



# Root Cause Analyses

## *2017-18 Wildfires*

Root Cause Analyses of the 2017-18 Wildfires found to have been ignited by PG&E & Corrective Action Report

Conducted under CPUC OII #7 for:

California Public Utilities Commission Safety Policy Division  
& PG&E

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# I. REPORT SUMMARY

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## BACKGROUND

On the evening of October 8, 2017, a series of 17 wildfires began in the North Bay region of California. The California Department of Forestry and Fire Protection (CAL FIRE) and the California Public Utilities Commission (CPUC) later determined that 16 of the fires were ignited by PG&E electricity system equipment, while the largest and most destructive wildfire, Tubbs, was found to be ignited by another entity. On November 8, 2018, the Camp Fire started and went on to become the most destructive wildfire then in California history. CAL FIRE and the CPUC determined that it was ignited by PG&E equipment.

In January 2019 PG&E declared bankruptcy due to the costs associated with these fires. In 2020, the CPUC considered PG&E's petition to emerge from bankruptcy leading to the Commission's Wildfire Order Instituting Investigation (OII). In that order PG&E and the CPUC agreed to a series of follow-up actions intended to mitigate the risk of future wildfires. The seventh item on that list was to hire an independent firm to undertake a Root Cause Analysis (RCA) of each of the 17 wildfires ignitions to "identify gaps that can be closed in order to reduce the risk of future catastrophic wildfires."

The CPUC staff directed PG&E to identify three qualified firms from which the CPUC staff would select one. PG&E identified about 18 firms and requested formal proposals from a subset. Three were recommended to the CPUC staff, who interviewed each. As a result, Envista Forensics, based in Atlanta, was selected. The RCA Team included Witt O'Brien's, a global crisis and emergency management firm, as the prime subcontractor.

The project scope included the following:

- Conduct Root Cause Analyses for each of the 17 wildfire ignitions, including identification of physical, procedural, operational, management, and organizational issues that may have contributed to the ignitions.<sup>1</sup> The scope of this review was limited to events leading up to November 2018.
- Identify areas where the CPUC's General Orders could be updated.

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<sup>1</sup> Identification of contributions to cause of the fire incidents:

- PHYSICAL is normally related to equipment failure caused by physical reasons.
- PROCEDURAL is directly related to non-adherence to procedures, lack of procedure, procedure deficiency and/or incorrect procedure.
- OPERATIONAL is related to system deficiencies because of flawed design standards or standards that do not adhere to generally accepted engineering practices.
- MANAGEMENT identifies deficiencies associated with lack of management visibility, well defined performance metrics, training requirements, support for employee questioning attitude, hazard recognition, effective corrective action, peer benchmarking, high turnover, and clear expectation for compliance.
- ORGANIZATIONAL relates to unclear chain of command, compartmentalization, lack of inter-departmental communication, organizational flux, conflicting goals, and external factors.

- Evaluate whether PG&E's Public Safety Power Shutoff (PSPS) process would have effectively reduced the likelihood of the 2017 fires.
- Evaluate the incorporation of the California High Fire-Threat Districts into PG&E's risk-reduction planning.
- Provide an overview, without findings or recommendations, of other factors contributing to the wildfires.

The content of this report includes evaluation of overall performance, and a narrowed focus on specific items of inquiry that appeared to offer the greatest potential for improving utility performance. This evaluation method inherently emphasizes the negatives. PG&E employees and contractors conduct millions of operations without incident every day. In October 2017, the company was operating over 3,000 circuits; less than 20 of them led to wildfire ignitions.

## **ROOT CAUSE ANALYSIS**

Root Cause Analysis (RCA) is a process for identifying the basic or contributing causal factors that underlie variations in performance associated with adverse events. These are the most fundamental causes that can reasonably be identified, that management has control to fix, and when fixed, will prevent, or significantly reduce the likelihood of, the problem's recurrence.<sup>2</sup>

### **Methodology**

A traditional forensic analysis focuses on the physical evidence thought to be involved in the incidents. No physical evidence was available for this RCA. It has been nearly five years since the 2017 wildfires; many of the PG&E employees involved in the incidents are no longer with the company.

The RCA Team requested unredacted versions of the reports on the fires from CAL FIRE, the CPUC Safety Enforcement Division (CPUC-SED) and PG&E. The RCA Team received the CAL FIRE and CPUC reports. The RCA Team requested, received, and reviewed thousands of pages of documents and data reports from PG&E but did not have access to PG&E's internal analyses and conclusions of the wildfire ignitions.

Given these limitations, the RCA team developed methodologies to determine the root cause of the ignitions:

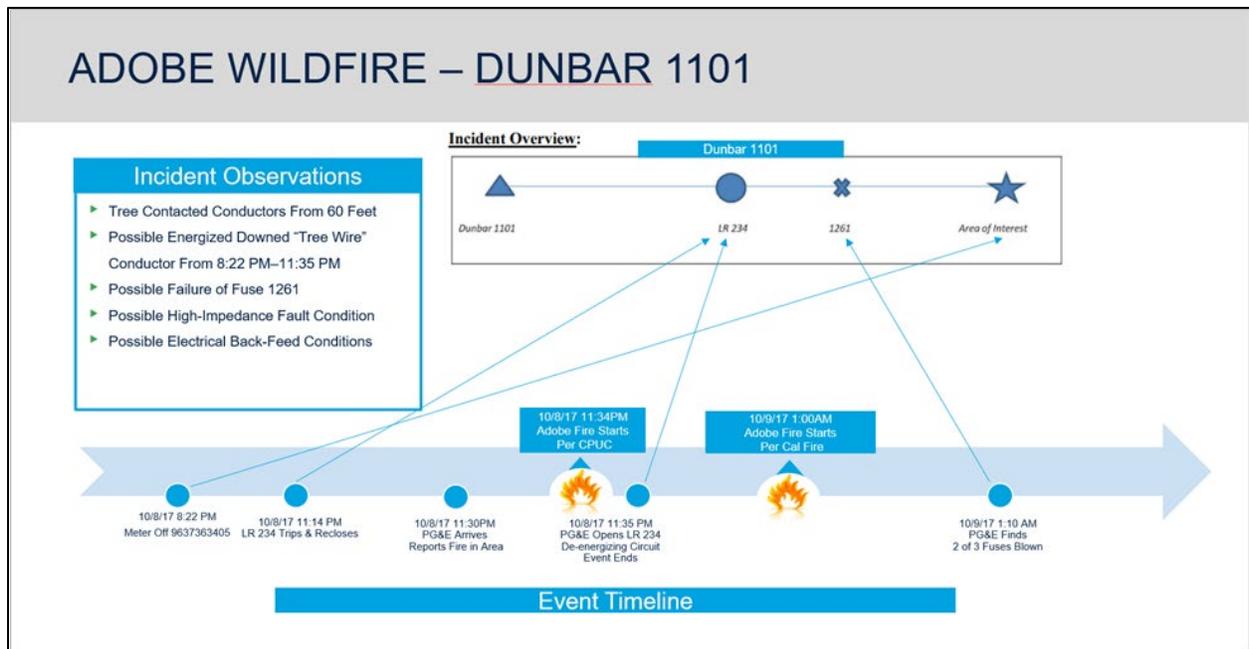
Vegetation management specialists reviewed the reports from CAL FIRE and CPUC SED as well as other public sources. They requested and reviewed significant documentation from PG&E management and interviewed personnel and contractors. They developed their own conclusions about the root causes related to vegetation and trees involved in the ignition incidents.

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<sup>2</sup> TAPROOT Systems Improvements, Inc.

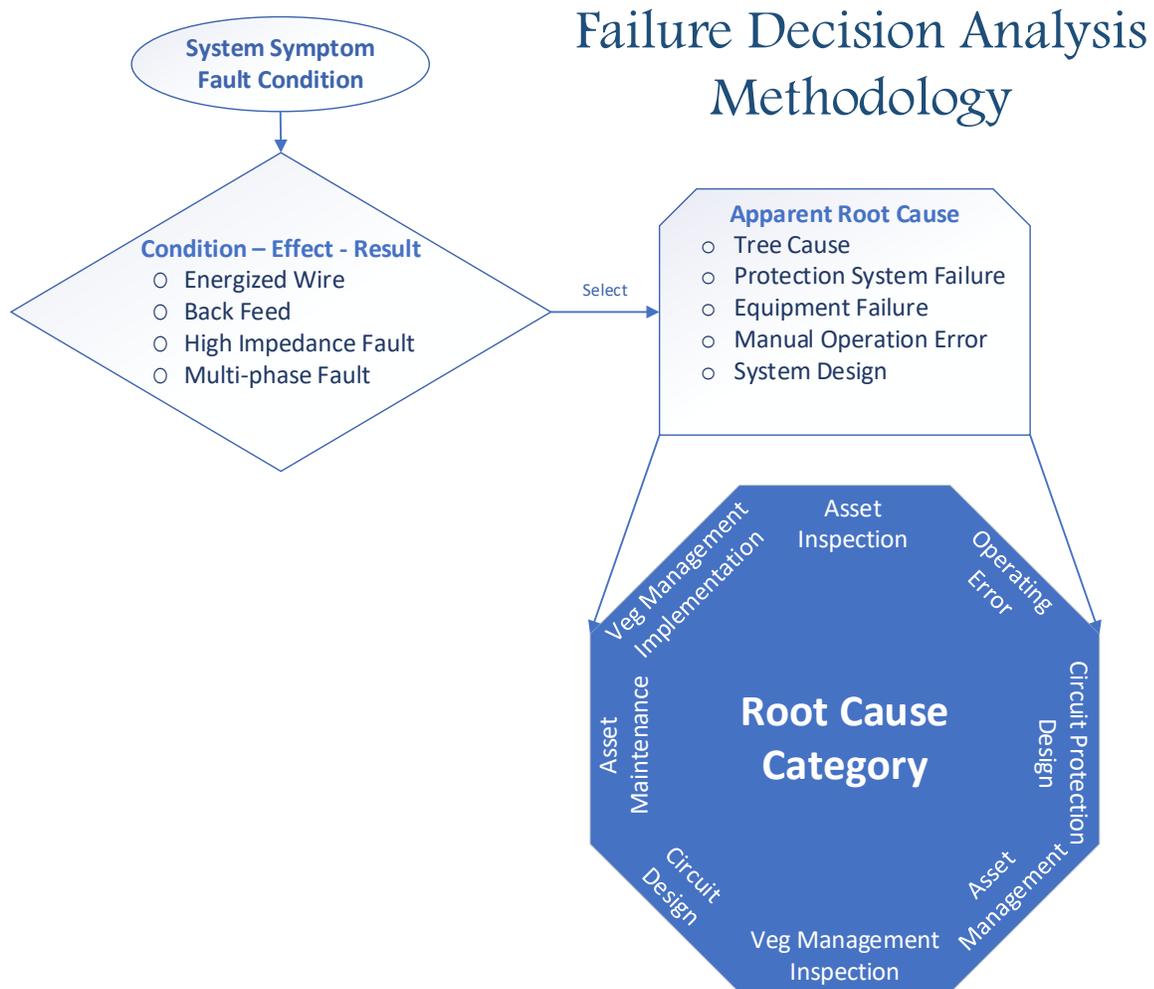
Without physical evidence, the RCA Team relied on a document-based technical understanding of the PG&E electrical system, including time stamps and other data from PG&E records, all supplemented by the CAL FIRE and CPUC investigative reports. Using this data for each wildfire ignition, the RCA Team reconstructed what happened on each distribution system power line including the protection systems designed to reduce the risk of fires. Through this reconstruction model the RCA Team identified the characteristics of the circuit design, where the protection systems failed to perform and the estimated duration of energized power lines on the ground. In some cases, gaps, or unexplained inconsistencies in the data, increase the uncertainty associated with potential explanations for what caused the fires. A graphical example of this process is provided below for the Adobe Wildfire and explained in more detail in the report. Through this analysis it is estimated that for the Adobe Wildfire, the downed energized conductor was on the ground for at least 193 minutes, far beyond industry standards. In the other wildfire ignitions evaluated the estimates are less, and others are higher.

**Figure S1.** Wildfire Circuit Sequencing for Adobe Wildfire Ignition



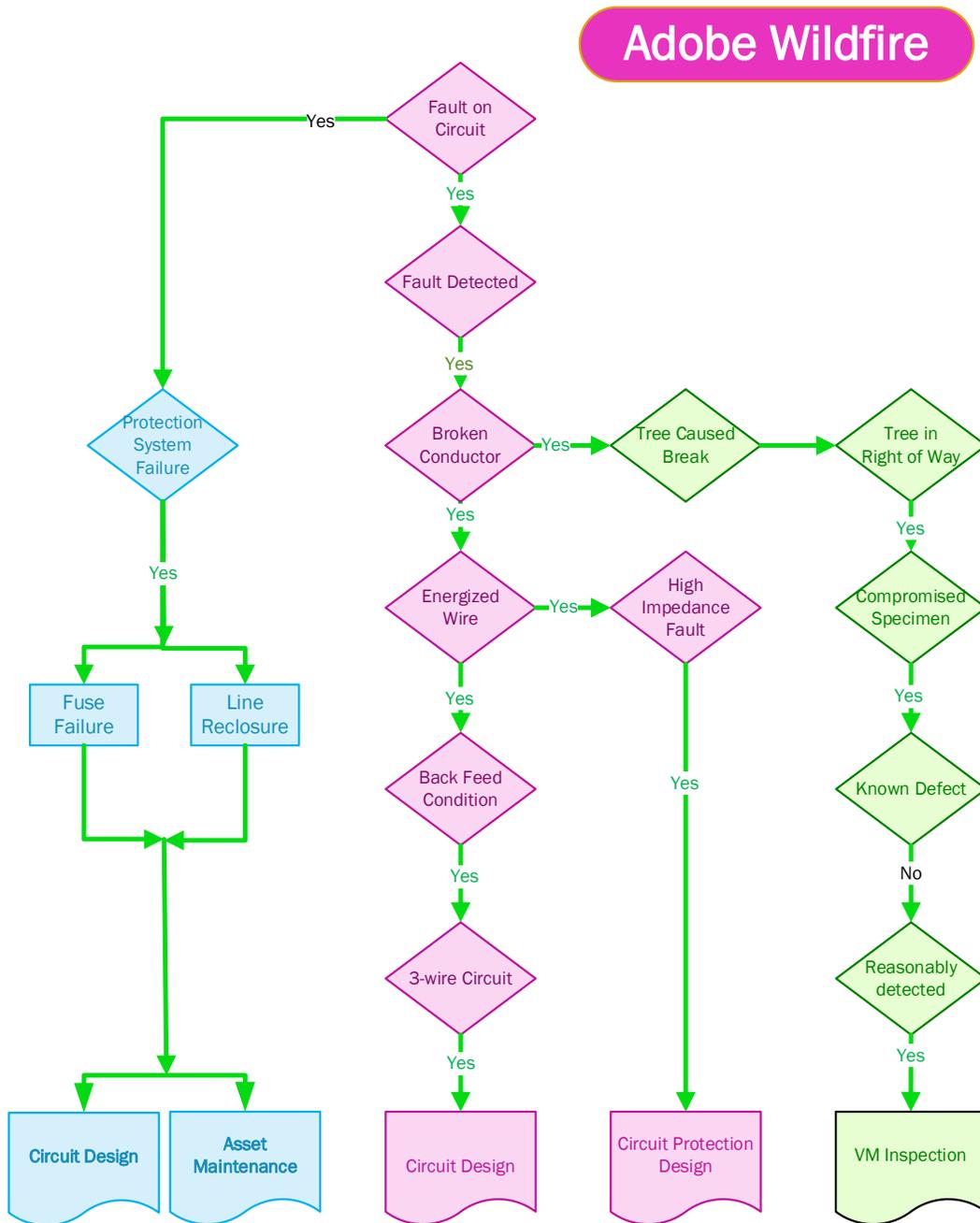
Based on the findings from the review of vegetation management, circuitry and protection systems, a database of potential root cause criteria was compiled for each ignition. A Failure Decision Analysis (FDA) methodology was developed and applied to each of the ignition sources. The methodology differentiates the apparent root cause from the actual root causes and is summarized in the following chart.

**Figure S2.** Failure Decision Analysis Methodology



This methodology was applied to the FDA criteria in the database for each wildfire ignition and decision tree flow charts were developed to show the determination of the root causes for each. An example is provided for the Adobe Wildfire. The decision analysis flowchart displays the process of determining the Root Causes; in this case vegetation management inspections, circuit design (in two cases), circuit protection design and asset maintenance.

Figure S3. Failure Decision Analysis Flowchart for Adobe Wildfire Ignition



## **FINDINGS**

Three categories of findings are presented in the report:

- General observations about PG&E's electrical operations and approach to downed energized conductors in the time prior to the October 2017 wildfires.
- Findings from the Root Cause Analysis including identification of the most common root causes amongst the fires. Increased frequency indicates increased risks.
- Findings, and related recommendations related to physical, procedural, operational, management, and organizational issues.

### **PG&E's approach to downed energized conductors prior to 2017 wildfire**

- PG&E comported with industry practice with respect to distribution systems planning and engineering standards.
- PG&E systems reliability, planning & protection, and systems engineering functional groups failed to identify and mitigate the increasing risk profile of the electrical distribution protection system and scheme, which allowed for downed conductors to remain energized and undetected for prolonged periods.
- The PG&E distribution system reliability function did not identify any of the 2017 wildfire ignition circuits as a problem or high risk prior to the fires.
- Over 20 years ago, PG&E protection and/or engineering function resources piloted a program designed to improve and enhance the detection of ground faults. The 'Sensitive Ground Fault Detection' (SGF) pilot was initiated specifically to enable enhanced detection and de-energization of high-impedance conditions such as downed conductors. Because of nuisance tripping (resultant unplanned power outages), few PG&E Operating Divisions adopted practices to enable SGF tripping. Many of the pilot locations in the program were disabled, also due to nuisance tripping.

### **Root Cause Analysis Findings in summary**

- In many of the incidents investigated, CAL FIRE and the CPUC found that the wildfires were ignited when trees or branches, which should have been identified and addressed before the fire ignitions per State and CPUC rules, fell onto the electric distribution system wires. In general, the RCA Team concurs that the trees were the initial step in the ignitions. However, this was only the apparent cause of the ignitions. The data and RCA Team analysis suggest, to varying degrees of certainty, on most of the wildfire ignitions, that there were protection system failures on the electric distribution lines of components including fuses, circuit breakers, and line reclosers that are intended to immediately cut off the power to energized lines when struck by a tree. For a great majority of the wildfires studied, this led to energized, live wires, sitting on the dry fuel

bed of vegetation for extended periods of time, in some cases hours, far beyond industry standards. The longer the duration, the greater the risk.

- Commonalities amongst incidents were compiled during the Root Cause Analysis. The following tables identify the most frequent causes for the ignitions. In all but one wildfire the ignitions started with a tree-caused break.

**Table S1.** Summary of Vegetation Management Conditions

Condition	Frequency
<b>Tree-Caused Break</b> The failure of the conductor is attributed to contact with a tree or portion of a tree.	17
<b>Tree In or Along Right-of-Way</b> The failure of the conductor is attributed to contact with a tree or portion of a tree.	17
<b>Compromised Specimen</b> Trees or portions of trees that are dead, show signs of disease, decay or ground or root disturbance, and may fall into or otherwise impact primary or secondary conductors.	14
<b>Reasonably Detected by professionals</b> The primary form and structure defects would be readily visible to a diligent inspector performing a ground-based inspection along the right-of-way, especially one trained and sensitive to the electrical contact hazards posed by a tree.	14
<b>Receptive Fuel Beds</b> Burnable dead fuel loading in or around the right-of-way or near electric structures.	13
<b>Know Defect or Conditions</b> The defect or condition related to vegetation was previously identified and documented	2

The RCA Team data analysis found that for the vast majority of the 17 fire events, the circuits involved in the ignitions had evidence of a distribution circuit protection system failure, many with high-impedance fault conditions, downed energized conductors, and possible electrical back-feed.

**Table S2.** Summary of Root Wildfire Circuit Findings

Condition	Frequency
<b>Possible Downed Energized Conductors</b> Primary medium-voltage or secondary low-voltage conductors on the ground that remained energized from the source and/or back-feed conditions.	15
<b>Likely Protection System Failure</b> The installed distribution circuit protection system and scheme failing to detect and clear a fault.	12
<b>Possible High Impedance Fault Conditions</b> Faulted electric distribution circuit not producing enough energy to be detected.	12
<b>Possible Back Feeds</b> Occurs when electrical conductors open and/or break and the circuit configuration allows an abnormal reverse electrical energization.	10

For each wildfire ignition, the Failure Decision Analysis identified the actual root cause, or in many cases, multiple causes, leading to the ignition. Although 17 wildfires were reviewed, three had two ignition sources each so there were 20 ignitions studied. As shown below, the most frequent causes were Asset Maintenance, Circuit Design, Circuit Protection Design and Vegetation Management Inspections. Detailed definitions of the Root Cause categories are provided in **Table 7** in the report body.

**Table S3.** Summary of Root Causes for 17 Wildfires

Root Cause	Frequency
<b>Asset Maintenance</b>	15
<b>Circuit Design</b>	14
<b>Circuit Protection Design</b>	13
<b>Circuit Design</b>	14
<b>Vegetation Management Inspections</b>	11
<b>Asset Inspections</b>	3
<b>Vegetation Management Implementation</b>	3
<b>Asset Management Implementations</b>	1
<b>Operating Error</b>	1

**Major findings, and related recommendations related to procedural, operational, management, and organizational issues, are grouped by theme:**

- Institutionalizing Learning
  - The lack of an effective Corrective Action Program at PG&E resulted in the absence of a mechanism to identify trends in all identified deficiencies. The company should implement such a program.
  - PG&E did not develop a de-energization protocol prior to the 2017 wildfire siege despite evidence of risk and regulatory guidance.
- Vegetation Management
  - PG&E vegetation management leadership, employees and contractors lacked appropriate qualifications and training.
- Circuit Design & Maintenance
  - The fundamental design of the overall PG&E electric system permits undetected ground-faulted overhead conductors to remain electrically energized in contrast to industry best practice. Therefore, PG&E should expeditiously proceed with System Enhancement Initiative No. 20<sup>3</sup>, which requires PG&E and the CPUC to engage an independent engineering firm to study the grounding methods and circuit and transformer configuration in PG&E's distribution system and transmission system.
  - The corrective maintenance (tag) backlog was significant in both duration and number, which contributed to degraded system conditions. Therefore, PG&E should implement a comprehensive program that includes the proper balance of the various approaches to maintenance, including preventive, predictive, and corrective.
- Emergency Management
  - At the time of the fires in 2017 and 2018, PG&E had not fully adopted and implemented the Incident Command System (ICS) for preparing for and responding to major incidents. Given the nature of threats in their service territory, the company should consider full implementation of ICS.

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<sup>3</sup> Order Instituting Investigation on the Commission's Own Motion into the Maintenance, Operations and Practices of Pacific Gas and Electric Company (U39E) with Respect to its Electric Facilities; and Order to Show Cause Why the Commission Should not Impose Penalties and/or Other Remedies for the Role PG&E's Electrical Facilities had in Igniting Fires in its Service Territory in 2017, I.19-06-015, Filed June 27, 2019, Exhibit C, Description of PG&E Shareholder-Funded System Enhancement Initiatives, System Enhancement Initiative 20, Independent Study of Distribution and Transmission System.

## Recommended Changes to the CPUC's General Orders

The CPUC regulates investor-owned utilities and other entities. Utilities are required to comply with the Commission's General Orders (GO). As a result of the Root Cause Analysis effort, recommendations to update or modify related General Orders include:

- Modify GO 95 to better align transmission and distribution preventative maintenance standards with those existing for power generation in GO 167.
- Modify GO 166 to require utilities to utilize standardized resource typing to better facilitate the effective use of mutual assistance from other utilities when required.<sup>4</sup>
- Through interviews for this report we learned of confusion faced by vegetation management contractors. They report challenges trying to comply with the sometimes-conflicting requirements of GO 95 and State of California Public Resource Codes 4292 and 4293. We recommend an effort to align those requirements.
- Modify Rule 35 to provide better support to utilities' access to vegetation threatening public safety on private property.
- Modification of GO 95, Rule 35 to emphasize safety, reliability and hazard tree assessment that would direct and enable electric utilities to better focus on the root cause of tree-related fires by requiring utilities to use the following standards and best management practices:
  - ANSI-A300 (Part 9) Tree Risk Assessment a. Tree Failure *American National Standards for Tree Care Operations—Tree, Shrub, and other Woody Plant Management—Standard Practices (Tree Risk Assessment a. Tree Failure)* Latest Edition<sup>5</sup>
  - International Society of Arboriculture's Best Management Practices Utility Tree Risk Assessment Practices Edition 2020<sup>6</sup>

## OTHER QUESTIONS

Three other questions are posed by the project scope, addressed briefly below and in more detail in the report:

- Would PG&E Public Safety Power Shutoff program, implemented after the 2017 fires, have stopped the fires in 2017?
- Has PG&E integrated the High-Fire Threat Districts into their risk management efforts?
- What are other factors which contributed to the ignition and spread of wildfires in 2017 and 2018?

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<sup>4</sup> Resource typing is defining and categorizing, by capability, the resources requested, deployed and used in incidents. Resource typing definitions establish a common language and defines a resource's (for equipment, teams, and units) minimum capabilities. Resource typing definitions serve as the common language for the mobilization of resources.

<sup>5</sup> <https://www.isa-arbor.com/store/product/133>

<sup>6</sup> <https://www.isa-arbor.com/store/product/4430/cid/117>

### **Public Safety Power Shutoff (PSPS) program**

If PG&E had a PSPS program in place in 2017 would they have been able to stop the fires? In general, yes. PSPS would have been a strong tool had it been available prior to the fire siege in October 2017. PG&E had an initial PSPS program in place in November 2018 and initiated the process, only to cancel it before the Camp Fire. CAL FIRE subsequently found that, had PG&E followed through with the PSPS, Camp Fire #2 would likely not have been ignited.

PG&E has developed very complex analytical forecast models to better inform their Officer-in-Charge, who makes the final decision for PSPS events. In the Fall 2021, they reported to the newly created California Office of Energy Infrastructure Safety (Energy Safety) that—had their models and protocols been in place—they would most likely have been able to avoid some of the fires, including Camp, Nuns, Cascade, Atlas, Kincade, and Pocket. Through interviews we learned PG&E reported that other ignitions would most likely not have been avoided by a PSPS, because wind gust speeds were forecasted to be below six miles per hour.

It is clear to the RCA Team that the PSPS forecasting tool could have provided PG&E with the data indicating conditions were such that implementing PSPS was warranted prior to the October 2017 wildfires. It is difficult for the RCA Team to declare definitively that these fires would have been avoided as the models only provide the data recommending go or no go, and the final decision is made by the Officer-In-Charge.

Although effective in stopping ignitions, there must be a recognition of the significant difficulties created by shutting off power for substantial periods of time. PG&E's initial implementation of these shutoffs did not fully integrate with existing public emergency management protocols and practices, leading to significant hardship. Public officials acknowledge that PG&E has made significant strides to improve the shutoff process, including better communication, making changes to their system to limit the number of customers affected, and reducing the duration of the outages. However, PG&E can further enhance this integration by accepting offers of assistance from emergency management officials regarding the PSPS and EPSS programs.

### **High Fire-Threat Districts**

PG&E's 2017 internal risk maps did not include the areas where the ignitions occurred. Since then, PG&E has put in substantial resources to improve its risk management process, often at the direction of the CPUC. PG&E believes its own maps of high fire-threat zones are more accurate than the State-developed maps.

Many have weighed in on the degree to which PG&E has fully integrated the HFTD into their risk management process in recent years including, most recently, the Acting State Auditor.<sup>7,8</sup> Based on our interviews and documents reviewed, including a total of four detailed interviews with the PG&E specialist responsible for the PSPS and high fire-threat districts, the RCA Team feels that PG&E has made great strides toward enhancing their approach to risk management, but continued improvement is warranted.

### **Other Contributing Factors**

The primary focus of this report is on the ignition of the 17 wildfires. There were other factors that contributed to the ignitions and especially to the spread of the fires. The RCA Team researched current thoughts on other contributing factors, including the unprecedented drought, bark beetles, wind conditions, vegetation management policies, fire mitigation efforts, and land-use policies. As called for in the scope, each is presented in the report without findings or recommendations.

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<sup>7</sup> Auditor of the State of California, Electrical System Safety, California's Oversight of the Efforts by Investor-Owned Utilities to Mitigate the Risk of Wildfires Needs Improvement, Report 2021-117, March 2022, <https://www.auditor.ca.gov/pdfs/reports/2021-117.pdf>

<sup>8</sup> California State Senate Subcommittee on Gas, Electric, and Transportation Safety, California Burning: Utility Wildfire Prevention and Response, Follow-up to the November 2015 Wildfire Safety Hearing, Background Document, Hearing date January 26, 2018, [https://seuc.senate.ca.gov/sites/seuc.senate.ca.gov/files/01-26-18\\_background.pdf](https://seuc.senate.ca.gov/sites/seuc.senate.ca.gov/files/01-26-18_background.pdf).

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### III. ACKNOWLEDGEMENTS

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The RCA Team especially wants to recognize the significant contributions of the CPUC Staff, particularly Richard White, Saab Bagri, Wendy al-Mukdad, and Ben Turner of the Safety Policy Division and finally, the Regulatory Affairs, Compliance, and Data Response Unit of PG&E.

## IV. CAVEATS

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Traditionally, a forensic root cause analysis is conducted as soon as possible following an incident. That was not the case here. The fires occurred from October 2017 to November 2018. This project began in July 2021 and analysis continued through July 2022, nearly 5 years later. There was no physical evidence to review. Many of the relevant PG&E employees are no longer with the company. Given this, the RCA Team relied on the vast amount of publicly available information, and PG&E confidential data requested by the RCA Team during the project duration.

Thousands of pages of confidential documents and data were requested by the RCA Team and responded to by PG&E. However, PG&E did not provide their own analyses of the root causes of the ignitions. Although they provided substantial information regarding vegetation management, PG&E did not provide information regarding the qualifications and training of vegetation management personnel employed at the time of the fires.

## **V. DISCLAIMER**

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The opinions, findings, conclusions, and recommendations in this document are provided solely for the use and benefit of the requesting party. Any warranties (expressed and/or implied) are specifically waived. Any statements, allegations, and recommendations in this assessment are not to be construed as governing policy or decision, unless so designated by other documentation. The assessment is based on the most accurate data available to the authors at the time of publication, and therefore is subject to change without notice.

## VI. INTRODUCTION

On the evening of October 8, 2017, a series of 17 wildfires began in the North Bay region of California. The California Department of Forestry and Fire Protection (CAL FIRE) and the California Public Utilities Commission (CPUC) later determined that 16 of the fires were ignited by PG&E electricity system equipment, while the largest and most destructive wildfire, Tubbs, was found to be ignited by another entity. On November 8, 2018, the Camp Fire started and went on to become the most destructive wildfire then in California history. CAL FIRE and the CPUC determined that Camp II was ignited by PG&E distribution system equipment.

In January 2019 PG&E declared bankruptcy due to the costs associated with these fires. In 2020, the CPUC considered PG&E's petition to emerge from bankruptcy leading to the Commission's Wildfire Order Instituting Investigation (OII). In that order PG&E and the CPUC agreed to a series of follow-up actions intended to mitigate the risk of future wildfires. The seventh item on that list was to hire an independent firm to undertake a Root Cause Analysis (RCA) of each of the 17 wildfires ignitions to "identify gaps that can be closed in order to reduce the risk of future catastrophic wildfires."

The CPUC staff directed PG&E to identify three qualified firms from which the CPUC staff would select one. PG&E identified about 18 firms and requested formal proposals from a subset. Three were recommended to the CPUC staff, who interviewed each. As a result, Envista Forensics, based in Atlanta, was selected. The RCA Team included Witt O'Brien's, a global crisis and emergency management firm, as the prime subcontractor.

There are multiple components of the scope for this project.

SCOPE COMPONENT	REPORT SECTION
<b>Conduct a Root Cause Analysis for each of the 17 wildfires including identification of physical, procedural, operational, management, and organizational issues that may have contributed to the ignitions.</b>	Section VII & Appendix A
<b>Identify areas where the CPUC's General Orders could be updated.</b>	Section VIII E
<b>Evaluate whether PG&amp;E's PSPS process would have been effective in reducing the likelihood of the 2017 fires.</b>	Section IX C
<b>Evaluate the incorporation of the California High Fire-Threat Districts into PG&amp;E's risk-reduction planning</b>	Section IX B
<b>Provide an overview, without findings or recommendations, of other factors contributing to the wildfires.</b>	Section X

## VII. ROOT CAUSE ANALYSIS

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### A. Introduction

In order to conduct root cause analyses for the ignition sources of the 17 wildfires the RCA Team went through a series of steps:

- Initially, the RCA team requested and reviewed confidential PG&E manuals, documents, reports, procedures and others as well as public sources. These documents, combined with information gleaned from scores of interviews eventually led to findings and related recommendations related to procedural, operational, management and organization elements potentially related to the wildfires.
- The vegetation management specialists reviewed existing reports to either validate previous findings from CAL FIRE and the CPUC or, in only two instances, have different findings.
- Simultaneously, an engineering expert reviewed PG&E electrical circuit operations in the years prior to the October 2017 fires.
- Then an engineering expert developed a methodology to piece together the sequence of events from the time a tree struck a distribution system line to the time the felled conductor was de-energized

### B. Definition

The Root Cause Analysis (RCA) utilized is a process for identifying the basic or contributing causal factors that underlie variations in performance associated with adverse events. These are the most basic causes that can reasonably be identified that management has control to fix, and when fixed, will prevent (or significantly reduce the likelihood of) the problem's recurrence<sup>9</sup>.

### C. Vegetation Management

The RCA Team includes a Board-Certified Master Arborist and Certified Arborist who are both Certified Utility Specialists. These qualified utility arborists also hold Tree Risk Assessment Qualification based on the American National Standards Institute A300 standards and include a major contributor to the Best Management Practice for Utility Tree Risk Assessment. The Team reviewed the findings of CAL FIRE and the CPUC-SED reports on vegetation management, as well as hundreds of pages of documents and several interviews with PG&E personnel and current and former vegetation management contractors.

In general, the RCA Team concurs with the previous findings pertaining to vegetation management with two exceptions:

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<sup>9</sup> TAPROOT System Improvements, Inc.

- In the Point Wildfire, the valley oak tree branch area had structural failures that were clearly visible hazards that should have been identified and abated<sup>10</sup>.
- In the LaPorte Wildfire, there was visible evidence of decay in the valley oak tree that should have been discovered with a normal assessment<sup>11</sup>.

In addition, the RCA Team met with attorneys from the Federal Monitor appointed by U.S. District Judge Alsup regarding PG&E's operational issues with vegetation management. In general, the RCA Team concurs with those findings.

The specific factors for each wildfire are included in the RCA PowerPoint slides. The specific vegetation management contributing factors are summarized in **Table 1** below.

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<sup>10</sup> Point: SED's investigation correspondingly found that the subject conductor failed due to contact with the subject tree limb, fell to the ground, subsequently arced, and started the fire. SED's review of PG&E's outage reports found that one of the two fuses at Fuse L2005 (located immediately upstream of the incident location) had blown. Furthermore, SED's investigation correspondingly found the subject tree and limb to be healthy with no external signs of decay or disease; therefore, SED determined that the limb failure was caused by high winds. The CAL FIRE arborist report stated the limb had been sound with no evidence of rot at the breaking point. The entire limb appeared healthy with no obvious indicators of insect and disease dated January 11, 2018, Incident Number 17 CA-TCU-012170. The subject tree had clearly visible hazards that should have been identified and abated by PG&E. The primary form and structure defects would be readily visible to a diligent inspector and auditors performing a ground-based inspection along the right-of-way (ROW), especially those trained and sensitive to the electrical contact hazards posed by these trees.

<sup>11</sup> LaPorte: The CAL FIRE report stated the following regarding the report by contracted arborist, [REDACTED]: "The subject valley oak did show signs of decay. The arborist report stated there may have been a crack at the base of the limb. The arborist report states it is possible there were no visible outward signs of failure or weakness that would have been discovered with normal poor pruning cuts. The vegetation management contractor was pruning for clearance and not following ANSI A300 Part 1 pruning standards. Stubbing and tipping branches can lead to disease and insect damage. The proper cut is at the branch bark ridge. PG&E did not provide enough oversight to ensure the contractors were performing work to industry standards and specifications."

**Table 1.** Summary of Vegetation Management Conditions for 17 Wildfires

Condition	Frequency
<b>Tree-Caused Break</b> The failure of the conductor is attributed to contact with a tree or portion of a tree.	17
<b>Tree In or Along Right-of-Way</b> The failure of the conductor is attributed to contact with a tree or portion of a tree.	17
<b>Compromised Specimen</b> Trees or portions of trees that are dead, show signs of disease, decay or ground or root disturbance, and may fall into or otherwise impact primary or secondary conductors.	14
<b>Reasonably Detected by professionals</b> The primary form and structure defects would be readily visible to a diligent inspector performing a ground-based inspection along the right-of-way, especially one trained and sensitive to the electrical contact hazards posed by a tree.	14
<b>Receptive Fuel Beds</b> Burnable dead fuel loading in or around the right-of-way or near electric structures.	13
<b>Know Defect or Conditions</b> The defect or condition related to vegetation was previously identified and documented.	2

#### D. PG&E Electrical Circuitry History Leading up to the 2017 Wildfires

PG&E owns and operates electrical distribution systems that CAL FIRE and the CPUC identified as being involved in wildfires which occurred in 2017-2018. The probability of a significant high-impact wildfire event in Northern California remains. As noted elsewhere in this report, implementation of the Public Safety Power Shutoff program, part of this scope, and the EPSS program that was created after the scope of this OII was developed, help to some extent to address the PG&E system problems identified in this report. However, system infrastructure problems still exist.

PG&E and the CPUC have proactively initiated this introspective root cause analysis (RCA) study to assess the situation in greater detail and identify root causes and gaps in regulations, processes, and procedures that may have led to wildfire ignitions. The objective is to address these deficiencies in a material and long-lasting way to reduce the probability of future high-impact wildfire events. The individual wildfire RCA results presented are also consolidated into a holistic corrective actions summary that:

1. Considers feasibility of implementation, and
2. Includes industry-leading practices and/or industry standards.

Root Cause Analysis (RCA) is a widely used approach in determining how and why an issue arose initially. It aims to locate the source of an issue to determine the fundamental cause of the problem. The RCA approach is predicated on the premise that systems and events are

intricately intertwined. A single action in one area results in further actions in other areas, and so on. By retracing these activities, you may ascertain when the problem originated and how it manifested as the symptom you are now experiencing. In short, Root Cause Analysis is an effective method for diagnosing and resolving problems.

The RCA analysis here included examination of publicly available information; data provided by PG&E, the CPUC, and CAL FIRE; and interactive interviews with leadership and staff of each organization. The scope of this work focused on the time period of 2016-2018, and the following key points were identified:

- Key Point #1 – PG&E comported with industry practice with respect to distribution systems planning and engineering standards.
- Key Point #2 – PG&E engineering functional groups, and the CPUC, failed to identify and mitigate the increasing risk profile of the electrical distribution system protection scheme, allowing downed conductors to remain energized and undetected for prolonged periods.

It is important to note that PG&E was operating over 3,000 electric distribution circuits the evening of October 8, 2017. Sixteen of those circuits in operation all failed within a few hours and in such a way to cause catastrophic wildfires.

Looking back with hindsight and second-guessing criticism is easy; for this assessment, the effort of the RCA Team was deliberate and impartial to identify corrective actions so lessons will be learned and not repeated.

## **E. Electrical Circuits**

This portion of the report is focused on the PG&E distribution electrical circuitry involved in each wildfire event. The analysis begins with a review of PG&E functional areas, processes, and procedures in place in 2017-2018 to establish a baseline as compared to industry best practices.

The functional areas reviewed were limited to the PG&E distribution systems' reliability, protection, and engineering. This analysis was based strictly on documentation provided to the RCA Team by PG&E that was in place during the 2017-2018 timeframe.

As the RCA Team analysis progressed, several key technical elements emerged that required further evaluation to identify gaps in PG&E's processes and procedures. The key elements for the electrical circuits included:

1. Distribution electrical configurations, namely the 3-wire uni-grounded and the 4-wire multi-grounded systems.
2. Distribution systems' high-impedance fault (HIF) conditions.
3. Distribution systems' protection system performance.

Each of these elements is briefly described to clarify their importance with respect to the PG&E distribution systems' circuitry performance.

Then, the RCA Team developed analysis 'sequences' for the PG&E distribution systems' electric circuits for each of the 17 wildfire events. Each respective circuit sequence is represented in a timeline of events from data included in PG&E, CPUC-SED, or CAL FIRE documents. The project team used only this fact-based dataset, which appeared to be sparse in some cases.

The project team conducted supplemental interviews and submitted targeted data requests as the importance of the preliminary circuit sequencing results came into focus. A listing of interviewees can be found in Appendix E.

## **F. PG&E Distribution Systems Overview<sup>12</sup>**

PG&E's Electric Operations group has one of the largest single-company, single-state electric distribution systems in the United States. The PG&E service area covers 70,000 square miles, and ranges from Eureka in the north to Bakersfield in the south, and from the Pacific Ocean in the west to the Sierra Nevada Mountain range in the east. PG&E's 2018 electric distribution network consisted of approximately 107,000 circuit miles of distribution lines, of which approximately 20% were underground and approximately 80% were overhead; 50 transmission switching substations; and 769 distribution substations, with a capacity of approximately 32,000 MVA.

PG&E's distribution network interconnects with its transmission system, primarily at switching and distribution substations, where equipment reduces the high-voltage transmission voltages to lower voltages, ranging from 44 kV to 2.4 kV.

Emanating from each substation are distribution circuits or feeders connected to local transformers and switching equipment linking distribution lines and delivering power to end-users. In some cases, PG&E sells electricity from its distribution facilities to entities, such as municipal and other utilities that resell the electricity.

## **G. Northern California Wildfires 2017<sup>13</sup>**

In October of 2017, a confluence of abnormal weather events resulted in the catastrophic North Bay Fires. The October 2017 North Bay Fires marked a substantial shift in the wildfire risk facing PG&E's service territory, causing PG&E to significantly expand the work it had already done to identify and respond to wildfire risk in Northern California.

Beginning on October 8, 2017, multiple wildfires spread through Northern California, including Napa, Sonoma, Butte, Humboldt, Mendocino, Lake, Nevada, and Yuba Counties, and the area

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<sup>12</sup> [2018 Joint Annual Report to Shareholders \(pgecorp.com\).  
https://www.pgecorp.com/investors/financial\\_reports/annual\\_report\\_proxy\\_statement/ar\\_pdf/2018/2018\\_Annual\\_Report.pdf](https://www.pgecorp.com/investors/financial_reports/annual_report_proxy_statement/ar_pdf/2018/2018_Annual_Report.pdf)

<sup>13</sup> PG&E (U 39 E) REPORT IN RESPONSE TO ATTACHMENT B OF THE COMMISSION'S ORDER INSTITUTING INVESTIGATION AND ORDER TO SHOW CAUSE, Page 99

surrounding Yuba City. According to the CAL FIRE California Statewide Fire Summary dated October 30, 2017, at the peak of the 2017 Northern California wildfires, there were 21 major fires that, in total, burned over 245,000 acres and destroyed an estimated 8,900 structures. The 2017 Northern California wildfires resulted in 44 fatalities.

CAL FIRE issued determinations on the cause of each of the 2017 Northern California wildfires, and alleged that all of these fires, with the exception of the Tubbs Fire, involved PG&E's equipment. In 2018, CAL FIRE released an additional determination that the fires "were caused by trees coming into contact with power lines" or "were caused by electric power and distribution lines, conductors, and the failure of power poles."<sup>14</sup>

## H. Distribution Systems Electric Circuitry

### 1. 4-Wire Multi-Grounded Distribution Circuits

In North America, the predominant design for electric utility distribution systems is the 4-wire, multi-grounded neutral system. The 4-wire system is made up three energized phase conductors, and one grounded conductor known as the 'neutral'. The phase conductors will be arranged at the top of the pole on insulators and the neutral conductor will be positioned and mounted below. The neutral conductor will be grounded at every pole by another wire that is connected directly to the earth. This is accomplished by driving an eight-foot copper rod into the ground at each pole and making the connection by a smaller wire that runs up each pole.

The main driver for this design is safety and lower costs associated with serving single-phase loads like a typical single-family residential home. While some end-use customers require three-phase, or primary voltage service, such as commercial or light industrial installations, the vast majority are served on a single phase with one power transformer.

The location of the neutral conductor just below the energized phase conductors helps to warn craft workers that live conductors are above. The neutral conductor oftentimes will interfere with falling phase conductors, causing the protection system to detect and de-energize the circuit. Since the neutral is solidly grounded any energized conductor coming into contact with it will immediately cause a phase to ground high energy fault.

During operations, a multi-grounded system will experience more higher fault currents during typical fault conditions. An example would be a tree coming into contact with a conductor or conductors and pushing the energized phase conductor into the solidly grounded neutral. Higher fault currents will be quickly detected and cleared by the system's protection technologies.

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<sup>14</sup> [2018-Annual-Report-FINAL-web-ready-version-4-24-19.pdf \(q4cdn.com\)](https://s1.q4cdn.com/880135780/files/doc_financials/2018/2018-Annual-Report-FINAL-web-ready-version-4-24-19.pdf).  
[https://s1.q4cdn.com/880135780/files/doc\\_financials/2018/2018-Annual-Report-FINAL-web-ready-version-4-24-19.pdf](https://s1.q4cdn.com/880135780/files/doc_financials/2018/2018-Annual-Report-FINAL-web-ready-version-4-24-19.pdf)

## 2. 3-Wire Uni-Grounded Distribution Systems<sup>15</sup>

The uni-grounded distribution circuit or feeder configuration consists of three conductors, one for each energized phase. The three-wire system is grounded in only two places: at the source transformer in the substation and at the termination point which is typically the power transformer serving the customer.

Uni-grounded systems are not common in North America, but are extensively used in California, Europe, and Australia. The substation transformer neutral is usually solidly grounded or grounded through a small resistance if fault currents need to be limited. The customer's load is connected phase-to-phase, and ground fault protection is typically provided by ground time-overcurrent and ground instantaneous elements.

Ground faults typically generate several hundred to several thousand amperes, depending on system grounding impedance and fault resistance. The large difference between the standing ground currents and ground fault currents on 3-wire uni-grounded systems is that it allows relays to be set more sensitively and detect more high-impedance ground faults than relays on 4-wire multi-grounded systems.

Because all single-phase load transformers are connected phase-to-phase on a 3-wire system, a broken conductor that falls on the ground from the load side can result in partial voltage on the downed conductor, due to back-feed through the primary winding, and coupling with the secondary winding to load. This back-feed condition with partial voltage has resulted in fatalities and fire ignition incidents.

## 3. High-Impedance Faults (HIF)

High-impedance faults on distribution systems produce a much lower fault current. High-impedance faults can result from dirty insulators, vegetation touching overhead conductors, and most frequently, from downed conductors. When the ground surface is a poor electrical conductor, such as dry earth or sand, the fault current generated from a downed conductor can be low. Studies from many staged high-impedance fault tests conclude that high-impedance fault currents from downed conductors vary anywhere from zero to under 100 Amps.

High-impedance faults will occur with the same frequency on uni-grounded systems as on systems with other grounding schemes. The key factors driving high-impedance fault current magnitudes are the surface contact and the voltage level. The following excerpt from the Electric Power Distribution Handbook further describes high-impedance faults:

*When a conductor comes in physical contact with the ground but does not draw enough current to operate typical protective devices, you have a high-impedance fault. In the most common scenario, an overhead wire breaks and falls to the ground (a downed wire). If the phase wire misses the grounded neutral or another ground as it falls, the circuit path is*

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<sup>15</sup> Understanding Ground Fault Detection Sensitivity and Ways to Mitigate Safety Hazards in Power Distribution Systems, Scott Hayes, Pacific Gas and Electric Company, 2019

*completed by the high-impedance path provided by the contact surface and the earth. The return path for a conductor lying on the ground can be a high impedance. The resistance varies depending on the surface of the ground. The frequency of high-impedance faults is uncertain. Most utilities responding to an IEEE survey reported that high-impedance faults made up less than 2% of faults while a sizable number (15% of those surveyed) suggested that between 2% and 5% of distribution faults were not detectable (IEEE Working Group on Distribution Protection, 1995). Even with small numbers, high-impedance faults pose an important safety hazard. Three-wire distribution systems have some advantages and some disadvantages related to high-impedance faults. The main advantage of 3-wire systems is that there is no unbalanced load. A sensitive ground relay can be used, which would detect many high-impedance faults. The sensitivity of the ground relay is limited by the line capacitance. The main disadvantage of 3-wire systems is that there is not multi-grounded neutral. If a phase conductor breaks, there is a high probability that there will be a high-impedance fault<sup>16</sup>.*

#### 4. Distribution Circuit Design

Low cost, simplification, and standardization are important design characteristics of utility electric distribution systems. Few components and/or installations are individually engineered and standardization or ‘cookbook’ methods are used for much of the design of distribution systems in place today in North America<sup>17</sup>.

*The PG&E system is divided into three classes of primary voltage areas based on the probability that the distribution facilities will be converted to 21 kV in the future. For PG&E, the most common distribution system is 3-wire, 12 kV; however, the most desirable system is the 4-wire, 21 kV system. PG&E will use either of these two systems to serve any distribution-size load from overhead or underground lines using standard system designs.*

*The 4-wire, 21 kV system is especially economical for extending service to residential subdivisions and developments. This system consists of standard, single-phase, daisy-chain, radial tap construction using less-costly, two-bushing transformers and only one underground primary cable connected line-to-neutral. The equivalent 3-wire, 12 kV system requires four bushing transformers and two underground primary cables connected line-to-line, as well as an additional position on the main-line protective device. As a result, the cost of a single-phase extension from a 3-wire, 12 kV system is nearly twice the cost of the equivalent extension from the 4-wire, 21 kV system.<sup>18</sup>*

#### 5. Distribution Circuit Protection

The possibility of electrical short circuits, or faults that cause overcurrent on utility distribution systems is always a concern. Utility companies focus specialized technical resources, typically

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<sup>16</sup> Electric Power Distribution Handbook, 2<sup>nd</sup> Edition, T.A. Short, 2014

<sup>17</sup> Electric Power Distribution Handbook, 2<sup>nd</sup> Edition, T.A. Short, 2014

<sup>18</sup> PG&E Electric Design Criteria: Underground and Overhead, Section 2, July 2008

within an internal functional group, to apply protection devices to detect and interrupt or clear faults. Circuit breakers, reclosers, and current limiting are examples of devices designed and applied to detect and interrupt fault currents.<sup>19</sup>

PG&E functional groups are expected to be familiar with the operating characteristics and requirements of the protective devices in use. This requires:

- Knowing the types of fault conditions that protective relays could encounter,
- Being able to calculate the fault information by hand,
- Understanding and being able to use the zero-sequence equivalent circuits for various configurations involving three-winding transformers and autotransformers, including the 3-wire and 4-wire circuits, and
- Understanding how to calculate the phase shift through transformers for coordinating devices on either side of the transformers<sup>20</sup>.

## I. PG&E Distribution Systems Functions

The need to establish a baseline of the PG&E distribution systems circuitry for the 2017-2018 time period was accomplished by examining the key functional groups accountable for reliability, planning and engineering of the electrical system at distribution class voltages. Each area is briefly covered, and observations are offered with each respective subsection.

### 1. Reliability<sup>21</sup>

PG&E uses four metrics commonly utilized in the electric utility industry to measure reliability for both unplanned and planned outages: the System Average Interruption Duration Index (SAIDI), the System Average Interruption Frequency Index (SAIFI), the Momentary Average Interruption Frequency Index (MAIFI), and the Customer Average Interruption Duration Index (CAIDI).

The data indicates that PG&E was following industry practice by focusing on reliability data to target poor-performing assets within the distribution system. PG&E distribution systems reliability metrics<sup>22</sup> were trending in 2008-2016 in a favorable direction, which confirms the process was prudent and successful in dealing with an aging system with limited budgets.

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<sup>19</sup> Ibid

<sup>20</sup> PG&E Protection Handbook, Part 1: Distribution, Section 1, Application of Distribution Protective Devices

<sup>21</sup> Pacific Gas and Electric Company 2017 Annual Electric Reliability Report, July 12, 2018, Page 11.

[https://www.pge.com/pge\\_global/common/pdfs/outages/planning-and-preparedness/safety-and-preparedness/grid-reliability/electric-reliability-reports/AnnualElectricDistributionReliabilityReport2017.pdf](https://www.pge.com/pge_global/common/pdfs/outages/planning-and-preparedness/safety-and-preparedness/grid-reliability/electric-reliability-reports/AnnualElectricDistributionReliabilityReport2017.pdf)

<sup>22</sup> Ibid, Page 10

**Table 2.** PG&E Report on Distribution System Indices (2007-2016)**Table 3 – Distribution System Indices (2007-2016)**  
(Excludes planned outages, transmission, substation, and generation related outages)

Year	Major Events Included			Major Events Excluded		
	SAIDI	SAIFI	CAIDI	SAIDI	SAIFI	CAIDI
2007	131.1	1.047	125.2	121.5	1.019	119.2
2008	374.9	1.363	275.0	132.8	1.041	127.5
2009	191.2	1.151	166.1	119.4	0.974	122.5
2010	210.8	1.164	181.1	108.2	0.921	117.5
2011	239.2	1.041	229.7	92.8	0.796	116.5
2012	120.1	0.959	125.2	96.3	0.882	109.2
2013	100.1	0.869	115.2	84.8	0.804	105.5
2014	119.7	0.926	129.2	85.2	0.780	109.2
2015	99.4	0.804	123.6	72.5	0.689	105.3
2016	95.4	0.895	106.6	83.0	0.818	101.5

Note: PG&E defines its distribution system as line voltage less than 50 kilovolts (KV)

The MAIFI information is not included in Table 3 since non-SCADA automatic recording devices (EON or Smart Meters) do not distinguish between transmission system outages or distribution system outages.

### Worst-Performing Circuits

In 2017<sup>23</sup>, PG&E identified circuits with the worst SAIDI and SAIFI performance based on the sustained outage impacts to the average customer on that circuit. However, to maximize the cost-effectiveness of remediating poor reliability performing circuits, PG&E generally focused on circuits with larger numbers of customers. Specifically, PG&E identifies the worst-performing circuits for cost-effective remediation based on the highest total number of customers experiencing sustained outages (CESO) on a circuit. The reliability remediation of these worst-performing circuits is addressed in PG&E's Targeted Circuit Program. In addition to the Targeted Circuit Program, PG&E performs internal reviews of unplanned outages on a regular basis.

The objective of the outage review process is to identify and minimize chronic reliability issues that affect smaller numbers of customers. Cost-effective remediation work that addresses those circuits identified from the outage review process are incorporated into PG&E's base reliability work.

### Targeted Circuit Program

In the Targeted Circuit Program<sup>24</sup>, PG&E's distribution engineers analyze the causes and characteristics of historical outages, and the current circuit design in order to identify targeted work for improvement of the circuit's reliability performance. The typical targeted circuit work

<sup>23</sup> 2016 Annual Electric Distribution Reliability Report, D.16-01-008

<sup>24</sup> Pacific Gas and Electric Company 2017 Annual Electric Reliability Report, July 12, 2018

includes, as appropriate for the circuit, installing new fuses and line reclosers, replacing overhead and underground conductors, installing new fault indicators, reframing poles to increase phase separation, installing animal/bird guards, repairing or replacing deteriorated equipment, completing pending reliability related maintenance work, performing infrared inspections, and trimming trees. It typically takes two to three years for a targeted circuit project to be initiated, engineered, and constructed. As forecasted in PG&E's 2017 General Rate Case (GRC), PG&E expected to complete an average of 37 circuits in the Targeted Circuit Program per year through 2019, at a cost of \$26 million per year.

### Findings/Observations

- a) PG&E was following industry practice with respect to distribution systems reliability.
- b) PG&E reliability method utilized IEEE 1366-2012 and took into account the number of customers affected by outages.
- c) PG&E does not perform reliability focused outage forensics, root cause analyses, or have a formal equipment failure reporting system (the RCA Team requested these but none were produced for this project).
- d) PG&E placed much of its reliability effort on densely loaded circuits.<sup>25</sup>
- e) PG&E distribution systems reliability analysis did not identify any of the wildfire circuits as problematic or high risk.
- f) PG&E distribution systems reliability functions, processes, procedures, and practices failed to recognize and escalate the increasing risk profile of energized downed conductors.

## 2. Protection Function

The PG&E protection and/or engineering function resources piloted a program designed to improve and enhance the detection of ground faults. The 'Sensitive Ground Fault Detection' (SGF) pilot was initiated specifically to enable enhanced detection and de-energization of high-impedance conditions such as downed conductors. Because of nuisance tripping, few PG&E Operating Divisions adopted practices to enable SGF tripping. There were many SGF locations in the program that were disabled, estimated at 50%.<sup>26</sup>

PG&E has a comprehensive Protection Handbook, consisting of two sections with over 29 technical exhibits. The analysis and review of the PG&E document 'library' aimed at the distribution protection function found technical content that was rich, accurate, and clearly industry leading and cutting-edge.

However, the RCA Team was unable to link the obviously superior documentation to demonstrated application and skill in operation of the distribution systems. This is not to say

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<sup>25</sup> <https://www.wsj.com/articles/pg-e-wired-to-fail-11577509261>

<sup>26</sup> PG&E Sensitive Ground Fault Guideline, September 2020

the skill, talent, and expertise are not there; most of the PG&E personnel interviewed were not 'protection' subject matter experts.

PG&E did not provide interviewees with actual and direct wildfire distribution circuit protection performance experience. Hence, this area of analysis remains incomplete.

### Findings/Observations

- a) PG&E followed industry practice with respect to the distribution planning function and used adequate technology and tools.
- b) PG&E distribution systems planners conducted technical circuitry studies on an annual basis.
- c) PG&E distribution planning produced system protection settings for all system circuitry.
- d) PG&E outsourced technical audits of distribution systems circuit protection studies.
- e) In the past, PG&E technology pilots to mitigate high-impedance faults were disabled by field operations, wary of customer outage complaints. Had the pilot programs been allowed to continue, and perhaps expand, they may have found a solution to the high-impedance faults decades sooner.
- f) PG&E distribution planning and protection functions, processes, procedures, and practices failed to recognize and escalate the increasing risk profile of energized downed conductors.

### 3. Engineering<sup>27</sup>

The PG&E system is divided into three classes of Primary Voltage Areas based on the probability that the distribution facilities will be converted to 21 kV in the future. The following passage is directly from the PG&E Electric Design Manual.

*For PG&E, the most common distribution system is 3-wire, 12 kV; however, the most desirable system is the 4-wire, 21kV.*

*The 4-wire, 21 kV system is especially economical for extending service to residential subdivisions and developments. This system consists of standard, single-phase, daisy-chain, radial-tap construction, using less costly, two-bushing, pad-mounted transformers connected line-to-neutral and only one underground primary cable. The equivalent 3-wire, 12 kV system requires four bushing transformers, two underground primary cables, and an additional position on the main-line protective device. As a result, the cost of a single-phase extension from a 3-wire, 12 kV system is nearly twice the cost of the equivalent extension from a 4-wire, 21 kV system.*

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<sup>27</sup> PG&E Electric Design Manual, General Design Criteria for Primary Underground and Overhead, Section 2, Page 2, August 2018

## Findings/Observations

- a) In 2013, PG&E had 113,000 circuit miles of primary distribution conductors with 22,206 miles of potentially obsolete #6 copper conductors.<sup>28</sup> As of Q1 2022, there are approximately 14,800 miles of #6 copper conductors installed in the PG&E system; of that about 2,500 are in the HFTD.<sup>29</sup>
- b) In 2013, PG&E estimated that 600,000-800,000 auto splices existed on its system with 2,000-3,000 splice failures annually.<sup>30</sup>
- c) In 2013, PG&E recorded 32% of system outages as unknown.<sup>31</sup>
- d) In 2013, PG&E reported that a large percentage of downed conductors remained energized.<sup>32</sup>
- e) PG&E shifted construction resources away from primary conductor replacement work to what it determined as “higher priority emergency work.”<sup>33</sup>
- f) PG&E distribution systems engineering functions, processes, procedures, and practices failed to recognize and escalate the increasing risk profile of energized downed conductors.

#### 4. Wildfire Circuits Root Cause Analysis (RCA) Method

In order to conduct an RCA of the 17 wildfire events, each electrical distribution circuit was analyzed using facts derived from the available documents, and records produced by PG&E in response to the RCA Team’s requests. Documents pertinent to these 17 wildfires were considered, and additional documents were requested from PG&E, the CPUC, and CAL FIRE as the analysis progressed.

To evaluate the distribution circuits, each wildfire circuit protection system was time sequenced from a protective equipment perspective using the facts contained in the following documents:

- Pacific Gas & Electric (PG&E)
  - Incident Description and Factual Summary Reports
  - Incident Description and Factual Summary Supplemental Reports
  - Equipment Data Logs (Circuit Breakers, Line Reclosers, Fuses, Smart Meters)
  - Outage Reports (System and Dispatcher Logs)
- California Public Utilities Commission (CPUC)
  - SED Incident Investigation Report
- California Department of Forestry and Fire Protection (CAL FIRE)
  - Investigation reports

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<sup>28</sup> Study of Risk Assessment and PG&E’s GRC, The Liberty Consulting Group, May 2013, Page 96

<sup>29</sup> PG&E Data Response Unit June 8, 2022 reply to Envista data request, DRU-5088.02

<sup>30</sup> Ibid, Page 125

<sup>31</sup> Ibid, Page 125

<sup>32</sup> Ibid, Page 141

<sup>33</sup> PACIFIC GAS AND ELECTRIC COMPANY 2017 GENERAL RATE CASE APPLICATION 15-09-001 ELECTRIC DISTRIBUTION, Page B3-37

The starting point of the analysis originated with the available documents provided by PG&E, covering assets present on each distribution feeder from the station circuit breaker to the incident location. The use of a simplified distribution circuit representation, along with a timeline and related event data, combined with data logs, enabled the development of the incident observations.

The CPUC-SED reports were carefully analyzed for event time information. This was cross-checked with other incident reports provided by both CAL FIRE and PG&E.

Additionally, SCADA data and AMI meter data made available later, was analyzed and incorporated into the circuit protection sequencing. This additional data improved accuracy and consistency to “recreate” the performance of the circuitry protection system.

However, the completeness of the available dataset remains in question. The use of the data and information provided by PG&E also included the following limitation:

*“...based on information available to PG&E, PG&E believes that the protective devices operated as intended. PG&E is not presently in possession of all information necessary to demonstrate whether all devices operated as intended...”*

The resulting time sequencing for each wildfire incident is detailed in the subsequent summaries. The analysis is subject to change based on the availability and receipt of relevant and available supplemental data.

## 5. Summary

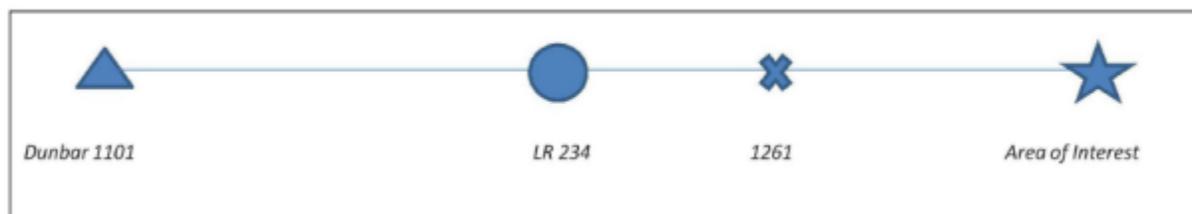
The fundamental objective of any utility electric distribution protection system and scheme is to protect the public, company personnel, and equipment from being harmed by electric current following an unintended path. The system achieves protection through application of protective devices that have careful and precise timing coordination settings.

The RCA method outlined above was applied to each of the wildfire circuits to establish findings, identify gaps, and draw conclusions on the performance of the respective protection system scheme and devices.

The fact that most of the events began with a tree contacting the lines was put aside for the following analysis in order to focus on the performance of the PG&E distribution protection system, scheme, equipment, and assets.

The following example is provided to aid the reader's understanding of the method and resulting findings presentation. For each wildfire circuit, the simplified "Incident Overview" provided by PG&E will be used to represent the electrical circuit and corresponding protection devices such as circuit breakers, line reclosers (LR ###) and fuses, represented as an "X" (Figure 1 below). The area of interest identifies the approximate location of the fire's ignition.

### Incident Overview:



**Figure 1** – Example of Incident Overview

The PG&E distribution system uses both 3-wire uni-grounded and 4-wire multi-grounded circuit configurations to provide electric service to customers across PG&E's operating regions. PG&E uses an industry circuitry naming and nomenclature convention to help identify each distribution circuit.

For example, in the Incident Overview identified in **Figure 1**, for the Adobe Wildfire, the circuit is Dunbar 1101. Each part of the circuit name has a specific meaning. The first part of the name means the circuit emanated from the Dunbar substation. The second part of the circuit name is a four-digit code which provides two additional types of information. The first two digits refer to the voltage of the circuit, with '11' referring to a 12,000 volt, 3-wire circuit in this case. The second two digits typically refer to the substation breaker position, in his case Dunbar substation breaker position "01." The majority of the circuits involved in the wildfires were 3-wire uni-grounded configurations operating at 12,000 volts.

There are two instances of PG&E circuits involved in the wildfires that are configured as 4-wire multi-grounded. Those circuits are Narrows 2102 for the Lobo Fire, and Pueblo 2103 for the Partrick Fire. In these cases, the circuit numbering change indicates the circuit operates at 21,000 volts. In this assessment, there are also two transmission class circuits, the Caribou-Palermo 115,000-volt line and the Mendocino 60,000-volt line.



**Figure 2** – Example of Wildfire Circuit Timeline

A timeline for each wildfire circuit was created from data in the available documents and records (**Figure 2**). The analysis team used only facts from evidence to avoid misinterpretations. The timeline sequences the electrical circuitry events and formulates incident observations, such as energized downed conductors, high-impedance faults, and back-feed conditions. The fire ignition per CAL FIRE and/or CPUC-SED is also included on the timeline where available.

A high-level summary of the wildfire circuits commonality characteristics can be found in **Figure 3** below. The circuit sequencing analysis reveals that 12 of the circuits had possible high-impedance fault conditions, 15 had downed energized conductors, 10 had possible electrical back-feed conditions, and the distribution systems circuit protection system failed on 12 of the circuits.

**Figure 3 – Wildfire Circuits Commonality Characteristics**

Condition	Frequency
Possible Downed Energized Conductors	15
Likely Protection System Failure	12
Possible High Impedance Fault Conditions	12
Possible Back Feeds	10

Distribution Circuit Protection System Failure: For the purpose of the root cause analysis (RCA), electric distribution circuit protection system failure is defined as the installed distribution circuit protection system and scheme failing to detect and clear a fault. Evaluation of a circuit protection includes all related protective devices such as a circuit breaker, line reclosers, and fuse operation. The voltage class designated by distribution is typically under 60,000 volts.

High-impedance fault (HIF): High-impedance fault (HIF) conditions are defined as a faulted circuit not producing enough energy to be detected. For example, an HIF condition can occur when a downed energized conductor lies on dry pavement or concrete. The IEEE defines HIF as a condition when a primary conductor makes unwanted electrical contact with a road surface, sidewalk, sod, tree limb, or some other surface or object which restricts the flow of fault current to a level below that reliably detectable by conventional overcurrent devices. The presence of a high-impedance fault condition has a significant impact on the distribution circuit protection system and protection scheme.

Energized downed conductors: Energized downed conductors are defined as primary medium-voltage or secondary low-voltage conductors on the ground, that remained energized from the source and/or back-feed conditions.

Back-feed: Back-feed conditions typically occur when electrical circuit conductors open and/or break and the configuration allows an abnormal reverse electrical energization. There can be

conditions for back-feed current and voltage that are present on one or more phases of an electrical distribution circuit while the phase(s) are disconnected at the source.

#### 6. Wildfire Circuit Root Cause Analysis Results Summary

The RCA Team relied on the available data and documents provided by PG&E to develop an RCA for each wildfire. Following a review of the initial RCA draft report, PG&E provided feedback, offering differing starting and ending times for the downed energized conductors based on modified assumptions. The PG&E inputs have since been captured for comparison to the Envista/Witt O'Brien's findings on the downed energized duration. In some cases, the PG&E calculations resulted in shorter duration estimates, in others the same, and in one case, a longer duration estimate than was presented in the initial RCA draft report.

Note that although the RCA scope was limited to the 17 fires, three of the fires involved more than one electrical circuit. RCA assessments were performed for those additional circuit events for the Camp, Nuns, and Redwood wildfires. The results are summarized in the table below.

**Table 3.** Wildfire Circuit RCA Summary

Wildfire	Circuit	Circuit Configuration	Cause	Likely Protection System Failure	<sup>34</sup> Possible Downed Energized Conductor Envista (Mins)	<sup>35</sup> Possible Downed Energized Conductor PG&E (Mins))
Adobe	Dunbar 1101	3-Wire	Tree	Yes	193	27
Atlas 1 & 2	Pueblo 1104	3-Wire	Tree	Yes	87	102
Camp 1	Caribou-Palermo 115kV	Trans	Equipment	No	UNKN	UNKN
Camp 2	Wyandotte 1105	3-Wire	Tree	No	UNKN	UNKN
Cascade	Bangor 1101	3-Wire	Sag	Yes	0	0
Cherokee	Clark Rd 1102	3-Wire	Tree	Yes	144	103
LaPorte	Bangor 1101	3-Wire	Tree	Yes	38	38
Lobo	Narrows 2102	4-Wire	Tree	Yes	0	0
McCourtney	Grass Valley 1103	3-Wire	Tree	Yes	109	99
Norrbom	Sonoma 1103	3-Wire	Tree	Yes	1440	45
Nuns #1	Dunbar 1101	3-Wire	Tree	No	103	103
Nuns #2	Dunbar 1101	3-Wire	Tree	No	103	70
Oakmont	Rincon 1101	3-Wire	Error	Yes	164	58
Partrick	Pueblo 2103	4-Wire	Tree	No	4	154
Pocket	Cloverdale 1102	3-Wire	Tree	Yes	186	186
Point	West Point 1102	3-Wire	Tree	Yes	378	318
Redwood	Potter Valley 1105	3-Wire	Tree	No	61	17
Redwood	Mendocino 60kV	Trans	Tree	No	0	0
Sulphur	Redbud 1101	3-Wire	Pole Failure	No	62	0
Young	Fulton 1102	3-Wire	Tree	Yes	38	38

<sup>34</sup> Envista RCA methodology and analysis produced the downed conductor duration for each wildfire circuit.

<sup>35</sup> PG&E provided input for the downed conductor duration of each wildfire circuit.

The RCA analysis of the wildfire circuits found 10 instances of possible high-impedance fault conditions and possible electrical back-feed.

**Table 4.** RCA Summary: High-Impedance Fault Conditions & Possible Back-Feed

Wildfire	Circuit	Cause	Possible High-Impedance Fault Conditions	Possible Back-Feed	Possible Downed Energized Conductor Envista (Mins)
<b>Norrbom</b>	Sonoma 1103	Tree	Yes	Yes	1,440
<b>Point</b>	West Point 1102	Tree	Yes	Yes	378
<b>Adobe</b>	Dunbar 1101	Tree	Yes	Yes	193
<b>Oakmont</b>	Rincon 1101	Error	Yes	Yes	164
<b>Cherokee</b>	Clark Rd 1102	Tree	Yes	Yes	144
<b>McCourtney</b>	Grass Valley 1103	Tree	Yes	Yes	109
<b>Nuns #2</b>	Dunbar 1101	Tree	Yes	Yes	103
<b>Atlas 1 &amp; 2</b>	Pueblo 1104	Tree	Yes	Yes	87
<b>Redwood</b>	Potter Valley 1105	Tree	Yes	Yes	61
<b>LaPorte</b>	Bangor 1101	Tree	Yes	Yes	38

The following circuits involved in the wildfires were found to have an energized downed conductor for over 30 minutes. Fulgurites are formed when temperatures reach approximately 1800 degrees Fahrenheit which fuses and vitrifies mineral grains found in the ground soils. (See Figures 4 & 5)

**Table 5.** Wildfire Circuit RCA Energized Downed Conductors Over 30 Minutes

Wildfire	Circuit	Circuit Configuration	Cause	Possible Downed Energized Conductor Envista (Mins)
<b>Norrbom</b>	Sonoma 1103	3-Wire	Tree	1,440
<b>Point</b>	West Point 1102	3-Wire	Tree	378
<b>Adobe</b>	Dunbar 1101	3-Wire	Tree	193
<b>Pocket</b>	Cloverdale 1102	3-Wire	Tree	186
<b>Oakmont</b>	Rincon 1101	3-Wire	Error	164
<b>Cherokee</b>	Clark Rd 1102	3-Wire	Tree	144
<b>McCourtney</b>	Grass Valley 1103	3-Wire	Tree	109
<b>Nuns #1</b>	Dunbar 1101	3-Wire	Tree	103
<b>Nuns #2</b>	Dunbar 1101	3-Wire	Tree	103
<b>Atlas 1 &amp; 2</b>	Pueblo 1104	3-Wire	Tree	87
<b>Sulphur</b>	Redbud 1102	3-Wire	Pole Failure	62
<b>Redwood</b>	Potter Valley 1105	3-Wire	Tree	61
<b>LaPorte</b>	Bangor 1101	3-Wire	Tree	38
<b>Youngs</b>	Fulton 1102	3-Wire	Tree	38

The following wildfire circuits were found to have an energized downed conductor where electrical arcing caused the formation of fulgurites.

**Table 6.** Wildfire Circuits: Formation of Fulgurites

Wildfire	Circuit	Cause	Possible High-Impedance Fault Conditions	Possible-Back Feed	Possible Downed Energized Conductor Envista (Mins)
<b>Adobe</b>	Dunbar 1101	Tree	Yes	Yes	193
<b>Pocket</b>	Cloverdale 1102	Tree	No	No	186
<b>McCourtney</b>	Grass Valley 1103	Tree	Yes	Yes	109
<b>Atlas 1 &amp; 2</b>	Pueblo 1104	Tree	Yes	Yes	87
<b>Redwood</b>	Potter Valley 1105	Tree	Yes	Yes	61



**Figure 4** – Wildfire Circuit RCA Fulgurites Created



**Figure 5** – Wildfire Circuit Fulgurites (Atlas & McCourtney)

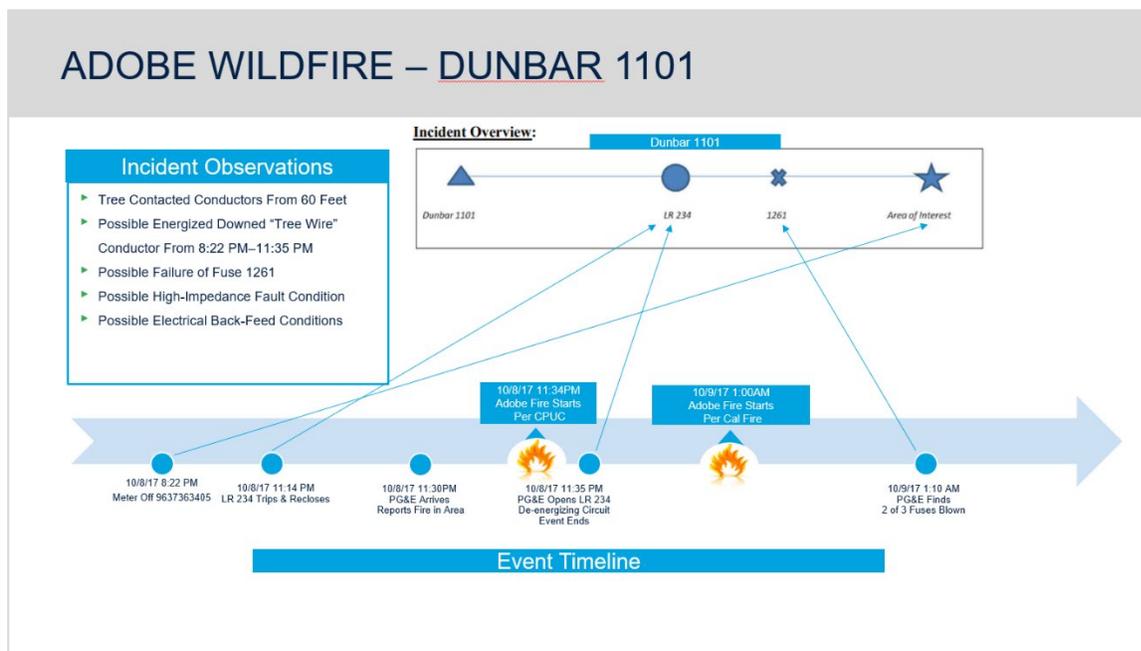
## 7. Wildfire Circuit Sequencing

The RCA Team conducted Root Cause Analyses for each of the 17 wildfires. Per the scope of this project, they are provided in PowerPoint format and are included as Appendix A to this report. The following is a synopsis of the RCA findings for each of the wildfires.

### Adobe Wildfire – Dunbar 1101

The Adobe Wildfire involved the Dunbar 1101, a 3-wire 12,000-volt circuit; the analysis found that a tree contacted the primary conductors from 60 feet away, causing downed conductors that remained energized as only two of three protective fuses were operating as intended. The fuse's failure to open resulted in an electrical back-feed condition due to the configuration of the 3-wire uni-grounded circuit.

PG&E had installed 'tree wire' conductors to mitigate tree contact faults; however, the failure of one fuse to blow allowed one phase of the downed tree wire to remain energized. Tree wire is designed with minimal insulation, or covering, and in this case, may have unintentionally contributed to extending the high-impedance conditions and the duration of the energized downed conductor. The duration of the energized downed conductor was long enough to cause fulgurites to be formed by the arcing down conductors.

