall further explain why those risks are currently excluded, and outline a plan including a detailed timeline to include those risks, if applicable.

Deficiency (PGE-8, Class A): Annual risk ranking is quickly out of date.

In its response to the WSD's data request 43895-C-321, PG&E states that the wildfire risk ranking for distribution lines is only calculated on an annual basis. The ranking thus may incorporate repairs or other maintenance that occur after the annual ranking. Risks are mitigated by corrective action, and if a static annual calculation of risk causes PG&E to scope PSPS events based on incorrect information, PSPS decision making will be erroneous.

For instance, PG&E tags assets requiring repairs with a "Tag Risk Score" in its effort to comply with General Order 95, Rule 18. Needed repairs with an "A" Tag are of immediate risk and require immediate response; "B" Tag items require corrective action within 3 months. By contrast, "E" and "F" Tag items pose lower risk according to PG&E and require correction for "E" Tags in 12 months (6 months if in HFTD Tier 3), and for "F" Tags require action within 5 years (distribution) and 2 years (transmission).¹⁶

Because "A" and "B" Tags require mitigation immediately ("A" Tags) and within 3 months ("B" Tags), repairs made after PG&E's annual risk calculation will not show up. Given that the highest risk tags may be corrected before the subsequent fire season, the risk of a particular circuit may be different from PG&E's annual risk calculation. That is, assets along the circuit should not fail due to recent repairs or replacement. However, PG&E may make PSPS decisions based on a "high risk" score of a circuit that may already be largely mitigated. According to PG&E's responses in the Utility Survey, it is currently updating condition assessments on an annual basis but expects to increase the frequency to quarterly by 2023.

Condition (PGE-8, Class A): PG&E shall file an RCP that:

- i) Lists and describes all plans related to timely incorporation of maintenance status across its grid;
- ii) Includes a timeline and sequence of activities that will be required to increase the frequency of these updates; and

¹⁶ PG&E WMP at 5-41.

- iii) Explains why it will take until 2023 to increase the frequency of its updates from condition assessments to a quarterly basis.

Deficiency (PGE-9, Class B): How PG&E weighs egress as a risk factor.

While it is good PG&E includes egress, the ability of community members and first responders to leave a community during a wildfire, as one of the factors indicative of risk, it is not clear how PG&E weighs this factor against other factors in its risk modeling and deployment of initiatives.

Condition (PGE-9, Class B): In its first quarterly report, PG&E shall detail:

- i) How egress factors into its risk assessment, including how egress is weighted against other factors; and
- ii) How egress impacts the prioritization and deployment of initiatives.

6.5.2. SITUATIONAL AWARENESS AND FORECASTING

The situational awareness and forecasting section of the WMP requires the filer to discuss its use of cameras, weather stations, weather forecasting and modeling tools, grid monitoring sensors, fault indicators, and equipment monitoring. Situational awareness requires the electrical corporation to be aware of actual ignitions in real time, and to understand the likelihood of utility ignitions based on grid and asset conditions, wind, fuel conditions, temperature and other factors.

Other ways of enhancing situational awareness include use of SCADA and communications devices that allow remote detection of line faults, and sensitive settings on relays so they are triggered before they cause wildfire. Most utilities are in various levels of upgrade to enable the use of relays, reclosers, capacitors, circuit breakers, and fault detectors.

The WMP Guidelines refer to key situational awareness measures, including:

- 1) Installation of advanced weather monitoring and weather stations that collect data on weather conditions so as to develop weather forecasts and predict where ignition and wildfire spread is likely,
- 2) Installation of high definition cameras throughout an electrical corporation's service territory, with the ability to control the camera's direction and magnification remotely,
- 3) Use of continuous monitoring sensors that can provide near real-time information on grid conditions,

- 4) Use of a fire risk or fire potential index that takes numerous data points in given weather conditions and predicts the likelihood of wildfire, and
- 5) Use of personnel to physically monitor areas of electric lines and equipment in elevated fire risk conditions.

Generally speaking, PG&E's use of situational awareness technology is promising. It plans on increasing its number of weather stations to 630, located primarily within Tier 2 and Tier 3 of the HFTD. We discuss below the need for PG&E to discuss its deployment of weather stations on U.S. Forest Service land.

Use of weather monitoring and weather stations, cameras, and satellites related to fire weather and fire impact potential on power lines is in its infancy for PG&E. However, the utility has made significant strides since 2017.¹⁷ A strong weather monitoring and situational awareness system is not only one of the more feasible mitigation measures, it is also critical to determining risk-based fire ignition prevention/mitigation, PSPS needs, safe work in the wildlands protocols, and providing an accelerated response to incidents. PG&E must follow best practices in weather monitoring and forecasting from their utility peers in and out of California and the U.S.

PG&E also plans on using various monitoring technology to detect problems on lines to minimize ignition risk, including Enhanced Wires Down technology, pilots funded through the Electric Program Investment Charge (EPIC) program administered by this Commission and the California Energy Commission, program including distribution fault attribution (DFA) and early fault detection (EFD), Line Sensor Devices, an Arc Fault Signature Library, Transmission wave relays (SEL T400Ls), and Sensor IQ.¹⁸ Line sensing/monitoring equipment, systems, and emerging technology seem to be a promising area of safer grid operations. Any system that can sense and possibly predict faults, hardware damage, or ignitions before

¹⁷ For an extensive description of PG&E's advanced weather monitoring, *see* PG&E WMP Sections 5.3.2.1 and subparts.

¹⁸ Enhanced Wires Down Detection uses smart meters to send real-time alerts to help detect and locate downed distribution lines more quickly. DFA technology is installed at a substation and captures current and voltage disturbance on the distribution system. EFD sensors monitor distribution lines for partial discharge emissions which can indicate problems. Line sensors continuously measure conductor current report events as they occur. The signature library will be built from data PG&E collects using optical sensors that sample voltage, current, temperature, pressure, vibration, and acoustic variables, so that PG&E can detect incipient fault conditions on the distribution system. Travelling wave relays (SEL T400Ls) capture high frequency travelling waves emitted by faults or other electric system anomalies. Sensor IQ supports distribution asset analytics.

incidents happen should be supported and used when proven effective. Systems that cut or reduce power to a safe level before an ignition can take place should also continue to be explored and used. Indeed, engineering the natural environment through vegetation management is important but is very costly and can be dangerous to workers. Line sensing options may potentially offer a safer and more cost-effective alternative.

While still in its infancy, PG&E has developed and continues to improve its FPI. PG&E's improvements to the FPI's underlying weather database are also promising. PG&E has an Outage Producing Winds (OPW) index it has historically used to predict winter weather damage on assets. PG&E has improved the index and added the FPI to evaluate weather and fire impacts on lines and equipment. Similar to the FPI, the underlying weather database is also being updated to provide additional resolution of data.

PG&E is strong in terms of its use of personnel monitoring areas of electric lines and equipment in elevated fire risk conditions. Compared to the other electrical corporations, PG&E has by far the most robust group of Safety and Infrastructure Protection Teams, with approximately 28 two-person teams trained in wildfire behavior, suppression, weather and fuel moisture monitoring, and other related areas. By the 2020 fire season PG&E expects that number to increase to 98 crew members. The focus of these teams is twofold: to aid in the immediate response to a wildfire, and to collect wildfire-related data, especially when PSPS is expected to occur.

PG&E's strengths lie in its FPI and piloting of new technology to detect conditions that can lead to ignition. PG&E enhanced the FPI model in 2019 building upon utility best practices.¹⁹ While PG&E is "open to sharing daily FPI data with interested stakeholders," it notes that it "greatly values the role state and federal agencies play in communicating fire danger and risk to the general public. As a result, PG&E's data sharing strategy centers not on communicating the fire potential, but rather the potential for executing PSPS."²⁰

Deficiencies and Conditions - Situational Awareness and Forecasting

The following concerns arise regarding PG&E's situational awareness plans, and we impose conditions on approval of PG&E's WMP as noted below.

¹⁹ See, e.g., PG&E WMP at 4-10 – 4-12.

²⁰ PG&E WMP at 5-99.

Deficiency (PGE-10, Class B): PG&E lacks sufficient weather station coverage.

PG&E lacks sufficient weather station coverage on U.S. Forest Service National Forest lands relative to other locations. Since a large portion of Tier 2 and 3 HFTD areas are in National Forests, it is important to understand PG&E's methodology for choosing where to put weather stations and its justification of why they are not in National Forests. While PG&E understandably has fewer electric assets in these areas, weather stations in these areas could paint a picture of how weather systems are moving across PG&E's whole territory.

Condition (PGE-10, Class B): In its first quarterly report, PG&E shall:

- i) Explain in detail how it chooses to locate its weather stations and explain gaps or areas of lower weather station density, including in the National Forest Areas; and
- ii) Provide a cost/benefit analysis of the impact of having a higher density of weather stations across its territory, including on U.S. Forest Service National Forest lands.

Going beyond pilots

As noted, PG&E is testing a number of technology options through pilots and small demonstration projects. To ensure pilots that are successful result in expansion if appropriate, PG&E must evaluate each pilot or demonstration and describe how it will expand use of successful pilots.

The electrical corporations' WMPs are generally lacking in the area of evaluation and expansion of successful pilots. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

DFA Technology

PG&E states it has used DFA technology to capture abnormal events on its distribution lines. Of the 23,000 disturbance events it has captured using the technology, 6.4 percent are abnormal events, and 11.2 percent of the abnormal events involve arcing. However, PG&E does not explain what it does with this information.

