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PACIFIC GAS AND ELECTRIC COMPANY

PUBLIC SAFETY POWER SHUTOFF EVENT ORDER TO SHOW CAUSE

OPENING TESTIMONY

PACIFIC GAS AND ELECTRIC COMPANY
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A. Introduction

My name is Aaron Johnson, and I am the Vice President of Customer Energy Solutions at Pacific Gas and Electric Company (PG&E or the Company). Since February 2018, I have been on special assignment in PG&E's Electric Operations organization, working on a series of wildfire mitigation programs. The purpose of this testimony is to provide policy background regarding the Public Safety Power Shutoff (PSPS) events that PG&E initiated in October through November of 2019, which are the subject of the Order to Show Cause (OSC) in California Public Utilities Commission (CPUC) Rulemaking (R.) 18-12-005. In addition, this testimony includes an overview of the remaining chapters of PG&E's prepared testimony, which provide relevant information and address the specific issues raised in the December 23, 2019 Scoping Memo[1] regarding customer notifications, PG&E's website and data portal, customer contact centers, and maps.

PG&E recognizes the seriousness of the issues raised in this OSC. PG&E's most important responsibility is the safety of its customers and the communities that it is privileged to serve. When weather or other circumstances threaten the ability to provide electricity safely, PG&E must take the appropriate steps necessary to protect the public. That is, in certain conditions, public safety is best served by implementing a PSPS event. PG&E's PSPS Program evaluates proactively de-energizing a portion of the Company's electric system in the interest of public safety when a combination of Outage Producing Winds, or winds that are forecasted to present a statistically high likelihood of causing disruptions to PG&E's above-ground power lines, and location-specific factors related to fuel conditions and vegetation suggest a heightened risk of catastrophic wildfires.

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[1] Assigned Commissioner and Assigned Administrative Law Judge's Ruling Setting the Scope and Schedule of the OSC Against PG&E for Violations Related to the Implementation of the PSPSs in October 2019, R.18-12-005 (December 23, 2019) (Scoping Memo).

When circumstances dictate, a decision to de-energize can protect against serious consequences. Yet while de-energization can prevent catastrophic wildfires, de-energization events also disrupt lives and present their own public safety risks, including the risk of fires igniting from other sources. Even a perfectly executed PSPS event will impose hardships on individuals and communities, particularly those in vulnerable circumstances. Thus, PG&E does not take the decision to de-energize lightly.

The wildfire risk in Northern California has changed dramatically in the past several years, as the potentially devastating ramifications of climate change have become increasingly apparent. In 2012, the CPUC described the risks in Southern California as materially different from the threat in Northern California:

> There is no history of catastrophic power-line fires in Northern California, and Northern California does not experience Santa Ana winds that contribute significantly to the risk of catastrophic power-line fires in Southern California.[2]

But by 2019, it became clear that "an extended period of drought, upwards of 10 years, increased fuel for fires, and unprecedented conditions" were leading to extreme weather events that required changes in how PG&E and other Northern California utilities approached these issues.[3]

As a result of the changes in environmental conditions, the electrical facilities in PG&E's service territory that are subject to significant risk of catastrophic wildfires has increased dramatically. For example, as of 2012, only 15 percent of PG&E's service area was designated as having an elevated wildfire risk on the fire-threat maps recognized by the CPUC at that time. Today, more than 50 percent of PG&E's service area is in designated Tier 2 or Tier 3 High Fire Threat District (HFTD) areas.[4] As described in other chapters of PG&E's prepared testimony,[5] PG&E has worked hard—and continues to do

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2 D.12-01-032, p. 74; see also *id.*, p. 166, Finding of Fact 8.

3 Order Instituting Rulemaking to Examine Electric Utility De-Energization of Power Lines in Dangerous Conditions, R.18-12-005, p. 1 (December 13, 2018).

4 See HFTD area maps designated in Decision (D.) 17-12-024, *available at* https://www.cpuc.ca.gov/FireThreatMaps/

5 See, e.g., Ch. 2 (PSPS preparation and Emergency Operations Center (EOC) decision-making); Ch. 3 (customer notification); Ch. 4 (website and secure data portal); Ch. 5 (customer contact centers); Ch. 6 (PSPS maps).

so—to respond to these changing conditions and to be prepared for potential de-energization events.

PG&E is keenly aware that PSPS events create significant disruption and potential safety hazards for its customers. As a result, PG&E makes every effort to minimize that disruption and associated safety risks by constantly monitoring weather conditions and limiting or expanding the scope of the planned PSPS outage as weather conditions change. While this has the benefit of minimizing the number of customers who may be impacted by a PSPS event, it also makes it much more difficult to provide advanced notification to some customers. The challenges are exacerbated because PG&E must at the same time assess the impact on a "live," constantly changing, interconnected grid, as well as on individual facilities that at any given time may be in an unusual, temporary configuration due to routine maintenance or other issues.

PG&E is committed to continuous improvement and implementing lessons learned from prior PSPS events. PG&E undertook substantial efforts to prepare for the 2019 wildfire season, but acknowledges that many aspects of its PSPS implementation fell short of expectations of the CPUC, PG&E's customers and other stakeholders, and the Company itself.[6] PG&E has learned and is continuing to learn from those experiences, and PG&E is dedicated to implementing the lessons learned in order to minimize disruption in future PSPS events.

B. Policy Background

On June 4, 2019, the CPUC issued detailed Guidelines (the Phase One Guidelines) setting forth the requirements that public utilities were to follow when implementing a PSPS event in 2019. Those Guidelines impose operational requirements regarding the implementation of PSPS events, including instructions relating to coordination with Public Safety Partners and local governments, advanced communication with all customers, and special requirements relating to certain customers, among other things. The Phase One

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6 See, e.g., Letter from Bill Johnson, PG&E Corporation, to Governor Gavin Newsom, *available at* https://www.pgecurrents.com/2019/10/18/pges-psps-response-bill-johnson-letter-to-gov-gavin-newsom/ (Oct. 18, 2019) (hereinafter, October 18 Letter); *Emergency Meeting on PG&E's Planning and Execution of the Public Safety Power Shut-Off Events in Northern California*, Testimony of Bill Johnson, PG&E Corporation, at p. 12, line 18, to p. 12, line 26.

Guidelines were issued a few days before PG&E's first 2019 PSPS event and a few months before the events at issue in this proceeding.[7]

The Phase One Decision noted the CPUC's expectation:

> …that the utilities will make every effort to implement these guidelines in advance of the 2019 wildfire season; however, the CPUC recognizes that some of these guidelines will take additional time to fully deploy.[8]

The CPUC acknowledged that "there is no one-size-fits-all approach for utility de-energization," and that "the utilities must be afforded some flexibility in developing and deploying their de-energization programs.[9]

The Phase One Decision also emphasized that utilities cannot implement safe and effective de-energization events on their own. Appropriate PSPS management requires utilities to coordinate with local governments, Public Safety Partners, non-profits, and entities responsible for a wide range of critical infrastructure. Effective notice, the Phase One Decision emphasized, "necessitates shared responsibility between the utilities, Public Safety Partners, and local governments," and a "joint effort to educate the public on how to prepare."[10]

PG&E strongly supports the Phase One Decision's emphasis on collaboration and coordination between utilities and key stakeholders on PSPS issues. The work that PG&E undertook prior to and during the PSPS events at issue in this OSC—and that it plans to continue and improve upon in future PSPS events—requires important coordination with local governments, Public Safety Partners, and other key stakeholders. All of these entities are also facing the same crucial public safety issues in a rapidly changing environment and at a scale that has few precedents. PG&E will continue to focus on improving and working collaboratively with the CPUC and other stakeholders on identifying lessons learned and remedial actions that can be taken going-forward to reduce the impact of future PSPS events.

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7 D.19-05-042.

8 D.19-05-042, p. 66; see also *id.*, p. 130, Ordering Paragraph 3.

9 D.19-05-042, pp. 66-67.

10 D.19-05-042, pp. 5-6.

C. Overview of Testimony

PG&E's prepared testimony provides an overview of the work that the Company did to prepare for the October through November 2019 PSPS events, addresses those areas identified in the OSC Scoping Memo where PG&E fell short of expectations, and explains what PG&E has done and is doing in response to those shortcomings to ensure that they do not recur in the future.

Chapter 2 provides testimony from Mark Quinlan, PG&E's Senior Director of Emergency Preparedness and Response, on PSPS event preparation and EOC decision-making. Specifically, Mr. Quinlan provides an overview of the processes and procedures that PG&E has created to implement a PSPS event, including activation and operation of the EOC, where many of the critical decisions were made for PG&E's 2019 PSPS events. He describes steps that PG&E took prior to wildfire season to prepare for de-energization events, the meteorological process that is used in determining whether to de-energize and the scope of de-energization, and the decision-making process in the EOC.

Chapter 3 provides testimony from Megan Ardell, PG&E's Senior Director of Local Customer Experience, and Shawn Holder, PG&E's Manager of Emergency Management and Public Safety, on customer notification. Specifically, Ms. Ardell and Mr. Holder discuss the efforts that PG&E made throughout 2019, in advance of the PSPS events, to help educate the public about emergency preparedness and to ensure that PG&E had the information necessary to notify customers, including medical baseline customers, of the PSPS events. While PG&E notified the overwhelming majority of its affected customers, there were some customers who were not notified. Ms. Ardell and Mr. Holder explain the reasons for the missed notifications.

Chapter 4 provides testimony from Lori Geoffroy, PG&E's Director of Digital Strategy, Customer Care, and Rajesh Arora, PG&E's Senior Director of Applications, Information Technology, on PG&E's website and secure data portal. Specifically, Ms. Geoffroy and Mr. Arora discuss the work that PG&E did in advance of the PSPS events to provide the public with information regarding PSPS events through PG&E's website, including posting robust content to provide the public with important information and strengthening the website's capacity in order to meet the anticipated customer demand. Ms. Geoffroy and Mr. Arora acknowledge that, despite those efforts, the website was inaccessible

for much of the October 9-12 PSPS event. Their testimony explains the cause for the website's inaccessibility and describes the efforts that PG&E has made to strengthen the integrity of its website to ensure that this issue does not occur in the future.

Also in Chapter 4, Mr. Arora describes the secure data portal the Company established to provide certain information to its Public Safety Partners. As Mr. Arora notes, when PG&E's primary website became inaccessible, users who sought to reach the portal by going through the website may have had difficulty accessing the portal, but they could still reach the portal by going directly to its separate web address.

Chapter 5 includes testimony from Chris Zenner, Senior Director of Customer Service Operations and Support, on PG&E's customer contact centers. Mr. Zenner explains the work PG&E's contact centers did to prepare for the 2019 PSPS events, how PG&E's website issues resulted in higher than anticipated call volume during the October 9-12 PSPS event, and how that volume affected the customer experience. Mr. Zenner also explains steps PG&E's contact centers are taking to further prepare for future events.

Finally, Chapter 6 provides testimony from Shawn Holder, Manager of Emergency Management and Public Safety, on PG&E's PSPS maps. Specifically, Mr. Holder describes the two primary types of maps that PG&E develops in connection with PSPS events and the process by which PG&E worked with the California Governor's Office of Emergency Services and other utilities to develop a map for emergency service providers that showed the general area affected by de-energization. Mr. Holder also addresses the OSC's allegation that PG&E's online maps were inaccurate.

D. Conclusion

PG&E takes its responsibility to properly implement PSPS events very seriously. PG&E undertook significant efforts to prepare for the PSPS events in October through November of 2019, and there were many aspects of that preparation in which PG&E excelled. However, there were also several areas where PG&E fell short of expectations, and PG&E recognizes and acknowledges those shortcomings. The Company is keenly focused on learning from those experiences and making appropriate changes to ensure that they do not happen again. PG&E remains supportive of working with the CPUC, its

partners, and other utilities in California in a constructive setting to share best practices, safeguard public safety, and minimize inconvenience for all Californians.

PACIFIC GAS AND ELECTRIC COMPANY

CHAPTER 2

PUBLIC SAFETY POWER SHUTOFF EVENT PREPARATION AND EMERGENCY OPERATIONS CENTER DECISIONMAKING

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PUBLIC SAFETY POWER SHUTOFF EVENT PREPARATION AND EMERGENCY OPERATIONS CENTER DECISIONMAKING

A. Introduction

My name is Mark Quinlan, and I am the Senior Director of Emergency Preparedness and Response at Pacific Gas and Electric Company (PG&E or the Company). In that capacity, among other things, I am charged with overseeing PG&E's Emergency Operations Center (EOC), which is responsible for executing Public Safety Power Shutoff (PSPS) events. The purpose of this testimony is to describe the steps that PG&E's Electric Operations organization took prior to the 2019 wildfire season to prepare for de-energization events, the meteorological data and other objective factors that are used in determining whether to de-energize and the scope of de-energization, and the decision-making process in the EOC. PG&E believes an understanding of PG&E's preparation prior to the 2019 wildfire season and the Company's EOC decision-making process is necessary for the California Public Utilities Commission (CPUC) to properly analyze the issues raised in the Order to Show Cause scoping memo.

B. PG&E's Preparation for the 2019 Wildfire Season

PG&E knows how much its customers rely on electric service and appreciates the impacts that PSPS events can have on its customers and communities. In an effort to minimize these impacts, PG&E took a number of steps before the start of the 2019 wildfire season to limit the number of customers potentially affected by PSPS events. The following section describes some of the efforts that PG&E's Electric Operations organization undertook to prepare for the 2019 wildfire season. Other aspects of PG&E's preparatory activities are addressed in Chapters 3-6.[1]

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[1] See Chapter 3 (customer notification); Chapter 4 (website and secure data portal); Chapter 5 (contact centers); Chapter 6 (mapping).

1. Technology Investments

Recognizing that one of the key aspects to effective PSPS implementation is localized precision, PG&E spent considerable time and resources ensuring that the proper technology was in place in advance of the 2019 wildfire season both to monitor and forecast the weather conditions that give rise to PSPS events and to execute PSPS events with the narrowest possible impact consistent with their purpose of preventing catastrophic wildfires.

Among other efforts, as of September 30, 2019, PG&E had installed 600 new weather stations and 100 high-definition cameras in High Fire Threat Districts (HFTD) to obtain more geographically granular data about weather conditions in its service area. The more detailed weather data produced by the additional stations enables PG&E's meteorology team to more accurately model and pinpoint regions forecast to experience PSPS conditions, which in turn allows PG&E to narrow the geographic scope of a PSPS event, ultimately reducing the number of customers affected. PG&E has continued to refine its efforts to gather more accurate and precise data inputs for utilization in its weather forecasting models.

Further, in order to ensure that PSPS events have the narrowest possible impact, as of September 30, 2019, PG&E had installed more than 160 sectionalizing devices that allow PG&E to limit the geographic impact of de-energization and accelerate the restoration process. PG&E also worked with the California Independent System Operator to determine how best to minimize impacts on the interconnected electric grid if PG&E needed to turn off high-voltage transmission lines for public safety.

2. PSPS-Related Training and Pre-October 2019 PSPS Events

PG&E also invested resources in training its crews to quickly restore power during a PSPS event while maintaining public and employee safety. Through September 4, 2019, PG&E crews had conducted 18 restoration drills in HFTDs across Northern and Central California to help prepare and respond quickly during PSPS events.

PG&E also conducted a series of PSPS events prior to—and on a much smaller scale than—the October 2019 events:

- On June 7-9, 2019, PG&E conducted one PSPS event in two locations on the same weekend, affecting approximately 22,000 customers.[2]
- On September 23, 2019, PG&E de-energized certain distribution and transmission lines, affecting approximately 26,000 customers in three counties.[3]
- On September 25, 2019, PG&E de-energized again in seven different counties, affecting approximately 49,000 customers.[4]

Following these de-energization events, PG&E crews visually inspected thousands of miles of power lines to assess any damage and perform repairs before safely restoring service. In those smaller events, PG&E was able to restore power to all customers less than 24 hours after the weather conditions indicating the existence of a potential wildfire risk had passed.[5]

By the time of the October 2019 PSPS events, PG&E had made important strides in its preparations for de-energization events and implementation of the Phase One Guidelines.

C. The Emergency Operations Center for PSPS Events

One of the key components of PG&E's PSPS response plan for the 2019 wildfire season was—and remains—the EOC. The EOC is PG&E's centralized EOC that is tasked with executing PSPS events in compliance with the Phase One Guidelines and in ways that minimize disruptions to PG&E's customers.

PG&E has a clearly delineated process for determining whether to activate the EOC and what to do once the EOC is activated for a PSPS event. Those steps are: (1) weather monitoring before the EOC is activated; (2) "readiness posture" (3) activation of the EOC; (4) identifying the initial scope of the de-energization event; (5) approval of initial government, Public Safety Partner, and customer notifications based on anticipated scope of de-energization;

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2 See *PG&E Public Safety Power Shutoff (PSPS) Report to the CPUC, June 7-9, 2019 De-Energization Event*, pp. 8-9.

3 See *PG&E Public Safety Power Shutoff (PSPS) Report to the CPUC, September 25-27, 2019 De-Energization Event*, p. 1.

4 *Id.*

5 Letter Re: Preparation for High Wind Season and Number of Fires (Greater or Equal to 10 Acres in Size), *United States v. Pacific Gas and Electric Company*, Case No. 14-CR-00175-WHA (N.D. Cal. filed Oct. 10, 2019), Docket 1099, p. 5.

(6) deciding whether to de-energize based on updated forecasting and other information; (7) approving additional government, Public Safety Partner, and customer notifications; (8) de-energizing transmission and distribution assets identified to be in scope; and (9) making the all clear determination and re-energizing the power grid.

1. Weather Monitoring

The first stage in any PSPS event is weather monitoring. PG&E maintains an in-house Fire Science and Meteorology team, and that team, in conjunction with outside experts, actively assesses weather patterns for events that may have a high probability of leading to a wildfire within PG&E's service area. To ensure the most accurate forecasts possible, PG&E has worked to provide its Fire Science and Meteorology team the tools that it needs to succeed—including state of the art weather and forecast modeling technology, dedicated satellite support, and installation of hundreds of localized weather stations within its service territory.

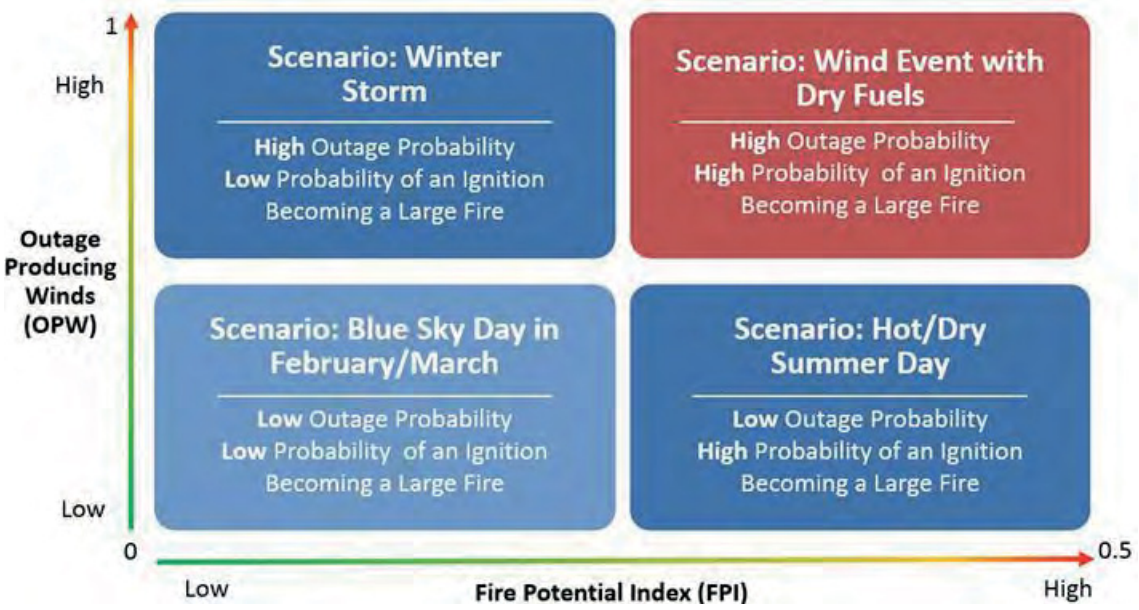
The two key forecasting metrics that are drivers of the decision to initiate PSPS events are Outage Producing Winds (OPW) and Utility Fire Potential Index (FPI). OPWs are winds that are forecasted to present a statistically high likelihood of causing disruptions to PG&E's above-ground power lines. PG&E's OPW Model converts forecasted wind speed into an outage probability. The OPW model was constructed using PG&E's unplanned outage data from 2008-2018 and PG&E's high-resolution climatology model, which contains 30 years of hourly wind data—over 5 billion data points of wind. The OPW model is location-specific because wind-outage response varies across PG&E's territory depending on factors such as vegetation, climatological wind exposure, and topography.

The second input, the Utility FPI, calculates the probability of significant wildfires occurring within PG&E's service territory. It, too, is location-specific, because risk factors vary across locations. Among other factors, the FPI model utilizes historic data on wildfires in the relevant territory from 1992-2018, weather forecasts (wind, temperature, and relative humidity), and fuel conditions (10-hour dead-fuel moisture, live fuel moisture, and fuel type) to assess wildfire risk. The FPI output is ranked on a scale from R1 (low) to R5 (high) with R5 indicating a very high potential for

significant wildfires. The highest level, R5-Plus, indicates high wildfire danger plus the potential for OPWs.