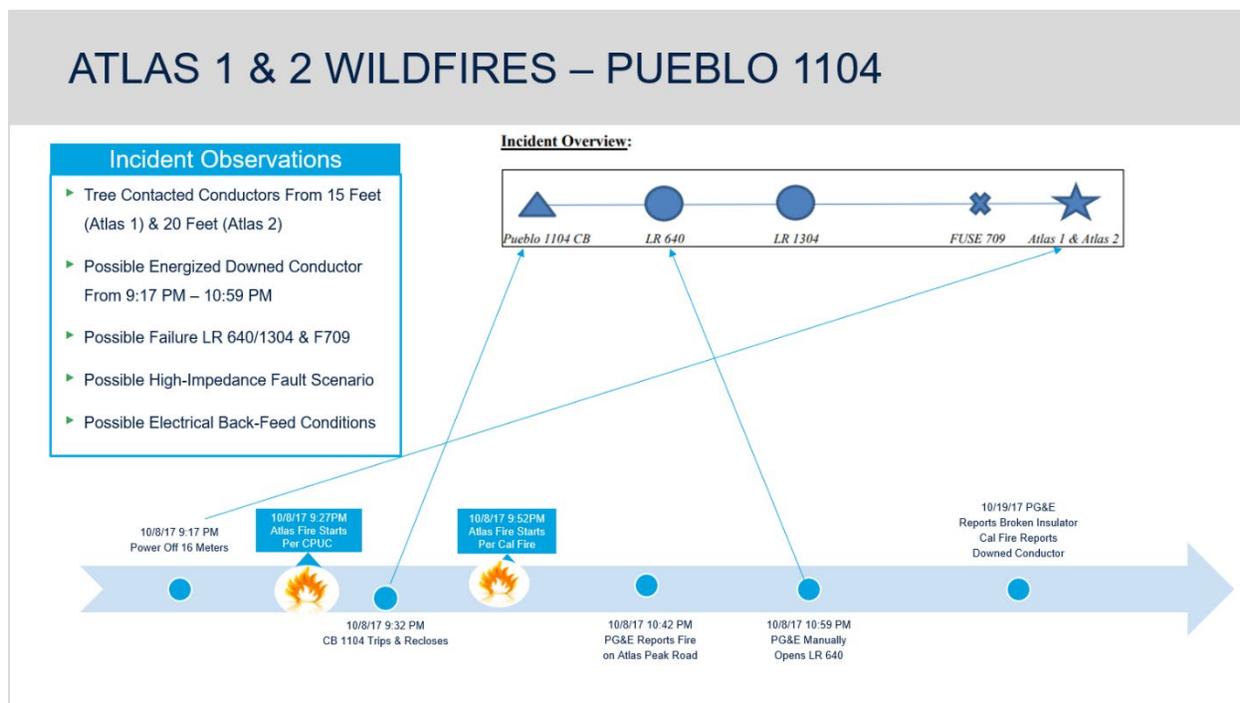


## Atlas 1 & 2 Wildfires – Pueblo 1104

The Atlas 1 & 2 Wildfires involved the Pueblo 1104, a 3-wire 12,000-volt circuit; the analysis found that two trees 15 and 20 feet away contacted the primary conductors. Smart meters located downstream of fuse 709 and LR1304 recorded power-off events beginning at 9:17 PM.

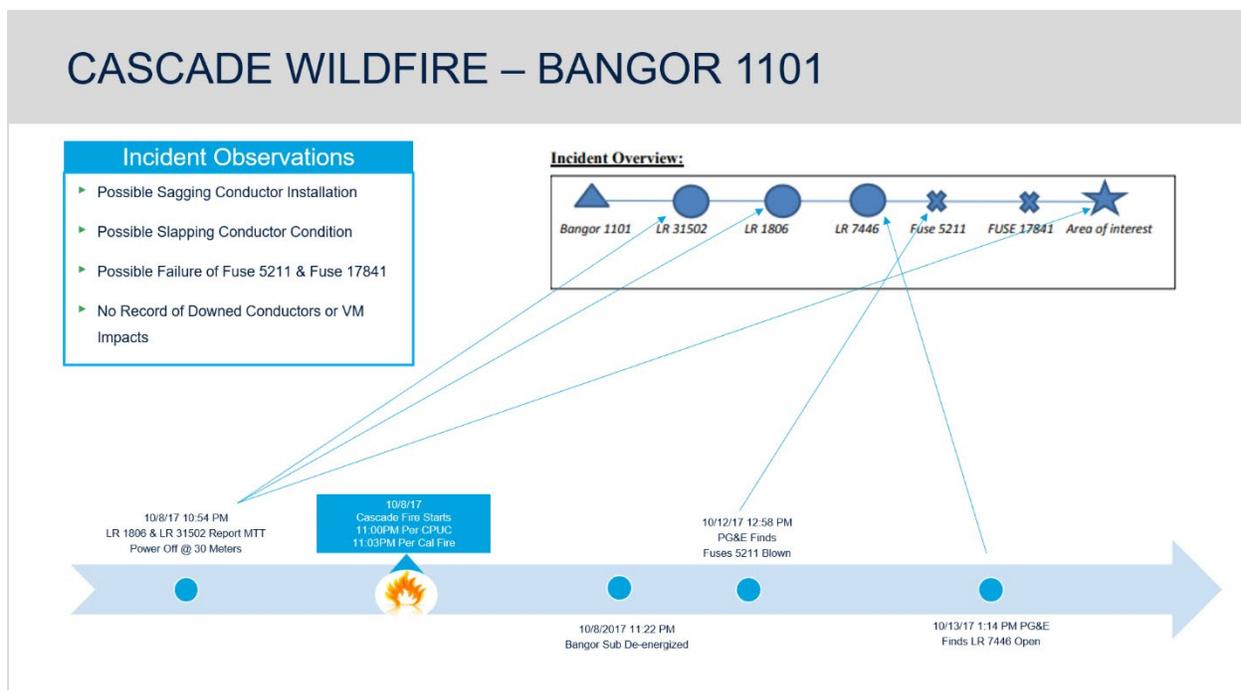
The tree contact brought the conductor to the ground where it remained energized for an extended period of time. None of the installed protective equipment – fuse 709, LR1304, or LR640 – detected or cleared the faulted condition.

PG&E de-energized the location at 10:59 PM by manually operating LR640. Fulgurites were found at the incident location.



## Cascade Wildfire – Bangor 1101

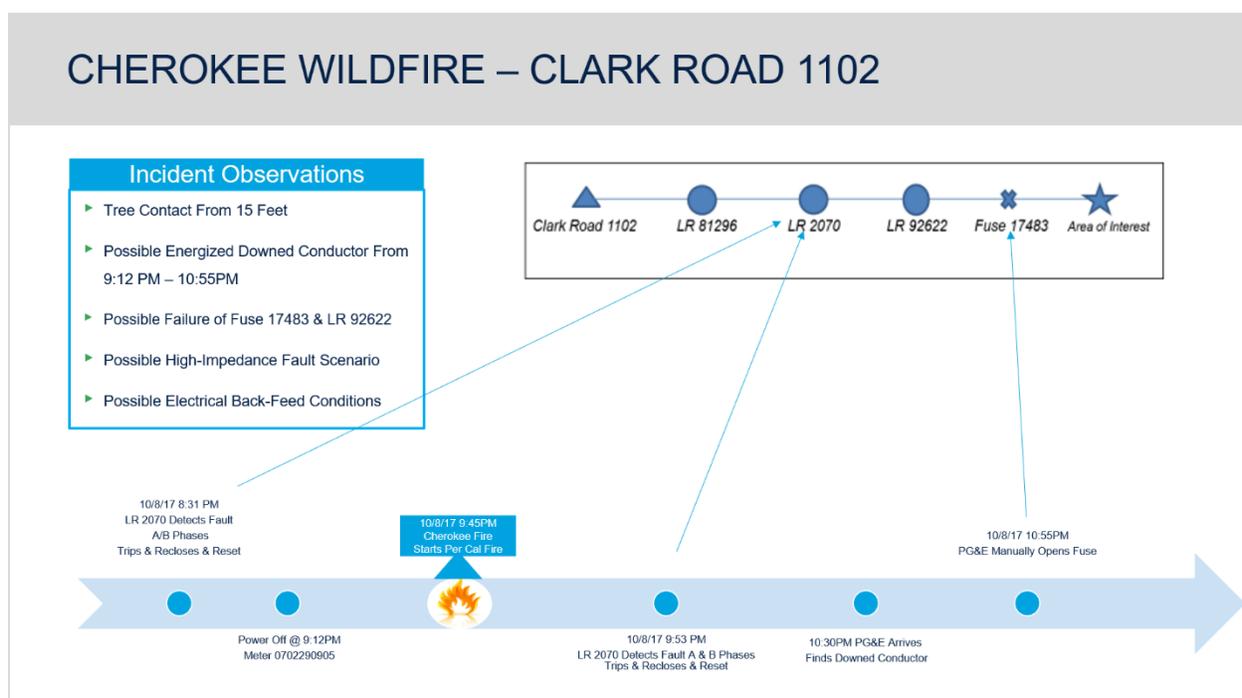
The Cascade Wildfire involved the Bangor 1101, a 3-wire 12,000-volt circuit; the analysis determined the cause to be sagging phase conductors that came into contact due to wind conditions. The resulting phase-to-phase fault went undetected by fuse 17841.



## Cherokee Wildfire – Clark Road 1102

The Cherokee Wildfire involved the Clark Road 1102, a 3-wire 12,000-volt circuit; the analysis found a tree 15 feet away contacted the primary conductors at approximately 8:31 PM causing downed conductors. The downed conductors remained energized following multiple protective system detections and reclosing operations.

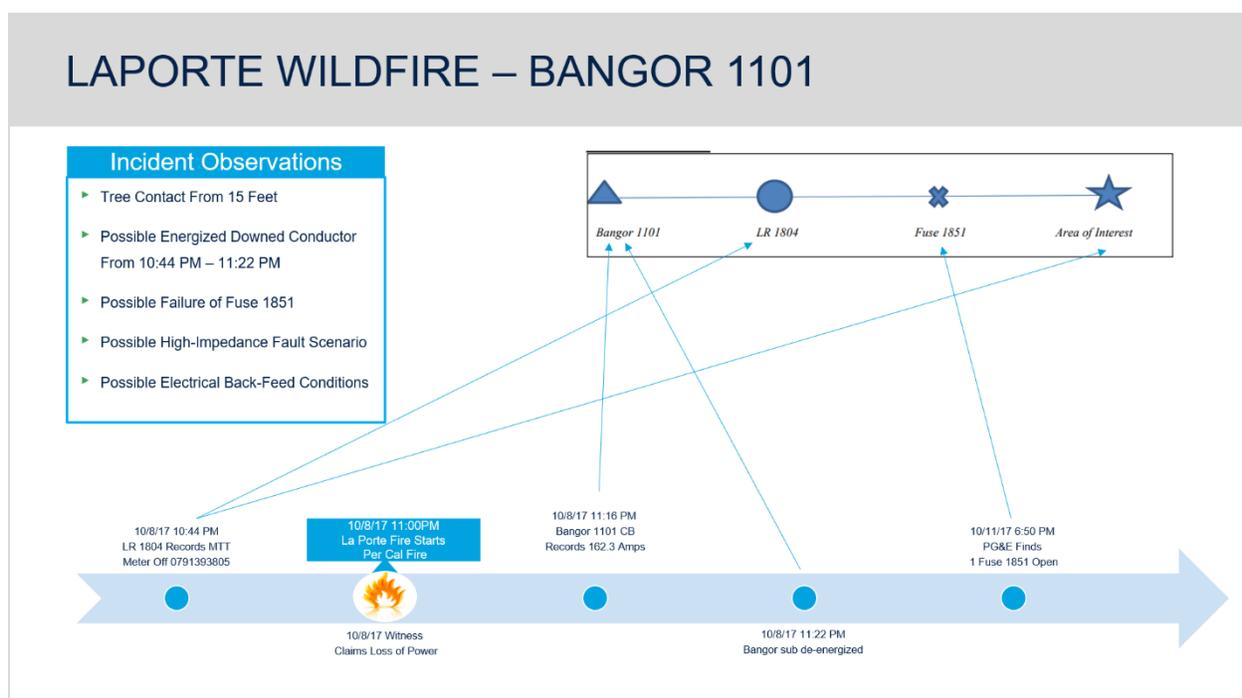
PG&E de-energized the incident location at 10:55 PM by manually opening fuse 17483. Fuse 17483 did not blow, LR 92622 did not detect, and LR 2070 detected and reclosed at 9:12 PM and again at 9:53 PM. The faulted circuit location was a high-impedance fault condition, with back-feed that remained downed and energized for approximately 144 minutes.



## LaPorte Wildfire – Bangor 1101

The LaPorte Wildfire involved the Bangor 1101, a 3-wire 12,000-volt circuit; the analysis found a tree 15 feet away contacted the primary conductors at approximately 10:44 PM, causing downed conductors. The protective equipment installed did not perform as intended, and the downed conductors remained energized.

Only one of two fuses blew at fuse 1851; LR 1804 recorded MTT at 10:44 PM and again at 11:16 PM; the station breaker recorded 162 amps at this same time. The incident ended at 11:22 PM when the 60kV transmission circuit Colgate-Palermo tripped and deenergized the Bangor station.

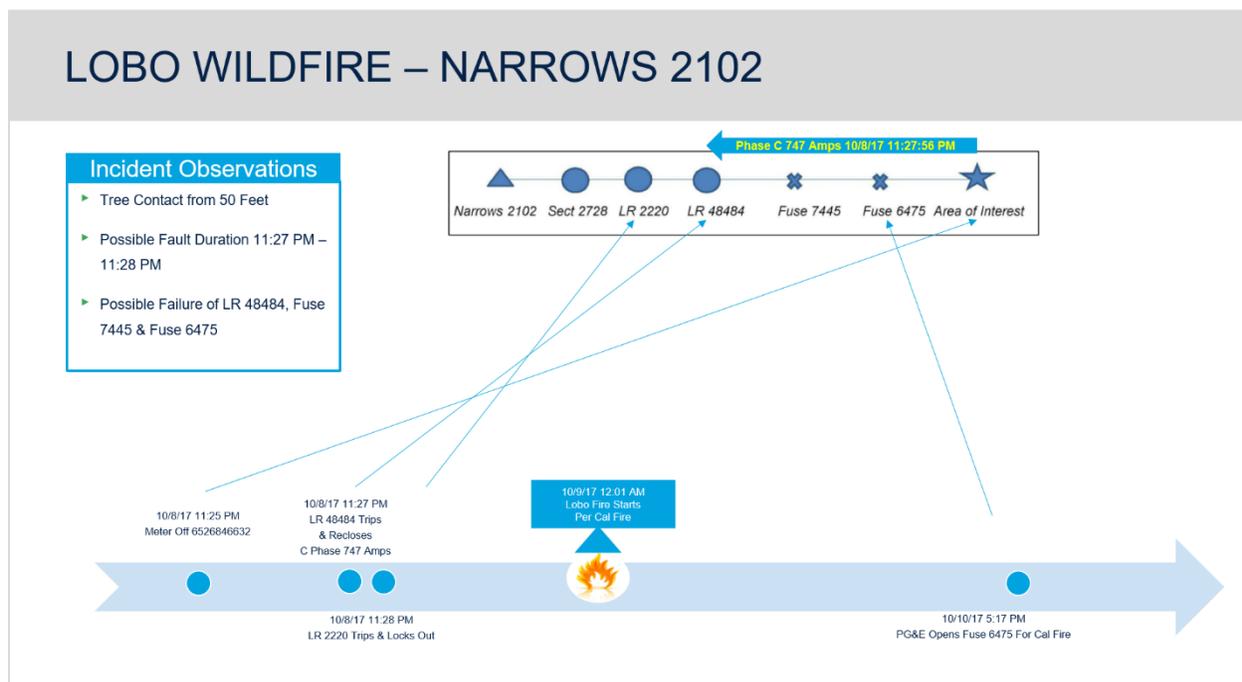


## Lobo Wildfire – Narrows 2102

The Lobo Wildfire involved the Narrows 2102 circuit, a 4-wire multi-grounded 21,000-volt distribution circuit; the analysis found that a tree 50 feet away contacted the primary conductors at approximately 11:25 PM.

As the tree fell, it caught the single energized phase and neutral and was suspended above the ground. The resulting contact pushed the conductor close enough to the neutral to cause tracking, which increased to enough of a fault condition (approximately 2-3 minutes) to be detected and de-energized by LR 2220.

However, fuse 6475, fuse 7445, and LR 48484 failed to detect the fault conditions and operate. This analysis was unable to determine the installed fuse size at fuses 6475 and 7445 or confirm any recordings or settings on LR 48484.

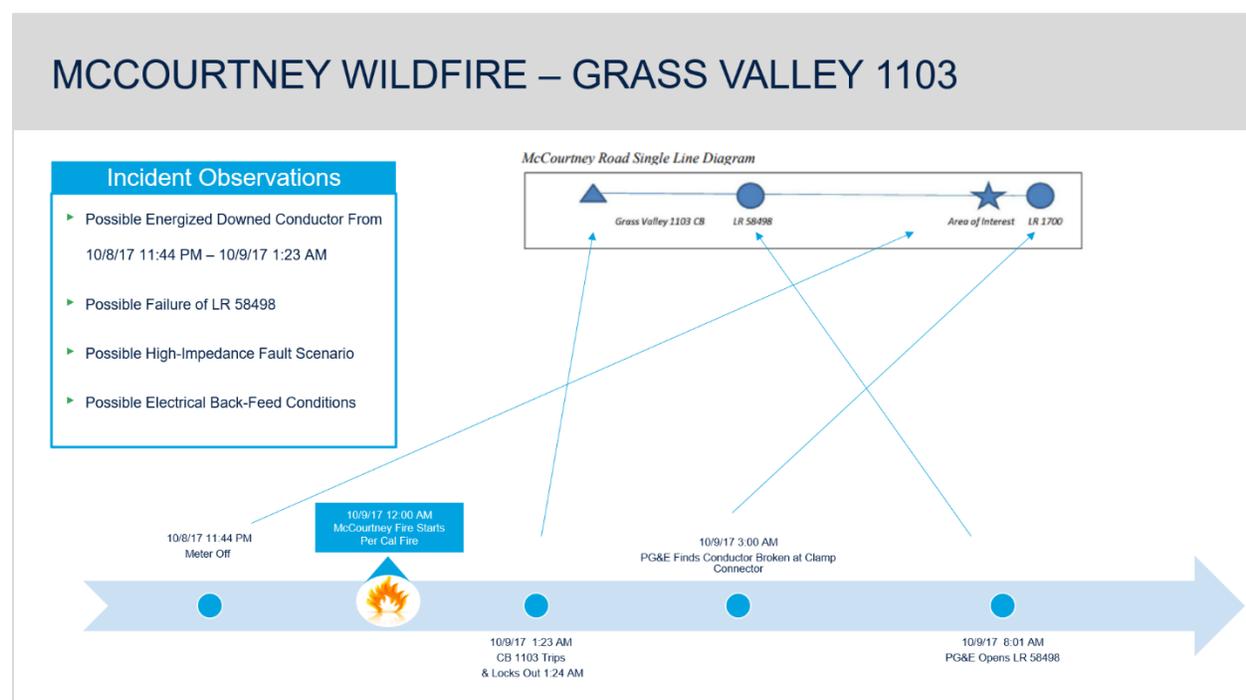


## McCourtney Wildfire – Grass Valley 1103

The McCourtney Wildfire involved the Grass Valley 1103 circuit, a 3-wire 12,000-volt circuit; the analysis found the presence of extensive fulgurites caused by an energized downed conductor.

Photographic evidence confirmed a downed energized conductor caused the fulgurites to form; the event began at 11:44 PM and ended at 1:23 AM the following morning.

There were no available records for LR 58498; hence, the analysis was unable to make a conclusive determination as to why LR 58498 did not detect and trip. Absent the records, the analysis finds that LR 58498 did not detect the fault conditions; the fault was detected by the station circuit breaker at 1:24 AM.



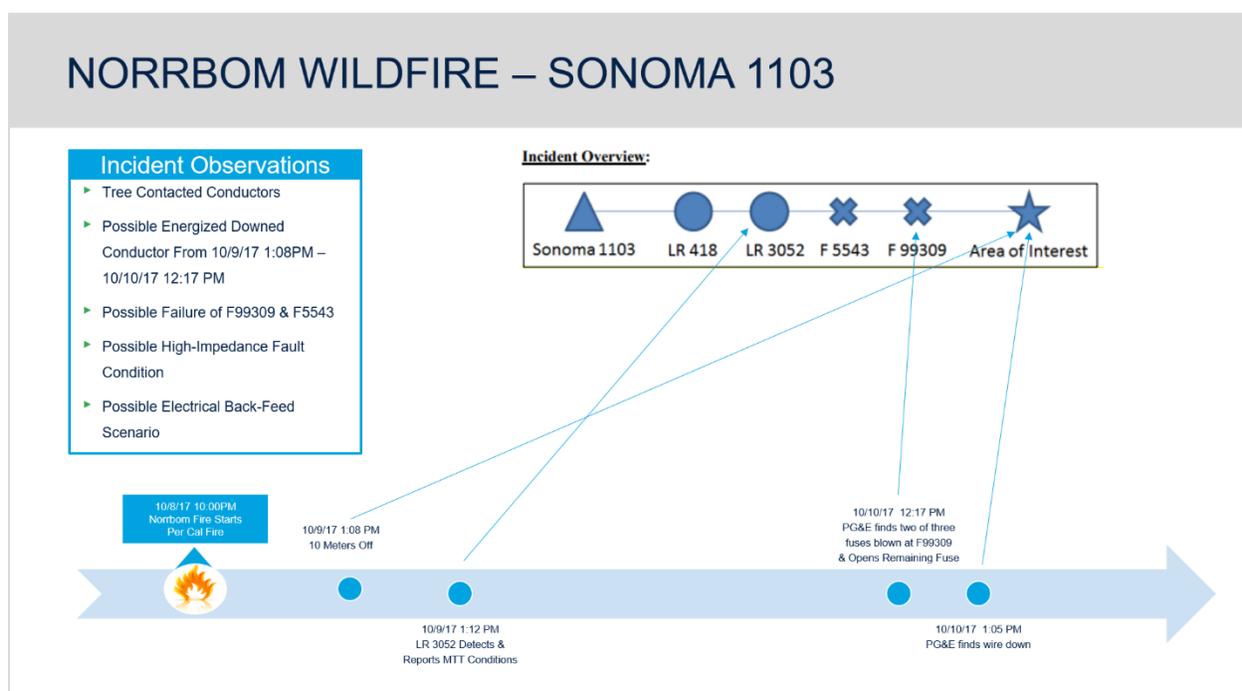
## Norrbom Wildfire – Sonoma 1103

The Norrbom Wildfire involved the Sonoma 1103, a 3-wire 12,000-volt circuit; the analysis found that a tree contacted the primary conductors and remained suspended at approximately 1:08 PM on October 9, 2017 when several smart meters recorded a power-down event.

The next day, October 10, 2017, PG&E found two of three fuses blown at fuse 99309 and a wire down six spans from the fuse location. The PG&E field Troublemaker opened the remaining fuse, de-energizing the circuit at 12:17 PM.

It's possible that the event initiated late evening on October 8, 2017; both the station circuit breaker and LR 3052 detected faulting conditions below tripping settings during this time. The data available is incomplete and does not support conclusive incident observations.

None of the protective equipment installed performed as intended. The single-phase fuse that did not blow, at fuse 99309, energized the downed conductor and caused a back-feed condition to be present.

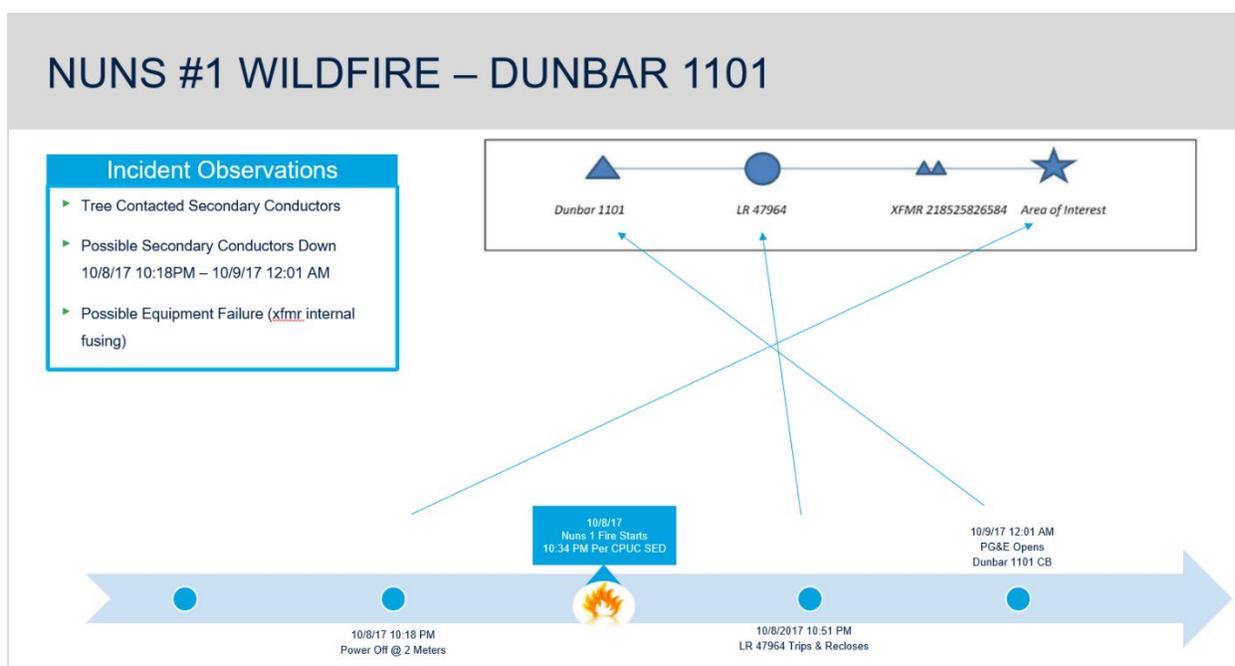


## Nuns #1 Wildfire – Dunbar 1101

The Nuns #1 Wildfire involved the Dunbar 1101, a 3-wire 12,000-volt circuit; the analysis found that a tree contacted and broke the 'open wire' configuration secondary conductors which remained energized on the ground. Smart meters recorded power-off conditions on October 8, 2017 at approximately 10:18 PM.

The Dunbar 1101 circuit was de-energized by PG&E manually on October 9, 2017 at 12:01 AM. The downed secondary conductors would have likely remained energized.

The PG&E dataset did not contain details about the power transformer design and whether the unit had been equipped with an internal protective fuse. It's possible that the downed secondary conductors would have been de-energized by the internal transformer protective fuse tripping.

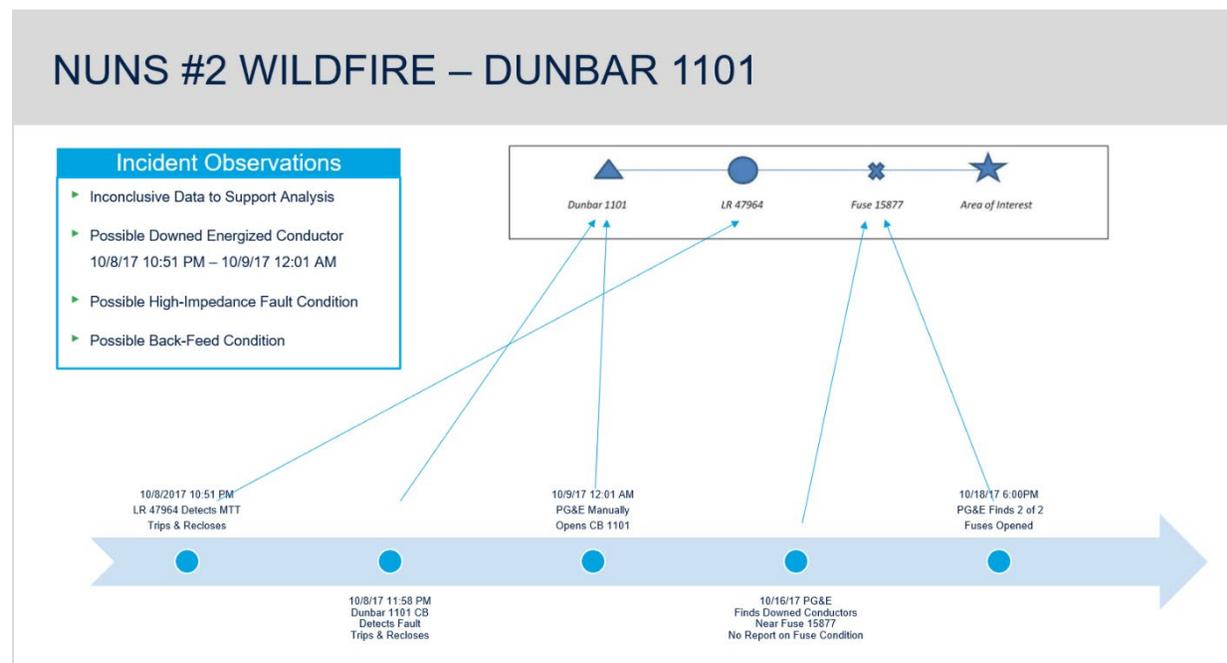


## Nuns #2 Wildfire – Dunbar 1101

The Nuns #2 Wildfire involved the Dunbar 1101, a 3-wire 12,000-volt circuit; the dataset for the analysis was inconclusive.

On October 8, 2017 at 10:51 PM, LR 47964 detected fault conditions, tripped, and reclosed. The Dunbar 1101 station circuit breaker detected fault conditions eight minutes later, tripped, and reclosed. Finally, on October 9, 2017 at 12:01 AM, PG&E manually opened circuit breaker 1101 at the request of CAL FIRE and because of fire activity in the area.

The available dataset did not support conclusive observations; however, the known sequencing of the protective equipment and the CPUC-SED photographic evidence (CPUC, SED E20171016-01, Page 18) of the copper conductors removed from the Nuns #2 location would indicate an energized downed conductor. The conductor damage is consistent with a high-current fault condition which might explain the recorded overcurrent faults of 562 amps at 11:13 PM.

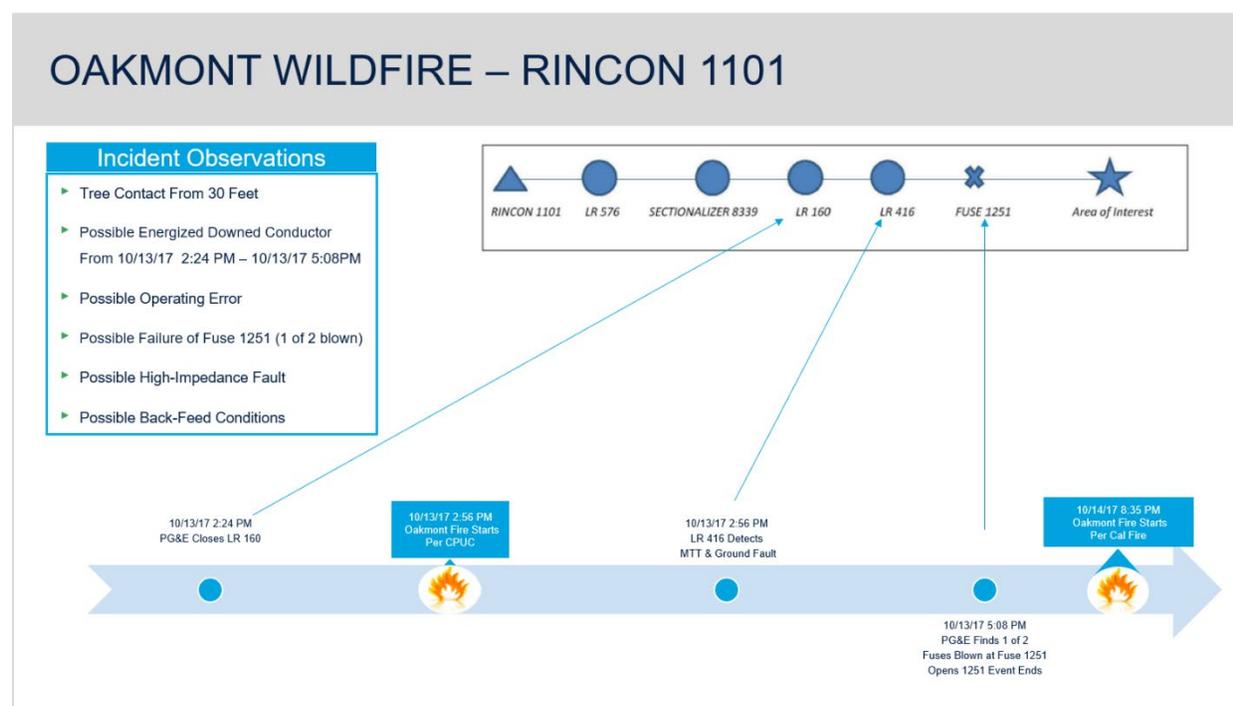


## Oakmont Wildfire – Rincon 1101

The Oakmont Wildfire involved the Rincon 1101 circuit, a 3-wire 12,000-volt circuit; the analysis found that PG&E caused an operating error during emergency restoration activities.

On October 13, 2017 during restoration procedures, PG&E closed LR 160 into a downed conductor that might have occurred earlier and was not found during a line patrol. Only one of two fuses at fuse 1251 blew, possibly due to a high-impedance fault, and back-feed conditions were present for approximately 164 minutes.

None of the remaining installed protective equipment detected the high-impedance fault condition and the conductor remained energized until PG&E manually opened the unblown fuse.

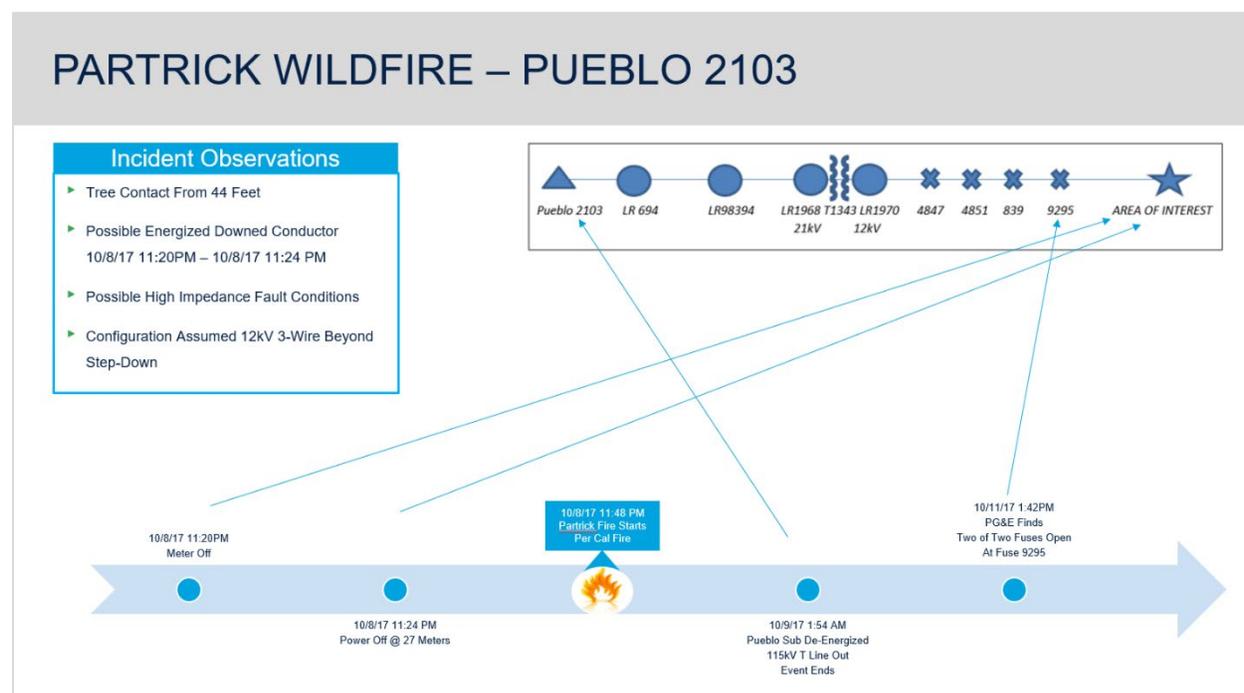


## Partrick Wildfire – Pueblo 2103

The Partrick Wildfire involved the Pueblo 2103 circuit, a 4-wire multi-grounded 21,000-volt distribution circuit; the analysis found that a tree contacted the primary conductors from 44 feet away sometime between 11:20 PM and 11:24 PM on October 8, 2017 when several smart meters recorded a power-down event.

The Pueblo 2103 circuit included a step-down to 12,000-volt configuration. The step-down portion of the circuit experienced the event and subsequent wildfire. The configuration of the step-down portion of the circuit is thought to be a 3-wire uni-grounded design configuration.

The available dataset does not support a conclusive incident observation regarding when the two fuses at 9295 opened. However, it is possible that fuse 9295 operated properly, and two fuses blew when the tree contacted the conductors, de-energizing the line immediately.



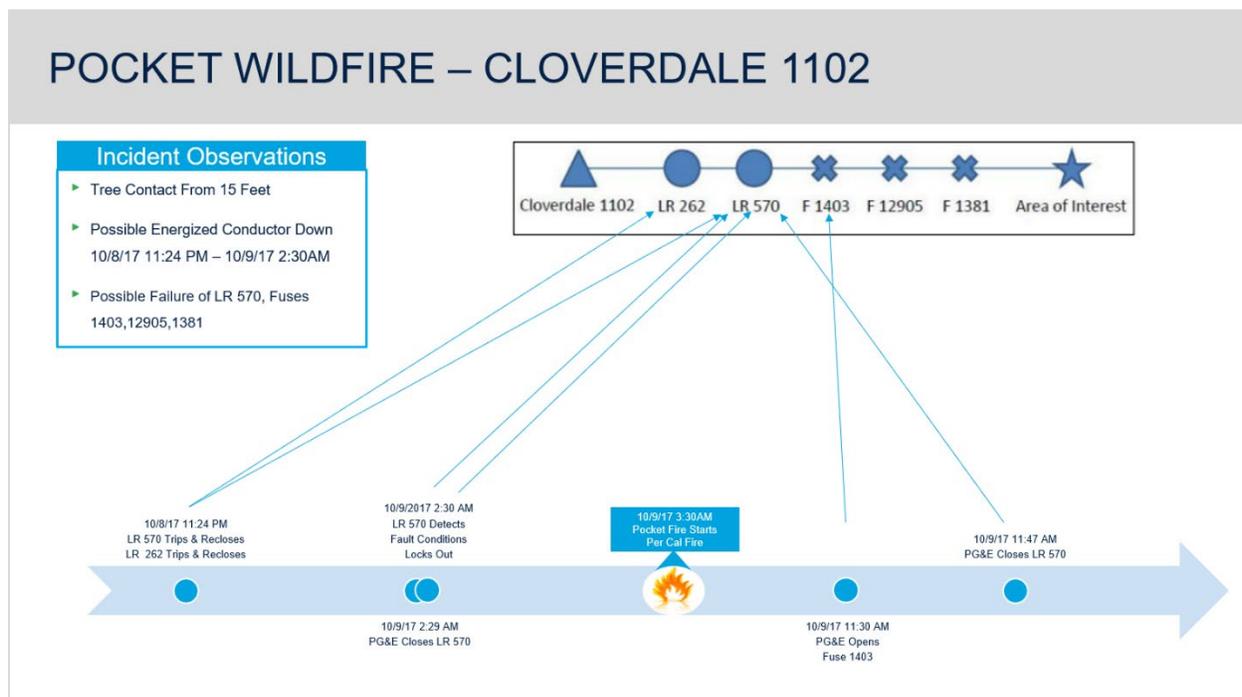
## Pocket Wildfire – Cloverdale 1102

The Pocket Wildfire involved the Cloverdale 1102, a 3-wire 12,000-volt circuit; the analysis found that a tree 15 feet away contacted the primary conductors on October 8, 2017 at approximately 11:24 PM when LR 570 and LR 262 detected fault conditions. Both of the recloser devices, LR 570 and LR 262, tripped and reclosed.

PG&E reports that LR 570 remained open; however, the device record shows LR 570 closed at 11:25 PM. On October 9, 2017 at 2:30 AM, LR 570 detected fault conditions, tripped, and locked out.

The available dataset does not support a conclusive incident observation regarding fuses 1381, 12905, and 1403. The CAL FIRE Investigative Report (17CALNU010057, Page 46) notes that data provided by PG&E shows an operating device, fuse 3181, that was involved at the time but doesn't describe the condition of the fuse. Hence, this analysis cannot render any conclusive findings.

However, the presence of fulgurites as found by CAL FIRE is indicative of a downed energized conductor with an extended duration, such as the timeframe from October 8, 2017 11:24 PM to October 9, 2017 2:30 AM or 186 minutes.

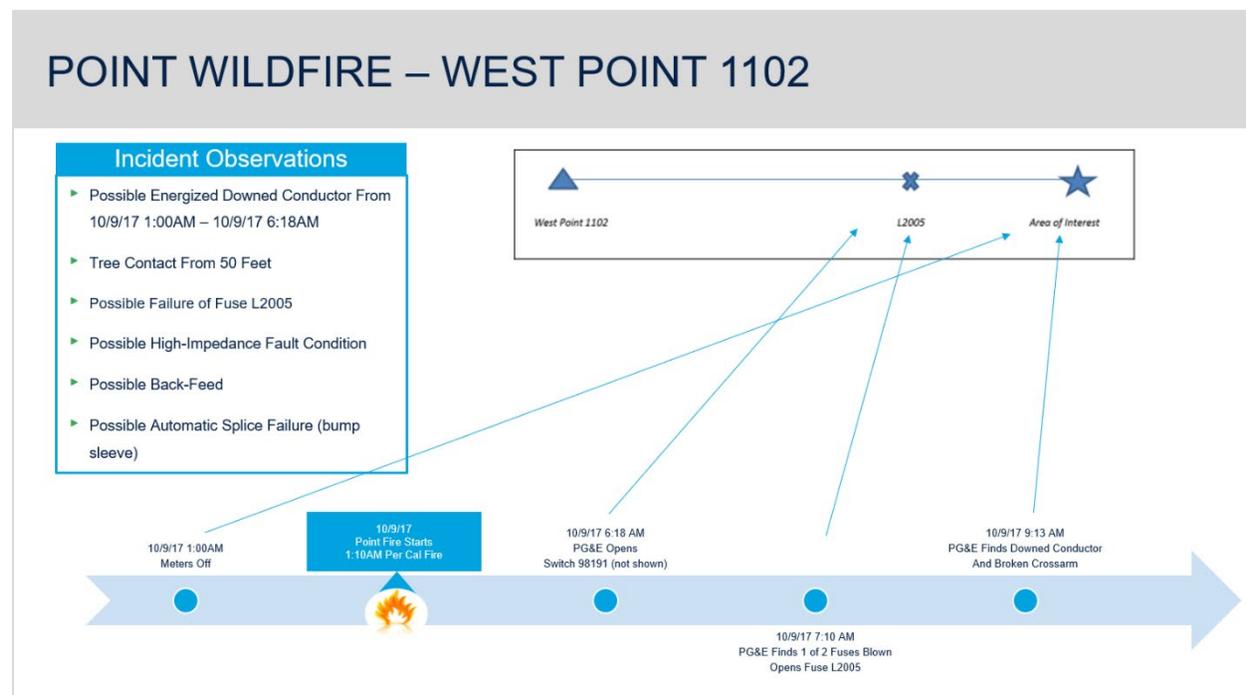


## Point Wildfire – West Point 1102

The Point Wildfire involved the West Point 1102, a 3-wire 12,000-volt circuit; the analysis found that a tree 50 feet away contacted the primary conductors on October 9, 2017 at approximately 1:00 AM.

The fault conditions, likely a high-impedance fault, caused only one of two fuses to blow at LR 2005. The resulting downed conductor remained energized, and a back-feed condition was present until PG&E opened the unblown fuse at LR 2005.

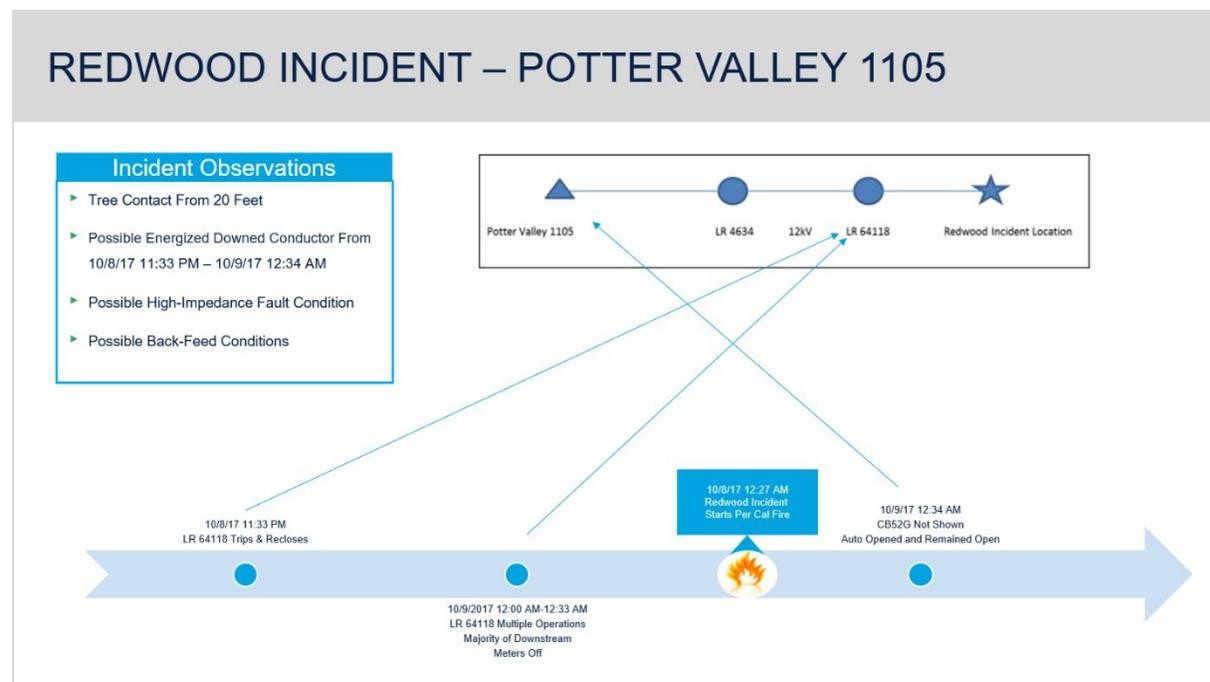
PG&E provided a detailed analysis of the smart meter data on meters downstream of LR 2005, confirming an energized wire down condition from 12:45 AM to 6:18 AM.



## Redwood Incident – Potter Valley 1105

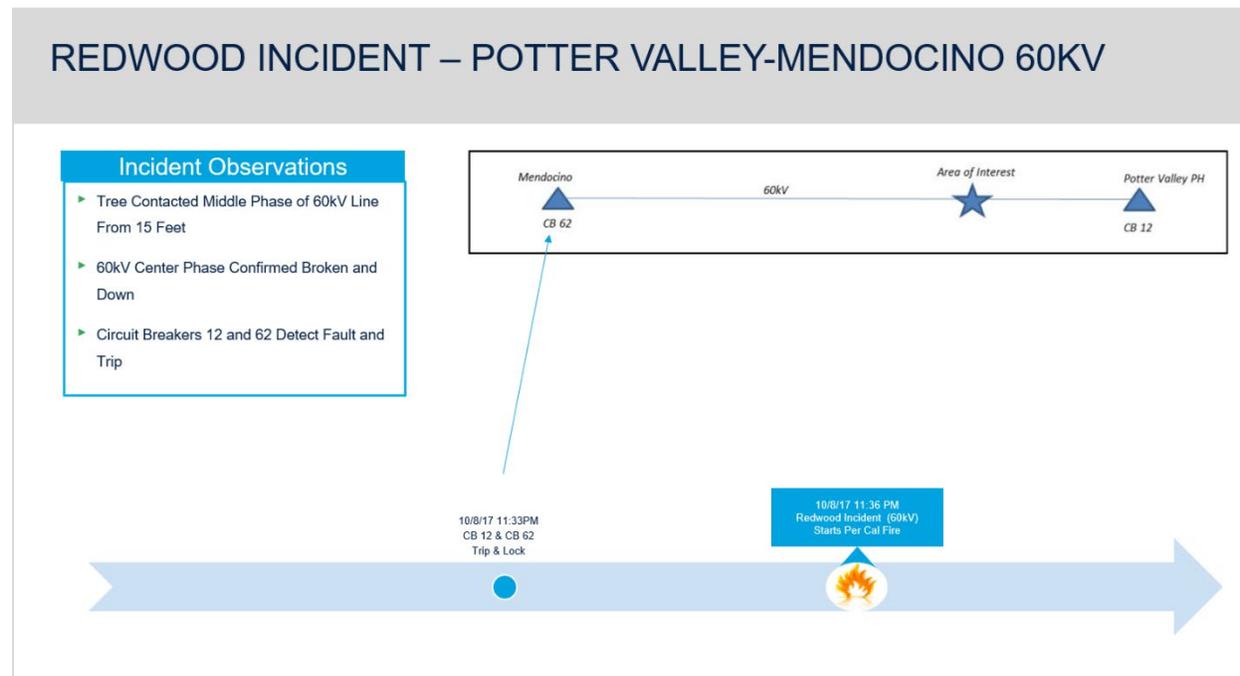
The Redwood Incident involved the Potter Valley 1105 circuit, a 3-wire 12,000-volt circuit; the analysis found a tree 20 feet away contacted the primary conductors on October 8, 2017 at approximately 11:33 PM when LR 64118 detected fault conditions, tripped, and reclosed.

The result was a downed energized conductor. LR 64118 and LR 4634 did not detect the fault conditions which were likely high impedance, with a long enough duration and intensity to cause fulgurites to be formed.



## Redwood Incident – Mendocino 60kV

The Redwood Incident also involved the Potter Valley-Mendocino 60,000-volt transmission line; the analysis found that a tree 15 feet away contacted the primary conductors at approximately 11:33 PM when station circuit breakers 12 & 62 detected fault conditions, tripped, tested the line, found a fault condition, and locked out.

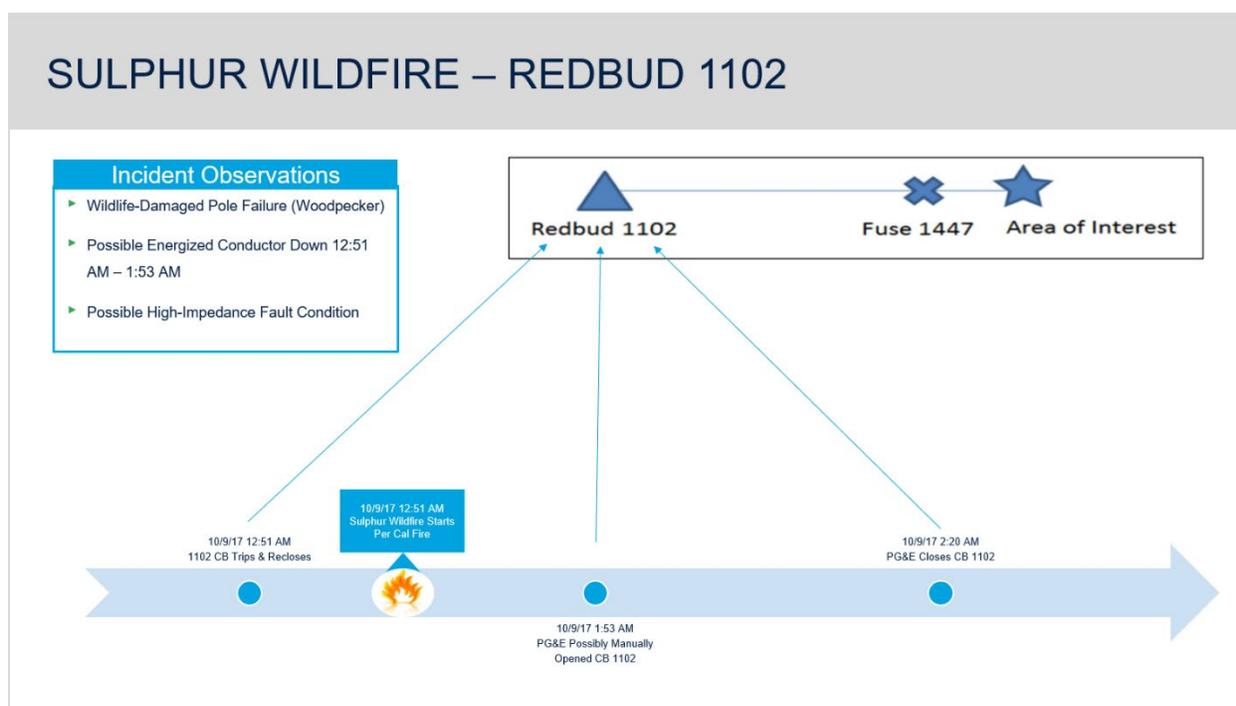


## Sulphur Wildfire – Redbud 1102

The Sulphur Wildfire involved the Redbud 1102, a 3-wire 12,000-volt circuit; the analysis found that an equipment pole failed due to wildlife nesting. A woodpecker had built a nest in the heartwood of the pole which had protective fusing equipment mounted above the nest; the weakened pole failed and fell at approximately 12:51 AM.

The pole failure resulted in downed conductors and fault conditions that were detected by the station circuit breaker CB 1102.

The PG&E Incident Description and Factual Summary indicates CB 1102 tripped and locked out at 12:51 AM; however, the records reviewed in this analysis show CB 1102 tripped at 12:51 AM and reclosed at 12:52 AM. The circuit remained energized until being remotely opened by PG&E at 1:53 AM.

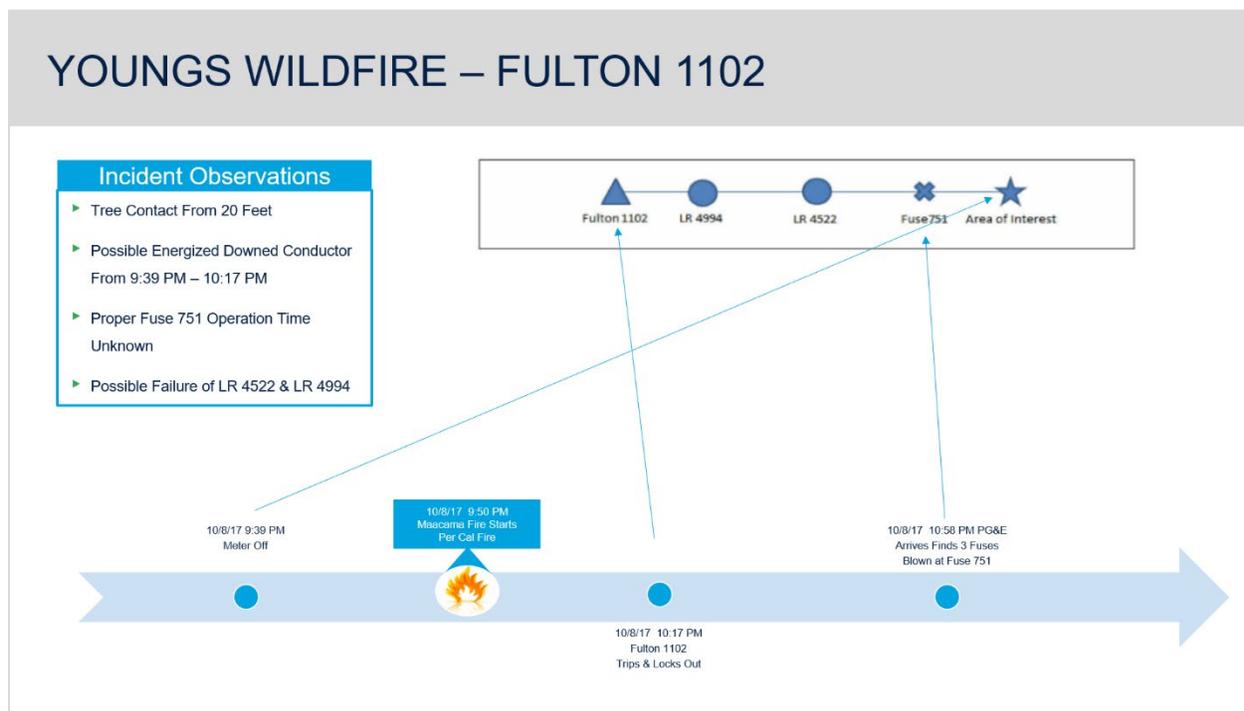


## Youngs Wildfire (Maacama Lane) – Fulton 1102

The Youngs Wildfire involved the Fulton 1102 circuit, a 3-wire 12,000-volt circuit; the analysis was inconclusive to determine the approximate sequence of events.

A tree 20 feet away contacted the primary conductors. PG&E found all three fuses blew at fuse 751; however, there is no way to know the exact time when the fuses blew. Based on smart meter records, some meters were still energized beyond 9:39 PM and downstream of fuse 751 which would indicate the circuit was still energized.

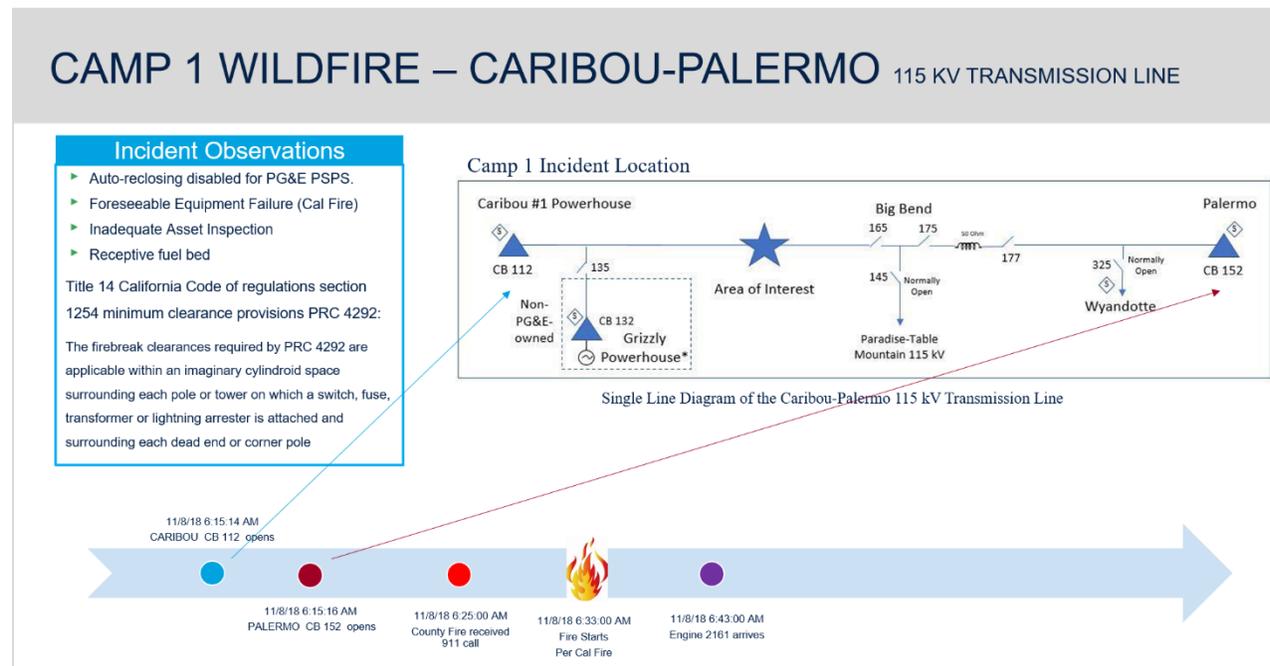
The analysis is incomplete without further smart meter data. The possibility of an energized downed conductor, between 9:39 PM and 10:17 PM for 38 minutes, cannot be ruled out.



## Camp #1 Wildfire – Caribou-Palermo 115kV

The Camp #1 Wildfire involved the Caribou-Palermo 115,000-volt transmission line; the electrical circuit analysis found that the line detected and tripped fault conditions on November 8, 2018 at 6:15 AM.

A large volume of physical, technical, and other investigations and studies confirm the point of failure originated in a 'C' hook that suspended the conductors. Energized conductors contacted the tower causing a high-energy fault.



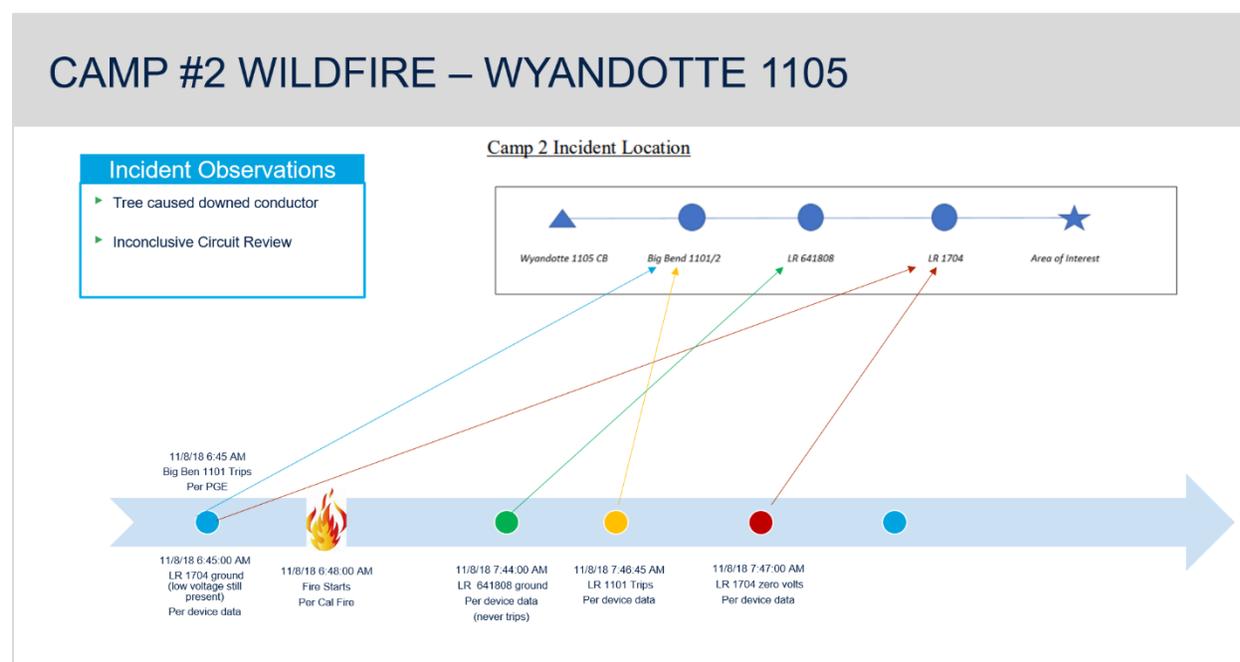
## Camp #2 Wildfire – Wyandotte 1105

The Camp #2 Wildfire involved the Wyandotte 1105, a 3-wire 12,000-volt circuit; the electrical circuit analysis found that LR 1704 detected fault conditions at 6:45 AM, tripped, and locked out since the reclosing feature had been disabled due to a high-fire threat.

The available PG&E evidence related to the electrical circuit is inconclusive beyond 6:45 AM.

CAL FIRE investigations refer to video evidence from fire lookouts of smoke and fire in the area at 6:48 AM, and subsequent site findings support a defective tree contacting the circuit and sustaining ‘conductor’ burn marks.

It is possible the tree contact caused LR 1704 to detect and trip at 6:45 AM, and enough energy was released to cause an ignition.



## J. Failure Decision Analysis (FDA) Methodology

The Root Cause Analysis for each wildfire produced the data required to determine the true root causes of each ignition. The RCA Team developed a Failure Decision Analysis (FDA) methodology to use this data to determine the true root causes for each wildfire ignition. FDA is a graphical technique that identifies all potential failure causes. These are the most fundamental causes that can reasonably be identified that management has control to fix, and when fixed, will prevent (or significantly reduce the likelihood of) the problem's recurrence.<sup>36</sup> The model for the FDA developed for this effort is in **Figure 6** below.

For each fire, the FDA criteria was developed in two key areas. The first area was the Condition/Effect/Result criteria which included the energized conductor present, high-impedance fault, back-feed condition, and/or multi-phase fault. The second area was Apparent Root Cause as it relates to the direct cause based on physical failure evidence:

- Tree Cause
- Protection System Failure
- Equipment Failure
- Manual Operation Error
- System Design
- Protection Scheme

Following the process from the initial system symptom of a fault condition to the Condition/Effect/Result criterion then to the apparent root cause, a root cause category can be derived.

Root cause categories are defined as programmatic or process-related activities, such as inspection, maintenance, management, implementation, design, and human performance. Programmatic or process-related activities used in the RCA are defined below in **Table 7** followed by the FDA model.

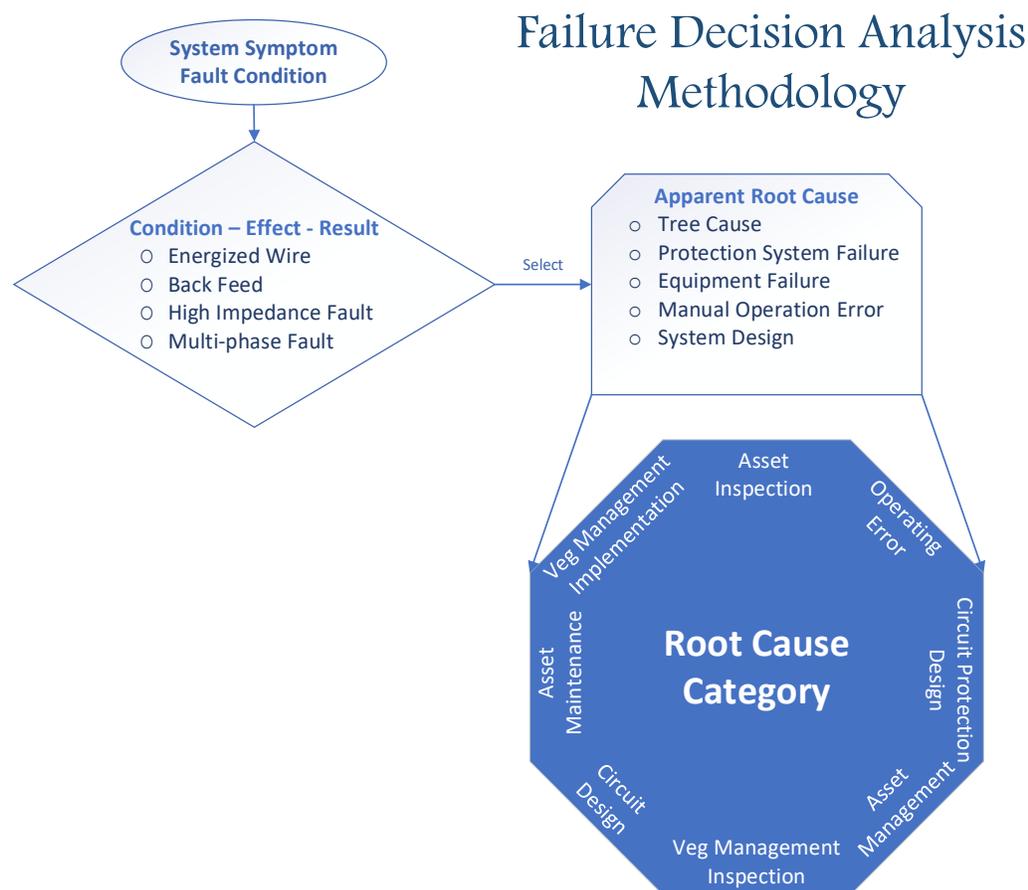
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<sup>36</sup> TAPROOT System Improvements, Inc.

**Table 7.** Root Cause Category Definitions

Root Cause	Defined
<b>Asset Inspection</b>	Inadequate procedure for and/or inspection of distribution facilities that fails to ensure reliable, high-quality, and safe operation.
<b>Asset Maintenance</b>	Electrical systems not adequately maintained for their intended use, with regard being given to the conditions under which they are to be operated, to enable the furnishing of safe, proper, and adequate service.
<b>Asset Management</b>	Lacking a defined systematic process of cost-effectively operating, maintaining and upgrading critical electrical assets by combining engineering practices and economic analysis with sound business practice, including tracking age, usage, maintenance history, and a range of other variables.
<b>Circuit Design</b>	The design of the 3-wire overhead distribution systems creates a condition in which the circuit protective devices, comprising circuit breakers, reclosers, sectionalizers and fuses, frequently do not detect and interrupt a phase to ground fault (L-G fault) caused by one or more downed conductors.
<b>Circuit Protection Design</b>	Inadequate circuit protection design to protect the electrical circuit from damage in the event of a fault such as high temperature, excessive current or a short circuit in a conductor.
<b>Operating Error</b>	An event or condition resulting from the failure, malfunction, or deterioration of the individual human performance associated with the process.
<b>VM Implementation</b>	Vegetation management trimming and removal performed were inadequate to establish necessary and reasonable clearances between line conductors and vegetation under normal conditions.
<b>VM Inspection</b>	Vegetation management inspection activities performed were inadequate to identify dead, rotten, or diseased trees or dead, rotten, or diseased portions of otherwise healthy trees overhanging or leaning toward—and may fall into—a span of electrical lines.

**Figure 6.** Failure Decision Analysis Methodology



The following pages summarize the findings of the Failure Decision Analysis for each of the wildfires. A more detailed explanation is provided for the Adobe Fire to help explain the graphical presentation of the findings for each fire.

### **Adobe Wildfire – Example**

#### Background

A Eucalyptus tree had fallen and all three of the primary conductors of the Dunbar 1101 (12 kV) circuit were on the ground. The Eucalyptus tree was green, approximately 120 feet tall, and rooted approximately 60 feet from the distribution conductors. The Eucalyptus tree struck suspended electrical conductors which broke and fell to the ground and onto surrounding vegetation. Several of the conductors remained energized and arced causing a vegetation fire.<sup>37</sup>

<sup>37</sup> CAL FIRE Investigation Report 17CALNU010050

The primary tap line conductors were #4AR (aluminum, steel reinforced) tree wire, installed in 1966.

Based on PG&E records, a Troublemaker reported that at Fuse 1261, two of three fuses had blown, and LR 234 operated and reclosed.

Arborists use the Beaufort Wind Scale to determine the effects of wind on trees. The Adobe Fire was not a high-wind event and is considered a normal weather event.

The subject tree was not identified for work; however, it was clearly a visible hazard tree that should have been identified and abated by PG&E. The primary form and structure defects would be readily visible to a diligent inspector performing a ground-based inspection along the right-of-way, especially one trained and sensitive to the electrical contact hazards posed by this tree.

#### Adobe Wildfire Criteria

The provided documents from PG&E, CAL FIRE, and CPUC-SED were reviewed to identify the criteria required to conduct the FDA for each of the wildfires. The follow represents the criteria for the Adobe Wildfire:

**Figure 7.** Sample Failure Decision Analysis Criteria

Criteria 1	Condition	Criteria 2	Condition	Criteria 3	Condition
Fault on Circuit	Yes	Wire Down	Yes	Tree-Caused Break	Yes
Fault Detected	Yes	Multi-Phase Fault	No	Tree in or Along ROW	Yes
Conductor Broken	Yes	Tree-Caused Fault	No	Compromised	Yes
Energized	Yes	Line Sag Caused	No	Known Defect or	No
Back-Feed Condition	Yes			Reasonably Detected	Yes
High-Impedance	Yes				

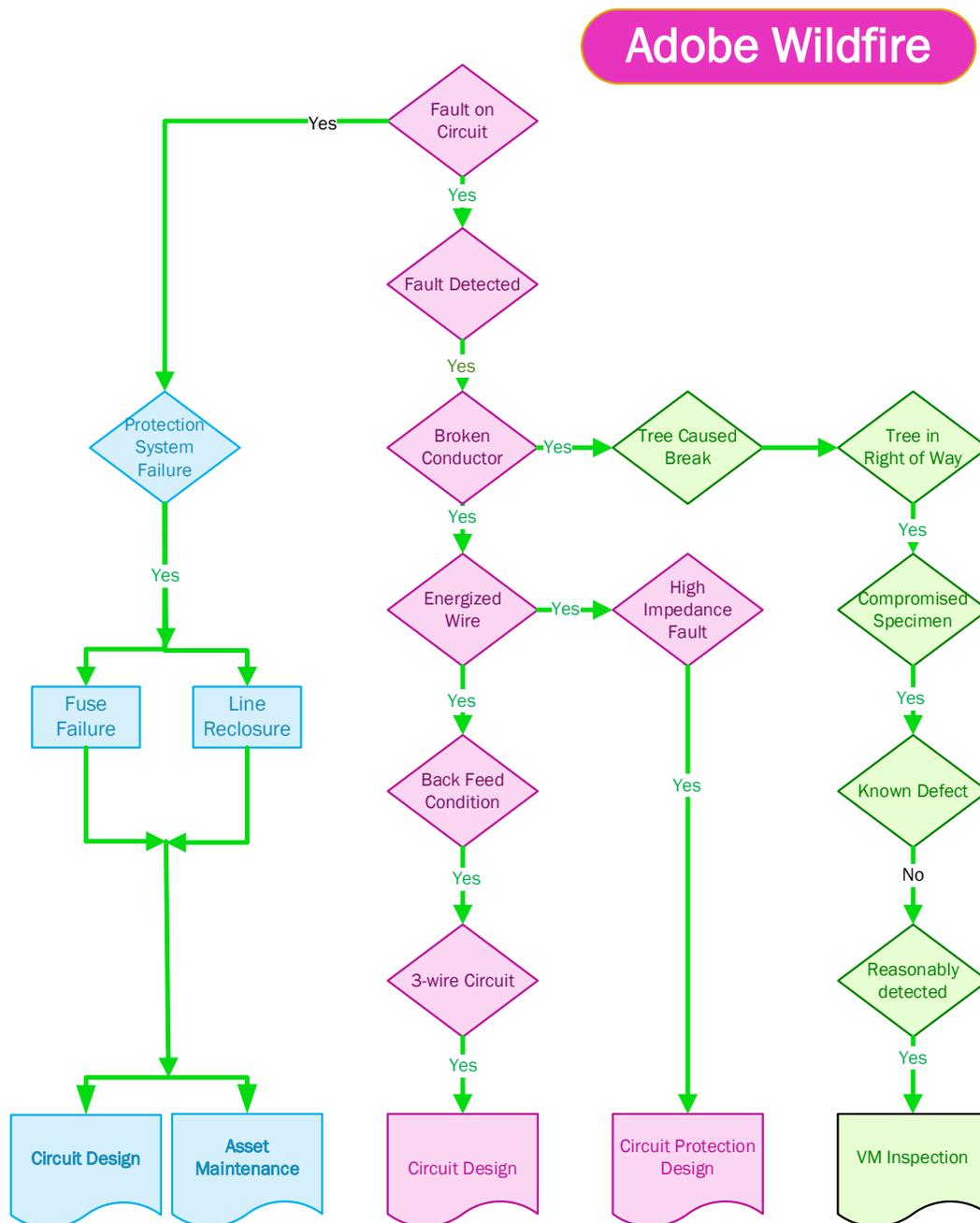
Criteria 4	Condition	Criteria 5	Condition
Wire Fatigue	No	Protection System Failure	Yes
Wire Type	#4 al	Protection System Failure Device	Fuse &
Insulator Failure	No	Equipment Failure	No
Connector Failure	No	Failed Component	N/A
Connector Type	N/A		



Based on the FDA process diagram, the root cause categories are determined. In the case of the Adobe Wildfire, the root cause categories are:

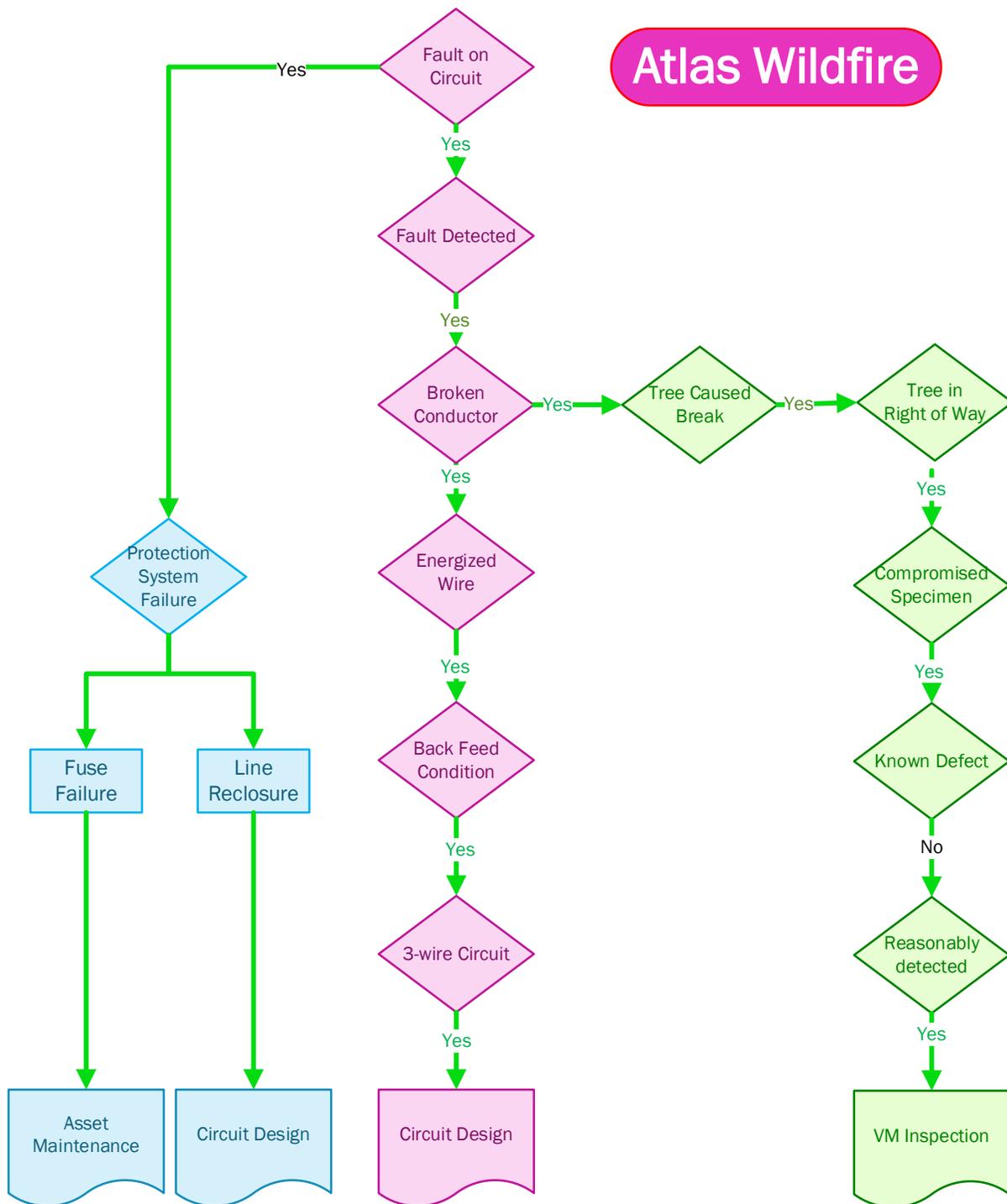
- Asset Maintenance
- Circuit Design
- Vegetation Management Inspection

1. Adobe Failure Decision Analysis Process Results Diagram

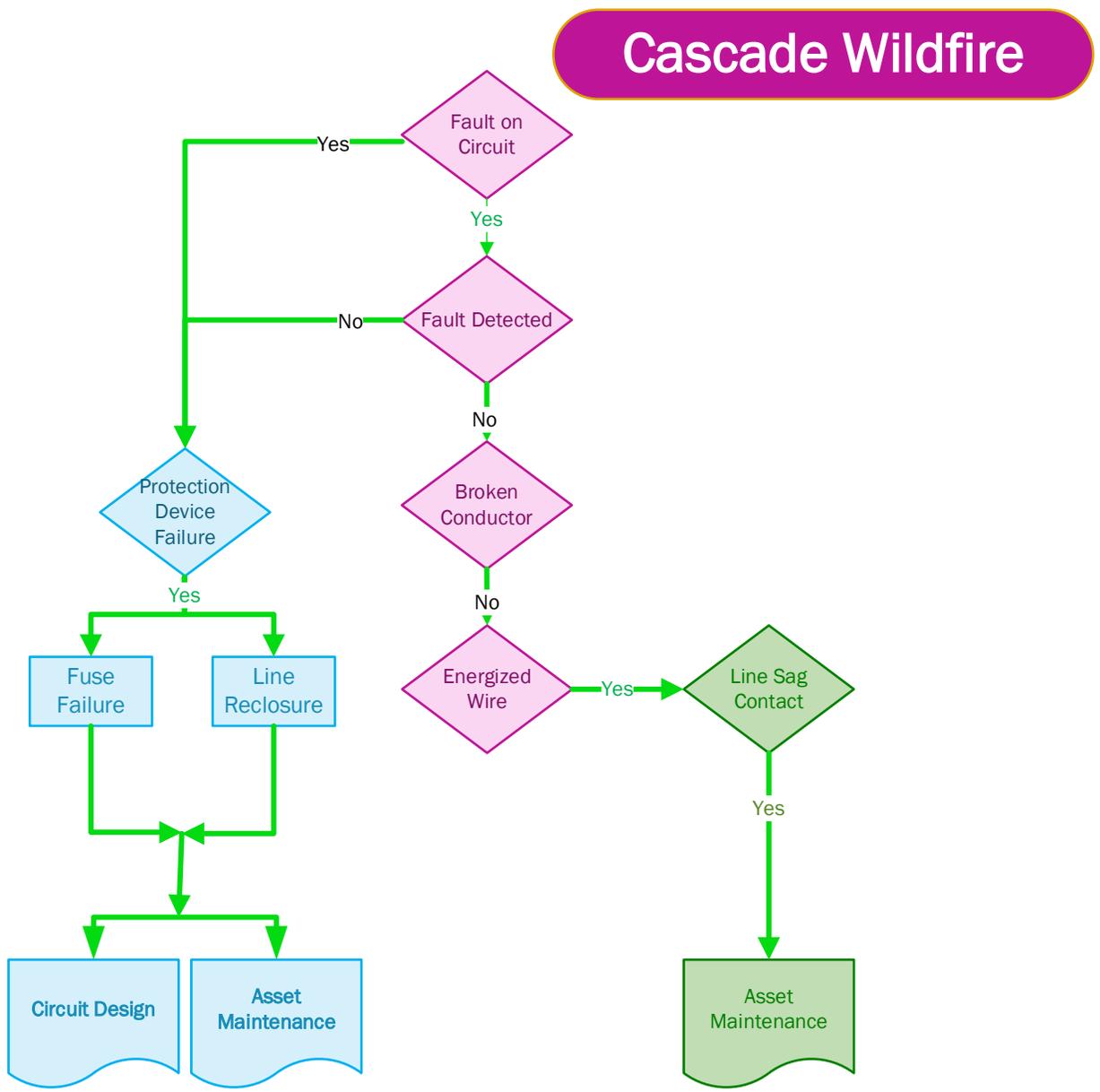


The Failure Decision Analysis flowcharts for each of the other fires follows.