Deficiencies such as these are not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

6.5.3. GRID DESIGN AND SYSTEM HARDENING

The grid design and system hardening section of the WMPs examine how the filer is designing its system and what it is doing to strengthen its distribution and transmission system and substations to prevent catastrophic wildfire. The grid design and system hardening WMP section also requires discussion of routine and non-routine maintenance programs, including whether the filer replaces or upgrades infrastructure proactively rather than running facilities to failure. Programs in this category, which often cover the most expensive aspects of a WMP, include initiatives such as the installation of covered conductors to replace bare overhead wires, undergrounding of distribution or transmission lines, and pole replacement programs. The filer is required, at a minimum, to discuss grid design and system hardening in each of the following areas:

- 1) Capacitor maintenance and replacement,
- 2) Circuit breaker maintenance and installation to de-energize lines upon detecting a fault,
- 3) Covered conductor installation,
- 4) Covered conductor maintenance,
- 5) Crossarm maintenance, repair, and replacement,
- 6) Distribution pole replacement and reinforcement, including with composite poles,
- 7) Expulsion fuse replacement,
- 8) Grid topology improvements to mitigate or reduce PSPS events,
- 9) Installation of system automation equipment,
- 10) Maintenance, repair, and replacement of connectors, including hotline clamps,
- 11) Mitigation of impact on customers and other residents affected during PSPS event,
- 12) Other corrective action,
- 13) Pole loading infrastructure hardening and replacement program based on pole loading assessment program,
- 14) Transformers maintenance and replacement,
- 15) Transmission tower maintenance and replacement,
- 16) Undergrounding of electric lines and/or equipment,
- 17) Updates to grid topology to minimize risk of ignition in HFTDs, and

- 18) Other/not listed items if an initiative cannot feasibly be classified within those listed above.

PG&E's grid design and system hardening plans consist of most of the items in the foregoing list. However, we will require quarterly reporting on its grid hardening efforts to ensure it is meeting its targets. PG&E fails adequately to explain how it prioritizes various grid hardening projects or justify its use of more than one type of mitigation in the same location. Its cost tracking lumps measures together, which will cause problems when PG&E seeks cost recovery. The WSD's concerns with its proposals appear below, along with requirements PG&E must satisfy as a condition of WMP approval.

Deficiencies and Conditions – Grid Design and System Hardening

PG&E does not adequately describe how it uses modeling to target grid hardening efforts, and more detail is needed.

Failure to adequately describe the use of modeling to target such efforts is not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

PG&E's plans raise a general concern in that the process for identifying potential mitigation solutions at specific grid locations based upon need, cost and feasibility is generally not presented. By contrast, SDG&E has developed a WMP prioritization and resource allocation process to evaluate strategic undergrounding, overhead hardening, covered conductor, remote sectionalizing, microgrids, and individual customer generation as potential in concert. SDG&E is also looking at end use (for a community resource center set up during a wildfire or PSPS event, critical facilities, or medical baseline customers) as a criterion for what mitigation solutions will be selected.

Lack of process for identifying potential mitigation solutions based upon need, cost and feasibility is not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Initiative Choice and Risk

PG&E asserts that system hardening reduces ignitions by 56 percent, vegetation management reduces ignitions by 31 percent and implementing both programs reduces ignitions by 79 percent. Based on this conclusion, PG&E has chosen to conduct EVM and system hardening in some cases in the same areas. However, PG&E admits that the analysis only establishes a correlation and not a proven synergy between EVM and system hardening. PG&E states that it will conduct

further analysis to assess any potential incremental benefit of having multiple initiatives in the same location. PG&E does not otherwise explain how it chooses current and planned near-term system hardening projects according to type, location and cost. This is concerning since it indicates that PG&E does not seem to adopt and use a methodology that will render the creation of an optimal solution (least cost, best fit, effective, feasible to implement) that considers different technologies for a similar use case.

Deficiencies such as these are not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Failure to disaggregate WMP work from standard maintenance

Each of the large electrical corporations state that programs for cross arms, poles, transformers, transmission towers and similar infrastructure changes that reduce wildfire risk are embedded within standard maintenance programs litigated in GRCs. Therefore, it is difficult to determine whether and how these incrementally impact wildfire risk reduction.

It is not clear how PG&E is tracking its WMP activities in memorandum accounts if it does not budget for them by type of mitigation. The Commission will scrutinize its memorandum accounts for WMP carefully, and if all costs are simply lumped together or included in general operations and maintenance accounts, PG&E risks failing to provide entitlement to cost recovery.

Many electrical corporations fail to track WMP activities by type of mitigation in memorandum accounts. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

PG&E does not support its decision to make infrastructure upgrades such as covered conductor, fuses,²¹ smart circuit breakers and relays with any comparative analysis of mitigation options. PG&E states it will conduct enhanced vegetation management and install covered conductor in the same location but does not document how this approach increases the effectiveness of wildfire mitigation over using one mitigation rather than both. PG&E states that it will conduct further analysis but will continue overlaying EVM and grid hardening in the same area until results from these studies are available. This is part of PG&E's scattershot approach to wildfire

²¹ During overcurrent conditions, fuses are designed to overheat and burn out and shut off power to the electrical line. Fuses need to be replaced after being burned out.

mitigation; it provides little rationale for conducting grid hardening and vegetation management in the same location.

Deficiencies such as these are not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Deficiency (PGE-11, Class B): Including additional relevant reports.

In Section 5.2.A of its WMP, PG&E identifies several internal reports it generates for its leadership and Board of Directors (a weekly dashboard, status and tracking reports that provide leadership and the Board visibility into the different elements of the WMP). PG&E also makes reports to the federal monitor in its federal criminal probation case before District Judge William Alsup.²²

Condition (PGE-11, Class B): In its quarterly reports, PG&E shall append the following:

- i) All internal reports provided to its executive officers and/or Board of Directors, as described in Section 5.2A of its 2020 WMP, during the previous quarter. In its first quarterly report, PG&E shall also produce all internal reports or other documents provided to its executive officers and/or Board of Directors related to its electric grid from January 1, 2018 to the present; and
- ii) All reports or other documents related to its electric grid provided to the federal monitor in the previous quarter. In its first quarterly report, PG&E shall also produce all reports or other documents related to its electric grid provided to the federal monitor from January 1, 2018 to the present.

Deficiency (PGE-12, Class B): PG&E's fuse replacement program planned to take 7 years.

PG&E estimates it has more than 15,000 "non-exempt" fuse devices located in Tier 2 or 3 of its HFTD. These devices operate on average 2,920 times per year. Operation of these non-exempt devices creates an ignition source; however, PG&E states it will replace 625 fuse cutouts per year (starting in 2019) for 7 years. It is unclear why the program is so drawn out.

Condition (PGE-12, Class B): In its first quarterly report, PG&E shall detail:

²² *United States v. PG&E*, U.S. District Court Case No. 14-CR-00175-WHA (N.D. Cal).

- i) Its plans for replacing non-exempt fuses, including the pace of fuse replacements; and
- ii) How this pace is supported by wildfire risk analysis, including providing the cost and benefit estimates of launching a faster fuse replacement program.

Deficiency (PGE-13, Class B): PG&E does not explain how the factors limiting microgrid deployment will impact its microgrid plans.

PG&E has committed to installing microgrids and switches to sectionalize the grid to mitigate PSPS events. However, PG&E explains that construction resource, land access, permitting, substation upgrades and the presence of interconnection points are limiting factors in microgrid deployment. Further, PG&E does not state how each of these factors will limit microgrid deployment or identify limitations to microgrid deployment posed by its network system design. PG&E also does not explain if it considered microgrid proposals as alternate solutions to traditional grid design.

Condition (PGE-13, Class B): In its first quarterly report, PG&E shall:

- i) State all factors that will limit microgrid deployment or identify limitations to microgrid deployment posed by its network system design;
- ii) Explain if it considered microgrid proposals as alternate solutions to other grid solutions; and
- iii) Address whether options the other large electrical corporations are exploring might be feasible in its territory.

6.5.4. ASSET MANAGEMENT AND INSPECTIONS

The asset management and inspections portion of the WMP Guidelines requires the filer to discuss power line/infrastructure inspections for distribution and transmission assets within the HFTD, including infrared, LiDAR, substation, patrol, and detailed inspections, designed to minimize the risk of its facilities or equipment causing wildfires. The filer must describe its protocols relating to maintenance of any electric lines or equipment that could, directly or indirectly, relate to wildfire ignition. The filer must also describe how it ensures inspections are done properly through a program of quality control.

Key concerns in PG&E's asset inspection section relate to the high number of "Level 3" (*i.e.*, low risk) findings its inspections unearthed. PG&E is so out of proportion to its fellow large electrical corporations that the WSD questions the accuracy of its data and requires follow-up. The WSD also addresses PG&E's history of poor record

keeping, among other deficiencies. Approval of PG&E's WMP is conditioned on its compliance with the conditions set forth below.

PG&E's asset management and inspection plans consist primarily of distribution and transmission line inspections, with a plan for improved inspections "to proactively highlight abnormal results" before the 2020 wildfire season.²³ PG&E states it has two basic inspection approaches: "proactive replacement" and "run to condition."²⁴ "Proactive replacement" is for assets with a high risk of catastrophic wildfire if they fail (conductor, pole, and fuses and surge arresters that cause sparks and potential ignition). The "run to condition" approach is for assets with lower risk of catastrophic wildfire (including cross arms, insulators, voltage regulation, protective equipment, transformers and switching equipment).

PG&E began a "Wildfire Safety Inspection Program" (WSIP) in 2019 to expand on inspections in the Tier 2 and 3 HFTD areas. PG&E describes WSIP as risk-based, using Failure Modes and Effects Analysis (FMEA) to identify single points of failure of electric system components that could lead to fire ignition. PG&E uses GIS for inventory of its assets, overlaying facility type, asset health, and geographic risk factors when determining the appropriate patrol and inspection cycle. PG&E is expanding its data collection and GIS functions. It is using Infrared and LiDAR inspections for distribution and transmission lines and equipment, intrusive pole inspections, drones, patrol inspections (by foot, vehicle, boat or helicopter), Quality Assurance (QA), pole loading assessments, substation inspections and a new "Ultrasonic" pilot.