As shown on the following chart, the risk of a utility-caused catastrophic wildfire is highest during situations where both the OPW and FPI are high:

FIGURE 2-1
WILDFIRE RISK MATRIX



The OPW and FPI models are forecast across PG&E's territory four times daily and provide a 3-day forecast. Results from these models, in conjunction with global and local forecasts from external agencies, are evaluated by members of PG&E's Fire Science and Meteorology team to determine if there is concurrence of a heightened outage risk from a wind event and the potential for large wildfires to occur.

2. "Readiness Posture"

When PG&E's Fire Science and Meteorology team determine that there is a heightened risk for a significant wildfire event within PG&E's service territory, they inform the EOC Commander. The EOC Commander then determines whether PG&E should be in a heightened state of readiness—the "readiness posture"—for a potential PSPS event. In the readiness posture, among other things, PG&E involves key members from the EOC to actively monitor the potentially dangerous weather event and begins the

preliminary planning stages for a potential PSPS event. From this "readiness posture," the EOC Commander continues to receive updates from key EOC team members, including meteorology. At the appropriate time, if weather forecast data indicates a high likelihood of a PSPS event, the EOC Commander makes a recommendation to the Officer-in-Charge (OIC) to fully activate the EOC. The OIC ultimately makes the decision on whether to activate the EOC.

3. Activation of the EOC

Once the decision to activate the EOC is made, a dedicated EOC team will report for duty. The activation of the EOC does not dictate that a PSPS event will occur. Rather, it places PG&E in the best possible position to assess in real time whether a PSPS may be needed in the coming days in order to protect against catastrophic wildfires, and to ensure customers and stakeholders are notified accordingly. While key Public Safety Partners, including the CPUC and California Governor's Office of Emergency Services, are notified when the decision to activate the EOC is made, the public is not broadly notified at this initial phase; doing so may be premature when it has not yet been determined that de-energization will occur. Rather, the EOC will be continually staffed in 12-hour shifts, 24 hours a day, seven days a week, until either a determination is made that the severe fire danger has passed and a PSPS is not required, or a decision is made to move forward with the PSPS and all steps of the PSPS process—including notification of customers, the decision to de-energize, the decision to re-energize, and all restoration activities—are complete.

The EOC is comprised of a multi-disciplinary team of PG&E employees who assume existing emergency response positions that are consistent with the Incident Command System. Included in an emergency response team are the EOC Commander and the Command and General Staff. Command Staff positions include the Safety Officer, Customer Strategy Officer, Liaison Officer, Human Resources Officer, Legal Officer and Public Information Officer. General Staff positions include the Operations Section Chief, Planning and Intelligence Section Chief, Logistics Section Chief, Finance Section Chief and Intelligence & Investigations Section Chief. Each member of the Command and General Staff have specific responsibilities and staffs

to help execute their responsibilities. For EOC activations specific to PSPS events, additional roles and positions are staffed including, but not limited to the OIC, Chief Meteorologist, Wildfire Safety Operations Lead and PSPS Advisor.

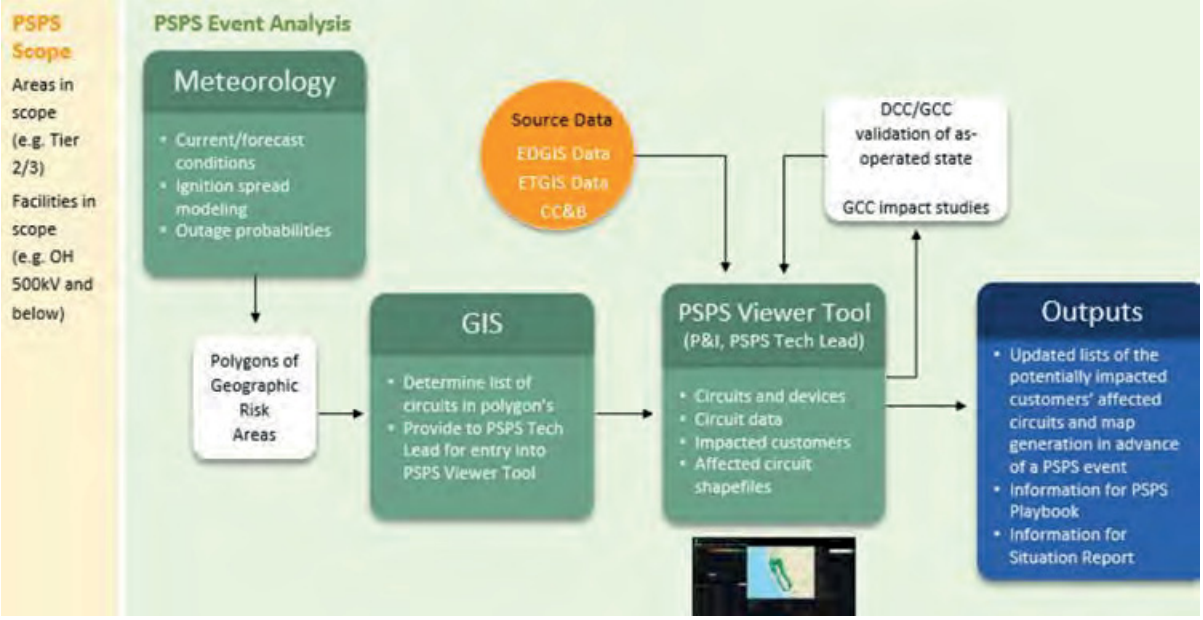
Prior to the 2019 wildfire season, EOC team members participated in multi-day training sessions that included exercises on how to respond to different operational scenarios to execute a PSPS event. Further training is planned in 2020 to ensure EOC team members respond appropriately to PSPS events based on lessons learned from previous events, coupled with the evolution of the PSPS Program in general.

4. Determination of the Initial Scope of Potential PSPS Event

After the EOC is activated, the next step is to determine the potential scope of a PSPS event by identifying which, if any, distribution and transmission facilities are within the area forecasted to be impacted by the weather event and would require de-energization in order to protect public safety. Once the potential scope is determined, the EOC coordinates to ensure customers within the affected area are identified and to prepare for possible de-energization while complying with all electric grid regulations.

Among the resources available to the EOC to assist in this process is the PSPS Viewer, which displays the circuits, premises, and facilities potentially impacted by a PSPS event. The PSPS Viewer incorporates this information to support customer and stakeholder outreach and notifications. Together, the PSPS Viewer and Geographic Information System information help create awareness of potential circuits within scope and the associated customer and stakeholder impacts in preparation for a PSPS event. The following graphic is instructive of the type of ongoing, iterative process that is at play to determine the scope of a PSPS event:

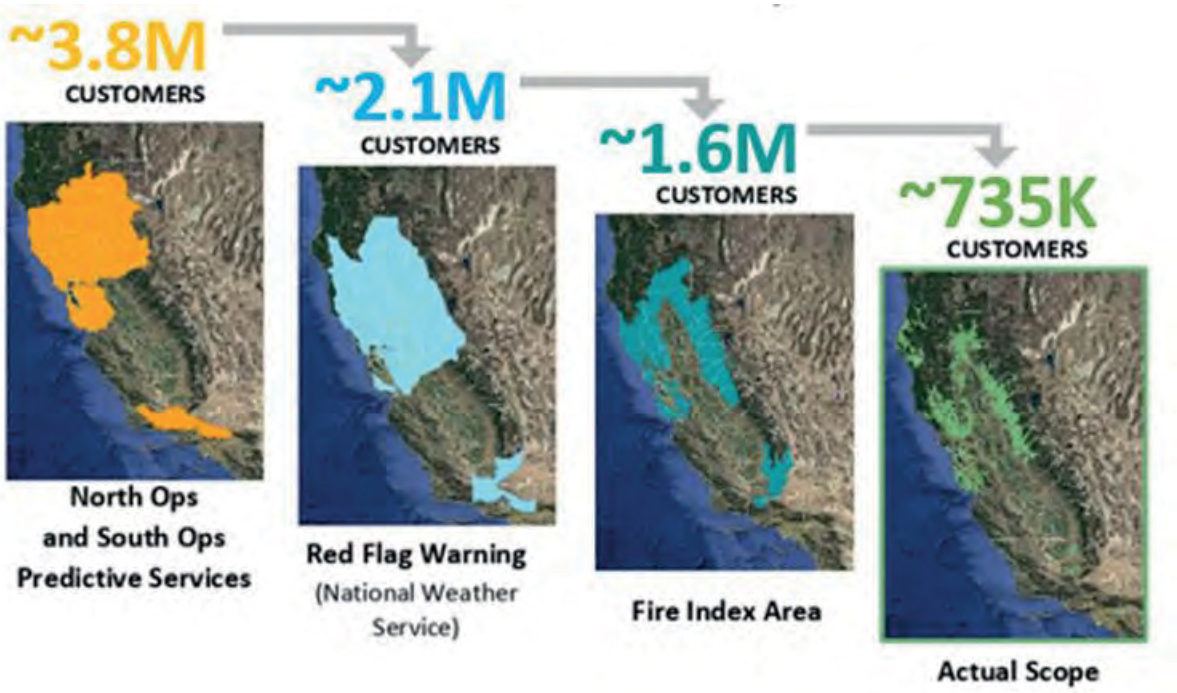
FIGURE 2-2
PSPS EVENT ANALYSIS FLOWCHART



While ensuring public safety and avoiding catastrophic wildfires is the goal of the PSPS Program, PG&E also recognizes that there are burdens placed on individuals, businesses and broader communities when the power is shut off. Accordingly, in scoping the impact of the PSPS event, PG&E makes every effort to identify the narrowest possible area of impact that is consistent with the PSPS event's purpose of avoiding catastrophic wildfires.

The following graphic from the October 9 PSPS event shows how refined analyses have tangible effects on a de-energization event's impact on customers.

FIGURE 2-3
OCTOBER 9 EVENT EXAMPLE



The first image shows how the National Interagency Fire Center's Predictive Services for Northern California and Southern California identified the area of high fire threat for the October 9, 2019 offshore wind event. Close to 4 million customers were within the area identified by Predictive Services. The second image shows the areas in which the National Weather Service had issued a Red Flag Warning; that warning covered more than 2 million customers.

The third image shows the area for potential de-energization as identified by PG&E's localized and granular weather modeling, based on boundaries defined by Fire Index Areas (FIA), which are individual geographic units initially established by the California Department of Forestry and Fire Protection and the U.S. Forest Service and currently defined by PG&E based on those original boundaries and modified by the CPUC HFTD boundaries. PG&E's scoping of the PSPS event when using the pre-defined FIA boundaries identified a more narrow 1.6 million customer population as compared to the areas of wildfire risk identified by other agencies.

Finally, the last image depicts the area that was actually subject to de-energization after PG&E's various efforts to narrow in scope as far as possible to limit public impact of de-energization. As in other events, PG&E's scoping efforts ultimately identified specific localized areas where conditions indicated the need to shut off power for public safety on a substantially smaller scale than risk areas identified by other agencies.

5. Providing Initial Government, Public Safety Partner, and Customer Notifications

Once the initial scope of the PSPS event is determined, the next step is to provide initial notice to government, Public Safety Partner, and customers of the preliminary anticipated scope of the PSPS event. The customer notification process and the challenges associated with it are described further in Chapter 3.

6. Determining Whether to Proceed With De-Energization

While the EOC is scoping the potential impact of the PSPS, PG&E's meteorology team continues to closely monitor changing forecasts and conditions, updating the OIC and the EOC team of any changes in the forecasts or conditions and continually revising the scope of the possible event, both in terms of event magnitude and estimated timing, to reflect the latest forecasted conditions. The updated forecasts may add to or remove additional areas from the scope of the PSPS event.

For example, during the October 9, 2019 PSPS event, the forecasted weather footprint expanded on the day before the shutoff was scheduled to begin, resulting in the identification of additional areas being added to the de-energization scope.[6] Similarly, during the October 26-November 1, 2019 PSPS event, the footprint of the forecasted weather event changed on October 29 and into the early morning of October 30, causing the addition of two areas to the PSPS scope and the removal of three others.[7]

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6 Amended PG&E Public Safety Power Shutoff (PSPS) Report to the CPUC October 9-12, 2019 De-Energization Event (January 27, 2020) at p. 15.

7 Amended PG&E Public Safety Power Shutoff (PSPS) Report to the CPUC October 26 and 29, 2019 De-Energization Event (January 27, 2020) at p. 1.

The OIC is responsible for deciding whether and where to shut off power. In making this initial decision,[8] the OIC receives up-to-date information from certain members of the Command and General Staff of PG&E's EOC, including but not limited to, Meteorology, Planning and Intelligence and Customer teams. In the case of de-energization, the field units working at the direction of the EOC will execute on the de-energization.

7. Providing Additional Government, Public Safety Partner, and Customer Notifications

Once the final decision to de-energize (or remain energized) is made, updated notices are sent to government entities, Public Safety Partners, including Cal OES, and PG&E's customers. Some customers will receive confirmation of their earlier notice; they remain in the PSPS scope. Others may receive notice that they are no longer expected to be within the scope of the PSPS event. Still others may receive notice that they have been added to the scope due to updates in the forecasting models due to the evolution of the weather.

Customer notifications are discussed in greater detail in Chapter 3.

8. De-Energization and Issuing the All Clear

After the decision to de-energize is made, appropriate PG&E personnel are responsible to ensure that electric assets within scope are de-energized safely.

Once weather conditions permit, the OIC will make the decision to issue an "all clear" and begin the re-energization process. Consistent with the safety goals of PSPS events, the first steps in the re-energization process are designed to promote public safety and involve PG&E crews visually inspecting the key lines within the scope of the PSPS event for potential weather-related damage. Where damage is found, crews work to isolate the area and then work to safely and quickly make repairs. Once it is safe to energize, a call is made to the PG&E control center to complete the energization process.

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[8] The scope of the PSPS event can still be further refined based on updated information even after the de-energization decision is made.

D. Planned Improvements for 2020

The descriptions above provide a broad overview of how the EOC functioned during the 2019 PSPS events, including the October PSPS events at issue in this proceeding. After each PSPS event, PG&E evaluated ways to improve its processes to both protect against catastrophic wildfires while also minimizing impacts on the general public. Although PG&E's PSPS response accomplished many of its goals in 2019—critically, including avoiding any catastrophic wildfire events—the Company also understands that there are many areas where PG&E's PSPS response can be improved. PG&E is working to make those improvements for the upcoming wildfire season and many of those efforts are described in subsequent chapters.

PACIFIC GAS AND ELECTRIC COMPANY

CHAPTER 3

CUSTOMER NOTIFICATION

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CHAPTER 3
CUSTOMER NOTIFICATION

A. Introduction

This testimony is co-sponsored by Megan Ardell, Senior Director of Local Customer Experience, and Shawn Holder, Manager of Emergency Management and Public Safety. The purpose of this testimony is to describe the customer notification efforts that Pacific Gas and Electric Company (PG&E or the Company) undertook for the October through November 2019 Public Safety Power Shutoff (PSPS) events that are the subject of the Order to Show Cause (OSC) in California Public Utilities Commission (CPUC) Rulemaking 18-12-005. These efforts include not only the actual customer notifications that occurred during the PSPS events themselves, but also the significant work that PG&E conducted prior to the events in order to educate, prepare, and support the Company's customers and communities. This testimony also describes the process by which PG&E identifies which customers will be affected by a particular PSPS event and who should receive a notification, as well as certain challenges that arise in attempting to identify the population of affected customers that can sometimes lead to missed notifications.

B. Pre-Event Education and Outreach to Customers (Testimony of Megan Ardell)

PG&E understands that de-energization events impose extreme hardship on its customers, especially its customers with special Access and Functional Needs (AFN). PG&E also understands that it can best minimize or mitigate that disruption by ensuring that customers are well-informed and understand what to expect and how to prepare for a de-energization event. It is the Company's responsibility to communicate that information to customers in advance, and PG&E takes that responsibility very seriously. As discussed below, PG&E made substantial efforts to educate customers about the PSPS Program and to provide advance notification of any PSPS event.

PG&E's efforts during the pre-wildfire season period can be grouped in two categories: efforts to educate the public about emergency preparedness and the realities of possible de-energization events, and efforts to update or

collect customer contact information for eventual use to notify customers in connection with actual PSPS events. Both categories are discussed below.

1. General PSPS Preparedness

Between May and September 2019, PG&E undertook extensive efforts to educate the public about PSPS preparedness. These efforts began before the CPUC issued its PSPS Phase One Guidelines on June 4, 2019, and included the proactive distribution of information about emergency preparedness, backup generation options, the Medical Baseline Program, and other topics related to PSPS planning.

a. The "Power of Being Prepared" Campaign

One important educational initiative consisted of a collaboration with other large electric investor-owned utilities (IOU) to launch a statewide "Power of Being Prepared" campaign, under the direction and review of the Governor's Office of Emergency Services, the California Department of Forestry and Fire Protection (CAL FIRE), and the CPUC. The campaign, which launched in May 2019, sought to prepare the public for the likelihood of de-energization events using a variety of media channels, including radio, advertising, digital video, and social media to communicate information about emergency preparedness. The campaign also included its own dedicated website—prepareforpowerdown.com—with links to each IOU's company website. PG&E played an active role in the campaign by coordinating activities with the other IOUs, developing content and messaging, and using the campaign materials in its outreach to communities, customers, and organizations.

As of September 2019, the campaign had run more than 36,000 radio advertisements with more than 276 million impressions. The advertisements and related outreach also generated significant page views on the dedicated website from over 110,000 unique visitors.

b. Direct Outreach

PG&E also communicated with its customers directly. Because PG&E knows that emergency preparedness messages benefit from repetition, the efforts were ongoing and sustained:

- *May 2019*. Before the Phase One Guidelines were issued, PG&E sent every electric customer a letter or e-mail with information about the PSPS Program, guidance on emergency preparedness, and a request to update contact information.[1]
- *June 2019*. PG&E sent all electric customers with an e-mail address on file another emergency preparedness e-mail. PG&E also provided a PSPS preparedness checklist brochure to over 1.5 million customers, including all Medical Baseline customers and certain customers in areas most likely to be impacted by a PSPS event.[2] Additionally, PG&E sent tenant education toolkits to "master metered" customers,[3] providing information about PSPS and importance of educating their tenants and notifying them in the case of a PSPS event. Copies of a tenant education flyer were included, with translated versions posted on www.PGE.com/psps.
- *July 2019*. PG&E e-mailed information about backup power safety and how to evaluate whether a backup generator is needed to over two million customers, including critical facilities.
- *May—August 2019*. PG&E sent nearly three million customers invitations to join PG&E's PSPS webinars and Community Wildfire Safety Program open house events in their region. PG&E hosted three customer-focused webinars and 23 open houses throughout its service area, which were attended by thousands of customers.

By September 2019, PG&E's education and outreach campaign included over 5 million direct mail pieces and over 11 million e-mails to customers.

Knowing that some customers prefer to receive information in different forms, PG&E also used a variety of other channels to convey these PSPS preparedness messages. For example, PG&E sent postcards to all electric customers in September 2019 advising them

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1 Exhibit 3A.

2 Exhibit 3B.

3 In master metered facilities and communities, there is a single electric meter for multiple units or buildings, linked to the property owner or manager's account. Examples might include some apartment buildings, condominium buildings, or mobile home parks.

about preparedness resources. In addition, PG&E included notices on the outside of PG&E billing statements during the May to August 2019 period, as well as inserts inside the August billing statements, reminding customers of the PSPS Program and encouraging them to update their contact information.

PG&E shared information broadly with the public through dedicated webpages on its external-facing website: PGE.com/wildfiresafety and PGE.com/psps. PG&E regularly pointed customers to these links in its direct communications and on social media. To promote greater transparency regarding its PSPS decision-making process, PG&E also shared detailed weather and PSPS forecasting information at PGE.com/weather, which included explanations about conditions that may lead to a PSPS event, real-time information from PG&E's high-definition camera network and weather stations, and 7-day localized forecasts for a potential PSPS event. In addition, PG&E developed a dedicated webpage to provide backup power education at PGE.com/backuppower and posted educational materials from its open houses and other information, including translated materials, at PGE.com/psps.

c. Targeted Outreach to Medical Baseline Customers

During this preparatory phase, PG&E also recognized that de-energization has a disproportionate impact on the Medical Baseline population. Accordingly, PG&E offered additional and customized messaging and resources for these populations.

At the most elemental level, PG&E engaged in a campaign to publicize and increase enrollment in the Medical Baseline Program. While this campaign was not focused solely on PSPS issues, it targeted customers in the Tier 2 and 3 High Fire Threat District areas through e-mail and digital media. PG&E noted in its recruitment efforts that enrolling in Medical Baseline would enable the Company to facilitate additional notifications prior to and during a PSPS event.