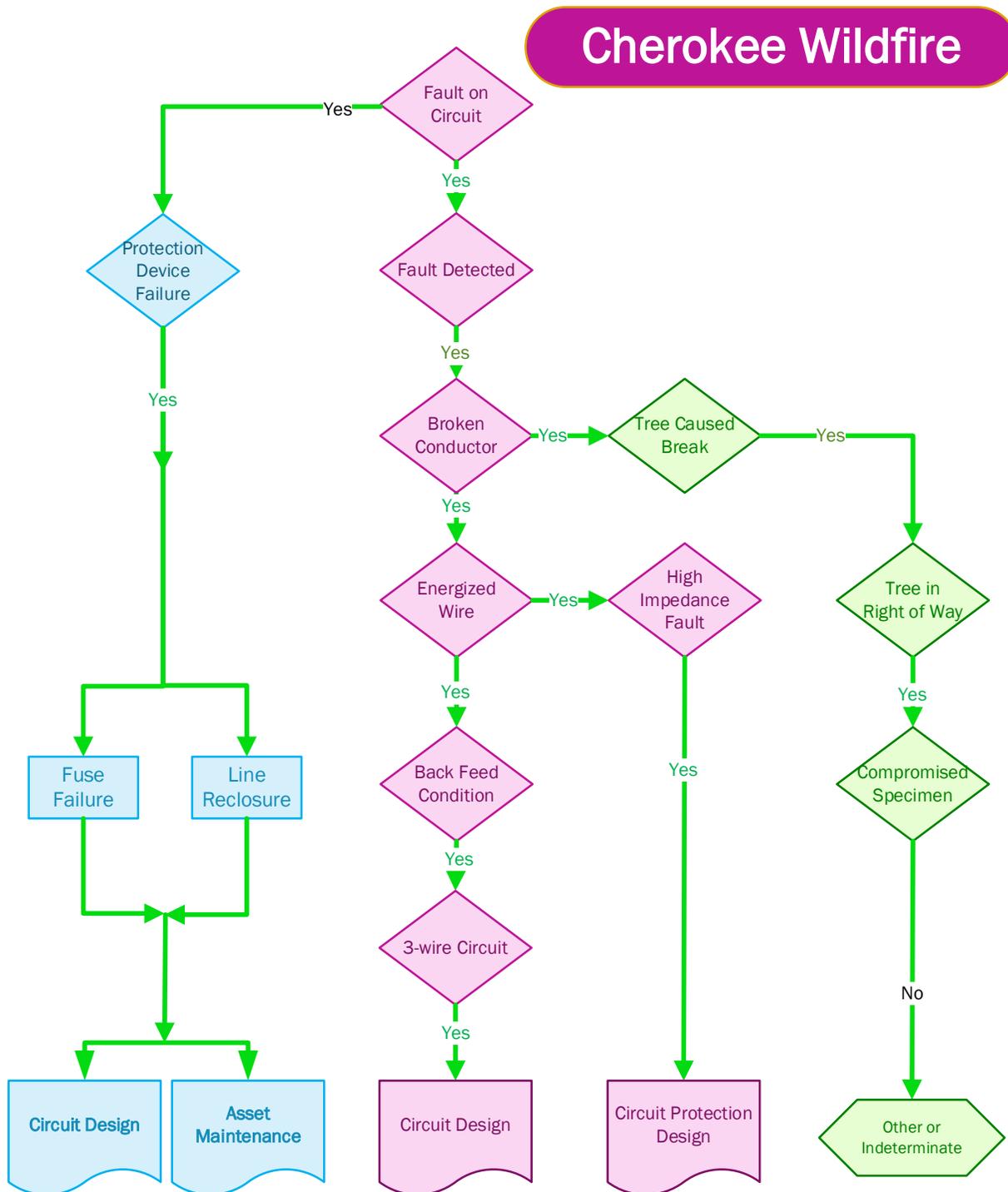
2. Atlas Failure Decision Analysis Process Results Diagram



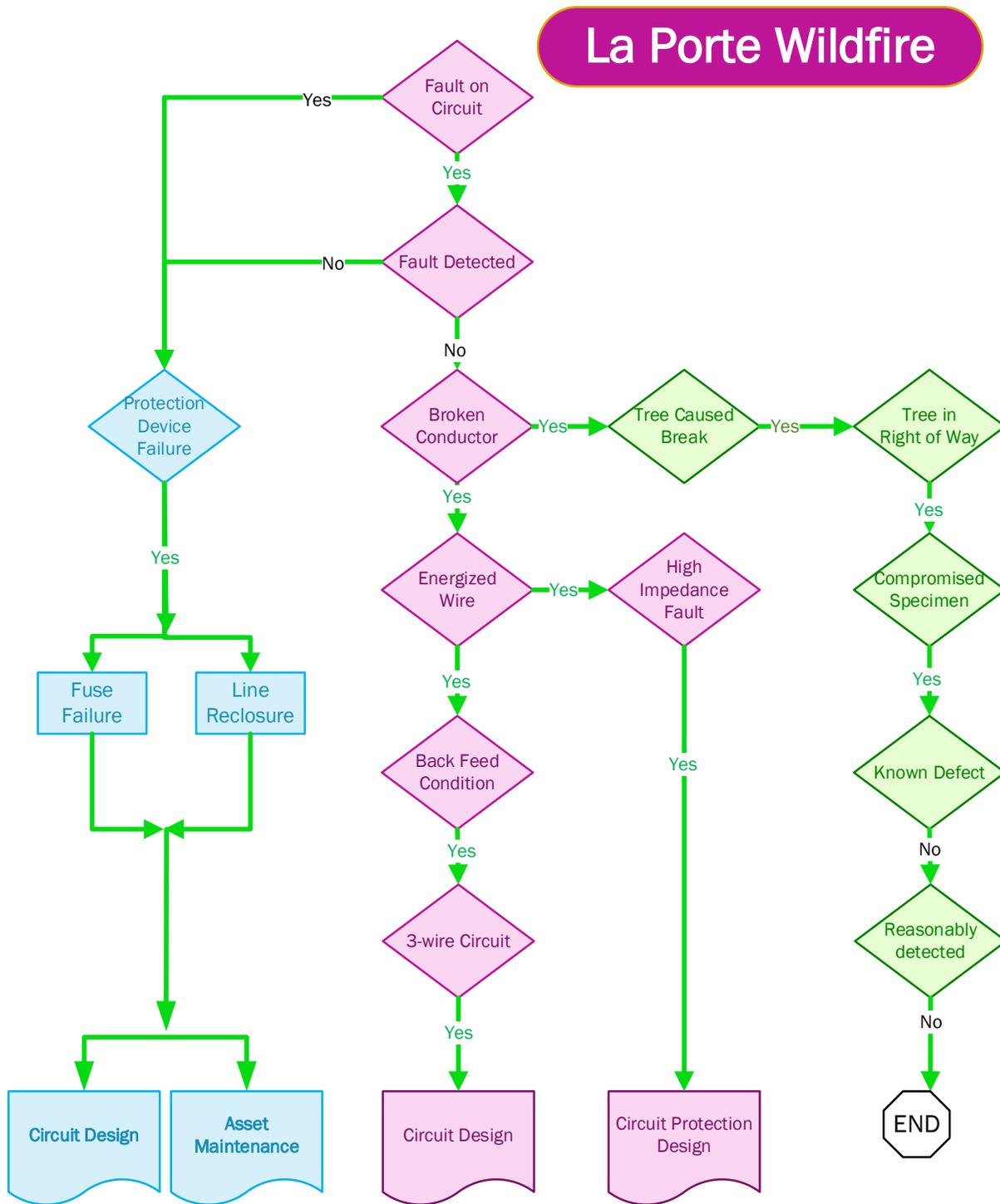
3. Cascade Failure Decision Analysis Process Results Diagram



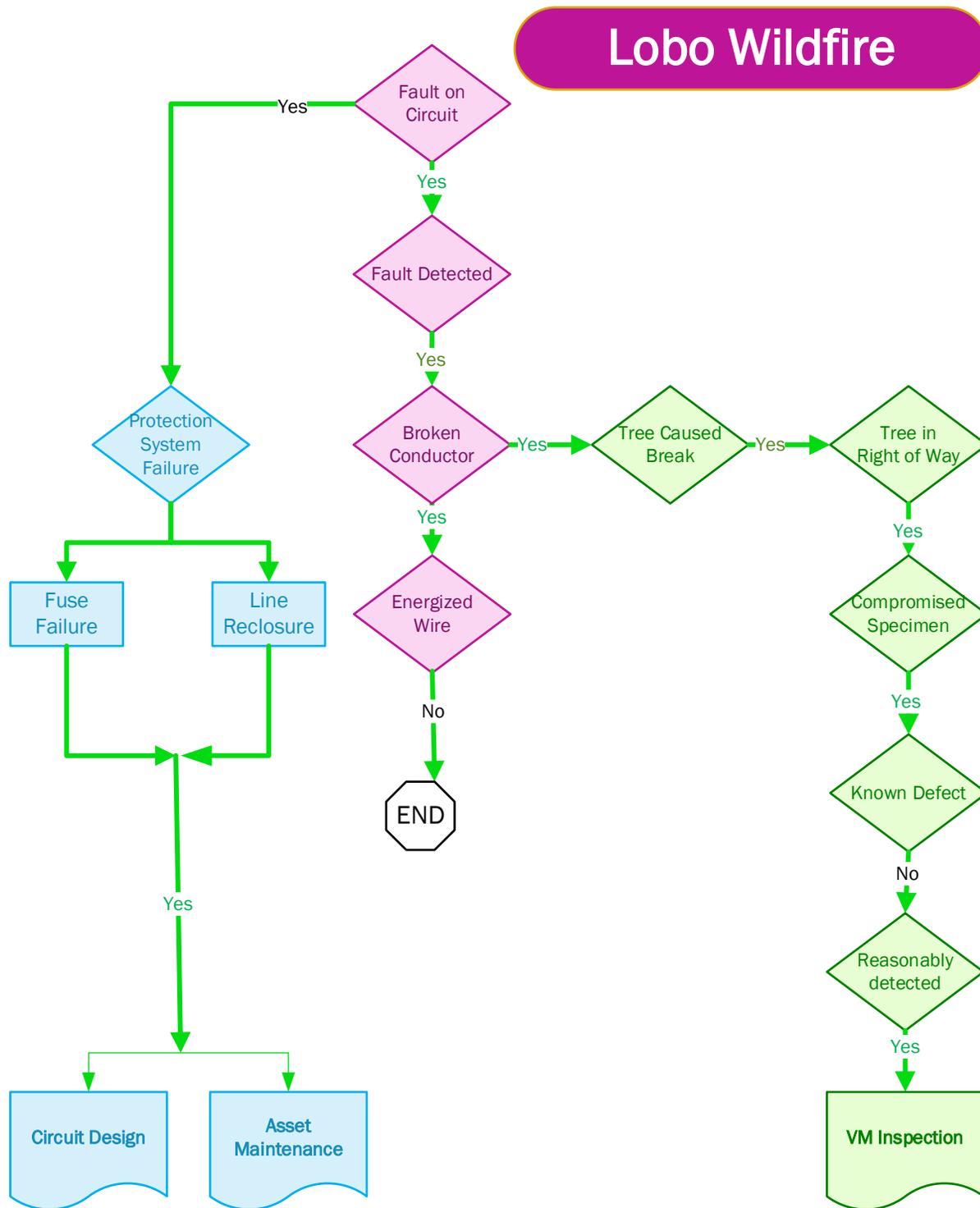
4. Cherokee Failure Decision Analysis Process Results Diagram



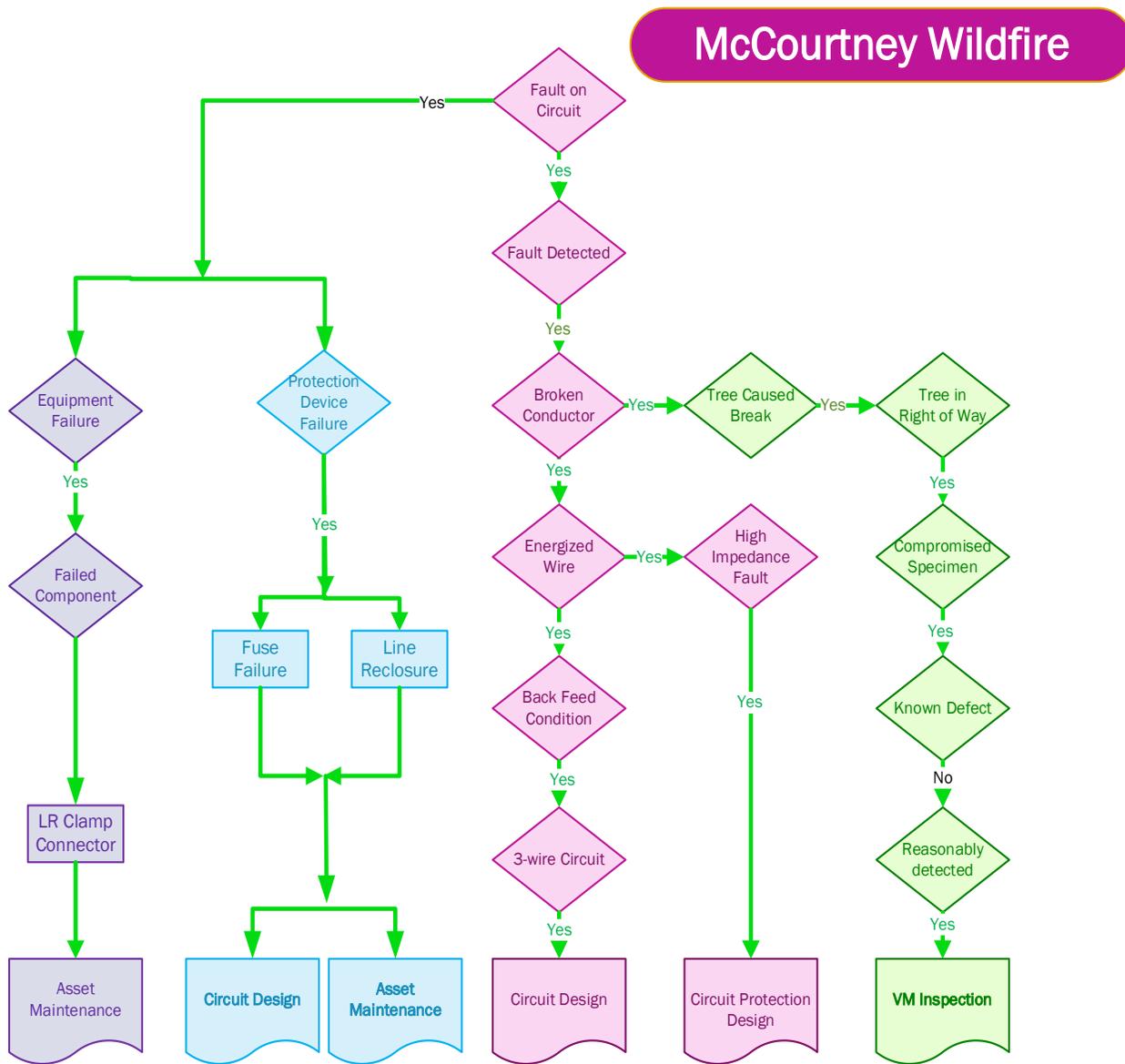
5. La Porte Failure Decision Analysis Process Results Diagram



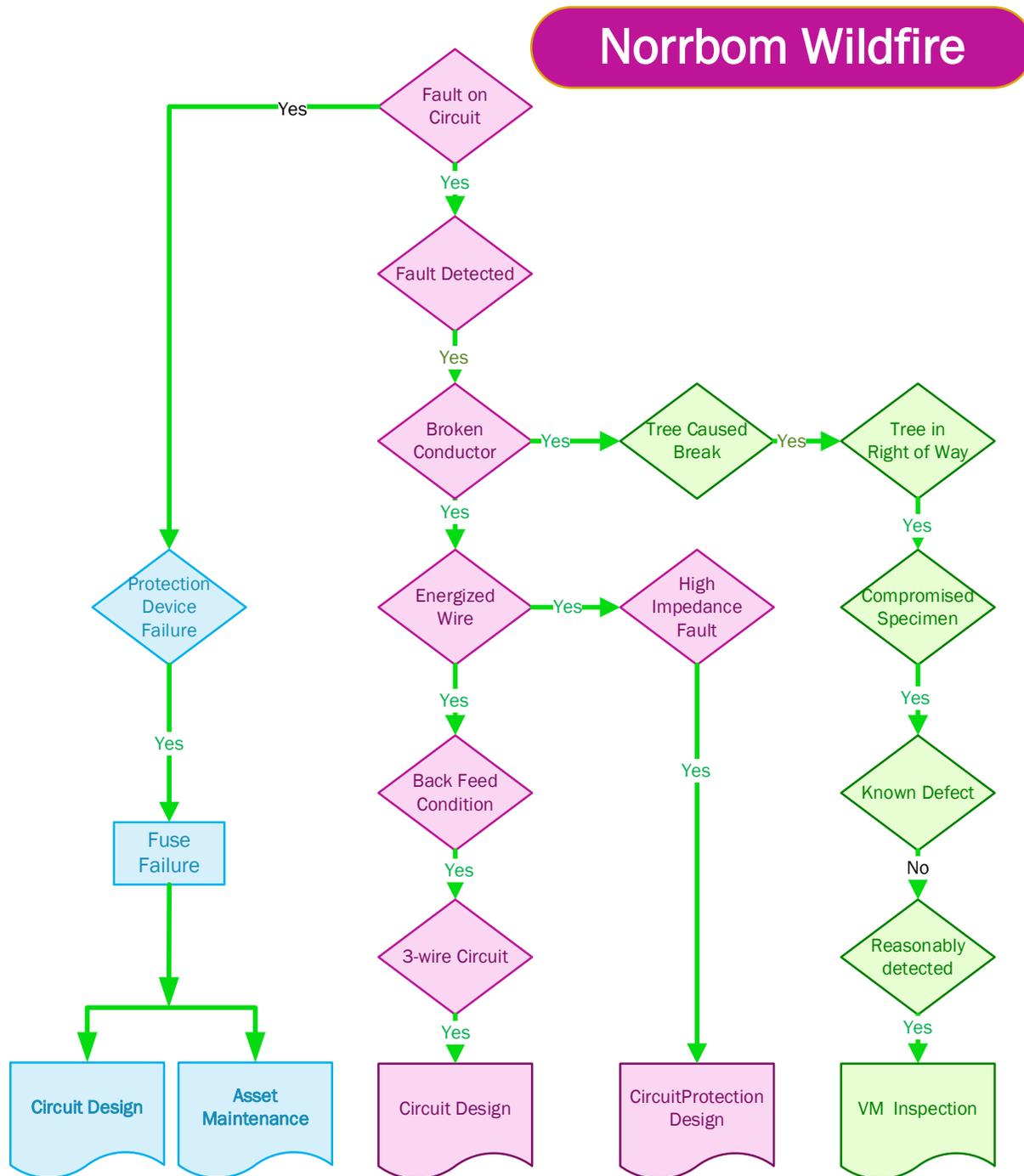
### 6. Lobo Failure Decision Analysis Process Results Diagram



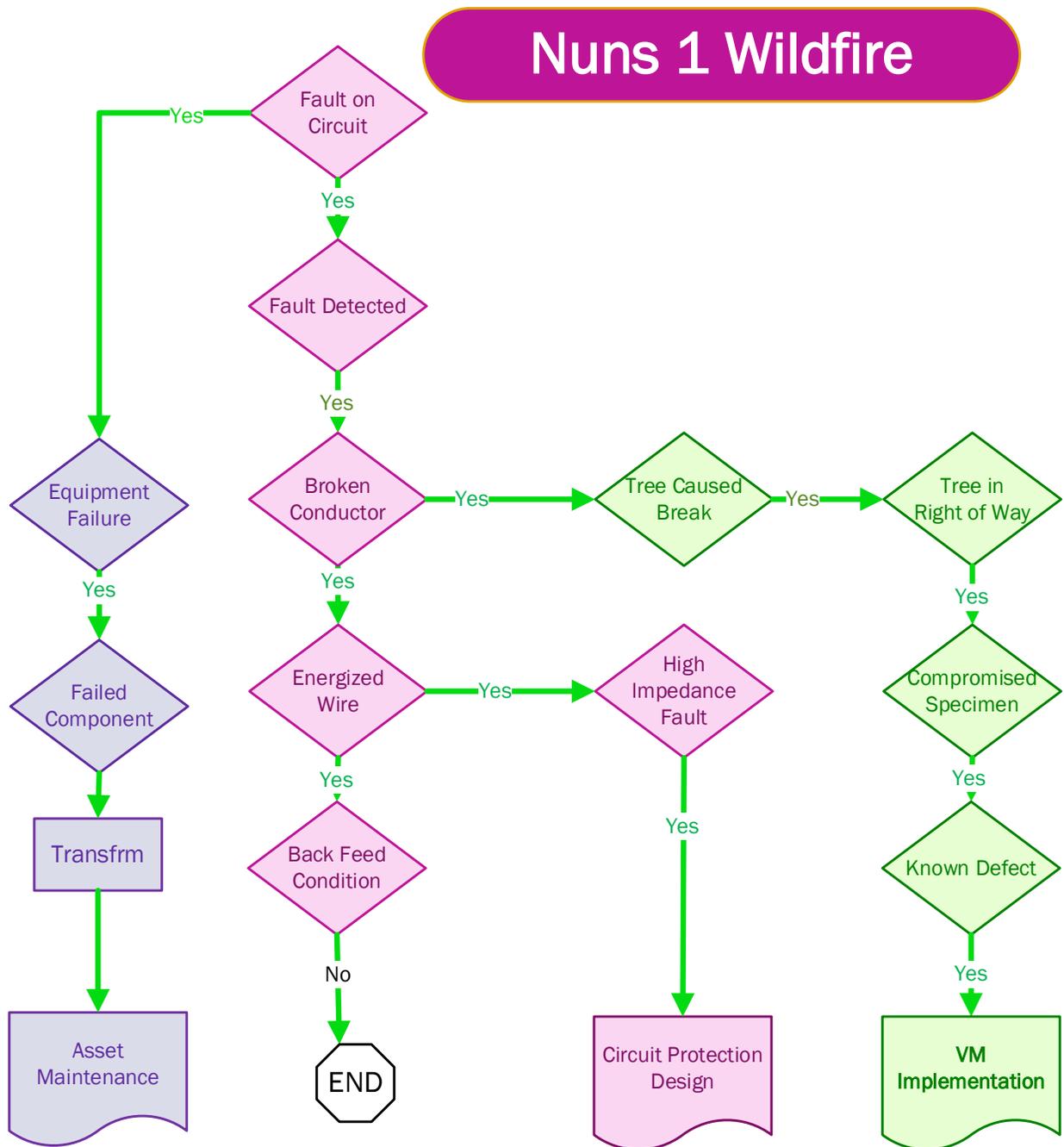
7. McCourtney Failure Decision Analysis Process Results Diagram



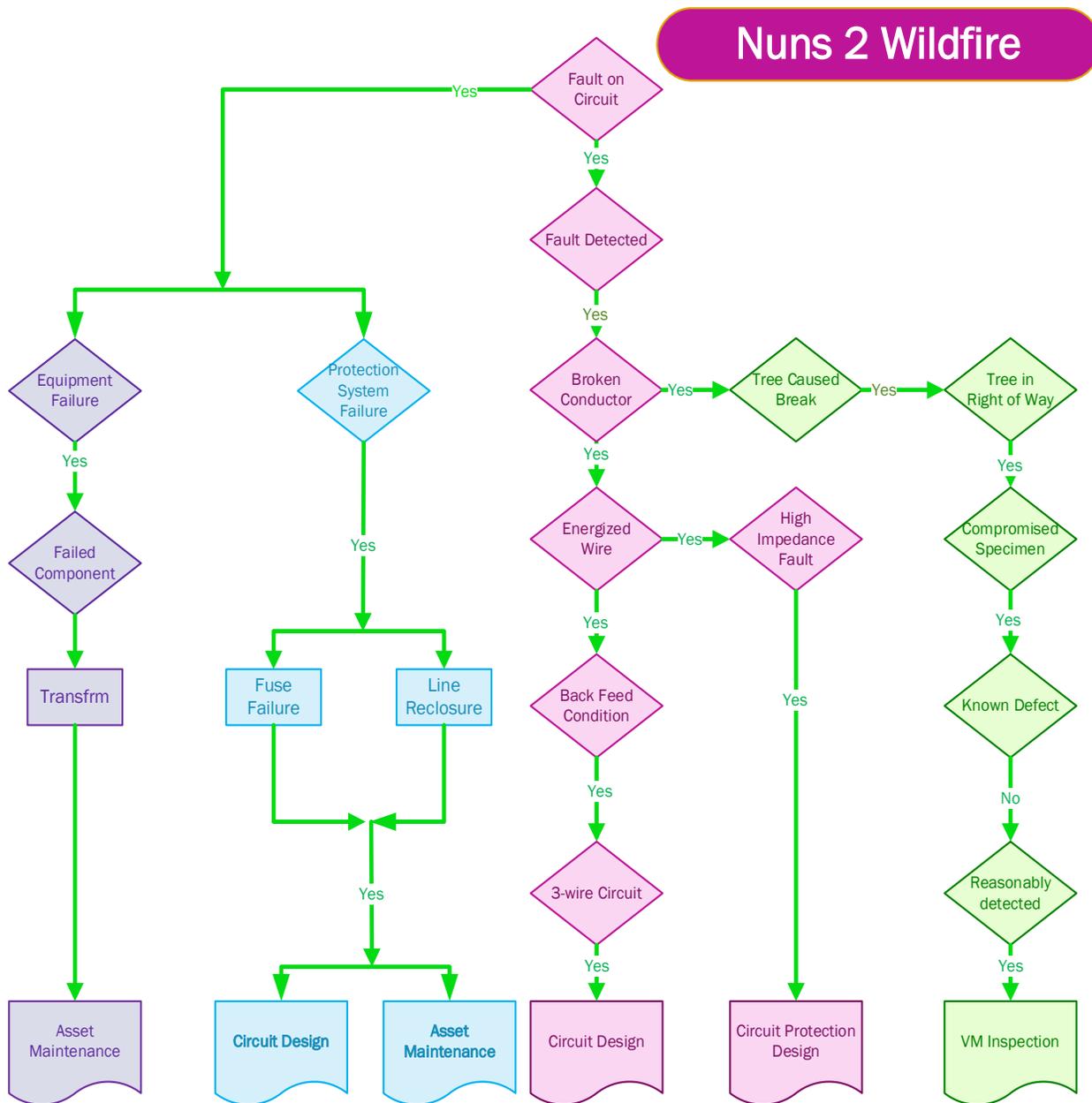
8. Norrbom Failure Decision Analysis Process Results Diagram



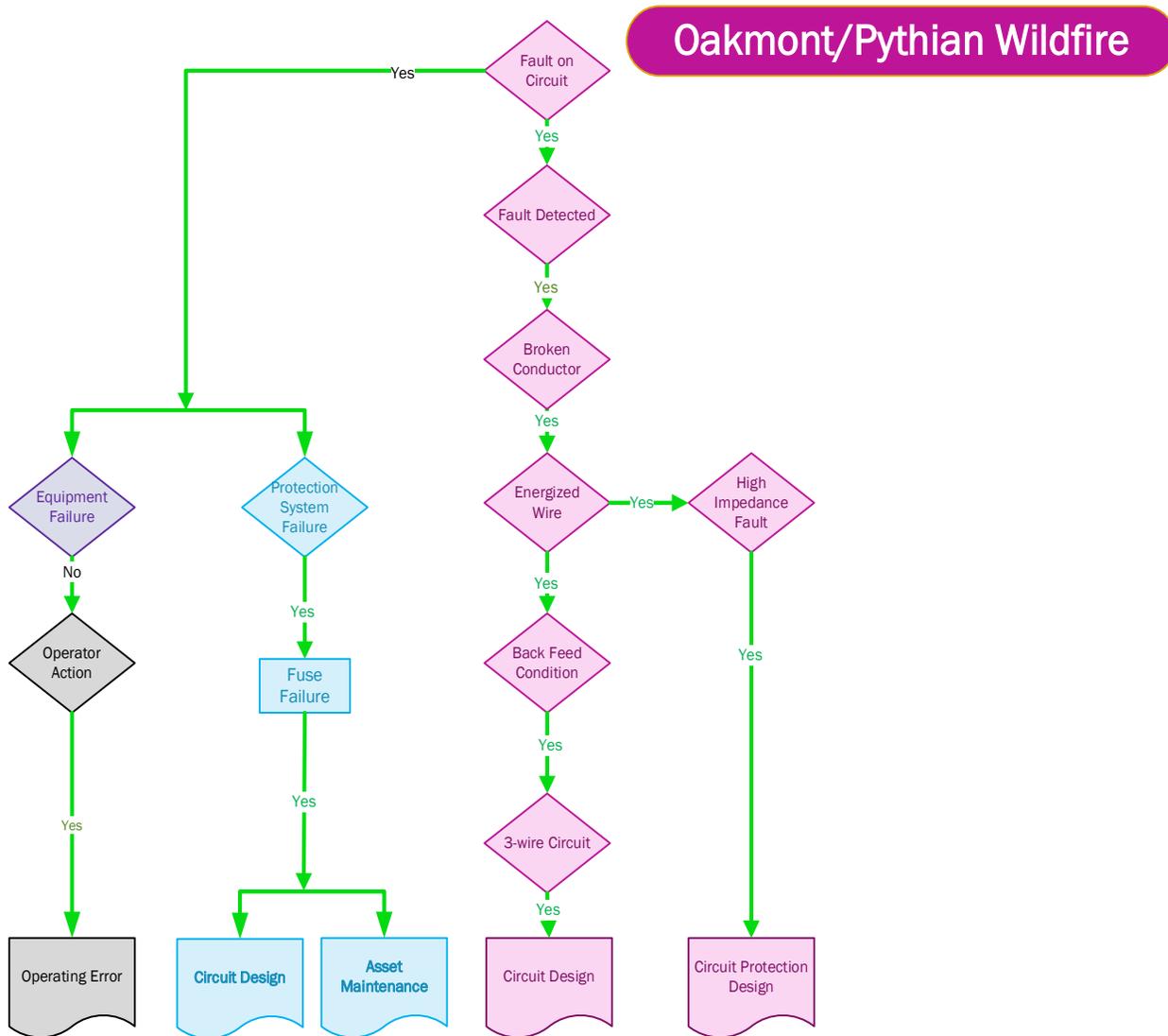
9. Nuns 1 Failure Decision Analysis Process Results Diagram



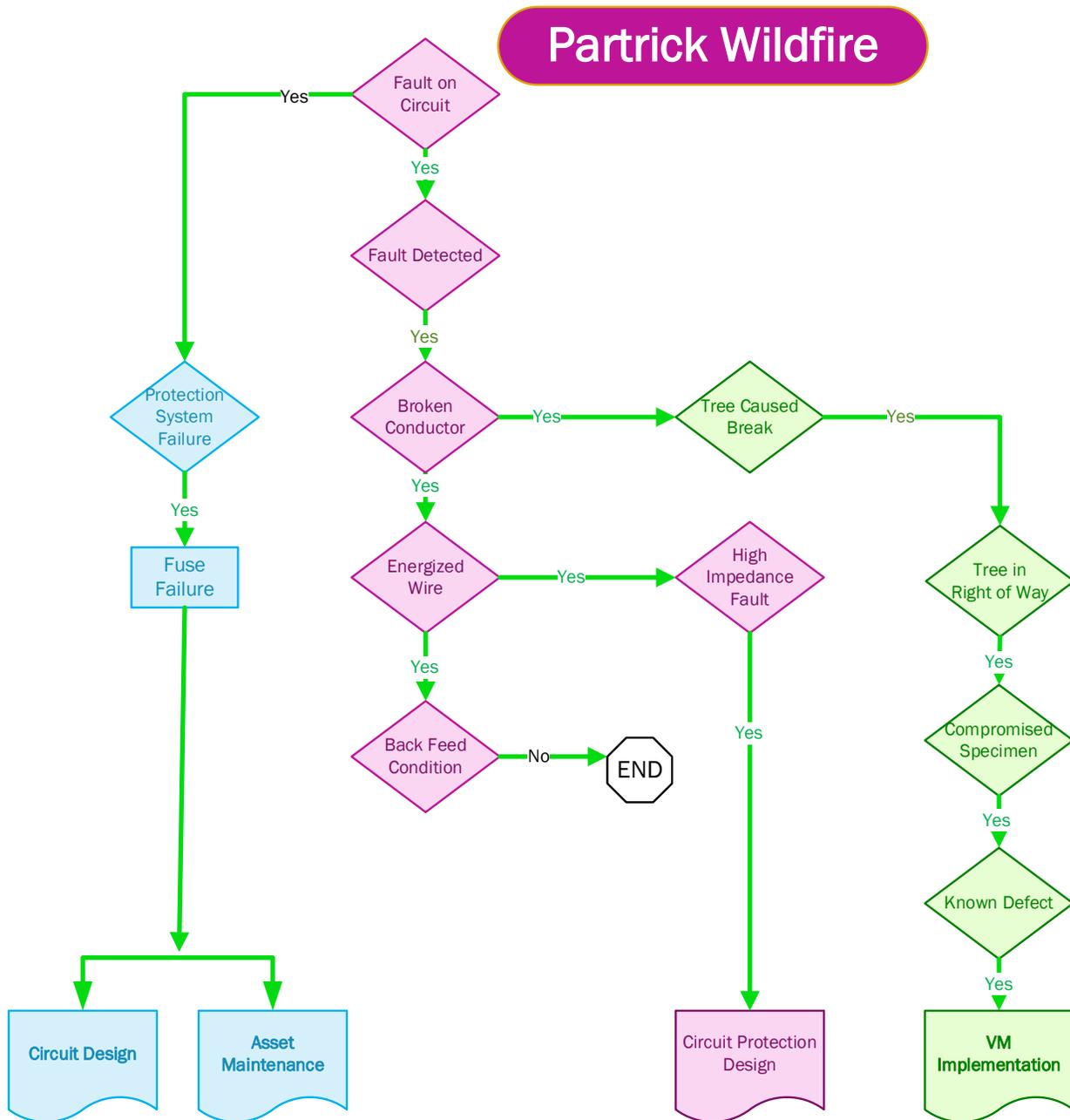
### 10. Nuns 2 Failure Decision Analysis Process Results Diagram



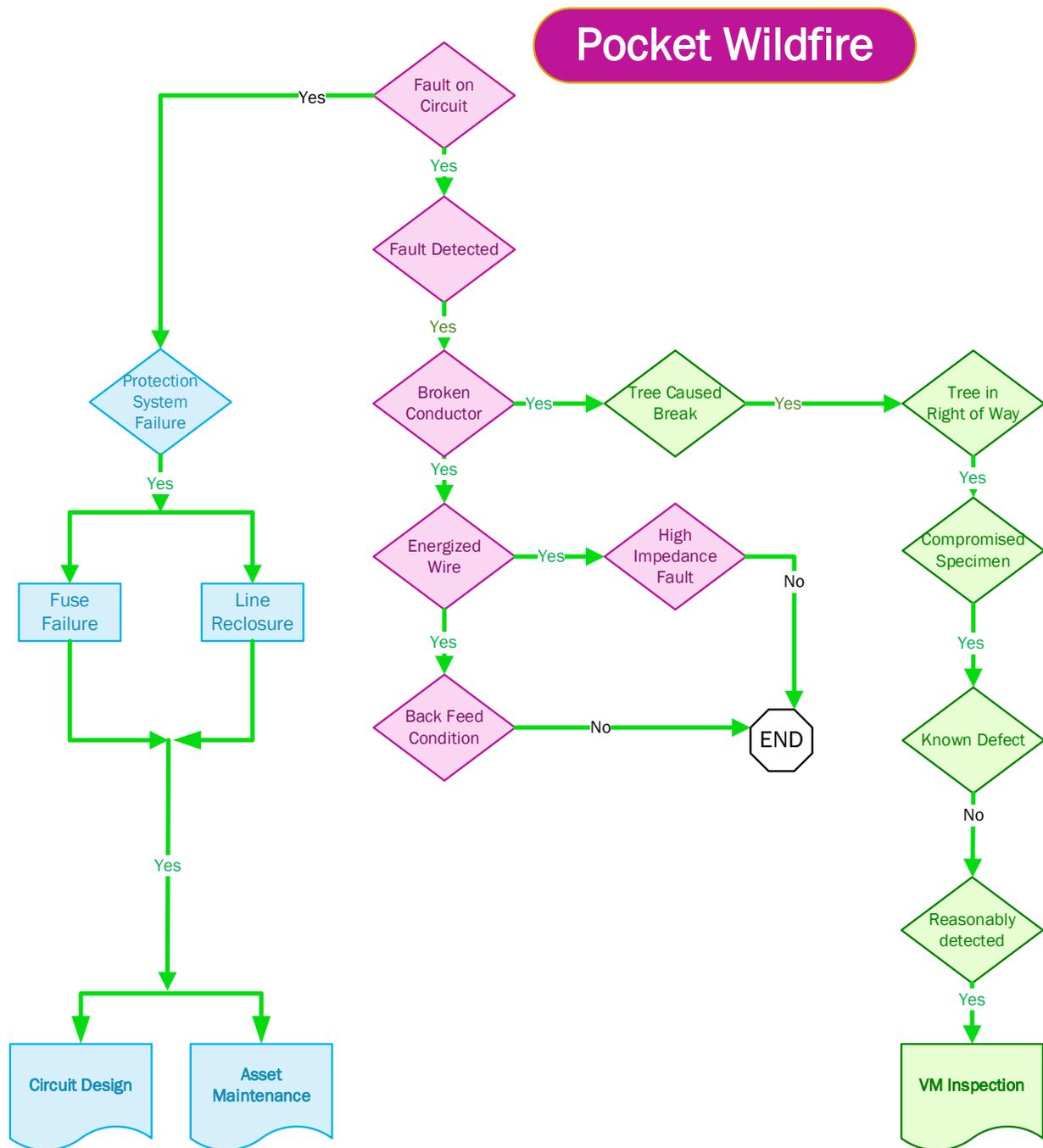
11. Oakmont/Pythian Failure Decision Analysis Process Results Diagram



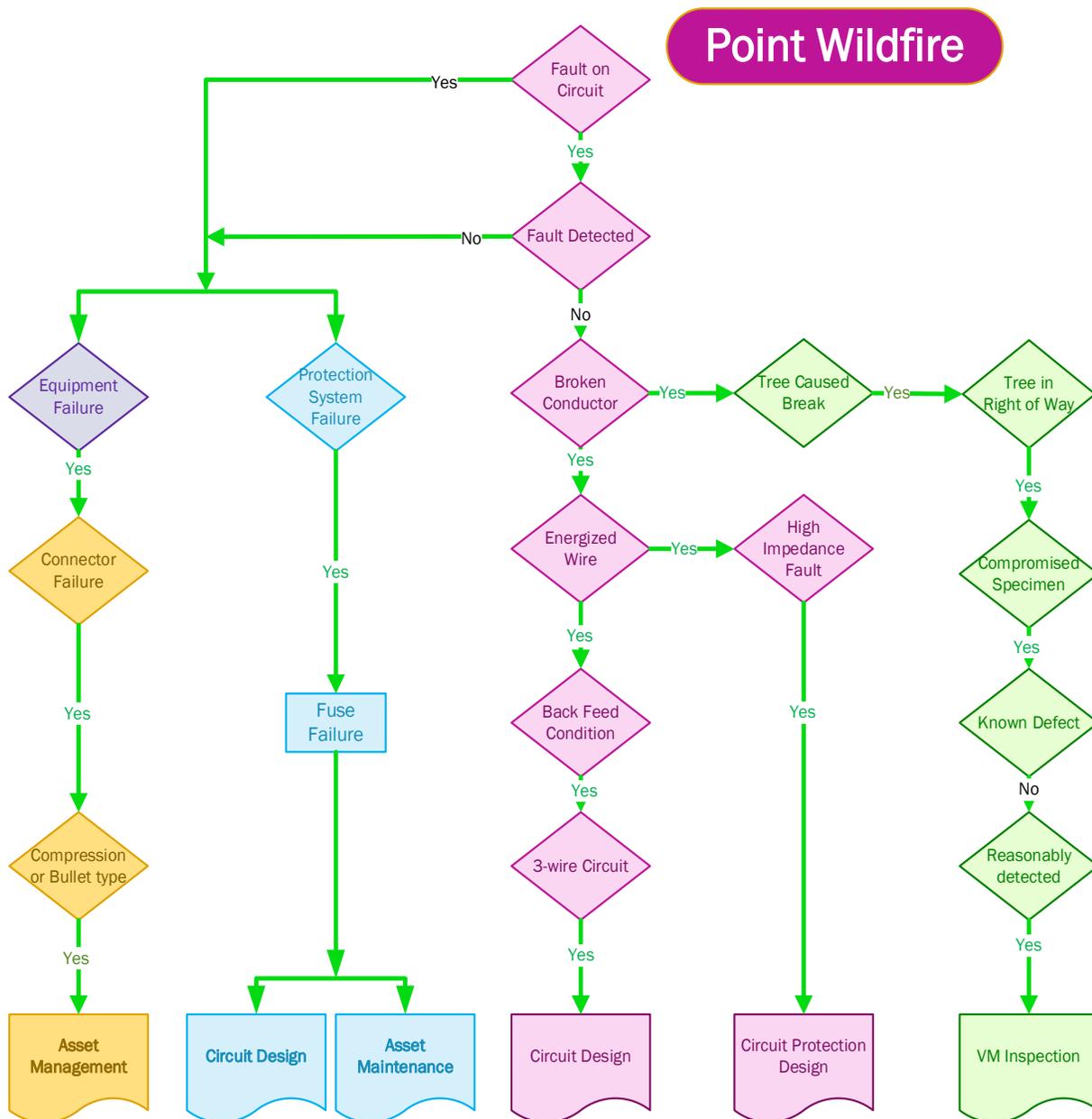
12. Partrick Failure Decision Analysis Process Results Diagram



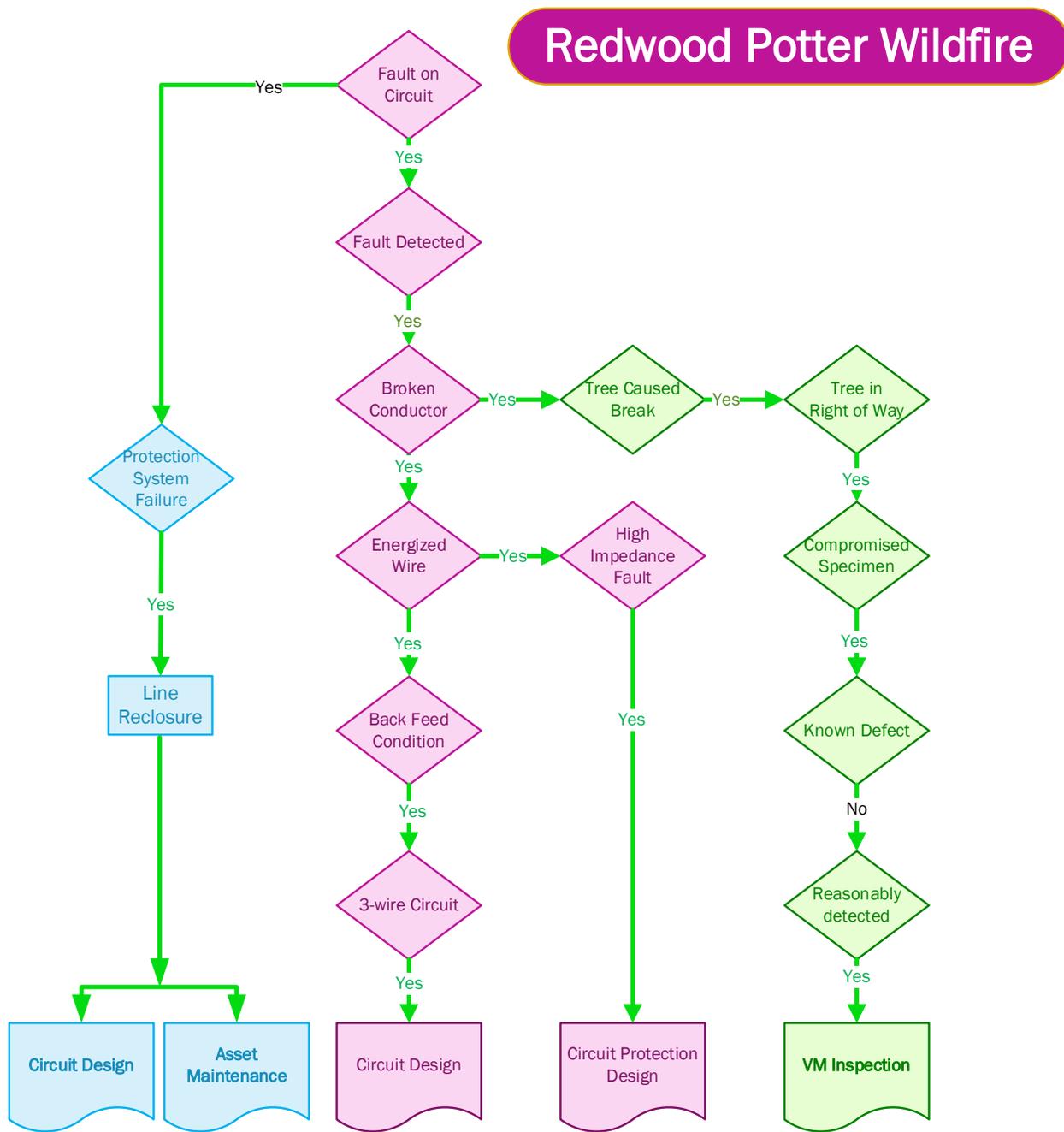
13. Pocket Failure Decision Analysis Process Results Diagram



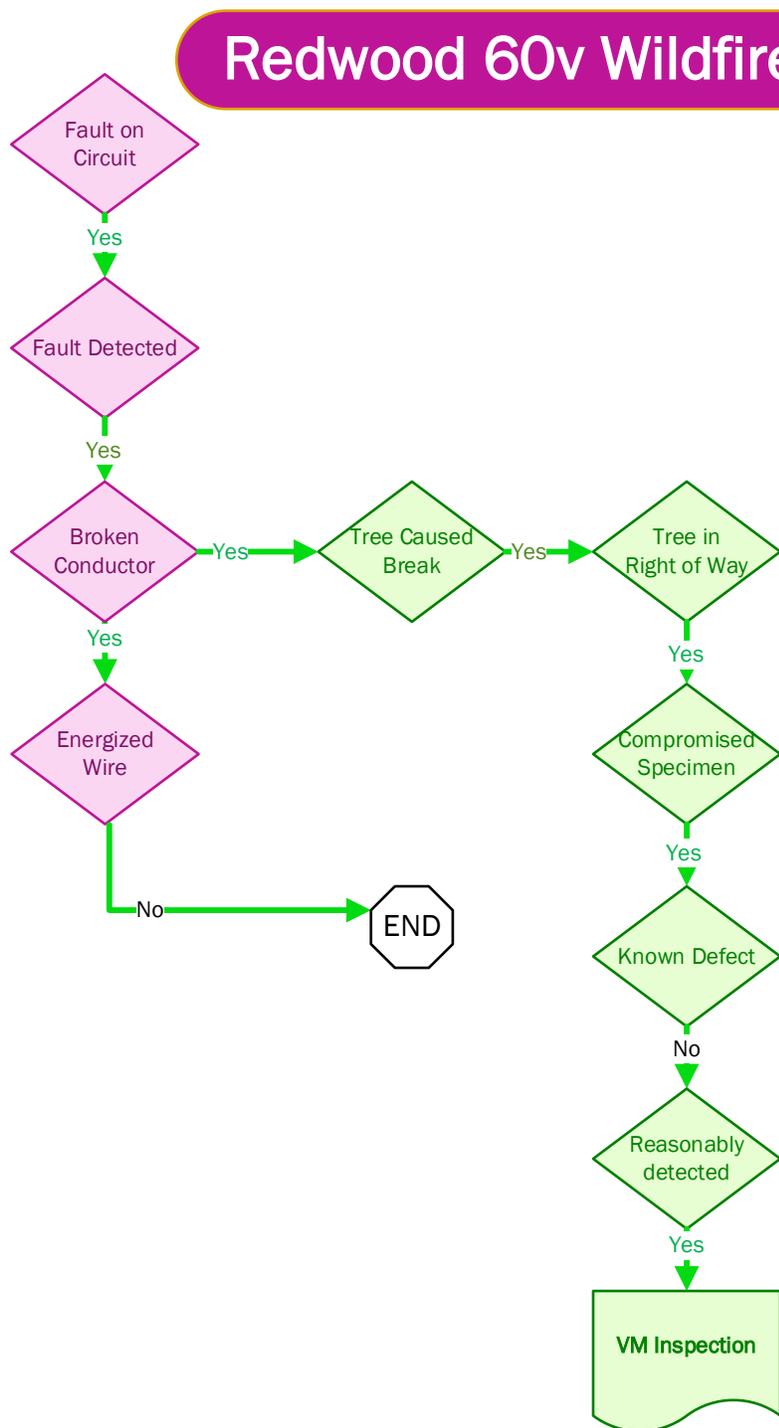
14. Point Failure Decision Analysis Process Results Diagram



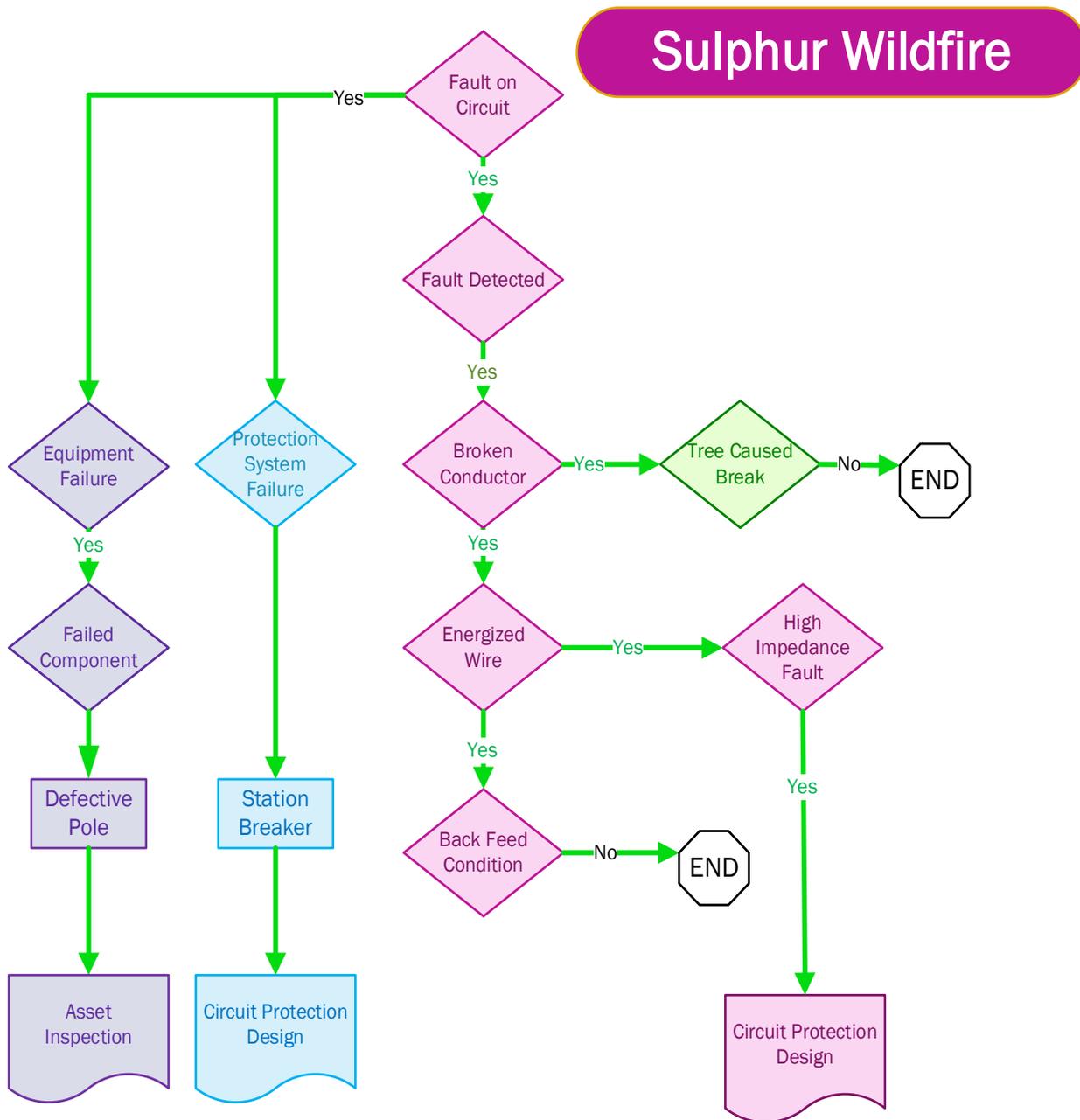
15. Redwood Potter Failure Decision Analysis Process Results Diagram



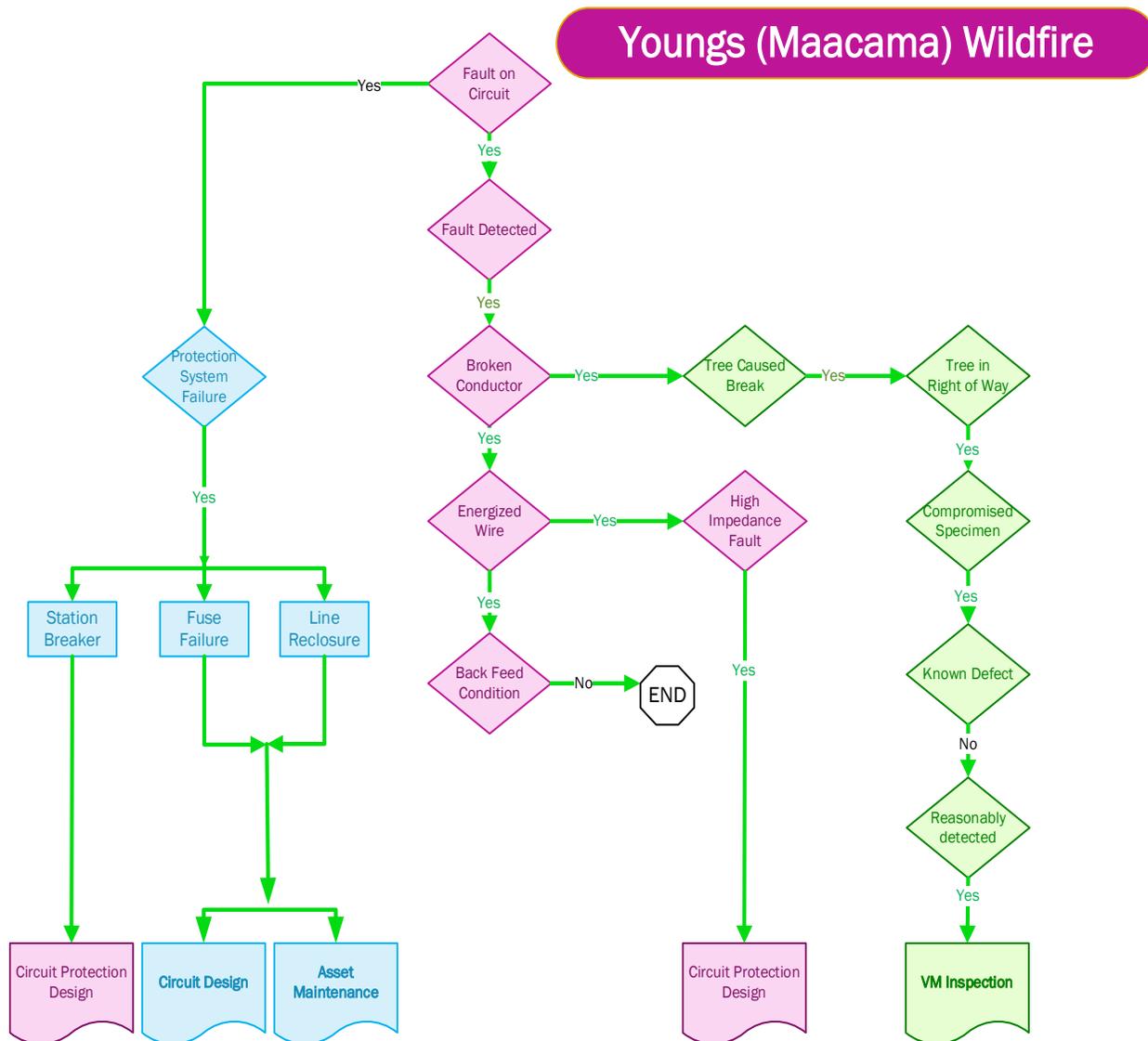
## 16. Redwood 60v Failure Decision Analysis Process Results Diagram



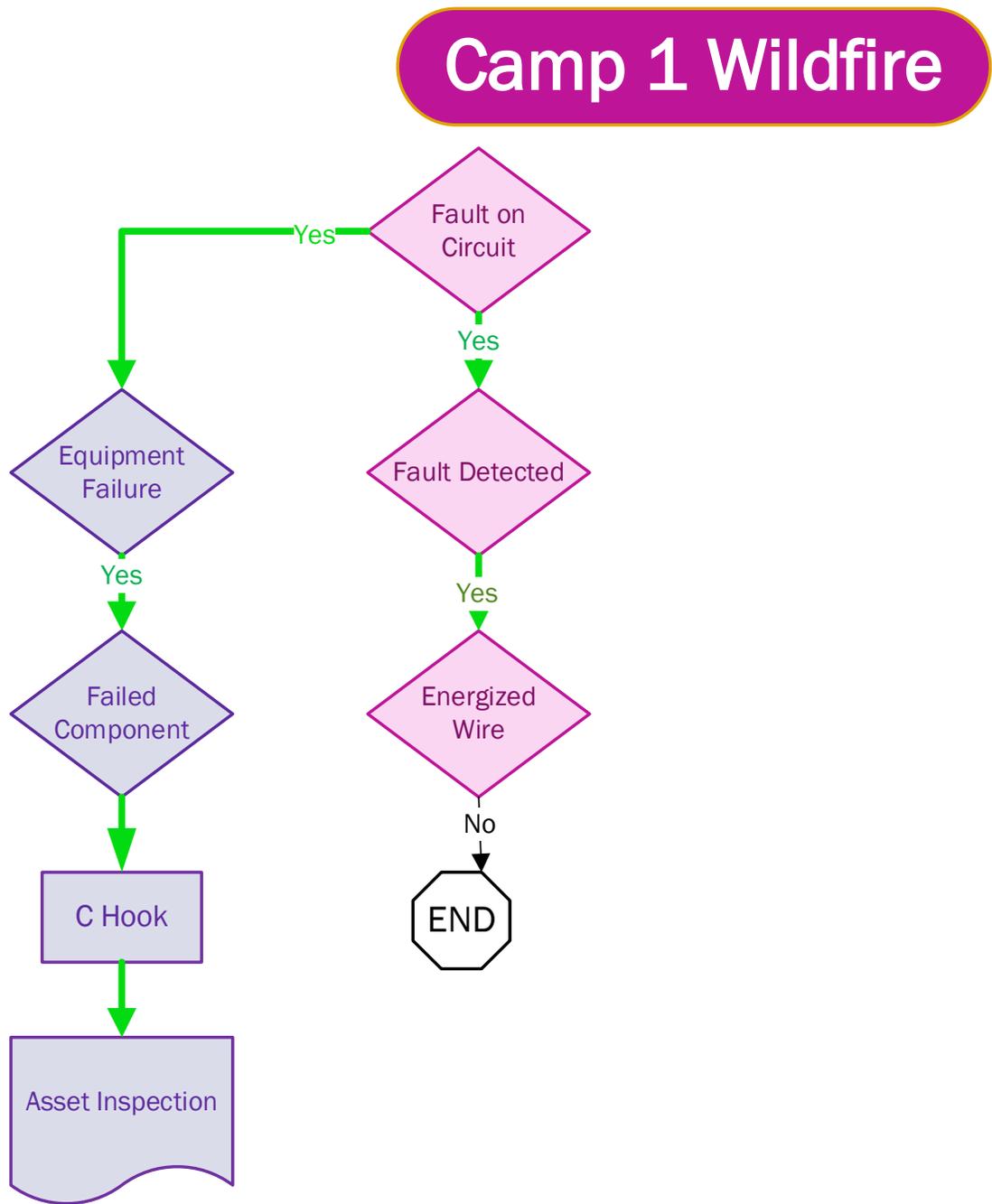
17. Sulphur Failure Decision Analysis Process Results Diagram



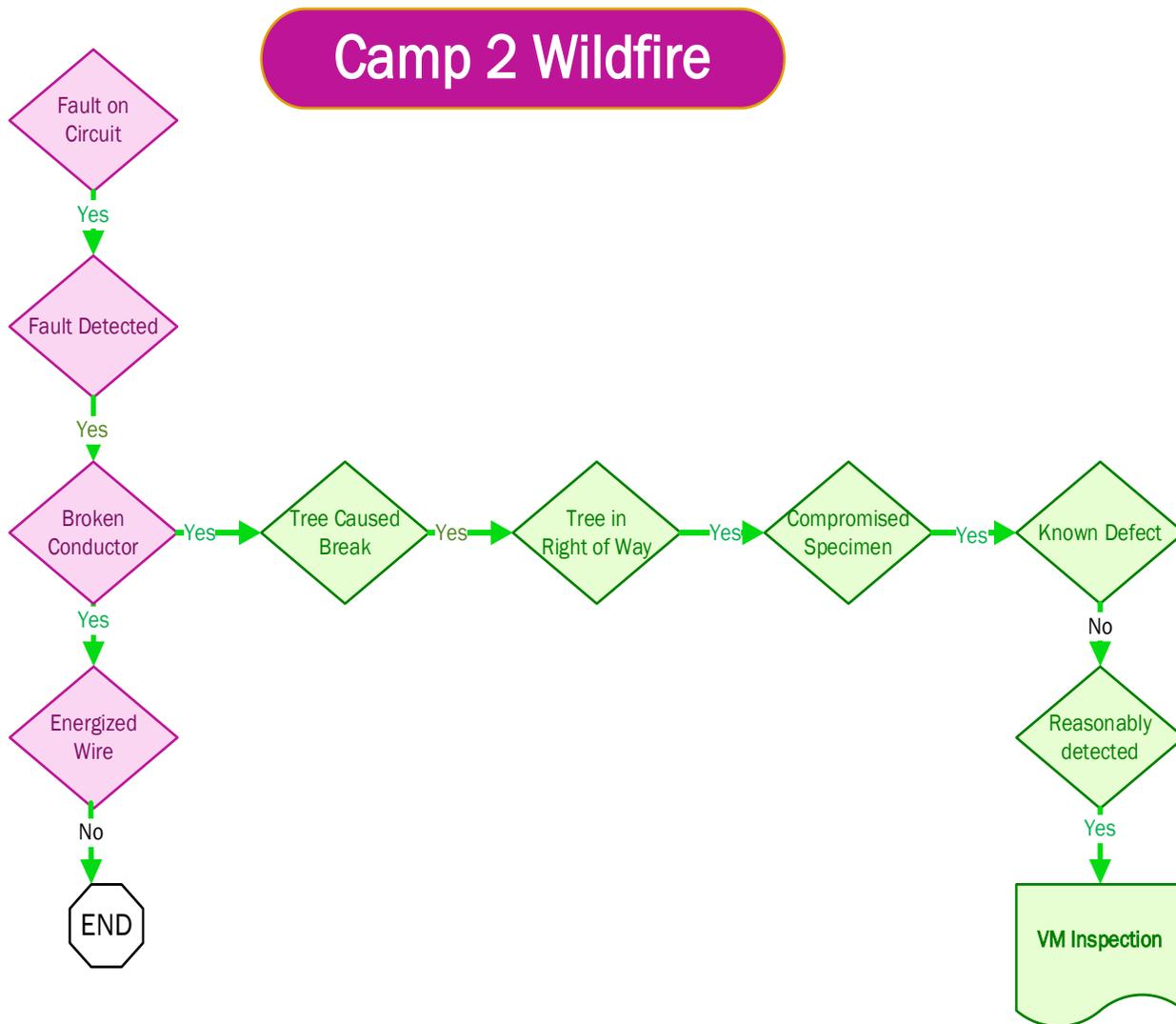
18. Youngs (Maacama) Failure Decision Analysis Process Results Diagram



19. Camp 1 Failure Decision Analysis Process Results Diagram



20. Camp 2 Failure Decision Analysis Process Results Diagram



## Conclusion

The FDA process has been applied to each of the 17 wildfires to determine the Root Cause Category. The frequency at which the Root Cause Categories have been determined are as follows:

**Table 8.** Summary of Root Cause by Category and Frequency

Root Cause	Frequency
Asset Maintenance	15
Circuit Design	14
Circuit Protection Design	13
Circuit Design	14
Vegetation Management Inspections	11
Asset Inspections	3
Vegetation Management Implementation	3
Asset Management Implementations	1
Operating Error	1

While PG&E has procedures that dictate how and what activities are necessary to design, maintain, and reduce risk, it is apparent that the lack of implementation of the requirements contributed to the frequency and intensity of the wildfires caused by their electrical system components.

## VIII. FINDINGS AND RECOMMENDATIONS

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In addition to conducting the 17 RCAs, the RCA Team reviewed thousands of pages of documents and conducted 101 interviews. Based on such, the Team has developed findings and, in some cases, associated recommendations for PG&E and the CPUC. In some cases, the findings are a direct result of individual RCAs, while others are based on a review of documentation of programs in place prior to the wildfires.

The findings and recommendations are organized by the following themes; as required by the scope of this project, the findings are also categorized by the type of element involved – physical, procedural, operational, management, or organizational.

- Institutionalized Learning
- Vegetation Management
- Circuitry
- Emergency and Crisis Management
- Recommended changes to CPUC General Orders

## A. Theme 1: Institutionalized Learning

### Finding #1: Corrective Action – Compliance Management

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**Corrective Action – Compliance Management**

The lack of an effective Corrective Action Program (CAP) resulted in the absence of a mechanism to trend all identified deficiencies.

**Background**

The current Corrective Action Program (CAP) has a formal process, but its use is at the discretion of the Line of Business (LOB). Findings from AARs are not tracked centrally.

**Analysis**

There is a lack of consistent After-Action Reviews (AAR), Root Cause Analyses (RCA), and other lessons learned processes and documentation.

**Finding:** The lack of an effective Corrective Action Program (CAP) at PG&E resulted in the absence of a mechanism to trend all identified deficiencies.

**Background:** The current Corrective Action Program (CAP) has a formal process, but its use is at the discretion of the Line of Business (LOB). Findings from AARs are not tracked centrally. While the process described in PG&E's Utility Standard GOV-6102S (Enterprise Cause Evaluation Standard) is robust, it lacks a trigger for conducting Root Cause Analyses except for personal injury. The procedure is voluntary and leaves it up to each LOB to determine the appropriate type of Cause Evaluation (CE). This is in contrast to the requirement delineated in PG&E's Utility Standard GOV-6101S (Enterprise Corrective Action Program Standard) which states:

*“This standard applies to identifying, reporting, and resolving asset, safety, performance, and process-related issues involving or affecting any line of business (LOB) that are not reported through other reporting processes.”*

Further, PG&E's Utility Policy GOV-3 Corrective Action Program Policy states *"Each PG&E line of business (LOB) is required to incorporate a corrective action process in its operating procedures and governance processes."*<sup>38</sup>

**Analysis:** Prior to 2017, PG&E had standalone corrective action programs.<sup>39</sup> The lack of AAR, RCA, or other lessons learned documentation indicates that PG&E lacks a robust best practice corrective action program.

PG&E event or 'incident' reports using the online Corrective Action Program (CAP) are only prepared for select unplanned outages (approximately 10%).

Momentary outages on the distribution system feeders for the period from 2007 to 2012 were not routinely investigated for cause. Of the 314 momentary outages during this period, 25% noted that "patrol not conducted" and 86% of the basic causes were noted as "unknown cause."

The investigations of the 2017 wildfires and the 2018 Camp Fires conducted by PG&E's Engineering groups were requested by Envista as part of the document review, but were not provided for analysis. PG&E indicated that these investigations and subsequent reports were "at the direction of legal counsel and deemed privileged."

**Recommendation:** Implement an enterprise-wide CAP that requires its use for all incidents and events, as well as trends issues across all LOBs.

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<sup>38</sup> **Document Reference Materials:**

- Ref #62 – Transmission outage incidents reports
- Ref #7 – Root Cause and Corrective Action Procedures
  - Utility Standard GOV-6102S (Enterprise Cause Evaluation Standard)
  - Utility Standard GOV-6101S (Enterprise Corrective Action Program Standard)
  - Utility Policy GOV-3 Corrective Action Program Policy
- Ref #275 - Detailed studies and analyses of the protection scheme for each of the 17 wildfires that are within the scope of this project

<sup>39</sup> Pacific Gas & Electric – Enterprise Corrective Action Program, Gary Close, Director, PG&E Director (<https://blogs.sap.com/2016/05/23/pacific-gas-electric-enterprise-corrective-action-program/>)

## Finding #2: After-Action Review

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PART OF THE BEACON GROUP

**After-Action Review**

After-Action Reports (AARs) are not produced in a timely manner and repeat findings indicate that corrective action processes need to be improved.

**Background**

The quality of AARs varied significantly during the period from 2015-2017. Recurring findings indicate that corrective action processes need to be improved: Emergency Operations Center (EOC) issues, meeting cadence, and IMT staffing.

**Analysis**

A review of past findings has not been part of the AAR process. Many of the AARs are limited to a set of comments and have not always reflected the quality of the Tabletop Exercise (TTX) scenarios.

**Finding:** After-Action Reports (AARs) are not produced in a timely manner and repeat findings indicate that corrective action processes need to be improved.

**Background:** Only one non-PSPS event has an AAR and does not involve a transmission or distribution outage. A review of past findings is not part of the AAR process.<sup>40</sup>

**Analysis:** The lack of event AAR documentation indicates that PG&E does not have a central process for collecting, tracking, and trending all event lessons learned.

Quality of AARs varied significantly during the period from 2015-2017. Recurring findings indicate corrective action processes need to be improved: Emergency Operations Center (EOC) issues, meeting cadence, and IMT staffing.

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### <sup>40</sup> Document Reference Materials

- Ref #63 Emergency Preparedness and Response teams have been focused on the Dixie Fire. Once these reports are finalized, we will provide them shortly thereafter.
- Ref #2 - Attachment 13 AAR TTX litany of comments - poor - does not reflect the quality of the TTX Scenario.
- Ref #64, 65, 66 - The Quick-Look Reports (QLR) referenced in our SitMan and ExPlan documents were provided by our previous Exercise contractor (CADMUS) and are no longer available. Information from the QLRs was used to prepare our After-Action Reports (AARs).
- Ref #8 - Transmission Event Exercise/Drill Scenarios

**Recommendation:** Incorporate the After-Action Reports (AARs) into the enterprise-wide CAP that requires timely AARs for emergency and wildfire exercises and events across all LOBs.

### Finding #3: De-Energization Protocol




**De-Energization Protocol**

PG&E did not have a de-energization protocol prior to the 2017 wildfire siege.

**Background**

Prior to the October 2017 North Bay Wildfires, PG&E had not determined that the wildfire risk in its territory met the high threshold warranting a de-energization plan, especially in view of the countervailing risks associated with de-energization.

Several Orders, Decisions and Emergency Proclamations that were issued in part directing IOUs to take action to mitigate fire risk did not result in action on the part of PG&E.

Decision (D.) 12-04-024 issued on April 19, 2012, provided guidance on SDG&E's authority to shut off power under the PU Code in emergency situations when necessary to protect public safety.

**Analysis**

PG&E has stated that "had the current model been deployed since 2012, the protocols would have prevented wildfires such as Camp, Tubbs, Nuns, Atlas, Kincade and Zogg fires."