Appendix B, Figure 2.1a represents a breakdown of utility inspection findings per circuit mile and delineates the findings in accordance to the priority levels defined in General Order (GO) 95, Rule 18. In accordance with Rule 18, priority Level 1 findings are those that pose "an immediate risk of high potential impact to safety or reliability." Priority Level 2 findings are any non-immediate "risk[s] of at least moderate potential impact to safety or reliability..." GO 95, Rule 18 considers priority Level 3 findings as, "any risk of low potential impact to safety or reliability." Pursuant to Rule 18, each priority level corresponds to a maximum timeframe for corrective action (*i.e.* to fix the identified GO 95 violation or safety hazard).

From 2015-2018, PG&E's inspection findings remained relatively constant. However, in 2019 PG&E's inspection findings per circuit mile increased by approximately 500 percent as compared to the 2015-2018 time period. This figure

²³ PG&E WMP Section 5.3.4.3.

²⁴ PG&E WMP at 5-152.

illustrates that there is a large discrepancy between PG&E and peer electrical corporations in the prevalence of Level 2 versus Level 3 findings from inspections (all electrical corporations report relatively low numbers of Level 1 inspection findings). In 2019, 94 percent of PG&E's inspection findings related to priority Level 3 findings whereas only 30 percent of SCE's inspection findings were classified as priority Level 3. Comparatively, SDG&E reports no Level 3 findings. In 2019, 96 percent of SDG&E's inspection findings are priority Level 2, compared to 64 percent for SCE and only 6 percent for PG&E.

PG&E spent a combined \$228 million on "enhanced" transmission and distribution inspections (WSIP) in HFTD areas in 2019.²⁵ Further, PG&E's planned spending for 2019 was projected to be \$160 million but its actual spending was far higher at \$228 million. Therefore, its spending for the period covered by this WMP could be far higher than projected by PG&E.

If PG&E correctly categorized the findings at Level 3, then its WSIP mostly correlates to a substantial increase in low-risk Level 3 findings. By definition, these GO 95 violations or safety hazards present risks of low potential impact to safety and reliability, and thus are unlikely to provide much in the way of increased ignition risk reduction.

Based on its 2019 experience with enhanced inspection, PG&E plans on "incorporating the enhanced inspection processes and tools into our routine inspection and maintenance program."²⁶ Doing so will result in more frequent inspections in Tier 3 (annual inspections) and Tier 2 (three-year interval). Because nearly all (94 percent) of PG&E findings resulting from those enhanced inspections were classified as Level 3, the quality of and value added by these inspections is questionable.

Therefore, the WSD requires more information on PG&E's Level 3 findings. If they are incorrectly categorized, PG&E has a serious problem with record keeping. If they are correct, PG&E may be spending a large amount on enhanced inspections for little return since the findings are mostly minor.

In addition to the proliferation of Level 3 findings, PG&E needs to address record keeping and infrared inspections, as described below. PG&E does not adequately address whether its transition from a paper records system to a digital system will ensure that its records are accurate, especially in view of serious PG&E record

²⁵ PG&E WMP Table PG&E 5-1.

²⁶ PG&E WMP at Executive Summary-17 & 5-5.

keeping lapses discovered in connection with the San Bruno natural gas pipeline explosion, and gas and electric “locate and mark” records defects revealed in a separate investigation. Approval of its 2020 WMP is therefore conditioned upon PG&E’s compliance with the following remedies.

Deficiencies and Conditions - Asset Management and Inspections

The following discussion outlines areas of concern with PG&E’s asset management and inspection proposals and imposes remedies with which PG&E shall comply as a prerequisite to approval of its WMP.

Deficiency (PGE-14, Class B): Level 3 findings.

In accordance with GO 95, Rule 18, to determine the priority level classification of an inspection finding, a utility must differentiate the potential severity of the risk to safety or reliability, classified as high (*i.e.*, Level 1), moderate (*i.e.*, Level 2) or low (*i.e.*, Level 3). As shown in Appendix B, Figure 2.1a, PG&E’s increased inspection efforts in 2019 generated a huge spike in Level 3 findings which it has 60 months or longer to address. Considering that this determination of risk level is made at the discretion of utilities and directly corresponds to the amount of time allowed to address the risk, the lack of parity with SCE and SDG&E in the number of Level 3 findings gives the WSD concern that PG&E may be using the Level 3 category to avoid fixing problems quickly. In notes to Table 7 of its WMP, PG&E indicates it currently utilizes two models to calculate ignition risk, with a third developed in 2019, all of which produce outputs in potential structures damaged or acreage burned should an ignition occur. However, it seems as though PG&E is currently prioritizing utilizing these models to enhance and support its PSPS implementation over grid hardening, asset inspections and vegetation management decision-making.²⁷ While it is encouraging that PG&E is utilizing its meteorology resources to develop models and analyses to support short-term initiatives such as PSPS, these resources must be equally leveraged for long-term planning and management of its grid.

Condition (PGE-14, Class B): In its first quarterly report, PG&E shall detail:

²⁷ PG&E WMP at p. 4-10 states, “... when the potential for outages is high (high OPW) and the potential for large fires is high (high FPI), **a PSPS event should be considered.**” (Emphasis added) Whereas PG&E WMP at p. 4-11 states, “This analysis as well as other historical analyses are **currently being considered for** longer term projects such as grid hardening, enhanced vegetation management, and others.” (Emphasis added)

- i) How it determines the priority level of its inspection findings in accordance with high, moderate, and low risk to safety and reliability, as detailed in GO 95, Rule 18;
- ii) How it utilizes its models that produce outputs measuring impact to people, structures or the environment, as detailed in Table 7 of its WMP, to assess the potential between high, moderate, and low risk on safety and reliability for the purposes of classifying priority levels in accordance with Rule 18; and
- iii) If PG&E does not utilize its models for such a purpose, PG&E shall develop a plan for doing so.

Deficiency (PGE-15, Class A): It is unclear how PG&E classifies findings at the appropriate level.

PG&E classifies inspection findings as primarily lower-risk Level 3 findings. PG&E's inspection programs have resulted mostly in lower-risk Level 3 findings. It is unclear how PG&E classifies findings at the appropriate level. Furthermore, inspections are costly and the effectiveness of each of these inspections should be demonstrated to support PG&E's spend on them.

Condition (PGE-15, Class A): PG&E shall develop and furnish an RCP that includes:

- i) A description of the value and effectiveness of these enhanced inspections in identifying GO 95 violations and safety hazards that present greater than "low" risk of potential impact, including quantitative metrics, and a detailed explanation of how it classifies findings by Level and how it plans to ensure that front-line inspection staff are properly classifying findings; and
- ii) A description of whether it is more effective in terms of findings per dollar spent to incorporate the enhanced inspection processes and tools into its routine inspection and maintenance program given the program's results.

Deficiency (PGE-16, Class C): PG&E's record keeping is deficient.

PG&E has a history of poor record keeping. PG&E is only just moving from a paper records system to digitized records. The Commission has found that PG&E's record keeping is deficient in other contexts with serious safety implications, including records on the location of its underground natural gas and electric lines. PG&E should explain whether it has detected errors or other problems with its wildfire mitigation records.

Condition (PGE-16, Class C): In PG&E's 2021 WMP update, PG&E shall:

- i) Disclose any problems with its paper record keeping system described in its WMP; and
- ii) Outline any gaps (missing records), inaccuracies (inadvertent or intentional) and other errors.

PG&E's WMP states that it uses infrared inspections as part of its overall suite of inspection tools. PG&E states that it will continue to use infrared inspections as determined appropriate and over the next three years will use predictive modelling to identify and schedule inspections.

Deficiency (PGE-17, Class B): Effectiveness of inspections using infrared technology.

PG&E does not explain in detail how its infrared inspections will incrementally mitigate ignitions, especially since it does not tie its infrared inspections to changes to its existing initiatives or inspection practices or report infrared inspection findings separately.

Condition (PGE-17, Class B): In its first quarterly report, PG&E shall:

- i) Provide a detailed description of how its infrared inspections incrementally identify issues or faults along PG&E's grid that lead to ignitions, including evidence for the number of inspection findings uncovered by infrared inspections that would not have been uncovered in detail and patrol inspections; and
- ii) If it has no evidence that infrared inspections identify findings that would not have been identify in other inspections, describe and provide evidence for the expected outcomes in the context of risk reduction or cost savings that its infrared inspection program is expected to generate.

6.5.5. VEGETATION MANAGEMENT AND INSPECTIONS

This section of the WMP Guidelines requires filers to discuss vegetation inspections, including inspections that go beyond existing regulation, as well as infrared, LiDAR, and patrol inspections of vegetation around distribution and transmission lines/equipment, quality control of those inspections, and limitations on the availability of workers. The filer must also discuss collaborative efforts with local land managers to leverage opportunities for fuel treatment activities and fire break creation, methodology for identifying at-risk vegetation, how trim clearances beyond minimum regulations are determined, and how the filer considers and addresses environmental and community impacts related to tree trimming and removal (erosion, flooding, and the like).

PG&E's vegetation management and inspection programs consist of an EVM program in addition to existing vegetation management requirements in GO 95, Rule 35. It states the work encompasses overhead distribution lines in Tier 2 and 3 HFTD areas. First, PG&E is extending the clearance area around lines from the 4-foot minimum required by GO 95 to a 12-foot clearance at the time of trim. Second, PG&E states it is removing overhanging branches four feet out from the lines and up to the sky. Third, it is assessing trees tall enough to strike electrical lines or equipment and based on that assessment trimming or removing trees that pose a potential safety risk, including dead and dying trees.

Key concerns relate to PG&E's "hazard tree" program; lack of clarity on whether it targets the highest risk areas first; cost allocation and the potential for duplicate recovery where PG&E records costs both in wildfire mitigation memorandum accounts and its Tree Mortality account; PG&E's Quality Assurance results; a change in PG&E's focus to transmission; lack of expertise in its vegetation management operations; personnel shortages; and fuel management and "slash" reduction. Approval of PG&E's WMP is conditioned upon its compliance with the following conditions aimed at these and other deficiencies.