PG&E also provided additional PSPS-related information to customers who were enrolled in the Medical Baseline Program, in addition to the general emergency preparedness materials that the

Company provided to its customer base generally. In June 2019, for example, PG&E sent an emergency preparedness checklist brochure to all Medical Baseline customers, which included specific information about PSPS preparedness for the aging population and customers who rely on power for medical devices. In August 2019, PG&E sent a postcard to all Medical Baseline customers with a further notification and reminder of potential PSPS events during the wildfire season.[4]

2. Efforts to Update Customer Contact Information

In addition to general messages regarding PSPS preparedness, PG&E undertook a focused effort to update and collect contact information from all electric customers. E-mail addresses and phone numbers are not required in order to obtain electrical service, so some customers do not provide a way to contact them in time-sensitive circumstances. But in a PSPS situation, being able to communicate directly with PG&E customers is critical. Accordingly, PG&E made particular efforts to make sure, to the greatest extent it could, that the Company had accurate contact information for as many customers as possible.

a. General Customer Contact Information

First, in the months leading up to wildfire season, every customer who called a PG&E contact center was prompted to verify his or her contact information. This resulted in over *six million* reminders to customers to confirm or update their contact information in 2019. Similarly, every electric customer who logged into his or her PGE.com account online was prompted to update his or her contact information through a pop-up window, and reminded that contact would be important in the event of de-energization:

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4 PG&E also provided additional support to other AFN populations, other than Medical Baseline customers. These efforts, which PG&E understands are not within the scope of this OSC, ranged from language support to partnerships with community-based organizations.

FIGURE 3-1
PGE.COM LOG-IN POP-UP

PG&E also identified and reached out to customers whose contact information was incomplete. In June 2019, PG&E sent postcards to all electric customers with incomplete contact information to ask them to provide e-mail addresses and phone numbers for potential PSPS notifications. PG&E sent e-mails to more than 135,000 customers with missing phone numbers, with a similar request to update their contact information. And in August 2019, PG&E sent another round of e-mail or postcard reminders to all electric customers with missing contact information, with a further request to provide a phone number for potential PSPS notifications.

FIGURE 3-2
CONTACT INFORMATION POSTCARD

PUBLIC SAFETY POWER SHUTOFF

We have a plan. We want our customers to have a plan, too.

For the safety of you and your community, it may be necessary for us to **temporarily turn off electricity to your area when extreme fire danger conditions occur.**

We know how much you rely on electric service and would only consider temporarily turning off power in the interest of safety, and as a last resort.

For more information visit pge.com/wildfiresafety.

Take these steps to get ready:

- **UPDATE YOUR CONTACT INFO** by visiting **pge.com/mywildfirealerts.** We will send notifications and updates when and where possible.
- **PREPARE AND PRACTICE YOUR PLAN.** Make sure everyone in your home knows what to do during an emergency.
- **REFRESH YOUR EMERGENCY SUPPLY KIT.** Stock supplies to last a week in waterproof containers that are easy to reach. Update your kit yearly.

As a result of these outreach efforts, the Company acquired updated contact information for 292,122 PG&E customers in 2019, and had a phone number on file for over 95 percent of its customers in advance of the October 2019 PSPS events.

PG&E also took steps to provide an alternative notification option for persons who were not direct customers of record with PG&E. PG&E developed notifications based on zip code, called PSPS Zip Code Alerts. This notification option could be leveraged by community-based organizations, tenants of a master metered account, renters, visitors, caretakers, or anyone else who may need to receive PSPS notifications but who is not a direct customer of record to PG&E. Community members were able to enroll through text or by calling a toll-free number, and upon enrollment, could select one or more zip codes for which they would like to receive PSPS notifications. This enabled the Company to provide alerts to individuals who were not a customer of record with PG&E, but who may have a personal interest in knowing when a PSPS event will occur in certain areas.

b. Medical Baseline Customer Contact Information

PG&E also recognized the unique importance of having contact information for its Medical Baseline customers during PSPS events. In addition to the efforts targeted at PG&E's general electric customer base, PG&E took steps to ensure that it had updated contact information, to the extent possible, for all Medical Baseline customers.

As with its other customer notification efforts, PG&E used multiple channels to reach its Medical Baseline community.

- *Calls.* In July 2019, Medical Baseline customers received an automated call inviting them to press a button and update their contact information.
- *Postcards.* In August 2019, PG&E sent a postcard to all Medical Baseline customers with invalid or restricted phone numbers with a request to provide a current phone number.

As a result of these outreach efforts, PG&E was able to update the contact information of 13,962 of its Medical Baseline customers in 2019, and had a phone number on file for over 99.9 percent of them in advance of the October 2019 PSPS events.

C. Delivering Notifications in a PSPS Event (Testimony of Megan Ardell)

As a PSPS event approaches, PG&E provides advance notice, to the extent possible under the circumstances, to all potentially affected customers to allow them time to prepare for a potential outage. The Company's goal is to send direct notifications to all potentially impacted customers identified to be within the PSPS event scope at the following intervals: approximately 48 hours prior to de-energization, 24 hours prior to de-energization, and again when de-energization is near imminent (when possible in light of weather forecasts). These notification intervals are in alignment with the CPUC's PSPS Phase One Guidelines on notification.[5] PG&E also directly notifies affected customers when the weather event has passed and restoration has begun. The process can be complex, because a single event can result in a substantial number of direct notifications being delivered to a variety of different customers.[6] To take one

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5 Decision (D.) 19-05-042, Appendix A at pp. A8-A9.

6 Exhibit 3C.

example, the October 9-12 event alone involved 36 separate notification "events," ranging in size from 2 customers to 606,289 customers.[7]

The direct notification process can generally be broken down into two parts: (1) the identification of those customers who are subject to a PSPS event, and (2) the notification of those customers. The testimony below addresses both of these issues.

1. Identifying Affected Customers in a PSPS Event (Testimony of Shawn Holder)

In the context of a specific event, one of PG&E's primary goals is to ensure that it provides direct notification to all customers whose power will be (or may be, given the constantly changing nature of a shutoff) affected. In order to accomplish this objective, the Company needs to identify those customers that it believes may be affected during a PSPS event. The process, and the associated challenges, of attempting to identify customers who may be subject to a de-energization event are described below.

a. The Process of Identifying Affected Customers

In general, as PG&E begins to evaluate whether de-energization is required, PG&E's Planning and Intelligence (P&I) section within the Emergency Operations Center (EOC) identifies specific electrical facilities (e.g., circuits, lines, substations, and other facilities) that are being considered for de-energization. That list is created using a PSPS risk polygon developed by the meteorology group based on forecasted weather conditions, which determines the assets that need to be de-energized for safety.

In order to notify customers, the P&I section needs to then translate that list of electrical facilities into a list of customers who are serviced by those facilities. To do that, PG&E developed a tool that automates much of the analysis, which is called the PSPS Viewer. The PSPS Viewer incorporates information related to PG&E's circuits, as they were designed and in their normal configuration, and associates the relevant facilities with the customers who rely on those facilities for power. The

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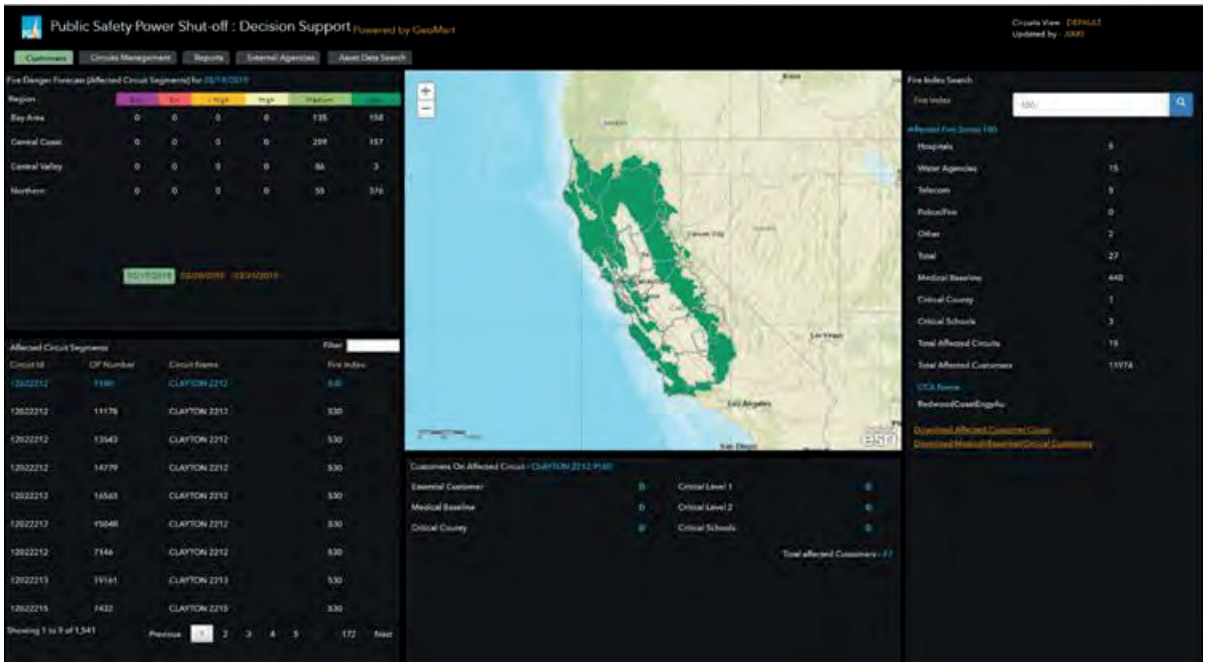
7 See Second Amended PG&E PSPS Report to the CPUC—October 9-12, 2019 De-Energization Event (January 27, 2020) at Appendix E, Table 1-1.

PSPS Viewer also includes breakdowns of numbers of Medical Baseline customers, critical facilities, and other relevant data.

FIGURE 3-3
PSPS VIEWER – CUSTOMER TAB



These breakdowns help P&I personnel quantify the impact that de-energizing certain circuits will have on communities, so that PG&E can minimize the scope of an event where it can safely do so. For purposes of the notification process, the PSPS Viewer enables the P&I section to prepare lists of affected customers that it then provides to other EOC teams and the Company's Customer Contact Emergency Coordination Center, who perform quality control on the customer data.

b. Challenges in Developing a List of Affected Customers

In developing the list of affected customers, the P&I section faces a number of challenges. As an initial matter, it is important to note that these direct customer notifications are being made in the context of a dynamic PSPS process. Among other things, the process of de-energizing facilities is a new one for PG&E. As discussed in Chapter 1, the risk of catastrophic wildfires in Northern California has increased substantially in recent years. PG&E experienced its first

PSPS event in fall 2018 and its first large-scale PSPS events in 2019. As a result, PG&E continues to learn and improve its processes.

In addition, it is also important to note that the event scope is constantly changing due to evolving weather conditions. PG&E has a team devoted to tracking weather conditions and evaluating the risk of wildfires in light of those conditions. The weather conditions and associated forecasts can change many times leading up to and during the course of a single PSPS event. As the forecasted weather changes, electrical facilities are added to or removed from the scope of an event. Those adjustments can require fast action, particularly when an area is added to the scope of a PSPS event close in time to the start of the de-energization event. If time is particularly short, concern for public safety may require de-energization before the customers associated with the newly in-scope facilities can be identified and notified.

As in many de-energization events, PG&E had to expand the scope of de-energization at certain points during the October events. As noted above, the October 9-12 event alone involved 36 separate notification "events," requiring direct notification of customers ranging in size from 2 customers to 606,289 customers. The constantly changing weather conditions, and resulting scope changes, make it more difficult to timely provide advanced notification to all potentially impacted customers.

Notwithstanding these challenges, during the three events at issue here, PG&E successfully provided direct notifications via e-mail, text, or phone to over 1.75 million customers, which amounts to over 97 percent of all customers affected.[8] PG&E acknowledges that it was not able to

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8 These figures are updated since the time of PG&E's initial PSPS De-energization Reports submitted in compliance with Resolution ESRB-8 and in accordance with D.19-05-042 and the OSC in this proceeding. These updates are in accord with PG&E's usual processes for analyzing data after final post-event information has been collected, which typically takes longer than 10 days. These analyses show a total of 712,000 notifications for the October 9 event, 176,700 notifications for the October 23 event, and 945,700 notifications for the October 26 event. See Second Amended PG&E PSPS Report to the CPUC—October 9-12, 2019 De-Energization Event (January 27, 2020) at p. 16; Second Amended PG&E PSPS Report to the CPUC—October 23-25, 2019 De-Energization Event (January 27, 2020) at p. 17; Amended PG&E PSPS Report to the CPUC—October 26 and 29, 2019 De-Energization Event (January 27, 2020) at p. 14.

provide direct notifications to approximately 46,500 customers,[9] which amounts to less than 3 percent of the affected customers, across the three events.

PG&E recognizes the importance of providing direct notification to all customers, to the maximum extent possible. In order to continue to enhance its processes and procedures, PG&E has undertaken significant efforts to understand the causes of the missed notifications so it can address those issues in advance of the next wildfire season. The most prevalent causes of the missed notifications are described below.[10]

1) Missing Contact Information

The single-biggest cause of missed direct notifications, accounting for over 20,000, or more than 40 percent, of the missed notifications during the October 2019 PSPS events (including approximately 100 Medical Baseline customers), is a lack of contact information for an affected customer. As described above, PG&E undertook extensive efforts in 2019 to collect updated contact information for all of its customers. These efforts included prompts during contact center calls, pop-up windows on the PG&E website, direct mailings and postcards, and e-mail communications. As a result of these efforts, PG&E was able to update contact information for almost 300,000 customers and validate contact information for other customers during more than six million calls to PG&E's contact

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9 This total of approximately 46,500 customers excludes approximately 11,000 customers that experienced a short duration loss of power that lasted for one hour or less, and often no more than a few minutes. These customers were not in the PSPS event scope and only briefly lost power as PG&E worked to de-energize or restore power across its system to other customers who were within the event scope. There are a number of reasons why customers outside of a PSPS event scope may experience a brief power outage, including as part of PG&E's effort to narrow the event scope and continue providing power to as many customers as possible by temporarily rerouting power to those customers through facilities that were not de-energized.

10 PG&E reported that approximately 23,000 customers were not directly notified prior to the October 9 event, but this includes 1,177 placeholder accounts for "new" customers in the Paradise area that PG&E anticipated becoming PG&E customers in the future. No customer or meter exists at this point in time for these accounts. Accounting for this anomaly, the actual number of missed notifications for the October 9 event is approximately 22,000.

centers. Notwithstanding this extensive outreach, not all customers responded to PG&E with updated contact information. Accordingly, there were a number of customers for whom PG&E did not have contact information in advance of the October and November 2019 PSPS events. PG&E continues to focus significant direct outreach efforts to capture accurate and complete contact information, including, for example, a program for 2020 to make proactive in-person visits, or "door knocks," for the approximately 12,000 Medical Baseline Program participants with missing or invalid contact information.

2) Challenges Related to Manual Process of Identifying PG&E Assets and Correlating List of Customers

Another major challenge PG&E faced—accounting for approximately 15,000 missed notifications during the October events (including approximately 500 Medical Baseline customers)—relates to the manual process of taking the geographic areas identified as high-risk by the meteorology team, translating those areas into PG&E assets on the grid, and tracing through those assets to identify impacted customers.

In many cases, these missed notifications were a by-product of PG&E's efforts to narrow the scope of a PSPS event. In September 2019, PG&E transitioned away from using "Fire Index Areas" (FIA) as the baseline unit to determine the geographic scope of deenergization. FIAs were areas originally designated by the CAL FIRE and the U.S. Forest Service, and assigned fire-danger ratings based on local conditions. PG&E's service area consists of 109 FIAs. In preparation for the 2019 wildfire season, PG&E incorporated data into the newly-developed PSPS Viewer, so that if a particular FIA was to be de-energized, the PSPS Viewer would automatically identify the impacted assets and customers within that FIA.

As PG&E approached the larger PSPS events in 2019, however, it realized that using the entire FIA as the geographic unit for PSPS would likely result in de-energizing substantially more

customers than necessary. Given the Company's interest in minimizing the scope of de-energization where it could safely do so, it undertook a process to de-energize only parts of FIAs. While these efforts narrowed the scope of events and resulted in fewer customers being de-energized, it also introduced additional complexity into the notification process. Specifically, the PSPS Viewer, as it was set up in advance of the 2019 wildfire season, could no longer automatically identify all of the assets and customers to be de-energized. Instead, for the October 2019 events, PG&E had to perform manual intersections of the meteorology risk polygons with portions of the transmission and distribution system to identify assets in scope, and develop algorithms to trace through those assets to identify impacted customers.

In the short timeframe between the change in methodology and the October 2019 PSPS events, PG&E did not have enough time to thoroughly test its tracing algorithms in the parts of its service territory that use step-down transformers on distribution feeders to distribute power to customers. As a result, PG&E's algorithms did not fully trace through those unique assets and PG&E did not identify all customers downstream of an affected step-down transformer. PG&E recognizes that this is an issue and is working on enhancing its algorithms and developing an automated tracing process for the narrower fire risk areas.

Similarly, PG&E also had to develop a novel strategy to identify which transmission lines and distribution substations were in high-risk areas and needed to be de-energized due to their proximity to vegetation or other reasons. After identifying an impacted transmission line, PG&E determined which distribution substations would be affected when that particular transmission line is de-energized, and in turn, which customers were downstream from those substations. This process is not one that PG&E has implemented outside the PSPS Program, and had not previously been utilized by PG&E or other utilities, to PG&E's knowledge.

During the 2019 wildfire season, the process of identifying all distribution substations tied to specific transmission lines involved a challenging, manual review process that was made more complicated by the short timeframe that PG&E had to perform the work and the changing weather conditions. PG&E also acknowledges that this is an issue and is in the process of automating this operational step for the 2020 wildfire season.

3) Temporary Abnormal Switching Configurations

Another challenge—accounting for approximately 3,700 missed notifications during the October events (including approximately 100 Medical Baseline customers)—relates to temporary abnormal configuration changes in the PG&E grid. In the ordinary functioning of a dynamic grid, there are occasions where a customer is temporarily assigned to a different circuit than the primary circuit that usually feeds their electricity. As explained earlier in this chapter, the PSPS Viewer that generates the customer list identifies those customers who generally receive electricity from the electric facilities in the scope of a PSPS event. However, customer accounts are frequently supplied by a different circuit on a temporary basis, in order to maintain the customer's power when the customer's primary circuit is de-energized for any number of reasons, from routine maintenance work to major repairs resulting from weather-related or other accidents. As a result, at the time of a PSPS event, some customers may be temporarily receiving electricity from a circuit that is within the PSPS event scope, even though the customers are geographically outside of the event scope, as identified on the PSPS Viewer.

Prior to and during the October PSPS events, PG&E was aware that not all customers would be receiving power from their primary electrical facilities at any given time, and so developed a strategy for dealing with this issue in its PSPS notification process. Specifically, PG&E's Electric Distribution Emergency Center (EDEC), which is distinct from the PSPS EOC, tracks the ongoing adjustments that cause these temporary configurations. When the PSPS Viewer

generates a list of customers who are associated with affected facilities, the EOC's P&I section then provides the list to the EDEC for what is called an Abnormal Configuration Distribution Circuits Analysis. That analysis identifies temporary circuit changes that affect those facilities and customers, and updates the customer list to reflect those changes.

The realities of system maintenance and the speed at which the PSPS process moves, however, can create challenges for the EDEC in performing this analysis. Importantly, even a short lag of a couple of hours between the time that manual work is performed and when records are ultimately updated can mean that an abnormal configuration may not be available for consideration in the time-sensitive process of developing a customer notification list for a PSPS event, and notifications can be missed. PG&E is aware of this issue and is working to identify potential solutions in advance of the 2020 wildfire season.

4) Customers Not Mapped to Local Transformer

Another significant challenge PG&E faces in developing lists of affected customers is that there are instances in which PG&E's systems will show a customer's Service Point Identification (SPID) number as linked to one circuit when in fact the customer is linked to a different circuit. This mapping issue affected approximately 900 customers during the October 2019 events (including approximately 30 Medical Baseline customers). If a customer's SPID location is mapped to an incorrect transformer, the system will not identify it as affected by the de-energization of the facility to which the SPID is actually linked, and the customer will not be included on notification lists. When PG&E identifies issues with individual SPID locations, it has a process for correcting the inaccurate linkage, but it was not able to identify and correct all of these errors in advance of the 2019 PSPS events. PG&E is currently undertaking significant data quality and cleanup efforts to address the transformer mapping and customer mapping issues.

2. Process for Notifying Customers (Testimony of Megan Ardell)

PG&E's goal is to send direct notifications to all customers within the PSPS event scope at approximately 48 hours and 24 hours prior to de-energization, and again when de-energization is imminent. PG&E also directly notifies affected customers when the weather has passed and restoration has begun. The process can be complex, because a single event can result in a substantial number of notifications being delivered to a variety of different customers.[11] To take one example, the October 9 event alone involved 36 separate notification "events," ranging in size from 2 customers to 606,289 customers.[12] Described below are the format and content of PG&E's direct notifications, and efforts the Company takes to ensure, to the extent possible, that customers have the information they need to prepare for de-energization.

a. Direct Notifications to General Customers

Once the list of potentially affected customers is developed by P&I personnel, the list is provided to the EOC's Customer Strategy Officer's team for the purpose of sending the notifications to customers in the days and hours before the customers are de-energized. As with its pre-PSPS preparatory outreach and communications, and recognizing that communication channels may be restricted due to power loss during a PSPS event, PG&E attempts to notify potentially impacted customers directly by using multiple notification channels, including automated phone calls, text messages, and e-mails. During the October 2019 PSPS events, PG&E's notifications were available in English and Spanish. Additionally, PG&E provides translation services to support customers with Limited English Proficiency in its contact centers, which are available in over 240 languages. Moreover, in preparation for the 2019 season, the Company retained a new vendor, Message Broadcast, capable of pushing as many as 900,000 phone, text, and e-mail communications—2.7 million communications in total—per hour to potentially affected customers.