X
Procedural

**Finding:** PG&E did not have a de-energization protocol prior to the 2017 wildfire siege.

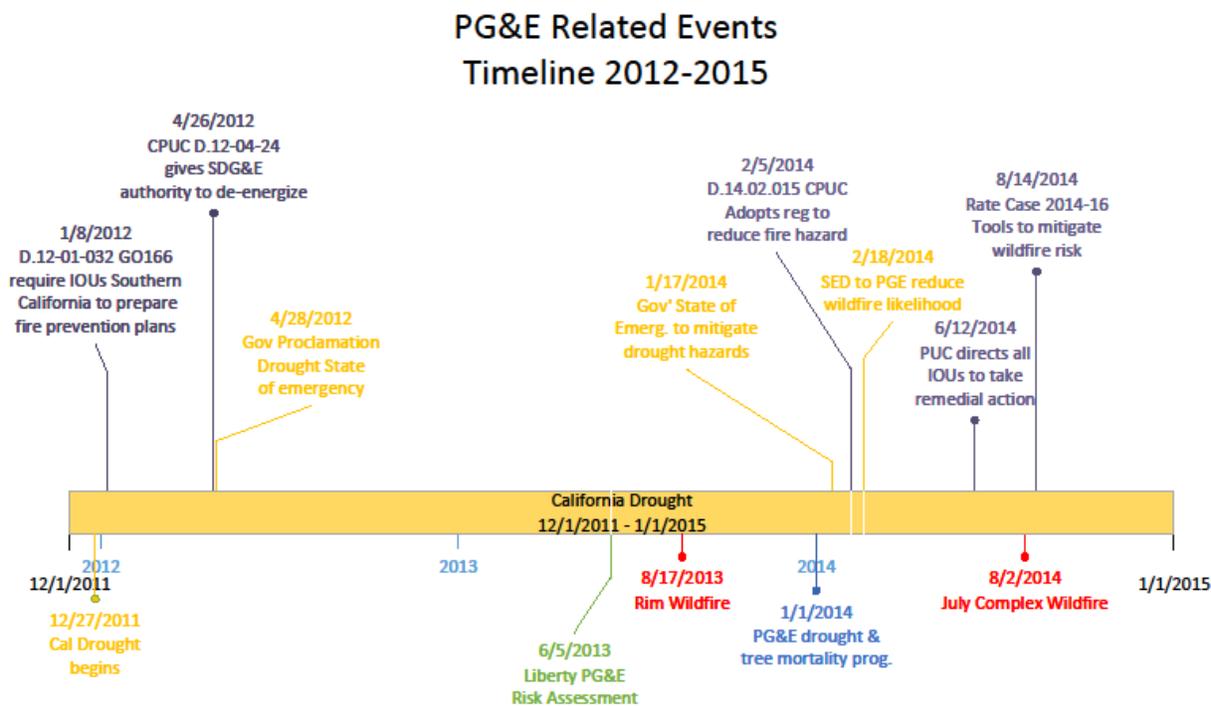
**Background:** Prior to the October 2017 North Bay Wildfires, PG&E had not determined that the wildfire risk in its territory met the high threshold warranting a de-energization plan, especially in view of the countervailing risks associated with de-energization. Several Orders, Decisions, and Emergency Proclamations that were issued, in part to direct Investor-Owned Utilities (IOUs) to take action to mitigate fire risk, did not result in the creation of a PSPS Program. Decision (D.) 12-04-024 issued on April 19, 2012, provided guidance on San Diego Gas & Electric (SDG&E's) authority to shut off power under the PU Code in emergency situations when necessary to protect public safety.<sup>41</sup>

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#### <sup>41</sup> Document Reference Materials

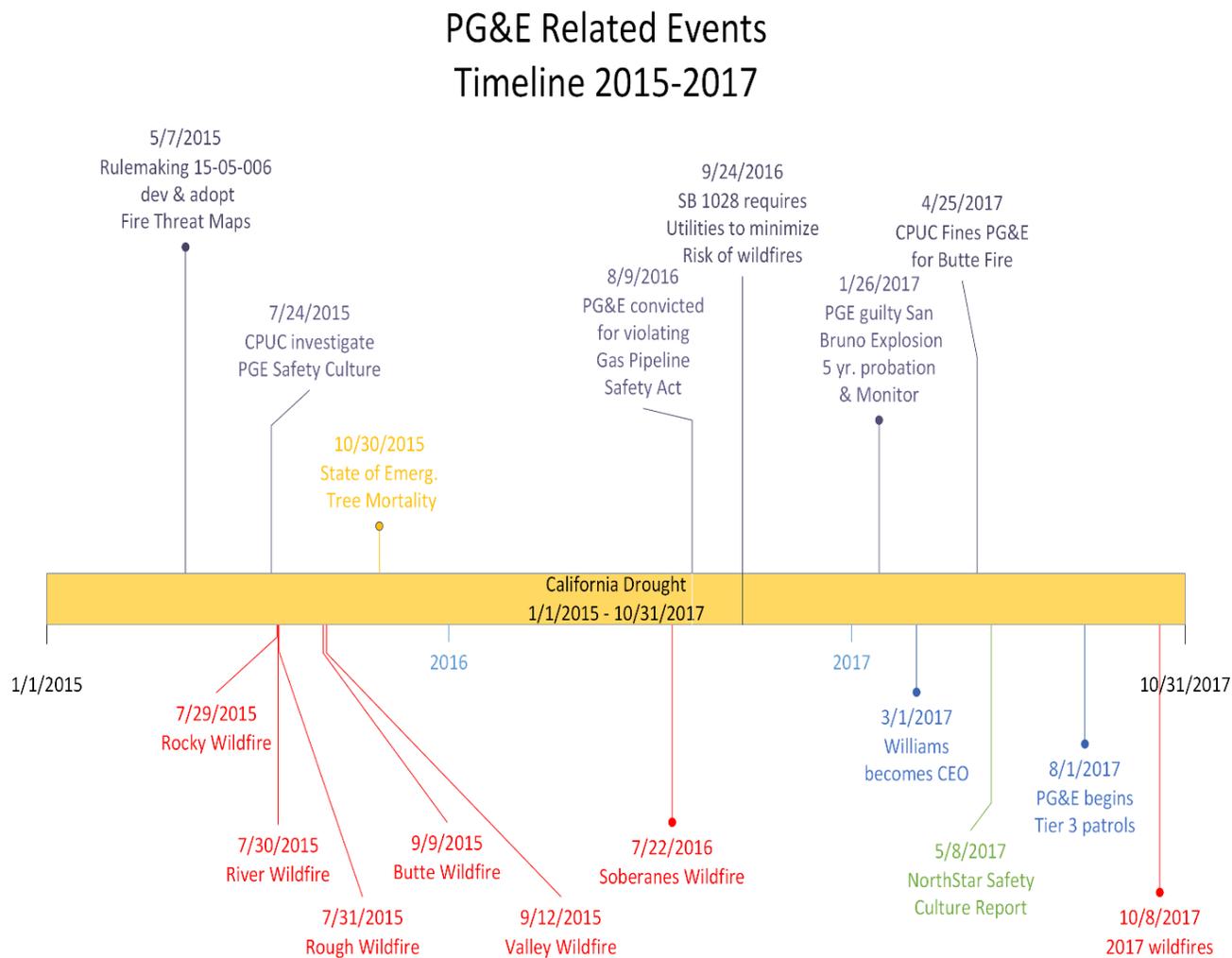
- Ref #91: Prior to the October 2017 North Bay Wildfires, PG&E had not determined that the wildfire risk in its territory met the high threshold warranting a de-energization plan, especially in view of the countervailing risks associated with de-energization.
- Ref #36: PG&E informal procedures regarding power shutoff process in October 2017.
  - Informal guidance included in the August 31, 2017 CERP; see Table 10.2 for OEC activation authorization in October 2017, included in DRU-3867.01. First formal PSPS event was October 14, 2018 under Resolution ESRB-8 and Decision D12-04-024 documents, provided in this response.

Figure 9. Timeline of Pre-2017 Wildfire Events: 2012-2015



- Decision (D.) 12-04-024 issued on April 19, 2012 provided guidance on SDG&E's authority to shut off power under the Public Utilities Code (PUC) and also established factors the Commission may consider in determining whether or not a decision by SDG&E to shut off power was reasonable. The decision ruled that SDG&E has the authority under PUC Sections 451 and 399.2(a) to shut off power in emergency situations when necessary to protect public safety. It also ruled that a decision to shut off power by SDG&E under its statutory authority, including the adequacy of any notice given and any mitigation measures implemented, may be reviewed by the Commission to determine if SDG&E's actions were reasonable.
- Resolution ESRB-8 Dated July 12, 2018: Resolution Extending De-Energization Reasonableness, Notification, Mitigation And Reporting Requirements In Decision 12-04-024 To All Electric Investor-Owned Utilities.
- ORDER INSTITUTING INVESTIGATION AND ORDER TO SHOW CAUSE – June 27, 2019 (I.19-06-015)

Figure 10: Timeline of Pre-2017 Wildfire Events: 2015-2017



Under California Public Utility Code § 451 and § 399.2(a), electric utilities had the authority to shut off power in emergency situations when necessary to protect public safety. The utilities have a statutory obligation under such code to operate their systems safely, which requires the utility to shut off its system if doing so is necessary to protect public safety.

Resolution ESRB-8 explicitly extends the de-energization reasonableness, public notification, mitigation, and reporting requirements in Decision (D.) 12-04-024 to all IOUs.

Electric Operations updated the Wildfire Mitigation Plan on February 16, 2010. The conclusion of this Mitigation Plan was as follows:

“Events in Southern California have served to highlight the risk of an urban wildland fire to utilities operating in California. PG&E continues to learn from the Southern California utilities’ experiences and continues to make progress to mitigate this risk.”<sup>42</sup>

The Liberty Report goes on to state:

*“SCADA installations provide a critical safety tool for mitigating the down-wire risk to which the PG&E system is particularly vulnerable. Downed electrical conductors remain energized 36 percent of the time (on the ground or on objects). Vehicle accidents have produced a number of occupant injuries and fatalities when exiting vehicles. First responders to the accident scene also face risks from conductors that have remained energized. The absence of SCADA inhibits line de-energization before Troublemakers can arrive. Troublemaker callout and arrival time can take up to an hour. SCADA control will allow the system operator to interact with 911 responders and to de-energize the line via remote control. Even de-energized downed lines are not completely safe until grounding, but they are much safer than energized ones.”<sup>43</sup>*

**Analysis:** There is sufficient evidence—utilizing the timeline coupled with the results of the interviews—that indicates not enough was done to show a proactive approach to de-energization.

It wasn’t until August 31, 2017 that PG&E provided guidance to activate the OEC if “PG&E de-energizes electric distribution facilities to mitigate public safety and/or first responder risk”; this guidance is provided in the Company Emergency Response Plan (CERP) in **Table 10.2** Emergency Center Activation Authority and Triggers.<sup>44</sup>

A great majority of the wildfires involved downed conductors potentially being energized for long durations.

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<sup>42</sup> The Liberty Consulting Group - Report to the Safety and Enforcement Division Study of Risk Assessment, California Public Utilities Commission and PG&E’s GRC, May 6, 2013, Page 100.

<sup>43</sup> The Liberty Consulting Group - Report to the Safety and Enforcement Division Study of Risk Assessment, California Public Utilities Commission and PG&E’s GRC, May 6, 2013, Page 148.

<sup>44</sup> Appendix B - ATTACHMENT B - Requirements for PG&E Report on Systemic Issues

Procedures or policies for proactive de-energization of power lines:

- a) Describe PG&E activities to consider de-energization as a tool to reduce fire risk between January 2013 and May 31, 2019. Include any analyses or consideration given to SDG&E’s de-energization program, and to Southern California Edison (SCE’s) de-energization program. Identify and provide contemporaneous documentation that explains PG&E’s efforts, conclusions, and actions regarding a de-energization program.
- b) Describe the status of PG&E’s development of a de-energization program in October 2017.
- c) Describe whether PG&E considered de-energization at the time leading up to and including the October 2017 fire siege. If so, explain the steps taken, factors considered, decisions made, and outcomes.

PG&E has stated that “had the current model been deployed since 2012, the protocols would have prevented wildfires such as Camp, Tubbs, Nuns, Atlas, Kincade and Zogg fires.”

**Recommendation:** None.

## Finding #4: Risks Identified but not Acted Upon




**Risks Identified but not Acted Upon**

The threat of wildfires was identified as a significant risk but organized planning and preparation efforts for such a threat were limited.

**Background**

PG&E's 2015 Corporate Risk Register first included the threat of wildfires as a significant risk. However, the company's 2017 Company Emergency Response Plan (CERP), finalized less than two months before the October wildfires, did not include the terms 'fire' nor 'wildfire.'

**Analysis**

Organized planning and preparation efforts for such a threat were limited.



**Finding:** The threat of wildfires was identified as a significant risk but organized planning and preparation efforts for such a threat were limited.

**Background:** PG&E's 2015 Corporate Risk Register first included the threat of wildfires as a significant risk. However, the company's 2017 CERP, finalized less than two months before the October wildfires, did not include the terms 'fire' nor 'wildfire.'

**Analysis:** Organized planning and preparation efforts for such a threat were limited.

**Recommendation:** Given the proven costs of not taking quick action when new major risks are identified, PG&E could institute a process to ensure that relevant plans, operational programs, and procedures are aligned with actions to address such threats.

## Finding #5: Safety Culture

ENVISTA  
FORENSICS
WITT O'BRIENS  
PART OF THE BRADCO GROUP

**Safety Culture**

The RCA Team generally agrees with NorthStar Consulting's safety culture findings.

**Background**

At the outset, the CPUC staff emphasized that, although mentioned in the scope language, issues regarding safety culture were not to be a primary focus of this project as substantial resources, both at PG&E and the CPUC, were being dedicated to a parallel review of safety culture by the CPUC's consultant NorthStar Consulting.

**Analysis**

The RCA Team met with the NorthStar Team and reviewed their reports going back to 2015.



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**Finding:** The RCA Team has reviewed NorthStar Consulting's and Dekra's safety culture findings to-date and has no basis for challenging such.

**Background:** At the outset, the CPUC staff emphasized that issues regarding safety culture were not to be a primary focus of this project as substantial resources from PG&E, CPUC, and Energy Safety were already dedicated to this topic. This included CPUC's consultant NorthStar Consulting and the Safety Culture Assessment by Dekra overseen by Energy Safety.

**Analysis:** The RCA Team met with the NorthStar Team and reviewed their reports going back to 2015.

**Recommendation:** Based on documents reviewed and interviews conducted for this RCA report, the RCA Team has no additional findings or recommendations beyond related subjects discussed in this report.

## B. Theme 2: Vegetation Management

### Finding #6: Leadership Qualifications

ENVISTA  
FORENSICS
WITT O'BRIEN'S  
PART OF THE BEACON FAMILY

**Leadership Qualifications**

PG&E places key management individuals into Vegetation Management who do not have the required qualifications and competence.

**Background**

PG&E's Vegetation Management Leadership, Job Profile Matrix for Director, Senior Vegetation Management, and Supervisor Vegetation Program Management positions indicate that qualifications and experience in utility vegetation management are desired requirements.

**Analysis**

PG&E has a \$1.5 billion budget for vegetation management; however, the company lacks adequate VM expertise and qualifications at the vice president level.

**Finding:** PG&E places key management individuals into Vegetation Management who do not have the required qualifications and competence.

**Background:** PG&E's Vegetation Management Leadership, Job Profile Matrix for Director, Senior Vegetation Management, and Supervisor Vegetation Program Management positions indicate that qualifications and experience in utility vegetation management are desired requirements:

1. Director
  - a. ISA Arborist/Utility Specialist certification.
  - b. Strong knowledge of forestry and/or utility vegetation management concepts, methods, and techniques.
  - c. Knowledge of forestry, horticulture, and utility vegetation management theories, concepts, methods, best practices, and techniques as needed to perform at the job level.
  - d. 12 years of related experience with at least 7 years in a leadership role, team leader or project leader.

2. Senior Manager, Vegetation Management
  - a. ISA Arborist/Utility Specialist certification.
  - b. Strong knowledge of forestry and/or utility vegetation management concepts, methods, and techniques.
  - c. 10 years of related experience with at least 7 years in a leadership role, team leader or project leader.
3. Supervisor, Vegetation Program Management
  - a. ISA Arborist/Utility Specialist certification.
  - b. Strong knowledge of forestry and/or utility vegetation management concepts, methods, and techniques.
  - c. 7 years of related experience with at least 5 years in a leadership role, team leader or project leader.

A benchmark study, “Utility Vegetation Management in North America”<sup>45</sup> clearly shows that vegetation management qualifications are important:

1. Nearly all responding UVM programs (92.9%) had a department head.
2. 56% of those department heads hold degrees in natural resources or a related field; 49.2% hold a B.S. and another 6.3% hold an M.S.
3. 82.5% are ISA-Certified Arborists.
4. 52.4% are Certified Utility Specialists.
5. 20.6% are ISA Tree Risk Assessment-Qualified (TRAQ).

ANSI A300-part 7<sup>46</sup> states a vegetation manager is an individual engaged in the profession of vegetation management who, through appropriate experience, education, and related training, possesses the competence to provide for or supervise an integrated vegetation management program.

**Analysis:** During the 2017 and 2018 wildfires, the Senior Manager, Director, and Vice President did not have adequate education, training, or experience in electric utility vegetation management, but were making significant operational and spending decisions.

PG&E has a \$1.5 billion budget for vegetation management; however, the company lacked adequate VM expertise and qualifications at the Senior Manager, Director, and Vice President levels.

**Recommendation:** PG&E should immediately take steps to ensure that a Vice President and other senior program leaders have the necessary professional VM education, experience,

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<sup>45</sup> Utility Vegetation Management In North America, College of Natural Resources, University of Wisconsin–Stevens Point, CNUC, 2019

<sup>46</sup> ANSI A300 (Part 7) 2018 Tree, Shrub, and other Woody Plant Management – Standard Practices (Integrated Vegetation Management)

training, certifications, and competence to adequately administer and manage Vegetation Management functions.

## Finding #7: Contractor Qualifications





**Contractor Qualifications**

Many of the CUFs lacked the education, skill, and experience to perform the pre-inspections. PG&E didn't verify that the CUFs met the minimum qualifications.

**Background**

PG&E's pre-inspection services and post-auditing work specifications require that the consulting utility forester (CUF) shall have at least two years' experience in line clearance tree pruning. It is desired but not required that a CUF have an AA degree in forestry or a related field. The CUF shall become a certified arborist within 18 months.

**Analysis**

PG&E relied on the contractors to provide the training to the pre-inspectors. PG&E didn't verify if the CUFs were trained on these matters. A minimum level of basic education, training, and experience in utility arboriculture and tree risk assessment has been proven adequate by utilities throughout the U.S. and internationally.

X

X

X

**Finding:** Many of the consulting utility foresters (CUFs) lacked the education, training, skill, and experience to perform pre-inspections. PG&E didn't verify that the CUFs met the minimum qualifications.

**Background:** PG&E's pre-inspection services and post-auditing work specifications require that the CUF shall have at least two years' experience in line clearance tree pruning. It is desired but not required that a CUF have an AA degree in forestry or a related field. Depending on the contract with various contractors, the CUF shall become a certified arborist within 12 to 18 months.

**Training:** In the years leading up to the 2017 wildfires, PG&E's Vegetation Management Department didn't provide any training to the contractors on policies, procedures, or the hazard tree rating system. PG&E relied on the contractors to provide the training to the pre-inspectors. PG&E didn't verify whether the CUFs were trained in conformance with PG&E specifications on these matters.

The large number of potential exceptions identified thus far strongly suggest there were gaps in PG&E's training of pre-inspectors and/or tree workers, and the existing training and contractor oversight was not effective. This issue has been noted by the former Federal Monitor as well.

**Analysis:** PG&E’s demand for qualified CUFs exceeded the supply as demonstrated by PG&E managers and contractors we interviewed. There were not enough professionals educated and experienced in utility forestry or arboriculture to meet the demand to annually inspect and assess the approximately eight million trees PG&E estimates as subject trees. Furthermore, the requirement to become a certified arborist within 12 to 18 months was not practical given that the ISA requires a minimum of three years’ experience in arboriculture to even sit for the required exam.

Extensive industry experience has demonstrated that certified arborist credentials are not required for the majority of utility line clearance inspections. Only pre-inspectors who have been qualified by basic utility arboricultural education, training, and experience to achieve competence in basic utility tree risk assessment are required to inspect, assess, and identify line clearance compliance, hazard trees and potential hazard trees. The potential hazard trees, that may include healthy trees, are much fewer in number and can be assessed by the certified arborists in conformance with the CPUC decision. This practice will significantly reduce the unnecessary, excessive, and virtually impossible demand for certified arborists and ensure that all trees are more effectively inspected and assessed.

A college degree and arborist credential are not required for conducting most of the required utility tree risk assessments. Electric utilities throughout the U.S. and internationally have demonstrated the majority of utility tree risk assessments can be effectively conducted through a Level 1 Limited Visual Assessment (LVA) as defined and described within the American National Standards Institute (ANSI) A300 (Part 9) Tree Risk Assessment.<sup>47</sup> The Level 1 LVA does not require a utility forester or arborist with a college degree or with a Certified Arborist Credential. A minimum level of basic education, training, and experience focused on key aspects of utility arboriculture and tree risk assessment has been proven adequate by utilities throughout the U.S. and internationally.

**Recommendations:** Personnel performing tree risk assessments shall have the demonstrated competence to effectively conduct required tasks including a minimum defined level of education, training, skills, and experience to identify and mitigate at-risk trees. This includes, but should not be limited to, education, training, and demonstrated competence in basic tree biology and major species identification. A basic understanding of electricity and the utility structure and operations is necessary. The CUFs should understand all applicable CPUC and Public Resources Code (PRC) regulatory requirements. In addition, personnel should recognize key electrical hardware, including identification of maximum potential operating voltage.

Understanding utility tree risk assessment processes and systems as described within the Utility Tree Risk Assessment Best Management Practices is required. A CUF shall demonstrate

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<sup>47</sup> Tree Structure Assessment – Standard Practices, and Best Management Practices – Utility Tree Risk Assessment (2020)

competency in recognition of common tree and site defects and conditions. Effective communication techniques for tree owners/managers to ensure effective mitigation, permissions, and notifications is essential. An understanding of crew types for effective and efficient mitigation, field recordkeeping, field marking of trees for satisfactory identification, and reporting practices and procedures to ensure accurate database management is paramount.

As these utility arborists gain experience, within one year they should be able to conduct a Level 2 Basic Assessment through additional training and education based on Level 1 experience. After gaining three years of experience in utility arboriculture, these arborists should be required to hold a current ISA-certified arborist, Tree Risk Assessment Qualification, and the ISA Utility Specialist credential.

All vegetation management staff and contractors should have annual training to identify, analyze, and evaluate tree risks.

CUFs need annual training on identifying and evaluating high-risk trees. Training should include information from the following sources:

- GO 95 Rule 35
- Power Line Fire Prevention Field Guide, Edition 2020
- PRC-4293
- ANSI A-300 (Part 7) Integrated Vegetation Management, Latest Version
- ISA Best Management Practices Integrated Vegetation Management
- ANSI A-300 (Part 9) Tree Risk Assessment, Latest Version
- Best Management Practices – Utility Tree Risk Assessment, By John W. Goodfellow
- FERC-003.4

It is important to develop lead trainers within PG&E's VM Staff. These lead trainers can train new CUFs and do additional training because of QC audits. Field verification shall be done annually to ensure the CUFs are identifying and listing hazard trees for pruning and removal. CUF training should be documented with signatures of the CUF and trainer.

## Finding #8: Vegetation Management Programs




**Vegetation Management Programs**

PG&E has too many disjointed programs that could be combined to improve efficiencies in the vegetation management program. This will reduce costs over time, increase the cycle length, and can be less confusing to PG&E's contractors and customers.

**Background**

VM Programs: Routine VM, Facility Protect, Public Safety and Reliability, Drought and Tree Response, and CEMA.

**Analysis**

Utilities across the U.S. and Canada perform all vegetation maintenance at one time except in California. The exception for some utilities is a separate tree risk assessment program. This is done due to environmental conditions such as insect outbreaks or droughts. This work can be done at the same time as routine work or modified according to the severity of the problem.

X Physical
X Procedural
X Operational
X Management
X Organizational

**Finding:** PG&E has too many unnecessarily disjointed programs that should be combined to improve efficiencies in vegetation management. This will reduce costs over time, increase the cycle length, and be less confusing to PG&E's contractors and customers without losing any safety or electric service reliability.

**Background:** The following programs are part of PG&E's vegetation management system:

The Routine VM program strategy is to perform an annual patrol and identify tree work on all overhead primary and secondary distribution facilities to maintain radial clearance between vegetation and conductors. This program also identifies trees that will encroach within PG&E's minimum distance requirements, and hazard trees with a high potential to fall and strike conductors within the defined cycle period.

The Facility Protect Program is designed to remove or prune all trees that are dead, or show signs of disease, decay, or ground/root disturbance that may fall into or otherwise impact the primary conductors or secondary standalone conductors within the defined cycle period. This is an add-on hazard tree program that unnecessarily repeats the program conducted during the Routine Program.

The Public Safety and Reliability Vegetation Work (PS&R) is an add-on routine and hazard tree program that unnecessarily repeats the Routine Program. This work, among other things, is

designed to reduce the likelihood of wildfires. PG&E performed additional vegetation patrols and tree work in areas with risk factors associated with a higher likelihood of vegetation-caused outages and downed wires.

PG&E's Drought and Tree Mortality Response Program started in 2014 and represents other VM activities that PG&E implemented. PG&E implemented additional distribution initiatives to further work to prevent trees and vegetation from encountering electrical facilities. In 2017, PG&E added the Enhanced Vegetation Inspection & Mitigation Program, which conducts additional ground and air vegetation inspections and tree work in high fire-threat areas. PG&E started a supplemental Tier 3 Patrol Program.

Catastrophic Event Memorandum Account (CEMA) is a secondary patrol project to address only dead, dying, and declining trees, or dead portions of trees, that can contact PG&E equipment. This is an add-on hazard tree program that unnecessarily repeats the work conducted during the Routine Program.

**Analysis:** PG&E's customers are contacted up to three times per year by various contractors implementing the above programs. This approach is confusing to customers when contacted by more than one inspector multiple times—often before work is conducted based on the previous contact.

Within the CEMA program, tree crews will only work the trees assigned. When many more trees are marked for pruning or removal by various inspectors, trees can be missed by the tree crews.

**Recommendation:** Combine these programs, resulting in a more efficient, streamlined program. The inspectors and tree crews can identify and clear the ROW and off-ROW hazard trees, maintaining regulatory clearance requirements at lower costs without any reduction in safety or reliability, as has been demonstrated by utilities across the country.

## Finding #9: QA/QC Program




### Quality Assurance and Quality Control

The PG&E Quality Assurance and Quality Control Program wasn't designed for auditing tree populations but instead line miles. In addition, the focus of these audits was to identify noncompliant trees with the radial clearance requirements of General Order (GO) 95, Rule 35, and PRC-4293. Hazard trees were identified by the auditors, but this didn't affect the audit scorecard for contractors to be in compliance with PG&E's own procedures.

**Background**

PG&E uses line miles as the foundation for the sampling procedure for auditing the UVM work, and not the number or distribution of the tree population.

**Analysis**

The PG&E processes for the QA/QC programs were not designed to audit trees, but instead line miles. The Butte fire depositions from PG&E employees demonstrate that there are gaps in the processes. These two audits are performed independently.

X Physical
X Procedural
X Operational
X Management
X Organizational

**Finding:** The PG&E Quality Assurance/Quality Control Program wasn't designed for auditing tree populations but instead for line miles. In addition, the focus of these audits was to only identify trees not in compliance with the radial clearance requirements of General Order (GO) 95, Rule 35, and PRC-4293. Hazard trees were sometimes identified by the auditors, but this didn't affect the audit scorecard for contractors to be in compliance with PG&E's own procedures.

Line miles is a metric for the total length of overhead lines. PG&E's and other studies by the CPUC have found that significant portions of PG&E's overhead line system do not include any trees. The result is that there are far more line miles than "tree" miles. Using the line mile standard to establish the baseline metric for performance will miss a significant proportion of trees and provide a deceptively positive performance result due to the significantly higher miles of line used as a denominator. A more accurate metric would be tree miles or individual trees. PG&E possesses an inventory that identifies specific trees, so that this much more accurate metric could be applied based on the current data.

**Background:** The following is testimony from PG&E employees as a result of the Butte Fire:

██████████ testified that he met with ██████████, PG&E economics and forecasting department, on a sampling technique that would result in a statistically valid sample of the population. ██████████ advised ██████████ that line miles were to be used, not tree

populations. ██████ stated they never sampled the population of trees, but they did apply the result to trees.<sup>48</sup> However, ██████ testified that he never talked to anyone in the vegetation management department, and he did not know how they would use the formula.<sup>49</sup>

██████ further testified that the level of confidence established through PG&E's sampling intensity, which is the amount of linear line feet required to be inspected to provide the desired confidence level of the result, was set at 1.96, which gives a level of confidence of 95%. The minimum level of compliance for PG&E's UVM program was set at 99%. However, ██████ testified that he does not know whether or not they apply the 3% correction factor to the 99% goal.<sup>50</sup>

**Analysis:** By using line miles as the foundation for the sampling, and not the number or distribution of the tree population, PG&E was not accurately sampling and measuring their UVM performance. ██████, Consulting Arborist for PG&E, testified during his Butte Fire deposition that PG&E did not use the correct sample formula and should have used cluster sampling.<sup>51</sup>

These audits were completed separately. In interviews, the person in charge of the QA process stated it is the responsibility of the VPM to ensure all hazard trees are identified, which isolates enforcement and reduces the effectiveness of the program.

**Recommendation:** The QA/QC programs should be performed at the same time with the priority of identifying hazard trees. The QA/QC programs should consider auditing 100% of all circuits in high fire-risk areas and ensure 100% auditing of circuits with unsatisfactory performance. In other areas, the sample formula should be based on tree populations. Since PG&E has QA/QC programs, these departments should be responsible for identifying all hazard trees.

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<sup>48</sup> May 8, 2017 Transcript of the Deposition of ██████ at 29:14 – 31:24.

<sup>49</sup> April 12, 2017 Transcript of the Deposition of ██████ at 16:15-17:4.

<sup>50</sup> Feb. 27, 2017 Transcript of the Deposition of ██████ at 20:11-21:15.

<sup>51</sup> July 28, 2017 Transcript of the Deposition of ██████ at 89:4-15.

## Finding #10: Pre-Inspection Contract Strategy




**Pre-Inspection Contract Strategy**

PG&E uses a lump sum pre-inspection contract strategy. A time and materials (T&M) contract will allow the pre-inspector the time to thoroughly inspect and identify hazard trees.

**Background**

If the contractors got behind schedule, additional resources would have to be brought in or overtime paid to get back on schedule. These actions also reduce the profit margins for the contractors. The QA program was only looking at clearance requirements and missing trees that should be listed, or over-listing trees which did not violate regulations.

**Analysis**

PG&E was incentivizing the contractors to meet schedules, adhere to clearance requirements for regulations, and use the pre-inspector's best judgment not to list at-risk trees or trees that may hold compliance until the following year. This should not be necessary as PG&E's VM Team, and the Pre-Inspection Contractors have been managing the distribution systems for decades. The data compiled over this time should provide adequate data to plan budgets and manage costs on inspection for a given circuit.

X Physical
X Procedural
X Operational
X Management
X Organizational

**Finding:** PG&E uses a lump sum pre-inspection contract strategy. A time and materials (T&M) contract will allow the pre-inspector the time to thoroughly inspect and identify hazard trees.

**Background:** Lump Sum Work refers to the following: "Contractor shall, at its own risk and expense, perform Pre-Inspection Lump Sum Work requested by PG&E. Contractor shall furnish all labor, supervision, material, equipment, transportation, and administrative services required to perform the work in compliance with this specification."

Lump Sum Work to be performed includes forecasting of the number of units by circuit and participating in creating the annual plan in cooperation with the tree contractor and PG&E; monitoring, revising, and updating the annual plan in the Project Management Database (PMD) as required; generating and distributing PMD reports; analyzing PMD reports and taking necessary action as indicated in the PMD reports; and attending area status meetings to monitor progress.

If the contractors got behind schedule, additional resources would have to be brought in or overtime paid to get back on schedule. These actions also reduce the profit margins for the contractors. The QA program was only looking at clearance requirements and missing trees that should be listed, or over-listing trees which did not violate regulations.

**Analysis:** PG&E was incentivizing the contractors to meet schedules, adhere to clearance requirements for regulations, and use the pre-inspector's best judgment not to list at-risk trees or trees that may hold compliance until the following year.

This should not be necessary as PG&E's VM Team, and the Pre-Inspection Contractors, have been managing the distribution systems for decades. The data compiled over this time should provide adequate data to plan budgets and manage costs on inspection for a given circuit.

In the utility vegetation management industry, a great majority of firms use time and materials contracts to inspect trees to better ensure that adequate time and effort is provided to identify hazard trees. The industry realizes the time it takes to inspect potential hazard trees in the ROW.

Interviews with a PG&E management team stated a lump sum pre-inspection contract is focused on managing costs.

**Recommendation:** PG&E should consider converting from lump sum contracts to time and materials contracts.

## C. Theme 3: Circuitry

### Finding #11: 3-Wire System




**Three-Wire System**

The fundamental design of the overall PG&E electric system permits undetected ground-faulted overhead conductors to remain electrically energized in contrast to industry best practice.

**Background**

The design and implementation of a large portion of PG&E's overhead distribution systems inherently create a condition in which the circuit protection devices, circuit breakers, reclosers, sectionalizing switches, and fuses may not detect and interrupt a phase to ground fault (L-G fault) caused by one or more downed conductors. In these cases, damaged conductors can remain energized for long durations until PG&E becomes aware of the situation and dispatches a qualified electrical worker to de-energize the conductor.

**Analysis**

PG&E has initiated the PSPS Program under which they preemptively de-energize overhead facilities in high fire-threat areas during threatening extreme heat, wind, and humidity weather conditions. PG&E has also undertaken several recent trial electric system enhancement initiatives to limit fire ignitions by deploying feeder undergrounding and new, not yet industry adopted, solutions and technology, such as fault anticipation, fault current neutralizing, and Rapid Earth Fault Current Limiting.

X Physical

X Operational

**Finding:** The fundamental design of the overall PG&E electric system permits undetected ground-faulted overhead conductors to remain electrically energized in contrast to industry best practice.

**Background:** PG&E's overhead electric system consists of 18,466 miles of interconnected and radial 69 to 500 kV transmission lines, and 106,681 miles of radial 4 to 21 kV distribution feeders. The design and implementation of a large portion of PG&E's overhead distribution systems inherently create a condition in which the circuit protection devices, circuit breakers, reclosers, sectionalizing switches, and fuses may not detect and interrupt a phase to ground fault (L-G fault) caused by one or more downed conductors. In these cases, damaged conductors can remain energized for long durations until PG&E becomes aware of the situation and dispatches a qualified electrical worker to de-energize the conductor.

Between 2014 and 2019, PG&E has documented nearly 2,500 fires ignited by failed electrical system components, of which over 1,900 fires involved energized conductors. These situations are common knowledge both internally within PG&E, as well as with external stakeholders.

Also, High-Impedance Faults on the PG&E system have been documented by Liberty Consulting<sup>52</sup>, Quanta Technology<sup>53</sup>, CAL FIRE, and others.

Further, the Root Cause Analyses (RCA) conducted by the RCA Team found that in over 70% of the ignitions, a damaged conductor was energized for a long duration. Of which, 14 wildfires involved the 3-wire circuit design. The results of the RCAs also concluded that 10 of the fires involved the 3-wire circuit design that had undetected back-feed conditions present for an extended period.

**Analysis:** PG&E initiated the PSPS Program under which they preemptively de-energize overhead facilities in high fire-threat areas during threatening extreme heat, wind, and humidity weather conditions.

PG&E has also undertaken several recent trial electric system enhancement initiatives to limit fire ignitions, by deploying feeder undergrounding and new, not yet industry adopted, solutions and technology, such as fault anticipation, fault current neutralizing, and Rapid Earth Fault Current Limiting.

**Recommendation:** PG&E should expeditiously proceed with System Enhancement Initiative No. 20<sup>54</sup>, which requires PG&E and the CPUC to engage an independent engineering firm to study the grounding methods and circuit and transformer configuration in PG&E's distribution system and transmission system.

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<sup>52</sup> CPUC initiated 2013 "Liberty Consulting Risk Assessment Report"

<sup>53</sup> PG&E initiated "Quanta Technology - Protection Review and Practices Report"

<sup>54</sup> Order Instituting Investigation on the Commission's Own Motion into the Maintenance, Operations and Practices of Pacific Gas and Electric Company (U39E) with Respect to its Electric Facilities; and Order to Show Cause Why the Commission Should not Impose Penalties and/or Other Remedies for the Role PG&E's Electrical Facilities had in Igniting Fires in its Service Territory in 2017, I.19-06-015, Filed June 27, 2019, Exhibit C, Description of PG&E Shareholder-Funded System Enhancement Initiatives, System Enhancement Initiative 20, Independent Study of Distribution and Transmission System.

## Finding #12: Asset Management




**Asset Management**

The corrective maintenance (tag) backlog was significant in both duration and number, which contributed to degraded system conditions.

**Background**

The current backlog of T-line corrective work orders (tags) indicates the lack of an adequate preventive maintenance program. There existed a gap between technical review of events and the programs initiated to improve operation. Also lacking were metrics to validate that actions provided the intended improvement. Based on a review of the incidents, it could be concluded that measures taken by PG&E were not effective in the areas of asset and vegetation management. The 2017 and 2018 Risk Register identified eight risks associated with failure of transmission and distribution system components which may result in fire.

**Analysis**

The CAL FIRE Camp Wildfire Investigation Report determined that the fire was the result of a foreseeable PG&E transmission line component failure. PG&E was not able to provide documentation that frequent and thorough inspections were done prior to the Camp Fire. PG&E had tested C-hooks and recommended frequent inspection yet failed to complete thorough, regular inspections.

X Physical		X Operational	X Management	
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**Finding:** The corrective maintenance (tag) backlog was significant in both duration and number, which contributed to degraded system conditions.

**Background:**<sup>55</sup> A backlog of T-line corrective work orders (tags) indicates the lack of an adequate preventive maintenance program. There existed a gap between technical review of

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### <sup>55</sup> Document Reference Materials

- Ref #50 Quarterly Reporting on Electric Maintenance Work
- PACIFIC GAS AND ELECTRIC COMPANY SUPPLEMENTAL FILING ADDRESSING REMEDIAL COMPLIANCE PLAN AND FIRST QUARTERLY REPORT ACTION ITEMS. See 5.3.3.12-1 Other Corrective Action – “This initiative is intended to reduce the risk of an arc flash event within a substation propagating into adjacent wildlands. There are three actions associated with this initiative; establishment of defensible space for substations, implementation of improved animal abatement requirements and equipment repairs and replacement from deficiencies identified through the enhanced inspection program.”
- PACIFIC GAS AND ELECTRIC COMPANY SUPPLEMENTAL FILING ADDRESSING REMEDIAL COMPLIANCE PLAN AND FIRST QUARTERLY REPORT ACTION ITEMS. See Page 34. “Although PG&E tries to identify the suspected initiating cause given the evidence available at the time, sometimes the evidence is sparse and PG&E investigators **may attribute the cause of an ignition to equipment failure** if that scenario is most likely given the physical evidence available at the time and the absence of any evidence to suggest otherwise (e.g., vegetation, bird carcass, etc.).”
- Ref #136 PG&E Repair and Maintenance Employee staffing

events and programs initiated to improve operation. Also lacking were metrics to validate that action provided the intended improvement. Based on incidents, it could be concluded that measures taken by PG&E were not effective in the areas of asset and vegetation management. The 2017 and 2018 Risk Register identified several risks associated with failure of transmission and distribution system components which may result in fire.

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- Ref #268 General Order 165 requires each utility to submit to the CPUC an annual maintenance report describing its inspection activities for the prior year, no later than July 1st every year. Copies of the 2015, 2016, 2017, and 2018 annual maintenance reports should be submitted to the CPUC.
  - Ref #31 Transmission Repair work packages (2015-2017)
  - CAL FIRE Investigation Report Case #: 18CACNR000320 dated 11/18/2018 (Page 60 lines 5-8)
  - Ref #186 Risk Register
    - 2017 / 2018 Risk Name: Wildfire
      - PG&E assets may initiate a wildland fire that is not easily contained and that endangers the public, private property, sensitive lands, and/or leads to long-duration service outages.
    - 2017 / 2018 Risk Name: Distribution Overhead Line Equipment – Voltage Regulators, Boosters, and Capacitors
      - Failure of, or interaction with, distribution overhead voltage line equipment may result in public or employee safety issues, fire, oil spill, or property damage.
    - 2017 / 2018 Risk Name: Distribution Overhead Conductor – Primary
      - Failure of, or contact with, energized electric distribution primary conductor results in public or employee safety issues, significant environmental damage, prolonged outages, or significant property damage.
    - 2017 / 2018 Risk Name: Distribution Overhead Conductor – Secondary
      - Failure of, or contact with, energized electric distribution secondary conductor may result in public or employee safety issues, fire, or significant property damage.
    - 2017 / 2018 Risk Name: Distribution Overhead Line Equipment – Protective
      - Failure of distribution overhead protective line equipment may result in public or employee safety issues, fire, or property damage
    - 2017 / 2018 Risk Name: Distribution Underground Line Equipment
      - Failure of, or interaction with, energized distribution underground line equipment may result in public or employee safety issues, fire, or property damage (includes capacitors, switches, interrupters, fused switches, and controls). A lack of sufficient resources contributed to an increased backlog of 22.3% of electric transmission corrective maintenance tags from 2016 to 2020. A review of the Quarterly Reporting on Electric Maintenance Work and Corrective Action Tag documents indicated a significant backlog of tags.
    - 2017 / 2018 Risk Name: Distribution Underground Subsurface and Pad-Mount Transformers
      - Failure of or contact with energized distribution transformers may result in public or employee safety issues, fire, or property damage.
    - 2017 / 2018 Risk Name: Transmission Overhead Conductors
      - Failure of or contact with energized electric transmission conductors may result in public or employee safety issues, fires, or significant property damage.
    - 2017 / 2018 Risk Name: Transmission Overhead Switches
      - Failure of overhead transmission switches may result in employee safety issues, prolonged outages, fires, or significant property damage.

**Table 9.** Incidents by Year

- Trending up
- 2021 on pace to be third highest (806)

Year	Count
2015	540
2016	382
2017	613
2018	533
2019	995
2020	847
2021 (thru March)	470
<b>Grand Total</b>	<b>4,380</b>

**Table 10.** Cause Category

- Tree trending up
- 2021 on pace to be 2.5 times 2020 (50)

Year	Count
2015	42
2016	29
2017	95
2018	17
2019	54
2020	20
2021 (thru March)	29
<b>Grand Total</b>	<b>286</b>

**Analysis:** The CAL FIRE Camp Wildfire Investigation Report concluded that:

*Based on my training, experience, evidence, witness reports, and 911 reports, I determined the Camp Fire was the result of a foreseeable PG&E transmission line component failure. At approximately 6:15 AM on November 8, 2018, the supporting hook of the right to left phase*

*transposition conductor of the Caribou-Palermo 115 KV transmission tower 271222 catastrophically failed after a prolonged period of wear.*

PG&E was not able to provide any documentation that frequent and thorough inspections were done prior to the Camp Fire. Moreover, PG&E had tested C-hooks and recommended frequent inspection yet failed to complete thorough, regular inspections of the Caribou-Palermo 115 KV circuit even after five towers collapsed in 2012.

Both the c-hook testing and inspection reports demonstrated PG&E's quantifiable knowledge of the deteriorated hardware similarly used on the Caribou-Palermo 115 KV circuit and CP27/222. PG&E has not provided any report, inspections records, or other documentation that these conditions were ever inspected or considered on the Caribou-Palermo 115 KV circuit.<sup>56</sup>

CAL FIRE also found PG&E in violation of GO 95 Rule 31.1 and 31.2 related to inspection and maintenance of facilities.

The Liberty Report found PG&E lacked a strategic asset management program, specifically:

"We recommend the establishment of a formal asset management program in Electric Operations. Aging infrastructure is best addressed by having a strategic asset management program in place. These types of programs, such as the PAS 55 program, force a detailed and thorough condition assessment survey of the major assets. These types of formal programs also take failure modes into consideration. Long-term sustainable plans can then be prepared to address the asset conditions. A sustainable asset management program will mitigate system safety risks from aging infrastructure, which constituted a major portion of the safety items in this GRC."<sup>57</sup>

**Recommendation:** PG&E should implement a comprehensive program that includes the proper balance of the various approaches to maintenance, including preventive, predictive, and corrective, and not replace on failure.

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<sup>56</sup> Cal Fire Investigation Report Case #: 18CACNR000320 dated 11/18/2018 (Page 60, lines 5-8)

<sup>57</sup> The Liberty Consulting Group – Report to the Safety and Enforcement Division Study of Risk Assessment California Public Utilities Commission and PG&E's GRC, May 6, 2013, Page 98

## D. Theme 4: Emergency and Crisis Management

### Finding #13: Incident Command System Not Fully Implemented

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**Incident Command System Not Fully Implemented**

PG&E had taken steps before the 2017 wildfires to implement ICS but a review of documents and interviews with PG&E emergency management officials make it clear that the company had not fully implemented ICS before the fires in 2017.

**Background**  
 Since 2005, units of government and private sector owners of critical infrastructure which received federal funding are required to fully implement the Incident Command System (ICS) for emergency response operations.

**Analysis**  
 After-Action Reports on the Camp Fire indicate that PG&E management did not follow the ICS reporting structure in the company's emergency operations center in preparation for, and during, the incident.

X Physical

X Operational

**Finding:** PG&E had taken steps before the 2017 wildfires to implement ICS but review of documents and interviews with PG&E emergency management officials identifies that the company had not fully implemented ICS before the fires in 2017.

**Background:** Since 2005, units of government and private sector owners of critical infrastructure which received federal funding are required to fully implement the Incident Command System (ICS) for emergency response operations.

**Analysis:** After-Action Reports on the Camp Fire indicate that PG&E management did not follow the ICS reporting structure in the company's emergency operations center in preparation for, and during, the incident.

**Recommendation:** PG&E should consider full implementation of the ICS, including for daily operations, as has been done at other major utilities, including ConEd in New York and Consumers Energy in Michigan.

## Finding #14: Crisis Management Plan




**Crisis Management Plan**

A Crisis Management Plan that fully utilizes the executive management team for oversight during planning and response activities did not exist during the 2017 and 2018 timeframe.

**Background**

The 2018 CERP only has a reference to a Crisis Management Officer Requested Position procedure/guide during a National Response Event (NRE). An NRE is an electric utility event that is forecasted to cause or causes widespread power outages impacting a significant population or several regions across the U.S.

**Analysis**

The successful implementation of a corporate emergency preparedness program starts with executive management. Vitally important is the role of the executive management team during an event. The Incident Command Structure is charged during an event with mitigation and response. The adverse impact of an emergency can affect public confidence, stakeholder satisfaction, and regulatory action which must be addressed. This requires strategic incident management planning, coordination, and establishing overarching incident objectives. These objectives assess long-term and company-wide impacts of the incident including financial and brand image.



**Finding:** A crisis management plan which fully utilizes the executive management team for oversight during planning and response activities did not exist during the 2017 and 2018 timeframe.

**Background:**<sup>58</sup> No crisis management plan existed in 2017 and 2018. The 2018 CERP only has a reference to Crisis Management Officer Requested Position procedure/guide during a National Response Event (NRE). An NRE is an electric utility event that is forecasted to cause or causes widespread power outages impacting a significant population or several regions across the U.S. The NRE Officer's responsibilities as stated in the CERP Section 9.2.6 National Response Event (NRE) are:

- Chief Executive Officer or designees are the primary stakeholders for the National Response Event. Working through the EEI Policy Committee on Reliability, Security and

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<sup>58</sup> **Document Reference Material**

- "ASSESSMENT OF PACIFIC GAS AND ELECTRIC CORPORATION AND PACIFIC GAS AND ELECTRIC COMPANY'S SAFETY CULTURE; SECOND UPDATE IMPLEMENTATION STATUS - 8/9/2021. Exhibit III-6 - PG&E and PG&E Corp. Board Member Skills Matrices – 2019 and 2021"
- Ref #10 – Crisis Management Plan
- Ref #71 – Crisis Management Officer Position Procedure

Business Continuity (PC-RSBC), they support fellow CEOs and the NREC in the NRE appeals process. Further, neither the 2020 CERP nor the 2021 Wildfire Annex contain a crisis management plan.

**Analysis:** The successful implementation of a corporate emergency preparedness program starts with executive management. Vitally important is the role of the executive management team during an event. The ICS is charged during an event with mitigation and response. The adverse impact of an emergency can affect public confidence, stakeholder satisfaction, and regulatory action which must be addressed. This requires strategic incident management planning, coordination, and establishing overarching incident objectives. These objectives assess long-term and company-wide impacts of the incident including financial and brand image.

PG&E admits there was no crisis management plan, and that senior leadership was imbedded in the ICS process. Industry best practice utilizes the C-suite as a crisis management team. In 2019, crisis response/management was a Board Member skill which was removed in 2020.

**Recommendation:** Redefine the role of the executive management team during an event to that of a Crisis Management Team (CMT). The CMT can deal with a major event that threatens to harm the organization, its stakeholders, or the general public by assessing long-term and company-wide impacts of the incident and providing overarching incident objectives aimed at essential business operations.

## Finding #15: Emergency Preparedness – Officer-in-Charge (OIC)




**Emergency Preparedness (OIC)**

The Officer-in-Charge (OIC) was created ad hoc during the 2018 Wildfire event to address the unspecified role of the executive. Officer-in-Charge (OIC) responsibilities overlap those of the Incident Commander (IC); the OIC operates outside of the IC Chain-of-Command which effectively usurps the IC's authority.

**Background**

The Incident Command System (ICS) is flexible and is utilized for incidents of any type, scope, and complexity. ICS allows its users to adopt an integrated organizational structure that matches the complexities and demands of single or multiple incidents. ICS, when utilized by government, nongovernmental organizations, and the private sector, provides a uniform approach with seamless communication between dissimilar organizations.

**Analysis**

During PSPS events, the OIC assumes the authority to lead in the commencement of PSPS activities, emergency operations center (EOC) activation, assessment of situational status, decision-making to de-energize and re-energize, implementation of notifications, and ensuring regulatory reporting. Conducting PSPS operations outside of the ICS framework may adversely affect response and mitigation activities.

X Physical		X Operational	X Management	
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**Finding:** OIC was created ad hoc during the 2018 Wildfire event to address the unspecified role of the executive. OIC responsibilities overlap those of the Incident Commander (IC) and operates outside of the IC Chain-of-Command which effectively usurps the IC's authority.

**Background:**<sup>59</sup> ICS is flexible and is utilized for incidents of any type, scope, and complexity. ICS allows its users to adopt an integrated organizational structure that matches the complexities

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### <sup>59</sup> Document Reference Materials

- Ref #1 Emergency Response Plan(s) 2015-2021 CERP 2018. P49 Section 5.1 Command Staff 5.1.2.1 Officer-in-Charge.
- The new as of 2018 Officer-in-Charge (OIC) responsibilities did not provide operational direction – only go/no go for PSPS activation.
- Participates in the decision to activate Corporate Incident Management Council (CIMC) Call/Executive update (managed by EP&R) and there is only one Director for EP&R and WSOC so this should be “Director”. As provided in the updated CIMC procedures, the OIC doesn't participate in the decision to activate the CIMC. This is done by the EOC Commander, VP of EP&R, and the CEO, who is the CIMC Chair.
  - Some of the major activities performed by the OIC are:
    - Participates in initial meeting with Directors of EP&R and WSOC and Meteorology to understand extreme forecast data
    - Participates in the Corporate Incident Management Council (CIMC) Call/Executive update (managed by EP&R)

and demands of single or multiple incidents. ICS, when utilized by government, nongovernmental organizations, and the private sector, provides a uniform approach with seamless communication between dissimilar organizations.

The OIC was created ad hoc during the 2018 Wildfire event to address the unspecified role of the executive. The IAP form ICS 203 indicates that both the OIC and IC were assigned to the 11/8/18 Extreme Weather Event. The 2017 and 2018 Risk Registers identify Emergency Preparedness and Response to Catastrophic Events due to inadequate plans and poor response execution.

The 2020 CERP states, “There is always an assigned EOC Commander on-call who is in charge of company emergency operations. Single Command (also called Single Incident Command) is when one Incident Commander (IC) has full responsibility for incident management.”

However, the 2021 PSPS Annex states, “The Officer-in-Charge (OIC) is a role specific to PSPS events and was created to engage higher-level management accountability of the decision given the magnitude and impact of PSPS, while also enabling rapid decision-making during a real-time PSPS event. The OIC is the Senior Vice President and Chief Risk Officer at PG&E. The OIC receives situational awareness from the Command Staff and general staff of PG&E’s EOC.

- 
- Reviews and approves timing of notification list of external agencies
    - Provides guidance on timing of resource allocation
    - Reviews customer profile data in forecasted PSPS zones
    - Reviews final PSPS shutoff zones
    - Confirms with Meteorology that Extreme+ weather has passed and verifies with Field Observers
    - Approves “All Clear” to release clearances and initiates patrols and restoration, based on meteorological recommendations
    - In coordination with the EOC, executes the final re-energization order to Electric Operations
    - Reviews estimated patrol and restoration times
    - Reviews PSPS report for the California Public Utilities Commission (CPUC) with Regulatory
  - Ref #180 Incident Action Plans
    - 11/08/2018 IAP
      - OIC: Pat Hogan / Aaron Johnson
      - IC: Mark Quinlan / Jason Regan
  - Ref #186 Risk Register
    - 2017 / 2018 Risk Name: Wildfire
      - PG&E assets may initiate a wildland fire that is not easily contained and that endangers the public, private property, sensitive lands, and/or leads to long-duration service outages.
    - 2017 / 2018 Risk Name: Emergency Preparedness and Response to Catastrophic Event
      - The risk of inadequate plans and poor response execution to a catastrophic emergency may result in safety concerns, extended outages, regulatory action, and reputational damage. This risk includes business continuity for the enterprise outside of the event.

The Officer-in Charge gives approval to start restoration and can be issued for all impacted areas at once or for specific areas.”

Further, the 2020 CERP states, “The power shutoff decision will be made by the designated Officer-in-Charge (OIC) with support from the Emergency Operations Center (EOC) leads.”

**Analysis:** Newly added to the CERP in 2018, the Officer-in-Charge (OIC) is activated to provide operational direction during potential and impending Public Safety Power Shutoff (PSPS) events. The OIC’s main objectives are to lead in the commencement of PSPS activities, emergency operations center (EOC) activation, assessment of situational status, decision-making to de-energize and re-energize, implement notifications, and ensure regulatory reporting.

**Recommendation:** PG&E should realign the OIC responsibilities to be centralized under the IC.

## E. Recommendations for potential modifications to CPUC General Orders

### Finding #16: General Order 95 Maintenance Program

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**GO 95 - Maintenance Program**

GO 95 does not provide guidance on preventive and predictive maintenance minimum standards.

**Background**

GO 95 addresses the construction and inspection of IOU electric systems. Companies are required to undertake corrective actions within time periods prescribed in the rule (Section 22.2 Maintenance means the work done on any line or any element of any line for the purpose of extending its life (excepting the replacement of the supporting poles or structures). This practice of maintenance is commonly known as “run-to-failure corrective maintenance repairs.”

**Analysis**

In contrast, GO 167 - Enforcement of Maintenance and Operation Standards for Electric Generating Facilities - specifically calls out the requirement to have a balanced maintenance program that includes preventive and predictive maintenance.

GO 167 Section 7.2 Maintenance Plan Appendix D: Maintenance Standards for Generating Asset Owners – Maintenance Standard MS 7 – Balance of Maintenance Approach - The maintenance program includes the proper balance of the various approaches to maintenance, e.g., preventive, predictive, or corrective.

X

Procedural

Management

**Finding:** General Order 95 does not provide guidance on preventive and predictive maintenance minimum standards.

**Background.**<sup>60</sup> The purpose of GO 95 is to formulate, for the State of California, requirements for overhead line design, construction, and maintenance, the application of which will ensure adequate service and secure safety to persons engaged in the construction, maintenance, operation, or use of overhead lines and to the public in general.

GO 95 defines maintenance [as the] work done on any line or any element of any line for the purpose of extending its life (excepting the replacement of the supporting poles or structures). This practice of maintenance is commonly known as *run-to-failure corrective maintenance repairs*.

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<sup>60</sup> **Document Reference Materials**

- GO 95
- GO 167 – Enforcement of Maintenance and Operation Standards for Electric Generating Facilities
- NFPA 70B – Electrical Preventive Maintenance

In contrast, GO 167 – Enforcement of Maintenance and Operation Standards for Electric Generating Facilities – specifically calls out the requirement to have a balanced maintenance program that includes preventive and predictive maintenance.

#### GO 167 Section 7.2 Maintenance Plan

#### Appendix D: Maintenance Standards for Generating Asset Owners – Maintenance Standard MS 7 – Balance of Maintenance Approach

The maintenance program includes the proper balance of the various approaches to maintenance, e.g., preventive, predictive, or corrective.

GO 95 Section 18.B Maintenance Programs only requires that:

“Each company (including electric utilities and communications companies) shall establish and implement an auditable maintenance program for its facilities and lines for the purpose of ensuring that they are in good condition so as to conform to these rules. Each company must describe in its auditable maintenance program the required qualifications for the company representatives who perform inspections and/or who schedule corrective actions.

The auditable (corrective) maintenance program must include, at a minimum, records that show the date of the inspection, type of equipment/facility inspected, findings, and a timeline for corrective actions to be taken following the identification of a potential violation of GO 95 or a Safety Hazard on the company’s facilities.”

Companies are required to undertake corrective action within time periods prescribed in the rule.

PG&E’s Overhead Design Manual contains the standards and methodologies for designing and assessing facilities according to the known local conditions such as mechanical loading, geographic location, and HFTD and non-HFTD areas.<sup>61</sup>

Leading maintenance programs incorporate three types of activities:

- Corrective Maintenance (CM)
  - CM is performed after asset failure or after anything goes wrong.
- Preventive Maintenance (time-based maintenance; usage-based): Preventive maintenance is triggered for an asset based on time or usage. PM is performed before asset failure or before anything goes wrong.
  - Predictive maintenance, also known as condition-based maintenance, is a proactive maintenance strategy that monitors the condition and performance of an asset in real time to predict when an asset needs maintenance before it breaks down. Electrical Preventive Maintenance (NFPA 70B) is the practice of conducting routine inspections,

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<sup>61</sup> 2022 Wildfire Mitigation Plan Update – Page 67

tests, and the servicing of electrical equipment so that impending troubles can be detected and reduced or eliminated.

**Analysis:** PG&E acknowledges that GO 95, Rule 31.1 directs PG&E to design, construct, and maintain a facility in accordance with accepted good practice for the intended use and known local conditions. However, PG&E has limited their maintenance program to after-failure corrective maintenance activities.

**Recommendation:** The CPUC should modify General Order (GO) 95 to require California utilities to implement a comprehensive maintenance program that includes the proper balance of the various approaches to maintenance, e.g., preventive, predictive, or corrective. This action would align GO 95 with GO 167 – Enforcement of Maintenance and Operation Standards for Electric Generating Facilities – which specifically calls out the requirement to have a balanced maintenance program that includes preventive and predictive maintenance.

## Finding #17: General Order 166 – Mutual Agreement Resource Typing




**GO 166 - Mutual Agreement Resource Typing**

PG&E did not maintain a list of available resources (amount, type of personnel, capability, equipment, materials, and supplies) to meet mutual agreements with EEI, FPL, Yolo County, and Western Regional and to comply with the intent of the GO 166 Mutual Assistance Agreement(s) Standard.

**Background**

PG&E performed a diligent search and reasonable inquiry to find documentation outlining past efforts to incorporate Resource Typing into the emergency response plans but were unable to locate records responsive to this request. PG&E does not maintain resources capability.

**Analysis**

GO 166 – Mutual Assistance Agreement(s) Standard 2 requires:

- The utility shall enter into mutual assistance agreement(s), such as those facilitated by the California Utilities Emergency Association, to the extent that such agreements are practical and would improve emergency response. The agreements shall include:
  - Resources that are available to be shared.

X Physical		X Operational	X Management	
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**Finding:** PG&E did not maintain a list of available resources (amount, type of personnel, capability, equipment, materials, and supplies) to meet mutual agreements with EEI, FPL, Yolo County and Western Regional and to comply with the intent of GO 166 Mutual Assistance Agreement(s) Standard.

**Background:**<sup>62</sup> PG&E was unable to find documentation outlining past efforts to incorporate Resource Typing into the emergency response plans.<sup>63</sup> PG&E did produce an Electric Repair and Maintenance Personnel Report listing the number of repair and maintenance personnel by job classification. However, the list did not provide details required to identify the capability and type of resource.

**Analysis:** GO 166 outlines the requirement for utilities to provide the resources that are able to be shared and is further indicated in the mutual assistance agreements:

- EEI Mutual Agreement: 8. Requesting Company shall indicate to Responding Company the type and size of trucks and other equipment desired as well as the number of job function of employees requested.
- FPL reciprocal agreement: The Requesting Company shall [provide] the amount and type of personnel, equipment, materials, and supplies needed.
- Yolo County: The Requesting Company shall [provide] the amount and type of personnel, equipment, materials, and supplies needed.
- Western Region MUA (G&E): The Assisting Party shall provide the number and type of crews and equipment available to be furnished.

As part of the 2021 WMP update, PG&E, along with Southern California Edison Company (SCE) and San Diego Gas & Electric Company (SDG&E), shall submit a joint, unified plan that reflects collaborative efforts and contains uniform definitions, methodology, timeline, data standards, and assumptions.

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#### <sup>62</sup> Document Reference Materials

- Ref #18
  - Response notes no resource or typing process system for Inventory resources and type by capability. "Crew level information" could be provided if requested.
- Ref #22
  - California Utilities emergency association (E&G) - Electric Repair and Maintenance Personnel Report that lists the number of repair and maintenance personnel by job classification provided
  - GO 166 – Mutual Assistance Agreement(s) Standard 2 requires:  
The utility shall enter into mutual assistance agreement(s), such as those facilitated by the California Utilities Emergency Association, to the extent that such agreements are practical and would improve emergency response. The agreements shall include:  
A. Resources that are available to be shared.
- Ref #182: Incorporate Resource Typing into the emergency response plans
  - We performed a diligent search and reasonable inquiry to find documentation outlining past efforts to incorporate Resource Typing into the emergency response plans, but were unable to locate any records responsive to this request

<sup>63</sup> Resource typing is defining and categorizing, by capability, the resources requested, deployed and used in incidents. Resource typing definitions establish a common language and defines a resource's (for equipment, teams and units) minimum capabilities. Resource typing definitions serve as the common language for the mobilization of resources.

**Recommendation:** The CPUC should modify GO 166 – Mutual Assistance Agreement(s) Standard 2 to explicitly require California utilities to include available resource by amount, capability, and type (personnel, equipment, materials, and supplies) in their mutual assistance agreements.

**Interview References:**

- Gibson – Resource typing the industry has tried for some time. Different tools and crew set up, no standardized vehicles/supplies/tools on vehicles

## Finding #18: Support PG&E Vegetation Management Effort on Private Property

EN<sup>VISTA</sup>  
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**Support PG&E Vegetation Management Effort on Private Property**

PG&E Vegetation Management Department encounters resistance from property owners to prune or remove trees that pose a risk to reliability and public safety.

**Background**  
PG&E does not have the legal right in all cases to prune and remove hazard trees in and adjacent to the ROW.

**Analysis**  
A rule change would give utility companies the legal authority to address reliability and public safety.

X Physical		X Operational		
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**Finding:** PG&E's Vegetation Management Department encounters resistance from property owners to prune or remove trees that pose a risk to reliability and public safety.

**Background:** PG&E may not have the legal right in all cases to maintain vegetation which can start wildfires located within and adjacent to the ROW.

**Analysis:** A rule change would give utility companies the legal authority to address reliability and public safety.

**Recommendation:** The CPUC could make changes to Rule 35 which allows utility companies the ability to maintain vegetation that poses a risk to reliability and public safety.

Suggested language for this change:

- When Company discovers that the customer or the customer's agent is performing work, has constructed facilities, or has allowed vegetation to grow adjacent to or within an easement or right-of-way or Company-owned equipment, and such work, construction, vegetation or facility poses a hazard or is in violation of federal, state, or local laws, ordinances, statutes, rules or regulations, or significantly interferes with Company's safe use, operation or maintenance of, or access to, equipment or facilities, Company shall notify the customer or the customer's agent and shall take whatever actions are necessary to eliminate the hazard, obstruction, interference or

violation at the customer's expense. Company will notify the customer in writing of the violations.

- The Company will notify the CPUC of these actions.
- The Company should work with the customer before taking this action.

## Finding #19: Modification of GO 95, Rule 35 to Emphasize Safety, Reliability, and Hazard Tree Assessment




### GO 95, Rule 35

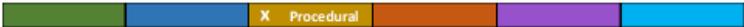
Modification of GO 95, Rule 35 to emphasize safety, reliability and hazard tree assessment would direct and enable electric utilities to better focus on the root cause of tree-related fires instead of clearance distances.

#### Background

General Order 95, Rule 35, in non-high fire-threat areas, year-round minimum clearances of 1.5 feet around power lines. In high fire-threat areas, minimum clearances of four feet around power lines, with recommended minimum clearances of 12 feet or more at time of vegetation maintenance to ensure year-round compliance. Hazardous vegetation such as dead, defective or dying trees that **may** fall into the lines or equipment **should** be removed.

#### Analysis

Review of American National Standards Institute, (ANSI) A-300, Part 9 Tree Risk Assessment, and International Society of Arboriculture Best Management Practice (BMP) Utility Tree Risk Assessment.



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Modification of GO 95, Rule 35 to emphasize safety, reliability and hazard tree assessment would direct and enable electric utilities to better focus on the root cause of tree-related fires. PG&E's focus was primarily on complying with the clearance requirement of 18 inches and not on identifying hazard trees. None of the vegetation-related fires were a result of clearance violations. Studies by Finch and Allen 2001 and Guggenmoos 2009 have demonstrated the majority of outages are caused by trees outside the ROW. These exceed 80 percent of all related vegetation management outages.<sup>64</sup> Therefore, the focus of pre-inspection, vegetation management, and post-audits need to go beyond the maintained ROW.

#### Recommendation:

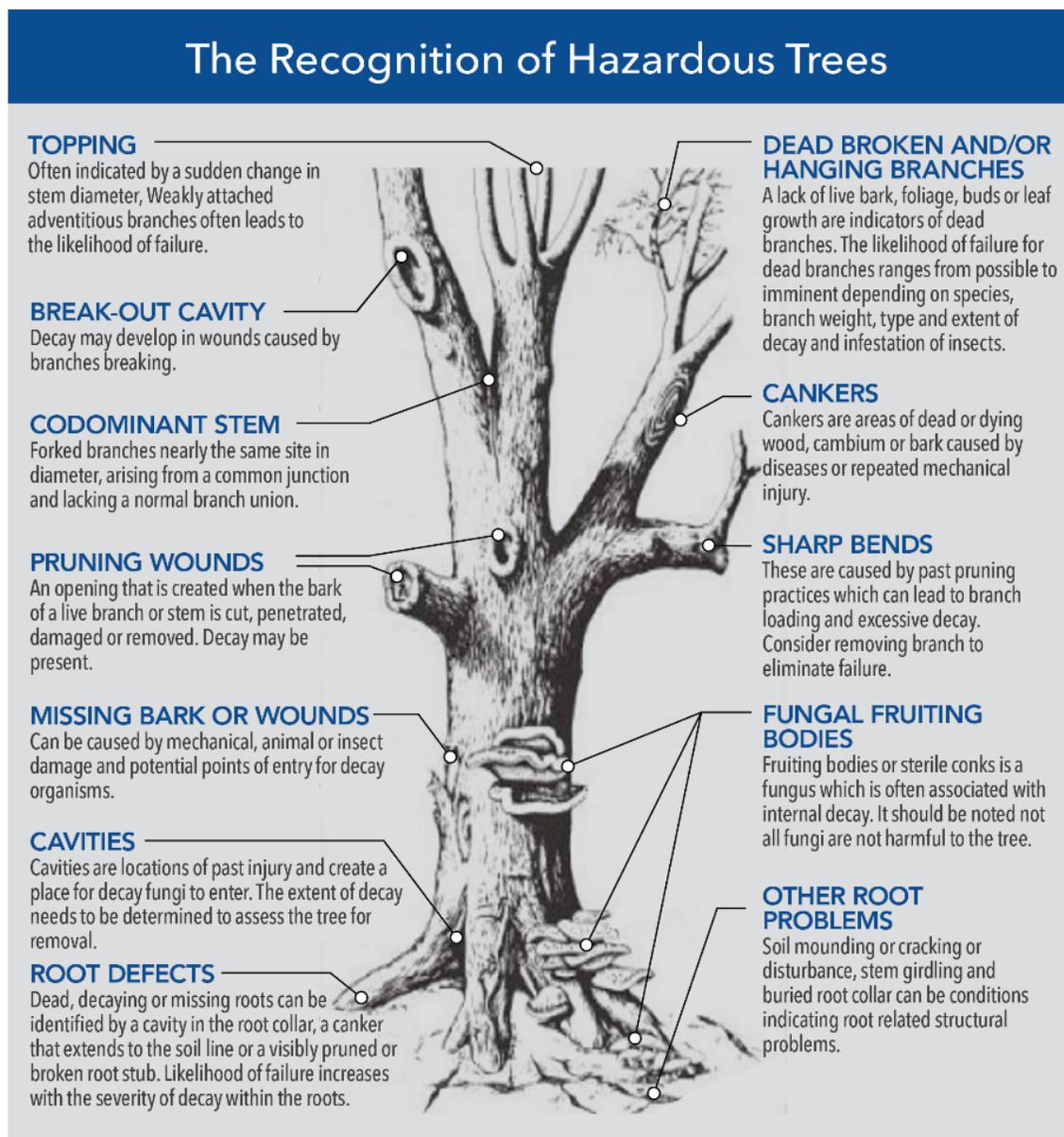
1. The California Public Utilities Commission (CPUC) could consider requiring the utilities to use the following standards and best management practices:
  - a. ANSI-A300 (Part 9) Tree Risk Assessment a. Tree Failure–*Tree, Shrub, and other Woody Plant Management–Standard Practices (Tree Risk Assessment a. Tree Failure)* Latest Edition, *American National Standards for Tree Care Operations*<sup>65</sup>

<sup>64</sup> Guggenmoos, Managing Tree-caused Electric Service Interruptions July 2003

<http://www.ecosync.com/tdworld/Avoiding%20Interruptions.pdf>

<sup>65</sup> <https://www.isa-arbor.com/store/product/133>

- b. International Society of Arboriculture's Best Management Practices Utility Tree Risk Assessment Practices Edition 2020<sup>66</sup>
2. Also, the CPUC could consider requiring that the California utilities vegetation management managers develop a pocket field guide and a quantitative risk matrix<sup>67</sup> for identifying and removing hazard trees. Once developed this recommendation should be adopted by the CPUC into GO 95 Rule 35 (see illustration below).



<sup>66</sup> <https://www.isa-arbor.com/store/product/4430/cid/117>

<sup>67</sup> A process used to estimate numerical probability values for consequences and to calculate numeric values for risk.

## IX. PG&E EFFORTS TO REDUCE WILDFIRE RISK SINCE 2017

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The scope of this project included the evaluation of PG&E's efforts to reduce wildfire risks with a focus on the Public Safety Power Shut-off (PSPS) process to determine if that would have been effective in reducing the likelihood of the 2017 fires and further to evaluate the incorporation of California High Fire-Threat District Zones into risk-reduction planning.

### A. PG&E Wildfire Risk Recognition<sup>68</sup>

PG&E annual reports identified fire risks and discussed preparation for fire season years prior to the 2017 and 2018 wildfires. The 2016 Corporate Responsibility and Sustainability Report noted that, in preparation for fire season, PG&E used air patrols to help detect wildfires and to assist local fire agencies with early detection to stop fire spread. Those patrols identified 146 fires and, in 25 cases, PG&E was the first to report them to CAL FIRE or the U.S. Forest Service.

"Wildfire" appeared as a heading in the Public Safety section of the 2017 Corporate Responsibility and Sustainability Report, and the focus of preparation for fire season was removal of drought- and beetle-infested dead trees. PG&E noted that they incorporated "new meteorology technology" to forecast fire danger. PG&E continued to use daily air patrols to help detect wildfires from June to October.

The 2017 Joint Annual Report to Shareholders described the new regulations approved by the CPUC for enhanced fire safety of overhead electric transmission and distribution lines in high

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<sup>68</sup> PG&E Corporate Responsibility and Sustainability Report 2016,  
[https://www.pgecorp.com/corp\\_responsibility/reports/2016/downloads.jsp](https://www.pgecorp.com/corp_responsibility/reports/2016/downloads.jsp)

PG&E Corporate Responsibility and Sustainability Report 2017,  
[https://www.pgecorp.com/corp\\_responsibility/reports/2017/downloads.html](https://www.pgecorp.com/corp_responsibility/reports/2017/downloads.html)

PG&E Corporation, Pacific Gas & Electric Company, 2017 Joint Annual Report to Shareholders,  
[https://www.pgecorp.com/investors/financial\\_reports/annual\\_report\\_proxy\\_statement/ar\\_pdf/2017/2017\\_Annual\\_Report.pdf](https://www.pgecorp.com/investors/financial_reports/annual_report_proxy_statement/ar_pdf/2017/2017_Annual_Report.pdf)

PG&E Corporate Responsibility and Sustainability Report, 2018,  
[https://www.pgecorp.com/corp\\_responsibility/reports/2018/downloads.html](https://www.pgecorp.com/corp_responsibility/reports/2018/downloads.html)

PG&E Corporate Responsibility and Sustainability Report, 2019,  
[https://www.pgecorp.com/corp\\_responsibility/reports/2019/downloads.html](https://www.pgecorp.com/corp_responsibility/reports/2019/downloads.html)

PG&E Corporate Responsibility and Sustainability Report, 2020,  
[https://www.pgecorp.com/corp\\_responsibility/reports/2020/downloads.html](https://www.pgecorp.com/corp_responsibility/reports/2020/downloads.html)

PG&E Corporate Responsibility and Sustainability Report, 2021,  
[https://www.pgecorp.com/corp\\_responsibility/reports/2021/downloads.html](https://www.pgecorp.com/corp_responsibility/reports/2021/downloads.html)

fire-threat areas. PG&E recognized that these were a “culmination of a decade-long effort to improve the fire safety of overhead utility and communication infrastructure across California.” PG&E acknowledged that the new regulations required increased patrol frequency, expanded vegetation clearances, and increased authority for work on private property.

The “Northern California Wildfires” appeared prominently in the 2018 Corporate Responsibility and Sustainability Report. PG&E stated that they were “bolstering wildfire prevention and emergency response efforts,” and implementing enhanced safety measures, including long-term commitments to harden the electric grid to reduce wildfire risks. PG&E created a Wildfire Safety Operations Center (WSOC) to monitor potential fire risks, installed weather stations, and enhanced their vegetation management program.

In 2019, PG&E reported that they enhanced their Community Wildfire Safety Program to increase safety precautions following the 2017 and 2018 wildfires. Efforts included accelerated inspections of electric towers and poles, deployment of satellite fire detection and alerting systems, and implementation of the Public Safety Power Shut-Off de-energization program.

In 2020, PG&E established a new Wildfire Safety organization, including former firefighters, experts in vegetation management, and meteorologists. More detailed focus on wildfire and situational awareness was identified and described by PG&E. Real-time monitoring, heightened awareness of vegetation management acceleration, and system hardening were identified as part of the Community Wildfire Safety Program.

PG&E recognized and discussed the CPUC High Fire-Threat District (HFTD) areas in the 2021 Corporate Sustainability Report: “High winds can cause tree branches and debris to contact energized electric lines, damage our equipment and cause a wildfire. California continues to experience an increase in wildfire risk and a longer wildfire season. Today, nearly one-third of the electric lines that provide our customers electricity are now in High Fire-Threat District (HFTD) areas, as designated by the CPUC.” As a result of their Wildfire Safety Program, PG&E identified key initiatives to inspect all structures and lines in Tier 3 extreme wildfire risk areas, and one-third of lines and structures in Tier 2 elevated wildfire risk areas.

A California State Senate Subcommittee on Gas, Electric, and Transportation Safety held a hearing on November 18, 2015 and January 26, 2018 to address wildfires caused by power lines and utility wildfire prevention and response. Background documents for the January 2018 hearing recognized that relative to other states in the nation, “California stands as a leader in its wildfire mitigation policies, especially as they relate to requirements placed on electric utilities to reduce the risk of wildfires.”<sup>69</sup>

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<sup>69</sup> California State Senate Subcommittee on Gas, Electric, and Transportation Safety, California Burning: Utility Wildfire Prevention and Response, Follow-up to the November 2015 Wildfire Safety Hearing, Background Document, Hearing date January 26, 2018, [https://seuc.senate.ca.gov/sites/seuc.senate.ca.gov/files/01-26-18\\_background.pdf](https://seuc.senate.ca.gov/sites/seuc.senate.ca.gov/files/01-26-18_background.pdf)

## B. High Fire-Threat District Maps<sup>70</sup>

The 2007 Southern California wildfires that were ignited by overhead utility power lines and proximate aerial communication facilities caused the CPUC to consider and adopt safety-related regulations related to potential fire hazards. Beginning with a 2008 rulemaking and associated decisions, new fire safety regulations were adopted, most as new or revised General Order 95 provisions. Some of the fire safety regulations only applied to “high fire-threat areas,” where there was an identified higher risk of power line-initiated fires and rapid wildfire spread.

Development of the high fire-threat maps began with a series of interim maps for different areas within the State of California that lacked consistency in identifying the threat areas and potential enforcement issues. CPUC addressed the fragmented interim maps and began a process to develop a statewide fire-threat map, where stricter fire safety regulations would apply in identified higher-risk areas.

The fire-threat map project suffered from significant scope creep and lasted a decade. Initial resources dedicated to the high fire-threat area initiatives were redirected and called “wasteful” and of “no value.” The mapping was only a start to the process, and it began to help define and prioritize wildfire risk reduction with the intent to identify areas for the utilities to focus their efforts on system hardening and vegetation management in high-risk zones.

In December 2017, the CPUC issued a decision adopting regulation to enhance fire safety in the areas identified within the High Fire-Threat District (HFTD) boundaries. The final CPUC Fire-Threat Map was adopted on January 19, 2018.

### 1. Discussion

The CPUC HFTD requirements and HFTD map have effectively helped PG&E to focus their Wildfire Mitigation efforts and identify and understand wildfire risk in their territory more clearly. PG&E began this focus following the January 2018 CPUC adoption of the HFTD map.

PG&E continues to aggressively evaluate and assess wildfire risk, and their efforts did not stop with the issuance of the HFTD regulations. PG&E continues to learn about wildfire risk and has developed additional tools including advanced “Technosylva” modeling for fuel loading and fire spread.

PG&E evaluated the HFTD areas at a granular level to more clearly identify community development relative to power line locations. This resulted in a more refined map, what PG&E calls the High Fire-Risk Area (HFRA). The HFTD regulations and map did not include the granular information that PG&E incorporated into their HFRA.

The HFRA is not the HFTD. PG&E identifies some HFRA areas that are outside of the HFTD maps, and some HFTD areas that do not overlap with their HFRA areas. The HFRA areas, in addition to

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<sup>70</sup> Fire-Threat Maps and Fire-Safety Rulemaking, <https://www.cpuc.ca.gov/industries-and-topics/wildfires/fire-threat-maps-and-fire-safety-rulemaking>

the Tier 2 and Tier 3 areas in the CPUC map, are treated as areas of higher risk, even though they would not apply all mitigations that would be required in the HFTD.