Deficiencies and Conditions – Vegetation Management and Inspections

EVM should be targeted to highest risk areas

It is not clear that PG&E is targeting EVM to the highest risk areas first. It should address when within the next 10 years it plans to have treated the riskiest areas and riskiest trees for the first time. That is, vegetation management is always ongoing because trees regrow if they are not removed. However, the WSD needs to understand when PG&E will complete vegetation management under its EVM program for the riskiest trees in the riskiest areas in the first instance, even if the risk will recur and require further mitigation as trees regrow.

Deficiencies such as these are not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Vegetation management personnel shortages

PG&E is having trouble arranging sufficient staffing to complete all desired EVM. The WSD acknowledges that all large electrical corporations report staffing difficulties in vegetation management, but this problem is not a defense to catastrophic wildfire caused by vegetation contact.

Deficiencies such as these are not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Deficiency (PGE-18, Class B): PG&E does not describe in detail how its hazard tree analysis focuses on at-risk trees.

PG&E does not describe in detail how its hazard tree analysis focuses on at-risk areas (based on wind conditions, outage history and the link) and specific species that pose a high risk (due not only to fast growth rate but other risk factors) to focus its current proposal. That is, PG&E's hazard tree program should focus on at risk trees first, rather than on every tree within striking distance. PG&E also now accounts for removal of hazard trees under both its EVM program and an existing Tree Mortality Program. Trees that are dead or that will die as a result of trimming are removed under the Tree Mortality Program. PG&E's memorandum account for Tree Mortality work is separate from the memorandum account allowed in AB 1054 for WMP work.

Condition (PGE-18, Class B): In its first quarterly report, PG&E shall detail:

- i) How it will ensure its hazard tree program prioritizes the highest risk areas and types of trees; and
- ii) How it accounts for hazard tree programs in its memorandum accounts.

Quality assurance failures

PG&E's EVM program experienced high QA failures over the past year according to its most recent quarterly report. PG&E states:

Quality of EVM Work (item 3.6): The 2019 Plan committed to perform work verification on every mile of EVM work completed in the field in 2019, with a target of achieving a 92 percent rate of "meets expectations" performance in these reviews. The "first pass" quality results of this work verification process showed approximately a 60 percent "meets expectations" pass rate for the year. To ensure PG&E mitigated any "first pass" quality issues, PG&E says it reworked all of the distribution line-miles that did not pass the initial work verification. Each reworked mile was then re-examined and verified to "meet expectations" before PG&E moved it to completed status. As a further process quality check, PG&E implemented an additional Quality Assurance review in October 2019 to assess the quality of the work verification process, sampling about 9 percent of all EVM work completed in 2019 (approximately 230 miles of EVM work that had passed work verification and were considered complete). In contrast to the 60 percent pass rate noted above, these QA assessments found that 98 percent of the sampled work-verified

miles that had been designated as complete had in fact been properly assessed and worked according to our company standard.²⁸

Deficiency (PGE-19, Class B): Low pass rate on EVM QA.

PG&E is falling far short of meeting its stated 92 percent pass rate in EVM inspections, leading to a large volume of re-work and repetitive QA testing that consumes limited resources and lengthens the time required to complete EVM initiatives.

Condition (PGE-19, Class B): In its first quarterly report, PG&E shall detail:

- i) Its enhanced vegetation management QA process, including identifying what type of process was used to determine the 60 percent pass rate and the 98 percent pass rate as well as the credentials and experience of the employees that did the inspections (title, rank and number of employees);
- ii) How PG&E plans to achieve its stated goal of a 92 percent rate of “meets expectations” on the “first pass” of inspections going forward, including the specific capabilities that PG&E plans to build or acquire and the timeline against which PG&E will build these, and the cost savings and other resource efficiencies that would be achieved by meeting this goal; and
- iii) When PG&E plans to meet its stated goal of a 92 percent rate of “meets expectations” on the “first pass” of inspections.

Deficiency (PGE-20, Class B): PG&E is redistributing resources to focus more on transmission clearances.

In a change from its 2019 WMP, PG&E is redistributing resources to focus more on transmission clearances, without sufficient explanation of the impact or benefit of this decision. Some recent wildfires have been attributed to a failure in transmission assets, which could be driving this redistribution.

Condition (PGE-20, Class B): In its first quarterly report, PG&E shall:

²⁸ Pacific Gas and Electric Company’s 2019 WMP Compliance Report submitted to Caroline Thomas Jacobs, Director of the Wildfire Safety Division, California Public Utilities Commission and served in R.18-10-007 on April 1, 2020. PG&E filed the report in R.18-10-007 on April 7, 2020.

- i) Explain in more detail why it made the change to transmission clearance, including whether the change was caused by recent fire(s) involving PG&E transmission lines;
- ii) Identify all ignitions that resulted in spread on transmission assets; and
- iii) Explain what vegetation management will not occur as result of the change in focus.

Deficiency (PGE-21, Class B): PG&E fails to describe why additional programs for transmission clearances are necessary.

Vegetation-caused incidents are more common at the distribution level, since lines have shorter required clearances and typically use shorter poles. This fact is verified through data reported in Tables 11-1 and 11-2 in PG&E's WMP, as the five-year annual average of vegetation contact near miss incidents is nearly 5,600 on the distribution system compared to about 61 annual incidents on the transmission system. For some of PG&E's vegetation management measures on transmission lines, especially its Right of Way Expansion program, PG&E fails to adequately describe why additional programs for transmission clearances are necessary or effective.

Condition (PGE-21, Class B): In its first quarterly report, PG&E shall explain:

- i) The reason for PG&E's vegetation management focus on transmission;
- ii) Why this is an effective use of resources, and how PG&E has reached this conclusion, supported by quantitative data;
- iii) Whether the focus on transmission level vegetation management is driven by short-term goals related to PSPS or long-term goals to reduce ignition risk;
- iv) The amount of labor and resources being allocated to the program; and
- v) The opportunity costs of its transmission clearance program on its broader vegetation management efforts for the distribution system.

Deficiency (PGE-22, Class B): Some of PG&E's vegetation management inspectors may lack proper certification.

PG&E's vegetation management inspectors may lack proper certification; they may not be certified by the International Society of Arboriculture (ISA). Since the scope of its program is so large, PG&E developed a specific evaluation tool called tree assessment tool (TAT) to be used by inspectors. However, PG&E is not requiring inspectors to be ISA-certified.

Condition (PGE-22, Class B): In PG&E's quarterly reports, PG&E shall detail:

- i) The portion of its inspectors who are ISA certified;
- ii) The portion of its inspectors who plan to be ISA certified by the time of its 2021 WMP supplement filing; and
- iii) How it will ensure effective inspection quality control protocols if some inspectors are not ISA certified.

Deficiency (PGE-23, Class B): *Vegetation waste and fuel management processes unclear.*

PG&E's description of "Fuel management and reduction of 'slash' from vegetation management activities" states the utility will continue to assess effectiveness to determine whether to continue or adjust work. This response is generic and does not give detail on how much fuel reduction occurs, whether vegetation is cleared to bare soil, or how wide the zone of clearance will be. PG&E also does not discuss the criteria it uses to identify what areas are treated to effectively enhance defensible space. Based on the information given it is not possible to determine how effective this work will be. Finally, PG&E does not discuss how slash is treated during its vegetation management work. PG&E also states in its Utility Survey that it does not remove slash from its right of ways and does not plan to remove vegetation waste from its right of ways across its entire grid, citing constraints. However, PG&E does not describe the practices it uses to reduce risk where it does not remove slash/vegetation waste.

Condition (PGE-23, Class B): In a quarterly report, PG&E shall detail:

- i) The criteria it uses to identify and prioritize areas for fuel management to enhance defensible space;
- ii) What specific areas were treated during the previous reporting period, including supporting GIS files;
- iii) What specific areas are planned to be treated during the upcoming reporting period, including supporting GIS files;
- iv) The types of vegetation waste treatments it uses across its grid, including how it chooses where to use each treatment, and how effective each of these vegetation waste treatments are in the location where they are deployed; and
- v) Its work with federal and state landowners, including the U.S. Forest Service, on fuel reduction programs, including a listing of all programs it has in place with these entities, and the end date of each program, if applicable.

6.5.6. GRID OPERATIONS AND OPERATING PROTOCOLS, INCLUDING PSPS

The grid operations and operating protocols section of the WMP requires discussion of ways the filer operates its system to reduce wildfire risk and has a strong focus on reducing PSPS in the future. For example, disabling the reclosing function of automatic reclosers²⁹ during periods of high fire danger (*e.g.*, during RFW conditions) can reduce utility ignition potential by minimizing the duration and amount of energy released when there is a fault. This section also requires discussion of work procedures in elevated fire risk conditions, PSPS events and protocols, and whether the filer has stationed and on-call ignition prevention and suppression resources and services.

The Commission has made clear that the scale, scope and execution of PG&E's PSPS events in 2019 was unacceptable. PG&E briefly describes plans to improve, but the descriptions are not sufficient for the WSD to evaluate whether improvements will be achieved based on the description in the plan alone. Weekly oversight meetings since February between the Safety Enforcement Division, Safety Policy Division, the WSD and PG&E indicate the utility is behind on certain tasks in its Bi-Weekly PSPS Corrective Action Report³⁰ to improve PSPS for 2020. PSPS-specific actions within the WMP are of particular and significant concern.

PG&E's strengths lie in 1) aggressive upgrading of automatic reclosers with SCADA capabilities on distribution and transmission assets; 2) crew -accompanying ignition prevention and suppression resources and services (PG&E currently has up to 98 Safety and Infrastructure Protection Team crew members and 40 engines, which will take time to train and be fully operational); 3) personnel work procedures and training in conditions of elevated fire risk, including updated work standards and annual safety training on orientation to FPI and use of available tools; 4) an improved "re-energization" process after PSPS events in the future based on lessons learned from 2019 (additional training, updated work standards and new distribution circuit segment guides and maps); and 5) ramp up of stationed and on-

²⁹ A recloser is a high voltage circuit breaker that detects and interrupts momentary fault conditions on the grid. The device can reclose automatically and reopen if a fault condition is still detected. However, if a recloser closes a circuit that poses the risk of ignition, wildfire may be the result. For that reason, reclosers are disabled in certain high fire risk conditions. During overcurrent situations, circuit breakers trip a switch that shuts off power to the electrical line.