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11 Exhibit 3C.

12 See Second Amended PG&E PSPS Report to the CPUC—October 9-12, 2019 De-Energization Event (January 27, 2020) at Appendix E, Table 1-1.

The content of customer notifications typically includes an approximate timeline for potential de-energization and a phone number for PG&E's contact centers, and also directs customers to the PG&E website and its Address Look Up tool for additional information. Text messages were sent to general customers along the following lines:

> PG&E Safety Alert: Due to weather forecast PG&E may turn off power on <<START DATE>>. Prepare a plan. More info: pgepsps.com/<<CODE>>.[13]

Automated phone calls were sent to general customers along the following lines:

> This is an important safety alert from Pacific Gas and Electric Company, calling on <<SYSTEM DAY, DATE>>. Para español oprima nueve.
>
> Gusty winds and dry conditions, combined with a heightened fire risk, are forecasted in the next 24 hours and may impact your electric service. To view a list of your potentially impacted locations visit pge.com/myaddresses and enter code <<CODE>> when prompted.
>
> Please have your emergency plan ready in case we need to turn off power for public safety. If you have a backup generator, please do a safety check and make sure you have enough fuel to last a few days.
>
> If these conditions persist, PG&E may need to turn off power for safety. Outages could last for multiple days. We will continue to monitor conditions and will contact you with further updates. For more information, including regular updates, visit pge.com or call 1-800-743-5002. Thank you. To repeat this message, please press pound.

E-mails were sent to general customers along the following lines:

> SUBJECT: PG&E Safety Alert: Weather conditions may require a Public Safety Power Shutoff (Message sent on <<SYSTEM DAY, DATE>>).
>
> Dear Valued Customer,
>
> Gusty winds and dry conditions, combined with a heightened fire risk, are forecasted in the next 24 hours and may impact your electric service. To view a list of your potentially impacted locations visit pgepsps.com.

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13 See Second Amended PG&E PSPS Report to the CPUC—October 9-12, 2019 De-Energization Event (January 27, 2020) at Appendix E, Table 1-2.

Here is what you need to know:

- Please have your emergency plan ready in case we need to turn off power for public safety
- We will continue to monitor conditions and will contact you with further updates
- If there is an outage we will work to restore service as soon as it is safe to do so
- In most cases, we would expect to be able to restore power within 24 to 48 hours after weather has passed
- Depending on weather conditions or if any repairs are needed, outages (weather event plus restoration time) could last longer than 48 hours
- For planning purposes, we suggest preparing for multiple-day outages
- If you see a downed power line, assume it is energized and extremely dangerous and report it immediately by calling 911

For more information, including regular updates, visit pge.com or call 1-800-743-5002.

Thank you,

Pacific Gas and Electric Company[14]

b. Direct Notifications to Medical Baseline Customers

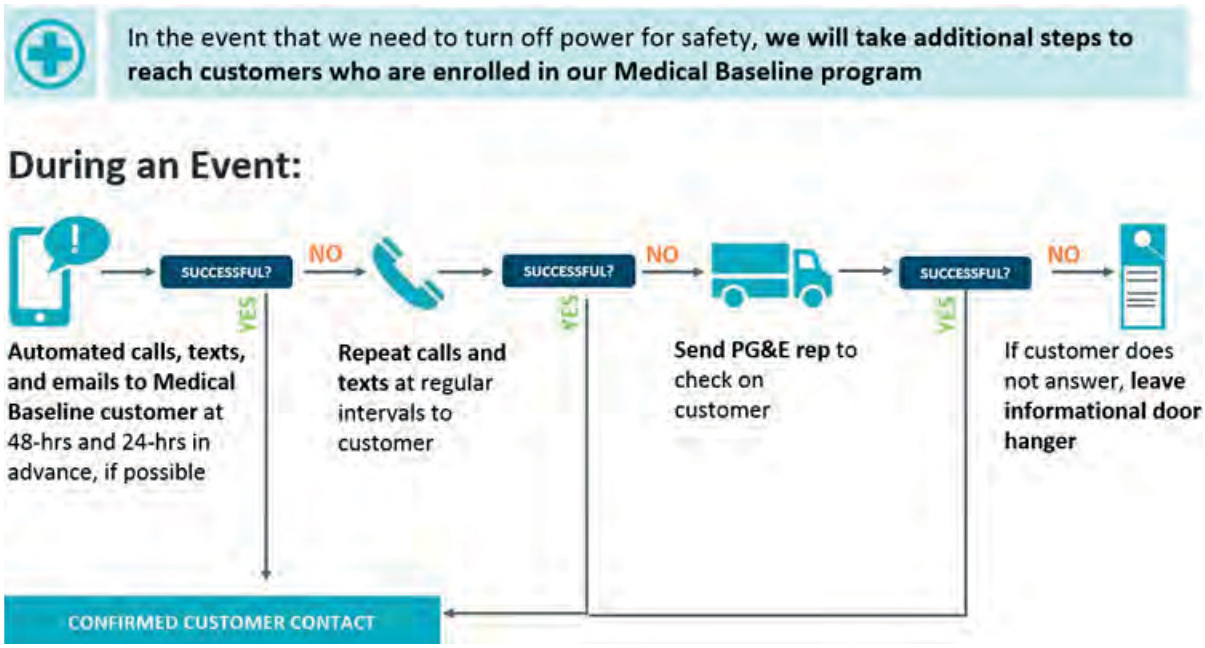
As with its other communications, PG&E took additional steps to communicate with Medical Baseline customers, and the Company continued attempting to reach each Medical Baseline customer until it could verify that he or she had actually received the notification. PG&E requested that Medical Baseline customers respond to its PSPS-related text alerts to confirm that the message was received,[15] and PG&E's communications system could track whether an e-mail was opened or a call was answered. When PG&E was unable to confirm receipt of the message, it initiated additional follow-up calls and texts at hourly intervals, and again monitored those communications to confirm the notification was received. If those follow-up efforts were not acknowledged, PG&E would send a representative to the customer's residence to conduct an in-person notification. If PG&E did not get an

14 See *Id*.

15 See *Id*.

answer, the representative would leave an informational doorhanger for the customer, and PG&E would continue hourly notifications to the customer until contact was confirmed or the power was shut off, whichever happened first.[16]

FIGURE 3-4
MEDICAL BASELINE EVENT NOTIFICATION PROCESS



Beginning with the October 23-25 event, PG&E also established a process to share the lists of Medical Baseline customers who had not confirmed receipt of their notifications with county and tribal EOCs within their jurisdictions. This process was requested by local jurisdictions and authorized by the CPUC, and some jurisdictions leveraged this information to conduct their own door knocks, wellness checks, or other notification efforts.

D. Notifications to General Public

PG&E leverages a number of platforms to distribute updates and information. In addition to the direct notifications PG&E provided to potentially impacted customers, PG&E also proactively engaged the media during the active PSPS events via news briefings, news releases, interviews, and social

16 Exhibit 3D.

media updates. This included sharing information in the various required languages on PG&E's website and social media and sharing press releases with multi-cultural news outlets to provide in-language, translated updates to their listeners and viewers.

During the time that PGE.com was temporarily inaccessible during the October 9-12 event, PG&E also ramped up its engagement through other channels. The Company used Facebook, nine Twitter accounts, and Nextdoor to share PSPS-related functions, and conducted more than 900 interviews with media. PG&E also expanded the capacity of its contact centers to offer customers the ability to get their specific questions answered. PG&E continued to update its Public Safety Partners to leverage their ability to publicize PSPS-related information. For example, among these efforts, PG&E increased its daily operations briefings with local agencies from two daily calls to three.

E. Conclusion

PG&E's goal through all of the efforts described in this chapter is to provide its customers, to the greatest extent possible, the information they need during a PSPS event. While the October to November 2019 PSPS events were of significant scope, PG&E successfully provided notifications to over 1.75 million affected customers. Unfortunately, due to a number of factors such as customers not updating their contact information, PG&E's efforts to reduce the physical scope and attendant customer impact of de-energization events, and temporary abnormal switching configurations, there were also some customers whom the Company did not successfully notify directly in the course of each event. PG&E sincerely regrets each missed notification and will continually improve its processes in an attempt to minimize the number of missed notifications in the future.

PACIFIC GAS AND ELECTRIC COMPANY

CHAPTER 3

EXHIBIT A

MAY 2019 LETTER TO ELECTRIC CUSTOMERS

Pacific Gas and Electric Company

Important Customer Message: Prepare for power outages and help us reach you. Please visit pge.com/mywildfirealerts to update your contact information today.

«Date»

«Prsn_name»
«mail_address_ln_1_txt»
«mail_address_ln_2_txt»
«mail_cty_nm » «mail_state_abb» «mail_zip»

RE: Important Message: Take Action Today to Prepare for Public Safety Power Outages

Dear Valued Customer:

Given the growing threat of extreme weather, we want all of our customers to be prepared for power outages. If extreme fire danger conditions threaten a portion of the electric system serving your community, it will be necessary for us to turn off electricity in the interest of public safety. This is called a Public Safety Power Shutoff.

What you need to know about Public Safety Power Shutoff

- Before any Public Safety Power Shutoff, we carefully review a combination of criteria such as predictions of strong winds and very low humidity levels, along with critically dry vegetation and on-the-ground observations from field crews.
- Because the energy system relies on power lines working together to provide electricity across cities, counties and regions, your power may be shut off, even if you do not live or work in an area experiencing high winds or other extreme weather conditions. This is done for the safety of all communities and customers.
- When we need to turn off your power, we will attempt to contact you in advance by phone, text and email, and provide updates through social media, local news, radio and the pge.com website.
- We expect to be able to visually inspect the system for damage and restore power to most of our customers within 24 to 48 hours after extreme weather has passed. Because extreme weather can last several hours or days, for planning purposes, we suggest customers prepare for outages that could last longer than 48 hours.

Attend a Wildfire Safety Open House

To learn more about how to stay safe and about Public Safety Power Shutoffs, including details on upcoming **regional open houses and informational webinars**, please visit **pge.com/wildfiresafety.**

How to better prepare

We know how much our customers rely on electric service and want to work together to help you prepare for power outages related to extreme weather and wildfire threats. Here are some important steps you can take today:

- **Update your contact information by visiting pge.com/mywildfirealerts or call 1-866-743-6589** during normal business hours. We will use this information to alert you through automated calls, texts and emails, when and where possible, prior to a Public Safety Power Shutoff.
- **Plan for medical needs** like medications that require refrigeration or devices that need power.
- **Identify backup charging methods** for phones and keep hard copies of emergency numbers.
- **Build or restock your emergency kit** with flashlights, fresh batteries, first aid supplies and cash.
- **Know how to manually open** your garage door.

For more information on our wildfire safety efforts and Public Safety Power Shutoffs, including details on upcoming **open houses and informational webinars in your region**, please visit **pge.com/wildfiresafety**.

Sincerely,

PG&E Community Wildfire Safety Team

Following the wildfires in 2017 and 2018, some of the changes included in this document are contemplated as additional precautionary measures intended to further reduce future wildfire risk. CCR-0210-0803

PACIFIC GAS AND ELECTRIC COMPANY

CHAPTER 3

EXHIBIT B

JUNE 2019 CHECKLIST BROCHURE

Create Your Plan For Extreme Weather

Make it a priority to create an emergency-preparedness plan to keep you and your family safe. Please take these steps to prepare for wildfire season and possible outages.

- ☐ **Update your current contact information.**
  To be sure we can contact you in the event we need to turn off power, visit pge.com/mywildfirealerts or call us at 1 (866) 743-6589.
- ☐ **Plan for any medical needs.**
  Talk with your doctor about planning for any medications that may need to be refrigerated or medical devices that require power.
- ☐ **Ensure any backup generators are ready to safely operate.**
  Make sure you have enough fuel to last for a few days and keep fuel in a safe and well-ventilated place. Visit pge.com/generatorsafety for more information.
- ☐ **Coordinate a plan with a friend or relative to spend time together during an outage.**
- ☐ **Keep a hard copy of emergency numbers.**
  Have phone numbers for hospitals, fire departments, police, friends, and relatives on hand.
- ☐ **Build or restock your emergency supply kit.**
  Stock supplies to last a week – include flashlights, fresh batteries, first aid supplies, food, water, and cash.
- ☐ **Know how to open your garage door manually.**
  Learn and practice opening your garage door using the manual release level.
- ☐ **If there is an outage, turn off appliances.**
  Avoid overloading the circuit and prevent fire hazards when power is restored.

DO YOU HAVE A PLAN TO STAY SAFE DURING POWER OUTAGES?

Learn more inside about how to prepare for extreme weather and possible outages

Together, Building a Better California

THE WILDFIRE THREAT IS REAL. SHUTTING OFF POWER TO KEEP YOU SAFE.

Extreme weather events are causing unprecedented and unanticipated wildfires. PG&E has a plan to deal with the growing threat of extreme weather and wildfires. We want our customers to have plans too.

That's why we're reaching out to customers like you. We want to let you know that, for safety, it may be necessary for us to temporarily turn off your electricity if extreme fire danger conditions occur. We would only consider turning off power in the interest of safety, and as a last resort. If we need to turn off your power, we will try to contact you in advance, when and where possible, and provide updates until power is restored.

3-ExhB-2

When your power is turned off, you can expect:

Early Warning Notification

Early warning notification, when and where possible, so you can prepare. If conditions allow, we would provide notice between one hour to 48 hours in advance through automated phone calls, texts, and emails.

Ongoing Updates

Regular updates will be provided through social media, local news, radio, and at pge.com.

Safety Inspections

After the extreme weather has passed and it is safe to do so, our crews will work to inspect the lines and safely restore power.

Power Restoration

In most cases, we would expect to be able to restore power within 24 hours. For planning purposes, we suggest you prepare for outages lasting between two to five days.

Visit us at pge.com/wildfiresafety to learn more about PG&E's Community Wildfire Safety Program and for more tips to help you prepare. You can also email us at wildfiresafety@pge.com with any questions about this work.

Emergency Contact Information

Call 911 immediately if you are experiencing a medical emergency.

Hospital Contact:

Phone Number:

Police Contact:

Phone Number:

Fire Station Contact:

Phone Number:

Neighbor Name:

Phone Number:

Family Member Name:

Phone Number:

Other:

After creating your own plan for extreme weather, keep the list above updated and posted in an accessible place for emergency situations that may arise.

Please visit pge.com/wildfiresafety for tips on how to plan for power outages.

Together, Building a Better California

PACIFIC GAS AND ELECTRIC COMPANY

CHAPTER 3

EXHIBIT C

NOTIFICATION TIMELINE FOR PSPS EVENTS

PUBLIC SAFETY POWER SHUTOFF

	INITIAL AGENCY NOTIFICATION (T-72 TO 48 HOURS)	FIRST CUSTOMER NOTIFICATION (T-48 TO 24 HOURS)	PSPS UPDATE NOTIFICATION (T-24 TO 4 HOURS)	IMMINENT PSPS NOTIFICATION (T-4 TO 0 HOURS)	WEATHER HAS PASSED (PATROLS + INSPECTIONS)	POWER RESTORATION COMPLETE
California Governor's Office of Emergency Services	✔ Live call ✔ Submit notification form	✔ Submit notification form	✔ Submit notification form	✔ Submit notification form	✔ Submit notification form	✔ Submit notification form
	Twice Daily State Executive Call					
California Public Utilities Commission	✔ Live call ✔ Email		✔ Email	✔ Email	✔ Email	✔ Email
	Twice Daily State Executive Call					
Governor's Office	✔ Live call					
	Twice Daily State Executive Call					
First Responders (County OES, Local Public Safety Answering Points)	✔ Live call ✔ Automated calls, texts and emails (County OES)	✔ Automated calls, texts and emails (County OES)	✔ Automated calls, texts and emails (County OES)	✔ Automated calls, texts and emails (County OES)	✔ Automated calls, texts and emails (County OES)	✔ Automated calls, texts and emails (County OES)
	Twice Daily Operational Briefing Call					
Government Agencies (City/County/Tribes)	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails
	Twice Daily Operational Briefing Call					
Critical Facilities (Telecom, Emergency Hospital Services, Water Agencies)	✔ Live call ✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails
Community Choice Aggregators	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails
Transmission-level Customers (Municipal Utilities)	✔ Live or automated call		✔ Live or automated call	✔ Live or automated call		
Medical Baseline Customers		✔ Automated calls, texts and emails Door knocks	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails
Customers (Residential, Commercial and Master-Meter)		✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails	✔ Automated calls, texts and emails

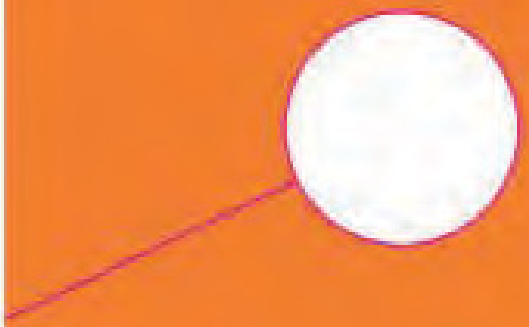
PACIFIC GAS AND ELECTRIC COMPANY

CHAPTER 3

EXHIBIT D

MEDICAL BASELINE DOORHANGER

DATE:



IMPORTANT NOTICE:

Electricity May Be Shut Off For Safety

Please take steps now to ready your emergency plan and prepare.

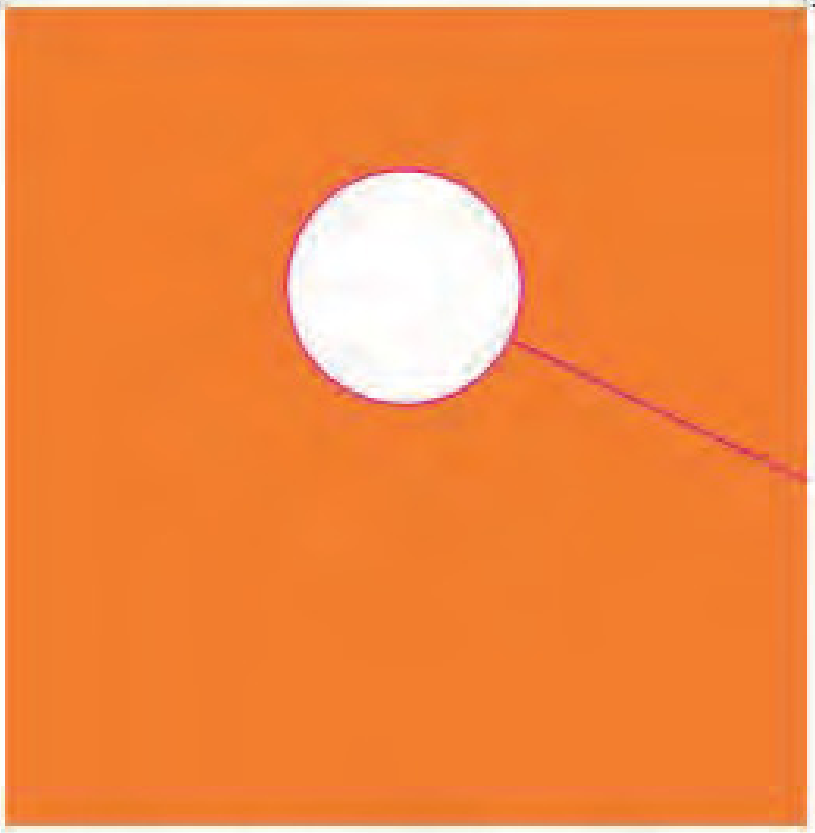
Extreme weather conditions with high fire-danger are occurring in your area. To protect public safety, we may need to temporarily turn off electricity in your neighborhood or community today or tomorrow *(see date we visited above)*.

Outages could last 2-5 days, depending on conditions. We will restore power as soon as it is safe to do so.

We understand how important electric service is to you. PG&E will only shut off power as a last resort.

PG&E has a plan and we want our customers to have plans, too. Please see reverse for steps you can take now to prepare.

Together, Building a Better California



Take these steps to prepare for outages:

We were unable to reach you by phone. Call us at 1-866-743-6589 to make sure we have your current contact information so we can keep you updated

Ensure backup generators are ready to safely operate and you have enough fuel for a few days
** generators should only be connected to an electric panel by a licensed electrician*

Print and store an emergency contact list outside of your mobile phone

Consider spending time with a friend or relative during an outage

More tips to help you prepare can be found at pge.com/wildfiresafety.

Community Wildfire Safety Program
pge.com/wildfiresafety

PACIFIC GAS AND ELECTRIC COMPANY

CHAPTER 4

WEBSITE AND SECURE DATA PORTAL

PACIFIC GAS AND ELECTRIC COMPANY
CHAPTER 4
WEBSITE AND SECURE DATA PORTAL

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WEBSITE AND SECURE DATA PORTAL

A. Introduction

This testimony is co-sponsored by Lori Geoffroy, Director of Digital Strategy, and Rajesh Arora, Senior Director of Information Technology (IT) Applications. The purpose of this testimony is to address the issues raised in the California Public Utilities Commission's (CPUC) Order to Show Cause (OSC) related to Pacific Gas and Electric Company's (PG&E or the Company) website and secure data transfer portal. Specifically, this testimony describes the efforts PG&E made to bolster its website in advance of the Public Safety Power Shutoff (PSPS) event that occurred on October 9-12, 2019. The testimony explains why, notwithstanding those efforts, the website was not available at times during the October 9-12 PSPS event, and how that unavailability may have affected PG&E's Public Safety Partners' ability to access the secure data transfer portal. The testimony describes the efforts that PG&E undertook both during and after the October 9-12 PSPS event to address the website outage, to provide relevant information to the public and PG&E's Public Safety Partners, and to ensure the integrity of the website going forward.