PG&E's research and development of the risk models for HFRA assessment were peer-reviewed and field-confirmed by former fire department personnel, and underwent internal stakeholder audits and Wildfire Risk personnel analysis to validate improvements and changes. The process included an independent review team as well as outside experts at Technosylva and UCLA risk professors.

The HFRA focuses on areas similar to Tier 2 and Tier 3 in the HFTD and removes fringe areas where there was less fire fuels. The process was developed over 2020 as PG&E expanded their learning about fire spread, understanding of areas of fire risk in their territory, and education related to detailed nuances where there are fuels that could create a fire. PG&E added areas and removed areas in the HFRA based on this analysis. In 2021, the internal and external review teams approved the process.

PG&E believes that the CPUC maps were developed with "good data" models on fire spread. However, the level of detail needed for the analysis was less granular than PG&E developed in their HFRA maps. PG&E also notes that earlier versions of the HFTD map, the interim maps developed by the CPUC in June 2017, did not identify all of the areas where the 2017 fires initiated, and that the Tier 2 and Tier 3 areas on the HFTD map were in place after October 2017.

PG&E's efforts to identify wildfire risk are complementary to the HFTD produced by the CPUC, but the analytics involved in PG&E's risk assessment efforts greatly exceed the baseline HFTD product. PG&E's development of HFRA areas more clearly recognizes the specific wildfire risk in their territory. Had the HFRA zones been in place prior to the 2017 and 2018 wildfires, the wildfire risk in the areas where the wildfires initiated would have been captured as identified risks.

## 2. Recommendation

Continue to update identification and definition of risks based on evolving externalities.

## C. Public Safety Power Shut-off (PSPS) Assessment

PG&E's electrical system is designed to balance the scales of electric system reliability and electric system safety, as well as affordability. Through interviews, we learned that, as far back as the 1990s, PG&E deployed pilot projects intended to enhance safety, but they were abandoned due to their impact on reliability. More recently, those efforts have led to the current PSPS process which, according to PG&E, has significantly reduced wildfire-ignition risk.

### 1. Background

PG&E did not have a formal power shut-off program in place before the October 2017 wildfires. Their initial program, titled Public Safety Power Shut-off (PSPS), was created following those

fires and was basically in place internally by the summer of 2018. The first successful implementation of the PSPS was October 14, 2018. PG&E was poised to implement a PSPS for what became the Camp Fire on November 6, 2018 but did not do so. CAL FIRE found that, had they followed through with the PSPS, Camp Fire #2 would likely not have been ignited.

## 2. Scope

The scope of this project includes the following:

*“Evaluate the utilization of PG&E’s new PSPS process and **determine if that would have been effective in reducing the likelihood of the 2017 (and 2018) fires.** (PSPS was not in place in October 2017).”*

## 3. Summary of PSPS Activity to Date

PG&E has deployed PSPS 21 times; in two of those incidents, the weather improved and so the PSPS was cancelled before implementation, as summarized in the table below. A summary of the PSPS events to date is provided in Appendix D.

**Table 11.** Summary of PSPS Activities

Year	# PSPS Deployed	# PSPS Cancelled
2018	2	1
2019	7	0
2020	7	1
2021	5	0
Q1 2022	0	0

The 21 times PSPS has been deployed, a total of about 2.8 million customers were impacted. A customer can be a single-family home, an apartment building, a medical facility, a school, or a business; therefore, the number of individuals impacted by PSPS far exceeds the 2.8 million number.

The longest-duration PSPS event was January 18-26, 2021 (8 days) affecting 5,099 customers. The second longest was September 7-13, 2020 (6.5 days) affecting 168,581 customers in 22 counties. The shortest duration was 18 hours on October 5, 2019.

We solicited feedback from local government officials (City of San Jose Deputy City Manager, City of Santa Rosa former City Manager, and Sonoma County Emergency Management Director) on PG&E’s implementation of PSPS initially and over time. We found that, after an initial very poor implementation with serious consequences, there have been substantial improvements including the number of customers affected, the duration of the outage, communication with government partners, etc. However, in each identified instance PG&E remains insular, citing

rebuffed efforts to offer to help them with editing their formal communications with local governments.

#### 4. Would PSPS have been effective in reducing the likelihood of the 2017 fires?

Implementing the PSPS process is effective in stopping ignitions.

PG&E's own study says that had their current "model been deployed and implemented since 2012, the new PSPS protocols would have prevented" some of the studied fires including "Camp, Tubbs, Nuns, Atlas, Kincade, and Zogg fires," but not all. Through interviews it became clear that the model would not predict the likelihood of an ignition if wind gusts measured less than 6 miles per hour. Also, normal hot day weather would not trigger data "above the line."

Just as an economist builds a model to forecast the impact of economic activity and utilizes historical data to enhance the validity of the model, the same holds in this situation. In our opinion, running the model against 2017-2018 data is more valuable in validation of the model as a predictor going forward, than as a determinant of a hypothetical counterfactual scenario. In addition, as noted above, the model itself does not make the decision to implement a PSPS; that is the responsibility of the Officer-in-Charge. This makes any determination on the part of the RCA Team regarding the hypothetical question even more uncertain.

Finally, there is another factor which increases the difficulty of answering the question. Through our interviews, we discussed the underlying outage data used in the PSPS model. The PSPS model included all outage incidents regardless of cause, including equipment failures. By including outages that may or may not be wind-related could cause the PSPS model to be too conservative and lead to slightly larger PSPS events. In PG&E's 2022 Wildfire Mitigation Plan they discuss the new outage and ignition model that was operationalized in 2021 for PSPS decision-making. The new model does differentiate between outages and ignitions that are typically wind caused (electrical vs. structural outages), which is a better approach compared to the 2020 PSPS model we reviewed. So, the answer to the question is potentially affected by which version of the program is considered.

## X. CONTRIBUTING FACTORS TO WILDFIRES

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At the recommendation of the CPUC staff the project scope included a review of other factors which possibly contributed to the ignition and spread of the 2017-2018 wildfires, without findings or recommendations.

California has witnessed an ever-increasing number of devastating wildfires in recent years. These fires have grown in size and become increasingly difficult to prevent and suppress due to a variety of complex factors.

Wildfires are part of the natural ecosystem of California as a result of a confluence of conditions including geography, topography, significant acreage of forest lands, a moderate to hot Mediterranean climate, frequent low humidity, and variable on-shore and off-shore winds.

Recently, wildfires have proven even more destructive due to increased fuel accumulation from drought, lack of a statewide vegetation management plan, suppression strategies limiting natural fire ecology, a massive bark beetle infestation, and stronger wind patterns. It is important to understand how these factors and others affect fire dynamics and the complex interrelationships between them.

Understanding the overlapping contributing factors to California wildfires can help identify mitigation strategies, even for those factors that seem out of the realm of our influence or control. Approximately 85% of all fire ignitions in California are the result of human activities.<sup>71</sup>

Since only about 3% of the fires are responsible for 97% of the areas burned,<sup>72</sup> these human activities can have devastating consequences. Reducing the impact of—or even the presence of one or more of the conditions necessary for the development of extreme fires—will significantly benefit the state and its people.

### VEGETATION MANAGEMENT

Vegetation management, as related to the fire environment, is a complex issue. There are many facets, including residential encroachment into vegetated areas, physical geography, history, environmental laws, environmental regulations, fuel reduction, mechanical reduction, air quality control limitations (burning), and competing special interests.

Vegetation is the primary fuel that carries fire during a wildfire incident. However, there are additional ingredients that contribute to fire growth. Other sources of fuel consist of human-made items such as buildings and other structures. There are 13 main vegetation fuel types that

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<sup>71</sup> *California Climate Change Assessment*. (n.d.). Retrieved March 28, 2022, from <https://climateassessment.ca.gov/>

<sup>72</sup> *How risk management can prevent future wildfire disasters in the wildland-urban interface | Rocky Mountain Research Station*. (n.d.). Home | U.S. Forest Service. Retrieved March 28, 2022, from <https://www.fs.usda.gov/rmrs/publications/how-risk-management-can-prevent-future-wildfire-disasters-wildland-urban-interface>

are further defined in many subtypes.<sup>73</sup> Managing this vegetation with a focus on mitigation of significant fire expansion, specifically in areas in or near wildland-urban interface (WUI) zones, is a focus in the broader development of fire strategy.

Different vegetative fuels exhibit a variety of different behaviors when exposed to fire. Light, flashy fuels such as dry grass can exacerbate the spread of an already ignited fire, thick vegetation at the base of trees allows ground fires to spread into the forest canopy, and dense forests with minimal vegetative separation promotes intensity and increased spread of a fire.

Ground fuels may actually increase in quantity and density as a result of fire suppression or extinguishing fires. Fire suppression activities interrupt the natural fire processes which tend to eliminate some of the dangerous ground fuels; this may result in unnaturally dense forests with higher fire risk. With over a hundred years of aggressive fire suppression activities, the unintended result has been an interruption of natural, healthy fire ecology.

California spends several times more on wildfire suppression and disaster recovery costs per year than on hazard mitigation for wildfire risks. A dollar spent on wildfire mitigation in the wildland-urban interface (WUI) saves \$3 in avoided disaster recovery costs; similarly, a dollar spent on improving building safety above baseline code requirements saves \$4 in avoided recovery costs.<sup>74</sup>

## LAND USE AND PUBLIC POLICY

Land-use policies are enacted to support the efficient use of resources in urban and rural land use, as well as providing various public benefits to the community and environment. Typical goals include consistent activities occurring on land, the appropriate application of housing stock, cost-effectiveness, environmental conservation, minimizing conflicts, and providing balanced facilities for the community.

Some land-use decisions have a significant negative impact on wildfire risk. For example, as a result of several factors, including the challenges currently seen throughout California such as rising housing costs and resulting migration away from urban centers and community level dynamics such as high population densities encouraging sprawl and a resistance to using or implementing fire resistive policies and strategies; development and risk in the WUI has increased in recent years. The WUI is defined by the California Governor's Office of Planning

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<sup>73</sup> *Fire Behavior Field Reference Guide, PMS 437 | NWCG*. (n.d.). NWCG | NWCG Is an Operational Group Designed to Coordinate Programs of the Participating Wildfire Management Agencies. Retrieved April 12, 2022, from <https://www.nwcg.gov/publications/pms437>

<sup>74</sup> *Rebuilding for a Resilient Recovery: Planning in California's Wildland-Urban Interface | Next 10*. (n.d.). Retrieved March 28, 2022, from <https://www.next10.org/publications/rebuilding-resilient#:~:text=Rebuilding%20for%20a%20Resilient%20Recovery%3A%20Planning%20in%20California's%20Wildland%20Urban%20Interface,-June%2010%2C%202021&text=California%20must%20comprehensively%20reshape%20how,amidst%20a%20record%20housing%20crisis>.

and Research (OPR) as any developed area located adjacent to wildland areas. Two processes can create new WUI: construction of new homes in or near existing wildland vegetation, and an increase in wildland vegetation within and near previously developed areas; the vast majority (97%) of encroachment into the WUI is from the former.<sup>75</sup>

Additionally, land-use conversion—from a natural state to higher-intensity uses such as heavier residential and commercial development—can result in the loss of capacity for the natural fire ecology to occur, as immediate-need fire suppression must be utilized in interface areas, ultimately disrupting the natural thinning of vegetation.

Since most fire ignitions are caused by human activity, the increased expansion and development into the wildland-urban interface is creating an environment for increased destructive wildfire activity. Additionally, this development into interface areas is often lacking in support infrastructure to include fire suppression resources, including fire stations, personnel, and water infrastructure—resulting in fires that are more difficult to suppress.

Lastly, the option of allowing the natural fire ecology to occur and the potential fire to burn becomes difficult or impossible, because of the exposures created by the development into the WUI and the necessity to protect life and property.

There are different and distinct groups and organizations making decisions separately about housing and land use, and they each have valid motivations. Some groups are focused on the state's housing challenges, which sometimes results in homes being built in the WUI. Other groups are looking at fire risk and asking for new developments to be located in lower-risk areas, be built with greater fire-resistive materials, and include defensible space and other fire-resistant qualities.

Better coordination among private, local, state, tribal, and federal agencies would help develop approaches that meet different, sometimes conflicting, priorities.

Other land-use approaches that reduce fire risk include requiring homes in WUIs to establish and maintain defensible space, including some elements of “hardening” homes, and thinning the vegetation near and around the property. Defensible space is the buffer between a building and other combustible material such as grass, trees, shrubs, or any wildland area that surrounds it. Without defensible space, fires can spread or expand from not only direct flame contact, but also embers carried in the wind and radiant heat. “Hardening” a home refers to actions and materials that reduce the vulnerability of the home to fires. Examples include the installation of metal roofs, removal of flammable materials adjacent to homes, and the use of other building materials that are less flammable. Protecting homes and other structures also includes reducing the density of vegetation, particularly any dry vegetation, which is a

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<sup>75</sup> *Rapid growth of the U.S. wildland-urban interface raises wildfire risk* | Treesearch. (n.d.). Home | U.S. Forest Service. Retrieved March 28, 2022, from <https://www.fs.usda.gov/treesearch/pubs/55817>

significant wildfire ignition hazard because much of it is a light, flashy fuel which may catch and spread embers and firebrands.

Development in WUIs presents risks to populations residing in these areas. However, given the existence and continual increase of development in these areas, other mitigation strategies must be considered and implemented. One example of fire risk reduction near or in a WUI is the Montecito Fire Protection District, which established lines of defense between Montecito residents and the Los Padres National Forest through fuel thinning, code enforcement, defensible space surveys, and community outreach. The effectiveness of this strategy was proven in the Thomas Fire of 2017, during which minimal damage was sustained.

### COMPETING INTERESTS

Inconsistent and inefficient coordination among public and private entities responsible for managing land creates opportunities for additional development of contributing factors in fire risk. There are numerous organizations and public agencies with the responsibility for managing land with the potential for fire development and spread. Wildfires do not observe jurisdictional lines and ultimately spread across multiple boundaries. Land management strategies and implementation of mitigation may differ across boundaries, ultimately creating environments that promote fire expansion—particularly within areas designated as interface zones.

In addition to the potential for inconsistent interjurisdictional approaches to land management and policy surrounding land use or management of vegetation, there are additional contributing factors with the inclusion of special interests. California is home to a number of organizations dedicated to the preservation of environmental and natural resource efforts.

When the objectives of these entities do not align well with the mitigation needs of the utility providers or the policy development of land-use decision-makers, implementing strategies to minimize fire growth and spread can be compromised through delayed processes such as litigation. While each of the efforts intend to serve a noble goal, a lack of collaborative strategy development leads to additional contributing factors in fire risk.

Competing priorities are at play about jurisdictional responsibilities, environmental concerns, and vegetation management. Removing tree inventory which does have significant benefits to communities and public health is a difficult decision. It is often opposed by environmental groups or other special interests, even if the scope is focused on wildfire risk reduction. In addition, since forests and fires do not have jurisdictional boundaries, collaboration among local, state, and federal government, as well as utilities and land-use entities, is critical but often inadequate.

### CLIMATE AND WEATHER

Certain parts of California, unfortunately, are prone to a perfect storm of severe weather conditions. The following conditions, combined with extensive vegetation quantities and

densities, contribute profoundly to the development, and spread of extreme fires—high winds, drought conditions during parts of the year, elevated temperatures, and low fuel moistures.

Recent extremes in climatic conditions are exacerbating these factors. The state is putting resources and effort into mitigating these forces, but in general, the short-term effects on wildfires are likely to continue to worsen. Aggressive vegetation management practices would have an immediate positive effect with these attempts to mitigate the effects of a complicated climatic environment until a long-term strategy can be implemented.

Extreme fires are usually made substantially more destructive by extreme weather conditions. These fires tend to burn with greater intensity when exposed to high winds, accompanied by very low fuel moistures, and in areas subject to warm to hot temperatures. These specific weather factors can produce extreme rates of spread and intensities.

Throughout California, dry winds during Santa Ana, Sundowner, or Diablo events, which carry dry, warm air offshore, play a key role in amplifying “fire weather” conditions. To add to the complexity that weather plays, high winds (oftentimes generated by the intense fire itself) can carry small embers great distances ahead of the fire, causing brand-new ignitions away from the main fire or adding to much bigger fires. In the 2017 Tubbs Fire, neighborhoods not in the ignition zone caught fire because of embers carried by strong winds up to half a mile away.

Based on CAL FIRE’s estimates and data, warmer and drier weather in California has increased the length of the fire season throughout the state and in particular in the Sierra Nevada Mountains by 75 days.<sup>76</sup> Prior to the 2020 fire season, 15 of the 20 most destructive wildfires in California history occurred after 2000, and 10 of the most destructive fires took place since 2015. Additionally, in 2020, Californians endured 5 of the 6 largest fires in the state’s history as measured by total acres burned.

By 2100, if climatic conditions continue to worsen, one study found that the frequency of extreme wildfires burning over approximately 25,000 acres would increase by nearly 50%, and the average area burned statewide would increase by 77% by the end of the century.<sup>77</sup> In that same timeframe, the average annual maximum daily temperature is projected to increase by 5.6 – 8.8 degrees, which impacts fire risk as well as electricity usage.

California’s dry season was traditionally from May to September, followed by precipitation starting in October. However, this cannot be relied upon and appears to be changing. In 2017, a

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<sup>76</sup> California Department of Forestry and Fire Protection (CAL FIRE). 2020 Incident Archive. Retrieved November 11, 2020, from <https://www.fire.ca.gov/incidents/2020/>

<sup>77</sup> *Rebuilding for a Resilient Recovery: Planning in California’s Wildland Urban Interface | Next 10*. (n.d.). Retrieved March 28, 2022, from <https://www.next10.org/publications/rebuilding-resilient#:~:text=Rebuilding%20for%20a%20Resilient%20Recovery%3A%20Planning%20in%20California’s%20Wildl and%20Urban%20Interface,- June%2010%2C%202021&text=California%20must%20comprehensively%20reshape%20how,amidst%20a%20recor d%20housing%20crisis.>

late onset of winter precipitation allowed for a continuance of dry vegetation even into December. Conversely, there have been seasons when the snowmelt in the spring occurred earlier than expected, resulting in vegetation drying out earlier than the expected May start of fire season. This could worsen over time based on climate change predictions; by 2100, water supply from snowpack is projected to decline by two-thirds.<sup>78</sup>

These dry conditions have indirect impacts, as well. Trees become stressed because of dry conditions, and subsequently are more susceptible to insect infestation such as the bark beetle. In recent years, the bark beetle infestation has resulted in millions of tree deaths, adding to dry tinder vegetation loads and available fuels for fire expansion. Overall fuel moistures are adversely impacted during periods of drought, creating vegetation inventories with compromised capabilities to withstand heating and flame impingement. Drought further reduces available water sources for containment and suppression efforts.

### INFORMATION AND DETECTION

Accurate and timely information is crucial to predicting possible high fire-risk locations, detecting ignitions, and monitoring fire behavior for the most effective resource allocations.

The science of predicting wildfire intensity, spread, and duration is still limited, and current fire behavior models are adapting to evolving conditions of fuel loads including the changes in dead and dying vegetation. Weather analytics, forecasting, satellites, Artificial Intelligence (AI), and machine learning will all improve information quality and understanding.

Since the wildfires of 2017-2018, significant advances have been made in fire modeling related to both the likelihood of ignitions caused by power lines as well as the predicted spread of the fires. These models have been developed by PG&E, CAL FIRE, the CPUC, and others. With more accurate fire-risk maps and models, mitigation and prevention tactics can be pursued, and resources may even be pre-positioned in high-risk areas. Fire responders can run simulations and plan response actions more comprehensively.

The information can also facilitate the proactive partnership with private landowners to take actions that will hopefully reduce the likelihood of a fire or the chances of severe property damage or impacts to human life. There are correlations between information management and fire modeling with vegetation management strategies. In the course of modeling and mitigation planning, the actual risks and situational understanding is improved regarding fire risk.

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<sup>78</sup> Rebuilding for a Resilient Recovery: Planning in California's Wildland Urban Interface | Next 10. (n.d.). Retrieved March 28, 2022, from <https://www.next10.org/publications/rebuilding-resilient#:~:text=Rebuilding%20for%20a%20Resilient%20Recovery%3A%20Planning%20in%20California's%20Wildland%20Urban%20Interface,-June%2010%2C%202021&text=California%20must%20comprehensively%20reshape%20how,amidst%20a%20record%20housing%20crisis>

Some wildfires spread so rapidly that every second counts in accurate fire detection and location details. The Camp Fire, at one of its worst points, for example, is estimated to have burned an area greater than a football field in a single second.<sup>79</sup>

Since wildfires often impact remote or rural locations, detection and fire movement information is usually less precise and received slower. The impacts don't stop there—the lack of broadband or spotty cell phone service in forestland areas impacts emergency notifications, and communication with the public and other responders.

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<sup>79</sup> Gabbert, B. 2018. On *60 Minutes*, Chief Pimlott describes the rapid rate of spread of the Camp Fire. Wildfire Today. December 5<sup>th</sup> 2018. <https://wildfiretoday.com/2018/12/05/on-60-minutes-chief-pimlott-describes-the-rapid-rate-of-spread-of-the-camp-fire/>.

## **XI. RECOMMENDATIONS SUMMARY**

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### **Theme 1: Missed Opportunities**

- A. Implement an enterprise-wide Corrective Action Program that requires its use for all incidents and events, as well as trends issues across all LOBs.
- B. Incorporate the After-Action Reports (AARs) into the enterprise-wide CAP that requires timely AARs for emergency and wildfire exercises and events across all LOBs.
- C. Given the proven costs of not taking quick action when new major risks are identified, PG&E could institute a process to ensure that relevant plans, operational programs, and procedures are aligned with actions to address such threats.

### **Theme 2: Vegetation Management**

- D. PG&E should immediately take steps to ensure that a Vice President and other senior program leaders have the necessary professional VM education, experience, training, certifications, and competence to adequately administer and manage Vegetation Management functions.
- E. Personnel performing tree risk assessments should have the demonstrated competence to effectively conduct required tasks including a minimum defined level of education, training, skills, and experience to identify and mitigate at-risk trees. Understanding utility tree risk assessment processes and systems as described within the Utility Tree Risk Assessment Best Management Practices is required.
- F. All Vegetation Management staff and contractors should have annual training to identify, analyze, and evaluate tree risks.
- G. PG&E should develop lead trainers within PG&E's VM Staff. These lead trainers can train new CUFs and do additional training because of QC audits. Field verification should be done annually to ensure the CUFs are identifying and listing hazard trees for pruning and removal. CUF training should be documented with signatures of the CUF and trainer.
- H. Combine all Vegetation Management programs into a single, more efficient and streamlined program. The inspectors and tree crews can identify and clear the ROW and off-ROW hazard trees, maintaining regulatory clearance requirements at lower costs without any reduction in safety or reliability, as has been demonstrated by utilities across the country.
- I. The QA/QC programs should be performed at the same time with the priority of identifying hazard trees. The QA/QC programs should audit 100% of all circuits in high fire-risk areas and ensure 100% auditing of circuits with unsatisfactory performance. The

sample formula should be based on tree populations, and PG&E's QA/QC program departments should be responsible for identifying all hazard trees.

- J. PG&E should consider converting Pre-Inspection contracts from lump sum contracts to time and materials contracts.

### **Theme 3: Circuitry**

- K. PG&E should expeditiously proceed with System Enhancement Initiative No. 20, which requires PG&E and the CPUC to engage an independent engineering firm to study the grounding methods and circuit and transformer configuration in PG&E's distribution system and transmission system. Such a study should include a detailed review of the role of the 3-wire system in the ignition of wildfires.
- L. PG&E should implement a comprehensive program that includes the proper balance of the various approaches to maintenance, including preventive, predictive, and corrective, and not replace on failure.

### **Theme 4: Emergency and Crisis Management**

- M. PG&E should consider full implementation of the ICS, including for daily operations, as has been done at other major utilities, including ConEd in New York and Consumers Energy in Michigan.
- N. PG&E should redefine the role of the executive management team during an event to that of a Crisis Management Team (CMT). The CMT can deal with a major event that threatens to harm the organization, its stakeholders, or the general public by assessing long-term and company-wide impacts of the incident and providing overarching incident objectives aimed at essential business operations.
- O. PG&E should realign the OIC responsibilities to be centralized under the IC.

### **Recommendations for potential modifications to CPUC General Orders**

- P. The CPUC should modify General Order (GO) 95 to require California utilities to implement a comprehensive maintenance program that includes the proper balance of the various approaches to maintenance, e.g., preventive, predictive, or corrective. This action would align GO 95 with GO 167 – Enforcement of Maintenance and Operation Standards for Electric Generating Facilities – which specifically calls out the requirement to have a balanced maintenance program that includes preventive and predictive maintenance.

- Q. The CPUC should modify GO 166 – Mutual Assistance Agreement(s) Standard 2 to explicitly require California utilities to include available resources by amount, capability, and type (personnel, equipment, materials, and supplies) in their mutual assistance agreements.
- R. The CPUC could make changes to Rule 35 which allows utility companies the ability to maintain vegetation that poses a risk to reliability and public safety. Changes to Rule 35 could provide stronger support to PG&E and other utilities when they are unable to appropriately address threatening vegetation on private property, due to denied access by the property owner.
- S. The CPUC could consider realigning GO 95 to address requirements for vegetation management to better align with Public Resource codes. The CPUC’s GO 95 and the Public Resource code (4292 and 4293) both address the distance required for trees from electric lines. Utilities and their contractors are challenged by sometimes-conflicting requirements.
- T. The CPUC could consider requiring the utilities to use the ANSI A300 (Part 9) Tree Risk Assessment a. Tree Failure - Tree, Shrub, and Other Woody Plant Management - Standard Practices, and the International Society of Arboriculture’s Utility Tree Risk Assessment Best Management Practices. The CPUC could also consider requiring that utility vegetation managers develop a quantitative risk matrix and a pocket field guide for identifying and removing hazard trees. Once developed, the risk matrix and pocket field guide could be adopted by the CPUC into GO 95 Rule 35.

## **XII. APPENDICES**

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### **A. Root Cause Analyses Details**



# APPENDIX A: ROOT CAUSE ANALYSIS *WILDFIRE CIRCUITS*



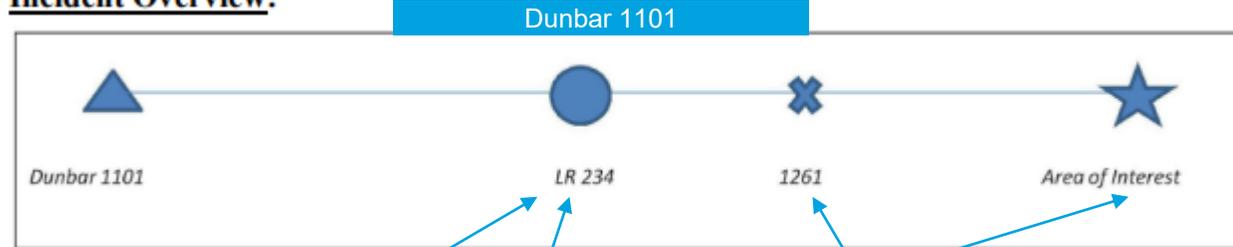
# ADOBE WILDFIRE – DUNBAR 1101

# ADOBE WILDFIRE – DUNBAR 1101

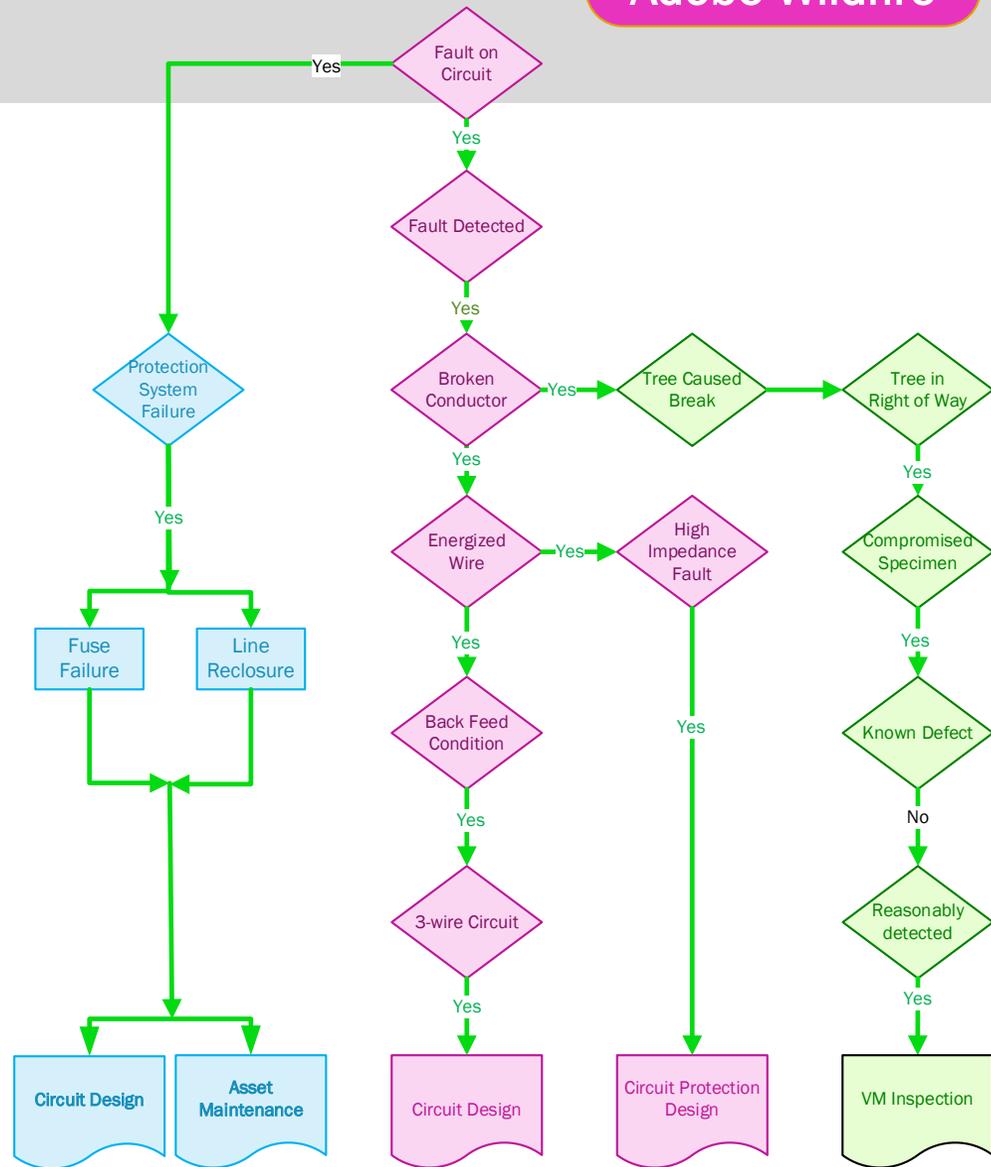
## Incident Observations

- ▶ Tree Contacted Conductors From 60 Feet
- ▶ Possible Energized Downed “Tree Wire” Conductor From 8:22 PM–11:35 PM
- ▶ Possible Failure of Fuse 1261
- ▶ Possible High-Impedance Fault Condition
- ▶ Possible Electrical Back-Feed Conditions

## Incident Overview:



# Adobe Wildfire



# ADOBE WILDFIRE – DUNBAR 1101

## VEGETATION MANAGEMENT

- Based on CPUC's SED Incident investigation PG&E violated General Order 95, Rule 31.1 which PG&E disputes.
  - Hazardous tree not identified and abated
  - Records of 2015 CEMA inspection not retained
  - Work order completed late
- The Adobe fire was not a high-wind event and is considered a normal weather event. Arborists use the Beaufort Wind Scale to determine the effects of wind on trees.
- The subject tree was clearly a visible hazard tree that should have been identified and abated by PG&E. The primary form and structure defects would be readily visible to a diligent inspector performing a ground-based inspection along the right-of-way, especially one trained and sensitive to the electrical contact hazards posed by this tree.

# ADOBE WILDFIRE – DUNBAR 1101

## VEGETATION MANAGEMENT

Condition	
Tree-Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	Yes
Known Defect or Condition	No
Reasonably Detected	Yes
Wind Event	Normal
Receptive Fuel Bed	Unknown

# ADOBE WILDFIRE – DUNBAR 1101

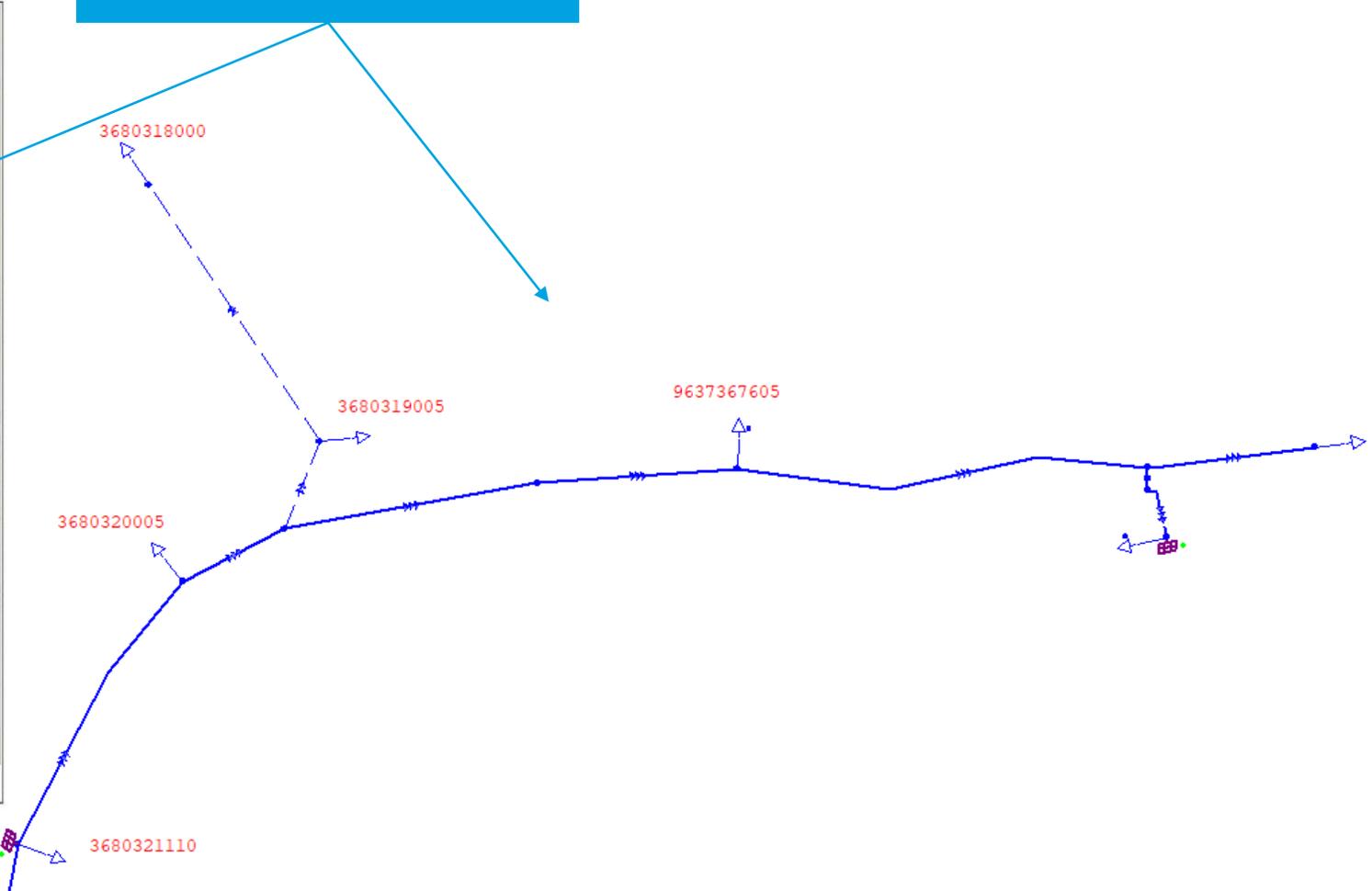
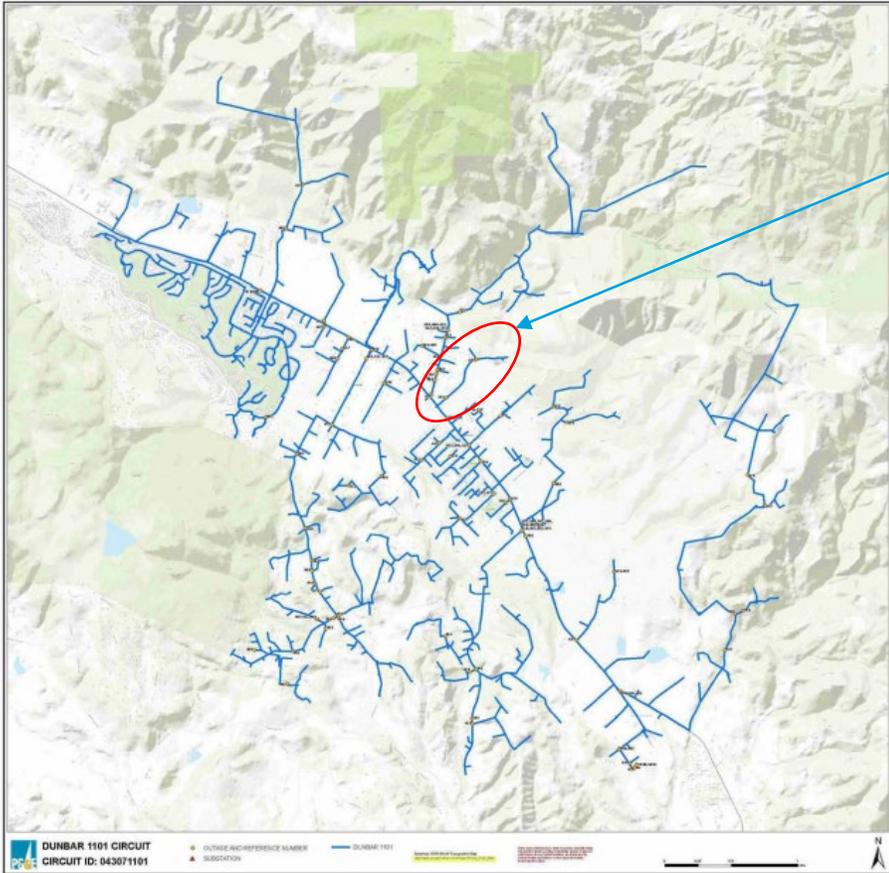
## VEGETATION MANAGEMENT



**Figure 8.** Subject Eucalyptus tree laying across the road and subject conductor spans. The tree was rooted in the top left corner of the image. (October 17, 2017)

# ADOBE WILDFIRE – DUNBAR 1101

Incident Location



# ADOBE WILDFIRE – DUNBAR 1101

## PG&E EVIDENCE RECORD IDFS

### ADOBE INCIDENT DESCRIPTION & FACTUAL SUMMARY

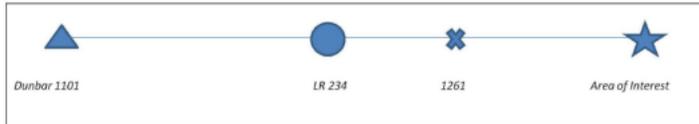
For completeness, this incident description and factual summary should be read in conjunction with the Factual Report Guidance and the contemporaneously submitted response to Question 62.

#### **Background:**

On October 10, 2017, PG&E filed an Electric Safety Incident Report (Incident No. 171010-8558) concerning an incident that occurred near 8555 Sonoma Highway (Highway 12), Kenwood, Sonoma County (the “incident location” as defined by the CPUC’s December 7, 2017, letter). When PG&E was granted access to the incident location, PG&E observed a green Eucalyptus tree that had fallen and was laying on three of three conductors of a Dunbar 1101 (12 kV) primary tap line on the ground. The Eucalyptus tree was rooted approximately 60 feet from the distribution conductors.

According to CAL FIRE’s website, the Adobe fire is part of the “Nuns fire”, which consists of six different fires: Nuns, Adobe, Norrbom, Pressley, Partrick and Oakmont, and the Adobe fire started at 1:00 AM on October 9, 2017.

#### **Incident Overview:**



The incident location is served by the Dunbar 1101 Circuit. On the Dunbar 1101 Circuit, Line Recloser 234 is the first recloser upstream of the incident location. Based on PG&E records, there are four meters downstream of the incident location. At 10:36 PM, the smart meter at service point 3680315905 recorded a NIC Power Down event. The smart meter at service point 9637363405, another meter downstream of the incident location, failed to report interval data between 8:22 PM and midnight. The other two meters were not reporting on October 8.

Based on PG&E records, 6 smart meters between the incident location and Fuse 1261—the fuse immediately upstream of the incident location—recorded a series of power off/on events between 11:08 PM and 11:35 PM. At 11:14 PM, Line Recloser 234 operated and reclosed.

Based on PG&E records, a PG&E troubleman was the first responder to the Adobe incident. Per the troubleman, at around 11:30 PM on October 8, he was driving north on Highway 12 to address an outage. Along the way, he saw fire in the Kenwood area. Per the troubleman, he stopped near a pole on Highway 12 that was close to the Chateau St. Jean winery. He saw firefighters and asked if they needed assistance. The firefighters requested de-energization of the lines. The troubleman called the Distribution Operator, who told him that Line Recloser 234 was nearby and could be opened remotely. Based on PG&E records, Line Recloser 234 was

Possible High Impedance Fault Condition

On October 10, PG&E was permitted access to the incident location and observed a Eucalyptus tree that had fallen and three of three primary conductors of the Dunbar 1101 (12 kV) on the ground. The Eucalyptus tree was green, approximately 120 feet tall and rooted approximately 60 feet from the distribution conductors. The Eucalyptus tree was found laying on top of the distribution conductors. The primary tap line conductors were #4AR (aluminum, steel reinforced) tree wire, installed in 1966.

Insulated Tree Wire Conductor

# ADOBE WILDFIRE – DUNBAR 1101

## PG&E EVIDENCE RECORD ILIS

**Santa Rosa**

**17-0085330**

**Outages**

Circuit: 043071101, DUNBAR-1101 District: Santa Rosa  
 Type: Unplanned Customer Minutes: 138495  
 Customers: CEMO 7 CEMO 0 ADJ 7 Initial 7 WEATHER: Clear;32-90 F  
 Active Interval: NO Sustained Fault Type: Line to Line  
 EquipID: 1261 Action Required: No  
 Equipment Type: Fuse Construction OH Type: OIS Outage# 1894854  
 Equipment Condition: Pole-Wood, Broken Targets: Supervisor Notified  
 Equipment Address: 500 NHWY 12 S/ADOBE CANY  
 Fault Location: MTR 1009435821  
 Previous Switching: LINE CUT IN CLEAR FOR FIRE INVESTIGATION OPEN MO (DMS# 1897214)  
 Action Description: Cause: Environmental/External, Fire, Forest/Grass No Access Reason: Available  
 Distribution Wire Down: No Wire Down Energized: No  
 Multi Damage Location: No # of Operations: Created By: KKCA  
 Counter Read: Outage Level: Distribution Circuit Last Updated By: SMBATCH\_FO  
 Responsible Organization: Distribution Fault Location Info: Latitude & Longitude: Reviewed By: SPK8  
 GPS MA Data: FNL: 10/08/17 23:35 Reviewed Date: 10/22/17 17:58  
 End Date: 10/22/17 17:20

**Actions**

Date	Description	Customers Restored	Customers Out	Minutes Out	Customer Minutes
10/09/17 01:10	FUSE 1261 OPEN; DEIGHAN RPTS FOUND 2/3 FU -AS- BLOWN, OPENED REMAINING AND TAGGED MOL, WILL NEED A PATROL	0	7	-	-
10/14/17 10:48	MULB: UPDATED NO ACCESS - Fire Activity	0	-	-	-
10/14/17 11:42	VMG1: UPDATED NO ACCESS - Available	0	-	-	-
10/15/17 13:14	MCGINLEY (661-978-0957) ASSUMES OWN CLEARANCE FROM 1261 TO EOL	0	-	-	-
10/15/17 18:03	MCGINLEY RELEASES OWN CLEARANCE FROM 1261 TO EOL REPLACED POLE AT MTR 1009432581. STILL HAS WIRE CUT GOING TOWDS 7443	0	-	-	-
10/16/17 08:37	AEHS: UPDATED NO ACCESS - Fire Activity	0	-	-	-
10/18/17 10:31	RAEL (905-459-7148) RPTS ON SITE GIVEN THE OK TO HOLD OWN CLEARANCE FROM 1261 TO EOL TO MAKE REPAIRS, WILL CALL BACK BEFORE CLOSING	0	-	-	-
10/18/17 12:05	OPD3: UPDATED NO ACCESS - Available	0	-	-	-
10/18/17 12:54	JCSN: UPDATED NO ACCESS - Fire Activity	0	-	-	-

[http://odspwv1spr002.com.pg&e.com:9003/lls\\_rpt/dailyeventlogdetail.jsp?ocbeventid=17-0085330&numberofmonths=24&showchangehistorylog=1](http://odspwv1spr002.com.pg&e.com:9003/lls_rpt/dailyeventlogdetail.jsp?ocbeventid=17-0085330&numberofmonths=24&showchangehistorylog=1)

CONFIDENTIAL PGE-CPUC\_00013091

LR 234 Records  
 10 MTT Alarm Events  
 9:49 PM – 11:35 PM

2 of 3 Fuses Blown –  
 Back Feed Conditions

Date	LogDescription
10/8/2017 21:49	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is NORMAL
10/8/2017 21:49	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is ALARM
10/8/2017 22:34	(P04) 1-Santa Rosa sonoma lr 234 pwr ok is ALARM
10/8/2017 22:34	(P04) 1-Santa Rosa sonoma lr 234 pwr ok is NORMAL
10/8/2017 22:34	(P01) 1-Santa Rosa sonoma lr 234 ac pwr fail is NORMAL
10/8/2017 22:34	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is NORMAL
10/8/2017 22:34	(P01) 1-Santa Rosa sonoma lr 234 ac pwr fail is ALARM
10/8/2017 22:34	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is ALARM
10/8/2017 22:35	(P01) 1-Santa Rosa sonoma lr 234 ac pwr fail is NORMAL
10/8/2017 22:35	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is ALARM
10/8/2017 22:35	(P01) 1-Santa Rosa sonoma lr 234 ac pwr fail is ALARM
10/8/2017 22:35	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is NORMAL
10/8/2017 22:35	(P04) 1-Santa Rosa sonoma lr 234 pwr ok is NORMAL
10/8/2017 22:35	(P04) 1-Santa Rosa sonoma lr 234 pwr ok is ALARM
10/8/2017 22:37	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is ALARM
10/8/2017 22:37	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is NORMAL
10/8/2017 23:09	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is ALARM
10/8/2017 23:09	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is NORMAL
10/8/2017 23:12	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is NORMAL
10/8/2017 23:12	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is ALARM
10/8/2017 23:13	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is NORMAL
10/8/2017 23:13	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is ALARM
10/8/2017 23:13	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is ALARM
10/8/2017 23:14	(P08) 1-Santa Rosa sonoma lr 234 lr position is OPEN
10/8/2017 23:14	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is NORMAL
10/8/2017 23:14	(P08) 1-Santa Rosa sonoma lr 234 lr position is CLOSED
10/8/2017 23:14	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is NORMAL
10/8/2017 23:14	(P01) 1-Santa Rosa sonoma lr 234 ltc disable output mode is ON
10/8/2017 23:14	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is ALARM
10/8/2017 23:15	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is NORMAL
10/8/2017 23:15	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is ALARM
10/8/2017 23:16	(P01) 1-Santa Rosa sonoma lr 234 ltc disable output mode is OFF
10/8/2017 23:35	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is NORMAL
10/8/2017 23:35	(P04) 1-Santa Rosa sonoma lr 234 lr above mtt is ALARM
10/8/2017 23:35	(P02) Control Select 1-Santa Rosa sonoma lr 234 rcl rly for C/OUT by rtwsnorth at rkldccws05
10/8/2017 23:35	(P02) Control Execute for 1-Santa Rosa sonoma lr 234 rcl rly by rtwsnorth at rkldccws05
10/8/2017 23:35	(P02) Commanded Change for 1-Santa Rosa sonoma lr 234 rcl rly is C/OUT
10/8/2017 23:36	(P02) Control Select 1-Santa Rosa sonoma lr 234 lr position for OPEN by rtwsnorth at rkldccws05
10/8/2017 23:36	(P02) Control Execute 1-Santa Rosa sonoma lr 234 lr position by rtwsnorth at rkldccws05

Adobe3\_SCADA\_PGE-CPUC\_00007876

# ADOBE WILDFIRE – DUNBAR 1101

## PG&E VEGETATION MANAGEMENT RECORD

### Supplemental Information Regarding Prior Inspections:

Between 2012 and October 2017, there were seven inspections of the vegetation at the incident location. PG&E’s understanding based upon its records is that the subject tree was not identified for work during any of those inspections. Between 2009 and October 2017 there were four electric maintenance overhead inspection and patrols at the incident location. In addition, an inspection of poles on the incident span was conducted in 2017. Pole with SAP Equipment ID 101957980, one of the poles on the incident span, was marked “Replace”. That pole was due to be replaced by November 30, 2018, but had not been replaced prior to the Adobe fire. Below is a summary of the vegetation management and electrical equipment patrols and inspections.

Date	Event	Findings
12/14/2012	Western Environmental Consultants, Inc. (“WECI”) performed a vegetation management routine patrol at the incident location.	PG&E’s understanding based on its records is that the subject tree was not identified for work.
02/05/2014	WECI performed a vegetation management routine patrol at the incident location.	PG&E’s understanding based on its records is that the subject tree was not identified for work.
07/03/2014	PG&E performed an electric maintenance overhead inspection at the incident location.	PG&E’s understanding based on its records is that three EC tags were created to trim overgrown vegetation above Guy Bob with a completion due date of July 3, 2019. PG&E’s understanding based on its records is that work was not completed prior to the Adobe Fire.
03/27/2015	WECI performed a vegetation management routine patrol at the incident location.	PG&E’s understanding based on its records is that the subject tree was not identified for work.
04/29/2016	WECI performed a vegetation management routine patrol at the incident location.	PG&E’s understanding based on its records is that the subject tree was not identified for work.
06/28/2016	PG&E performed an electric maintenance overhead patrol at the incident location.	PG&E’s understanding based on its records is that no issues with PG&E equipment at the incident location were identified.
10/19/2016 – 11/04/2016	WECI performed a CEMA patrol at the incident location.	PG&E’s understanding based on its records is that the subject tree was not identified for work.
04/11/2017	PG&E conducted an inspection of poles at the incident location.	PG&E’s understanding based on its records is that Pole with SAP Equipment ID 101957980, one of the poles on the incident span, was marked “Replace” and was due to be replaced by November 30, 2018, but was in fact replaced as part of restoration efforts on October 22, 2017.
07/11/2017	WECI performed a vegetation management routine patrol at the incident location.	PG&E’s understanding based on its records is that the subject tree was not identified for work.
07/13/2017	WECI performed a CEMA patrol at the incident location.	PG&E’s understanding based on its records is that the subject tree was not identified for work.

# ADOBE WILDFIRE – DUNBAR 1101

## CPUC-SED EVIDENCE RECORD

**Utility Facilities involved:** Dunbar-1101, 12 kV Circuit

**Violation:** Yes

### I. Summary

On October 8, 2017, at approximately 2234 hours, a Eucalyptus tree fell and contacted overhead conductors of PG&E's Dunbar-1101 12 kV circuit near 8555 Sonoma Highway in the city of Kenwood in Sonoma County. When the tree severed PG&E's insulated conductors, the Adobe Fire started on the Chateau St. Jean Winery property.

The Adobe Fire was combined with several other fires, which CAL FIRE called collectively the Nuns<sup>1</sup> Fire. The Nuns Fire burned a total of 56,556 acres, destroyed 1,355 buildings, and damaged 172 buildings. Three fatalities occurred as a result of the Nuns Fire, with one of those fatalities occurring within the perimeter of the Adobe fire.

---

<sup>1</sup> The Nuns Fire included the Nuns, Oakmont/Pythian, Norrbom, Adobe, Pressley and Partrick fires. SED investigated each of these incidents except the Pressley fire, which was a spot fire that ignited from an ember that originated from the Adobe Fire

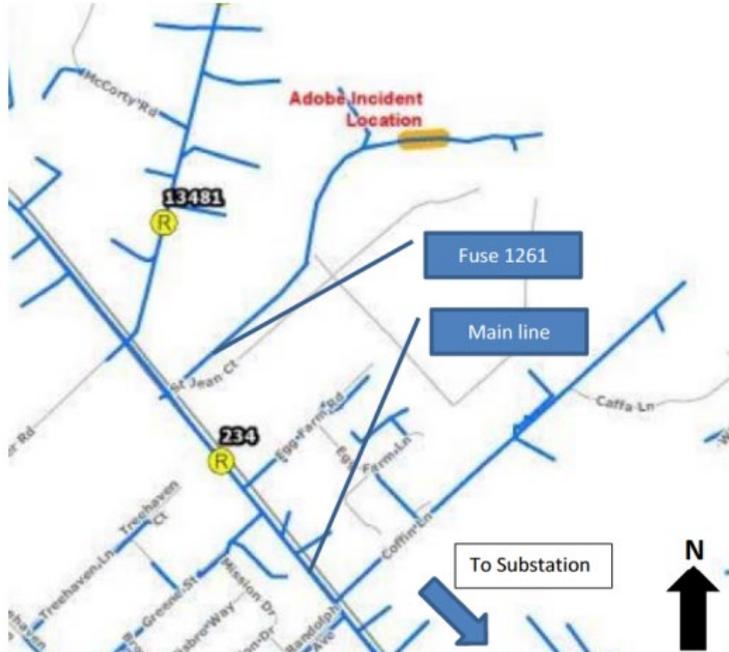
### V. Conclusion

Based on the evidence reviewed, SED found three violations of GO 95 by PG&E:

- GO 95, Rule 31.1, for PG&E's failure to maintain its 12 kV overhead conductors safely and properly. PG&E did not identify a hazardous tree condition and take the appropriate steps to prevent the subject Eucalyptus tree from striking the overhead conductors. SED found that PG&E did not document the subject Eucalyptus tree for trim or removal.
- GO 95, Rule 31.1, for PG&E's failure to maintain VM inspection records related to a 2015 CEMA inspection<sup>38</sup> according to best practices. PG&E could not locate records related to this inspection and notified SED of the lost record on March 30, 2018.
- GO 95, Rule 31.1 for PG&E completing work order #103891848<sup>39</sup> 15 days late.

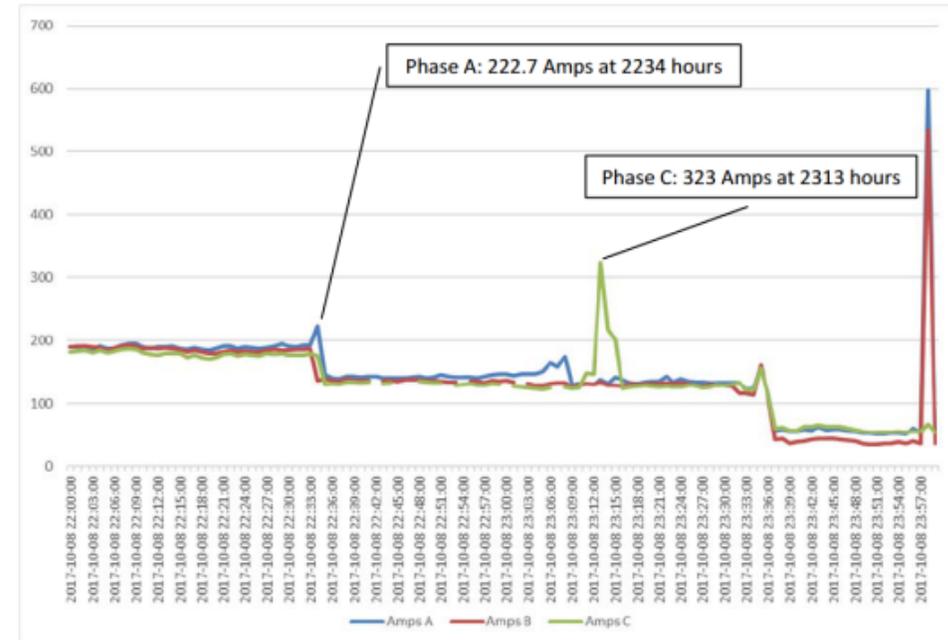
# ADOBE WILDFIRE – DUNBAR 1101

## CPUC-SED EVIDENCE RECORD



**Figure 6.** Map showing the approximate locations of protection devices upstream of incident span/Area of Interest. Not drawn to scale. (Source: PG&E)<sup>29</sup>

The incident span was protected by upstream fuse 1261, Line Recloser 234 (LR-234, manufactured by Cooper Power Systems, type F4C), and finally the Dunbar-1101 Circuit Breaker (CB-1101). Fuse 1261, located at the branch from the main line near Highway 12, consists of three 65T fuses, in line with each of the conductors.



**Figure 7.** SCADA plot of load data recorded at Dunbar-1101 CB on October 8, 2017, from 2200 hours to 2359 hours. Highlight of load reduction event at 2233 to 2235 hours.

On October 8, 2017, at 2234 hours, SED staff believes the load reduction to be linked to the operation of two fuses that are part of fuse 1261. The subject Eucalyptus tree falling into the overhead lines likely caused a ground fault condition and ultimately the fire.

# ADOBE WILDFIRE – DUNBAR 1101

## CPUC-SED EVIDENCE RECORD

PG&E CONFIDENTIAL UNDER NON-DISCLOSURE AGREEMENT

On October 12, 2018, SED staff, Wilson Tsai and Raymond Cho, met with CAL FIRE investigators in Santa Rosa to review evidence from the evidence site retained by CAL FIRE. Of the evidence reviewed and photographed, SED staff found multiple damaged electric facilities and hardware including a fulgurite-like mass, failed insulator tie wires and damaged conductors. Fulgurites<sup>33</sup> are naturally occurring masses of fused soil and/or other debris that can form when lightning discharges into the ground. In this case, a fulgurite-like mass was formed when conductors fell to the ground and discharged enough energy to fuse some of the ground material together.



Figure 10. Fulgurite-like mass found in the Adobe incident area.

SED staff did not unwind the multiple bundles of conductor wire but reviewed the failure points. The Eucalyptus tree and fire damaged the insulating rubber material around the conductors. SED found evidence of arcing exhibited by molten metal attached to failed pieces of conductor.

High-Impedance Fault  
Condition  
Possible Back-Feed Scenario



Figure 11. Failed pieces of conductor strands and evidence of arcing.

#### IV. CAL FIRE Investigation

CAL FIRE's investigation report determined that the subject Eucalyptus tree failed and fell into the three 12 kV conductors. The report notes that "(t)he electrical conductors broke and fell to the ground and onto surrounding vegetation. Several of the conductors remained energized and arced causing a vegetation fire..."<sup>34</sup>. The CAL FIRE investigator identified the grounded, energized conductors as the source of ignition.



# ADOBE WILDFIRE – DUNBAR 1101

## CAL FIRE EVIDENCE RECORD

17 **Opinion and conclusion:**

18 I determined the cause of the Adobe fire on October 8, 2017 to be caused by electrical  
19 power line. At approximately 11:08 PM on October 8, 2017, a eucalyptus tree (evidence  
20 item # E-5) fell south, across the secondary access road at the address of 8555  
21 Sonoma Highway. The eucalyptus tree struck suspended electrical conductors which  
22 were attached between power pole #120101124 (evidence item 9) and power pole  
23 #GT41422 (evidence item 18). The electrical conductors broke and fell to the ground  
24 and onto surrounding vegetation. Several of the conductors remained energized and  
25 arced causing a vegetation fire near evidence tents # 21, 7, 15, 20, 22, and 10. I saw  
26 that the electrical conductor wire which I marked with white electrical tape appeared to  
27 remain energized after falling to the ground and onto vegetation. Under each section of  
28 the white wire I found several fulgurites and spalded of rocks (see photograph  
29 IMG\_0842.JPG). Additionally, evidence of the reenergization of the powerlines was  
30 recorded within the data memory of the electrical transfer switch. Event 10 show the

Adobe October 8, 2017 17CALNU010050

1 time when the tree contacted the powerlines and events 11, through 16 show PG&E's  
2 equipment was attempting to re-energize the system after a failure occurred.  
3  
4 In a document which was provided to me from PG&E, called a Supervisory Control and  
5 Data Acquisition (SCADA) Event Log showed an electrical power outage. This outage  
6 occurred on October 8, 2017 at 23:08 (11:08 PM) on the DUNBAR 1101 circuit, to fuse  
7 1261. The location of this device is stated as 500 N/HWY 12 S/ADOBE CANY. The  
8 SCADA Event Log with the generator transfer switch data, fire pattern indicators, and  
9 witness accounts indicates the fire originated from the base of power pole # 120101124  
10 (evidence tent 9) from the electrical conductor (white) evidence item #2 at  
11 approximately 11:08 PM on October 8, 2017.

# ADOBE WILDFIRE – DUNBAR 1101

## REFERENCE DOCUMENTS

- ▶ CPUC-SED E20171010-02 Incident Report, April 29, 2019
- ▶ CAL FIRE Investigative Report Case Number 17CALNU010050

 956-12\_Adobe\_IDFSR

 2018.05.04 FINAL CPUC Adobe Factual Report\_CONF

 Adobe Supplemental Report

 PGE-CF\_00004982\_PGE-CF-VOL004

 PGE-CF\_00136021\_PGE-CF-VOL006\_03

 PGE-CF\_00136055\_PGE-CF-VOL006\_03

 PGE-CF\_00136070\_PGE-CF-VOL006\_03

 PGE-CPUC\_00001203\_PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00013039\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00013091\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00013124\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00015733\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00016059\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CF\_00000015

 PGE-CF\_00000046\_CONF

 PGE-CF\_00000047\_CONF

 PGE-CPUC\_00005393\_CONF

 PGE-CPUC\_00005394\_CONF

 PGE-CPUC\_00007876

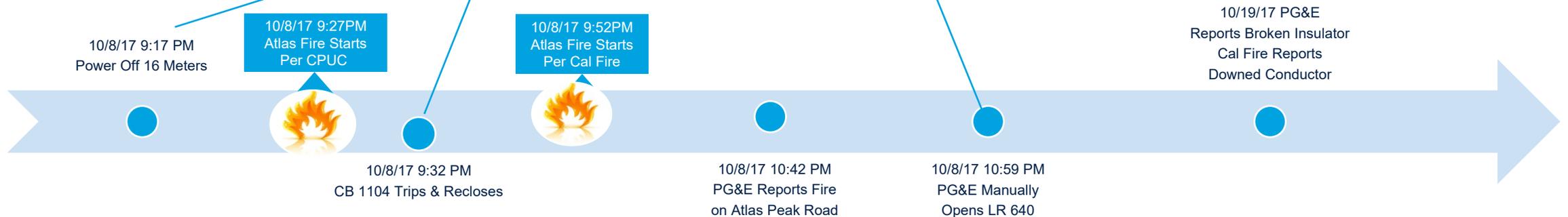
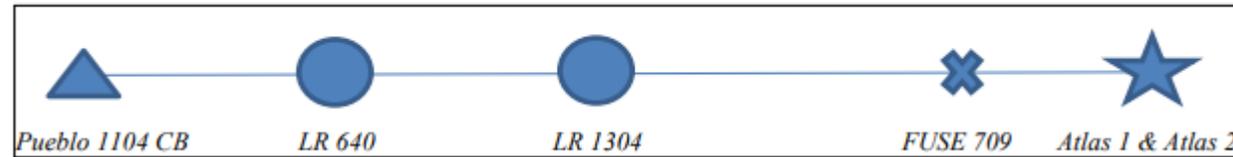
# ATLAS 1 & 2 WILDFIRES – PUEBLO 1104

# ATLAS 1 & 2 WILDFIRES – PUEBLO 1104

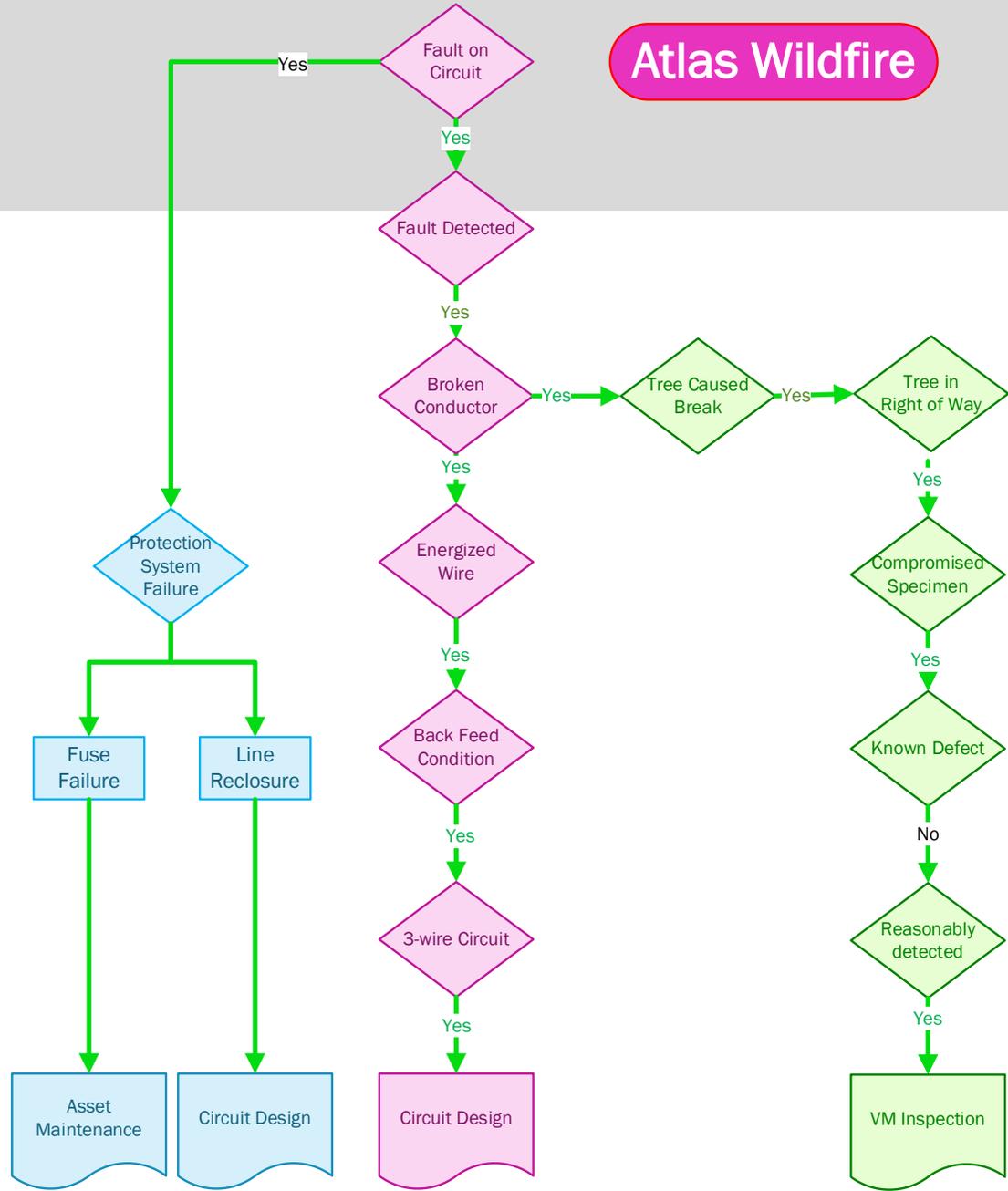
## Incident Observations

- ▶ Tree Contacted Conductors From 15 Feet (Atlas 1) & 20 Feet (Atlas 2)
- ▶ Possible Energized Downed Conductor From 9:17 PM – 10:59 PM
- ▶ Possible Failure LR 640/1304 & F709
- ▶ Possible High-Impedance Fault Scenario
- ▶ Possible Electrical Back-Feed Conditions

## Incident Overview:



# Atlas Wildfire



# ATLAS 1 & 2 WILDFIRES – PUEBLO 1104

## VEGETATION MANAGEMENT

- ▶ Based on the CPUC’s investigated report PG&E violated General Order 95 and five violations of Rule 31.1 as listed below:

GO Rule	Violations
GO 95, Rule 31.1	*Failure to identify and abate hazardous Black Oak tree at Atlas 1 site
GO 95, Rule 31.1	*Failure to identify and perform correctional prune of hazardous Valley Oak codominant branch at Atlas 2 site
GO 95, Rule 35	*Vegetation clearance not maintained at Atlas 1 site
GO 95, Rule 35	*Vegetation clearance not maintained at Atlas 2 site
GO 95, Rule 31.1	Work order completed late
	<b>*Violation disputed by PG&amp;E</b>

# ATLAS 1 & 2 WILDFIRES – PUEBLO 1104

## VEGETATION MANAGEMENT

Condition	
Tree Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	Yes
Known Defect or Condition	No
Reasonably Detected	Yes
Wind Event	Normal
Receptive Fuel Bed	Yes

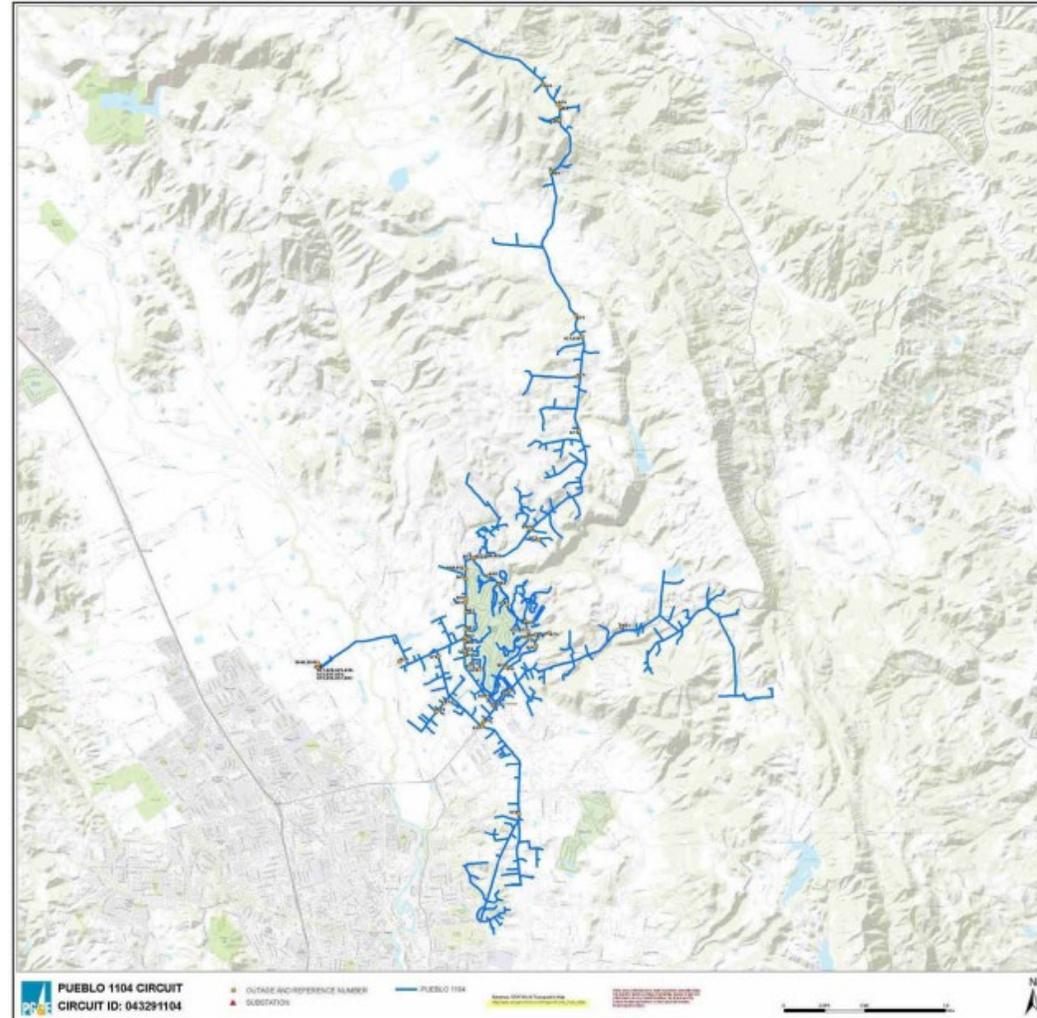
# ATLAS 1 & 2 WILDFIRES – PUEBLO 1104

## VEGETATION MANAGEMENT

The subject trees had clearly visible hazards that should have been identified and abated by PG&E. The primary form and structure defects would be readily visible to a diligent inspector and auditors performing a ground-based inspection along the right-of-way (ROW), especially those trained and sensitive to the electrical contact hazards posed by these trees. This conclusion is based on the following:

- ▶ The pre-inspector had three months' experience.
- ▶ Tree failure determination is largely based on the pre-inspector's and auditors' professional opinions.
- ▶ The auditors, Davey Resource Group, Western Environmental Consultants, California Forestry and Vegetation Management and PG&E's internal auditors, failed to identify the hazard trees.
- ▶ The vegetation management contractor failed to identify and notify PG&E of these hazard trees.
- ▶ The Black Oak tree was located within three feet of the cleared ROW and easily observable.
- ▶ The Valley Oak was located near the road and within eight feet of the cleared ROW and observable.

# ATLAS 1 & 2 WILDFIRES – PUEBLO 1104



# ATLAS 1 & 2 WILDFIRES – PUEBLO 1104

## PG&E EVIDENCE RECORD IDFS

Case 3:14-cr-00175-WHA Document 956-13 Filed 12/31/18 Page 2 of 9

### ATLAS INCIDENT DESCRIPTION & FACTUAL SUMMARY

For completeness, this incident description and factual summary should be read in conjunction with the contemporaneously submitted response to Question 62.

#### Background:

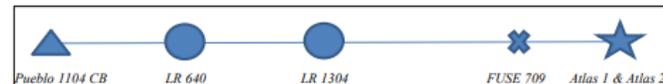
On October 20, 2017, PG&E filed with the CPUC an Electric Safety Incident Report (Incident No. 171020-8589) concerning an incident that occurred near 4011 Atlas Peak Road, City of Napa, Napa County (the “Atlas 1 incident location,” as defined by the CPUC’s December 7, 2017, letter). On October 23, 2017, PG&E filed with the CPUC an Electric Safety Incident Report (Incident No. 171023-8596) concerning an incident that occurred near 3683 Atlas Peak Road, City of Napa, Napa County (the “Atlas 2 incident location,” as defined by the CPUC’s December 7, 2017, letter and, together with the Atlas 1 incident location, the “incident locations”). The Atlas 2 incident location is approximately a quarter mile south of the Atlas 1 incident location.

When PG&E was granted access to the Atlas 1 incident location, PG&E observed a broken tree limb and broken field-phase primary insulator on the Pueblo 1104 (12 kV) Circuit. A green, healthy tree limb fell from a California White Oak/Valley Oak that was rooted approximately 15 feet from the distribution conductors.

When PG&E was granted access to the Atlas 2 incident location, PG&E observed a California Black Oak tree that had broken at the base and was lying on the ground. The base of the California Black Oak tree was burnt and rooted approximately 20 feet from the distribution conductors.

According to CAL FIRE’s website, the Atlas fire started at 9:52 PM on October 8, 2017. CAL FIRE has collected evidence near the incident locations.

#### Incident Overview:



Based on PG&E records, on October 8, 2017, between 9:17 PM and 9:32 PM, 16 smart meters located downstream of the incident locations recorded a series of power off/on events. From 9:32 PM to 10:00 PM, 34 smart meters (including the 16 above) located downstream of the incident locations recorded a series of power off/on events.

According to PG&E records, a PG&E troubleman responded to an outage report on the Pueblo 1104 Circuit on the night of October 8. The troubleman cleared a wire down at 1597 Estee Avenue, which is over four and a half miles to the southwest of the incident locations, and reported fire on Atlas Peak Road at 10:42 PM. According to PG&E records, at 10:59 PM, the

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Page 1 of 8

Line Recloser 640 was manually closed on October 12, 2017 at 7:11 PM, restoring power to 55 customers, but the incident locations remained de-energized at this time.

On October 12, according to PG&E records, a compliance inspector and an engineering estimator were the first PG&E personnel to reach the incident locations before CAL FIRE took possession of the sites. They patrolled the area to assess what PG&E equipment needed to be replaced. Near the Atlas 2 incident location, the compliance inspector and estimator observed plates, utensils and a camp stove on the ground.

On October 19, 2017, PG&E observed a broken tree limb and broken field-phase primary insulator on the Pueblo 1104 (12 kV) Circuit near the Atlas 1 incident location. A green, healthy tree limb fell from a California White Oak/Valley Oak that was rooted approximately 15 feet from the distribution conductors and came to rest on the lower of two communications cables. The conductors were 6CU (copper), installed in 1930.

On October 21, 2017, PG&E observed a California Black Oak tree that had broken at the base and was lying on the ground near the Atlas 2 incident location. The base of the California Black Oak tree was burnt and rooted approximately 20 feet from the distribution conductors. The conductors were 6CU (copper), installed in 1930.

On October 22, 2017, PG&E completed repair work at the incident locations. Based on PG&E records, power was restored to the incident locations on October 22, 2017, at 4:27 PM when Switch 861209 was manually closed.

#### Evidence Collection:

CAL FIRE collected a primary conductor, a primary insulator and a California White Oak/Valley Oak tree branch and communications cable from the Atlas 1 incident location. CAL FIRE collected broken conductor and a portion of the bottom of a California Black Oak tree from the Atlas 2 incident location. PG&E does not know whether CAL FIRE collected additional evidence at the incident locations.