³⁰ *Bi-Weekly Report of Pacific Gas and Electric Company (U 39 E) in Compliance with January 30, 2020 Assigned Commissioner's Ruling*, served April 6, 2020 in R.18-12-005.

call ignition prevention and suppression resources and services with a significant increase in workforce.

However, PG&E's presentation on its PSPS events and mitigation of PSPS impacts is a key weakness. This section³¹ lacks specificity and useful information. PG&E's long-term plan focuses on reducing the number of segments impacted by PSPS, but PG&E's plan provides few details on how the utility will reduce PSPS and therefore the WSD cannot assess with confidence the likelihood of PG&E achieving its PSPS objectives.

For a utility with a large service territory, granularity is needed to fully assess proposed programs. While the proposed mitigation projects are valuable and credible, there is still uncertainty in terms of operational execution during a weather event. For example, SCE has 1100 circuits within its high fire threat districts and has developed what it describes as "switching playbooks" which indicates a level of operational preparedness and planning so that when a weather event occurs, utility staff will have trained and are fully knowledgeable of the best options for de-energization to minimize impacts. PG&E does not specifically address how grid operators are prepared for PSPS events to minimize impacts. Particularly with increased system automation and remote control of distribution and transmission assets, it is critical that grid operators are knowledgeable of all available tools and appropriate protocols.

Finally, PG&E makes a statement about RFWs in connection with data it supplies on reducing the incidence of PSPS on RFW days that merits response. It states:

A potential relative decrease in the frequency of events compared to all fire weather days or red flag warnings could occur as PSPS may not be required for marginal weather events based on reasons described above (1) and (2). However, changes in how red flag warnings are issued by the [National Weather Service] may impact this evaluation *as red flag warnings are not totally objective at this time*. The absolute number and duration of customers impacted during this timeframe is unknown and dependent o[n] numerous external factors.³²

Without taking a position on whether there is merit to the assertion that RFWs are "not totally objective," RFW is currently the only uniform measure of fire weather potential that can be aggregated across the state. Electrical corporation FPIs offer a

³¹ PG&E WMP Section 5.3.6 Table B. *See also* WMP at 4-23 – 4-27 for further discussion of PSPS.

³² PG&E WMP, Table 20, at 4-30 (emphasis added).

more granular measure of weather and environmental conditions related to utility-ignited fire potential. However, FPIs have limitations, in that only the large California electrical corporations currently have FPI models, and the FPI models all have their own unique attributes, naming conventions and outputs.

Approval of its 2020 WMP is therefore conditioned upon PG&E's compliance with the conditions listed below and the other conditions contained in this Resolution.

Appendix B, Figure 1.5a shows the total annual RFW circuit mile days for each reporting year. This figure is used as a proxy for differentiating fire weather potential (as a function of RFWs) year over year for each electrical corporation. Appendix B, Figure 2.8a displays annual customer hours of PSPS events normalized across the WMP-defined metric of RFW Circuit Mile Days. Normalizing accounts for varying fire weather conditions using a common metric of RFWs. Further study and refinement are necessary, as there are inconsistencies in how the electrical corporations calculate this value. The following analysis discusses both normalized and total values for PSPS customer hours.³³

PG&E first initiated a PSPS event in 2018, resulting in over 1.5 million customer hours of outages. In 2019, PG&E's reported number of PSPS customer hours skyrocketed to 98.6 million, nearly a 6500 percent increase over the previous year. However, RFW circuit mile days from 2018 to 2019 decreased by over 30 percent. In sum, while PG&E's service territory experienced less high fire potential weather conditions in 2019, as compared to 2018, PG&E vastly increased its implementation of PSPS as a wildfire mitigation strategy. In comparison to peer utilities, the normalized duration of PG&E's PSPS events in 2019 was approximately 10 times greater than the other large electrical corporations, as shown in Appendix B, Figure 2.8a.

Deficiencies and Remedies Conditions – Grid Operations and Operating Protocols, Including PSPS³⁴

The grid operations section of PG&E's WMP focuses principally on reducing the incidence of PSPS. However, its description is very limited and generic. PG&E states it has a goal of reducing the number of customers affected by PSPS events by 30

³³ Total customer hours of PSPS obtained from PG&E's WMP Table 12.

³⁴ Several parts of PG&E's WMP involve PSPS, with a long discussion in Section 4.4, as well as references in Sections 5.3.1.4, 5.3.3.8, 5.3.3.11, 5.3.6.4, 5.3.6.5, 5.6.2.1.1, 5.6.2.2, 5.6.2.5, 6.3, tables 12 and 20, and figures 5-20 and 5-27. We include the bulk of the discussion in this section for ease of review.

percent and often repeats the slogan that its intent is for “smarter, smaller, and shorter” PSPS during future fire seasons. However, PG&E provides limited hard information to demonstrate how it will meet this goal.

As discussed above, in the PSPS proceeding (R.18-12-005), PG&E is required to submit bi-weekly progress reports on grid upgrades it is making to reduce the chances of PSPS. Sectionalization of circuits is a key means of reducing the number of customers affected by a particular PSPS event, because it limits the length of the line that must be deenergized. PG&E’s April 6, 2020 report³⁵ states it is off target in meeting its sectionalization goals. Without additional documentation in its WMP demonstrating how PG&E plans to get on track with meeting its sectionalization targets, the WSD cannot determine the likelihood of PG&E meeting this goal to reduce the scale and scope of PSPS.

Deficiencies such as these are not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

6.5.7. DATA GOVERNANCE

The data governance section of the WMP Guidelines seeks information on the filer's initiatives to create a centralized wildfire-related data repository, conduct collaborative research on utility ignition and wildfire, document and share wildfire-related data and algorithms, and track and analyze near miss data.

PG&E’s data governance plans consist of a centralized data platform, and it submitted helpful asset and weather data. However, PG&E claims confidentiality for some data, provides data in an unusable format, does not provide metadata, groups costs together unhelpfully, and lacks a long-term vision for data governance. Further, PG&E was uncooperative during some of the data gathering process. Therefore, approval of PG&E’s WMP is conditioned on its compliance with the following conditions designed to mitigate the listed deficiencies.

PG&E’s data governance submission is useful in the following ways:

- PG&E’s HFTD data, wildland-urban interface area data, and population density data are sufficient to help identify high-risk areas.
- PG&E provided a vast amount of asset data (with some limitations discussed below).

³⁵ *Bi-Weekly Report of Pacific Gas and Electric Company (U 39 E) in Compliance with January 30, 2020 Assigned Commissioner’s Ruling*, served April 6, 2020 in R.18-12-005, at 82.

- PG&E submitted a large volume of weather station points covering much of its service territory.
- PG&E has implemented a central data platform that integrates data from its dozens of records systems sources, supporting data analysis and accessibility in one platform. PG&E is also working to implement programs that will make it possible to consolidate data of similar types from different systems. Finally, the data platform initiative is appropriately ambitious and realistic for the most part.
- PG&E submitted very useful data layers for most required GIS data and submitted large amounts of requested data (*e.g.*, infrastructure damage points with photos) beyond what was required in the WMP requirements.

PG&E initially submitted a large volume of key asset data in an Oracle relational database format that the WSD and CAL FIRE staff could not fully access. PG&E stated that because of how the data is stored, it is unable to submit required data, as it exports in a non-usable GIS format. The requirement for the WMP was to submit all GIS data in a downloadable shapefile, so the WSD could view the asset data. After considerable effort on the part of the WSD staff, and after PG&E provided an alternate format (geodatabases) for their GIS asset data, all of it could be viewed. However, this was late in the WMP review process, and technical concerns remain regarding the ability of the WSD to efficiently utilize this GIS asset data in the future. Despite not being readily accessible in a traditional ArcGIS environment, PG&E's problematic versions of the asset data seem likely to have provided required information requested. Getting GIS data from PG&E was initially a more difficult and adversarial experience than getting GIS data from other electrical corporations. However, by the end of the data request process, PG&E willingly offered assistance and more openly shared data. All in all, it took around two months to gain access to PG&E's data. Moving forward, PG&E shall cooperate in all ways with the data requirements, or risk future sanctions or penalties.

Deficiencies and Conditions – Data Governance

Data in unusable format; confidentiality issues

As noted above, while PG&E provided a vast amount of asset data, some of the data provided caused time-consuming difficulties because it was in a unique format. The WSD was therefore unable to view all the data. Indeed, some of the most informative equipment data came from PG&E's publicly available website data and was not submitted with the WMP. PG&E provided critical infrastructure facility location data without attributes identifying the type of facility. Metadata are

missing from virtually all submitted data, which diminishes the data's usefulness, and makes some layers and fields within layers difficult to understand.

Further, a key objective of this year's WMP process is to gather improved data in a format that is useful for predicting and reducing utility-caused wildfire risk. The Commission is aware of the need to protect confidential material within datasets. However, the point of gathering more data is to lower the risk of catastrophic wildfire, a goal PG&E states it shares.

Deficiencies regarding data reporting and confidentiality are not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Costs lumped together

PG&E does not break down the costs for individual initiatives; program costs in Table 27 are for costs related to data management for "wildfire related activities" and encompass all Data Governance initiatives in section 5.3.7.

This deficiency is not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Evolution of data capability

PG&E's prediction of how its data will evolve over time simply states that the utility will continue to refine its methodologies, without specifics. Further, PG&E gives no details on risk-reduction potential or risk-spend efficiency.

These types of deficiencies are not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Long term planning missing

In Table B, Section 5.3.7, PG&E collects voluminous data for ignitions, system operations, outages, asset conditions, and other factors to prioritize wildfire mitigation efforts. However, its long-term plan is vague with no specific targets or goals.