B. PG&E Website

1. Background (Testimony of Lori Geoffroy)

PGE.com is the Company's primary website and includes a wide variety of content. The website includes general information of interest to the public at large as well as interactive services that are available only to PG&E customers. The public content is the same for all users (i.e., static content) and is hosted by a set of static content web servers. Examples of static content include articles about how to save energy, copies of PG&E's gas and electric tariffs, and emergency safety tips. The interactive services are customized to each customer and are hosted by a separate set of servers (called the Your Account servers). For example, after logging in to the Your Account portion of PGE.com, customers can access information related to their energy usage, pay their bills, and report electric outages.

In addition to the static and customized content on PGE.com, PG&E also uses the website during emergency events, including storms and wildfires, to provide alerts and core safety information to customers and Public Safety Partners. PG&E's Digital Strategy team is constantly updating the website's content in response to customer feedback and changing events. In addition, PG&E has a technical team that works behind the scenes to maintain the integrity of the website by actively monitoring its server utilization and capacity.

2. Preparation for PSPS—Website Content (Testimony of Lori Geoffroy)

PG&E understands that its public website is one of the primary sources of information for its customers, Public Safety Partners, and the general public. In the months leading up to the 2019 wildfire season, PG&E took proactive steps to update the static content of its website to inform customers about the PSPS program and the importance of preparing for PSPS events by, among other things, updating their customer contact information. PG&E also enhanced its website to give customers the tools to assess the likelihood that they would be impacted by a PSPS event, including a dedicated weather webpage, the Address Look-up Tool, and PSPS maps. Each of these elements of PG&E's website is discussed more fully below.

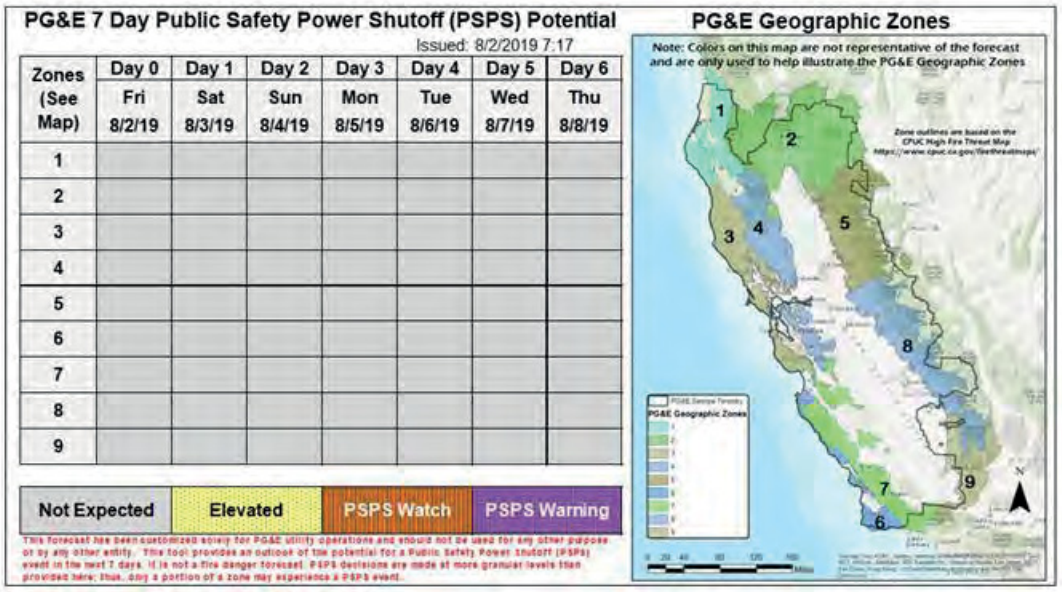
PGE.com. PSPS-related information appeared throughout the PGE.com website before and during PSPS events. On the static content side, informative pieces about the PSPS program were published on PGE.com. In addition, PG&E posted a warning banner on almost every page of the website to emphasize the importance of preparing for a PSPS event. According to PG&E records, these warning banners were shown more than 8 million times leading up to the October 2019 PSPS events.

On the interactive side, starting in June 2019, customers who logged into Your Account to pay a bill or take some other action automatically received a pop-up screen that informed them about the potential impact of a PSPS event and urged them to update their contact information. By October 2019, this pop-up message was shown to almost 2 million customers.

PSPS Events Landing Page. In addition to the general PSPS information described above and included throughout PG&E's website, PG&E also set up a one-stop, PSPS-focused landing page for use during de-energization events: PGE.com/pspsupdates. Alert boxes and banners located on almost every page of PGE.com were used to drive traffic to this landing page. The PSPS-focused landing page, with content in multiple languages, provides information about upcoming and current outages, answers frequently asked questions, provides outage preparation tips, and offers links to a wide variety of PSPS-related and preparedness content.

PSPS Weather. Because PSPS decisions are largely driven by weather conditions, PG&E launched a dedicated weather webpage: PGE.com/pspsweather. This page provides a seven-day forecast, including identification of the likelihood of a PSPS event, broken down by geographic areas. It also shows current weather conditions from numerous weather stations throughout PG&E's service territory. The following image provides an example of the content provided on that site.

FIGURE 4-1
PGE.COM/PSPSWEATHER



Not Expected	Conditions that generally warrant a PSPS event are not expected at this time.
Elevated	An upcoming event is being monitored for an increased potential of a PSPS event.
PSPS Watch	PG&E's Emergency Operations Center (EOC) is activated for a reasonable chance of executing PSPS due to a combination of adverse weather and dry fuel conditions. This level is typically issued within 72 hours before the anticipated start of an event
PSPS Warning	PG&E's EOC is activated and customers in areas being considered for PSPS have been or are being notified. PSPS is probable given the latest forecast of weather and fuels and/or observed conditions. PSPS is typically executed in smaller and more targeted areas than the PG&E Geographic Zones. This level does not guarantee a PSPS execution as conditions and forecasts may change.

Address Look-Up Tool. The PSPS landing page also included an Address Look-up Tool, which was hosted on the interactive Your Account servers. The Address Look-up Tool allowed customers to input the address of a specific residence or business in order to determine whether that address was within the scope of a PSPS event. The tool was especially useful for customers who are not PG&E account holders, as they would not necessarily have received notifications directly from PG&E. For example, master meter tenants such as apartment dwellers or mobile home park residents often do not have accounts with PG&E because their utility usage is included in their rent, and the landlord pays on their behalf. Although PG&E was not required to provide an Address Look-up Tool, the Company decided to provide this tool in order to better meet the needs and concerns of its customers.

Website Maps. In 2018 and the June 2019 PSPS events, PG&E published only static maps (in PDF format) for customers showing impacted areas. Customer feedback indicated that customers wanted to zoom into their particular location and see closer-in views. Accordingly, to provide a more interactive tool, PG&E took the Generalized Polygon maps that were created in response to the request of the Governor's Office of Emergency Services (Cal OES) and made those available on the website to the public. As further discussed in Chapter 6, the Generalized Polygon maps were developed to approximate the general area of the outage, not to identify whether particular addresses were within scope. To avoid confusion, the

website made clear that the maps provided "a general outline," were "not address specific," and did "not include the complete and exact area(s) impacted by a PSPS." The website also stated, in boldface, that the Address Look-up Tool was "**the most accurate information**" available.[1]

Continuous Feedback Loop. Prior to and during the 2019 PSPS events, PG&E's Digital Strategy team was constantly making updates to the website—both the static content and the interactive services—based on customer feedback and customer experience best practices. Feedback mechanisms include customer comments, click data, page visit data, and session replay tools. Typically, after feedback has been analyzed and possible improvements to new layouts or language are identified, PG&E launches tests to determine if the new approaches show improved results. This "learn, test, measure, launch" process helps the Company portray information to customers in the most meaningful way. This process is performed throughout the year to inform best practices that can be applied to any content on PGE.com, including PSPS-related content.

This feedback loop was accelerated during the October 2019 PSPS events, however, to provide real-time modifications to the website. For example, as PG&E received comments from customers expressing confusion about the discrepancy between the Generalized Polygon Maps and the Address Look-up Tool, PG&E immediately moved the disclaimer related to the maps to be more prominent so that customers would better understand that the Address Look-up Tool provided the more accurate information.

3. Preparation for PSPS—Website Integrity (Testimony of Rajesh Arora)

PG&E took action well in advance of the 2019 PSPS events to ensure the integrity of its website. Some of these actions were part of PG&E's ongoing efforts to maintain and upgrade server performance and capacity, while others were specifically completed in preparation for potential de-energization events.

Simulations and Troubleshooting. Since 2014, PG&E has run simulation programs to approximate the number and type of transactions

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[1] Emphasis in the original.

that customers perform using the “Your Account” features (e.g., bill pay). These programs allow PG&E to evaluate the speed of the website under various conditions and to trouble-shoot and make improvements if the website is slow or not operating in an optimal manner.

Back-up Systems. PG&E bolstered the integrity of its website by creating back-up systems in the event of a failure. For example, in 2014, PG&E developed a back-up website just in case the primary website was unavailable. The back-up website uses the URL “PGEalerts.com,” and was designed to provide customers, Public Safety Partners, and the general public with critical safety information in the event that the primary website were to become unavailable. The back-up website was designed to handle up to 100 times the normal traffic of PGE.com and was also designed with an automatic failover to automatically redirect traffic from PGE.com to PGEalerts.com.

Second Data Center. As another effort to improve system integrity, PG&E made the decision in late 2016 to split its servers across two separate data centers. Prior to this time, PG&E’s servers were all located in the Fairfield Data Center. This presented a risk because if something happened to the Fairfield Data Center, the website would become inaccessible. PG&E made the decision to utilize a second data center in Rancho Cordova. That way, if something happened to one data center, PG&E’s website would switch to the servers in the other data center and continue to operate without interruption. These efforts also doubled the capacity of PG&E’s website.

Website Tool Enhancements. In addition to continually monitoring and updating the website in the ordinary course of business, PG&E enhanced the functionality of its website’s PSPS-specific tools. For example, in August 2019, PG&E moved the Address Look-up Tool off of PGE.com’s main database into a standby database, which helped speed up the application’s performance and increase its capacity. Also, on October 5, 2019, PG&E further accelerated the Address Look-up Tool’s performance by deploying a new solution to narrow the Address Look-up Tool’s search action against PGE.com’s database. In practice, this meant that the tool’s address search algorithm would work much faster.

Assessment of Historical Data on Availability. Leading into the 2019 wildfire season, PG&E evaluated its historical data to assess whether its website could withstand the volume of traffic that would occur in a PSPS event. This data showed that the static content servers—that is, the servers used to host PG&E's public content—had demonstrated a very strong "availability" metric on an annual basis. Website "availability" measures the percentage of time that a website is unavailable, for reasons other than planned outages. The following chart depicts PG&E's static content server "availability" numbers for 2017 and 2018.

FIGURE 4-2
STATIC CONTENT WEB SERVER AVAILABILITY

Year	Overall Annual Availability
2017	99.83%
2018	99.94%

In addition, PG&E's static content servers had never come close to reaching their limits. PG&E maintains a number of static content servers across its two data centers, ten of which act as the front line defense for the others. If the ten servers were to be overwhelmed, the website would go down. As part of its ordinary business practices, PG&E regularly monitors the central processing unit (CPU) utilization on each of the ten servers. While the October 2019 PSPS de-energization events were significant in size, they were not the first events in PG&E's history that would drive customers (and others) to the PG&E website. When PG&E analyzed its server capacity in the months leading up to the October 2019 events, PG&E observed that its servers were generally operating at 5 percent or less of their total capacity. Based on this analysis, PG&E was confident that it had more than sufficient excess capacity to handle even a large-scale PSPS event.

4. October 9-12 PSPS Event (Testimony of Rajesh Arora)

a. Website Accessibility Issues

The CPUC's OSC Scoping Memo states that "PG&E's website was unavailable or non-functional during the majority of the duration of the [October 9-12] PSPS event." In fact, while there were times that the website was unavailable during the October 9-12 PSPS event, the extent of the website outage was narrower than described in the Scoping Memo. Third-party analytics show that almost 3 million unique visitors successfully visited PGE.com between October 9 and 12—including 1.4 million on October 9, the day of the de-energization:

FIGURE 4-3
PGE.COM UNIQUE VISITORS DURING OCT. 9 EVENT[(a)]

Date	Number of Unique Visitors
October 9	1,462,553
October 10	804,188
October 11	337,523
October 12	149,514
Total	**2,753,778**

(a) See Exhibit 4A, attached hereto. This data, from Adobe Analytics, reflects only users who successfully downloaded a page from PGE.com. It does not include users who were unable to reach the site, nor users who reached the alternative site that PG&E established shortly after PG&E.com began experiencing difficulties, as discussed further herein.

PG&E acknowledges, however, that the inaccessibility of the website at certain times during the PSPS event caused hardship to customers. As discussed above, PG&E undertook significant efforts to prepare and strengthen the website in advance of the 2019 PSPS events. PG&E believed based on its projections that the website could handle a substantial increase in customer traffic.

While the website had sufficient capacity to handle a substantial increase in traffic from PG&E customers, PG&E learned through this event that during a large-scale PSPS outage, the size and nature of the traffic is dramatically different.

First, PG&E discovered that many of the transaction requests were from users who were not PG&E customers. PG&E discovered this after analyzing the location of the user requests and learning that there were large numbers of transactions submitted by users outside of California, and even outside of the United States. The October 9 PSPS event was of global interest. PGE.com experienced almost a million page requests from users located outside of California.

Second, traffic to PGE.com was multiplied through the traffic of third-party websites, including online news sources and search engines, that directly or indirectly linked their page to the PG&E website. For example, if a user went to a local news outlet's website, that outlet may have had a link for the user to obtain additional information about the PSPS event. Rather than providing content on their own website, these third-party websites would either automatically direct the user to the PG&E website or send the request to the PG&E website. Some websites constantly search for updated information along these lines by using "bots," which are automatic software applications that are programmed to repeatedly scrape the "source" website, like PGE.com, for refreshed information.

Third, PG&E learned during the October 9-12 PSPS event that the same users were performing multiple transactions on the website, which increased the volume of traffic. For example, PG&E estimates that more than 50 percent of the transactions on October 9 and more than 60 percent of the transactions on October 10, 11 and 12 were performed by repeat users.

All of these factors resulted in PG&E experiencing an unprecedented increase in website traffic. According to PG&E's records, between January 24, 2019 through the end of September 2019,[2] the static content servers experienced an average of 6,471 page requests per hour,[3] with the peak reaching above 50,000 page requests per hour only once. Between October 7 and 10, however, the static

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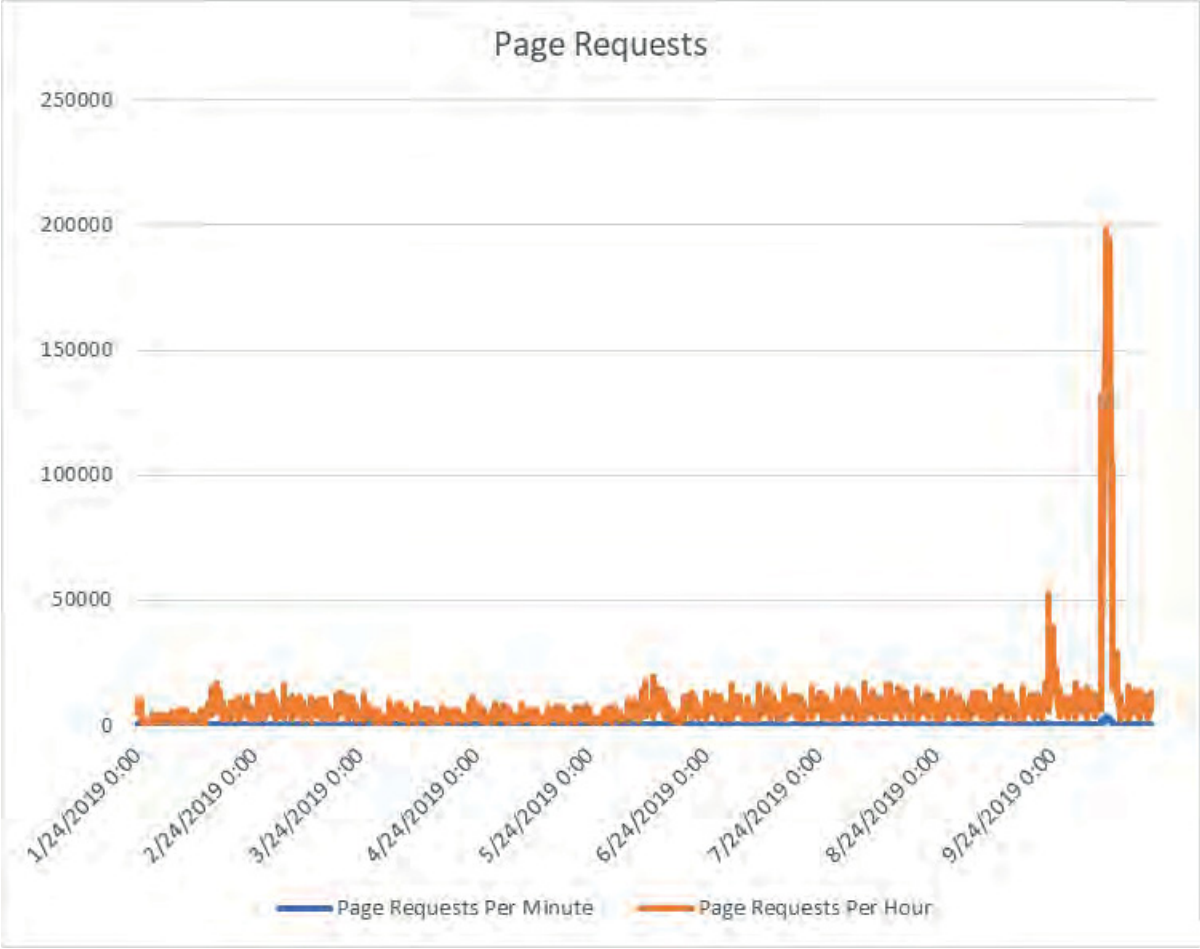
2 PG&E started to track requests on PGE.com on January 24, 2019.

3 As used in this Testimony, page requests per hour refers to the number of requests to the server for any page within the PGE.com domain, over a one-hour timeframe.

content servers experienced an average of 105,471 page requests per hour (or over 16X the former average), with a peak of 197,700 per hour on October 8 (or almost 4X the former peak). Figure 4-4 illustrates the page requests for the static content servers for January through October 2019 and shows the spike in the requests during the October 9-12 event.

FIGURE 4-4
PAGE REQUESTS PER HOUR FOR JANUARY THROUGH OCTOBER 20, 2019



In addition to the increase in traffic, some of the PSPS-related content on the website put additional strain on PG&E's servers. In particular, as discussed in Chapter 6, PG&E had developed maps that were originally designed to be made available to its Public Safety Partners through a secure data transfer portal. Due to partner feedback, however, PG&E also made certain map data available in a

downloadable format without requiring a login. Those downloadable data files were extremely large, and were used by sites such as the SF Chronicle newspaper and Google to create their own map renderings. While the inclusion of the downloadable maps provided additional transparency to the public, they also put substantial strain on PG&E's servers – over and above the other sources of strain described above.

In sum, there were a number of factors that influenced the accessibility of the website. PGE.com was no longer just serving PG&E's customer base, but was serving interested people from around the world, the audience of major news media, and many repeat users. In addition, the PSPS content that PG&E had made available in an effort to be more transparent put additional strain on the system. This resulted in a substantial increase in the amount and nature of traffic, which resulted in intermittent outages and accessibility issues.

b. PG&E Restores Access

In the morning of Tuesday, October 8, PGE.com experienced severe performance issues which caused some customers to experience longer wait times or to see "site not found."[4] The Company's IT team responded to system alerts and began the triage process, primarily focusing on recovering servers. PG&E's IT teams added memory in the form of CPU to the server and also made several configuration changes to optimize resource utilization and improve the servers' performance.

Later that afternoon, PG&E's cybersecurity team analyzed the traffic and identified the Internet Protocol (IP) addresses for the sources that were imposing the highest demand on PG&E's website and temporarily blocked some of those IP addresses from accessing the website. PG&E also started to develop plans to move the Generalized Polygon maps and downloadable data files, which as discussed above were impacting

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4 At times on October 8, the failover function was activated and directed users to PG&E's back-up website, PGEalerts.com. But PG&E was unable to load PSPS-related content onto PGEalerts.com because the site did not scale up as quickly as necessary to support additional uploads. To remedy the situation, as discussed below, PG&E set up a temporary website later that day through one of its partners and directed the public to that website.

the website's performance, from PGE.com to other systems that could sustain the load. The IT team also made several more server configuration changes to further improve server performance.