# ATLAS 1 & 2 WILDFIRES – PUEBLO 1104

## PG&E EVIDENCE RECORD ILIS

Silverado

**17-0085211**

**Outages**

**Circuit** 043291104, PUEBLO-1104 **District** Silverado  
**Type** Unplanned **Customer Minutes** Sus 413659 Mem 2694 Adj 413659 CAIDI 1055

**Customers** CESQ 330 CEMO 1966 ADJ 392 Initial 2296 Weather Clear;32-90 F

**Active Interval** NO Sustained **Fault Type** Line to Ground **Action Required** No

**EquipID** 1104/2 **Construction Type** OH

**Equipment Type** Circuit Breaker **OIS Outage#** 1893954, 1899743

**Equipment Condition** Conductor, Overhead, Broken, wire on ground **Targets** BC GRD TGT

**Crew Notified Time** **Supervisor Notified**

**Equipment Address** PUEBLO SUB  
**Fault Location** RUPP, DONOVAN, 1533 ESTEE AVE

**Previous Switching** 7217 CLOSE|1797 OPEN|T0947 COIS TWD T3618 CLOSE|T0124 COIS TWD T3101 OPEN|T3101 TWD T0124 OPEN|2717 OPEN|1880 CLOSE|T0945 TWD T0946 OPEN|T0946 TWD T0945 OPEN|2785 OPEN|2765BP CLOSE|1304 OPEN|7469 OPEN|807 OPEN|8579 OPEN|3623 OPEN|2631 OPEN|2583 OPEN|3469 OPEN|3467 OPEN

**Details**  
**Action Description** BC & GRD TGT @ 47912

**Cause** Environmental/External, Fire, Forest/Grass **No Access Reason** Available

**Distribution Wire Down** Yes **Wire Down Energized** No

**Multi Damage Location** No **# of Operations** 2

**Counter Read** 250 **Created By** BGA6

**Outage Level** Distribution Circuit **Last Updated By** SMBATCH\_FO

**Responsible Organization** Distribution **Fault Location Info**

**GPS MA Data** **Latitude & Longitude**

**FNL** 10/08/17 21:32 **Reviewed By** KSA3  
**End Date** 10/13/17 15:34 **Reviewed By** 10/17/17 23:14 **Date**

**Actions**

Date	Description	Customers Restored	Customers Out	Minutes Out	Customer Minutes
10/08/17 21:32	CB 1104/2 OPEN	0	2296	-	-
10/08/17 21:32	SECTIONALIZER 47912 OPEN	0	-	0	-
10/08/17 21:32	CB 1104/2 CLOSE	1068	1228	0	0
10/08/17 21:33	LINE RECLOSER 59106 OPEN	0	-	-	-
10/08/17 21:34	LINE RECLOSER 75462 OPEN	0	-	-	-
10/08/17 21:35	SECTIONALIZER 66864 CLOSE	620	608	3	3684
10/08/17 21:35	LINE RECLOSER 664 CLOSE	278	330	3	3684
10/08/17 21:41	DISABLED NAPA 1112, PUEBLO 1104 AND 1105 FA TAGGED CAUT	0	-	-	-
10/08/17 22:42	TMAN RUPP RPTS WIRE DOWN 1597 ESTEE AVE CUT IN THE CLEAR, FIRE ON ATLAS PEAK RD N/O REG 909 NEED TO DE-ENERGIZE	0	-	-	-
10/08/17 22:42	WIRE DOWN 1597 ESTEE AVE OPEN	0	-	-	-
10/08/17 22:59	TMAN RUPP OPENED LINE RECLOSER 640 DROPPING LD	-62	392	87	31404
10/08/17 23:10	TMAN RUPP PULLED YELLOW HANDLE ON LR 640	0	-	-	-

[http://dddapwfwspdr02.comp.pge.com:8003/ils\\_rpt/dailyeventlogdetail.jsp?odbeventlogid=17-0085211&numberofmonths=245&showchangehistorylog=1](http://dddapwfwspdr02.comp.pge.com:8003/ils_rpt/dailyeventlogdetail.jsp?odbeventlogid=17-0085211&numberofmonths=245&showchangehistorylog=1) 1/5

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PGE-CPUC\_00013215

FNL  
End Date

10/08/17 21:32  
10/13/17 15:34

Reviewed By KSA3  
Reviewed By 10/17/17 23:14  
Date

**Actions**

Date	Description	Customers Restored	Customers Out	Minutes Out	Customer Minutes
10/08/17 21:32	CB 1104/2 OPEN	0	2296	-	-
10/08/17 21:32	SECTIONALIZER 47912 OPEN	0	-	0	-
10/08/17 21:32	CB 1104/2 CLOSE	1068	1228	0	0
10/08/17 21:33	LINE RECLOSER 59106 OPEN	0	-	-	-
10/08/17 21:34	LINE RECLOSER 75462 OPEN	0	-	-	-
10/08/17 21:35	SECTIONALIZER 66864 CLOSE	620	608	3	3684
10/08/17 21:35	LINE RECLOSER 664 CLOSE	278	330	3	3684
10/08/17 21:41	DISABLED NAPA 1112, PUEBLO 1104 AND 1105 FA TAGGED CAUT	0	-	-	-
10/08/17 22:42	TMAN RUPP RPTS WIRE DOWN 1597 ESTEE AVE CUT IN THE CLEAR, FIRE ON ATLAS PEAK RD N/O REG 909 NEED TO DE-ENERGIZE	0	-	-	-
10/08/17 22:42	WIRE DOWN 1597 ESTEE AVE OPEN	0	-	-	-
10/08/17 22:59	TMAN RUPP OPENED LINE RECLOSER 640 DROPPING LD	-62	392	87	31404
10/08/17 23:10	TMAN RUPP PULLED YELLOW HANDLE ON LR 640	0	-	-	-

10/09/2017 00:05	SWITCH 7217 OPEN	0	ibg8	10/26/2017 07:34	UPDATED
10/09/2017 00:05	SWITCH 7217 OPEN	0	ibg8	10/26/2017 07:34	
10/09/2017 00:05	SWITCH 7217 OPEN	0	ibg8	10/26/2017 07:34	
10/09/2017 00:05	SWITCH 7217 OPEN	0	ibg8	10/26/2017 07:34	
10/08/2017 23:10	TMAN RUPP PULLED YELLOW HANDLE ON LR 640	0	ibg8	10/26/2017 07:34	UPDATED
10/08/2017 23:10	TMAN RUPP PULLED YELLOW HANDLE ON LR 640	0	ibg8	10/26/2017 07:34	
10/08/2017 23:10	TMAN RUPP PULLED YELLOW HANDLE ON LR 640	0	ibg8	10/26/2017 07:34	
10/08/2017 23:10	TMAN RUPP PULLED YELLOW HANDLE ON LR 640	0	ibg8	10/26/2017 07:34	
10/08/2017 22:59	TMAN RUPP OPENED LINE RECLOSER 640 DROPPING LD	-62	ibg8	10/26/2017 07:34	UPDATED
10/08/2017 22:59	TMAN RUPP OPENED LINE RECLOSER 640 DROPPING LD	-62	ibg8	10/26/2017 07:34	
10/08/2017 22:59	TMAN RUPP OPENED LINE RECLOSER 640 DROPPING LD	-62	ibg8	10/26/2017 07:34	
10/08/2017 22:59	TMAN RUPP OPENED LINE RECLOSER 640 DROPPING LD	-62	ibg8	10/26/2017 07:34	
10/08/2017 22:42	WIRE DOWN 1597 ESTEE AVE OPEN	0	ibg8	10/26/2017 07:34	UPDATED
10/08/2017 22:42	WIRE DOWN 1597 ESTEE AVE OPEN	0	ibg8	10/26/2017 07:34	
10/08/2017 22:42	WIRE DOWN 1597 ESTEE AVE OPEN	0	ibg8	10/26/2017 07:34	
10/08/2017 22:42	WIRE DOWN 1597 ESTEE AVE OPEN	0	ibg8	10/26/2017 07:34	
10/08/2017 22:42	TMAN RUPP RPTS WIRE DOWN 1597 ESTEE AVE CUT IN THE CLEAR, FIRE ON ATLAS PEAK RD N/O REG 909 NEED TO DE-ENERGIZE	0	ibg8	10/26/2017 07:34	UPDATED
10/08/2017 22:42	TMAN RUPP RPTS WIRE DOWN 1597 ESTEE AVE CUT IN THE CLEAR, FIRE ON ATLAS PEAK RD N/O REG 909 NEED TO DE-ENERGIZE	0	ibg8	10/26/2017 07:34	
10/08/2017 22:42	TMAN RUPP RPTS WIRE DOWN 1597 ESTEE AVE CUT IN THE CLEAR, FIRE ON ATLAS PEAK RD N/O REG 909 NEED TO DE-ENERGIZE	0	ibg8	10/26/2017 07:34	
10/08/2017 22:42	TMAN RUPP RPTS WIRE DOWN 1597 ESTEE AVE CUT IN THE CLEAR, FIRE ON ATLAS PEAK RD N/O REG 909 NEED TO DE-ENERGIZE	0	ibg8	10/26/2017 07:34	
10/08/2017 21:41	DISABLED NAPA 1112, PUEBLO 1104 AND 1105 FA TAGGED CAUT	0	ibg8	10/26/2017 07:34	UPDATED
10/08/2017 21:41	DISABLED NAPA 1112, PUEBLO 1104 AND 1105 FA TAGGED CAUT	0	ibg8	10/26/2017 07:34	

# ATLAS 1 & 2 WILDFIRES – PUEBLO 1104

## CPUC-SED EVIDENCE RECORD

CALIFORNIA PUBLIC UTILITIES COMMISSION  
Safety and Enforcement Division  
Electric Safety and Reliability Branch

### Incident Investigation Report

**Report Date:** May 2, 2019

**Incident Number:** Atlas 1: 171023-8596 & Atlas 2: 171020-8589

**Utility:** Pacific Gas and Electric Company (PG&E)

**Date and Time of the Incident:** October 8, 2017, 2151 hours

**Location of the Incident:** 3683 Atlas Peak Road  
Napa, CA  
County: Napa

**Fatality / Injury:** Six (6) fatalities

**Property Damage:** \$78 million (PG&E restoration costs)

**Utility Facilities Involved:** Pueblo-1104, 12 kV Circuit

**Violation:** Yes

#### I. Summary

On October 8, 2017 at approximately 2151 hours, a Black Oak tree fell on one of PG&E's Pueblo-1104 12 kV conductors, bringing one span to the ground and igniting a fire (Atlas 1). On the same date but at a second location, a failed branch from a Valley Oak tree fell and contacted PG&E's Pueblo-1104 12 kV overhead conductors thus igniting another fire (Atlas 2). The two fires burned into each other, and together are called the Atlas Fire. The Atlas Fire burned 51,624 acres, damaged 783 structures, and destroyed 120 structures. Six fatalities resulted from the fire.



Figure 3. Atlas 2 - Failed Valley Oak branch removed from conductors.

# ATLAS 1 & 2 WILDFIRES – PUEBLO 1104

## CPUC-SED EVIDENCE RECORD



**Figure 10.** Partial view of Pueblo-1104 circuit with LR-640, LR-1304 and Sectionalizer 47912 shown. (Source: PG&E)<sup>40</sup>

Of the PG&E outage reports reviewed, SED could not determine if Fuse 709 operated after the faults occurred at both locations. Also, LR-640 and LR-1304 each seemed to have operated once within 16 minutes of each other based on the "CONTROL ALARMS" recorded locally at each device. The LRs did not lock out, but rather LR-640 was manually opened by PG&E field personnel due to the Atlas fires.

In summary, based on SED's review of SCADA records and smart meter data, SED did not identify a violation for either incident area.



**Figure 6. Atlas 1** Left: Subject pole #1, 40-foot pole (PG&E pole #102292423, coordinates:38.409797, -122.246232). Photo taken from the southeast side of pole, looking north. Right: Subject pole #2, 45-foot pole with transformer attached (PG&E pole #102292420, coordinates: 38.409435, -122.245904). Photo taken from southwest side of pole, looking northeast.

# ATLAS 1 & 2 WILDFIRES – PUEBLO 1104

## CPUC-SED EVIDENCE RECORD



**Figure 11.** Subject Black Oak tree laying perpendicular to the road. Photo taken from road-side facing the field.

On October 12, 2018, SED staff, Raymond Cho and Wilson Tsai, traveled to Santa Rosa to meet with CAL FIRE investigators and review evidence that they retained from the incident scenes. Of the evidence reviewed and photographed for Atlas 1, SED found charred Madrone tree branches with what appeared to be signs of electric arcing, fulgurite-like masses with what seemed to be copper in the center and also a rock with what seemed to be molten copper in the center. Fulgurites<sup>43</sup> are naturally occurring masses of fused soil and/or other debris that can form when lightning discharges into the ground. In this case, a fulgurite-like mass was formed when conductors fell to the ground and discharged enough energy to fuse some of the ground material together.



**Figure 14.** Beading on the subject copper span in the Atlas 2 incident area. CAL FIRE evidence item 3A.

For Atlas 2, SED found beading on the subject PG&E copper conductor which indicated electric arcing on another object. The evidence shows that the conductor was energized when it contacted another object.

#### IV. CAL FIRE Investigation

CAL FIRE investigator, Russell West, determined that the fire was “the result of multiple starts.”<sup>44</sup> Mr. West stated the following in his report:

“For identification purposes only, the fires were separated by the names Atlas 1 and Atlas 2.

The Atlas 1 fire was caused when a large tree fell to the ground, breaking a conductor, and causing multiple fires to start below.”

The Atlas 2 fire was caused when a tree branch broke free from a tree, struck a conductor causing a nearby insulator to break, causing multiple fires to start below.”<sup>45</sup>



**Figure 12.** Fulgurite-like masses found in the Atlas 1 incident area. CAL FIRE Evidence Log items 5A through 5C.



**Figure 13.** Charring on a Madrone tree branch that appears to be arcing in the Atlas 1 incident area. CAL FIRE evidence item 9B.

<sup>42</sup> CAL FIRE Fire Investigation Report 17CALNU010046.

<sup>43</sup> <https://en.wikipedia.org/wiki/Fulgurite>.

# ATLAS 1 & 2 WILDFIRES – PUEBLO 1104

## CAL FIRE EVIDENCE RECORD

ATLAS October 8, 2017 17CALNU010046

1 **2 - SUMMARY:**

2

3 On October 8, 2017, at approximately 9:51 PM, a vegetation fire was reported to CAL  
4 FIRE, St. Helena. The reporting party stated the fire was located near 3183 Atlas Peak  
5 Road in the community of Napa, California. Local and state fire suppression resources  
6 responded. Fire units contained the fire on November 17, 2017. The fire burned 51,624  
7 acres, damaged 783 structures, and destroyed 120 structures. 6 fatalities resulted from  
8 the fire.

9

10 Following my origin and cause investigation I, Russell WEST, determined the fire to be  
11 the result of multiple starts. For identification purposes only, the fires were separated by  
12 the names Atlas 1 and Atlas 2.

13

14 The Atlas 1 fire was caused when a large tree fell to the ground, breaking a conductor,  
15 and causing multiple fires to start below.

16

17 The Atlas 2 fire was caused when a tree branch broke free from a tree, struck a  
18 conductor causing a nearby insulator to break, causing multiple fires to start below.

19

13 I looked at the ends of the broken conductor. I saw beading on the ends of sections of  
14 the damaged conductor (See Atlas 1 Origin Photo IMG\_0065.JPG). The beading  
15 indicated to me the conductor was energized when it came to rest. In the areas I  
16 observed the beading, I saw metal "slag" on the ground (See Atlas 1 Origin Photo  
17 IMG\_064.JPG). The metal "slag" indicated to me the conductor was energized when it  
18 came to rest. I also saw a large fulgurite on the ground with a small piece of conductor  
19 sticking out of it (See Atlas 1 Origin Photo IMG\_0114.JPG). The fulgurite indicated to  
20 me the conductor was energized when it came in contact with the ground.

19 It is my opinion the Atlas 1 originated when a large tree fell to the ground. While falling,  
20 the tree came in contact with a conductor and broke it free from the power pole. The  
21 conductor fell to the ground causing a fire to start in multiple locations.

22

23 It is my opinion the Atlas 2 Fire originated when a large tree branch broke free from a  
24 tree and struck a conductor below. The contact with the conductor caused a nearby  
25 insulator to break. The conductor fell and came in contact with the communication lines  
26 below. The conductor energized the communication lines causing one communication  
27 line to fail and fall to the ground. The second communication line remained suspended  
28 in the air. The second communication line remained energized and melted the plastic  
29 covering in multiple spots along the span. The sequence of events caused multiple fires  
30 to start below the conductor and communication lines.

31

LE80 (Rev. 7/2011)

32

Officer Initials *RW*

**Atlas 063**

PG&E CONFIDENTIAL UNDER NON-DISCLOSURE AGREEMENT

ATLAS

October 8, 2017

17CALNU010046

# ATLAS 1 & 2 WILDFIRES – PUEBLO 1104

## CAL FIRE EVIDENCE RECORD

### Customer Outages Coincident with CB 1104 Trip and Closing Cycle 9:32 PM

20 **On October 11, 2017**

21 I talked to the original 911 caller (David CAUL). CAUL told me the following in  
22 summary: he was at his house located at [REDACTED] the night the fire  
23 started. He was worried about his power pole leaning so he walked outside to look at it.  
24 At approximately 9:35 PM he saw a "reddish-orange" glow to the north of his residence,  
25 approximately one mile away. Within approximately 15 seconds the glow grew in size  
26 and a smoke cloud began to form above the glow. At approximately 9:58 PM CAUL  
27 called 911 to report the fire. CAUL also told me he had a power outage at his house at  
28 approximately 9:35 PM, and he said the power was restored approximately 5 minutes  
29 later. CAUL provided me the one picture he took and a written statement (See  
30 Attachment 2)

8 I talked to Michael PARMENTER, the homeowner at [REDACTED]  
9 PARMENTER told me the following in summary: the night of the fire he said his lights  
10 were flickering on and off between approximately 9:30 PM and 10:00 PM. He told me he  
11 lost power at his residence, and his wife looked out the window and saw a fire burning  
12 near the entrance to the Circle R Ranch. His wife showed him the fire she saw.  
13 PARMENTER told me the fire was growing in size and was burning in a southern  
14 direction. He woke up his tenant (Scott GOLDIE) located next door at [REDACTED]  
15 Road. I asked PARMENTER when the speaker in the vineyard was installed, and he  
16 told me it was put in a few weeks prior to the fire. I asked him when the last time the  
17 grass was "weed wacked", and he told me it was done a few weeks prior. He told me he  
18 has two part-time workers who manage the vineyard.  
19

# ATLAS 1 & 2 WILDFIRES – PUEBLO 1104

## REFERENCE DOCUMENTS

▶ PG&E Adobe Incident Description & Factual Summary, PG&E Adobe Supplemental Report

▶ CAL FIRE Report 17CALNU010046

 956-13\_Atlas\_IDFSR

 2018.05.22 CPUC Atlas Factual Report - Confidential Highlights\_CONF

 Atlas Supplemental Report

▶ Case 3:14-cr-00175-WHA Document 956-32 Filed 12/31/18

 PGE-CPUC\_00013215\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00013272\_PGE-CALPA-DATA\_VOL012\_CONF

▶ PGE-CF\_00004982

▶ PGE-CPUC\_00013215, PGE-CPUC\_00013273, PGE-CPUC\_00013215

▶ PG&E 17-0085193, 17-0089255, 17-0085211

# CASCADE WILDFIRE – BANGOR 1101

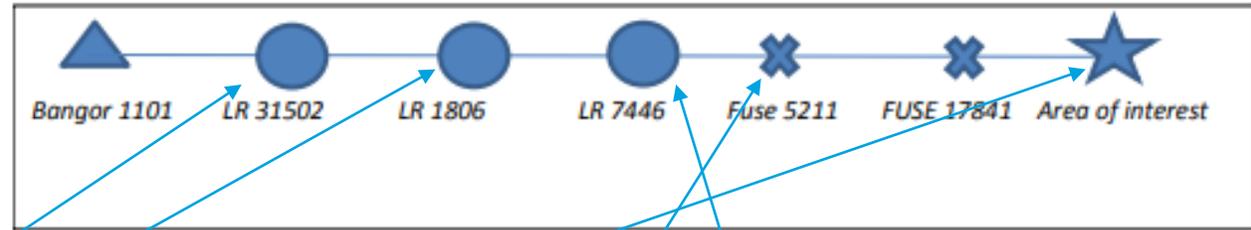
(PART OF WIND COMPLEX)

# CASCADE WILDFIRE – BANGOR 1101

## Incident Observations

- ▶ Possible Sagging Conductor Installation
- ▶ Possible Slapping Conductor Condition
- ▶ Possible Failure of Fuse 5211 & Fuse 17841
- ▶ No Record of Downed Conductors or VM Impacts

## Incident Overview:



10/8/17 10:54 PM  
LR 1806 & LR 31502 Report MTT  
Power Off @ 30 Meters

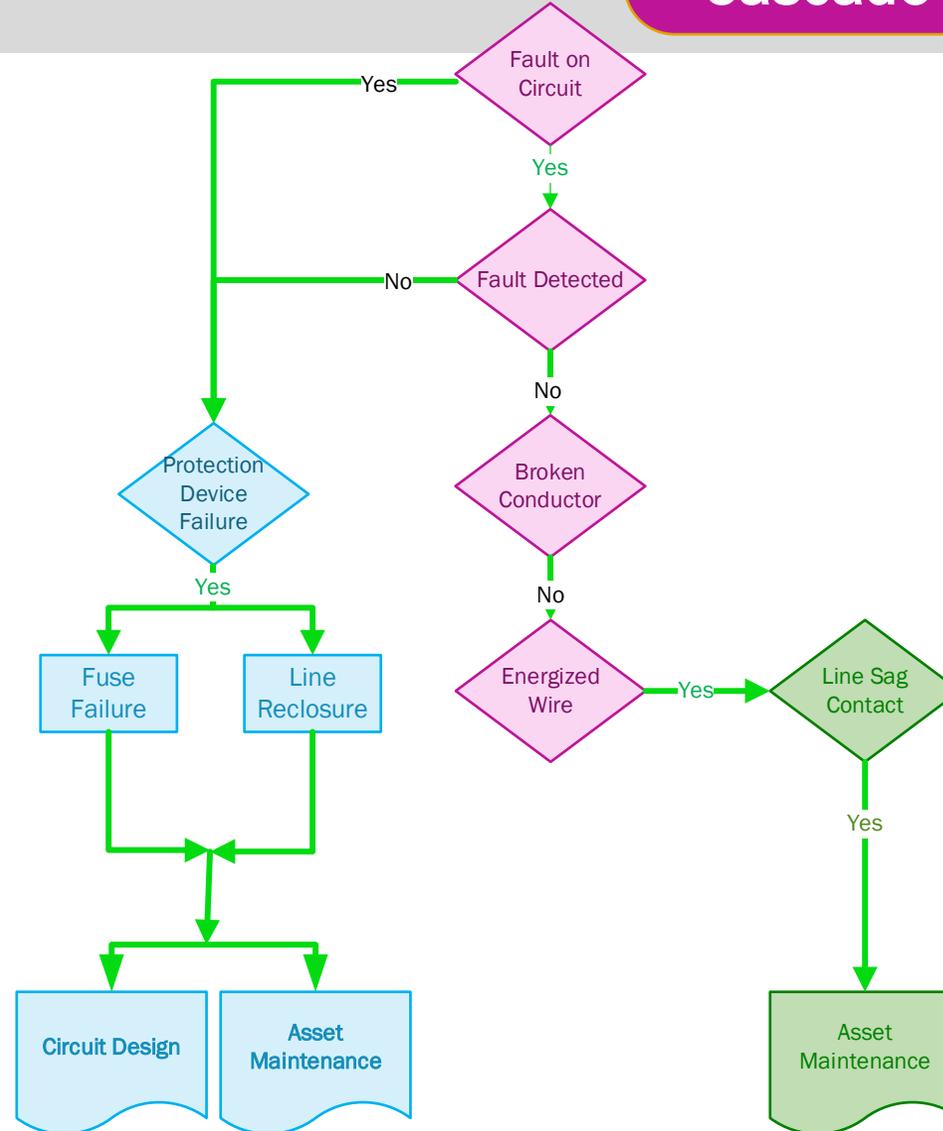
10/8/17  
Cascade Fire Starts  
11:00PM Per CPUC  
11:03PM Per Cal Fire

10/12/17 12:58 PM  
PG&E Finds  
Fuses 5211 Blown

10/8/2017 11:22 PM  
Bangor Sub De-energized

10/13/17 1:14 PM PG&E  
Finds LR 7446 Open

# Cascade Wildfire

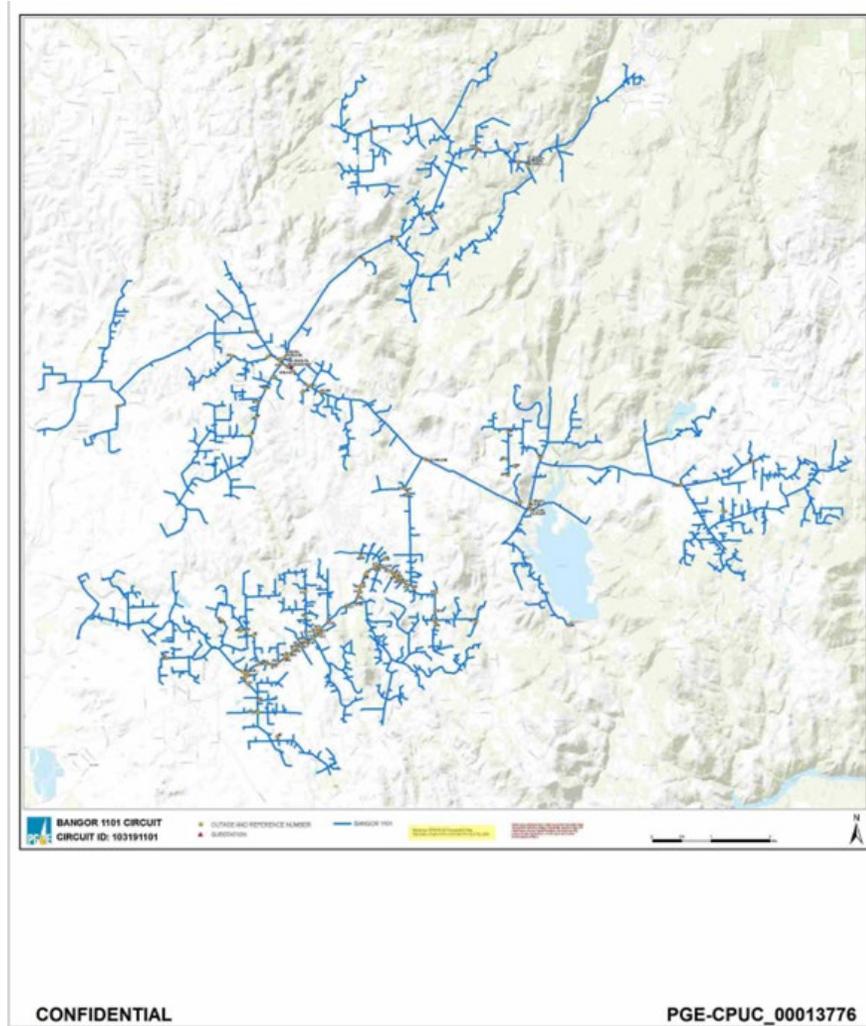


# CASCADE WILDFIRE – BANGOR 1101

## VEGETATION MANAGEMENT

Condition	
Tree-Caused Break	No
Tree In or Along ROW	N/A
Compromised Specimen	N/A
Known Defect or Condition	N/A
Reasonably Detected	N/A
Wind Event	Unknown
Receptive Fuel Bed	Yes

# CASCADE WILDFIRE – BANGOR 1101



# CASCADE WILDFIRE – BANGOR 1101

## PG&E EVIDENCE RECORD IDFS

PG&E CONFIDENTIAL UNDER NON-DISCLOSURE AGREEMENT

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### CASCADE INCIDENT DESCRIPTION & FACTUAL SUMMARY

For completeness, this incident description and factual summary should be read in conjunction with the Factual Report Guidance and the contemporaneously submitted response to Question 62.

#### Background:

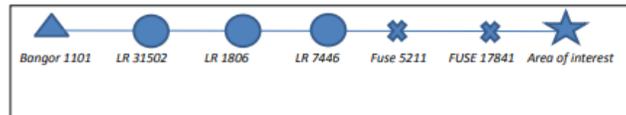
On October 20, 2017, PG&E filed an Electric Safety Incident Report (Incident No. 171020-8591) concerning an incident that occurred near 13916 Cascade Way Browns Valley, Yuba County (the "incident location" as defined by the CPUC's December 7, 2017, letter).

PG&E understands that CAL FIRE took possession of an intact span of primary distribution conductors on the Bangor 1101 (12 kV) Circuit and customer-owned electric equipment, including the customer service panel, at the incident location. The primary conductors were in place and appeared to be in working order at the time that CAL FIRE requested to take possession. The secondary service line appeared to be damaged at mid-span, but there was no apparent damage to other PG&E facilities.

According to CAL FIRE's website, the Cascade fire is part of the Wind Complex Incident, which consists of four different fires: Cascade, La Porte, Lobo, and McCourtney.

According to CAL FIRE's website, the Cascade fire started at 11:03 PM on October 8, 2017.

#### Incident Overview:



The incident location is served by the Bangor 1101 (12kV) Circuit and is downstream of both Fuse 5211 and Fuse 17841. Per PG&E records, on October 8, 2017, at 10:00 PM, a smart meter at service point 1062306405, located downstream of Fuse 5211, recorded a Zero Volt reading. Per PG&E records, at 10:57 PM, a smart meter at service point 1062299105, located downstream of Fuse 17841, reported a Last Gasp event. Also at 10:57 PM, per PG&E records, 9 of the 13 smart meters downstream of Fuse 17841 recorded a NIC Power Down or Last Gasp event, and 21 of 25 smart meters downstream of Fuse 5211 recorded a NIC Power Down event. Per PG&E records, the Colgate-Palermo 60 kV transmission line feeding the Bangor Substation experienced four momentary outages at 11:08 PM, 11:16 PM, 11:18 PM and 11:20 PM. Per PG&E records, at 11:22 PM, due to a fire impacting the transmission line, the Bangor Substation was automatically de-energized. The de-energization of the substation de-energized the incident location.

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### SUPPLEMENT TO CASCADE INCIDENT DESCRIPTION & FACTUAL SUMMARY

#### Supplemental Background Information:

On September 24, 2018, CAL FIRE released its Investigation Report for the Cascade Incident, which is publicly available on CAL FIRE's website at the following link: [http://calfire.ca.gov/fire\\_protection/downloads/FireReports/CascadeFire\\_InvestigationReport\\_Redacted.pdf](http://calfire.ca.gov/fire_protection/downloads/FireReports/CascadeFire_InvestigationReport_Redacted.pdf).

According to that report, CAL FIRE investigators concluded that the Cascade Fire was "due to line sag during the October 8, 2017 wind event".

#### Supplemental Evidence Collection Information:

PG&E indicated in the Cascade Factual Summary that CAL FIRE collected an intact span of primary distribution conductors on a tap line serving 13916 Cascade Way as well as customer-owned electric equipment, including the customer service panel, and PG&E collected parallel groove connectors, unblown liquid transformer fuses, a dead-end transformer pole with a cross arm and a transformer.

In addition to those items, on April 20, 2018, PG&E collected customer owned electrical equipment (four sections of a customer owned pole, a dryer, a bag containing customer wiring and parts for the dryer) at 14034 Cascade Way, Browns Valley. PG&E also collected smart meter #106 399 627/1007531164 from 14034 Cascade Way.

#### Supplemental Timeline Information:

The Cascade Factual Summary contained a timeline of PG&E's actions at or impacting the incident locations in the period immediately preceding CAL FIRE's designated start time until service to the incident locations was restored. The following additional information is relevant to the Cascade Fire timeline.

- **October 8, 2017, 10:00 PM:** PG&E records indicate that a smart meter at service point 1062306405, located downstream of Fuse 5211, but not downstream of Fuse 17841, recorded a Swell, Sag and Zero Volt Reading.
- **October 8, 2017, 10:57 PM:** PG&E records indicate that at 10:57 PM the following events occurred:
  - PG&E records indicate that 9 of the 13 smart meters downstream of Fuse 17841 recorded a NIC Power Down or Last Gasp event.
  - PG&E records indicate that 21 of 25 smart meters downstream of Fuse 5211, but not downstream of Fuse 17841, recorded a NIC Power Down event.
  - PG&E records indicate that Line Recloser 1806 and Line Recloser 31502, both upstream from the Incident Location, reported above minimum-to-trip ("MTT") alerts.

### Supplemental Evidence Collection Information:

PG&E indicated in the Cascade Factual Summary that CAL FIRE collected an intact span of primary distribution conductors on a tap line serving 13916 Cascade Way as well as customer-owned electric equipment, including the customer service panel, and PG&E collected parallel groove connectors, unblown liquid transformer fuses, a dead-end transformer pole with a cross arm and a transformer.

In addition to those items, on April 20, 2018, PG&E collected customer owned electrical equipment (four sections of a customer owned pole, a dryer, a bag containing customer wiring and parts for the dryer) at 14034 Cascade Way, Browns Valley. PG&E also collected smart meter #106 399 627/1007531164 from 14034 Cascade Way.

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#### SCADA Data

SCADA (Supervisory Control And Data Acquisition) data includes alarm and event data remotely collected in real time from data-collection capable devices on PG&E's electric distribution and transmission circuits. Reclosers and circuit breakers are examples of devices that may report SCADA data. Fuses do not have SCADA connectivity and, therefore, do not report SCADA data. SCADA alarms and events memorialize electrical events on a circuit. However, they are associated with the device that collected them and do not include information on the specific cause or precise origin location of the electrical event that they memorialize.

As noted above, PG&E has not included all SCADA events in the Incident Overview or the Timeline. For example, Minimum To Trip ("MTT") alarms have not been included. MTT alarms are generated when a SCADA-enabled device identifies a circuit load that exceeds a maximum threshold load but for less than a certain amount of time. MTT alarms can be frequent and do not include information on the specific cause or origin location of the event that triggered them. A record of all SCADA events and alarms that occurred during the requested time periods has been previously produced in response to Question 25, submitted to the CPUC on January 31, 2018, in the Bates range PGE-CPUC\_00007875-7911.

"MTT" Alerts  
LR 1806 & 31502

# CASCADE WILDFIRE – BANGOR 1101

## PG&E EVIDENCE RECORD ILIS

LR 31502  
MTT & Reverse PWR

10/8/2017 5:43	(P01) 1-Oroville LR 31502 battery test is TEST
10/8/2017 5:45	(P01) 1-Oroville LR 31502 battery test is NORMAL
10/8/2017 8:56	(P01) 1-Oroville LR 31502 ac pwr fail is ALARM
10/8/2017 8:56	(P01) 1-Oroville LR 31502 ac pwr fail is NORMAL
10/8/2017 20:56	(P01) 1-Oroville LR 31502 ac pwr fail is ALARM
10/8/2017 20:56	(P01) 1-Oroville LR 31502 ac pwr fail is NORMAL
10/8/2017 21:54	(P04) 1-Oroville LR 31502 lr above mtt is ALARM
10/8/2017 21:54	(P04) 1-Oroville LR 31502 lr above mtt is NORMAL
10/8/2017 22:58	(P04) 1-Oroville LR 31502 lr above mtt is ALARM
10/8/2017 22:58	(P04) 1-Oroville LR 31502 lr above mtt is NORMAL
10/8/2017 23:09	(P02) 1-Oroville bangor cb 1101 rcl blocking is NORMAL
10/8/2017 23:09	(P02) 1-Oroville bangor cb 1101 rcl blocking is ALARM
10/8/2017 23:09	(P01) 1-Oroville LR 31502 a ph pot is HOT
10/8/2017 23:09	(P01) 1-Oroville LR 31502 c ph pot is DEAD
10/8/2017 23:09	(P04) 1-Oroville LR 31502 system or control alarm is NORMAL
10/8/2017 23:09	(P04) 1-Oroville LR 31502 system or control alarm is ALARM
10/8/2017 23:09	(P01) 1-Oroville LR 31502 pwr flow is REVERSE
10/8/2017 23:09	(P01) 1-Oroville LR 31502 ac pwr fail is ALARM
10/8/2017 23:09	(P01) 1-Oroville LR 31502 b ph pot is HOT
10/8/2017 23:09	(P01) 1-Oroville LR 31502 c ph pot is HOT
10/8/2017 23:09	(P01) 1-Oroville LR 31502 pwr flow is NORMAL

# CASCADE WILDFIRE – BANGOR 1101

## CPUC-SED EVIDENCE RECORD

### Violation disputed by PG&E

#### IV. CAL FIRE Investigation

CAL FIRE's investigation report, 17CANEU026269 determined that the cause of the Cascade Fire was due to line sag during the October 8, 2017 wind event. The report concludes, "Based on my knowledge, training, and experience, 911 audio, witness statements, and evidence from the Cascade Fire, I believe the cause of the Cascade Fire was due to line sag during the October 8, 2017 wind event. The wind in conjunction with the line sag on the two-conductors located on the property at 13916 Cascade Way made contact creating an electrical arc. The electrical arc deposited hot burning or molten material on the ground in a receptive fuel bed causing the fire."

In addition, CAL FIRE references a report done by Jim Nolt, Electrical Mechanical and Corrosion Engineer of JH Nolt and Associates. Mr. Nolt's report concludes that the most probable source of ignition was the electric arcing that was occurring on the conductors between the two utility poles indicated. Both the concurrent wind event and the excessive slack in the high-voltage distribution conductors contributed to the likelihood of this cause. The evidence of recent arcing on the two conductors confirms unauthorized contact between conductors.

#### V. Conclusion

Based on the evidence that SED reviewed, SED found the following:

- ... PG&E violated GO 95, Rule 38 by not maintaining the minimum distance of 6 inches between two 12-kV conductors on the same crossarm, which eventually contacted each other.

The incident span was protected by fuse 17841, immediately upstream. As one progresses upstream from fuse 17841, four other protection devices are in place before the final source Bangor-1101 Circuit Breaker (CB):

1. Fuse 5211
2. Line Recloser (LR) 7446
3. LR 1806
4. LR 31502
5. Bangor-1101 CB

Fuse 17841, located at the branch from the main circuit line near the intersection of Cascade Way and Neptune Road, consists of 10 Amp fuses for each of the conductors.



<sup>8</sup> Bates number 2018.05.18 Amendment CPUC Cascade Factual Report.

# CASCADE WILDFIRE – BANGOR 1101

## CPUC-SED EVIDENCE RECORD

### End of Timeline

Prior to the fire, PG&E set LR-7446 to trip open for a ground fault above 100 Amps and for a phase fault above 200 Amps.<sup>28</sup> A PG&E troubleman found the device open so a fault large enough automatically opened the device since no other records show a manual operation of the device. The fact that the device was open means that two conductors contacting may have caused a phase to phase fault large enough to trip open the device. Also, reverse power flow was detected at LR-31502 which further supports that there was contact between energized conductors. Since no vegetation or facility failures occurred on the span, it is likely that the phase to phase fault caused the device to open and deposited molten metal found on the ground.

Based on the SCADA records and Smart Meter data reviewed, SED did not identify a violation regarding PG&E's distribution equipment operations and maintenance.



Figure 11. West conductor with burn mark.

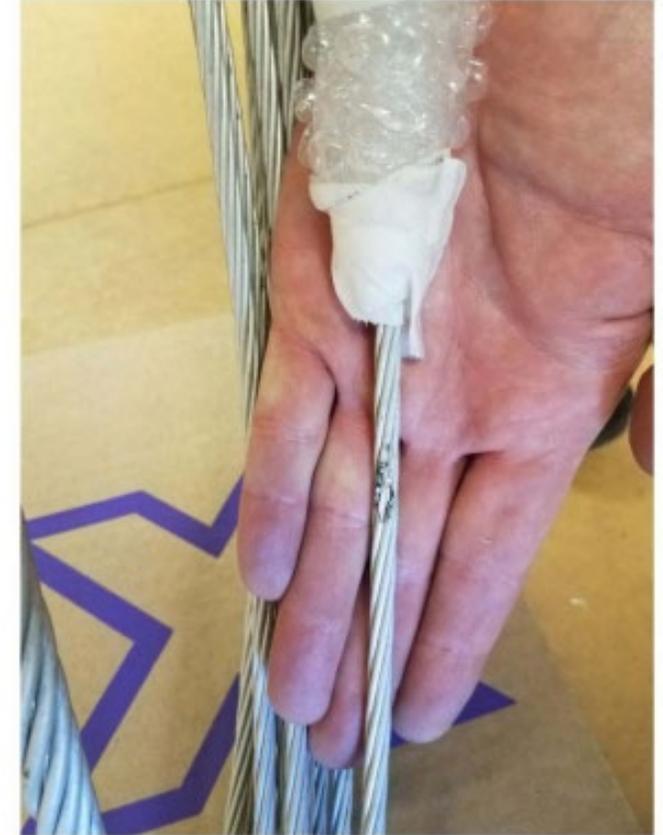


Figure 10. East conductor with burn mark.

# CASCADE WILDFIRE – BANGOR 1101

## CAL FIRE EVIDENCE RECORD

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### CAL FIRE NEWS RELEASE

California Department of Forestry and Fire Protection



**CONTACT:** Michael Mohler  
Deputy Director  
Phone: (619) 933-2357  
calfire.dutypl@fire.ca.gov

**RELEASE DATE:** October 9, 2018

Wind-driven slapping conductors  
Possible sag and tension

#### CAL FIRE Investigators Determine the Cause of the Cascade Fire

**Sacramento** – After a thorough investigation, CAL FIRE has determined the Cascade Fire which occurred during the October 2017 Fire Siege was started by sagging power lines coming into contact during heavy winds.

No violations of the Public Resources Code were found by CAL FIRE.

The Cascade Fire in Yuba County, started on the evening of October 8 and burned a total of 9,989 acres, destroying 264 structures and resulted in four civilian fatalities and one firefighter injury.

A high wind event in conjunction with the power line sag on two conductors caused the lines to come into contact, which created an electrical arc. The electrical arc deposited hot burning or molten material onto the ground in a receptive fuel bed causing the fire. The common term for this situation is called "line slap" and the power line in question was owned by the Pacific Gas and Electric Company.

The investigative report has been forwarded to the Yuba County District Attorney.

In total, the October 2017 Fire Siege involved more than 170 fires and burned at least 245,000 acres in Northern California. Approximately 11,000 firefighters from 17 states and Australia helped battle the blazes.

CAL FIRE investigators were dispatched to the fires last year and immediately began working to determine their origin and cause. CAL FIRE investigators continue to investigate the Tubbs Fire and will release the report once it is completed.

Californians are encouraged to remain vigilant and prepared for wildfire. For more information on how to be prepared, visit [www.readyforwildfire.org](http://www.readyforwildfire.org) or [www.fire.ca.gov](http://www.fire.ca.gov).

# CASCADE WILDFIRE – BANGOR 1101

## REFERENCE DOCUMENTS

- ▶ PG&E Cascade Incident Description & Factual Summary, PG&E Cascade Supplemental Report
- ▶ PGE-CPUC\_00013273, PGE-CPUC\_00013215, PGE-CPUC\_00013542
- ▶ CPUC-SED Incident Investigation Report – E20171020-06
- ▶ CAL FIRE Report – 17-CA-NEU-026269, October 8, 2017
- ▶ Case 3:14-cr-00175-WHA Document 956-14, 956-34, Filed 12/31/18
- ▶ PG&E 17-0085270, 17-0085751, 17-0087244

-  2018.05.04 FINAL CPUC Cascade Factual Report\_CONF
-  Attachment 13\_DRU-195\_ILIS\_Cascade\_Bangor 1101\_CONF (1)
-  Cascade Incident Description
-  Cascade Supplemental Report
-  PGE-CPUC\_00013542\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00013552\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00013569\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00013670\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00013712\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00013769\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00013776\_PGE-CALPA-DATA\_VOL012

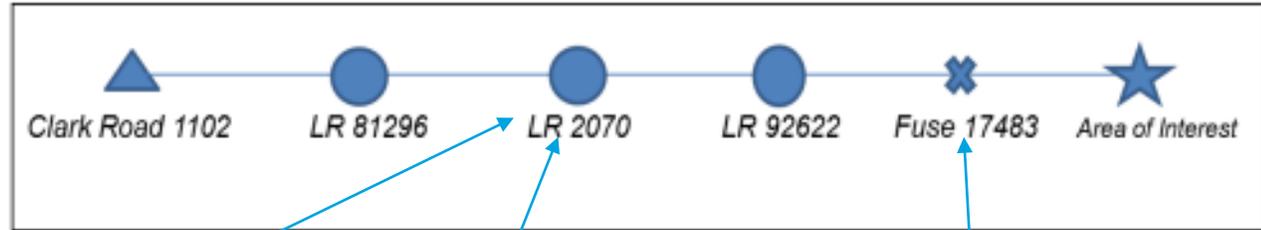
-  Cascade3\_SCADA\_PGE-CPUC\_00007881
-  Cascade5 Smart Meter Events DS of 5211 Nov 2 2018\_CONF
-  Cascade5\_AMI Smart Meter Data\_CONF
-  PGE-CPUC\_00005393\_CONF
-  PGE-CPUC\_00005394\_CONF

# CHEROKEE WILDFIRE – CLARK ROAD 1102

# CHEROKEE WILDFIRE – CLARK ROAD 1102

## Incident Observations

- ▶ Tree Contact From 15 Feet
- ▶ Possible Energized Downed Conductor From 9:12 PM – 10:55PM
- ▶ Possible Failure of Fuse 17483 & LR 92622
- ▶ Possible High-Impedance Fault Scenario
- ▶ Possible Electrical Back-Feed Conditions



10/8/17 8:31 PM  
LR 2070 Detects Fault  
A/B Phases  
Trips & Recloses & Reset

10/8/17 9:45PM  
Cherokee Fire  
Starts Per Cal Fire

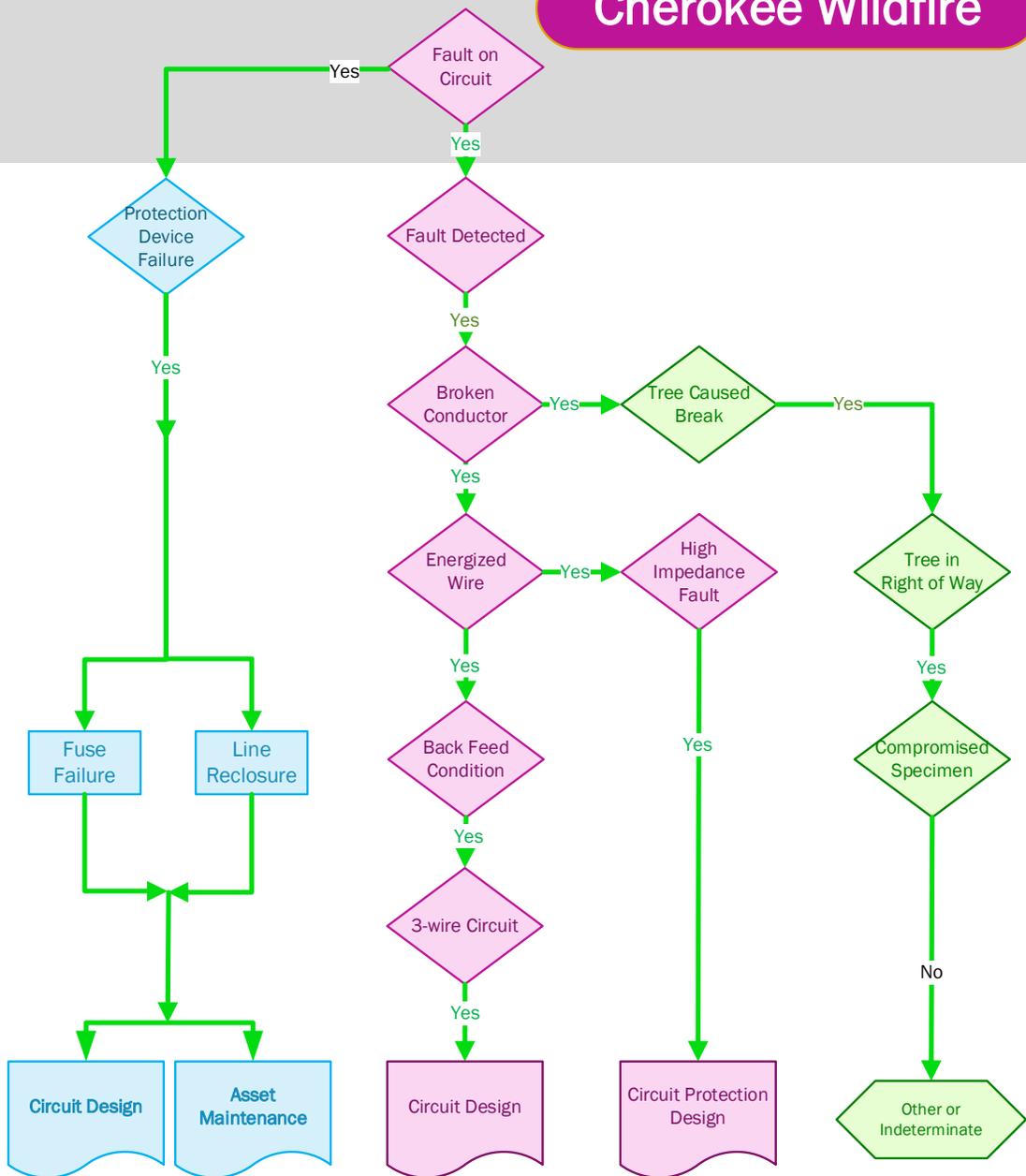
10/8/17 10:55PM  
PG&E Manually Opens Fuse

Power Off @ 9:12PM  
Meter 0702290905

10/8/17 9:53 PM  
LR 2070 Detects Fault A & B Phases  
Trips & Recloses & Reset

10:30PM PG&E Arrives  
Finds Downed Conductor

# Cherokee Wildfire



# CHEROKEE WILDFIRE – CLARK ROAD 1102

## VEGETATION MANAGEMENT

- The CPUC's SED Incident investigation did not identify any General Order violations.
- The Cherokee fire was determined to have been caused by multiple tree branch failures on a live oak.
- The subject tree was *Quercus lobata* (Valley Oak).

# CHEROKEE WILDFIRE – CLARK ROAD 1102

## VEGETATION MANAGEMENT

Condition	
Tree Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	No
Known Defect or Condition	No
Reasonably Detected	N/A
Wind Event	Normal
Receptive Fuel Bed	Yes

# CHEROKEE WILDFIRE – CLARK ROAD 1102

## VEGETATION MANAGEMENT



Figure 7. Burn mark from 12 kV conductor on the Valley Oak tree



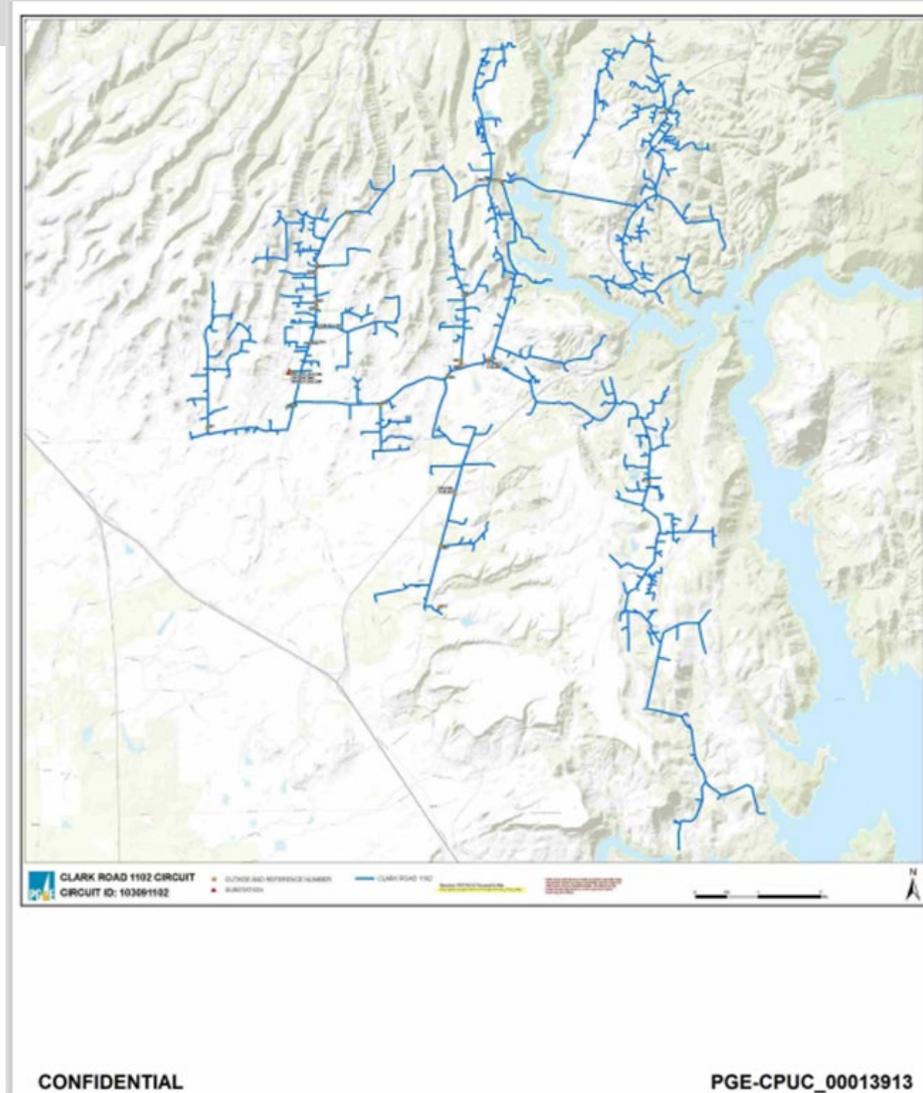
Figure 8. Another 12 kV conductor burn mark on the Valley Oak tree

# CHEROKEE WILDFIRE – CLARK ROAD 1102

VEGETATION MANAGEMENT



# CHEROKEE WILDFIRE – CLARK ROAD 1102



# CHEROKEE WILDFIRE – CLARK ROAD 1102

## PG&E EVIDENCE RECORD IDFS

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### CHEROKEE INCIDENT DESCRIPTION & FACTUAL SUMMARY

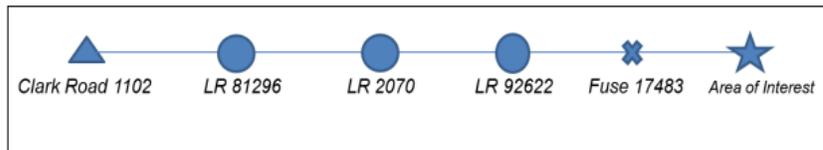
For completeness, this incident description and factual summary should be read in conjunction with the Factual Report Guidance and the contemporaneously submitted response to Question 62.

#### **Background:**

On October 10, 2017, PG&E filed an Electric Safety Incident Report (Incident No. 171010-8557) concerning an incident that occurred near 3401 Cherokee Road, Oroville, Butte County (the “incident location” as defined by the CPUC’s December 7, 2017, letter). PG&E observed that branches from a green, healthy California White Oak/Valley Oak tree had broken. Per the troubleman who responded on the evening of October 8 and photos taken by him of the incident location, one branch was found on the ground lying on top of a downed conductor. Another broken branch was suspended in the air, hanging on another branch and touching a conductor that remained intact. The incident location is on the Clark Road 1102 (12 kV) Circuit. The tree was rooted approximately 15 feet from the distribution conductors.

According to CAL FIRE’s website, the Cherokee fire started at 9:45 PM on October 8, 2017.

#### **Incident Overview:**



Per PG&E records, on October 8, 2017 at 8:31 PM, Line Recloser 2070 operated and reclosed. Per PG&E records, this operation caused a momentary outage at the incident location. Line Recloser 2070 is the second line recloser upstream of the incident location. Per PG&E records, the smart meter at service point 0702290905, the only smart meter downstream of the incident location, recorded a series of power off/on events between 9:12 and 9:17 PM. Per PG&E records, at 9:53 PM, Line Recloser 2070 operated and reclosed, again causing a momentary outage at the incident location.

On the evening of October 8, 2017, according to PG&E records, a troubleman was the first PG&E employee at the incident location after the fire started. Per the troubleman, when he arrived around 10:30 PM, CAL FIRE was already at the incident location, and the troubleman saw evidence of a fire. Per the troubleman, he found one broken conductor down. The troubleman saw that the load-side of the broken conductor was on the ground under a broken tree limb; the source-side of the conductor was tangled in and hanging over a tree, and was also touching the ground. The troubleman observed another branch in the air (resting on another branch) that was touching an intact conductor. Per the troubleman, CAL FIRE asked the troubleman to de-energize the area. Per PG&E records, the troubleman reported that at 10:55

CONFIDENTIAL

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PM he opened Fuse 17483, the closest protective device to the incident location, de-energizing the incident location, and then opened jumpers 8 poles south of Fuse 17483. Per PG&E records, the troubleman also reported fire in the area. Per the troubleman, after de-energizing the area, the troubleman returned to the incident location and cut the downed conductor both on the load and source sides.

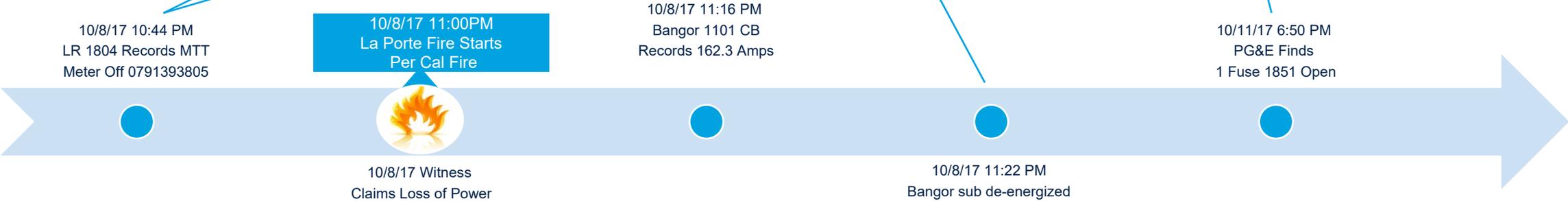
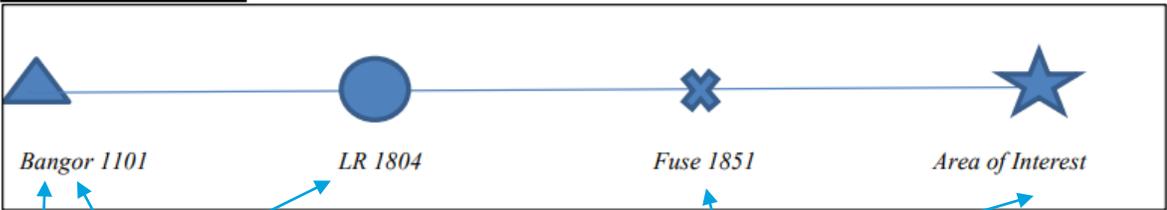
# LAPORTE WILDFIRE – BANGOR 1101

(PART OF WIND COMPLEX)

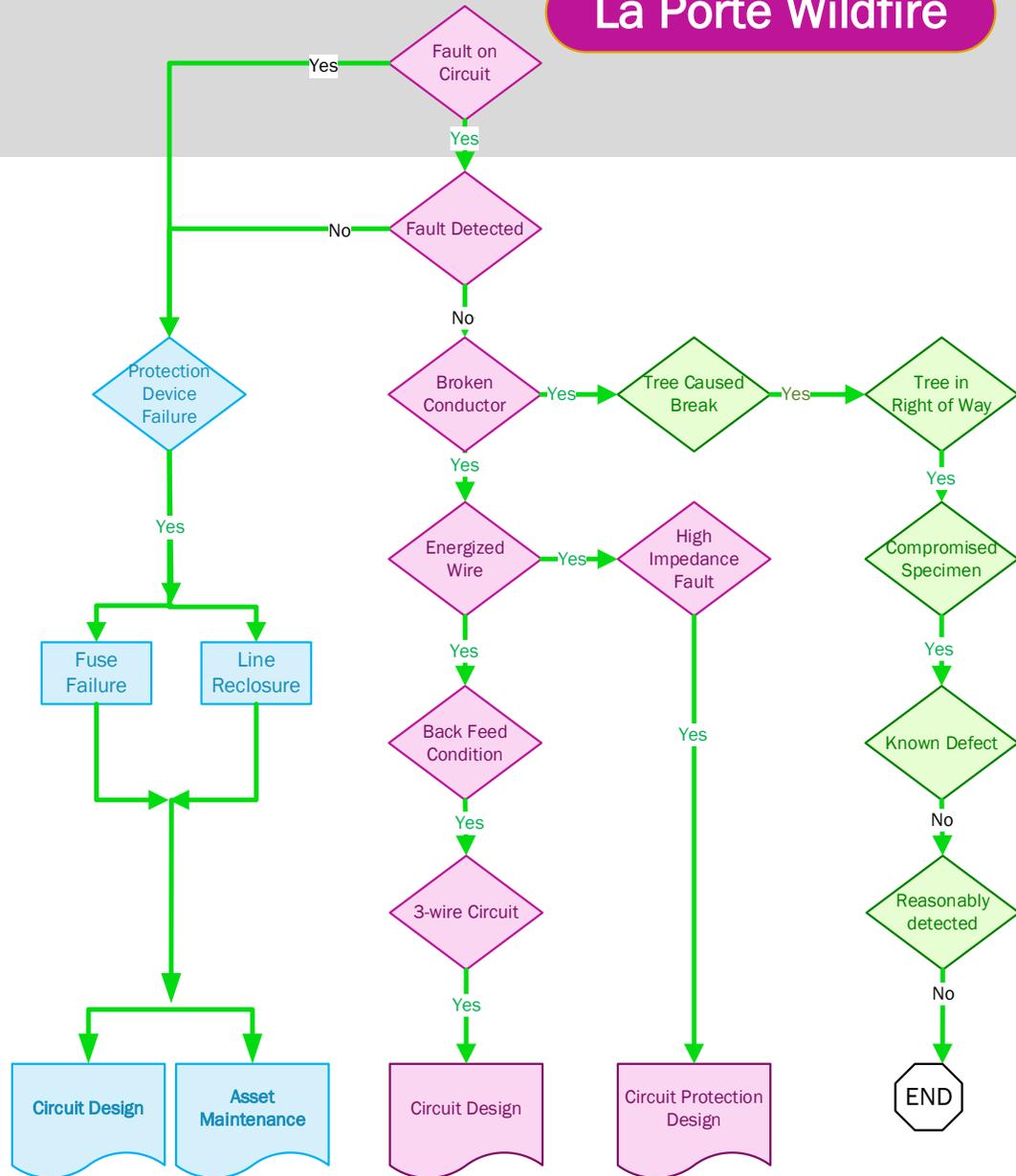
# LAPORTE WILDFIRE – BANGOR 1101

### Incident Observations

- ▶ Tree Contact From 15 Feet
- ▶ Possible Energized Downed Conductor From 10:44 PM – 11:22 PM
- ▶ Possible Failure of Fuse 1851
- ▶ Possible High-Impedance Fault Scenario
- ▶ Possible Electrical Back-Feed Conditions



# La Porte Wildfire



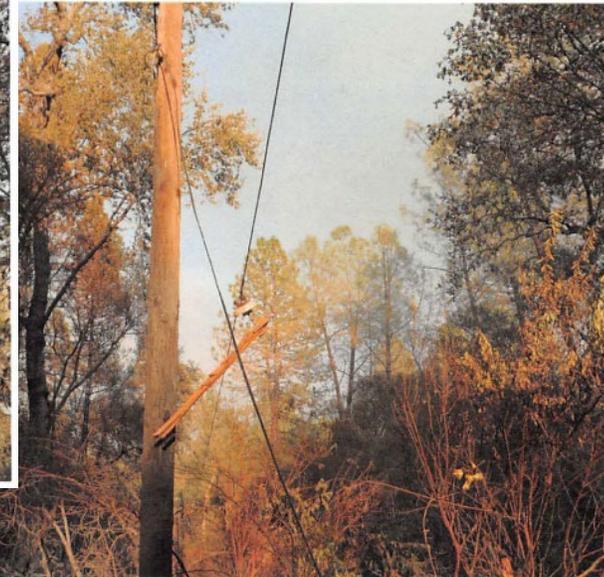
# LAPORTE WILDFIRE – BANGOR 1101

## VEGETATION MANAGEMENT

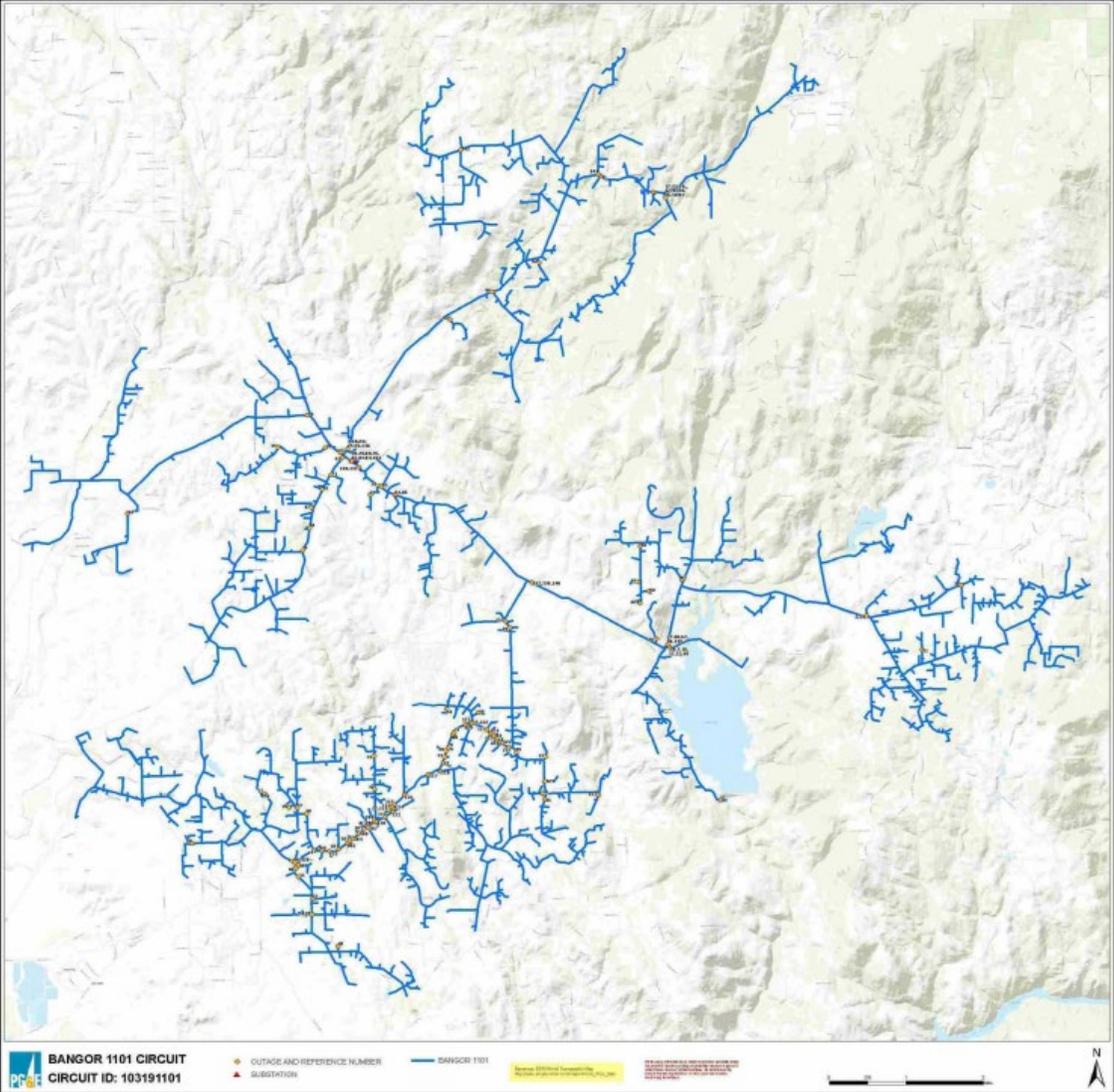
Condition	
Tree-Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	Yes
Known Defect or Condition	No
Reasonably Detected	No
Wind Event	Normal
Receptive Fuel Bed	Yes

# LAPORTE WILDFIRE – BANGOR 1101

VEGETATION MANAGEMENT



# LAPORTE WILDFIRE – BANGOR 1101



# LAPORTE WILDFIRE – BANGOR 1101

## PG&E EVIDENCE RECORD IDFS

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### LA PORTE INCIDENT DESCRIPTION & FACTUAL SUMMARY

For completeness, this incident description and factual summary should be read in conjunction with the Factual Report Guidance and the contemporaneously submitted response to Question 62.

#### **Background:**

On October 13, 2017, PG&E filed an Electric Safety Incident Report (Incident No. 171013-8569) concerning an incident that occurred at 167 Darby Road, Bangor, Butte County (the "incident location" as defined by the CPUC's December 7, 2017, letter).

PG&E understands that CAL FIRE collected a section of conductor and a tree branch prior to releasing the incident location. After CAL FIRE released the incident location on October 13, 2017, PG&E first accessed the site and was able to identify a number of broken oak tree branches and a downed conductor at the incident location.

According to CAL FIRE's website, the La Porte fire occurred at La Porte Road and Oroville-Bangor Highway, and is part of the Wind Complex, which consists of four different fires: Cascade, La Porte, Lobo, and McCourtney.

Per CAL FIRE, the La Porte fire started at 12:57 AM on October 9, 2017.

#### **Incident Overview:**



The incident location is served by the Bangor 1101 (12kV) Circuit and is downstream of Fuse 1851. On October 8, 2017 at 10:44 PM, per PG&E records, a smart meter at service point 0791393805, downstream of Fuse 1851, recorded a NIC Power Down event. Per PG&E records, between 10:44 PM and 11:20 PM, 25 smart meters downstream of Fuse 1851, including the two smart meters downstream of the incident location, recorded a series of power off/on events and/or Zero Volt readings. Per PG&E records, the Colgate-Palermo 60 kV transmission line feeding the Bangor Substation, which serves the incident location, experienced four momentary outages at 11:08 PM, 11:16 PM, 11:18 PM and 11:20 PM. Per PG&E records, at 11:22 PM, due to a fire impacting the transmission line, the Bangor Substation was automatically de-energized. The de-energization of the substation de-energized the incident location.

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Substation was re-energized, but no customers were restored as the Bangor 1101 Circuit Breaker remained open.

On October 10, 2017, at 12:20 PM, per PG&E records, Line Recloser 1804 was manually opened on a dead line. Per PG&E records, at 8:20 PM, the Bangor 1101 Circuit Breaker was remotely closed via SCADA, but the incident location remained de-energized because Line Recloser 1804 was open.

On October 11, 2017, at 6:50 PM, per PG&E records, Fuse 1851 was reported open. At 8:24 PM, per PG&E records, Line Recloser 1804 was remotely closed via SCADA, restoring 349 customers but not the incident location as Fuse 1851 remained open.

Per an electric crew foreman, he attempted to access the incident location on October 11, 2017, but CAL FIRE denied him access. The electric crew foreman observed fires burning and several burnt poles in the area.

On October 12, 2017 at 2:50 PM, per PG&E records, the same electric crew foreman manually opened the jumpers for the span serving the incident location. At 6:56 PM, per PG&E records, the electric crew foreman replaced one of two fuses and then closed Fuse 1851, restoring 26 customers, but not the incident location as the jumpers for that span remained open.

# LAPORTE WILDFIRE – BANGOR 1101

## PG&E EVIDENCE RECORD ILIS

3/14/2018 dodappwlsprd01.comp.pge.com:8003/ilis\_rpt/dailyeventlogdetail.jsp?odbeventlogid=17-0085381&numberofmonths=24&showchangehistorylog...

Possible High-Impedance Fault Condition

Oroville

17-0085381

### Outages

<b>Circuit</b>	103191101, BANGOR-1101	<b>District</b>	Oroville
<b>Type</b>	Unplanned	<b>Customer Minutes</b>	<a href="#">Sus</a> 5566429 0 <a href="#">Mom</a> <a href="#">Adj</a> <a href="#">Sus</a> 5566429 <a href="#">CAIDI</a> 4489
<b>Customers</b>	<a href="#">CESO</a> 1240 <a href="#">CEMO</a> 0 <a href="#">ADJ</a> <a href="#">CESO</a> 1240 <a href="#">Initial</a> 1240	<b>Weather</b>	Clear;32-90 F
<b>Active Interval</b>	NO Sustained	<b>Fault Type</b>	Open Circuit
<b>EquipID</b>	BANGOR	<b>Action Required</b>	No
<b>Equipment Type</b>	Substation	<b>Construction Type</b>	OH
<b>Equipment Condition</b>	Conductor, Overhead, Broken, wire on ground	<b>OIS Outage#</b>	1894305
<b>Crew Notified Time</b>		<b>Targets</b>	
<b>Equipment Address</b>	SUBSTATION	<b>Supervisor Notified</b>	
<b>Fault Location</b>	1 POLE N/OF 13527, 3 POLE N/OF 13527, @ 46631, 1 N/OF 1958, 1 N/OF 97449, AS WELL AS NUMEROUSE OTHER LOCATIONS FROM FIRE DAMAGE		
<b>Previous Switching</b>	QJ 2 SS <a href="#">MTR#1007766456</a> OPEN MO (DMS# 1897921) FUS 1875 OPEN MO (DMS# 1898952) FUS 7351 OPEN MO (DMS# 1899458) FUS 40133 OPEN MO (DMS# 1899481) FUS 173629 OPEN MO (DMS# 1899487) FUS 15811 OPEN MO (DMS# 1899520) FUS 15823 OPEN MO (DMS# 1899530) FUS		

# LAPORTE WILDFIRE – BANGOR 1101

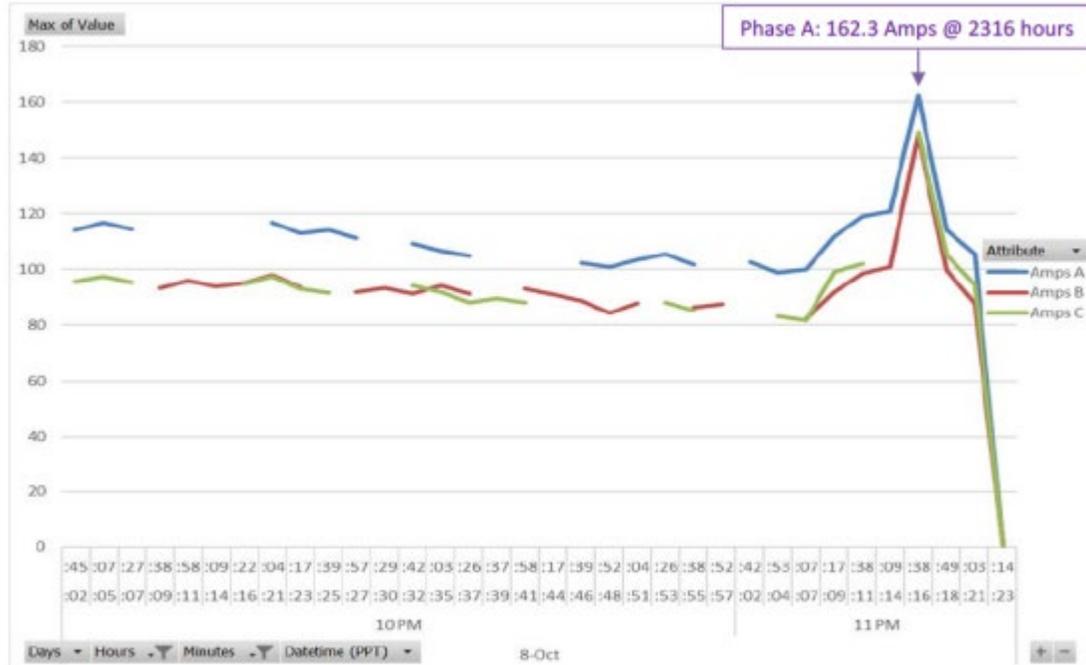
## PG&E EVIDENCE RECORD ILIS

LR 1804 Alarms  
MTT @  
8:44 PM & 11:16 PM

10/8/2017 5:59	(P01) 1-Oroville LR 1804 battery test is TEST
10/8/2017 5:59	(P01) 1-Oroville LR 1804 battery test is NORMAL
10/8/2017 9:04	(P01) 1-Oroville LR 1804 ac pwr fail is ALARM
10/8/2017 9:04	(P01) 1-Oroville LR 1804 ac pwr fail is NORMAL
10/8/2017 21:07	(P01) 1-Oroville LR 1804 ac pwr fail is ALARM
10/8/2017 21:07	(P01) 1-Oroville LR 1804 ac pwr fail is NORMAL
10/8/2017 22:44	(P04) 1-Oroville LR 1804 lr above mtt is ALARM
10/8/2017 22:44	(P04) 1-Oroville LR 1804 lr above mtt is NORMAL
10/8/2017 22:44	(P01) 1-Oroville LR 1804 c ph pot is DEAD
10/8/2017 22:44	(P01) 1-Oroville LR 1804 c ph pot is HOT
10/8/2017 23:09	(P02) 1-Oroville bangor cb 1101 rcl blocking is NORMAL
10/8/2017 23:09	(P02) 1-Oroville bangor cb 1101 rcl blocking is ALARM
10/8/2017 23:09	(P04) 1-Oroville LR 1804 system or control alarm is ALARM
10/8/2017 23:09	(P04) 1-Oroville LR 1804 system or control alarm is NORMAL
10/8/2017 23:09	(P01) 1-Oroville LR 1804 a ph pot is HOT
10/8/2017 23:09	(P01) 1-Oroville LR 1804 b ph pot is DEAD
10/8/2017 23:09	(P01) 1-Oroville LR 1804 c ph pot is DEAD
10/8/2017 23:09	(P01) 1-Oroville LR 1804 a ph pot is DEAD
10/8/2017 23:09	(P01) 1-Oroville LR 1804 ac pwr fail is ALARM
10/8/2017 23:09	(P01) 1-Oroville LR 1804 b ph pot is HOT
10/8/2017 23:09	(P01) 1-Oroville LR 1804 c ph pot is HOT
10/8/2017 23:09	(P01) 1-Oroville LR 1804 ac pwr fail is NORMAL
10/8/2017 23:09	(P02) 1-Oroville LR 1804 control stat is ALARM
10/8/2017 23:09	(P02) 1-Oroville LR 1804 control stat is NORMAL
10/8/2017 23:16	(P02) 1-Oroville bangor cb 1101 rcl blocking is NORMAL
10/8/2017 23:16	(P02) 1-Oroville bangor cb 1101 rcl blocking is ALARM
10/8/2017 23:16	(P01) 1-Oroville LR 1804 c ph pot is HOT
10/8/2017 23:16	(P04) 1-Oroville LR 1804 system or control alarm is ALARM
10/8/2017 23:16	(P04) 1-Oroville LR 1804 lr above mtt is ALARM
10/8/2017 23:16	(P04) 1-Oroville LR 1804 system or control alarm is NORMAL
10/8/2017 23:16	(P01) 1-Oroville LR 1804 a ph pot is HOT
10/8/2017 23:16	(P01) 1-Oroville LR 1804 b ph pot is DEAD
10/8/2017 23:16	(P01) 1-Oroville LR 1804 c ph pot is DEAD
10/8/2017 23:16	(P01) 1-Oroville LR 1804 ac pwr fail is ALARM
10/8/2017 23:16	(P01) 1-Oroville LR 1804 b ph pot is HOT
10/8/2017 23:16	(P04) 1-Oroville LR 1804 lr above mtt is NORMAL
10/8/2017 23:16	(P01) 1-Oroville LR 1804 ac pwr fail is NORMAL
10/8/2017 23:16	(P02) 1-Oroville LR 1804 control stat is NORMAL
10/8/2017 23:16	(P02) 1-Oroville LR 1804 control stat is ALARM

# LAPORTE WILDFIRE – BANGOR 1101

## CPUC-SED EVIDENCE RECORD



**Figure 9:** SCADA plot of load data recorded at the Bangor 1101 CB on October 8, 2017 from 2202 to 2323 hours.



**Figure 8:** Map showing locations of Line Reclosers. (Source: PG&E)

# LAPORTE WILDFIRE – BANGOR 1101

## CPUC-SED EVIDENCE RECORD

### IV. CAL FIRE's Investigation

CAL FIRE investigator, Tom Kluge, determined the following:

"The La Porte was caused when the valley oak limb fell upon energized conductor wires. The pole supporting the conductors catastrophically failed, causing an energized fault to ground. The fault to ground occurred within a receptive fuel bed and started the fire."