Deficiencies such as this are not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

6.5.8. RESOURCE ALLOCATION METHODOLOGY

The resource allocation section of the WMPs requires the filer to describe its methodology for prioritizing programs to minimize the risk of its equipment or

facilities causing wildfires in the most cost-efficient manner. This section requires filers to discuss risk reduction scenario analysis and provide a risk spend efficiency analysis for each aspect of the plan.

PG&E's resource allocation plans, like those of the other electrical corporations, concentrate spending on grid hardening, vegetation management, asset and vegetation inspection, and "grid operations" (in this context, mostly work to reduce PSPS impact). Each of the large electrical corporations is spending approximately the same amount per circuit mile. Appendix B, Figure 3.4a shows that the top five individual initiatives represent over half of PG&E's planned spending during the plan period. Most initiatives are related to grid design and system hardening; however, PG&E plans to allocate approximately 15 percent of its total plan budget on enhanced vegetation management work for addressing "at-risk" tree species.

This section also discusses PG&E's risk spend efficiency calculations, which are deficient. Further, PG&E does not adequately explain how it prioritizes mitigation measures and aggregates program budgets in a way that makes it difficult to analyze its programs. Approval of PG&E's WMP is conditioned on it remedying its deficiencies, as discussed below.

Appendix B, Figure 3.1a shows the total planned spend for each utility during the plan period (2020-2022). The planned spend is also presented as normalized over HFTD circuit miles. Considering that much of the planned spend will occur in HFTD areas, the HFTD circuit mile normalization is focused on in this analysis. However, utility-provided information was used to populate Appendix B, Figure 3.1a and there are errors in utility calculations for spend totals, as well as inconsistent interpretations on what data to report (*i.e.*, overhead vs. total miles, transmission vs. distribution, and other) for circuit mileage.

As shown in Appendix B, Figure 3.1a, when assessing planned spend per circuit mile in HFTD, large electrical corporations are roughly planning to spend similar amounts. On average, the large electrical corporations plan to spend approximately \$305,000 per HFTD circuit mile. PG&E's planned spend per HFTD circuit mile at approximately \$307,000 is near the average of the large electrical corporations.

Appendix B, Figures 3.2a and 3.3a show the same information – planned spend by category for the plan period – in different formats. The planned spend is normalized by HFTD circuit miles. Like in Figure 3.1a, utility-provided information was used to populate the information in Appendix B, Figures 3.2a and 3.3a and there are errors in utility calculations for spend totals, as well as inconsistent interpretations on what data to report (*i.e.*, overhead vs. total miles, transmission vs. distribution, and the like) for circuit mileage.

As shown in Appendix B, Figures 3.2a and 3.3a, over 90 percent of all large electrical corporations' planned spending is allocated to the following four categories: (1) Grid design and system hardening, (2) Vegetation management and inspections, (3) Asset management and inspections, and (4) Grid operations and protocols (mostly PSPS). On average, the large electrical corporations plan to allocate approximately 93 percent of their planned spend on initiatives across these four WMP categories. All large electrical corporations plan to spend more than half their total budget on grid design and system hardening initiatives and approximately 5 percent of their budget on other enabling initiatives (*e.g.*, situational awareness and risk assessment and mapping).

In comparing planned spend allocation to peer utilities across the four categories identified above, PG&E plans to allocate approximately twice as much as peer utilities on vegetation management and inspections, as well as grid operations and protocols. PG&E's larger allocation (as a percentage of total spend) on vegetation management and inspections seems appropriate considering its higher rates of vegetation caused outages and ignitions as compared to peer utilities. PG&E's larger allocation of spend on grid operations and protocols is likely in response to the challenges faced in implementing PSPS during 2019. Conversely, PG&E's planned allocation of spend on grid design and system hardening initiatives is approximately 20 percent less than the average of its peers.

In the WMP, two sections address how PG&E has chosen to allocate resources toward wildfire mitigation. There are mitigation budgets in Tables 23-30, which are supposed to be numerical calculations of an RSE for each mitigation. RSEs themselves appear in Section 5.3.1 of the WMP, discussed under "Risk Assessment and Mapping" earlier in this Resolution. Further, Section 5.3.8 of the WMP contains information on PG&E's resource allocation methodology.

However, most of the information PG&E provides about RSE and resource allocation is very limited. This is a key concern with PG&E's WMP, and PG&E does not adequately explain why it failed to provide the required information. During the RSE panel at the February 2020 WMP workshop described elsewhere in this Resolution, PG&E committed to improving its analysis in the future. However, that does not excuse its lack of responsiveness this year. The WSD issued a data request asking for more calculations or a better explanation why the information was not furnished. PG&E's response boils down to saying it cannot provide the information at this time.³⁶

³⁶ PG&E response to data requests 43879-C-100 and 43879-C-136.

PG&E's failure to comprehensively address RSE and resource allocation is unacceptable. RSE is a critical tool to inform targeted allocation of resources toward actions that offer the greatest risk reduction per dollar spent. One of the few initiatives for which PG&E does provide RSE is its use of PSPS. In the February workshops, PGE reported its PSPS RSE calculation assumes few internal costs, no external costs to society as a consequence of the PSPS, and near-perfect wildfire mitigation as a benefit—hence a high RSE value. This calculation does not account for the significant, cascading consequences of PG&E's decision to turn off the power to the communities it serves, including the potential for significant economic loss, customer and community safety risks, and transferred risk of ignitions, such as increased generator use. RSE should not be used to justify PG&E's use of PSPS.

Deficiencies and Conditions – Resource Allocation Methodology

PG&E only provides RSE calculations for 4 areas of spending and does not provide RSEs for individual mitigations as required. PG&E gives an overall RSE for grid hardening on distribution, enhanced vegetation management on its distribution system in HFTD, PSPS (transmission and distribution), and non-exempt surge arrester replacement on distribution lines.

Limited use of RSE is not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Analysis of PG&E's data is difficult due to PG&E's practice of bundling various initiatives into "programs" and reporting cost and other information at the program level.

This practice is not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Three of PG&E's top five initiatives, comprising approximately 30 percent of total planned spending, are focused on the distribution system, which comprises a large majority of total ignitions. PG&E plans to spend approximately 10 percent of its total on a transmission structure initiative. PG&E does not discuss the expected impact of this work on PSPS thresholds.

Failure to describe the expected impact of planned spending on PSPS is not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Interrelationship of initiatives

While PG&E outlines numerous efforts to improve its ability to more effectively conduct PSPS and minimize its impacts, there is a clear gap and absence of detail on the relationship between various hardening, vegetation management and asset management initiatives and corresponding impacts on thresholds for initiating PSPS events.

Failure to describe the interrelationship between initiatives on wildfire mitigation is not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Deficiency (PGE-24, Class B): Improving prioritization.

While PG&E expresses plans to expand its prioritization capabilities for better targeting mitigation activities, it provides scant information on how this will be achieved or timelines for doing so.

Condition (PGE-24, Class B): In its first quarterly report, PG&E shall explain its method and process for:

- i) Prioritizing between system hardening and vegetation management efforts in a single location;
- ii) Leveraging past initiative performance data and lessons learned for improving future prioritization decisions;
- iii) Balancing hardening and remediation work to reduce ignition probability related to asset failure; and
- iv) Determining the quantitative effect on PSPS thresholds from hardening initiatives.

Deficiency (PGE-25, Class A): Lack of details in PG&E's WMP on how to address personnel shortages.

PG&E has experienced personnel shortages that have had an impact on its wildfire mitigation initiatives, and particularly on vegetation management. During the February 2020 workshops and in its WMP, PG&E has expressed concern regarding talent/workforce shortages for vegetation management. Considering its extensive vegetation management work scale and scope, PG&E does not explicitly discuss a recruitment strategy, which will be critical to its completion of these initiatives. It is important for PG&E to document that it is not trying to mitigate its personnel

shortages simply by hiring away workers from other electrical corporations; such a practice will not reduce the state's overall personnel shortages.

Condition (PGE-25, Class A): PG&E shall develop and furnish an RCP that includes:

- i) A description of its recruitment and training for vegetation management talent and how it plans to address this constraining factor in scaling its vegetation management programs;
- ii) A description of its strategy for direct recruiting and indirect recruiting via contractors and subcontractors; and
- iii) Metrics to track the effectiveness of its recruiting programs, including metrics to track the percentage of recruits that are newly trained, percentage from out of state, and the percentage that were working for another California utility immediately prior to being engaged by PG&E. PG&E may file confidential information under seal so long as PG&E justifies its claim that the material requires such protection.

Deficiency (PGE-26, Class C): Effectiveness of increased vegetation clearances.

PG&E has numerous vegetation management programs focused on complying with existing requirements as well as “enhanced” vegetation management focused on “at-risk” species and fuel management work. Based on its responses to the Utility Survey, PG&E plans to increase the frequency of vegetation inspections while continuing to schedule them as schedule- and static-map based, and inspection checklists will remain compliance-based. As PG&E’s vegetation management programs grow in scope, it provides little discussion or evidence of the effect of increased vegetation clearances on utility ignitions.

Condition (PGE-26, Class A): PG&E shall submit an RCP with a plan for the following:

- i. Comparing areas with and without enhanced post-trim clearances to measure the extent to which post-trim clearance distances affect probability of vegetation caused ignitions and outages.
- ii. Collaborating with SCE and SDG&E in accordance with SCE-12 and SDG&E-13 to develop a consensus methodology for how to measure post-trim vegetation clearance distance impacts on the probability of vegetation caused ignitions and outages.

6.5.9. EMERGENCY PLANNING AND PREPAREDNESS

The WMP Guidelines require a general description of the filer's overall emergency preparedness and response plan, including discussion of how the plan is consistent

with legal requirements for customer support before, during and after a wildfire, including support for low income customers, billing adjustments, deposit waivers, extended payment plan, suspension of disconnection and nonpayment fees, and repairs. Filers are also required to describe emergency communications before, during, and after a wildfire in English, Spanish, and other languages required by the Commission.