PG&E continued working throughout the evening of October 8 and the morning of October 9 to further stabilize the website. Among other things, PG&E partnered with Second Watch, the vendor that services PGEalerts.com and its Critical Web Outage Map tool in Amazon Web Services (AWS), to analyze performance bottlenecks and implement solutions to boost functionality.[5] Further, the Company deployed a new webpage hosted in AWS for its Public Safety Partners and moved their designated PSPS file download to a cloud-based infrastructure to further boost performance.

PG&E also capitalized on its standing partnerships with other vendors and state actors. For example, the Company worked with its vendor Environmental Systems Research Institute (ESRI), an international supplier of geographic information system software and database management, to set up a temporary webpage to host the Website PSPS Maps that showed a rough approximation of impacted areas. PG&E posted shape maps and PSPS-related content directly onto the ESRI site, and pointed the public to that website through social media and other efforts.

Because the Address Look-up Tool was unavailable, PG&E worked with ESRI to make sure the ESRI website incorporated an address-checking function as well—albeit based on the Generalized Polygon Maps, not the specific address function that was available through PG&E's original website. The set up was completed by Wednesday afternoon, October 9. By that evening, PG&E had largely stabilized the ESRI website and users were able to consistently access its content. Importantly, this website remained available throughout the event, and the users who utilized it were not counted within the nearly 3 million unique visitors who successfully visited PGE.com.

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5 AWS is a secure cloud based services platform, offering computing power, database storage, content delivery and other functionality.

PG&E acknowledges that the inaccessibility and performance issues with PGE.com leading up and during the start of the PSPS event created hardship for its customers. However, PG&E worked promptly to address those issues and to restore access to the website as soon as possible. As a result of these efforts, PG&E records show that during the October 9-12 event, PGE.com and the ESRI website served millions of customers and other stakeholders, notwithstanding the website's temporary inaccessibility.

c. PG&E's Website Today

Since the October 9-12 PSPS event, PG&E has continued its efforts to improve the stability of its website and to supplement its back-up systems. For example, PG&E has moved the load related to its website's three core information sources—maps and downloads of the affected areas, the Address Look-up Tool, and power restoration information—to a web-based cloud in AWS. Because these functions are now hosted in a cloud-based server, all three functions can be scaled to meet the demand regardless of how much traffic the website experiences. Indeed, within a week of the event, the Company had tested all three functions to volumes that far exceeded the peak load it experienced during the October 9-12 PSPS event, and the website was able to handle that level of traffic.

Additionally, since the event, PG&E has started using a content delivery network (CDN) to reduce the load from its system and offer faster, higher quality experience to users. CDN is a large network of servers that accelerates the delivery of website's content by leveraging geographically distributed network of specialized servers. To meet its CDN needs, PG&E has partnered with Akamai, one of the world's largest content distribution networks, that span more than 216,000 servers in over 120 countries and more than 1,500 networks around the world.[6]

Further, PG&E now has a policy of stress-testing its website as part of any pre-event preparation. As part of this process, the website is

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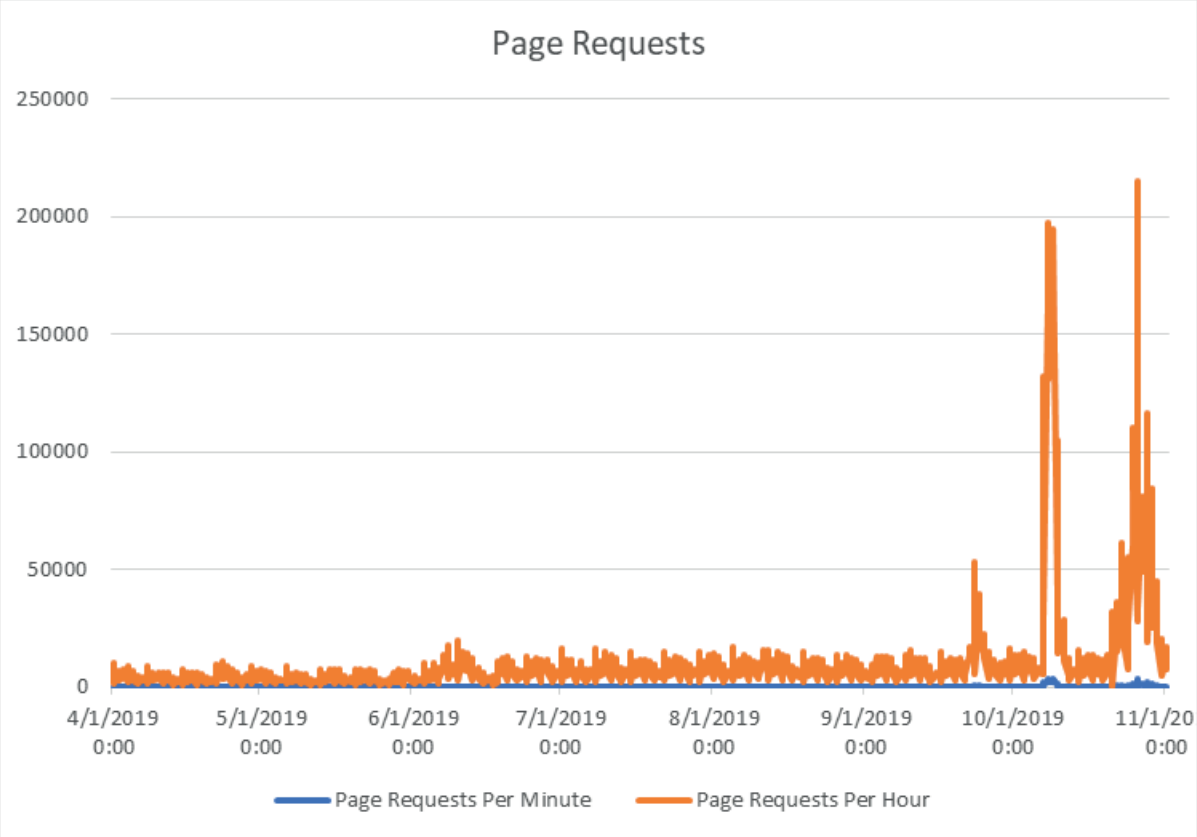
6 https://www.akamai.com/us/en/resources/content-distribution-network.jsp.

subjected to high load volumes to monitor its performance so that any kinks can be resolved before the event.

The remainder of 2019 proved that these efforts were successful. Within days of the October 9-12 PSPS event, PGE.com experienced 215,340 page requests per hour, which was the highest number of page requests the website had experienced all year—roughly 20,000 more page requests per hour than the October 8 peak. Despite this jump, the website scaled to meet the traffic and continued to make information available to customers and Public Safety Partners.

FIGURE 4-5
PAGE REQUESTS PER HOUR APRIL THROUGH NOVEMBER 1, 2019



Moving forward, PG&E also has plans to develop an entire new website that is solely dedicated for weather events and PSPS events. In sum, PG&E's website is now stronger than ever, and its three core functions are now scalable to meet the demand.

C. PG&E'S Secure Data Transfer Portal (Testimony of Rajesh Arora)

The CPUC's OSC Scoping Memo states that, with respect to the October 9-12 PSPS event, "PG&E's secure data transfer portal was inaccessible [to] its Public Safety Partners during portions of the PSPS [event]." In fact, however, PG&E has no evidence to suggest that its secure data transfer portal was generally inaccessible during the October 9-12 PSPS event. It is true that, when the PGE.com website went down, users who attempted to access the portal through the PGE.com website were at times unable to reach it. During all of that time, however, users who used a separate, portal-specific link that PG&E provided its Public Safety Partners were able to access it.

1. The ESFT Portal

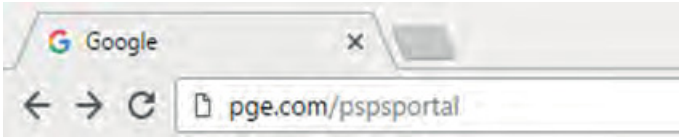
PG&E knows that de-energization events can create hardships and risks for communities. Cooperation among PG&E, state agencies, local governments, and providers of critical services is essential to minimizing both the risks and the disruption to customers. To facilitate this cooperation, PG&E has offered certain partners access to an Enterprise Secure File Transfer portal (the "ESFT Portal") that can be used to share certain PSPS-related information. The ESFT Portal is an independent platform dedicated to secure transfer of event-specific (and other) data that is not provided to the general public via the PGE.com website. In a PSPS event, the ESFT Portal has outage area maps, as well as data on certain categories of impacted customers that counties can use to support their communities.

Like many sources of information on the Internet, there are multiple ways to access the information stored on the ESFT Portal. One way is to go directly to what could be called the "ESFT address," at https://esft.pge.com. At that address, users are prompted to enter login credentials that PG&E had provided them, and can log in and access the information associated with their account.

The second way to access the ESFT Portal is to go through what could be called the "PGE.com address," at https://pge.com/pspsportal, which is an ESFT Portal-specific path via PG&E's website. The portal's PGE.com address is, in ordinary circumstances, identical to the ESFT address. Users who type in the PGE.com address will notice that their web browsers in fact

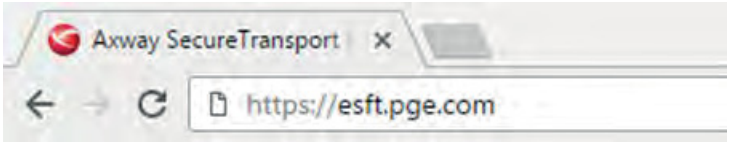
automatically redirect and take them to the ESFT address. That is, a user who enters this address:

FIGURE 4-6
PGE.COM ADDRESS



Will soon see the following on his or her screen:

FIGURE 4-7
ESFT ADDRESS



This automatic redirection was true during the October PSPS events and is true today. The two paths lead to the same ESFT Portal; the difference is that one address goes to the portal directly and the other routes through the PGE.com website. The Company offered the PGE.com address because it found that users often find it convenient for information on similar topics to be identified by similar addresses. For example, PGE.com/pspsportal fits in with other parts of PG&E's website such as PGE.com/pspsupdates and PGE.com/pspsweather. Thus, PG&E often

provided the PGE.com link to users in the workshops that were conducted in 18 counties during the June through August 2019 period.[7]

2. Access to the ESFT Portal During the October 9 Event

PG&E has investigated the October 9 PSPS event and has not discovered any evidence of an outage to the ESFT Portal that rendered it generally inaccessible. If there had been such an outage, PG&E personnel responsible for the data transfer portal would have been informed or would be able to see evidence of the outage in the various technical performance logs that the Company maintains.

It is true, however, that during the time that the PGE.com website was inaccessible, users who typed the PGE.com address into their browsers or clicked on a PGE.com link would, as a technical matter, be routed through the PGE.com website, and that effort to reach the ESFT Portal would have been unsuccessful. During that time, however, users who went directly to the ESFT address would have been able to directly access the ESFT Portal log-in screen.

PG&E recognized that some portal users would use the PGE.com address that was visible in some materials. Accordingly, when the website began having issues on October 8, PG&E's Liaison team—which is responsible for interfacing with the Company's county partners—reached

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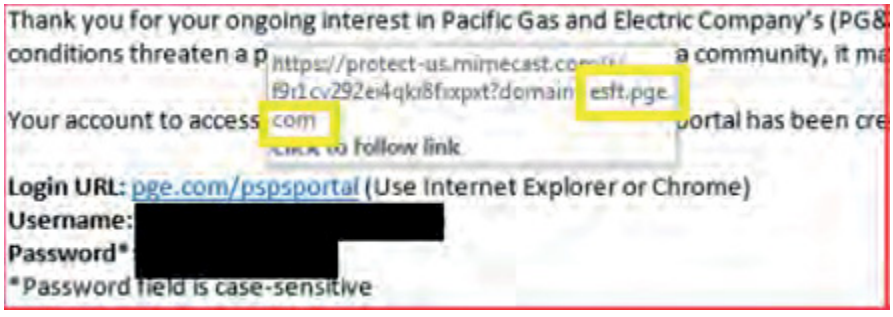
7 This is not to say that users who relied on those materials would necessarily have always gone through the PGE.com address, as opposed to the ESFT address. For example, when the ESFT Portal team emailed credentials and log-in information to new users, the email included what appeared to be a link to the portal's PGE.com address. But users who clicked on that link would in fact automatically go directly to the ESFT address, without passing through PGE.com. You can see this when you "hover over" the link in that email.

FIGURE 4-8
HOVER-OVER EMAIL LINK



out to portal users and specifically directed them to the ESFT address.

PG&E sent an email on October 8 to its county partners, providing 24 hours advance notice of the shutoff, that included the following statement:

> Maps of impacted areas are available on the Public Safety Power Shutoff data transfer portal. If you are having difficulty reaching the portal, there is an alternate website address. Please visit https://esft.pge.com.[8]

PG&E also sent its partners text messages with the ESFT address.[9] Immediately prior to shutting off power on October 9, PG&E sent another message—again, via text and email—pointing portal users to the ESFT address.[10]

D. Conclusion

PG&E acknowledges that its website was unavailable for a portion of the October 9-12, 2019 PSPS event, and this unavailability caused hardship for the Company's customers and the general public. PG&E sincerely regrets its shortcomings in this regard. This testimony demonstrates that PG&E undertook significant efforts both during and after the October 9-12 PSPS event to prepare its website for PSPS events, to address the website outage, to continue to provide relevant information to the public and PG&E's Public Safety Partners, and to ensure the integrity of the website going forward.

In addition, contrary to the OSC's suggestion, PG&E's secure data portal was not inaccessible for any portion of the October 9-12 PSPS event, although some customers may have been affected temporarily if they tried to reach the portal through PGE.com during the time that the website was unavailable.

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8 Exhibit 4B.

9 Exhibit 4B.

10 Exhibit 4C.

PACIFIC GAS AND ELECTRIC COMPANY

CHAPTER 4

EXHIBIT A

ADOBE ANALYTICS

Comparison Of PSPS vs Non PSPS days

PGE Prod - Generated on Jan 16 2020

powered by Adobe Analytics

Comparison Of PSPS vs Non PSPS days

This month
Jan 1 2020 - Jan 31 2020

Comparison Of PSPS vs Non PSPS days

	Oct 4 2019 - Oct 12 2019	Jun 4 2019 - Jun 12 2019
	Unique Visitors	Unique Visitors
Day ⬆ Page: 1 /1 Rows: 400 1-9 of 9	3,794,270 out of 3,794,270	1,208,367 out of 1,208,367
1. Oct 4, 2019	Oct 4 2019 158,924 4.2%	Jun 4 2019 147,560 12.2%
2. Oct 5, 2019	Oct 5 2019 127,879 3.4%	Jun 5 2019 164,606 13.6%
3. Oct 6, 2019	Oct 6 2019 106,730 2.8%	Jun 6 2019 143,347 11.9%
4. Oct 7, 2019	Oct 7 2019 580,885 15.3%	Jun 7 2019 162,965 13.5%
5. Oct 8, 2019	Oct 8 2019 1,221,803 32.2%	Jun 8 2019 177,284 14.7%
6. Oct 9, 2019	Oct 9 2019 1,462,553 38.5%	Jun 9 2019 133,021 11.0%
7. Oct 10, 2019	Oct 10 2019 804,188 21.2%	Jun 10 2019 215,114 17.8%
8. Oct 11, 2019	Oct 11 2019 337,523 8.9%	Jun 11 2019 188,547 15.6%
9. Oct 12, 2019	Oct 12 2019 149,514 3.9%	Jun 12 2019 175,942 14.6%

PACIFIC GAS AND ELECTRIC COMPANY

CHAPTER 4

EXHIBIT B

24-HOURS ADVANCED NOTIFICATION

FOR INTERNAL USE ONLY
UPDATED 10/9/2019

PUBLIC SAFETY POWER SHUTOFF
T-24 HOURS NOTIFICATION (IVR, Email, Text)

	CITY/COUNTY/STATE/TRIBE (SendWordNow)
VOICE	"This is an important safety alert from Pacific Gas and Electric Company, calling on Wednesday, October ninth. Gusty winds and dry conditions, combined with a heightened fire risk, are forecasted in the next twenty four hours and may impact electric service in portions of Kern County. If these conditions persist, P G and E may need to turn off power to local customers for safety. Outages could last for multiple days. Maps of impacted areas are available on the Public Safety Power Shutoff data transfer portal. If you are having difficulty reaching the portal, there is an alternate website address. Please visit h -t -t -p -s colon forward slash forward slash e -s -f -t dot pge dot com. We will continue to monitor conditions and will contact you with further updates. For more information visit p -g -e dot com or call 1, 800, 7, 4, 3, 5, 0, 0, 2. Thank you."
VOICE MESSAGE	**SAME AS VOICE**
EMAIL	**SUBJECT: PG&E Safety Alert: Weather conditions may require a Public Safety Power Shutoff (Notification on October 9)** Gusty winds and dry conditions, combined with a heightened fire risk, are forecasted in the next 24 hours and may impact electric service in portions of Kern County. If these conditions persist, PG&E may need to turn off power to local customers for safety. Outages could last for multiple days. Maps of impacted areas are available on the Public Safety Power Shutoff data transfer portal. If you are having difficulty reaching the portal, there is an alternate website address. Please visit https://esft.pge.com. We will continue to monitor conditions and will contact you with further updates. If we do need to turn off power for safety, we will work to restore power as soon as it is safe to do so. For more information visit pge.com or call 1-800-743-5002. Pacific Gas and Electric Company
TEXT	PG&E Alert: Due to weather forecast PG&E may turn off power on October 10. Visit https://esft.pge.com for maps of impacted areas. More info: pge.com or 1-800-743-5002

4-ExhB-1

Note: For customer messaging (IVR and text) the general guidance around curfew hours is 9PM to 8AM.

PACIFIC GAS AND ELECTRIC COMPANY

CHAPTER 4

EXHIBIT C

4-HOURS ADVANCED NOTIFICATION

FOR INTERNAL USE ONLY
10/8/2019

PUBLIC SAFETY POWER SHUTOFF
T-4-0 HOURS NOTIFICATION (IVR, Email, Text)

	CITY/COUNTY/STATE/TRIBE (SendWordNow)
VOICE	"This is an important safety alert from Pacific Gas and Electric Company, calling on Tuesday, October eighth. To protect public safety, P G and E will be turning off power in portions of your county beginning tomorrow, Wednesday, October ninth. Maps of impacted areas are available on the Public Safety Power Shutoff data transfer portal. If you are having difficulty reaching the portal, there is an alternate website address. Please visit h -t -t -p -s colon forward slash forward slash e -s -f -t dot pge dot com. Power will remain off until weather conditions improve and it is safe to restore service. Outages could last for multiple days. We have been reaching out to customers asking that they prepare emergency plans and supplies. We will continue to keep you updated. For more information visit p -g -e dot com or call 1, 800, 7, 4, 3, 5, 0, 0, 2. Thank you."
VOICE MESSAGE	**SAME AS VOICE**
EMAIL	**SUBJECT: PG&E Safety Alert: Planned Public Safety Power Shutoff (Notification on October 8)** To protect public safety, PG&E will be turning off power in portions of your county beginning tomorrow, Wednesday, October 9. Maps of impacted areas are available on the Public Safety Power Shutoff data transfer portal. If you are having difficulty reaching the portal, there is an alternate website address. Please visit https://esft.pge.com. Power will remain off until weather conditions improve and it is safe to restore service. Outages could last for multiple days. We have been reaching out to customers asking that they prepare emergency plans and supplies. We will continue to keep you updated. For more information visit pge.com or call 1-800-743-5002. Pacific Gas and Electric Company
TEXT	PG&E Alert: To protect public safety, PG&E will turn off power beginning on October 9. Visit https://esft.pge.com for maps of impacted areas. More info: pge.com or 1-800-743-5002

Note: For customer messaging (IVR and text) the general guidance around curfew hours is 9PM to 8AM.

PACIFIC GAS AND ELECTRIC COMPANY

CHAPTER 5

CUSTOMER CONTACT CENTERS

PACIFIC GAS AND ELECTRIC COMPANY
CHAPTER 5
CUSTOMER CONTACT CENTERS

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CHAPTER 5
CUSTOMER CONTACT CENTERS

A. Introduction

My name is Chris Zenner, and I am Senior Director of Customer Service Operations and Support at Pacific Gas and Electric Company (PG&E or the Company). The purpose of this testimony is to explain how PG&E prepared, staffed, and operated its contact centers during the Public Safety Power Shutoff (PSPS) events initiated in October through November of 2019. My testimony will also explain the reasons that PG&E's contact centers experienced a higher than anticipated call volume during the October 9-12 PSPS event, and the steps that PG&E took in response to this issue.

B. Background on Contact Centers

PG&E has operated contact centers for many years. As a general matter, PG&E customers and members of the public call the contact centers for a number of reasons, including to report emergencies, to pay bills or change payment plans, or for general information about their PG&E service or accounts. PG&E also makes automated outbound phone calls to notify customers of planned work or outages as well as occasional live agent outbound calls in certain limited circumstances. Thus, the contact centers have an important function in providing services and information to PG&E customers.