In addition, Mr. Kluge stated the following regarding the report by contracted arborist, Mark Porter:

"... the subject valley oak did show signs of decay. The arborist report stated there may have been a crack at the base of the limb. The arborist report states it is possible there were no visible outward signs of failure or weakness that would have been discovered with a normal assessment."

SED's investigation correspondingly found that the subject Valley Oak limb failed and brought down the subject conductors, which subsequently arced due to a ground fault and started the fire. SED's SCADA load plot confirms that a spike in load and subsequent power outage occurred near the time of the incident; in addition, SED's review of PG&E's outage reports found that Fuse 1851 (located immediately upstream of the incident location) had blown. Furthermore, SED's investigation correspondingly found that the subject limb showed no obvious outward signs of decay or disease that could have been identified during a routine VM PI.

CAL FIRE did not identify any violations by PG&E.

### V. Conclusion

Based on the investigation described herein, SED did not identify any General Order violations by PG&E.

If SED becomes aware of additional information that could modify SED's findings in this Incident Investigation Report, SED may re-open the investigation and may modify this report or take further actions as appropriate.



Figure 19: Burn Marks on Subject Conductor

# LAPORTE WILDFIRE – BANGOR 1101

## CAL FIRE EVIDENCE RECORD

La Porte                      October 8, 2017                      Case#17CABTU0015954-103

1    **2 - SUMMARY:**

2    On October 8, 2017, between the hours of 10:30 pm to 11:00 pm, a vegetation fire (La  
3    Porte Fire) started near the community of Bangor, CA. The La Porte Fire burned 6,151  
4    acres and burned into the Cascade Fire (Yuba County). The La Porte Fire was  
5    managed as part of the Wind Complex, a series of fires that began burning within 24  
6    hours of each other in the foothills of Northern California.

7  
8    The La Porte Fire was a wind driven fire influenced by both terrain and fuels. My origin  
9    and cause investigation led me to the property located at 167 Darby road. It is a mostly  
10    wooded parcel with a natural drainage bisecting the property from west to east. PG&E  
11    distribution lines follow the drainage through the property and terminate at 171 Darby  
12    Road.

13  
14    Near the origin area, as determined by methods described in the narrative of this  
15    document and the Origin and Cause LE-71 supplemental report, I observed a broken  
16    distribution pole with a broken cross arm and bent cross arm support. I also observed  
17    distribution conductors that had fallen to the ground. The conductors were covered by a  
18    seven-inch diameter limb that had broken off a nearby Valley Oak tree. The oak limb  
19    had been charred by fire but did not burn. I observed a tall standing oak tree with  
20    minimal fire damage at the base of the tree. The tall standing oak had a new break  
21    which appeared from the ground to match the broken limb on the conductor wires.

22  
23    The La Porte Fire was caused when the valley oak limb fell upon energized conductor  
24    wires. The pole supporting the conductors catastrophically failed, as did one of the  
25    conductor wires, causing an energized fault to ground. The fault to ground occurred  
26    within a receptive fuel bed and started the fire.

1    On October 12, 2017, I met Kevin HILL, 171 Darby Road, Bangor CA. HILL told me he was home  
2    with his wife at the time the fire started. HILL said the lights dimmed in the house sometime  
3    between 10:30 pm and 11:00 pm. HILL said he stepped outside and saw the glow in the drainage  
4    behind his neighbor's house (167 Darby Road). HILL said he knew it was a fire and left his property  
5    to notify everyone he could as he evacuated. HILL said Darby Road was overrun by fire blocking his  
6    egress to the north.

7  
8    Based on the facts observed, witness statements, and my training and experience of 20 years in the  
9    fire service, I believe the La Porte fire started between 10:30 p.m. and 11:00 p.m. on October 8,  
10    2017 in the drainage on the property located at 167 Darby Road, Bangor CA. The fire started when  
11    abnormally high gusty winds did cause an otherwise healthy tree to be broken at a high limb and did  
12    fall onto energized distribution powerlines. In falling, the limb did cause the power pole cross  
13    member to break along with other crucial components of the pole resulting in a catastrophic failure of  
14    the pole. The failure of the pole resulted in the failure of a conductor that did discharge electrical  
15    energy providing a heat source that resulted in a fire upon natural vegetation and forest ground litter  
16    that grew into a wildland fire.



# LAPORTE WILDFIRE – BANGOR 1101

## REFERENCE DOCUMENTS

▶ PG&E LaPorte Incident Description & Factual Summary, PG&E LaPorte Supplemental Report

▶ Case 3:14-cr-00175-WHA Document 965-15, 956-35, 956-54 Filed 12/31/18

▶ CAL FIRE Report 17CABTU015954-103, 10/8/2017

▶ CPUC-SED – Incident Investigation Report, E20171013-01, 4/29/2017

▶ PGE-CPUC\_00013769

▶ PG&E 17-0085193, 17-0085220, 17-0085276

 2017.10.08 - La Porte - Unredacted\_CONF

 2018.05.04 FINAL CPUC La Porte Factual Report (CPUC Only)\_CONF

 Cal Fire News Release LaPorte McCourtney Lobo Honey

 La Porte Incident Description

 LaPorte Supplemental Report

 LaPorte3\_SCADA\_PGE-CPUC\_00007885

 LaPorte4\_LR1804 SOE\_PGE-CPUC\_00020606

 LaPorte5\_Bangor1101\_S0BI\_20180323\_CONF

 PGE-CPUC\_00005393\_CONF

 PGE-CPUC\_00005394\_CONF

 PGE-CPUC\_00010364\_CONF

 PGE-CPUC\_00013532\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00013569\_PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00013769\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00013776\_PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00015750\_PGE-CALPA-DATA\_VOL012\_CONF

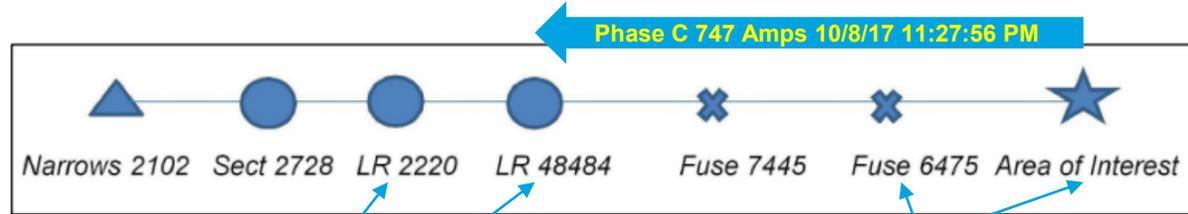
# LOBO WILDFIRE – NARROWS 2102

(WIND COMPLEX)

# LOBO WILDFIRE – NARROWS 2102

## Incident Observations

- ▶ Tree Contact from 50 Feet
- ▶ Possible Fault Duration 11:27 PM – 11:28 PM
- ▶ Possible Failure of LR 48484, Fuse 7445 & Fuse 6475



10/8/17 11:25 PM  
Meter Off 6526846632

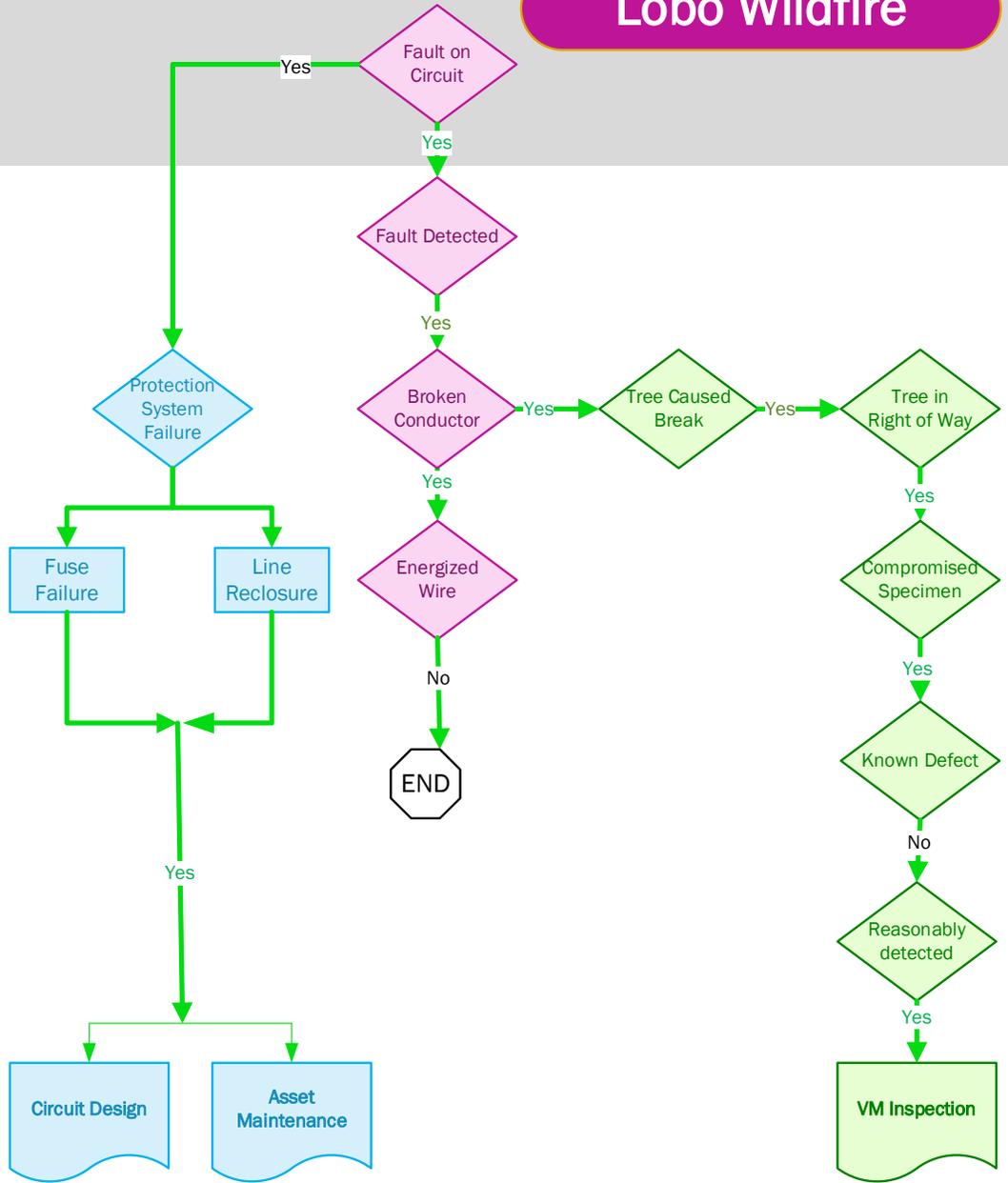
10/8/17 11:27 PM  
LR 48484 Trips  
& Recloses  
C Phase 747 Amps

10/9/17 12:01 AM  
Lobo Fire Starts  
Per Cal Fire

10/8/17 11:28 PM  
LR 2220 Trips & Locks Out

10/10/17 5:17 PM  
PG&E Opens Fuse 6475 For Cal Fire

# Lobo Wildfire



# LOBO WILDFIRE – NARROWS 2102

## VEGETATION MANAGEMENT

Condition	
Tree-Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	Yes
Known Defect or Condition	No
Reasonably Detected	Yes
Wind Event	Normal
Receptive Fuel Bed	Unknown

# LOBO WILDFIRE – NARROWS 2102

## VEGETATION MANAGEMENT



PGE-CPUC\_00016576

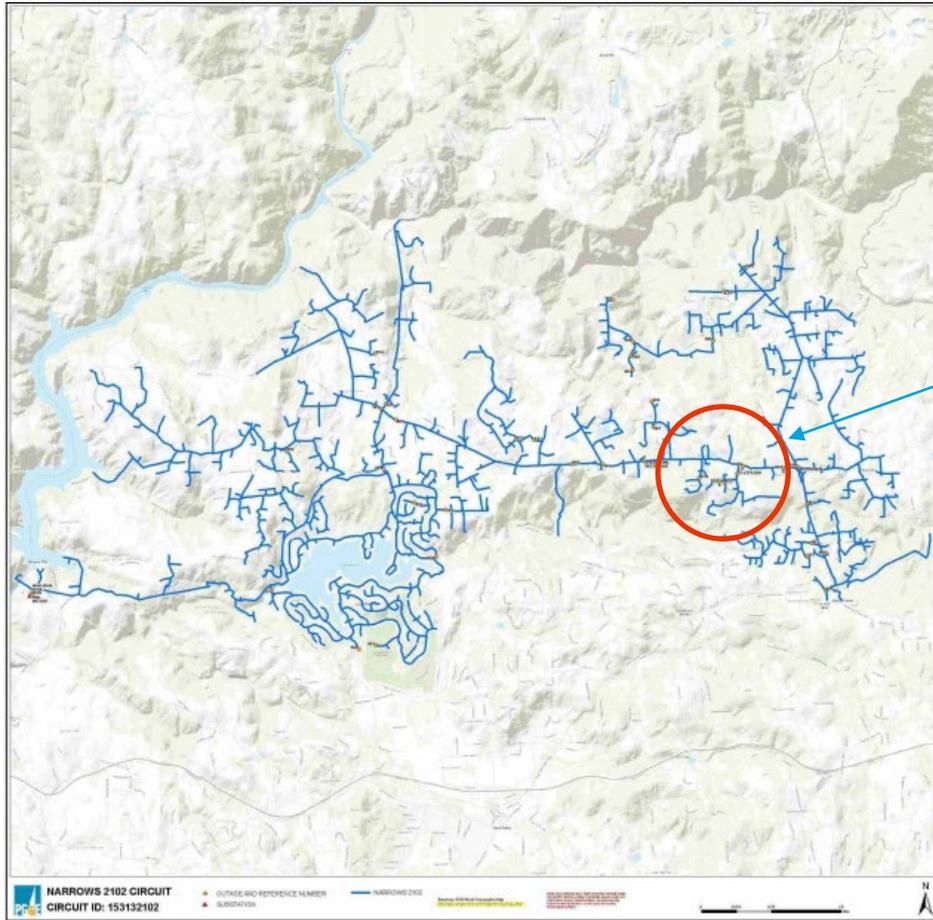


Figure 14: Subject Tree (Note: Abrasion and Burn Marks)



Figure 15: Subject Tree (Note: Abrasion and Burn Marks)

# LOBO WILDFIRE – NARROWS 2102



Incident Location

# LOBO WILDFIRE – NARROWS 2102

## PG&E EVIDENCE RECORD IDFS

Case 3:14-cr-00175-WHA Document 956-18 Filed 12/31/18 Page 2 of 10

### LOBO INCIDENT DESCRIPTION & FACTUAL SUMMARY

For completeness, this incident description and factual summary should be read in conjunction with the Factual Report Guidance and the contemporaneously submitted response to Question 62.

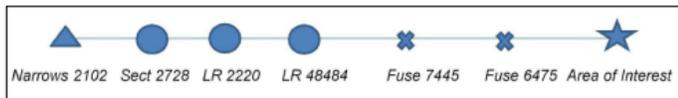
#### Background:

On October 12, 2017, PG&E filed an Electric Safety Incident Report (Incident No. 171012-8565) concerning an incident that occurred near 11218 Lone Lobo Trail near Nevada City, Nevada County (the “incident location” as defined by the CPUC’s December 7, 2017, letter). CAL FIRE removed both a Ponderosa Pine tree and distribution conductors on the Narrows 2102 (21 kV) Circuit at the incident location before releasing the incident location. Prior to CAL FIRE removing the tree, PG&E employees who assisted with CAL FIRE’s evidence collection reported briefly observing the pine tree resting on the conductors. PG&E does not know how the tree came to rest on the conductors because CAL FIRE removed the tree prior to PG&E having a chance to inspect the tree.<sup>1</sup>

According to CAL FIRE’s website, the Lobo fire is part of the Wind Complex, which consists of four different fires: Cascade, La Porte, Lobo, and McCourtney, and the location of the Lobo fire is near Lone Lobo Trail.

According to CAL FIRE’s website, the Lobo fire started at 12:01 AM on October 9, 2017.

#### Incident Overview:



The incident location is served by the Narrows 2102 Circuit and is located to the load-side of Fuse 6475.

On October 8, 2017, at 11:25 PM, per PG&E records, the smart meter at service point 6526846632, one of three smart meters downstream of the incident location, recorded a NIC Power Down event. PG&E has not received messages nor been able to retrieve data from the other two smart meters downstream of the incident location. PG&E believes these two additional smart meters were destroyed in the fire. At 11:27 PM, per PG&E records, Line

<sup>1</sup> In its initial EIR, PG&E reported that a ponderosa pine tree “fell on the Narrows 2102 (21 kV) Circuit near 11218 Lone Lobo Trail.” PG&E never had any information that the tree, in fact, fell on the conductors; PG&E only briefly observed the tree resting on the conductors during CAL FIRE’s evidence collection.

Case 3:14-cr-00175-WHA Document 956-18 Filed 12/31/18 Page 3 of 10

Recloser 48484—the first recloser upstream from the incident location on the Narrows 2102 Circuit—operated and reclosed. Then at 11:28 PM, per PG&E records, Line Recloser 2220—the second recloser upstream from the incident location—operated and locked out.<sup>2</sup>

On October 10, according to PG&E records, a crew foreman, along with a lineman, were the first PG&E responders to the incident location. Per the foreman and lineman, when they arrived near the incident location, an unidentified man denied the crew access to the incident location because of an “investigation.” The foreman and lineman stated that they then left and returned to the incident location later the same day. Per PG&E records, at 5:17 PM, the foreman reported opening Fuse 6475, which was mounted on the pole on the source-side of the incident location. The foreman and lineman stated that they left the scene with the single fuse for Fuse 6475 hanging near the bottom of the pole and put up a “man on line” tag onto the pole with Fuse 6475. The foreman stated that he saw evidence of limited vegetation burn near Fuse 6475. The lineman stated that the area around Fuse 6475 was burnt and ashy.

At 6:56 PM on October 10, per PG&E records, a troubleman manually closed Line Recloser 2220, restoring 861 customers. The incident location remained de-energized because Fuse 6475 remained open.

On either October 10 or 11, 2017, per a PG&E senior field engineering technician and a lineman, CAL FIRE brought a PG&E crew to the incident location to assist in collecting evidence but the crew declined because it was near dusk. On October 12, 2017, at 09:41 AM, per PG&E records, an electric crew foreman opened Fuse 7445, the next fuse upstream from Fuse 6475, at CAL FIRE’s request. CAL FIRE removed a Ponderosa Pine tree before PG&E had a chance to observe where it was rooted or why it was leaning on the conductors. Based on pink paint on one tree stump, which is reflected in a photo of the incident location, PG&E believes that the Ponderosa Pine tree removed by CAL FIRE was rooted approximately 50 feet downhill from the distribution conductors. CAL FIRE has not allowed PG&E to inspect the tree taken into evidence so PG&E cannot verify which tree was observed leaning on the conductors. Per an electric construction supervisor and an electric crew foreman, a PG&E crew removed the distribution conductors at CAL FIRE’s request. Shortly afterward, CAL FIRE released the incident location. Per PG&E records, the electric crew foreman then reported that he completed the repair work. At 12:10 PM, per PG&E records, the electric crew foreman closed Fuse 6475. At 12:50 PM, per PG&E records, the electric crew foreman closed Fuse 7445, restoring 19 customers and power to the incident location.

<sup>2</sup> The operation of Line Recloser 2220 is reflected in a Sequence Of Events (SOE) download The ILIS Outage Report 17-0085383 reports Line Recloser 2220 was reported “open” at October 10 at 11:14 AM. See PGE-CPUC\_00014019.

# LOBO WILDFIRE – NARROWS 2102

## PG&E EVIDENCE RECORD ILIS

Line Recloser (LR) 48484  
PGE-CPUC\_00007887

Fault Duration	2017-10-08 23:27:56	24
Fault Duration	2017-10-08 23:27:56	24
Fault Duration	2017-10-10 18:58:19	0
Fault Duration	2017-10-10 18:58:19	0
Fault Duration	2017-10-10 18:58:19	0
Fault Amps Max	2017-10-08 23:27:56	747
Fault Amps Max	2017-10-08 23:27:56	747
Fault Amps Max	2017-10-10 18:58:19	0
Fault Amps Max	2017-10-10 18:58:19	0
Fault Amps Max	2017-10-10 18:58:19	0
Fault Amps Ground	2017-10-08 23:27:56	715
Fault Amps Ground	2017-10-08 23:27:56	715
Fault Amps Ground	2017-10-10 18:58:19	0
Fault Amps Ground	2017-10-10 18:58:19	0
Fault Amps Ground	2017-10-10 18:58:19	0
Fault Amps C	2017-10-08 23:27:56	747
Fault Amps C	2017-10-08 23:27:56	747
Fault Amps C	2017-10-10 18:58:19	0
Fault Amps C	2017-10-10 18:58:19	0
Fault Amps C	2017-10-10 18:58:19	0
Fault Amps B	2017-10-08 23:27:56	11
Fault Amps B	2017-10-08 23:27:56	11
Fault Amps B	2017-10-10 18:58:19	0
Fault Amps B	2017-10-10 18:58:19	0
Fault Amps B	2017-10-10 18:58:19	0
Fault Amps A	2017-10-08 23:27:56	27
Fault Amps A	2017-10-08 23:27:56	27
Fault Amps A	2017-10-10 18:58:19	0
Fault Amps A	2017-10-10 18:58:19	0

LR 48484 Detects  
C Phase 747 Amp Fault  
Trips & Recloses

Does Not Detect  
Further Faults.

LR 2220 Detects and Locks  
out  
@ 23:28  
No Detailed Data for LR2220

The operation of Line Recloser 2220 is reflected in a Sequence Of Events (SOE) download ILIS Outage Report 17-0085383 reports Line Recloser 2220 was reported "open" at October 10 at 11:14 AM. See PGE-CPUC\_00014019

# LOBO WILDFIRE – NARROWS 2102

## PG&E EVIDENCE RECORD ILIS

Narrows 2102 CB  
C Phase Record  
10/8/17 23:28:49 256 AMPS

Amps C	2017-10-08 23:28:49	256.0547	
Amps C	2017-10-08 23:28:11	248.053	
Amps C	2017-10-10 18:56:41	152.0325	
Amps C	2017-10-08 23:28:06	128.0273	
Amps C	2017-10-10 18:56:46	128.0273	
Amps C	2017-10-10 19:09:24	128.0273	
Amps C	2017-10-10 19:09:47	128.0273	
Amps C	2017-10-10 19:11:37	128.0273	
Amps C	2017-10-10 19:12:55	128.0273	
Amps C	2017-10-08 19:27:46	120.0256	
Amps C	2017-10-08 19:28:12	120.0256	
Amps C	2017-10-10 19:02:03	120.0256	
Amps C	2017-10-10 19:09:33	120.0256	
Amps C	2017-10-10 19:10:51	120.0256	
Amps C	2017-10-10 19:12:37	120.0256	
Amps C	2017-10-10 19:13:00	120.0256	

Narrows CB 2102 LR 48484 LR 2220

Amps C	2017-10-08 23:23:42	64.01367	
Amps C	2017-10-08 23:23:47	72.01538	
Amps C	2017-10-08 23:23:52	64.01367	
Amps C	2017-10-08 23:24:07	72.01538	
Amps C	2017-10-08 23:24:12	64.01367	
Amps C	2017-10-08 23:28:06	128.0273	←
Amps C	2017-10-08 23:28:11	248.053	←
Amps C	2017-10-08 23:28:25	56.01197	
Amps C	2017-10-08 23:28:49	256.0547	←
Amps C	2017-10-08 23:28:53	48.01026	
Amps C	2017-10-08 23:30:17	56.01197	
Amps C	2017-10-08 23:31:31	48.01026	
Amps C	2017-10-08 23:31:35	56.01197	
Amps C	2017-10-08 23:31:45	48.01026	
Amps C	2017-10-08 23:31:50	56.01197	
Amps C	2017-10-08 23:38:48	48.01026	
Amps C	2017-10-08 23:38:53	56.01197	
Amps C	2017-10-08 23:40:30	48.01026	

Narrows CB 2102 LR 48484 LR 2220

# LOBO WILDFIRE – NARROWS 2102

## CPUC-SED EVIDENCE RECORD

**Utility Facilities Involved:** Narrows 2102, 21 kV Circuit

**Violation(s):** Yes

### I. Summary

On October 8, 2017, at approximately 2327 hours, a Ponderosa Pine tree failed and fell onto PG&E 21 kV overhead conductors near 11218 Lone Lobo Trail in Nevada City located in Nevada County. The tree's contact with PG&E's conductors caused the ignition of the Lobo Fire, which burned 821 acres, destroyed 47 structures, and damaged 2 structures. No fatalities or injuries were reported.

The Lobo Fire is part of the Wind Complex, which consists of four different fires: Cascade, La Porte, Lobo, and McCourtney.

### V. Conclusion

Based on the evidence reviewed and CAL FIRE's investigation, SED found PG&E in violation of:

1. GO 95, Rule 31.1 for failing to maintain its facilities safely and properly by:
  - a. Failing to properly identify and abate the subject tree, which had an extended open cavity. This weakened the trunk and caused the subject tree to fail, fall onto the subject conductors, and ignite the fire.
  - b. Following poor VM practices by not identifying and abating the hazardous condition created by removing surrounding trees; this left the subject tree exposed to high winds and was a contributing factor that caused the tree to fail.
2. GO 95, Rule 35 for failing to maintain the rule's minimum clearance requirements between the subject 21 kV conductors and subject tree.
3. GO 95, Rule 31.1 for failure to maintain VM inspection records related to a 2014 CEMA inspection according to best practices. PG&E could not locate records

All three violations disputed by PG&E

# LOBO WILDFIRE – NARROWS 2102

## CPUC-SED EVIDENCE RECORD

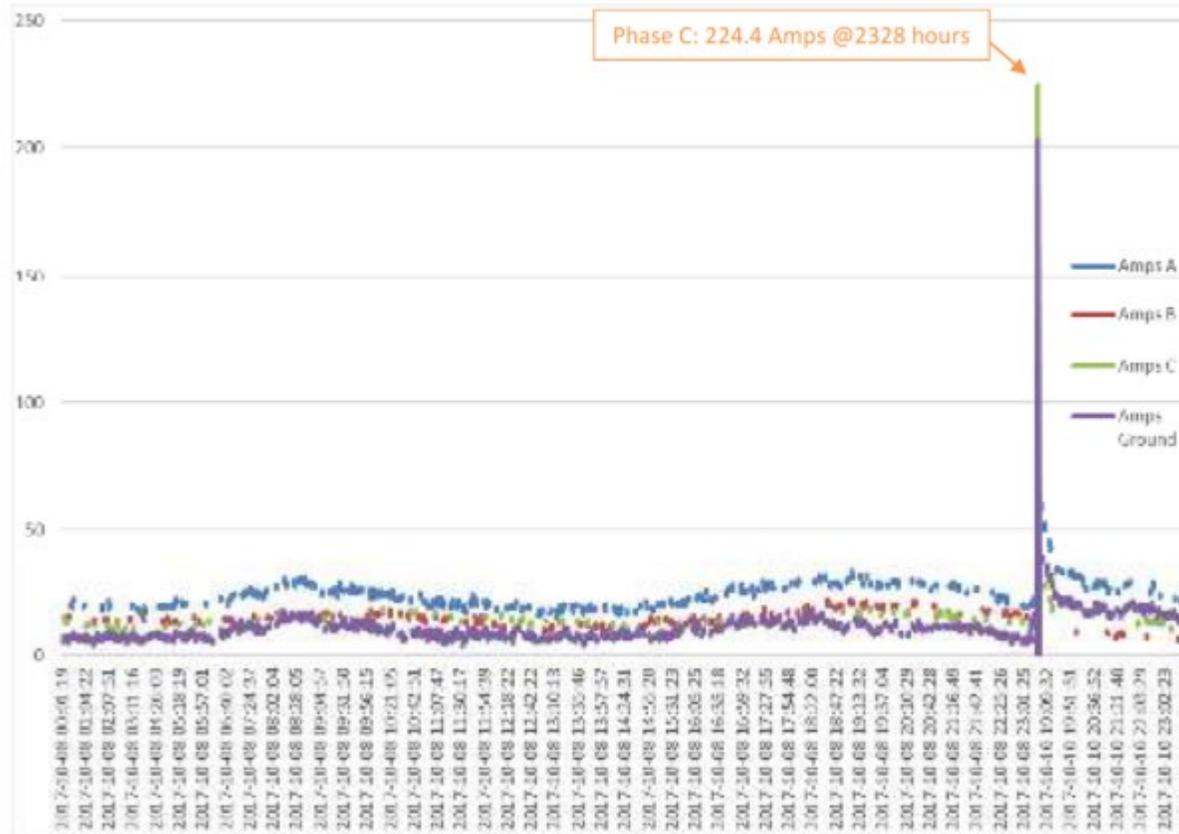


Figure 10: SCADA plot of load data recorded at LR 48484 from October 8 to 10, 2017.

# LOBO WILDFIRE – NARROWS 2102

## CAL FIRE EVIDENCE RECORD

22 I conducted the origin and cause investigation of the Lobo Fire and determined  
23 the cause to be a downed tree into energized electrical conductors (powerlines). The  
24 data collected from the origin and cause investigation, and assessment of the subject  
25 tree by a certified subject matter expert support this conclusion.  
26

19 My opinion is the competent ignition source responsible for the Lobo Fire was the  
20 subject tree made contact with energized electrical lines. My conclusion is this tree to  
21 powerline contact ignited the subject tree trunk. This ignition resulted in burning  
22 material falling into the vegetation below the subject tree and igniting the first available  
23 fuel which would have been dry vegetation. The area of dry vegetation likely consisted  
24 of leaf litter and grass which would have been intermixed with small shrubs. The effects  
25 of the recorded winds that impacted this area was a contributing factor in bringing down  
26 the subject tree and providing for increased fire behavior with a rapid rate of spread.  
27 The higher wind speeds were a component of the red flag fire weather warning issued  
28 for this geographic area. My opinion of the subject tree is that it was likely either dead,  
29 dying or diseased. I conclude poor vegetation management practices were a  
30 contributing factor in the cause of this fire. The area of the subject tree had a noticeable

# LOBO WILDFIRE – NARROWS 2102

## CAL FIRE EVIDENCE RECORD



Figure 14: Subject Tree (Note: Abrasion and Burn Marks)



Figure 15: Subject Tree (Note: Abrasion and Burn Marks)



Figure 16: East Phase Conductor



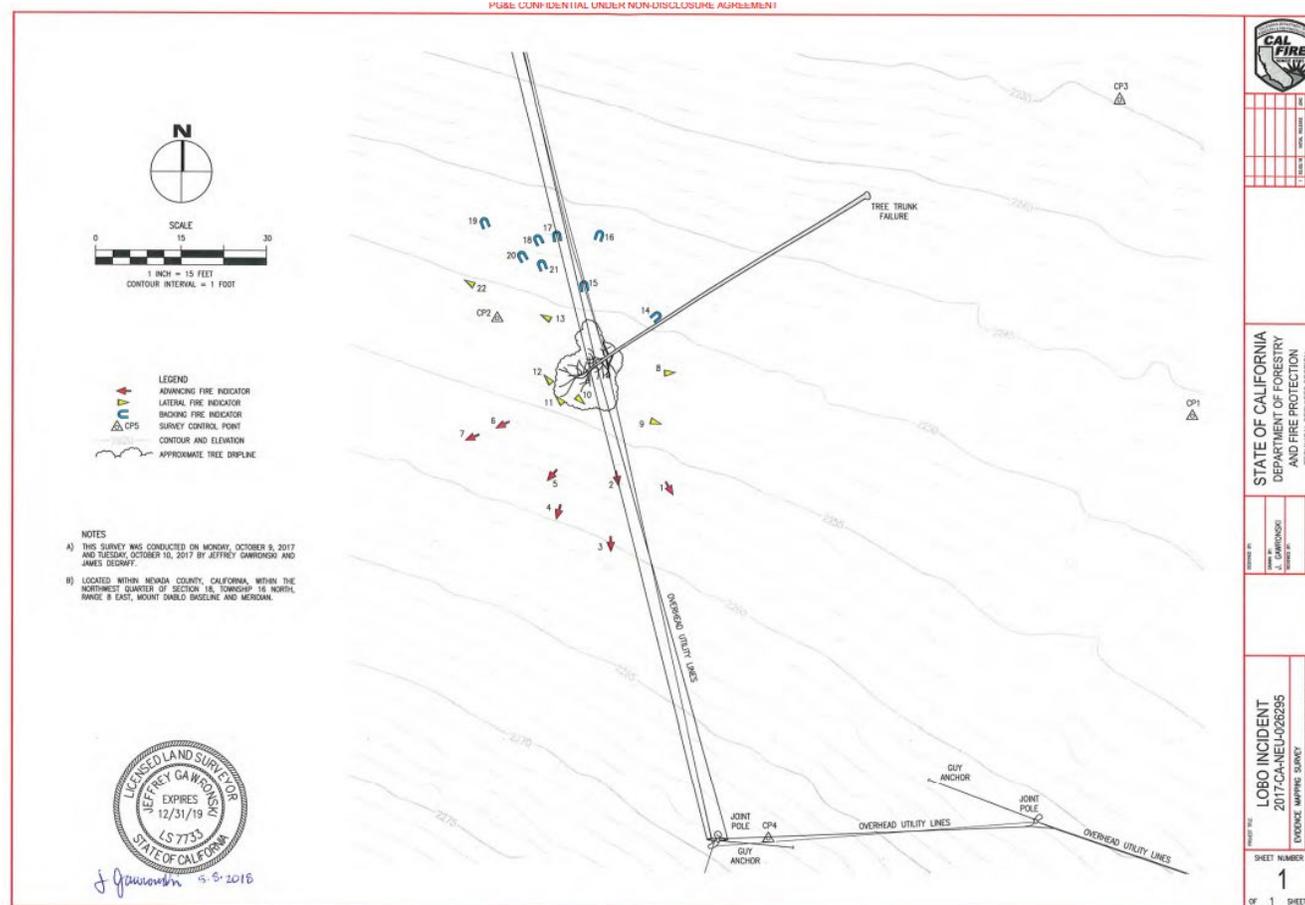
Figure 17: Neutral Conductor

#### IV. CAL FIRE's Investigation

CAL FIRE investigator, Jeremy Monroe, found no indicators of connectivity between the burned portion of the tree trunk and the vegetation below. Therefore, Mr. Monroe concluded that: the fire originated at the point of contact between the tree and conductor span and the burning embers from the tree ignited the dry vegetation below, which started the fire. Mr. Monroe stated that high wind speeds and dead and downed trees, likely taken down by mechanical means, fueled the fire. In addition, Mr. Monroe stated

# LOBO WILDFIRE – NARROWS 2102

## CAL FIRE EVIDENCE RECORD



# LOBO WILDFIRE – NARROWS 2102

## REFERENCE DOCUMENTS

- ▶ PG&E Lobo Incident Description & Factual Summary, Lobo Supplemental Report
- ▶ Case 3:14-cr-00175-WHA Document 956-18, 956-38, 956-54 Filed 12/31/18
- ▶ CAL FIRE Report 17CANEU026275, 10/8/2017
- ▶ CPUC E20171012-02, 4/29/2019
- ▶ PGE-CPUC\_00007887, PGE-CPUC\_00014063, PGE-CPUC\_00016576
- ▶ PG&E 17-0086138, 17-0085388, 17-008583

-  PGE-CPUC\_00016576\_PGE-CALPA-DATA\_VOL012
-  PGE-CPUC\_00015756\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00014063\_PGE-CALPA-DATA\_VOL012
-  PGE-CPUC\_00014019\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00013943\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00013914\_PGE-CALPA-DATA\_VOL012\_CONF
-  Lobo Supplemental Report
-  Lobo Incidnet Description
-  CPUC\_SED\_E20171012\_02 Lobo FINAL Package\_CONF
-  2018.05.04 FINAL CPUC Lobo Factual Report\_CONF

-  PG&E\_Outage\_Report\_Lobo\_Narrows\_2102\_CONF
-  PGE-CPUC\_00005394\_CONF
-  PGE-CPUC\_00007887
-  PGE-CPUC\_00007888

# MCCOURTNEY WILDFIRE GRASS VALLEY 1103 (WIND COMPLEX)

# MCCOURTNEY WILDFIRE – GRASS VALLEY 1103

## Incident Observations

- ▶ Possible Energized Downed Conductor From 10/8/17 11:44 PM – 10/9/17 1:23 AM
- ▶ Possible Failure of LR 58498
- ▶ Possible High-Impedance Fault Scenario
- ▶ Possible Electrical Back-Feed Conditions

McCourtney Road Single Line Diagram



10/8/17 11:44 PM  
Meter Off

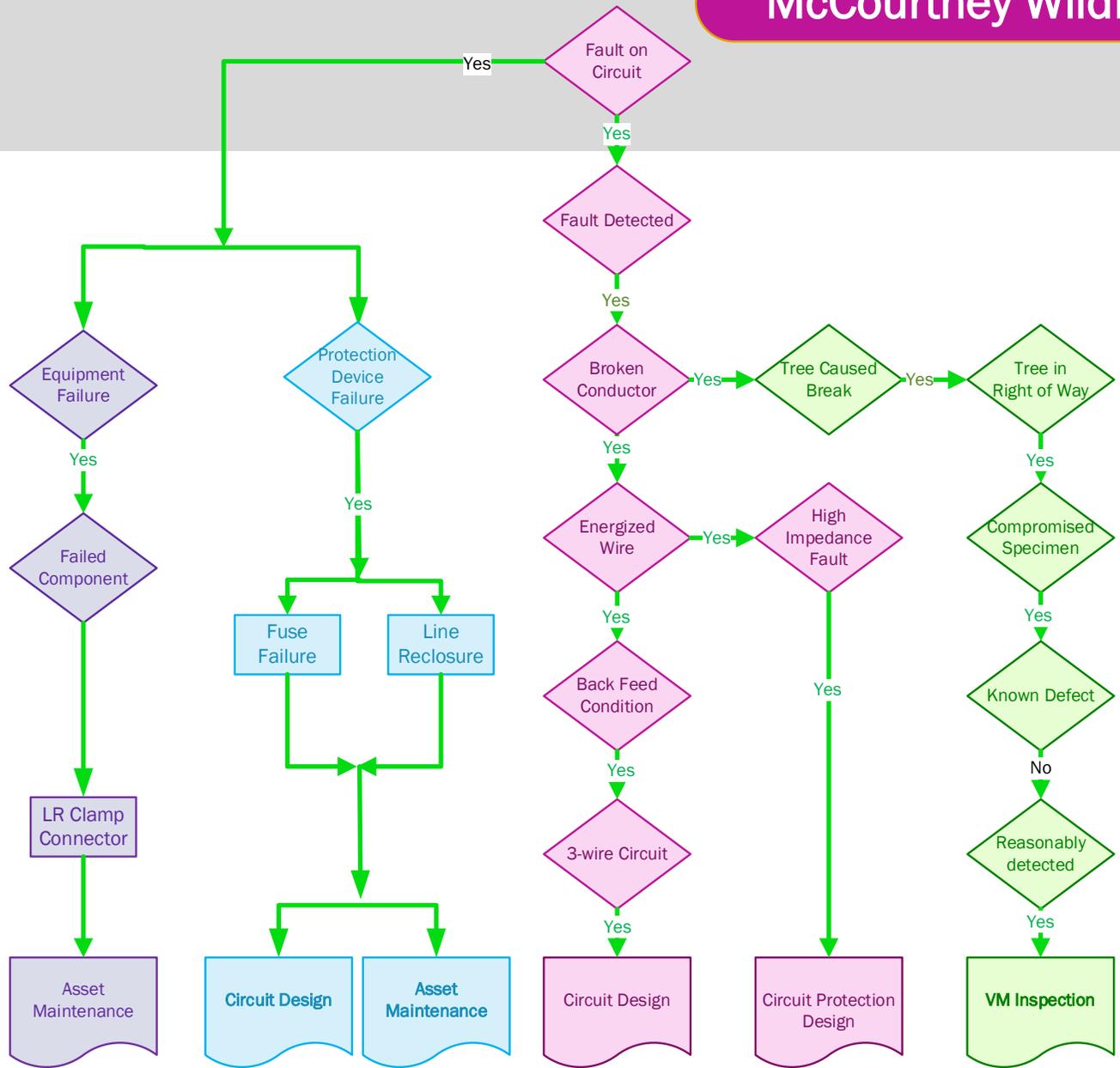
10/9/17 12:00 AM  
McCourtney Fire Starts  
Per Cal Fire

10/9/17 3:00 AM  
PG&E Finds Conductor Broken at Clamp  
Connector

10/9/17 1:23 AM  
CB 1103 Trips  
& Locks Out 1:24 AM

10/9/17 8:01 AM  
PG&E Opens LR 58498

# McCourtney Wildfire



# MCCOURTNEY WILDFIRE – GRASS VALLEY 1103

## VEGETATION MANAGEMENT

Condition	
Tree-Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	Yes
Known Defect or Condition	No
Reasonably Detected	Yes
Wind Event	Normal
Receptive Fuel Bed	Unknown

# MCCOURTNEY WILDFIRE – GRASS VALLEY 1103

## VEGETATION MANAGEMENT

On October 8, 2017, at approximately 2348 hours, the McCourtney Fire began when a diseased 80-foot Ponderosa pine fell onto PG&E's 12kV conductors.

The Reader Ranch Remote Automated Weather Stations (RAWS) is approximately 7.18 miles northwest of the McCourtney Fire. Wind speeds at 2200 hours were measured at 10 miles per hour (mph) and gusts at 24 mph (CPUC, Safety and Enforcement Division (SED) Incident Investigation Report, Incident number E20171011-03 dated May 6, 2019).

GO Rule	Violations
GO 95, Rule 31.1	Hazardous tree not identified and abated
GO 95, Rule 35	Vegetation clearance not maintained

# MCCOURTNEY WILDFIRE – GRASS VALLEY 1103

## PG&E EVIDENCE RECORD IDFS

### ORION WAY & MCCOURTNEY ROAD INCIDENT DESCRIPTION & FACTUAL SUMMARY

For completeness, this incident description and factual summary should be read in conjunction with the Factual Report Guidance and the contemporaneously submitted response to Question 62.

#### Background:

On October 11, 2017, PG&E filed an Electric Safety Incident Report (Incident No. 171011-8563) concerning an incident that occurred near 11253 Orion Way, Grass Valley, Nevada County (the "Orion Way incident"). When PG&E arrived at the Orion Way incident location,<sup>1</sup> PG&E observed a Ponderosa Pine tree that was lying next to some downed conductors and a charred pole.

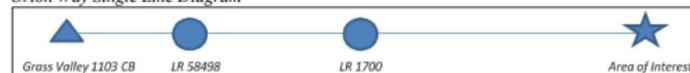
CAL FIRE's website has no information related to any fire that occurred at the Orion Way incident location in October 2017.

On January 12, 2018, PG&E filed a separate Electric Safety Incident Report (Incident No. 180112-8698) concerning an incident that occurred near 11228 McCourtney Road at approximately the same time as the Orion Way incident. In that report, PG&E stated that an overhead primary conductor separated at the source side of Line Recloser 1700, resulting in a wire down. PG&E also reported that a nearby fairground's parking lot allegedly caught fire, including structures located beyond the lot. The incident at 11228 McCourtney Road will be referred to as the "McCourtney Road incident."

According to CAL FIRE's website, the McCourtney fire started at McCourtney Road and Highway 20, Grass Valley at 12:00 AM on October 9, 2017. This is approximately 0.5 miles from the McCourtney Road incident and 0.85 miles from the Orion Way incident. According to CAL FIRE's website, the McCourtney fire is part of the Wind Complex, which consists of four different fires: Cascade, La Porte, Lobo, and McCourtney. According to CAL FIRE's website, the Orion Way incident location is outside the final boundary of the McCourtney fire.

#### Incident Overview:

Orion Way Single Line Diagram



The Orion Way incident location is served by the Grass Valley 1103 Circuit and is located downstream of Line Recloser 1700.

McCourtney Road Single Line Diagram



The McCourtney Road incident location<sup>2</sup> is also served by the Grass Valley 1103 Circuit but is upstream of Line Recloser 1700. The McCourtney Road incident location is upstream from the Orion Way incident location.

On October 8, 2017, at 11:44 PM, per PG&E records, smart meters downstream of Line Recloser 1700 and the McCourtney Road incident location recorded NIC Power Down events.

On October 9, 2017, at 1:23 to 1:24 AM, per PG&E records, the Grass Valley 1103 Circuit Breaker operated and locked out, which de-energized the McCourtney Road incident location. Shortly before 3:00 AM, according to PG&E records and a troubleman, the troubleman arrived at the site of the McCourtney Road incident. The troubleman stated that when he arrived, he saw a conductor had broken at the clamp connector at the source-side of Line Recloser 1700. The troubleman recalled that the conductor's broken end was lying on the ground. The troubleman also recalled that wood chips in a parking lot adjacent to the downed conductor were on fire. After confirming that the conductors at the McCourtney Road incident location had been de-energized, the troubleman cut the downed conductor in two places and left the conductor sections on the ground. At this time or during a later visit to the site on October 9, 2017, the troubleman also observed that Line Recloser 1700 was open.

On October 9, 2017, at 8:01 AM, per PG&E records, Line Recloser 58498, which is upstream of Line Recloser 1700, was remotely opened via SCADA on a dead line. At 9:42 AM, per PG&E records, the Grass Valley 1103 Circuit Breaker was remotely closed via SCADA, restoring 9 customers but neither the Orion Way incident location nor the McCourtney Road incident location was re-energized because Line Recloser 58498 remained open. At 12:35 PM, per PG&E records, PG&E manually opened Switch 1862, which is downstream of Line Recloser 58498 and upstream of Line Recloser 1700.

On October 9, 2017, at 12:45 PM, per PG&E records, a PG&E troubleman was the first PG&E employee at the Orion Way incident location. The troubleman observed a downed tree, downed conductor wires, and a charred pole that was still standing. The troubleman also observed a burnt structure. At 1:08 PM, per PG&E records, Line Recloser 58498 was remotely closed via

<sup>2</sup> The "McCourtney Road incident location" refers to the "the location and/or area of where the 'Electric Safety Incident Reported - Pacific Gas & Electric Incident No.'" 180112-8698, in accordance with the CPUC's December 7, 2017 letter, which defined "Incident Location."

CONFIDENTIAL

### SUPPLEMENT TO MCCOURTNEY INCIDENT DESCRIPTION & FACTUAL SUMMARY

#### Supplemental Background Information:

On May 25, 2018, CAL FIRE issued a press release stating that the McCourtney Fire was "caused by a tree falling onto PG&E power lines." CAL FIRE has not publicly released its investigation report.

#### Supplemental Timeline Information:

The McCourtney Factual Summary contained a timeline of PG&E's actions at or impacting the incident locations in the period immediately preceding CAL FIRE's designated start time until service to the incident locations was restored. The following additional information is relevant to the McCourtney Factual Summary timeline.

- **October 8, 2017, 11:48 PM:** Nevada City Sheriff's Office dispatch received a 911 call from McCourtney Road near Fairgrounds Gate 4 reporting a blown transformer, then classified the call as a "FIRE" call and transferred to CAL FIRE.
- **October 8, 2017, 11:57 PM:** Nevada City Sheriff's Office dispatch received a 911 call from Orion Way reporting a fire.
- **October 9, 2017, 12:10 AM:** Nevada County Consolidated Fire Department sounded its alarm.

#### Supplemental Information Regarding Prior Inspections:

Between September 2012 and October 2017, there were seven vegetation management inspections at or near the Orion Way incident location. Between November 2012 and October 2017, there were four electric maintenance overhead patrols and inspections at or near the Orion Way incident location. Since May 2013, three intrusive pole inspections occurred at or near the Orion Way incident location. PG&E's understanding based upon its records is that the subject tree and the subject poles were not identified for work during any of those inspections. Below is a summary of vegetation management patrols and inspections, electric maintenance overhead patrols and inspections, and intrusive pole inspections at or near the Orion Way incident location.

The CPUC did not request information on vegetation management patrols and inspections, electric maintenance overhead patrols and inspections, or intrusive pole inspections for the McCourtney Road incident location.

Date	Event	Findings
11/16/2012	PG&E performed an electric maintenance overhead inspection.	PG&E's understanding based upon its records is that no issues with PG&E equipment at the Orion Way incident location were identified.

<sup>1</sup> The "Orion Way incident location" refers to the "McCourtney incident location" as defined by the CPUC's December 7, 2017 letter.

# MCCOURTNEY WILDFIRE – GRASS VALLEY 1103

## PG&E EVIDENCE RECORD ILIS

Line Recloser LR58498  
Sees Reverse Power Flow  
Beginning @ 11:44 PM

Grass Valley  
CB 1103  
Trip Sequence to Lock Out

10/8/2017 23:44	(P01) 2-Grass Valley nev lr 58498 pwr flow is REVERSE
10/8/2017 23:44	(P01) 2-Grass Valley nev lr 58498 pwr flow is NORMAL
10/8/2017 23:44	(P03) 2-Grass Valley nev lr 58498 a ph tgt is ALARM
10/8/2017 23:44	(P03) 2-Grass Valley nev lr 58498 b ph tgt is ALARM
10/8/2017 23:44	(P03) 2-Grass Valley nev lr 58498 c ph tgt is ALARM
10/8/2017 23:44	(P01) 2-Grass Valley Grass Valley cb 1103 more recent rly event available is ALARM
10/8/2017 23:44	(P01) 2-Grass Valley Grass Valley cb 1103 unread rly event available is ALARM
10/8/2017 23:44	(P01) 2-Grass Valley nev lr 58498 pwr flow is NORMAL
10/8/2017 23:44	(P01) 2-Grass Valley nev lr 58498 pwr flow is REVERSE
10/8/2017 23:46	(P01) 2-Grass Valley Grass Valley cb 1103 unread rly event available is NORMAL
10/8/2017 23:46	(P01) 2-Grass Valley Grass Valley cb 1103 more recent rly event available is NORMAL
10/8/2017 23:52	(P01) 2-Grass Valley nev lr 58498 pwr flow is REVERSE
10/8/2017 23:52	(P01) 2-Grass Valley nev lr 58498 pwr flow is NORMAL
10/8/2017 23:52	(P03) 2-Grass Valley nev lr 58498 grd tgt is ALARM

10/9/2017 1:23	(P01) 2-Grass Valley nev lr 58498 pwr flow is NORMAL
10/9/2017 1:23	(P01) 2-Grass Valley nev lr 58498 pwr flow is REVERSE
10/9/2017 1:23	(P01) 2-Grass Valley nev lr 58498 a ph pot is HOT
10/9/2017 1:23	(P03) 2-Grass Valley Grass Valley cb 1103 trip is NORMAL
10/9/2017 1:24	(P03) 2-Grass Valley Grass Valley cb 1103 trip is ALARM
10/9/2017 1:24	(P03) 2-Grass Valley Grass Valley cb 1103 set a rly tgt is NORMAL
10/9/2017 1:24	(P09) 2-Grass Valley Grass Valley cb 1103 position is CLOSED
10/9/2017 1:24	(P01) 2-Grass Valley Grass Valley cb 1103 more recent rly event available is ALARM
10/9/2017 1:24	(P01) 2-Grass Valley Grass Valley cb 1103 unread rly event available is ALARM
10/9/2017 1:24	(P03) 2-Grass Valley Grass Valley cb 1103 set a rly tgt is ALARM
10/9/2017 1:24	(P09) 2-Grass Valley Grass Valley cb 1103 position is OPEN
10/9/2017 1:24	(P01) 2-Grass Valley nev lr 58498 ac pwr fail is ALARM
10/9/2017 1:24	(P01) 2-Grass Valley nev lr 58498 c ph pot is DEAD
10/9/2017 1:24	(P01) 2-Grass Valley nev lr 58498 b ph pot is DEAD
10/9/2017 1:24	(P01) 2-Grass Valley nev lr 58498 pwr flow is NORMAL
10/9/2017 1:24	(P01) 2-Grass Valley nev lr 58498 pwr flow is REVERSE
10/9/2017 1:24	(P01) 2-Grass Valley nev lr 58498 a ph pot is DEAD
10/9/2017 1:24	(P03) 2-Grass Valley Grass Valley cb 1103 time oc tgt is ALARM
10/9/2017 1:24	(P03) 2-Grass Valley Grass Valley cb 1103 a ph tgt is ALARM
10/9/2017 1:24	(P09) 2-Grass Valley Grass Valley cb 1103 position is OPEN

# MCCOURTNEY WILDFIRE – GRASS VALLEY 1103

## CPUC-SED EVIDENCE RECORD

**Utility Facilities Involved:** Grass Valley 1103, 12 kV Circuits

**Violation:** Yes

### I. Summary

On October 8, 2017, at approximately 2348 hours, the "McCourtney Fire" began at two separate locations on the PG&E Grass Valley 1103, 12 kV circuit. A diseased 80-foot Ponderosa Pine tree fell onto PG&E 12-kV conductors at 11253 Orion Way and started a fire which burned one building and approximately 1/4 acre of vegetation. Shortly afterward, at 1228 McCourtney Road, a 12-kV conductor broke at a clamp connector at the source-side of a Line Recloser, and fell to the ground; the fallen conductor started a fire at 1228 McCourtney Road which burned approximately 76 acres and damaged approximately 15 structures. There were no injuries or fatalities as a result of the fires.

The McCourtney Fire is part of the Wind Complex, which consists of four different fires: Cascade, La Porte, Lobo, and McCourtney.

### V. Conclusion

Based on the evidence that SED reviewed, SED's investigation found the following:

- PG&E violated GO 95, Rule 31.1, by failing to maintain their facilities to allow for safe, proper, and adequate service. PG&E failed to identify and remove a diseased Ponderosa Pine tree in the 11253 Orion Way incident area.  
The McCourtney Fire was caused due to PG&E's failure to remove the diseased Ponderosa Pine tree at 11253 Orion Way.
- PG&E violated GO 95, Rule 35, by failing to maintain the rule's clearance requirements for the hazardous subject tree that fell into the overhead conductors.

The fire at 1228 McCourtney Road was caused by the hot tap clamp failure on the source side of Line Recloser 1700. The failure led the 12-kV conductor to fall and ignite the vegetation. SED will not know why the hot tap clamp failed until a destructive test and failure analysis of the clamp is completed.

All violations disputed by PG&E

# MCCOURTNEY WILDFIRE – GRASS VALLEY 1103

## CPUC-SED EVIDENCE RECORD

CAL FIRE stated that the McCourtney Fire began at approximately 2348 hours on October 8, 2017. This time aligns with the fact that a ground fault is seen at 2345 hours by both Line Recloser 58498 and Circuit Breaker 1103. (Figure 9)

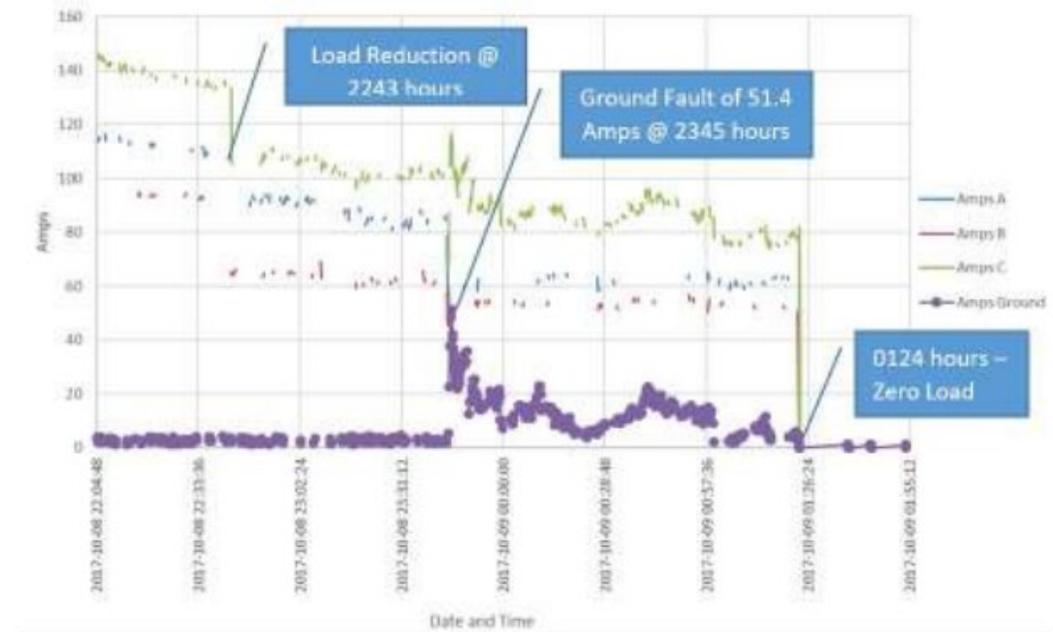
The Grass Valley 1103 circuit was energized until the Grass Valley 1103 Circuit Breaker operated and locked out at approximately 0123-0124 hours on October 9, 2017. The SCADA data matches this and shows a zero load across all phases for that time. It is then at this approximate time, 0124 hours, both the 11253 Orion Way and 11228 McCourtney Road incident were de-energized.

SED reviewed the Supervisory Control and Data Acquisition (SCADA) load and event data recorded at the equipment listed above beginning on October 8, 2017. Line Recloser 58498 (LR 58498) is the first protective device that was upstream of the 11228 McCourtney Road incident with SCADA data.

Line Recloser 1700 (LR 1700) is the first protective device that was upstream of the 11228 McCourtney Road incident but did not have SCADA data. Because there was no SCADA at LR 1700, SED can surmise that the McCourtney Fire occurred at the load reduction point on October 8, 2017 at 2234 hours, such as the Ponderosa Pine tree falling and opening LR 1700.

SED reviewed Line Recloser testing records for LR 1700 from 2014 to 2017. The tests confirm there was no SCADA for LR 1700, and they were done annually. The 2017 test was completed on November 21, 2017 and documented the new LR 1700 that was installed by PG&E after the previous one was collected by CAL FIRE for evidence. The new LR 1700 was installed with SCADA.

SED also reviewed LR 58498 testing records. The tests were also done annually from 2014 to 2017. There were no issues documented for the LR 58498 testing records.



**Figure 9:** Plot of SCADA load data recorded at the Line Recloser 58498 showing load for all phases and ground amps beginning on October 8, 2017 at 2200 hours and ending October 9, 2017 at 0155 hours.

# MCCOURTNEY WILDFIRE – GRASS VALLEY 1103

## CPUC-SED EVIDENCE RECORD



17CANEU026295

MCCOURTNEY



**Figure 12:** Conductor and fulgurites between Pole #10525757 and Pole #05172  
(Source: CAL FIRE)

# MCCOURTNEY WILDFIRE – GRASS VALLEY 1103

## CAL FIRE EVIDENCE RECORD

### IV. CAL FIRE Investigation

CAL FIRE's investigation report, 17CANEU026295 concluded, *"Based on my training and experience I believe that the diseased ponderosa pine that fell across powerlines at 11253 Orion Way, ultimately resulted in two separate fires, and the loss/damage of 16 structures. It is my opinion that the canker located on the fallen ponderosa pine at 11253 Orion Way, is an outward indicator of a tree weakened by decay or disease, and a violation of PRC 4293, and I agree with PORTER's opinion that the tree could have been identified during a routine inspection, and should have been abated."*<sup>27</sup>

<sup>27</sup> CAL FIRE Investigation Report, Case Number 17CANEU026295 and 17CANEU026279, Case Name McCourtney, by Shane Larsen, Page 29.

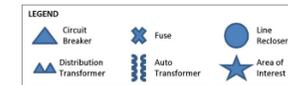
The report adds, *"Based on my training and experience I believe that the tree failure across the conductors at 11253 Orion Way caused a surge of power back down to the conductors along McCourtney Road and the equipment on PG&E pole #11052575 and Line Recloser 1700. The surge of electrical energy arced through the hot tap clamp at the jumper wire and conductor connection. This melted the conductor at pole #11052575 and caused the energized conductor to fall to the ground. The fault continued from the downed conductor and ignited fire in several locations between poles #11052575 and #05172. In speaking with PG&E personnel there should be no room for arcing between a properly installed hot tap clamp and energized conductor. Any arcing is evidence of a gap between the hot tap clam and conductor, possibly being faulty hot tap clamp installation or maintenance."*<sup>28</sup>

### McCourtney – Location 2



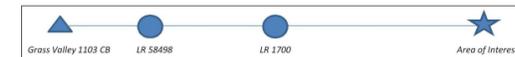
Device ID	Brand	Type
Grass Valley 1103 CB	GE, SEL	F60, 351
LR 58498	Cooper	Form 6 - PV4
LR 1700	Cooper	Form 6

Note: Images are drawn not to scale



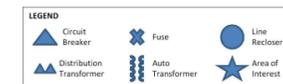
PGE-CF\_00137642

### Incident Location #6 – McCourtney (Incident #: 171011-8563)



Device ID	Brand	Type
Grass Valley 1103 CB	GE, SEL	F60, 351
LR 58498	Cooper	Form 6 - PV4
LR 1700	Cooper	Form 6

Note: Images are drawn not to scale



PGE-CPUC\_00001208

# MCCOURTNEY WILDFIRE – GRASS VALLEY 1103

## CAL FIRE EVIDENCE RECORD

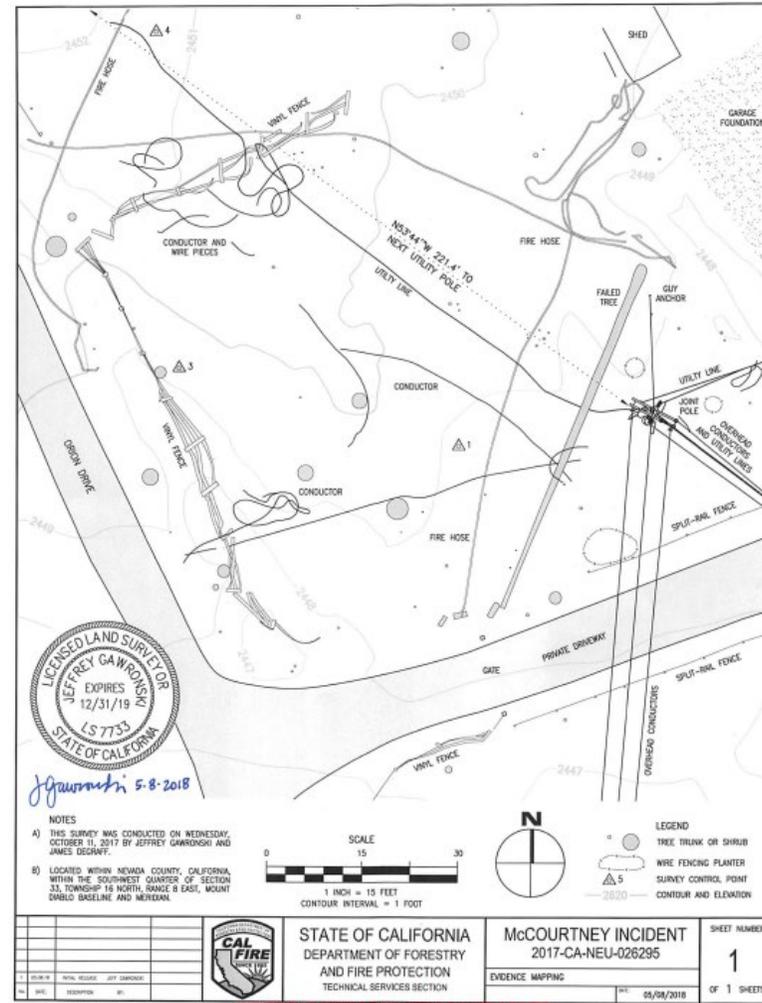
McCOURTNEY PG&E CONFIDENTIAL UNDER NON-DISCLOSURE AGREEMENT October 8, 2017 17CANEU026295

1 **OPINIONS & CONCLUSIONS**

2  
 3 Based on my training and experience I believe that the diseased ponderosa pine that  
 4 fell across powerlines at 11253 Orion Way, ultimately resulted in two separate fires, and  
 5 the loss/damage of 16 structures. It is my opinion that the canker located on the fallen  
 6 ponderosa pine at 11253 Orion Way, is an outward indicator of a tree weakened by  
 7 decay or disease, and a violation of PRC 4293, and I agree with PORTER's opinion that  
 8 the tree could have been identified during a routine inspection, and should have been  
 9 abated.

10  
 11 Based on my training and experience I believe that the tree failure across the  
 12 powerlines at 11253 Orion caused a surge of power back down the powerlines along  
 13 McCourtney Rd. The surge of electrical energy arced through the hot tap clamp,  
 14 melting the powerline on the field phase of pole 110525757, causing the energized  
 15 powerline to fall to the ground. Energy continued from the source into the powerline  
 16 and ignited fire in several locations between poles 110525757 and 05172, while also  
 17 posing as a serious life safety hazard. Discovery of arcing in the hot tap clamp of the  
 18 center phase, south of pole 110525757 is similar in appearance to the failure on the  
 19 north side, field phase powerline, prior to the complete failure of the powerline.

20 Speaking to PG&E personnel there should be no room for arcing between a properly  
 21 installed hot tap clamp and the powerline conductor. Any arcing is evidence of a gap  
 22 between the hot tap clamp and conductor, possibly being faulty hot tap clamp  
 23 installation, or maintenance. END OF REPORT



# MCCOURTNEY WILDFIRE – GRASS VALLEY 1103

*CAL FIRE EVIDENCE RECORD*



17CANEU026295

MCCOURTNEY

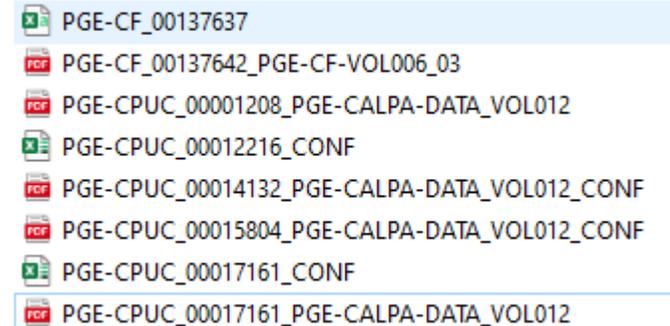
10/08/17

S.LARSEN #2087

# MCCOURTNEY WILDFIRE – GRASS VALLEY 1103

## REFERENCE DOCUMENTS

- ▶ PG&E McCourtney Incident Description & Factual Summary, McCourtney Supplemental Report
- ▶ Case 3:14-cr-00175-WHA Document 956-20, 956-40, File 12/31/18
- ▶ CAL FIRE Report 17CANEU026279, 17CANEU026295 10/8/2017
- ▶ CPUC E20171011-03, 5/6/2019
- ▶ PGE-CF\_00137637, PGE-CF\_00137642, PGE-CF\_00001208
- ▶ PG&E 17-0085336



- 2018.05.18 CPUC McCourtney Factual Report (20180522 - Highlighted)\_CONF (PDF icon)
- McCourtney Incident Description (PDF icon)
- McCourtney Supplemental Report (PDF icon)

# NORRBOM WILDFIRE SONOMA 1103

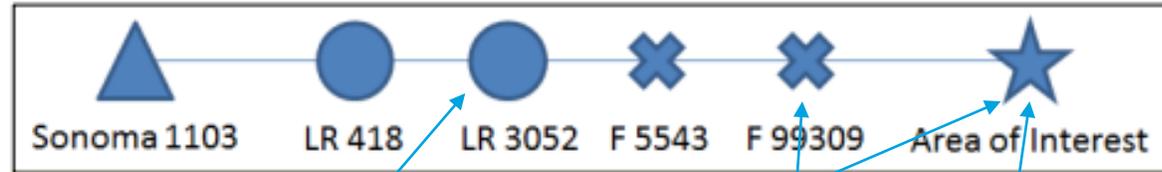
**(NORRBOM IS PART OF “NUNS FIRE” WHICH CONSISTS OF SIX FIRES: NUNS, ADOBE,  
NORRBOM, PRESSLEY, PARTRICK, AND OAKMONT. )**

# NORRBOM WILDFIRE – SONOMA 1103

## Incident Observations

- ▶ Tree Contacted Conductors
- ▶ Possible Energized Downed Conductor From 10/9/17 1:08PM – 10/10/17 12:17 PM
- ▶ Possible Failure of F99309 & F5543
- ▶ Possible High-Impedance Fault Condition
- ▶ Possible Electrical Back-Feed Scenario

## Incident Overview:



10/8/17 10:00PM  
Norrbon Fire Starts  
Per Cal Fire



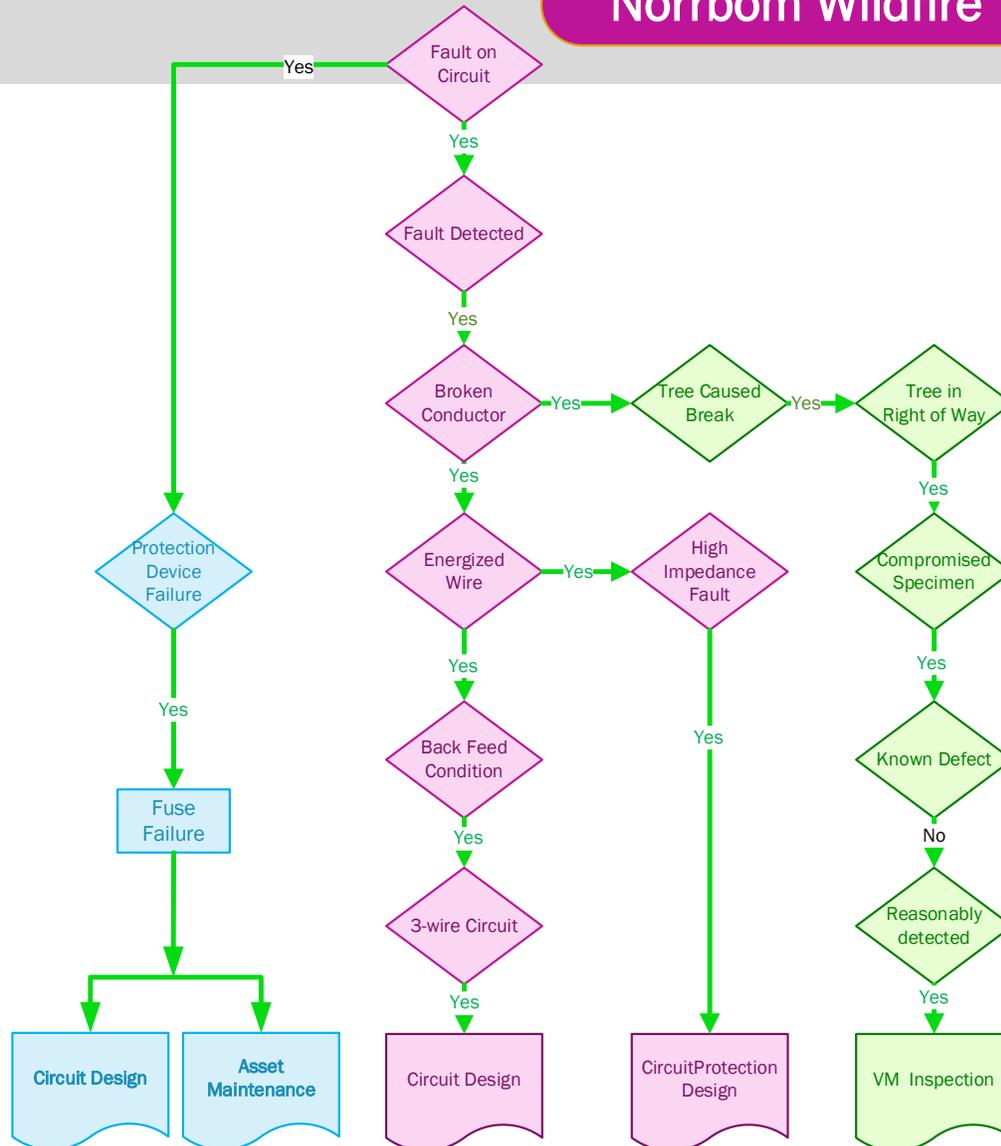
10/9/17 1:08 PM  
10 Meters Off

10/9/17 1:12 PM  
LR 3052 Detects &  
Reports MTT Conditions

10/10/17 12:17 PM  
PG&E finds two of three  
fuses blown at F99309  
& Opens Remaining Fuse

10/10/17 1:05 PM  
PG&E finds wire down

# Norrbon Wildfire

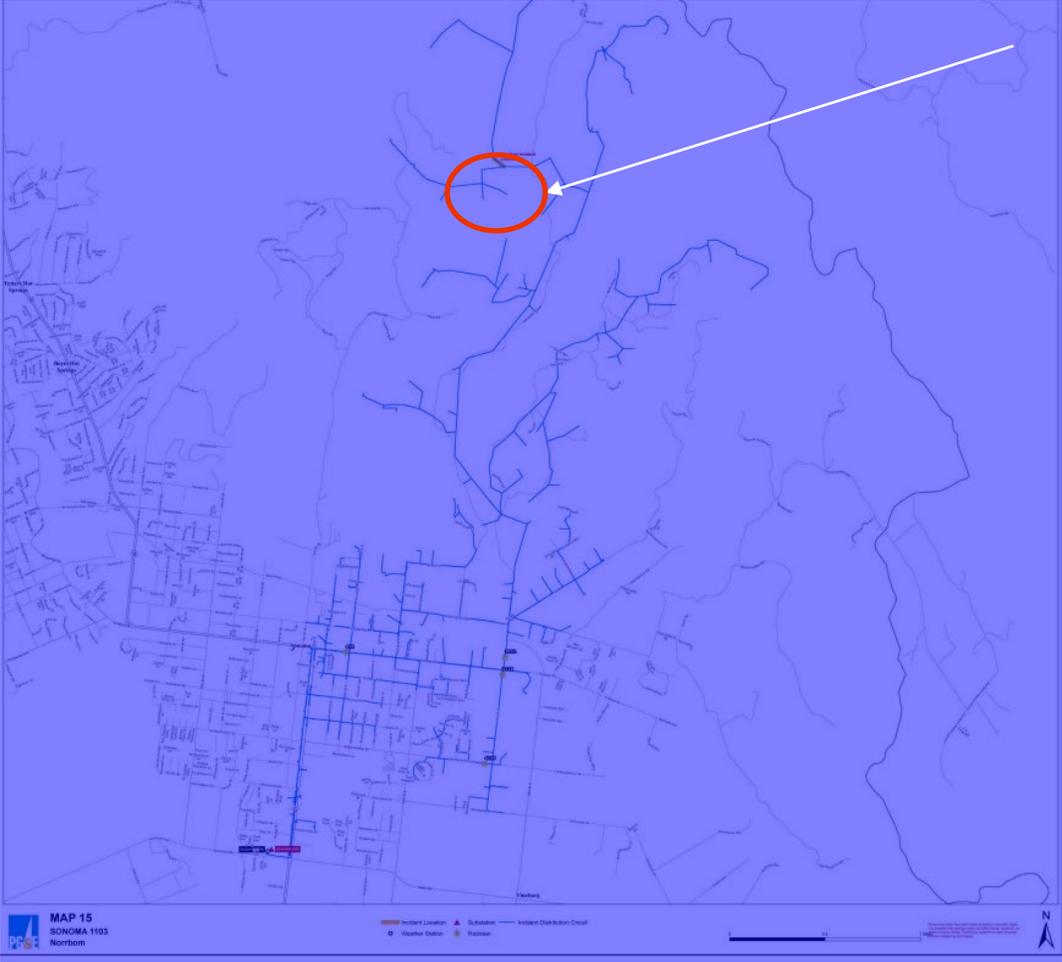


# NORRBOM WILDFIRE – SONOMA 1103

## VEGETATION MANAGEMENT

Condition	
Tree-Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	Yes
Known Defect or Condition	No
Reasonably Detected	Yes
Wind Event	Normal
Receptive Fuel Bed	Yes

# NORRBOM WILDFIRE – SONOMA 1103



# NORRBOM WILDFIRE – SONOMA 1103

## PG&E EVIDENCE RECORD IDFS

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### NORRBOM INCIDENT DESCRIPTION & FACTUAL SUMMARY

For completeness, this incident description and factual summary should be read in conjunction with the Factual Report Guidance and the contemporaneously submitted response to Question 62.