The WMP Guidelines also require discussion of the filer's plans for coordination with first responders and other public safety organizations, plans to prepare for and restore service, including workforce mobilization and prepositioning of equipment and employees, and a showing that the filer has an adequate and trained workforce to promptly restore service after a major event.

PG&E's emergency planning and preparedness plans are especially deficient in the area of PSPS. Its engagement with cities, counties, tribal governments and first responders is poor. It also fails to detail whether its personnel are trained or have work--acquired skills in emergency planning and preparedness. While the Commission is requiring PG&E to improve its emergency planning and preparedness in several forums, including in separate proceedings aimed at PSPS (R.18-12-005) and emergency preparedness/disaster relief (R.18-03-011), PG&E must address these issues as set forth below.

In terms of strengths, under "protocols in place to learn from wildfire events," CAL FIRE's representative has informed the WSD that two "after action meetings" held in October and November 2019 after the PSPS events were well organized and effective to capture the events and lessons learned. However, the PSPS execution itself was poor, as the Commission's several open proceedings on PSPS indicate.

Deficiencies and Conditions – Emergency Planning and Preparedness

Deficiency (PGE-27, Class A): Public safety partner coordination.

Poor preparedness and interaction with cities, counties, tribal governments and first responders are areas of continued weakness for PG&E before, during and after a wildfire and during the 2019 PSPS events. In one sentence, PG&E states it does coordinate, but additional explanation is needed on how its public safety specialists work with counties and incident management teams.

Condition (PGE-27, Class A): PG&E shall submit an RCP that does the following:

- i) Provide an updated "coordination with public safety partners" plan that details precisely how PG&E works with cities, counties, tribal governments, incident management teams, and other first responders;

- ii) Include the experience level of its employees that conduct the interaction in emergency management or other public safety functions;
- iii) Provide a list of every PG&E contact and their counterparts and the cities, counties, tribal governments and first responder entities and description of their interaction;
- iv) Provide any existing logs or other documents PG&E keeps of its interactions with cities, counties, tribal governments and first responder entities dating back to the beginning of 2020 and on a continuing basis, without redactions. To the extent PG&E does not track this information, PG&E shall provide the following dating back to the beginning of 2020 and on a continuing basis: date of contact, name of department or organization in which individual(s) work, purpose of contact and content of contact. PG&E may file confidential information under seal so long as PG&E justifies its claim that the material requires such protection;
- v) Detail its process for logging all complaints by PG&E employees or their public sector counterparts about poor or problematic interactions between PG&E and their counterparts;
- vi) Provide a description of all complaints logged to date that meet the criteria in (iv); and
- vii) Provide a description of how PG&E surveys public safety partners to ensure its interactions are constructive and useful.

6.5.10. STAKEHOLDER COOPERATION AND COMMUNITY ENGAGEMENT

The final topic covered in Section 5 relates to the extent to which the filer will engage the communities it serves and cooperate and share best practices with community members, agencies outside California, fire suppression agencies, forest service entities and others engaged in vegetation management or fuel reduction.

The Commission has heard continuously for the past several years that PG&E's stakeholder cooperation and community engagement activities are deficient. In the context of PSPS, the Commission has prescribed several remedies outside this proceeding, in R.18-12-005. Key problems PG&E must address as a condition of approval of its WMP include PG&E's failure to make actual binding commitments, lack of long-term goals to improve engagement, cooperation with other entities including fire suppression agencies and the U.S. Forest Service, and sharing of best practices.

A positive aspect of PG&E's plan is its relationship with state and federal landowners to control vegetation. However, as we discuss below, PG&E should do more work to evaluate extended vegetation management practices outside its

rights-of-way, with PG&E using the knowledge it gains and resources in general to supplement its vegetation management inspections.

Deficiencies and Conditions – Stakeholder Cooperation and Community Engagement

Eye on improvement

In connection with its community engagement description³⁷ PG&E's progress timeline (before fire season, before annual update, within 3 years and within 10 years) does not address how it will improve in the future. This is a common problem across PG&E's WMP, where the utility often simply states it will refine and improve its work over time without specifics. Community engagement is a special weakness for PG&E in light of the 2019 PSPS events. It is not sufficient for PG&E simply to state that it will continue outreach and evaluate effectiveness in the future. Doing so conveys that PG&E is reluctant to make commitments for which it will be accountable in the future. If 2019 proves anything, it is that PG&E must make and meet additional commitments moving forward, rather than resorting to vague representations.

Vague commitments in the area of stakeholder cooperation and community engagement are not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Fuel reduction

While PG&E's plans to coordinate with the U.S. Forest Service on fuel reduction are a good first step, additional steps are necessary. PG&E should do more to evaluate extended vegetation management practices past PG&E rights of way, with PG&E using the knowledge it gains and resources in general to supplement its vegetation management inspections. Further, it is not clear what the costs are of the program since it appears to be one-time expense in 2020.

This issue is addressed in the section on vegetation management above.

Future planning

PG&E describes instances where it has worked with the community and stakeholders to help mitigate wildfire risk but provides only limited detail on activities it will conduct in the future. As is true elsewhere in its WMP, PG&E

³⁷ PG&E WMP Section 5.3.10, Table B.

describes most future plans as continuing to do the same thing and reevaluating as time goes on, as opposed to calling out specific goals for the future. This lack of commitment or specific goals for which the Commission and others may hold PG&E accountable is troubling.

Lack of commitment to future goals is not unique to PG&E. As such, this deficiency and associated condition is addressed in the Guidance Resolution, WSD-002.

Deficiency (PGE-28, Class B): Lack of justification and detail for PG&E's self-assessed stakeholder engagement capabilities.

In response to the utility survey for the maturity model, PG&E answered many questions regarding its stakeholder and community engagement capabilities in ways that do not align with PG&E's documented poor coordination and engagement efforts. For example, PG&E's responses indicate that it has a clear and actionable plan to develop and maintain collaborative relationships with local communities; however, continued fallout and harsh criticism for poor coordination and collaboration with local communities during its October 2019 PSPS events, as well as in preparation for the 2020 wildfire season suggests its "actionable plan" is not sufficient or effective.

Condition (PGE-28, Class B): In a quarterly report, PG&E shall:

- i) List and describe all actions it is taking to coordinate and collaborate with local communities regarding its wildfire mitigation activities and PSPS;
- ii) The timeline for completion of the actions identified in (i);
- iii) Actions it completed in the previous quarter; and
- iv) Actions planned for completion in the following quarter.

Deficiency (PGE-29, Class B): Cooperation and sharing of best practices.

PG&E's cooperation and best practice sharing with agencies outside California also does not contain details over the prescribed timeline. PG&E states it will continue to engage partners from inside and outside California to share PG&E's experience and identify tools and technology that are effective at mitigating utility-caused wildfire risk. Such information sharing is useful in allowing PG&E and others to identify new solutions and assess the effectiveness of solutions used by other entities. At the WMP workshops held in February 2020 and described in this Resolution, several parties asked whether the electrical corporations are sharing information about pilots of new technology with each other and with other entities.

Condition (PGE-29, Class B): In its first quarterly report, PG&E shall:

- i) Provide a report detailing its progress regarding best practice sharing with entities outside of California;
- ii) Include a description of how such interactions have changed or improved, including specific examples; and
- iii) Include a description of how it has applied lessons learned into its 2020 WMP.

7. MATURITY EVALUATION

In 2020, the WSD introduced a new Utility Wildfire Mitigation Maturity Model, to establish a baseline understanding of utilities' current and projected capabilities and assess whether each utility is progressing sufficiently to improve its ability to mitigate wildfire risk effectively. The maturity model also serves as an objective means of comparing across utilities and provides a framework for driving utility progress in wildfire risk mitigation over time. WMP filers were required to complete a survey in which they answered specific questions which assessed their existing and future wildfire mitigation practices across 52 capabilities at the time of filing and at the end of the 3-year plan horizon. The 52 capabilities are mapped to the same 10 categories identified in Section 5 above.³⁸

The maturity model will continue to evolve each year to reflect best practices and lessons learned. With the inaugural use of the maturity model in 2020, it is important to note that the resulting maturity level is to be informative of a utility's capabilities within the context of the underlying assessment criteria. Accordingly, it is essential that the maturity assessments are understood within the context of the qualitative detail supporting each maturity level. The model results require context and should not be interpreted as the final word on an electrical corporation's wildfire mitigation capabilities without an understanding of the assessment process described in the Guidance Resolution. As such, the final maturity model outputs should be viewed as levels or thresholds – they are not absolute scores.

PG&E's initial maturity model assessment reveals that it is in the early stages of its maturity growth and is focused on building foundational capabilities, such as risk assessment and mapping and situational awareness and forecasting. PG&E's development in these foundational, enabling capabilities provides an opportunity for the WSD and the Commission to guide this development and drive towards increased transparency and standardization in decision-making. As shown in

³⁸ A detailed description of the purpose and use of the maturity model is provided the Guidance Resolution being issued concurrently with the instant Resolution.

Appendix C, PG&E generally projects growth across all 10 categories between 2020 and 2023.

Of note, PG&E projects to increase its ignition risk estimation capabilities to quantitatively and accurately assess the risk of ignition across its grid by 2023, as well as reliably estimate the risk reduction potential of initiatives with circuit-level granularity. However, in response to survey questions, PG&E indicates that it plans to use a confidence interval less than 80 percent, or use no quantified confidence interval at all, when estimating ignition risk. PG&E's maturity assessment also expresses projected growth in the range of weather variables collected and increased weather data resolution and forecasting with circuit-level granularity by 2023. PG&E also projects maturity growth in grid design and system hardening initiatives with increased granularity in prioritization and measurements of effectiveness. To support these foundational capabilities, PG&E plans to significantly increase the data it tracks for near misses to capture the specific mode of failure, simulate wildfire potential and calculate the probability of a near miss causing an ignition.