PG&E currently operates four contact centers: two are located in Sacramento, one in San Jose, and one in Fresno. The Sacramento 2740 Gateway Oaks Contact Center operates 24 hours per day, while the Sacramento 2730 Gateway Oaks Contact Center operates Monday through Friday, 8 a.m. to 6 p.m. The Fresno Contact Center operates Monday through Friday, 7 a.m. to 9 p.m. and Saturday 8 a.m. and 6 p.m. The San Jose Contact Center operates Monday through Friday, 7:30 a.m. to 6 p.m. The contact centers are staffed with a total of 900 agents, all of whom are PG&E employees. Altogether, the contact centers receive approximately 19 million calls per year, covering everything from emergencies, such as gas leaks and downed wires, to general customer account issues. Of these 19 million calls, approximately

6.75 million involved contact with a live agent, while the remainder are handled through PG&E's Interactive Voice Response (IVR) system.

C. Preparation for PSPS Events Generally

The contact centers are an integral part of PG&E's broader PSPS plan. Importantly, they provided a regular means of contact for customers making inbound calls to report emergencies or seek information about PSPS. The contact centers also had a role in issuing outbound notifications of PSPS events to potentially affected customers. As Chapter 3 explains, for each PSPS event, the Planning and Intelligence section within the Emergency Operations Center provided the Customer Strategy Officer team and the Customer Contact Emergency Coordination Center (CCECC) with files containing lists of customers within the PSPS event scope. The CCECC routing team loaded these files of customer data for its vendor, Message Broadcast, to push automated e-mail, text, and phone notifications to customers prior to de-energization.

PG&E has historical experience using its contact centers to provide customers with information related to planned outages, including the 2018 PSPS events, as well as emergency events in its service area. However, PG&E was also well aware that the 2019 wildfire season would likely involve the largest planned outage events that the Company had experienced to date. As a result, PG&E undertook extensive efforts to prepare for potential PSPS events in 2019 by forecasting staffing needs, training customer service representatives, and conducting exercises.

Forecasting. PG&E's contact center operations team includes experienced forecasters who leveraged and extrapolated data from the 2018 PSPS events and other high outage situations to assess the Company's needs for contact center staffing during the 2019 PSPS events. Based on prior experience, the Company understood that *outbound* messages typically prompt *inbound* inquiries. For example, if PG&E was going to simultaneously push 600,000 customer notifications for a single event, it would need a proportionate number of customer service representatives available to answer calls from customers in response to those notifications. Leveraging its experience from prior emergency and PSPS events, PG&E is able to model the proportion of customers that are likely to call a contact center for information, as well as the proportion that is

likely to take no action or to self-serve through the PG&E website. Based on these data projections PG&E had confidence in its ability to fully and appropriately staff the contact centers for the 2019 PSPS events.

Training. PG&E also provided extensive training to its customer service representatives to prepare for PSPS events. Between 2018 and 2019, prior to the October 2019 PSPS events, all contact center employees were required to attend several 90- to 150-minute long instructor-led trainings related to the Community Wildfire Safety Program, including two trainings that were specifically focused on preparation for PSPS events. Additionally, throughout 2018 and 2019, the CCECC held dozens of PSPS working sessions to develop, prepare, and test its systems and processes to handle a large volume of customer notifications and communications.

Overtime and Operational Flexibility. PG&E also had various means to leverage its resources, if necessary, to increase the capacity of its contact centers to serve customer needs during PSPS events. Among other measures, PG&E could increase staffing by maximizing overtime for customer service representatives, training agents in other departments to field PSPS calls, and requiring agents to continue working overtime after their shifts had ended. PG&E also had the ability to keep one or more of its contact centers operational for 24 hours a day.

D. Overview of the October 9-12 PSPS Event

The Order to Show Cause alleges that PG&E did not have sufficient staffing at its call center to handle the volume of customer communications during the October 9-12 PSPS event. As discussed below, PG&E believes that it appropriately staffed its contact centers to handle the volume of customer communications anticipated for the October 9-12 PSPS event, but not for the unanticipated surges in call volume caused by the intermittent capacity issues with PG&E's website.

PG&E took a number of steps to ensure that it had sufficient staffing in its contact centers for the October 9-12 PSPS event. PG&E worked to maintain full staffing of the contact centers by, among other things, opening all of the locations, expanding their operating hours, and offering maximum overtime to all 900 customer service representatives, which resulted in staffing that was significantly higher than normal, as well as implementing an IVR option to

prioritize PSPS calls. However, despite these efforts, there were issues outside of the contact centers that led to a multi-factor increase in expected call volume and increased customer wait times on particular dates and times.

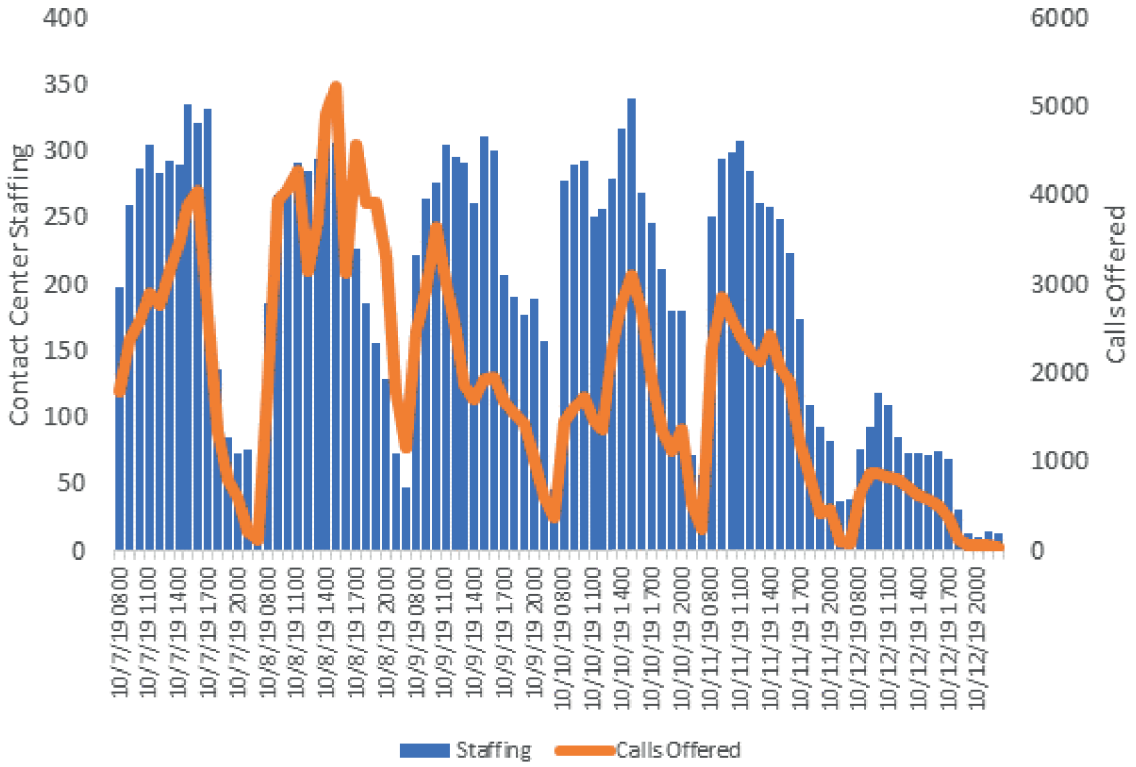
1. Contact Center Staffing

PG&E added substantial overtime capacity in the days leading up to the PSPS event, and during the event itself:

- October 7: 818 hours of overtime added
- October 8: 881 hours of overtime added
- October 9: 2,443 hours of overtime added
- October 10: 2,272 hours of overtime added
- October 11: 2,272 hours of overtime added

PG&E worked to ensure that the contact centers were, if anything, overstaffed in anticipation of the October 9-12 PSPS event. PG&E typically endeavors to staff its contact centers to handle 30-40 percent more calls than it actually expects to receive. Indeed, all of the Company's forecasts, data, and past experience indicated that this level of staffing was higher than what it would need. As depicted in the figure below, PG&E's call center staffing was commensurate to actual call volume.

FIGURE 5-1
CCO STAFFING AND CALL VOLUME



2. Prioritization of PSPS Calls

In addition to this increased staffing, PG&E implemented an IVR menu option to give priority to PSPS calls. As a general matter, when PG&E customers call the contact centers, an IVR menu prompts them to identify the purpose of their call so that the call can be appropriately directed and prioritized. A customer would have the option to press a button to indicate whether he or she is calling about an emergency, an outage, or a billing issue, among other menu options. In anticipation of a PSPS event, PG&E adds another option to its IVR menu for customers to indicate that they are calling about PSPS. For the October 9-12 event, this option was added near the beginning of the IVR menu. Under this system, emergency calls and PSPS calls were prioritized and moved to the front of the queue. This meant that if a customer who indicated he or she was calling about a billing issue was placed on hold for an available agent, and meanwhile, another customer called and indicated that he or she was calling about a PSPS issue, the PSPS customer would receive higher priority and be served first.

This process allowed PG&E to identify and prioritize PSPS calls, and to track average call wait times in real-time. But if a PSPS customer did not respond to the menu prompt or simply pressed “0” to speak to an agent, that caller was placed in the general queue and may have experienced longer wait times.

3. Website Issues

Despite extensive efforts to ensure that its contact centers were fully staffed and PSPS calls given priority, PG&E experienced some challenges with unanticipated surges in call volume. These issues can be traced to the intermittent capacity issues that the website, PGE.com, experienced. The timing of the surges was aligned with outbound customer notifications, which were issued to hundreds of thousands of customers on October 7 and 8. These notifications directed customers to PGE.com to access additional information, including the Address Look-Up tool that customers could use to determine whether their homes and businesses were within the event scope. The notifications also included the phone number for PG&E’s contact centers.

Because the website was unavailable at times in the days before and during the October 9-12 PSPS event, many customers who received notifications could not immediately access information through PGE.com. As a result of the website outages, many customers who would have otherwise self-served by visiting the website instead called the contact centers because they could not access the website at the time they received their notifications. This pattern resulted in a significant and unanticipated volume of calls that exceeded the expectations PG&E had developed based on historical experience.

These issues were compounded by the fact that the website outages meant that the Address Look-Up tool—which customer service representatives themselves relied on to answer questions about whether specific addresses were within the event scope—was intermittently unavailable. When the Address Look-Up tool on the website was unavailable, the customer service representatives did their best to mitigate the customer impact by developing workarounds to determine if a caller was within the PSPS event scope. These workarounds included reviewing lists

of impacted counties to determine if a customer was in an area likely to be de-energized, or asking a customer if he or she had received PSPS event notifications, in which case the customer was likely to be within the event scope. However, these workarounds, which were used to provide customers with the best available information under the circumstances, were more time-consuming than using the Address Look-Up tool, which sometimes resulted in longer customer wait times.

E. Chronology of Contact Center Issues for the October 9-12 Event

The following section provides a detailed chronology of the immediate and specific steps that PG&E took to address the increased call volume and to bring down customer wait times during the October 9-12 PSPS event.

1. Monday, October 7

On October 7, two days before de-energization, PG&E first began to experience an influx of calls after it pushed outbound customer notifications to over 600,000 customers, shortly after 1 p.m. Almost immediately, call volume increased to above-normal levels. PG&E had already maximized voluntary overtime and staffed 49 extra employees. However, at this point, PG&E also invoked mandatory overtime for all contact center employees to assist with customer inquiries, which increased staffing by an additional 278 employees.

At around 7 p.m., PG&E activated special messaging in an IVR to notify customers of a potential PSPS event and extended hold times. The message urged customers calling about matters unrelated to emergencies, outages, or the PSPS event (such as requests to change a payment plan) to call back at a later time. At around 8 p.m., PG&E sent notifications to over 37,000 additional customers that they could be impacted by the PSPS event. The result was an immediate increase in call volume. However, with PG&E's increased staffing, overall wait times were less than 90 seconds on average. At around 8:30 p.m., PG&E removed the special IVR messaging because wait times had become manageable.

On October 7, the overall Average Speed of Answer (ASA) for PSPS callers was 17 seconds. The ASA for emergency callers was five seconds.

2. Tuesday, October 8

On October 8, PG&E had 170 employees on overtime to provide additional staffing starting at 12 a.m. However, the contact centers began to experience above-normal call volume early in the morning. At around 8:30 a.m., PG&E reactivated its IVR messaging. By 9 a.m., call volumes had grown to 92 percent above normal, with an average customer wait time of three minutes. The longest wait time experienced by a PSPS caller was 16 minutes during this timeframe.

At around 11:30 a.m., PG&E pushed outbound customer notifications to nearly 500,000 customers. Within minutes, PG&E activated the PSPS Call Strategy, which blocked normal business calls, so that contact centers only accepted emergency calls and calls from customers impacted by the PSPS event. Over the next hour, PG&E pushed additional notifications to over 50,000 customers. At around 12:45 p.m., PG&E deactivated the PSPS Call Strategy and resumed taking general calls.

Shortly after 4:30 p.m., PG&E pushed outbound customer notifications to over 230,000 customers. At around 5:15 p.m., the Company reactivated the PSPS Call Strategy. By 6 p.m., call wait times for PSPS callers had grown to an average of 11 minutes, with a maximum wait time of 15 minutes. Shortly before 7 p.m., PG&E sent additional outbound notifications to over 500,000 customers, informing them that de-energization was imminent, resulting in another surge of calls.

On October 8, the overall ASA for PSPS callers was 372 seconds. The ASA for emergency callers was five seconds.

3. Wednesday, October 9 – Saturday, October 12

On October 9, PG&E began de-energizing the first group of customers shortly after midnight, and deployed additional contact center staffing of 407 overtime employees throughout the day, starting at 12 a.m. The PSPS Call Strategy remained activated. Despite experiencing call volumes that were nearly 50 percent above normal levels, PG&E maintained an ASA of nine seconds for PSPS callers, even as hundreds of thousands of additional customer notifications were sent and additional groups of customers were de-energized. Likewise, the ASA for emergency callers was four seconds.

On October 10, PG&E deployed additional contact center staffing of 333 overtime employees throughout the day. The PSPS Call Strategy was deactivated shortly after 1 p.m., although PG&E leveraged IVR messaging to advise general business callers of potentially extended wait times. PG&E maintained an ASA of five seconds for PSPS callers, and an ASA of three seconds for emergency callers.

On October 11, PG&E deployed additional contact center staffing of 177 overtime employees throughout the day. PG&E continued to leverage special messaging in its IVR, but the PSPS Call Strategy remained deactivated. PG&E maintained an ASA of five seconds for PSPS callers, and an ASA of three seconds for emergency callers, with no PSPS customer waiting longer than one minute to be answered.

On October 12, PG&E deployed additional contact center staffing of 120 overtime employees until midday. PG&E maintained an ASA of 10 seconds for PSPS callers and five seconds for emergency callers, with no PSPS callers waiting longer than three minutes to be answered. PG&E safely restored customers by approximately 5:45 p.m.

4. Analysis of Staffing and Wait Times

PG&E acknowledges that at certain times before and during the October 9-12 PSPS event, the wait times for customers who called the contact centers were longer than PG&E would have liked its customers to experience. As explained above, PG&E took significant steps—including leveraging historical data to forecast contact center staffing levels, providing extensive advance training to customer service representatives, and increasing contact center location hours and staffing—to prepare for the October 9-12 PSPS event. In addition, as the chronology of the October 9-12 event demonstrates, PG&E took real-time steps to address the wait times through staffing and policy changes. During surges in calls to the contact centers, PG&E invoked mandatory overtime, a seldom-used policy that required customer service representatives to continue working after their shifts had ended. Prior to de-energization, PG&E added IVR messaging to advise general business callers of the potential for prolonged wait times, and urged them to call back later. Shortly afterwards, PG&E activated the PSPS Call Strategy, which only connected calls related to

emergencies, outages, and the PSPS event to a live agent. Meanwhile, general inquiries were handled by the automated telephone system.

During the October 9-12 event, however, the website capacity issues drove a disproportionate volume of calls to the contact centers from customers who otherwise would have self-served online. At times, the influx of calls exceeded 500 percent of normal call volume. In response, PG&E implemented maximum staffing and deployed Credit customer service representatives to support the call volume. In addition, Billing customer service representatives were also prepared to deploy if call volume necessitated.

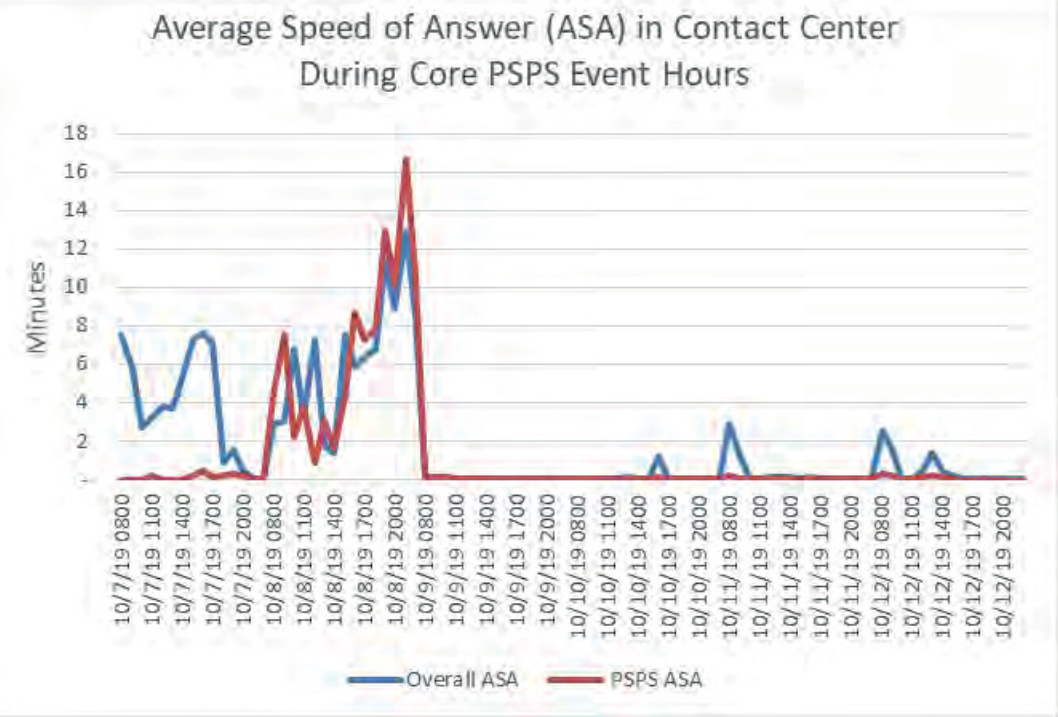
As a result of these efforts, the wait time for a PSPS customer never exceeded 21 minutes in the days before or during the October 9-12 PSPS event. Moreover, after de-energization commenced on October 9, average customer wait times were generally under one minute, as shown in the figures below.

FIGURE 5-2
CONTACT CENTER SERVICE LEVELS

Contact Center Service Levels During PSPS

	Mon 10/7	Tue 10/8	Wed 10/9	Thur 10/10	Fri 10/11	Sat 10/12	Overall
PSPS Max Delay (min)	3	21	14	17	1	3	21 mins
Overall ASA (sec)	290	337	8	11	27	38	140 sec
PSPS ASA (sec)	17	372	9	5	5	10	119 sec
Emergency ASA (sec)	5	5	4	3	3	5	4 sec

FIGURE 5-3
AVERAGE SPEED OF ANSWER IN CONTACT CENTERS



In short, PG&E's real-time efforts to reduce the average wait times for PSPS callers were effective. While customers calling for general business purposes may have experienced extended wait times, PG&E reasonably and timely addressed the unanticipated challenges posed by the intermittent website outages and mitigated the impact on customers affected by the October 9-12 PSPS event.

F. Ongoing Efforts to Improve Contact Center Operations

Beyond the real-time strategies and staffing deployed during the October 9-12 PSPS event, PG&E has undertaken additional efforts to reinforce its contact centers to handle a higher volume of callers. Going forward and during the subsequent PSPS events, PG&E made the decision to leverage the PSPS Call Strategy when an event scales to over 100,000 potentially impacted customers, as needed. Based on staffing resources, PG&E contact centers can handle PSPS events affecting up to 100,000 customers without invoking the PSPS Call Strategy, while still prioritizing PSPS and emergency type calls. To support larger events, PG&E also trained 150 more Credit and Billing customer service representatives to handle PSPS call overflows.

The website team also reinforced the PGE.com website, as described in Chapter 4, which further reduced the burdens placed on contact centers during subsequent PSPS events. As a result, PG&E did not experience issues of call volume exceeding plan in the subsequent October PSPS events.

PG&E has also reinforced the Address Look-Up tool since the October PSPS events. While the contact center operations team was not responsible for the Address Look-Up tool in October, that team has since taken custody of the Address Look-Up tool, and is currently in the process of implementing a technological solution that will allow customers to access the Address Look-Up tool in the IVR when they call into PG&E's contact centers. This approach will provide another avenue for self-service without requiring interaction with a live agent.

G. Conclusion

While PG&E contact centers experienced some challenges with managing call volume, PG&E implemented multiple real-time staffing and policy solutions that kept average customer wait time to a reasonable level. Further, PG&E took a number of proactive measures to reinforce its contact centers' capacity to handle customer inquiries, including a combination of staffing and technological solutions. Following the October 9-12 event, and after the website was stabilized, PG&E experienced no further issues with the volume of calls to its contact centers during subsequent PSPS events. Thus, PG&E's contact centers appear to be well-positioned to respond to large-scale PSPS events in the future.