When it comes to asset management and inspections, PG&E is currently in the process of building out its asset inventory database to include more frequent updates and additional information related to asset condition, maintenance history and circuit-level risk. In accordance with its maturity model survey responses related to Capability 16, PG&E is currently focused on gathering foundational asset data and building basic capabilities such as including asset maintenance history in its asset inventory. Accordingly, while PG&E indicates plans to move its asset inspection program from one focused simply on complying with existing requirements to one based on assessment of risk, it projects doing so only in the long term (*i.e.*, a 10-year horizon).³⁹ While PG&E's maturity scores don't reflect much growth in vegetation management and inspection capabilities, PG&E's qualitative survey responses indicate planned growth in vegetation data and characteristics tracked in its databases, as well as utilizing species growth and limb failure rates to establish post-trim clearances. Conversely, PG&E's inspection cycles and checklists are static, and compliance based and projected to remain the same in 2023.

PG&E's maturity assessment also reveals several areas where it projects little to no growth and can be pushed toward additional maturity, particularly in its resource

³⁹ Under the WMP Guidelines, a long-term horizon is 10 years, medium-term is 3 years, and near-term is before wildfire season or the next WMP filing.

allocation capabilities related to presentation of relative risk spend efficiencies of different initiatives and its portfolio-wide initiative allocation methodology. Moreover, PG&E projects no maturity growth in its data transparency and analytics, due to no plans for creating a central catalogue of all wildfire-related data, algorithms, analyses and data processes. The clear presentation and transparency of this information is critical for the WSD, the Commission and stakeholders understanding and efficient assessment of PG&E's wildfire mitigation initiatives and programs.

A detailed summary of PG&E's maturity model responses and results is provided in Appendix C.

8. IMPACT OF COVID-19 PANDEMIC

After PG&E submitted its WMP, on March 19, 2020, California Governor Gavin Newsom signed Executive Order N-33-20 requiring Californians to stay at home to combat the spread of the COVID-19 virus. Specifically, Governor Newsom required Californians to heed the order of the California State Public Health Officer and the Director of the California Department of Public Health that all individuals living in California stay home or at their place of residence, except as needed to maintain continuity of operation of the federal critical infrastructure sectors, in order to address the public health emergency presented by the COVID-19 disease (stay-at-home order).⁴⁰

As articulated in the March 27, 2020 joint letters⁴¹ of the WSD, CAL FIRE and the California Governor's Office of Emergency Services regarding essential wildfire and PSPS mitigation work during COVID-19 sent to each electrical corporation, electrical corporations are expected to continue to prioritize essential safety work. The WSD expects the electrical corporations to make every effort to keep WMP implementation progress on track, including necessary coordination with local jurisdictions. Such effort is essential to ensuring that electrical corporations are prepared for the upcoming and subsequent wildfire seasons, while complying with COVID-19 restrictions requiring residents to shelter-in-place, practice social distancing, and comply with other measures that California's public health officials may recommend or that Governor Newsom or other officials may require in response to the COVID-19 pandemic.

⁴⁰ Executive Order N-30-20. Available at <http://covid19.ca.gov/img/Executive-Order-N-30-20.pdf>.

⁴¹ <https://www.cpuc.ca.gov/covid/>. Letters to each electrical corporation are found under the heading "Other CPUC Actions", March 27, 2020: Joint Letters to IOUs re: Essential Wildfire and PSPS Mitigation Work.

Furthermore, the WSD expects the electrical corporations to continue to make meaningful progress on PSPS mitigation goals, including continuing with sectionalization projects, local outreach and coordination, establishing customer resource centers, and microgrid projects. Electrical corporations are expected to limit planned outage work during this time to wildfire mitigation, PSPS reduction, projects that immediately impact reliability if delayed, and emergency/public safety outages. In addition, electrical corporations are expected to undertake any other critical work related to operating a safe and reliable grid and to mitigate wildfire and/or PSPS risk.

9. CONCLUSION

- PG&E's Wildfire Mitigation Plan contains all of the elements required by AB 1054, Pub. Util. Code Section 8386(c) and all elements required by the WMP Guidelines.
- PG&E's WMP is approved by the WSD, subject to the conditions set forth in Appendix A.

10. COMMENTS

A draft of this Resolution was served on the service list for R.18-10-007. Comments were allowed under Rule 14.5 of the Commission's Rules of Practice and Procedure. The WSD accepted one set of comments per stakeholder that collectively addressed Draft Resolutions WSD-002 – WSD-009, which represent the totality of the WSD's evaluation of the 2020 WMPs. The following stakeholders served timely comments on one or more of the WMP Draft Resolutions: Kevin Collins on May 26, 2020; and PG&E, SCE, SDG&E, Bear Valley, California Association of Small and Multi-Jurisdictional Utilities, Horizon West Transmission, California Environmental Justice Alliance, East Bay Municipal Utility District, Energy Producers and User Coalition, Green Power Institute, Mussey Grade Road Alliance, Protect our Communities Foundation, Public Advocates Office, Catherine Sandoval, County of Santa Cruz, and The Utility Reform Network on May 27, 2020. Additionally, several members of the public submitted input regarding the Draft Resolutions. Changes reflecting comments have been made throughout this resolution. The changes are as follows:

- Require submission of Federal Monitor reports and reports to executive officers and/or Board of Directors back to January 1, 2018 and continuing that relate to PG&E's electric grid.
- Change the condition related to PG&E's public safety partner coordination from Class B to Class A to reflect PG&E's poor coordination in the past and the need for a prompt remedy.

- Require names of local/city/county contacts if already tracked; otherwise require date, department, purpose of contact, matters discussed, back to January 1, 2020 and continuing. Allow filing under seal if need for confidentiality documented by PG&E.
- Reference to "legitimacy" of costs incurred (for purposes of GRC) changed to "just and reasonable costs."
- Change "places" to "instances" in following sentence: "report all places where court or other decision-making body found fault with PG&E's historical equipment maintenance."
- Change wording that it is "prudent" for PG&E to carry out vegetation management to "PG&E may" carry out vegetation management.
- Change Condition PGE-2 (causes of conductor failure) to Class A from Class C.
- Add tribal governments to required city/county/first responder contacts throughout.
- Change Condition PGE-26 on vegetation clearances to Class A from Class C to highlight PG&E's failure to justify its enhanced vegetation management program and underscore the importance of understanding the value that this program provides beyond minimum regulatory requirements, and require PG&E to work with the other large electrical corporations on a consensus methodology to measure the effectiveness of increased clearance distances.
- Change Condition PGE-22 from Class C to Class B to reflect the importance of having certified arborists work on its vegetation management.

FINDINGS

1. AB 1054 and Commission Resolution WSD-001 require PG&E to file a WMP for 2020 that conforms with Pub. Util. Code § 8386(c) and guidance provided by the WSD and served on the R.18-10-007 service list on December 16, 2019 by ALJ ruling.
2. The WMPs were reviewed and acted upon with due consideration given to comments received from governmental agencies, the WSAB, members of the public, and all other relevant stakeholders.
3. The WMPs were reviewed and acted upon in compliance with all relevant requirements of state law.

4. PG&E's WMP contains all the elements required by AB 1054, Pub. Util. Code § 8386(c).
5. PG&E has satisfied the requirements of Pub. Util. Code § 8386(c) and the WMP Guidelines.
6. WSD staff spent almost two months trying to obtain certain data from PG&E in an accessible format.
7. Appendix A contains findings regarding deficiencies in PG&E's WMP.

THEREFORE, IT IS ORDERED THAT:

1. Ratification of the Wildfire Safety Division's approval of Pacific Gas and Electric Company's Wildfire Mitigation Plan is subject to conditions set forth in Appendix A.
2. The Wildfire Safety Division's approval of Pacific Gas and Electric Company's (PG&E) 2020 Wildfire Mitigation Plan, conditioned upon PG&E's compliance with the conditions listed in Appendix A, is hereby ratified.
3. Pacific Gas and Electric Company shall submit an update to its Wildfire Mitigation Plan in 2021 according to the forthcoming guidance and schedule issued by the Wildfire Safety Division.
4. Pacific Gas and Electric Company shall submit a new comprehensive 3-year Wildfire Mitigation Plan in 2023.
5. Pacific Gas and Electric Company shall cooperate with Wildfire Mitigation Plan data requirements and requests for data by the Wildfire Safety Division, or risk sanctions or penalties.
6. Nothing in this Resolution should be construed as approval of the costs associated with Pacific Gas and Electric Company's Wildfire Mitigation Plan mitigation efforts.
7. Pacific Gas and Electric Company may track the costs associated with its Wildfire Mitigation Plan in a memorandum account, by category of costs, and shall be prepared for Commission review and audit of the accounts at any time.
8. Pacific Gas and Electric Company shall submit a letter to the Wildfire Safety Division containing any updates to scope, timing or other aspects of any mitigation set forth in its Wildfire Mitigation Plan as result of the COVID-19 pandemic, including Public Safety Power Shutoff. The letter shall list items using

the same names and sections used in the Wildfire Mitigation Plan and give a thorough description of why the COVID-19 pandemic requires the specified action. The letter shall be submitted within 60 days of issuance of this Resolution and shall be addressed to the Director of the Wildfire Safety Division. The letter shall be emailed to wildfiresafetydivision@cpuc.ca.gov with service on the service list of Rulemaking 18-10-007. If there are no changes to report, no such submission is required.

9. Nothing in this Resolution should be construed as a defense to any enforcement action for a violation of a Commission decision, order, or rule.

This Resolution is effective today.

I certify that the foregoing resolution was duly introduced, passed and adopted at a conference of the Public Utilities Commission of the State of California held on June 11, 2020; the following Commissioners voting favorably thereon:

_____/s/ ALICE STEBBINS

Alice Stebbins
Executive Director

MARYBEL BATJER

President

LIANE M. RANDOLPH

MARTHA GUZMAN ACEVES

CLIFFORD RECHTSCHAFFEN

GENEVIEVE SHIROMA

Commissioners