PACIFIC GAS AND ELECTRIC COMPANY

CHAPTER 6

PUBLIC SAFETY POWER SHUTOFF MAPS

PACIFIC GAS AND ELECTRIC COMPANY
CHAPTER 6
PUBLIC SAFETY POWER SHUTOFF MAPS

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PACIFIC GAS AND ELECTRIC COMPANY
CHAPTER 6
PUBLIC SAFETY POWER SHUTOFF MAPS

A. Introduction

My name is Shawn Holder, and I am the Manager of Emergency Management and Public Safety at Pacific Gas and Electric Company (PG&E). The purpose of this testimony is to explain the development of event-specific maps that provided information regarding the areas that PG&E expected to de-energize for public safety during Public Safety Power Shutoff (PSPS) events, and to address the allegation in the Order to Show Cause (OSC) scoping memo that certain PSPS maps were inaccurate during the October 9-12, 2019 PSPS event.

As discussed below, to the best of my knowledge, none of the event-specific PSPS maps that PG&E provided were inaccurate, as they at all times conformed to the specifications that governed their creation and accurately depicted what they were designed to depict.[1]

B. PSPS Maps

There are two primary types of event-specific maps that PG&E has developed for PSPS events: the "Buffered Circuit" map and the "Generalized Polygon" map.

1. The Buffered Circuit Map

The "Buffered Circuit" maps are an operational tool that was developed for PSPS events to reflect de-energized PG&E assets. Specifically, the Buffered Circuit maps show, at a circuit-by-circuit level, the primary electric distribution lines that PG&E expects to de-energize, plus a 100-foot "buffer" on either side of the line that is meant to reflect the circuit sections that will be impacted in the immediately adjacent areas.

Figure 6-1 is an example of a Buffered Circuit map from the October 26, 2019 PSPS event, with this example taken from the El Dorado County area:

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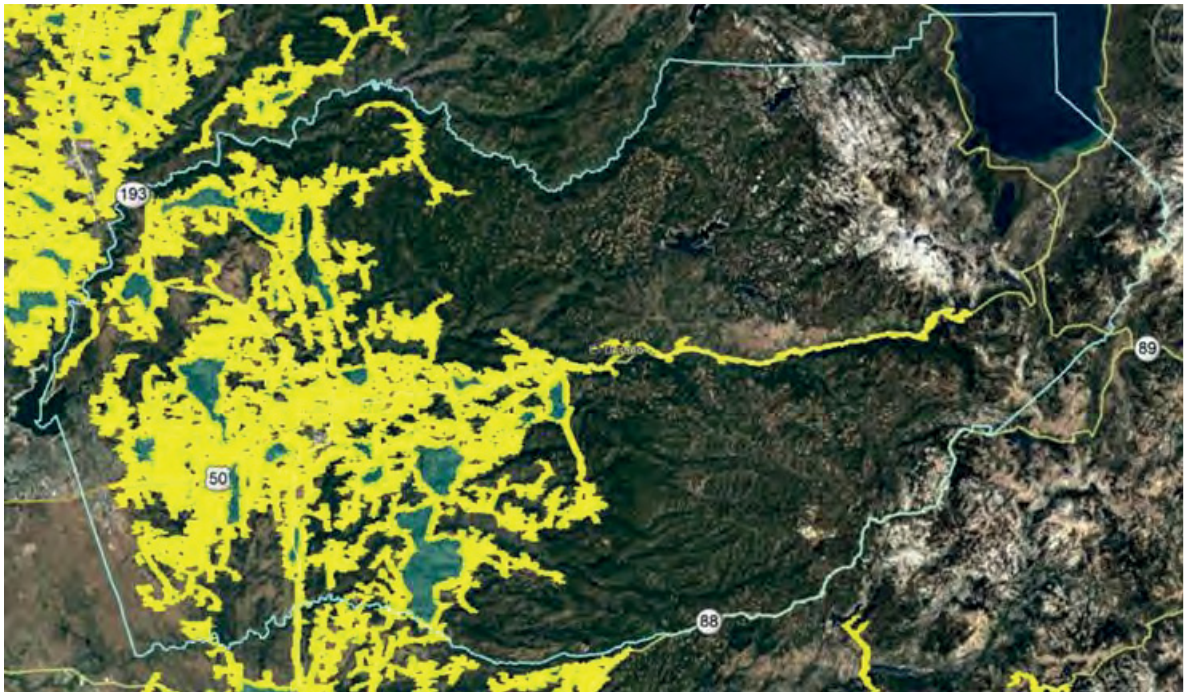
[1] The OSC also suggests that maps "were unavailable for some affected areas" on the PG&E website. This issue is addressed in Chapter 4 related to the PG&E website.

FIGURE 6-1
EL DORADO BUFFERED CIRCUITS MAP



As Figure 6-1 shows, the Buffered Circuit maps provide a high level of granularity regarding the particular lines that may be de-energized. However, these maps do not and are not intended to depict the effect of de-energization on particular homes or businesses. This is in part because the buffer surrounding each circuit in these maps is set at 100 feet, when in fact circuits may extend to homes and businesses that are outside of the 100-foot "buffer." In other words, the Buffered Circuit maps are not designed to show the boundaries of a PSPS event, but to show the particular circuit lines that are being de-energized so that PG&E can identify the specific *PG&E assets* that will be impacted.

The geospatial depictions of impacted PG&E assets that Buffered Circuit maps provide are a valuable operational tool for PG&E leading up to and during PSPS events. For example, in advance of PSPS events, the Buffered Circuit maps help PG&E minimize the potential impact by facilitating a manual review of the PG&E assets potentially in the footprint of the forecasted weather event. In some instances, after manual review, PG&E may be able to determine that certain assets that initially appeared to require de-energization can safely remain energized. Similarly, once a

PSPS event is underway, a geospatial depiction of the specific PG&E assets impacted helps facilitate efficient post-event line patrols by allowing both the Emergency Operations Center and PG&E field units to identify the impacted assets, determine where resources will need to be deployed, and develop work plans to inspect the de-energized lines once the weather event has ended. Efficiently conducting post-event line patrols helps PG&E ensure that power is restored as quickly as possible after an event, consistent with the purpose of PSPS events—to prevent catastrophic wildfires.

In addition to these internal uses, PG&E also shares these circuit level maps with its Public Safety Partners during each PSPS event, so that they are able to see where the affected circuits are located as they implement their own responses. The Buffered Circuit maps, however, were not developed to be shared with the public, and PG&E did not publish these maps on its website.

2. The Generalized Polygon Map

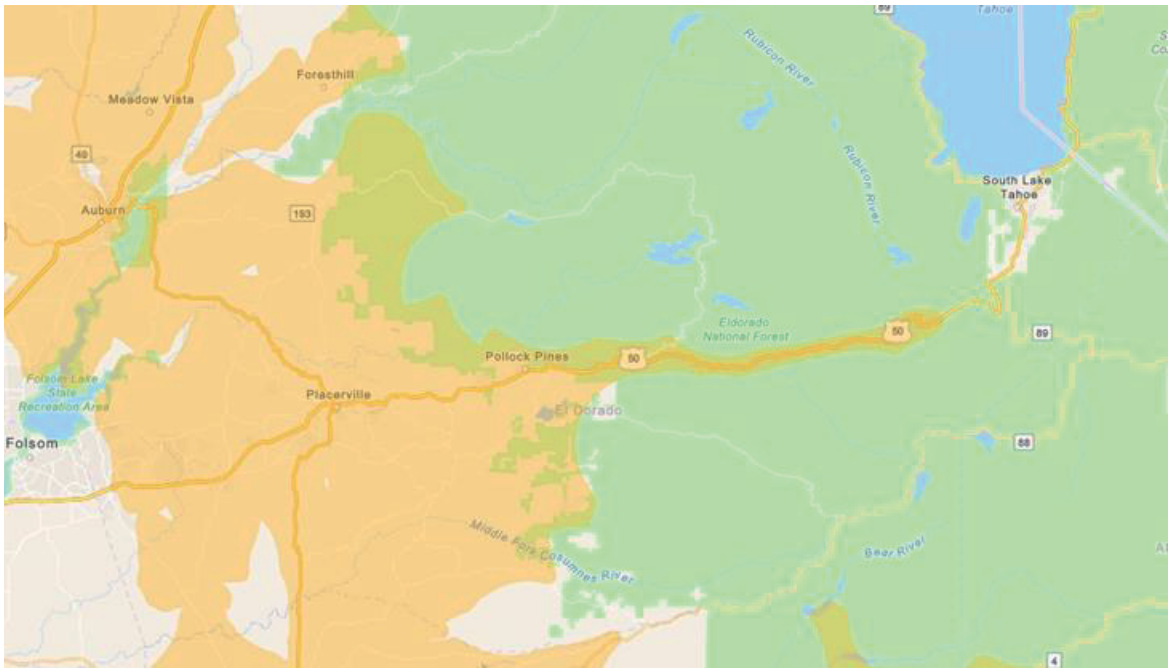
The second primary event-specific set of maps that were created can be described as "Generalized Polygon" maps. Unlike the operational Buffered Circuit maps, which merely track the PG&E circuits that will be de-energized (and their 100-foot "buffer"), the Generalized Polygon maps try to approximate, using geometric contours, the area potentially affected by de-energizing those lines. PG&E developed the Generalized Polygon maps in response to discussions with the Governor's Office of Emergency Services (Cal OES) and other utilities. After viewing PG&E's Buffered Circuit maps, Cal OES requested that PG&E create and provide the agency with a different kind of map that would provide a broader overview of the areas that may be affected by de-energization.

Importantly, PG&E met with Cal OES and others regarding the nature of the maps that Cal OES desired. During the course of these meetings, Cal OES indicated that Southern California Edison Company (SCE) already had a methodology for generating impact maps by overlaying generalized polygons to approximate potential outage areas, and suggested that PG&E implement the same methodology. At a high level, under SCE's approach, the shape of the polygon overlays are determined by drawing a rough shape, using smooth contours, around the areas of the affected circuits—

that is, not tracing assets, but capturing areas. Following those meetings, SCE provided the specifications it had used in developing this Generalized Polygon approach that Cal OES had referred to.

PG&E implemented the polygon map methodology based on SCE's methodology. Figure 6-2 is the Generalized Polygon map of approximately the same area of El Dorado County from the same October 26, 2019 PSPS event:

FIGURE 6-2
EL DORADO GENERALIZED POLYGON MAP



These Generalized Polygons that Cal OES requested provided an overview of the *general areas* that could be affected by PSPS events, but did not—and were not intended to—capture the precise de-energization status of a particular house or building.

As it pertains to this OSC, the scoping memo states, in connection with the October 9-12 PSPS event, that "[t]o the extent the website was functioning, the online maps were not accurate." PG&E disagrees with that statement, as the Generalized Polygon maps depicted what they were intended to depict—namely, an overview of the *general areas* that could be affected by PSPS events—and were developed in accordance with the specifications that PG&E discussed with Cal OES and others. The

Generalized Polygon maps did not identify—and were not intended to identify—whether a particular house or business would be subject to de-energization. PG&E's Address Look Up tool is the best way to determine such specific information.[2]

C. Conclusion

For the reasons discussed above, PG&E respectfully disagrees with the OSC's allegation that the maps provided on its website were inaccurate. At all times, PG&E's maps conformed to the specifications that governed their creation and accurately depicted what they were designed to depict.

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[2] PG&E recognizes that some customers may have been confused because the Generalized Polygon maps did not always match the information provided in the Address Look Up tool. PG&E's decision to include the Generalized Polygon maps on the website is addressed in Chapter 4 of this testimony.

PACIFIC GAS AND ELECTRIC COMPANY

APPENDIX A

STATEMENTS OF QUALIFICATIONS

PACIFIC GAS AND ELECTRIC COMPANY
STATEMENT OF QUALIFICATIONS OF MEGAN ARDELL

Q 1 Please state your name and business address.

A 1 My name is Megan Ardell, and my business address is Pacific Gas and Electric Company, 245 Market Street, San Francisco, California.

Q 2 Briefly describe your responsibilities at Pacific Gas and Electric Company (PG&E).

A 2 I am Senior Director of Local Customer Experience. I am responsible for leading an organization of approximately 130 customer service professionals serving our customers in their local communities. The team is focused on supporting operational teams achieve positive customer experiences. We do that through customer engagement and in-field marketing and education about PG&E's safety and reliability work. In addition, the Local Customer Experience team manages relationships with third party energy service providers and economic development organizations to support local community vitality throughout our service territory.

Q 3 Please summarize your educational and professional background.

A 3 I received a Bachelor of Business Administration degree from the University of San Diego in 2000 and a Master's of Business Administration degree from the Haas School of Business at UC Berkeley in 2012. I joined PG&E in June 2000 and have served as Manager of Customer Impact from 2012 to 2013 and Director of Customer Impact from 2014 to 2017. I assumed my current role at PG&E in 2017.

Q 4 What is the purpose of your testimony?

A 4 I am co-sponsoring Chapter 3, "Customer Notification."

Q 5 Does this conclude your statement of qualifications?

A 5 Yes, it does.

PACIFIC GAS AND ELECTRIC COMPANY
STATEMENT OF QUALIFICATIONS OF RAJESH ARORA

Q 1 Please state your name and business address.

A 1 My name is Rajesh Arora, and my business address is Pacific Gas and Electric Company, 77 Beale Street, San Francisco, California.

Q 2 Briefly describe your responsibilities at Pacific Gas and Electric Company (PG&E).

A 2 I am Senior Director, Applications within the Information Technology (IT) organization at PG&E.

Q 3 Please summarize your educational and professional background.

A 3 I received a Bachelor of Engineering from Punjab Engineering College in 1992, a Master's of Business Administration from Panjab University in 1994, and a Master's in Management Information Systems from Louisiana State University and Agricultural and Mechanical College in 1997. I also participated in the Six Sigma Black Belt Program at The Ohio State University's Max M. Fisher College of Business in 2005, as well as the General Management Program at Harvard Business School in 2013. I joined PG&E in 2001 and have held a number of positions of increasing responsibility, including Manager of Integrated Planning from 2008 to 2009, Senior Manager of Utility Systems from 2009 to 2011, IT Director from 2011 to 2018, and Senior Director within the IT organization from 2018 onward. I assumed my current role at PG&E in 2019.

Q 4 What is the purpose of your testimony?

A 4 I am co-sponsoring Chapter 4, "Website and Secure Data Portal."

Q 5 Does this conclude your statement of qualifications?

A 5 Yes, it does.

PACIFIC GAS AND ELECTRIC COMPANY
STATEMENT OF QUALIFICATIONS OF LORI GEOFFROY

Q 1 Please state your name and business address.

A 1 My name is Lori Geoffroy, and my business address is Pacific Gas and Electric Company, 77 Beale Street, San Francisco, California.

Q 2 Briefly describe your responsibilities at Pacific Gas and Electric Company (PG&E).

A 2 I am Director of Digital Strategy, Customer Care at PG&E. I am responsible for the customer experience on pge.com and oversee content, design, functionality and web analytics for the web site.

Q 3 Please summarize your educational and professional background.

A 3 I received a Bachelor of Science degree in Marketing and International Business from the Rochester Institute of Technology in 1997 and a Master of Business Administration degree from The George Washington University School of Business in 2002. I also attended the University of Idaho Utility Executive Course in 2015. I have worked in marketing for a number of companies including Gap Inc., AOL, Kodak and Revolution Health. I joined PG&E in 2013 as the Director of Digital Strategy in the Customer organization and have been in that role since.

Q 4 What is the purpose of your testimony?

A 4 I am co-sponsoring Chapter 4, “Website and Secure Data Portal.”

Q 5 Does this conclude your statement of qualifications?

A 5 Yes, it does.

PACIFIC GAS AND ELECTRIC COMPANY
STATEMENT OF QUALIFICATIONS OF SHAWN HOLDER

Q 1 Please state your name and business address.

A 1 My name is Shawn Holder, and my business address is Pacific Gas and Electric Company, 245 Market Street, San Francisco, California.

Q 2 Briefly describe your responsibilities at Pacific Gas and Electric Company (PG&E).

A 2 I am Manager of Emergency Management and Public Safety. I am responsible for overseeing development of tools and processes used for planning and execution of the Public Safety Power Shutoff program.

Q 3 Please summarize your educational and professional background.

A 3 I received a Bachelor of Science degree in Electrical Engineering from the University of Idaho in 2003; a Master's degree in Electrical Engineering from the University of Idaho in 2011, and a certificate in Strategic Decision and Risk Management from Stanford University in 2013. At PG&E, I have served as Senior Protection Engineer from 2008 to 2013 and Risk Management Principal from 2013 to 2018. I assumed my current role in 2018. Prior to PG&E, I held a number of electrical engineer positions at Avista, Ebara Cryodynamics, SEL, and Lee & Ro, Inc.

Q 4 What is the purpose of your testimony?

A 4 I am co-sponsoring Chapter 3, "Customer Notification" and sponsoring Chapter 6, "Public Safety Power Shutoff Maps."

Q 5 Does this conclude your statement of qualifications?

A 5 Yes, it does.

PACIFIC GAS AND ELECTRIC COMPANY
STATEMENT OF QUALIFICATIONS OF AARON JOHNSON

Q 1 Please state your name and business address.

A 1 My name is Aaron Johnson, and my business address is Pacific Gas and Electric Company, 245 Market Street, San Francisco, California.

Q 2 Briefly describe your responsibilities at Pacific Gas and Electric Company (PG&E).

A 2 I am Vice President (VP) of the Customer Energy Solutions organization, responsible for the company's portfolio of demand-side customer solutions. Since February 2018, I have been on special assignment in PG&E's Electric Operations organization, working on a series of wildfire mitigation programs.

Q 3 Please summarize your educational and professional background.

A 3 I received a Bachelor of Science degree in Optical Engineering from the University of Rochester in 1994 and a Master's degree in Electrical Engineering from the University of New South Wales in Sydney, Australia in 1997. I worked at the California Public Utilities Commission from 1999 to 2008, which included serving as an energy policy advisor to a Commissioner from 2002 to 2006, and as deputy director of Ratepayer Advocates from 2006 to 2008.

I joined PG&E in 2008 as director of Renewable Energy Policy and Strategy, served as Director of Renewable Resource Development in Energy Procurement from 2011 to 2013 overseeing the development of generation assets. I became Senior Director of Customer Programs in Customer Care in 2013, Senior Director of Customer Energy Solutions in 2014, and VP of Customer Energy Solutions in 2015. As noted above, I have been on special assignment in PG&E's Electric Operations organization working on a series of wildfire mitigation programs since February 2018.

Q 4 What is the purpose of your testimony?

A 4 I am sponsoring Chapter 1, "Policy and Overview."

Q 5 Does this conclude your statement of qualifications?

A 5 Yes, it does.

PACIFIC GAS AND ELECTRIC COMPANY
STATEMENT OF QUALIFICATIONS OF MARK QUINLAN

Q 1 Please state your name and business address.

A 1 My name is Mark Quinlan, and my business address is Pacific Gas and Electric Company, 77 Beale Street, San Francisco, California.

Q 2 Briefly describe your responsibilities at Pacific Gas and Electric Company (PG&E).

A 2 I am Senior Director of Emergency Preparedness and Response. I am responsible for overseeing PG&E's preparation for and response to emergencies such as storms, wildfires, earthquakes, and Public Safety Power Shutoff events that affect customers and utility service in PG&E's service territory.

Q 3 Please summarize your educational and professional background.

A 3 I received a Bachelor's degree in Professional Studies in Organizational Leadership from Roosevelt University in 2012. I worked at Commonwealth Edison Company in Chicago, Illinois from 1991 to 2013 where I held a number of roles, including Manager of Distribution System Operations and Director of Environmental, Health & Safety. I joined PG&E in 2014 as the Director of System Operations & Control within the Electric Distribution Operations organization. From 2017 to 2019, I was the Director of Transmission Grid Operations within the Electric Transmission Operations organization. I assumed my current role in September 2019.

Q 4 What is the purpose of your testimony?

A 4 I am sponsoring Chapter 2, "Public Safety Power Shutoff Event Preparation and Emergency Operations Center Decisionmaking."

Q 5 Does this conclude your statement of qualifications?

A 5 Yes, it does.

PACIFIC GAS AND ELECTRIC COMPANY
STATEMENT OF QUALIFICATIONS OF CHRIS ZENNER

Q 1 Please state your name and business address.

A 1 My name is Chris Zenner, and my business address is Pacific Gas and Electric Company, 2740 Gateway Oaks Drive, Sacramento, California.

Q 2 Briefly describe your responsibilities at Pacific Gas and Electric Company (PG&E).

A 2 I am the Senior Director of PG&E's Contact Center Operations and Customer Service Offices. I am responsible for overseeing PG&E's four contact centers, our workforce management team, as well as PG&E's 75 local offices. My team consists of roughly one thousand IBEW represented customer-facing employees as well as nearly one hundred management employees.

Q 3 Please summarize your educational and professional background.

A 3 I received a Bachelor of Science degree in Government from St. John's University in 1991. I joined PG&E in 2013 and have served as Director of Customer Service Offices from 2013 to 2016 and Director of Contact Center Operations from 2016 to 2019. I assumed my current role at PG&E in 2019.

Q 4 What is the purpose of your testimony?

A 4 I am sponsoring Chapter 5, "Customer Contact Centers."

Q 5 Does this conclude your statement of qualifications?

A 5 Yes, it does.