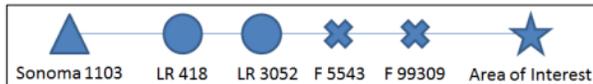
#### Background:

On October 20, 2017, PG&E filed an Electric Safety Incident Report (No. 171020-8590) concerning an incident that occurred near 16200 Norrbom Road, City of Sonoma, Sonoma County (the “incident location” as defined by the CPUC’s December 7, 2017, letter). CAL FIRE took possession of the conductors on the incident span on October 18, 2017. The conductors were in place and appeared to be in working order.

According to CAL FIRE’s website, the Norrbom fire is part of the “Nuns fire”, which consists of six different incidents: Nuns, Adobe, Norrbom, Pressley, Partrick and Oakmont.

According to CAL FIRE’s website, the Nuns fire started at 10:00 PM on October 8, 2017.

#### Incident Overview:



Based on PG&E records, on October 9, at 1:08 PM, ten smart meters on the load side of Fuse 99309 recorded NIC Power Down events. Six of these smart meters were downstream of the incident location. At 1:19 PM, a smart meter at service point 3918116205 and upstream of the incident location recorded a series of power off/on events until 1:53 PM.

Based on PG&E records, on October 10, at 12:17 PM, a PG&E troubleman reported two of three fuses blown on Fuse 99309, and he opened the remaining fuse. At 1:05 PM, the troubleman reported a wire down due to a tree six spans on the load side of Fuse 99309. This wire-down was located three spans to the source side of the incident location.

Based on PG&E records, on October 11, at 3:39 PM, a contract crew repaired the line at the wire-down location.

Based on PG&E records, on October 14, at 3:52 AM, CAL FIRE requested that PG&E de-energize the Sonoma 1103 Circuit east of the intersection of E Napa Street and 2nd Street. In response to CAL FIRE’s request, at 4:13 AM, a PG&E troubleman opened Switch 2910, de-energizing the portion of the Sonoma 1103 Circuit that CAL FIRE had requested. The section of the circuit beyond Fuse 99309, including the incident location, remained de-energized.

On October 18, CAL FIRE visited the incident span with PG&E and collected two primary conductors. The conductors were 4CU (Copper), installed in 1947. The conductors were in

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### SUPPLEMENT TO NORRBOM INCIDENT DESCRIPTION & FACTUAL SUMMARY

#### Supplemental Background Information:

On June 8, 2018, CAL FIRE issued a press release stating that the Norrbom fire “was caused by a tree falling and coming in contact with PG&E power lines.” CAL FIRE has not publicly released its investigation report.

PG&E is not aware of which specific location is referred to in CAL FIRE’s press release. It is possible CAL FIRE may be referring to a location at 16700 Gehricke Road, Sonoma, at which a black oak tree was found laying on downed conductors (the “wire down location”). The wire down location is located three spans to the source side of the location referenced in PG&E’s 20-Day Electric Incident Report and discussed in the Norrbom Factual Summary, located at 16250 Norrbom Road, Sonoma (the “EIR location”). As noted in the Norrbom Factual Summary, PG&E collected the black oak from the wire down location on March 29, 2018.

#### Supplemental Timeline Information:

The Norrbom Factual Summary contained a timeline of PG&E’s actions at or impacting the EIR location in the period immediately preceding CAL FIRE’s designated start time until service to the EIR location was restored. The following additional information is relevant to the Norrbom Fire timeline.

- **October 8, 2017, 10:36 PM:** A REDCOM Dispatch operator reports a structure fire at 16250 Norrbom Road.
- **October 8, 2017, 10:37 PM:** Sonoma Valley Fire Unit 3381 is dispatched to 2310 Norrbom Road to respond to a natural vegetation fire affecting a field / open land.
- **October 8, 2017, 11:02 PM:** Fire service personnel arrive at 2310 Norrbom Road to extinguish the fire.
- **October 8, 2017, 11:10 PM:** Fire service personnel leave 2310 Norrbom Road.
- **October 9, 2017, 8:15 AM:** Responder calls REDCOM Dispatch and relays that another engine had reported a possible column of smoke in the Norrbom Road area. Responder reports that they are in the Norrbom Road area and are unable to locate the smoke.
- **October 9, 2017, 8:17 AM:** Responder calls REDCOM Dispatch and relays that they have been stopped by people evacuating out of Norrbom Road who told them that there was a fire on Norrbom Road. Responder reports that they are continuing up the road.
- **October 9, 2017, 8:18 AM:** REDCOM Dispatch operator tells Responder that he is looking at her screen “outside the very end of Norrbom, and it looks like there’s

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a private road that leads to something. And there’s a flag there stating a fire”. The operator notes that he’s “going to check it a little further on [her] screen”.

- **October 9, 2017, 8:19 AM:** REDCOM Dispatch operator reports to Responder that REDCOM received a call at 7:30 in the morning from a caller at 16200 Norrbom Road, stating that there is vegetation in the area on fire. The REDCOM Dispatch operator reports that they advised the caller to evacuate and have not been able to put the call as an assigned call.
- **October 9, 2017, 8:20 AM:** REDCOM Dispatch operator reports “we had three events at Gehricke and Bain Ranch”. In another recording from the same time, a REDCOM Dispatch operator tells Responder that there are three events near Gehricke and Bain Ranch.
- **October 9, 2017, 8:21 AM:** Responder reports that they are at the top of Norrbom Road and that there is “drift smoke” but that they “can’t really actually see a fire”.
- **October 9, 2017, 8:43 AM:** Responder reports that they are heading up Gehricke Road and states that “possibly that’s where this new fire is”. Responder reports that they see some smoke and that there is a “new incident on Bain and Gehricke”. REDCOM Dispatch operator notes that they have “Gehricke and Bain Ranch Road”. Responder says, “that’s about where it looks like it’s at”.
- **October 10, 2017:** A PG&E troubleman who “reported a wire down due to a tree six spans on the load side of Fuse 99309”, responds to an outage at 16700 Gehricke Road. The PG&E troubleman meets with the homeowner who points in the direction of where he saw a fire originate down in a ravine. The PG&E troubleman and the homeowner then drive to 16600 Gehricke Road to Fuse 99309, where the PG&E troubleman discovers two of three fuses blown. The PG&E troubleman then patrols the line in the direction of where the homeowner had told him the fire started and finds a tree laying on a phone line with two severed conductors on the ground.

#### Supplemental Information Regarding Prior Inspections:

Between 2012 and October 2017, there were seven inspections of the vegetation at the wire down location. PG&E’s understanding based upon its records is that the tree that fell at the wire down location (the “subject tree”) was marked for trimming in March 2017 and was trimmed in May 2017. Additionally, PG&E’s understanding based upon its records is that there is no evidence of vegetation involvement at the EIR location. Therefore, we have confined the chart below to the vegetation management activity at the wire down location and have not included a summary of vegetation management patrols and inspections at the EIR location.

# NORRBOM WILDFIRE – SONOMA 1103

## PG&E EVIDENCE RECORD IDFS

2 of 3 fuses blown

Based on PG&E records, on October 10, at 12:17 PM, a PG&E troubleman reported two of three fuses blown on Fuse 99309, and he opened the remaining fuse. At 1:05 PM, the troubleman reported a wire down due to a tree six spans on the load side of Fuse 99309. This wire-down was located three spans to the source side of the incident location.

Based on PG&E records, on October 11, at 3:39 PM, a contract crew repaired the line at the wire-down location.

Based on PG&E records, on October 14, at 3:52 AM, CAL FIRE requested that PG&E de-energize the Sonoma 1103 Circuit east of the intersection of E Napa Street and 2nd Street. In response to CAL FIRE's request, at 4:13 AM, a PG&E troubleman opened Switch 2910, de-energizing the portion of the Sonoma 1103 Circuit that CAL FIRE had requested. The section of the circuit beyond Fuse 99309, including the incident location, remained de-energized.

On October 18, CAL FIRE visited the incident span with PG&E and collected two primary conductors. The conductors were 4CU (Copper), installed in 1947. The conductors were in

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place and in working order at the time they were collected. Based on PG&E's records, this was PG&E's first visit to the incident location.

Based on PG&E records, on October 22, at 9:03 PM, Fuse 99309 was closed, restoring power to the incident location.



# NORRBOM WILDFIRE – SONOMA 1103

## CPUC-SED EVIDENCE RECORD

**Utility Facilities Involved:** Sonoma 1103, 12 kV Circuit

**Violation:** Yes

### I. Summary

On October 8, 2017, at approximately 2200 hours, a branch of a Black Oak tree failed, fell, and contacted the overhead conductors of PG&E's Sonoma 1103, 12 kV circuit located near 16200 Norrbom Road in the city of Sonoma in Sonoma County. The contact caused a portion of the tree to ignite and fall. The burning tree material or sparks fell to the ground, thus starting the Norrbom Fire. The Norrbom Fire burned approximately 1,836 acres.

The Norrbom Fire was combined with several other fires, which were called collectively the Nuns<sup>1</sup> Fire. The Nuns Fire burned a total of 56,556 acres, destroyed 1,355 buildings, and damaged 172 buildings. Three fatalities occurred as a result of the Nuns

<sup>1</sup> The Nuns Fire included the Nuns, Oakmont/Pythian, Norrbom, Adobe, Pressley and Partrick fires. SED investigated each of these incidents except the Pressley fire, which was a spot fire that ignited from an ember that originated from the Adobe Fire

### VI. Conclusion

Based on the evidence that SED reviewed, SED's investigation found the following:

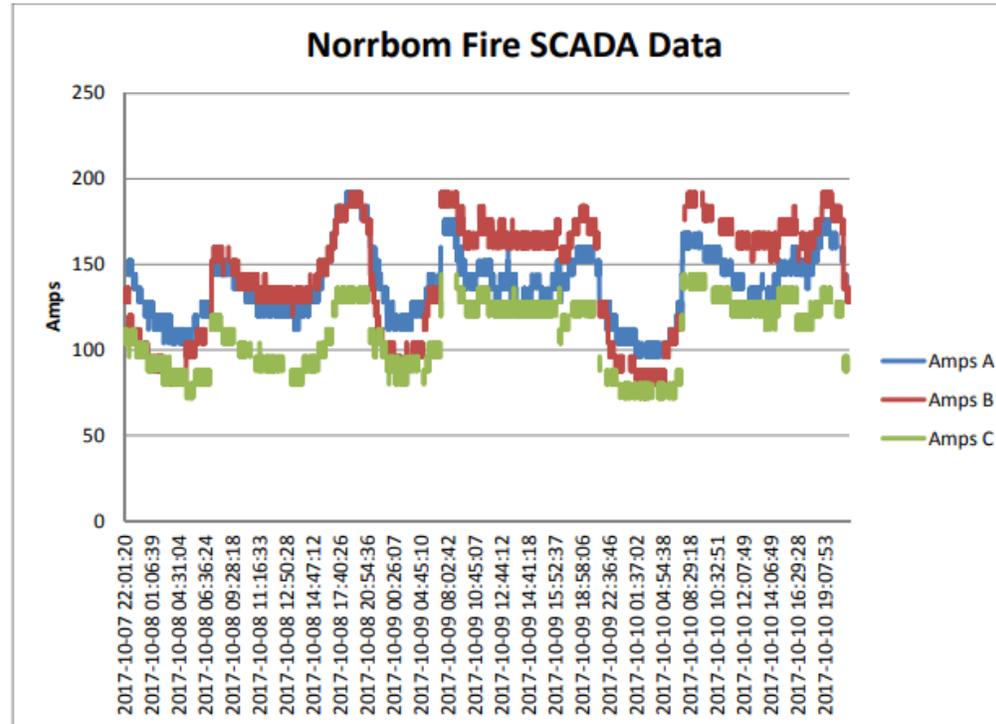
- ... PG&E violated GO 95, Rule 31.1, by failing to maintain their facilities to allow for safe, proper, and adequate service. PG&E failed to identify a hazardous tree condition despite the tree having visible defects, decay, and rot. PG&E did not take the appropriate steps to prevent the subject tree from falling into the overhead conductors. PG&E did not document the subject tree for trim or removal.
- ... PG&E violated GO 95, Rule 35, by failing to maintain the rule's clearance requirements for the hazardous subject tree that fell into the overhead conductors.

If SED becomes aware of additional information that could modify SED's findings in this Incident Investigation Report, SED may re-open the investigation and may modify this report or take further actions as appropriate.

All violations disputed by PG&E

# NORRBOM WILDFIRE – SONOMA 1103

## CPUC-SED EVIDENCE RECORD



**Figure 5:** Plot of SCADA data from Sonoma 1103 CB for each phase from 24 hours prior to 48 hours after the CAL FIRE designated start time.

The start time for the Norrbom Fire according to CAL FIRE was 2200 hours on October 8, 2017. Based on Figure 5, on the day of the incident, the circuit experienced an outage between 17:40 and 20:54 hours. The decline in circuit amperage from then on indicates interruption in service either affected by the fire or by protection devices tripping.



# NORRBOM WILDFIRE – SONOMA 1103

## REFERENCE DOCUMENTS

- ▶ PG&E Norrbom Incident Description & Factual Summary, Norrbom Supplemental Report
- ▶ Case 3:14-cr-00175-WHA Document 956-21 & 41, Filed 12/31/18
- ▶ CAL FIRE Report 17CALNU010142
- ▶ CPUC-SED – Incident Investigation Report, E20171020-05, 10/8/2017

-  PGE-CPUC\_00005394\_CONF
-  PGE-CPUC\_00005394\_PGE-CALPA-DATA\_VOL012
-  PGE-CPUC\_00007891
-  PGE-CPUC\_00007891\_PGE-CALPA-DATA\_VOL012
-  PGE-CPUC\_00014224\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00014236\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00014244\_PGE-CALPA-DATA\_VOL012\_CONF

 2018.05.04 FINAL CPUC Norrbom Factual Report\_CONF

 Norrbom Incident Description

 Norrbom Supplemental Report

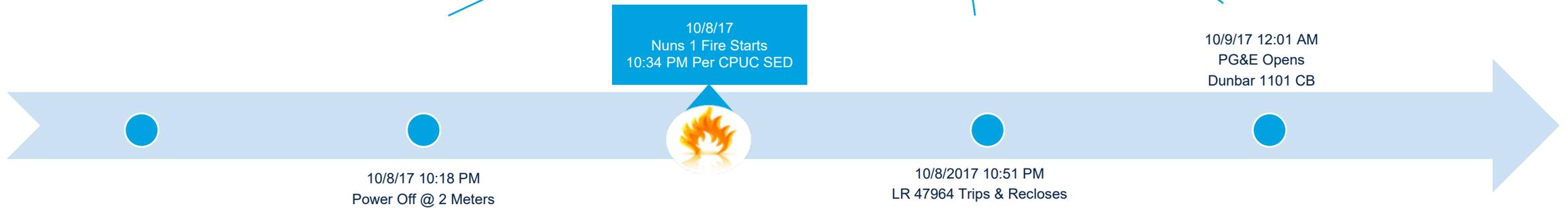
# NUNS #1 WILDFIRE – DUNBAR 1101

(NUNS FIRE CONSISTS OF SIX DIFFERENT FIRES: NUNS, ADOBE, NORRBOM, PRESSLEY, PARTRICK AND OAKMONT)

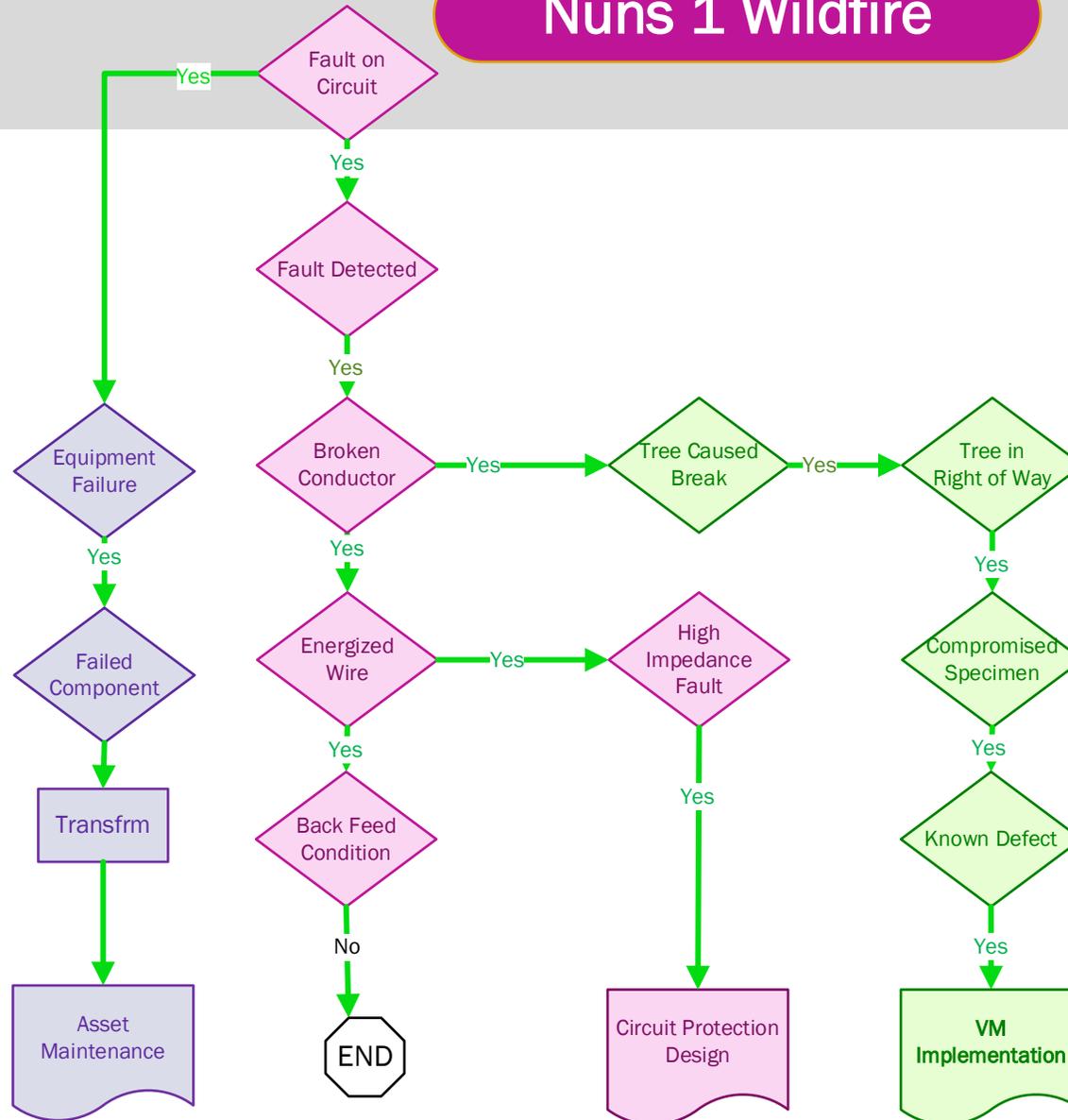
# NUNS #1 WILDFIRE – DUNBAR 1101

## Incident Observations

- ▶ Tree Contacted Secondary Conductors
- ▶ Possible Secondary Conductors Down  
10/8/17 10:18PM – 10/9/17 12:01 AM
- ▶ Possible Equipment Failure (xfmr internal fusing)



# Nuns 1 Wildfire



# NUNS #2 WILDFIRE – DUNBAR 1101

## Incident Observations

- ▶ Inconclusive Data to Support Analysis
- ▶ Possible Downed Energized Conductor  
10/8/17 10:51 PM – 10/9/17 12:01 AM
- ▶ Possible High-Impedance Fault Condition
- ▶ Possible Back-Feed Condition



10/8/2017 10:51 PM  
LR 47964 Detects MTT  
Trips & Recloses

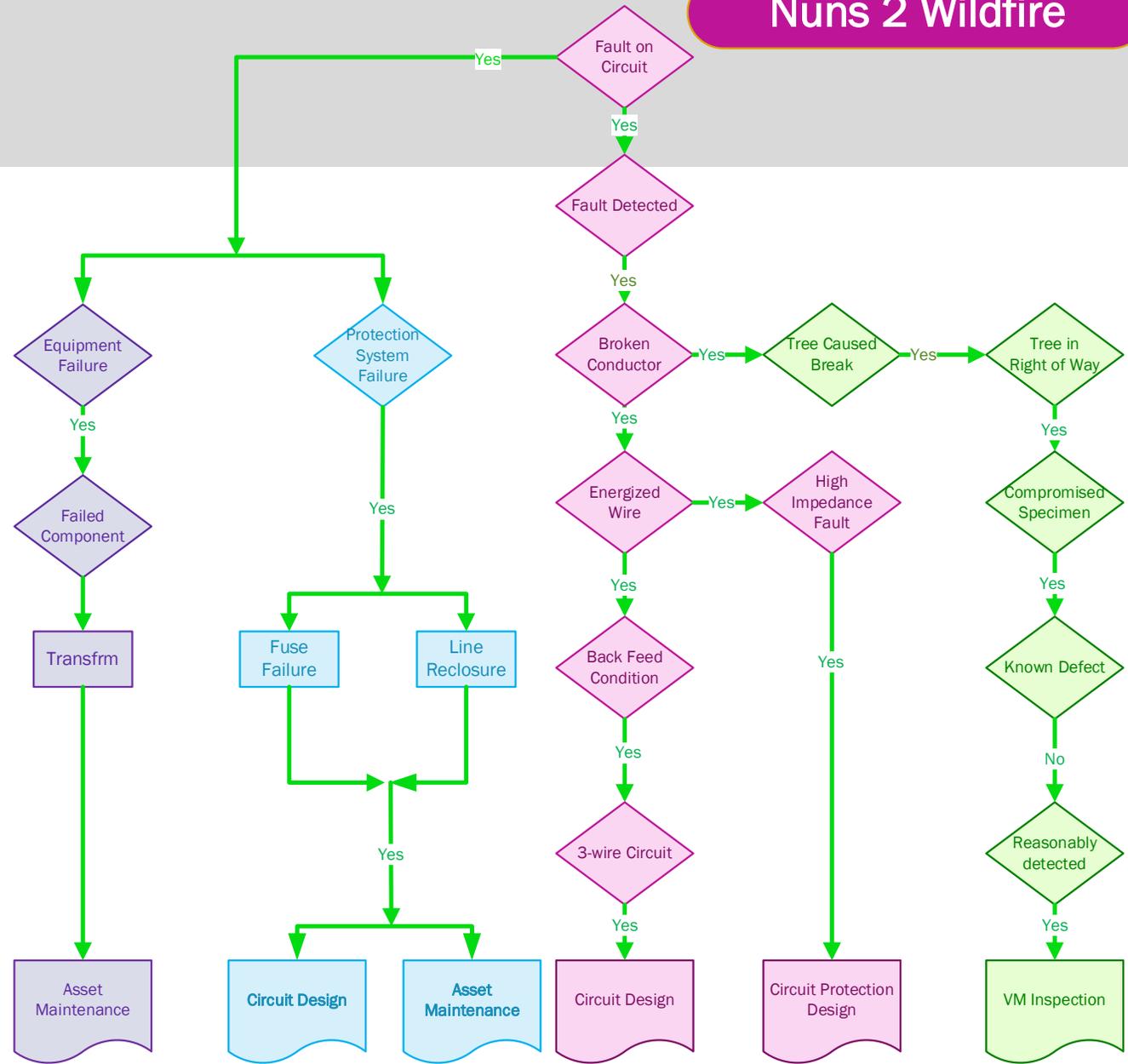
10/9/17 12:01 AM  
PG&E Manually  
Opens CB 1101

10/18/17 6:00PM  
PG&E Finds 2 of 2  
Fuses Opened

10/8/17 11:58 PM  
Dunbar 1101 CB  
Detects Fault  
Trips & Recloses

10/16/17 PG&E  
Finds Downed Conductors  
Near Fuse 15877  
No Report on Fuse Condition

# Nuns 2 Wildfire

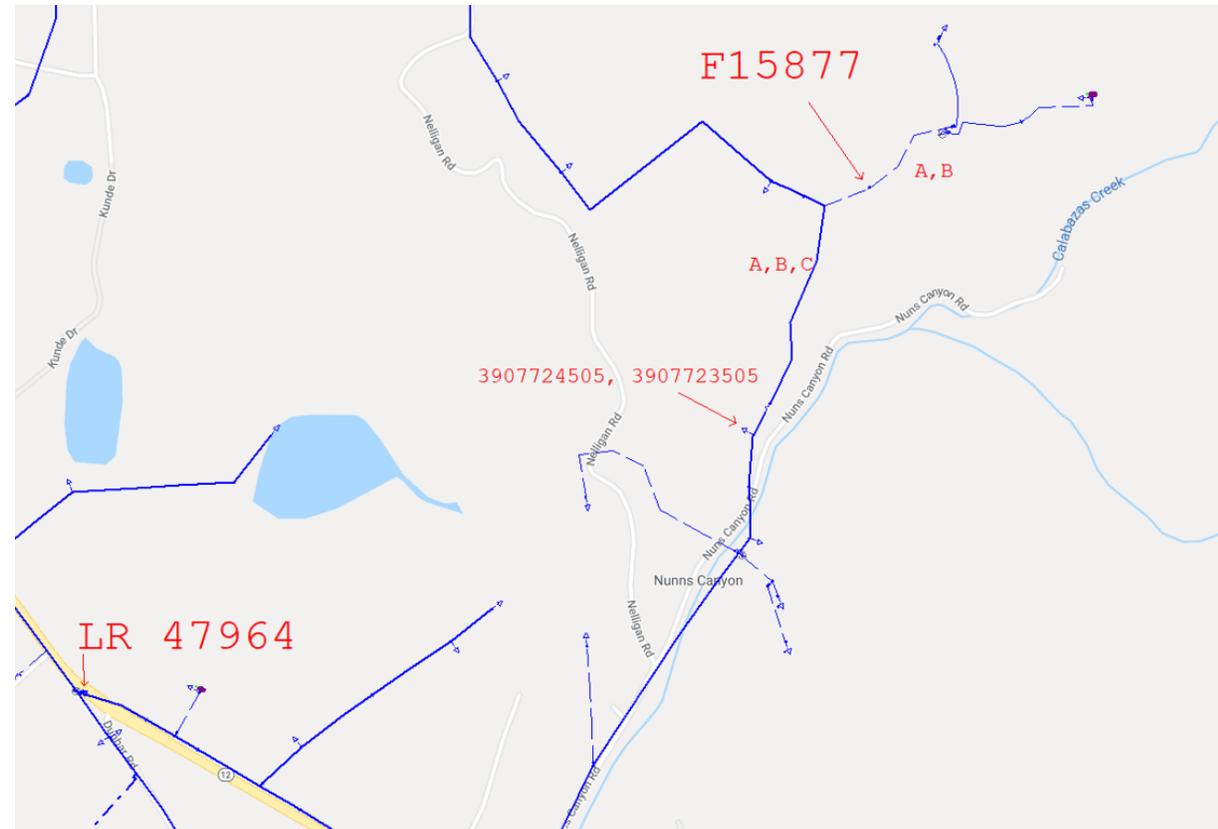
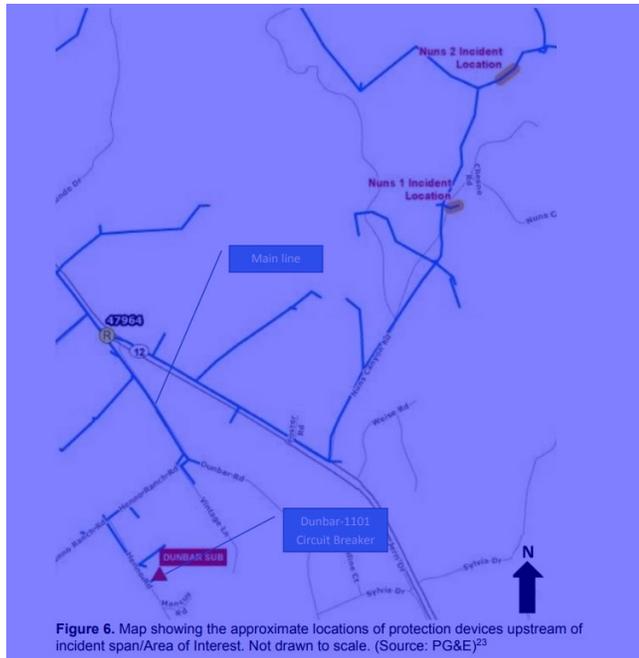


# NUNS WILDFIRE – DUNBAR 1101

## VEGETATION MANAGEMENT

Condition	Nuns 1	Nuns 2
Tree-Caused Break	Yes	Yes
Tree In or Along ROW	Yes	Yes
Compromised Specimen	No	Yes
Known Defect or Condition	Yes	No
Reasonably Detected	Yes	Yes
Wind Event	Normal	Normal
Receptive Fuel Bed	Yes	Yes

# NUNS WILDFIRE – DUNBAR 1101



# NUNS WILDFIRE – DUNBAR 1101

## PG&E EVIDENCE RECORD IDFS

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### NUNS INCIDENT DESCRIPTION & FACTUAL SUMMARY

For completeness, this incident description and factual summary should be read in conjunction with the contemporaneously submitted response to Question 62.

#### **Background:**

On October 16, 2017, PG&E filed an Electric Safety Incident Report (Incident No. 171016-8576) concerning an incident that occurred near 1210 Nuns Canyon Road, Glen Ellen, Sonoma County (“the Nuns 1 incident location” as defined by the CPUC’s December 7, 2017, letter). When PG&E was granted access to the Nuns 1 incident location, PG&E observed that the top section of a green, healthy Alder tree had broken and was laying on the ground near one of three conductors of a downed open wire secondary service of the Dunbar 1101 (12 kV) Circuit, which serves the residence of 1210 Nuns Canyon Road, Glen Ellen, CA 95442. The Alder tree was rooted approximately 30 feet from the overhead secondary service conductors.

On the same day that PG&E filed its report concerning the Nuns 1 incident location, PG&E identified downed primary conductors on the Dunbar 1101 (12 kV) Circuit near Fuse 15877 on Nuns Canyon Road, Glen Ellen, Sonoma County (“the Nuns 2 incident location” as defined by the CPUC’s December 7, 2017, letter). The Nuns 2 incident location is approximately 0.4 miles away and downstream from the Nuns 1 incident location. PG&E notified CAL FIRE regarding the Nuns 2 incident location on October 16, 2017. CAL FIRE released the Nuns 2 incident location on October 18, 2017, and did not request any electric facilities from the Nuns 2 incident location. PG&E filed an Electric Safety Incident Report (Incident No. 171031-8606) for the Nuns 2 incident location on October 31, 2017.

At 10:18 PM on October 8, two smart meters at service points 3907724505 and 3907723505, located downstream of the Nuns 1 incident location, both reported a Last Gasp event. At 10:51 PM, Line Recloser 47964 operated and reclosed, resulting in an approximately 10-second outage at the Nuns 1 and Nuns 2 incident locations. At approximately 12:01 AM on October 9, the Dunbar 1101 Circuit Breaker was remotely opened via SCADA, de-energizing the incident location. This was done at the request of CAL FIRE to de-energize the area due to fire activity.

According to PG&E records, on October 11, a Troublemaker was the first responder to the incident locations after the fire started. When the Troublemaker attempted to access the incident locations, he patrolled Nuns Canyon Road just past where the road intersects with Highway 12. However, per the Troublemaker, Nuns Canyon Road was impassable due to both (1) a downed tree laying across the road (which was not near any PG&E lines), and (2) a private citizen who parked his car on the road and prevented traffic from passing through.

CAL FIRE released the Nuns 1 incident location on October 16 and PG&E accessed the Nuns 1 incident location on the same day. PG&E identified a green, healthy Alder tree whose top section had broken and was laying on the ground near one of three conductors of a downed open wire secondary service of the Dunbar 1101 Circuit. The Alder tree was rooted approximately 30 feet from the overhead secondary service conductors. The conductors were 1/0 Al (Aluminum, Bare) installed in 1953.

# NUNS WILDFIRE – DUNBAR 1101

## PG&E EVIDENCE RECORD ILIS

### LR 47964 MTT

Date	LogDescription
10/8/2017 5:40	(P01) 1-SANTA ROSA sonoma lr 47964 battery test is TEST
10/8/2017 5:41	(P01) 1-SANTA ROSA sonoma lr 47964 battery test is NORMAL
10/8/2017 22:51	(P04) 1-SANTA ROSA sonoma lr 47964 lr above mtt is NORMAL
10/8/2017 22:51	(P08) 1-SANTA ROSA sonoma lr 47964 lr position is OPEN
10/8/2017 22:51	(P04) 1-SANTA ROSA sonoma lr 47964 lr above mtt is ALARM
10/8/2017 22:51	(P08) 1-SANTA ROSA sonoma lr 47964 lr position is CLOSED
10/8/2017 22:51	(P03) 1-SANTA ROSA sonoma lr 47964 rcl in progress is NORMAL
10/8/2017 22:51	(P03) 1-SANTA ROSA sonoma lr 47964 b ph tgt is ALARM
10/8/2017 22:51	(P03) 1-SANTA ROSA sonoma lr 47964 c ph tgt is ALARM
10/8/2017 22:51	(P03) 1-SANTA ROSA sonoma lr 47964 rcl in progress is ALARM

### CB 1101 Sequence Trip & Reclose

10/8/2017 23:58	(P05) 1-Santa Rosa Dunbar Substation cb 1101 amps a is High 597.22 AMPS, Limit = 570
10/8/2017 23:58	(P06) 1-Santa Rosa Dunbar Substation cb 1101 amps a is High High 597.22 AMPS, Limit = 590
10/8/2017 23:58	(P03) 1-Santa Rosa Dunbar Substation cb 1101 pri ph time tgt is ALARM
10/8/2017 23:58	(P09) 1-Santa Rosa Dunbar Substation cb 1101 position is OPEN
10/8/2017 23:58	(P03) 1-Santa Rosa Dunbar Substation cb 1101 bu rly tgt is NORMAL
10/8/2017 23:58	(P03) 1-Santa Rosa Dunbar Substation cb 1101 pri ph time tgt is NORMAL
10/8/2017 23:58	(P03) 1-Santa Rosa Dunbar Substation cb 1101 bu rly tgt is ALARM
10/8/2017 23:58	(P06) 1-Santa Rosa Dunbar Substation cb 1101 amps a High High is Normal 0.00 AMPS, Limit = 580
10/8/2017 23:58	(P05) 1-Santa Rosa Dunbar Substation cb 1101 amps a High is Normal 0.00 AMPS, Limit = 560
10/8/2017 23:58	(P09) 1-Santa Rosa Dunbar Substation cb 1101 position is CLOSED
10/8/2017 23:59	(P01) 1-SANTA ROSA sonoma lr 47964 c ph pot is HOT
10/8/2017 23:59	(P01) 1-SANTA ROSA sonoma lr 47964 a ph pot is HOT
10/8/2017 23:59	(P01) 1-SANTA ROSA sonoma lr 47964 b ph pot is DEAD
10/8/2017 23:59	(P01) 1-SANTA ROSA sonoma lr 47964 c ph pot is DEAD
10/8/2017 23:59	(P01) 1-SANTA ROSA sonoma lr 47964 a ph pot is DEAD
10/8/2017 23:59	(P01) 1-SANTA ROSA sonoma lr 47964 b ph pot is HOT
10/9/2017 0:00	(P02) Control Select 1-Santa Rosa Dunbar Substation cb 1101 rcl rly for C/OUT by rtwsnorth at rkldccws05
10/9/2017 0:00	(P02) Control Execute 1-Santa Rosa Dunbar Substation cb 1101 rcl rly by rtwsnorth at rkldccws05
10/9/2017 0:00	(P02) Commanded Change for 1-Santa Rosa Dunbar Substation cb 1101 rcl rly is C/OUT
10/9/2017 0:01	(P02) Control Select 1-Santa Rosa Dunbar Substation cb 1101 position for OPEN by rtwsnorth at rkldccws05
10/9/2017 0:01	(P02) Control Execute 1-Santa Rosa Dunbar Substation cb 1101 position by rtwsnorth at rkldccws05
10/9/2017 0:01	(P02) Commanded Change for 1-Santa Rosa Dunbar Substation cb 1101 position is OPEN

# NUNS WILDFIRE – DUNBAR 1101

## PG&E EVIDENCE RECORD ILIS

### LR 47964 Data From PGE-CPUC\_00007896

Date	LogDescription
10/8/2017 5:40	(P01) 1-SANTA ROSA sonoma lr 47964 battery test is TEST
10/8/2017 5:41	(P01) 1-SANTA ROSA sonoma lr 47964 battery test is NORMAL
10/8/2017 22:51	(P04) 1-SANTA ROSA sonoma lr 47964 lr above mtt is NORMAL
10/8/2017 22:51	(P08) 1-SANTA ROSA sonoma lr 47964 lr position is OPEN
10/8/2017 22:51	(P04) 1-SANTA ROSA sonoma lr 47964 lr above mtt is ALARM
10/8/2017 22:51	(P08) 1-SANTA ROSA sonoma lr 47964 lr position is CLOSED
10/8/2017 22:51	(P03) 1-SANTA ROSA sonoma lr 47964 rcl in progress is NORMAL
10/8/2017 22:51	(P03) 1-SANTA ROSA sonoma lr 47964 b ph tgt is ALARM
10/8/2017 22:51	(P03) 1-SANTA ROSA sonoma lr 47964 c ph tgt is ALARM
10/8/2017 22:51	(P03) 1-SANTA ROSA sonoma lr 47964 rcl in progress is ALARM

### LR 47964 Data From Nuns3\_Loc1\_SCADA\_PGE-CPUC\_0007

Date	LogDescription
10/8/2017 22:51	(P03) 1-SANTA ROSA sonoma lr 47964 rcl in progress is NORMAL
10/8/2017 22:51	(P04) 1-SANTA ROSA sonoma lr 47964 lr above mtt is ALARM
10/8/2017 22:51	(P08) 1-SANTA ROSA sonoma lr 47964 lr position is CLOSED
10/8/2017 22:51	(P04) 1-SANTA ROSA sonoma lr 47964 lr above mtt is NORMAL
10/8/2017 22:51	(P03) 1-SANTA ROSA sonoma lr 47964 rcl in progress is ALARM
10/8/2017 22:51	(P03) 1-SANTA ROSA sonoma lr 47964 c ph tgt is ALARM
10/8/2017 22:51	(P03) 1-SANTA ROSA sonoma lr 47964 b ph tgt is ALARM
10/8/2017 22:51	(P08) 1-SANTA ROSA sonoma lr 47964 lr position is OPEN

LR 47964 Data Set Conflict & Inconclusive  
Open or closed?

# NUNS #1 WILDFIRE – DUNBAR 1101

## CPUC-SED EVIDENCE RECORD

**Utility Facilities Involved:** Dunbar-1101, Secondary conductors

**Violation:** Yes

### I. Summary

On October 8, 2017 at approximately 2218 hours, a branch from an Alder tree fell and contacted overhead, secondary voltage conductors of PG&E's Dunbar-1101 circuit supplying power to 1210 Nuns Canyon Road in the city of Glen Ellen in Sonoma County. As a result, PG&E's secondary (120/240 V) conductors failed and fell to the ground, thus igniting the Nuns Fire.

### IV. CAL FIRE Investigation

CAL FIRE investigator, Captain Kyle Steis, determined that the "the Nuns Fire ignited as a result of a section of an Alder tree detaching from the stem and contacting an energized powerline conductor causing the conductor to fall to the ground contacting a

receptive fuel bed and ignited the Nuns fire."<sup>39</sup> Captain Steis determined that the subject Alder branch failed and fell into secondary voltage conductors.

Mr. Porter, the CAL FIRE contracted ISA Certified Arborist, did not note any visual signs of decay on the Alder tree that contributed to the branch failure. Also, Mr. Steuterman reported "no infections were observed at these sites"<sup>40</sup> for Nuns 1. CAL FIRE did not identify any violations by PG&E for the Nuns fire.<sup>41</sup>

Mr. Porter and Mr. Steuterman, who are trained and qualified professionals in a vegetation management related field, did not identify signs of hazardous tree conditions that PG&E inspectors would have reasonably been able to identify and mitigate prior to the fire.

### V. Conclusion

Based the evidence reviewed, SED found a violation by PG&E of GO 95, Rule 35 relating to PG&E's discovery during a September 22, 2017 detailed inspection of a tree that was in contact with and straining a secondary conductor and for which PG&E improperly prioritized the needed vegetation work to correct this immediate safety hazard. PG&E inspectors found the unsafe condition on September 22, 2017<sup>42</sup> and produced work order #113271607. Although this violation did not directly contribute to the ignition of the Nuns fire, it represents an unsafe practice conducted by PG&E.

Disputed by PG&E

# NUNS #2 WILDFIRE – DUNBAR 1101

## CPUC-SED EVIDENCE RECORD

On November 21, 2017, SED staff field investigated the Nuns 2 site that PG&E's contracted investigator identified. During SED's visit, PG&E retained two AT&T cable bundles left on the side of the road. PG&E employees also retrieved two solid copper conductor spans between the subject poles on this site. However, CAL FIRE investigators ruled out this site as an ignition point for the Nuns fire<sup>37</sup>.

On June 11, 2018, SED staff visited PG&E's evidence storage location in Oakland, California. SED identified abrasion and separation for the solid copper conductors PG&E retained from Nuns 2. The conductors were labeled as part of the Nuns fire at 1210 Nuns Canyon Road.



# NUNS WILDFIRE – DUNBAR 1101

## CAL FIRE EVIDENCE RECORD

26 Based on my origin and cause investigation, I determined the Nuns Fire ignited as a result  
27 of a section of an alder tree detaching from the stem and contacting an energized  
28 powerline conductor causing the conductor to fall to the ground contacting a receptive  
29 fuel bed and ignited the Nuns Fire.  
30

I observed the west span powerline conductor that was connected to the pump house power pole resting on the ground. I observed a section of tree had detached from the stem and was resting on top of the west span powerline conductor. It appeared when the section of tree detached from the stem, it fell towards the east and came in contact with the west span powerline conductor, causing the powerline conductor to separate and fall to the ground. A short section of the west span powerline conductor remained attached to the cross arm of the power pole next to the pump house. The center and east powerline conductors remained suspended. The center span powerline conductor appeared to have a bow in it (IMG\_1629).

# NUNS WILDFIRE – DUNBAR 1101

## REFERENCE DOCUMENTS

- ▶ PG&E Nuns Incident Description & Factual Summary, PG&E Nuns Supplemental Report
- ▶ CPUC-SED Incident Investigation Report – E20171016-01, 4/30/2017
- ▶ CAL FIRE Report – 17 CALNU 010049, 10/8/2017

 PGE-CPUC\_00001211-PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00001212-PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00007893\_PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00007896\_PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00012216\_PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00013124\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00015765\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00017161\_PGE-CALPA-DATA\_VOL012

 Nuns3\_Loc1\_SCADA\_PGE-CPUC\_00007893

 Nuns3\_Loc2\_SCADA\_PGE-CPUC\_00007896

 PGE-CPUC\_00007893

 PGE-CPUC\_00007896

 Nuns4\_LR47964 SOE\_DRU789\_PGE-CPUC\_00020735

 Nuns5\_AMI\_Nuns\_Events

 Nuns5\_PGE-CF\_00000027\_CONF

 Nuns5\_PGE-CF\_00000028\_CONF

 Nuns5\_SM\_event\_from10\_08\_CONF

 PGE-CPUC\_00012216

 PGE-CPUC\_00017161\_CONF

# OAKMONT WILDFIRE – RINCON 1101

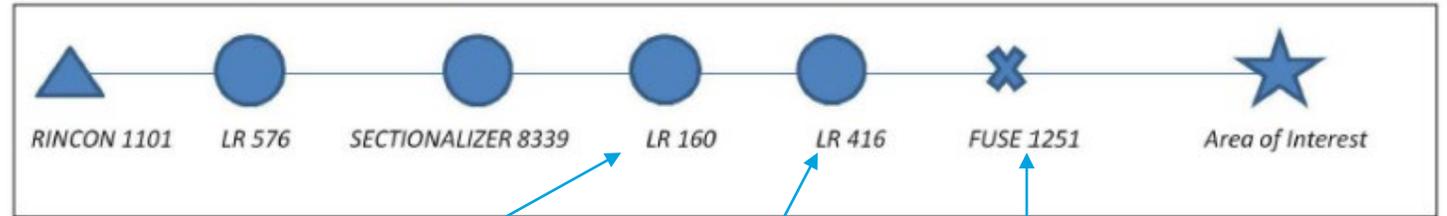
\* RESTORATION RECONFIGURATION DUNBAR 1101

(NUNS FIRE CONSISTS OF SIX DIFFERENT FIRES: NUNS, ADOBE, NORRBOM, PRESSLEY,  
PARTRICK AND OAKMONT)

# OAKMONT WILDFIRE – RINCON 1101

## Incident Observations

- ▶ Tree Contact From 30 Feet
- ▶ Possible Energized Downed Conductor From 10/13/17 2:24 PM – 10/13/17 5:08PM
- ▶ Possible Operating Error
- ▶ Possible Failure of Fuse 1251 (1 of 2 blown)
- ▶ Possible High-Impedance Fault
- ▶ Possible Back-Feed Conditions



10/13/17 2:24 PM  
PG&E Closes LR 160

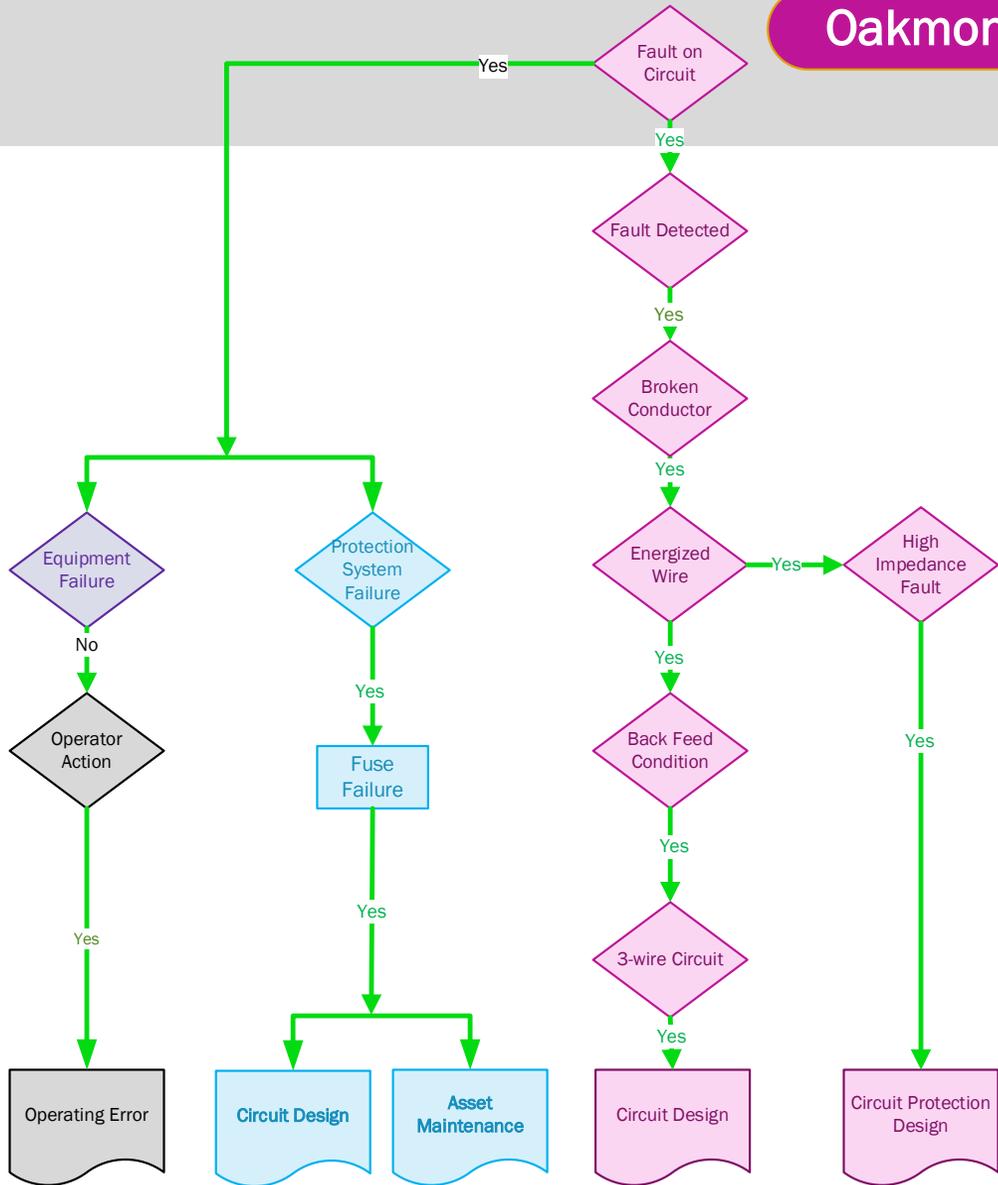
10/13/17 2:56 PM  
Oakmont Fire Starts  
Per CPUC

10/13/17 2:56 PM  
LR 416 Detects  
MTT & Ground Fault

10/14/17 8:35 PM  
Oakmont Fire Starts  
Per Cal Fire

10/13/17 5:08 PM  
PG&E Finds 1 of 2  
Fuses Blown at Fuse 1251  
Opens 1251 Event Ends

# Oakmont/Pythian Wildfire



# OAKMONT – RICON 1106

## VEGETATION MANAGEMENT

Condition	
Tree Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	No
Known Defect or Condition	N/A
Reasonably Detected	N/A
Wind Event	Normal
Receptive Fuel Bed	Yes

# OAKMONT WILDFIRE – RINCON 1101

## PG&E EVIDENCE RECORD IDFS

The incident location is ordinarily served by the Dunbar 1101 Circuit.<sup>1</sup> Line Recloser 234 is two line reclosers upstream of the incident location when the incident location is served by the Dunbar 1101 Circuit. Based on PG&E records, Line Recloser 234 was opened remotely via SCADA on October 8 at 11:35 PM, de-energizing the incident location until October 13.

Based on PG&E records, on October 13, 2017 by 12:12 PM, PG&E switched the source of power to the incident location from the Dunbar 1101 Circuit to the Rincon 1101 Circuit by opening Switch 1263 and closing Switch 6173. As a result, PG&E energized the circuit from the Rincon 1101 substation up to Line Recloser 160, which is two line reclosers upstream of the incident location when the area is served by the Rincon 1101 Circuit. Based on PG&E records, Line Recloser 160 had operated and locked out at 10:34 PM on October 8, 2017, when it was fed by the Dunbar 1101 Circuit, and it remained open at the time of switching. Therefore, the incident location, which is beyond Line Recloser 160, continued to be de-energized after the switching events.

Based on PG&E records, on October 13, 2017, PG&E patrolled the load side of Fuse 1251, the fuse immediately upstream of the incident location, to restore power. On the load side of Fuse 1251, the line forks to the east on one side and to the northwest on the other side. Based on PG&E records, at 1:22 PM, a troubleman reported wire down at the first tap to the east and that the jumpers were opened. The incident location is on the tap line to the northwest. Based on PG&E records, at 2:13 PM, after a patrol of the area, PG&E re-energized the incident location by closing Switch 14261, and subsequently closing Line Recloser 160 remotely via SCADA. Both devices are upstream of the incident location when the incident location is served by the Rincon 1101 Circuit.

Based on PG&E records, between 2:56 PM and 3:00 PM on October 13, 2017, 14 of 17 smart meters downstream of Fuse 1251 recorded a NIC Power Down and Restore event and/or a zero volt reading. Based on PG&E records, at 3:54 PM, all 14 of those meters recorded a NIC Power Down event.

Based on PG&E records, the troubleman who had previously patrolled the load side of Fuse 1251 later returned to the area on the same day. Based on PG&E records, at 5:08 PM, he reported one of two fuses at Fuse 1251 blown. At that time, he also reported that he opened the second fuse and tagged Fuse 1251 for a follow-up patrol, de-energizing the incident location, downstream of Fuse 1251.

On the evening of October 13, 2017, according to PG&E records, a different troubleman was the first PG&E employee at the incident location after the fire started. Per the troubleman, he met CAL FIRE at the intersection of Highway 12 and Pythian Road. Per the troubleman, CAL FIRE led him to the incident location so that he could make the lines at the incident location safe. The troubleman followed a CAL FIRE pickup truck and two bulldozers up a hill, and he arrived at the incident location approximately 30 to 45 minutes later. At the incident location, the troubleman saw two of two phases of the incident span down, which he reported at 8:23 PM on October 13, 2017, according to PG&E records.

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### SUPPLEMENT TO OAKMONT INCIDENT DESCRIPTION & FACTUAL SUMMARY

#### Supplemental Background Information:

On June 8, 2018, CAL FIRE issued a press release stating that the Oakmont fire was “caused by a downed power line after PG&E attempted to re-energize the line”. CAL FIRE has not publicly released its investigation report.

#### Supplemental Incident Overview Information:

In the Oakmont Factual Summary, PG&E explained that its understanding based upon its records is that on October 13, 2017, a PG&E troubleman patrolled the load side of Fuse 1251 before PG&E re-energized the incident location.

According to the PG&E troubleman, he patrolled up to a fence and performed a visual inspection of the portion of the line beyond the fence that was visible from that vantage point.

In the Oakmont Factual Summary, PG&E also explained that its understanding based upon its records is that on October 13, 2017 between 2:56 PM and 3:00 PM, and again at 3:54 PM, 14 of 17 Smart Meters downstream of Fuse 1251 recorded a NIC Power Down and Restore event and/or a zero volt reading.

PG&E’s understanding based upon its records is that when PG&E re-energized the conductors surrounding the incident location, 14 of 17 Smart Meters along the tap line past Fuse 1251 came back online and three Smart Meters did not. Two of those three were downstream of the incident location.

In the Oakmont Factual Summary, PG&E explained that on October 13, 2017, a PG&E troubleman met CAL FIRE at the incident location so that he could make the lines at the incident location safe. This troubleman arrived at the area around 5:30 PM. Engine 25 of the Santa Rosa Fire Department had arrived at the Oakmont incident location at 4:59 PM. According to the Captain of Engine 25, his crews were standing by waiting for confirmation from PG&E that the lines were de-energized. Also according to the Captain, he moved his crews back down to Pythian Road after a long wait (more than 2.5 hours) due to “hazardous” conditions in the area and because the PG&E troubleman who was at the site could not confirm that the lines were de-energized. However, PG&E’s understanding based upon its records is that the PG&E troubleman had ensured that the lines were de-energized before leaving the area around 8:30 PM.

# OAKMONT WILDFIRE – RINCON 1101

## PG&E EVIDENCE RECORD IDFS

1424 hours – LR-160 was closed remotely by PG&E's Distribution Control Center (DCC).<sup>30</sup> When "PG&E re-energized the conductors surrounding the incident location, 14 of 17 Smart Meters along the tap line past Fuse 1251 came back online and three Smart Meters did not. Two of those three were downstream of the incident location."<sup>31</sup>

1427 hours – Since LR-160 was now operational, Switch-14261 opened to undo the bypass of LR-160.

### 1456 hours - Approximate ignition time of Oakmont/Pythian fire.

LR-416 recorded an alarm condition and normal condition at the same time for the minimum to trip reading.<sup>32</sup> This may indicate an open and reclose operation. The LR also registered a ground fault condition based on the SCADA ground amperage reading of 2 amps and increasing to a peak of 8 amps.<sup>33</sup>

Between 1456 hours and 1500 hours - 14 of the 17 smart meters downstream of Fuse 1251 recorded power issues and/or a zero voltage reading.<sup>34</sup>

1522 hours – PG&E field personnel reports "trees falling" and "needs to be patrolled again".<sup>35</sup>

1533 hours - CAL FIRE was dispatched to a report of a fire near Pythian Road and Highway 12.<sup>36</sup>

1541 hours - LR-416 recorded a second alarm condition and normal condition at the same time for the minimum to trip reading.<sup>37</sup> This may indicate an open and reclose operation.

1554 hours – LR-416 recorded a third alarm condition and normal condition at the same time for the minimum to trip reading. Also, 14 of the 17 smart meters downstream of Fuse 1251 recorded Power Down events.

1708 hours – PG&E troubleman reported one of two fuses at Fuse 1251 blown. The troubleman manually opened the second fuse and flagged Fuse 1251 for follow-up patrol thus de-energizing the incident location.<sup>38</sup>

<sup>30</sup> Bates PGE-CPUC\_00024108. Line 69.

<sup>31</sup> Bates Oakmont Supplement 12-31. Page 1.

<sup>32</sup> Bates PGE-CPUC\_00020367.

<sup>33</sup> Bates PGE-CPUC\_00020366.

<sup>34</sup> Bates PGE-CF\_00000052\_Confidential.

<sup>35</sup> Bates PGE-CPUC\_00024108. Linen 78.

<sup>36</sup> CAL FIRE Fire Investigation Report 17CALNU010348.

<sup>37</sup> Bates PGE-CPUC\_00020366.

<sup>38</sup> Bates PGE-CPUC\_00014316\_CONFIDENTIAL. Line 316.



1 of 2 Fuses Blown  
Possible Wire Down  
Possible Back-Feed

# OAKMONT WILDFIRE – RINCON 1101

## PG&E EVIDENCE RECORD ILIS

### Actions

Date	Description	Customers Restored	Customers Out	Minutes Out	Customer Minutes
10/08/17 23:35	LINE RECLOSER 234 OPEN	0	997	-	-
10/09/17 00:01	CB 1101/2 OPEN (DMS# 1894587)	-499	1496	26	25922
10/09/17 00:08	SWITCH 1259 OPEN	0	-	-	-
10/12/17 14:11	SWITCH 5561 OPEN	0	-	-	-
10/12/17 14:32	OPEN JUMPERS 3 SP OF R9061 OPEN	0	-	-	-
10/12/17 15:12	SWITCH 4909 OPEN	0	-	-	-
10/12/17 19:29	OPEN JUMPERS 3 SP OF R9061 CLOSE	0	-	-	-
10/12/17 19:42	SWITCH 5561 CLOSE	0	-	-	-
10/13/17 12:12	SWITCH 1263 OPEN NG SEE SWLOG 17-0085919 OPERATION #63 - DISCOVERED LATER AT 1542 ON 10/13/2017 - OPERATION WAS NG AS WHIPS DID NOT DISENGAGE	0	-	-	-
10/13/17 12:12	SWITCH 1263 OPEN SEE SWLOG 17-0085919 OPERATION #63 - DISCOVERED LATER AT 1542 ON 10/13/2017 - OPERATION WAS NG AS WHIPS DID NOT DISENGAGE	0	-	-	-
10/13/17 14:18	SWITCH 14281 CLOSE ENERGIZING, LR 160 BYPASSED DUE TO INABILITY TO CLOSE SEE SWLOG 17-0085919	897	499	6638	9917474
10/13/17 14:24	LINE RECLOSER 160 CLOSE ENERGIZING, LR 160 BYPASSED DUE TO INABILITY TO CLOSE SEE SWLOG 17-0085919	0	-	-	-
10/13/17 14:27	SWITCH 14281 OPEN SEP A LOOP SEE SWLOG 17-0085919	0	-	-	-
10/13/17 14:50	SWITCH 14283 OPEN DE-ENERGIZING, LOAD PRIOR TO OPENING WAS 10 AMPS ALL 3 PHASES, TIMES PER VERINT RECORDING	-71	570	6675	9935937
10/13/17 15:42	SWITCH 1263 OPEN DE-ENERGIZING, T-MAN FOUND WHIPS WERE NOT COMPLETELY DISENGAGED, TIMES PER VERINT RECORDING	-53	623	6727	9965577
10/13/17 16:29	SW 14283 CLOSE TIME OF OPERATION WAS TAKEN FROM DEVICE OPERATION HISTORY TIME IN DMS	0	-	-	-
10/14/17 10:46	██████ UPDATED NO ACCESS - Fire Activity	0	-	-	-
10/15/17 10:13	Q3TFXT2: UPDATED NO ACCESS - Available	0	-	-	-
10/16/17 06:34	██████ UPDATED NO ACCESS - Fire Activity	0	-	-	-
10/17/17 11:59	LR 47964 OPEN	0	-	-	-
10/17/17 12:06	FUS 14289 OPEN	0	-	-	-
10/17/17 12:15	FUS 2727 OPEN	0	-	-	-

1/12

PGE-CF\_00136070

LR 160 Closed  
10/13/17 2:24 PM

LRs 160 & 416  
Records MMTs

10/13/2017 14:56	(P04) 1-Santa Rosa sonoma lr 160 lr above mtt is ALARM
10/13/2017 14:56	(P04) 1-Santa Rosa sonoma lr 160 lr above mtt is NORMAL
10/13/2017 14:56	(P04) 1-Santa Rosa sonoma lr 416 lr above mtt is NORMAL
10/13/2017 14:56	(P04) 1-Santa Rosa sonoma lr 416 lr above mtt is ALARM
10/13/2017 15:40	(P04) 1-Santa Rosa sonoma lr 160 lr above mtt is ALARM
10/13/2017 15:40	(P04) 1-Santa Rosa sonoma lr 160 lr above mtt is NORMAL
10/13/2017 15:41	(P04) 1-Santa Rosa sonoma lr 416 lr above mtt is NORMAL
10/13/2017 15:41	(P04) 1-Santa Rosa sonoma lr 416 lr above mtt is ALARM
10/13/2017 15:54	(P04) 1-Santa Rosa sonoma lr 416 lr above mtt is ALARM
10/13/2017 15:54	(P04) 1-Santa Rosa sonoma lr 416 lr above mtt is NORMAL
10/13/2017 15:55	(P04) 1-Santa Rosa sonoma lr 160 lr above mtt is ALARM
10/13/2017 15:55	(P04) 1-Santa Rosa sonoma lr 160 lr above mtt is NORMAL

# OAKMONT WILDFIRE – RINCON 1101

## PG&E EVIDENCE RECORD ILIS

### October 9, 2017

0001 hours – PG&E remotely opened Dunbar CB 1101 thus de-energizing the Dunbar-1101 circuit. Dunbar-1101 remained de-energized at the time of the Oakmont/Pythian Fire.

### October 13, 2017

PG&E attempts to switch to Rincon substation by opening Switch-1263 and closing Switch-6173:

- ... 1143 hours – PG&E successfully closes Switch-6173.
- ... 1212 hours – PG&E attempts to open Switch-1263 but the attempt results in “no good” or “NG” condition. The PG&E field personnel found that the switch did not fully disengage but LR-234 was still open at this point prevent power from flowing to Switch-1263.<sup>25</sup>

1212 hours – PG&E had energized the Rincon-1101 circuit up to LR-160. LR-160 was still open and locked out so no power was fed to the incident location from Rincon substation at this time.

1322 hours –A PG&E troubleman reports a wire down at the first leg (Leg 1) and that he/she opened the jumper wires at that location to isolate the leg and the fault.

(There are two sections of circuit that branch off of the main line and are protected by fuse 1251; the first leg (Leg 1) goes to the East and the second leg (Leg 2) is further downstream and heads Northwest. The incident location is served by the second leg (Leg 2) located further downstream.<sup>26</sup>)

1413-1424 hours – After a PG&E troubleman inspected some, but not all, of the line downstream of Fuse 1251, PG&E attempted to re-energize the incident location by closing Switch-14261 thus bypassing LR-160 due to its inability to close.<sup>27</sup> LR-160 lost its ability to close due to the depletion of battery after a prolonged outage on the Dunbar-1101 circuit.<sup>28</sup> Switch #14261 was used to bypass LR-160 and energize the lines past the LR.<sup>29</sup> This operation restored the remote SCADA connection to LR-160.

<sup>24</sup> Bates PGE-CPUC\_00013124. Line 124.

<sup>25</sup> Id.

<sup>26</sup> Bates PGE-CPUC\_00012928. Line 928.

<sup>27</sup> Bates PGE-CPUC\_00013124. Line 124.

<sup>28</sup> Bates PGE-CPUC\_02082019-DR\_Oakmont\_Q03.

<sup>29</sup> Id.



Figure 7. Map of incident location showing approximate locations of upstream reclosers and fuse 1251. (Source: PG&E<sup>22</sup>)

# OAKMONT WILDFIRE – RINCON 1101

## CPUC-SED EVIDENCE RECORD

**Utility Facilities involved:** Rincon-1101/Dunbar-1101, 12 kV Circuits

**Violations:** Yes

### I. Summary

On October 13, 2017, at approximately 1533 hours, a Douglas Fir tree fell and contacted overhead conductors of PG&E's Dunbar 1101 12 kV circuit located near 8050 Pythian Road in the city of Santa Rosa in Sonoma County. As a result, the 12 kV conductors failed and fell to the ground. The tree and conductor failures ignited the Oakmont/Pythian Fire.

The Oakmont/Pythian Fire was combined with other fires, which collectively were called the Nuns<sup>1</sup> Fire. The merged Nuns Fire burned 56,556 acres, destroyed 1,355 structures and damaged 172 structures. Three fatalities occurred as a result of the Nuns Fire, with

<sup>1</sup> The Nuns Fire included the Nuns, Oakmont/Pythian, Norrbom, Adobe, Pressley and Partrick fires. SED investigated each of these incidents except the Pressley fire, which was a spot fire that ignited from an ember that originated from the Adobe Fire.

Disputed by PG&E

### V. Conclusion

Based on the evidence reviewed, SED found three violations of GO 95, Rule 31.1 by PG&E:

- ... GO 95, Rule 31.1 for unsafely and incompletely patrolling<sup>51</sup> the circuit after a sustained outage and unsafely re-energizing. The PG&E inspectors did not complete a thorough patrol of all the spans downstream of a faulted span prior to re-energizing the circuit. This
- ... GO 95, Rule 31.1 for failing to follow PG&E procedures<sup>52</sup> for reinforcement of a weakened pole. This violation existed from September 4, 2012 when PG&E incorrectly documented that the reinforcement had occurred at least until October 23, 2017 when SED found that the reinforcement had not occurred.
- ... GO 95, Rule 31.1 for failing to complete a work order by its due date.

If SED becomes aware of additional information that could modify SED's findings in this Incident Investigation Report, SED may re-open the investigation and may modify this report or take further actions as appropriate.

# OAKMONT WILDFIRE – RINCON 1101

## CAL FIRE EVIDENCE RECORD

23 My experience and knowledge of conducting fire investigations, includes  
24 instances where powerlines producing heat/sparks in a receptive fuel bed, has the  
25 potential for igniting a low intensity, slow developing fire dependent on wind.

26 The facts and circumstances revealed during the course of the investigation  
27 indicate the fire was caused by re-energizing downed powerlines owned/operated by  
28 PG&E and arcing in a receptive fuel bed.

29 Based on my training, knowledge, experience, observations at the fire scene,  
30 consultation with other CAL FIRE investigators, and the elimination of other causes

(Rev. 8/2014)

30

Officer Initials JC

Oakmont 055

PG&E CONFIDENTIAL UNDER NON-DISCLOSURE AGREEMENT

PYTHIAN/OAKMONT

October 13, 2017

17CALNU010348

1 through the scientific methodology, I determined the fire was caused by electrical  
2 power.

 10/30/2018

Signature Date

Jace CHAPIN, Badge #3816

Battalion Chief

31

Officer Initials J

Oakmont 056



# OAKMONT WILDFIRE – RINCON 1101

## CAL FIRE EVIDENCE RECORD



# OAKMONT WILDFIRE – RINCON 1101

## REFERENCE DOCUMENTS

▶ PG&E Oakmont Incident Description & Factual Summary, PG&E Oakmont Supplemental Report

▶ CPUC-SED Incident Investigation Report – E20171020-03, 5/1/2019

▶ CAL FIRE Report – 17CALNU010348

▶ Case 3:14-cr-00175-WHA Document 956-43

▶ PG&E 17-0087215

-  PGE-CF\_00000015
-  PGE-CF\_00000021
-  PGE-CPUC\_00007876
-  PGE-CPUC\_00007897
-  Oakmont3\_Q9\_Rincon1101\_SCADA\_DRU789\_LD\_PGE-CPUC\_00020364
-  Oakmont3\_Q9\_Rincon1101\_SCADA\_COMM\_DRU789\_PGE-CPUC\_00020365
-  Oakmont3\_Q9\_Rincon1101\_SCADA\_DRU789\_PGE-CPUC\_00007897
-  Oakmont3\_Q10\_LR416\_SCADA\_Log\_DRU789\_PGE-CPUC\_00020366
-  Oakmont4\_Q10\_LR416\_LD\_SOE\_DRU789\_PGE-CPUC\_00020367
-  Oakmont4\_Q12\_LR160\_SOE\_DRU789\_PGE-CPUC\_00020368
-  Oakmont4\_Q12\_LR576\_SOE\_DRU789\_PGE-CPUC\_00020370
-  Oakmont4\_Q12\_LR8339\_SOE\_DRU789\_PGE-CPUC\_00020371
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-  Oakmont5\_PGE-CF\_00000053\_Confidential
-  Oakmont5\_Smart Meters\_SSD 1251\_20171208\_v1
-  Oakmont5\_Smart Meters\_SSD 1251\_20171208\_v1\_CONF
-  PGE-CF\_00000052\_CONF
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-  PGE-CPUC\_00012216\_CONF
-  PGE-CPUC\_00017161\_CONF

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-  PGE-CF\_00000021\_PGE-CF-VOL001
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-  PGE-CF\_00005005\_PGE-CF-VOL004
-  PGE-CF\_00135985\_PGE-CF-VOL006\_03
-  PGE-CF\_00136025\_PGE-CF-VOL006\_03
-  PGE-CF\_00136070\_PGE-CF-VOL006\_03
-  PGE-CF\_00136206\_PGE-CF-VOL006\_03
-  PGE-CPUC\_00001213\_PGE-CALPA-DATA\_VOL012
-  PGE-CPUC\_00012216\_PGE-CALPA-DATA\_VOL012
-  PGE-CPUC\_00012928\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00013043\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00013124\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00013171\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00014316\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00014333\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00014403\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00015771\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00017161\_PGE-CALPA-DATA\_VOL012

# PARTRICK WILDFIRE – PUEBLO 2103

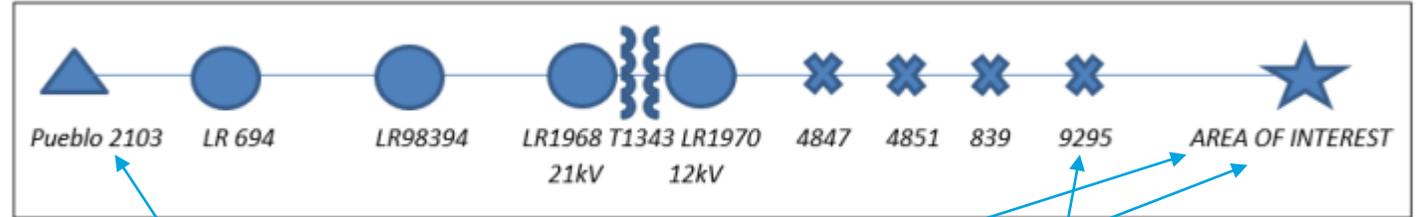
\* STEP DOWN TO 12KV

(NUNS FIRE CONSISTS OF SIX DIFFERENT FIRES: NUNS, ADOBE, NORRBOM, PRESSLEY, PARTRICK AND OAKMONT)

# PARTRICK WILDFIRE – PUEBLO 2103

## Incident Observations

- ▶ Tree Contact From 44 Feet
- ▶ Possible Energized Downed Conductor  
10/8/17 11:20PM – 10/8/17 11:24 PM
- ▶ Possible High Impedance Fault Conditions
- ▶ Configuration Assumed 12kV 3-Wire Beyond Step-Down



10/8/17 11:20PM  
Meter Off

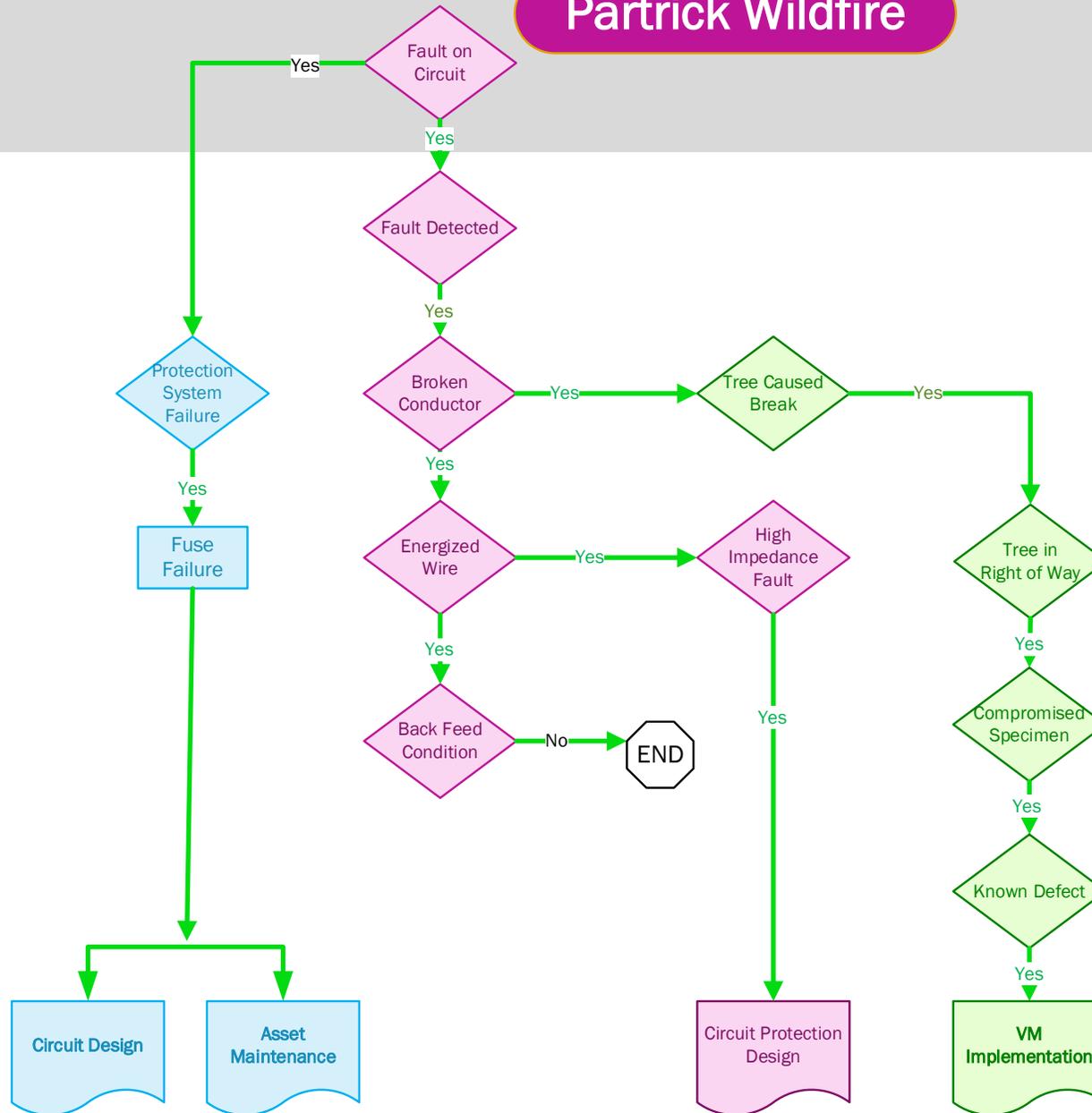
10/8/17 11:24 PM  
Power Off @ 27 Meters

10/8/17 11:48 PM  
Partrick Fire Starts  
Per Cal Fire

10/9/17 1:54 AM  
Pueblo Sub De-Energized  
115kV T Line Out  
Event Ends

10/11/17 1:42PM  
PG&E Finds  
Two of Two Fuses Open  
At Fuse 9295

# Partrick Wildfire



# PARTRICK WILDFIRE – PUEBLO 2103

Condition	
Tree-Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	Yes
Known Defect or Condition	Yes
Reasonably Detected	Yes
Wind Event	Normal
Receptive Fuel Bed	Yes

# PARTRICK WILDFIRE – PUEBLO 2103

## PG&E EVIDENCE RECORD IDFS

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### PARTRICK INCIDENT DESCRIPTION & FACTUAL SUMMARY

For completeness, this incident description and factual summary should be read in conjunction with the Factual Report Guidance and the contemporaneously submitted response to Question 62.

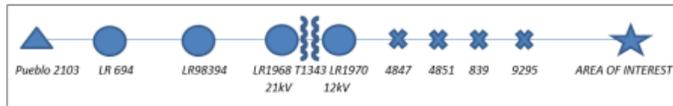
#### **Background:**

On October 20, 2017, PG&E filed an Electric Safety Incident Report (Incident No. 171020-8586) concerning an incident that occurred near 1721 Partrick Road, Napa, Napa County (the “incident location” as defined by the CPUC’s December 7, 2017, letter). When PG&E was granted access to the incident location on October 18, PG&E observed that a 20-inch diameter Coast Live Oak tree, approximately 50 feet tall and rooted approximately 40 feet uphill from the distribution conductors had broken above its base. One of the two phases on a 12kV tap line on the Pueblo 2103 Circuit was on the ground.

According to CAL FIRE’s website, the Partrick fire is part of the “Nuns fire”, which consists of six different fires: Nuns, Adobe, Norrbom, Pressley, Partrick and Oakmont.

According to CAL FIRE’s website, the Partrick fire started at 11:48 PM on October 8, 2017.

#### **Incident Overview:**



The incident location is served by the Pueblo 2103 Circuit. According to PG&E records, at 11:20 PM on October 8, 2017, the smart meter at service point 3725037405, downstream from the incident location, reported a NIC Power Down event. Four minutes later, 27 smart meters on the load side of Fuse 9295 recorded a series of power off/on events.

Based on PG&E records, at 1:54 AM on October 9, 2017 the Pueblo Substation, which feeds power to the incident location, was de-energized as a result of an outage on the 115kV transmission line feeding the substation. At 12:10 PM on October 10, 2017 the Pueblo Substation was re-energized but the incident location remained de-energized because the Pueblo 2103 Circuit Breaker remained open. Based on PG&E records, at 5:19 PM on October 10, the Pueblo 2103 Circuit Breaker was closed remotely via SCADA and the circuit was re-energized.

At 1:42 PM on October 11, 2017, a Troublemaker reported that the nearest source side protection device from the incident location, Fuse 9295, had 2 of 2 fuses open.

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the fire started. Per the First Responders, they were both patrolling the area to check on the status of PG&E facilities. While patrolling the line at the incident location they were stopped by CAL FIRE approximately 50 yards from the incident span and prevented from patrolling any further down the line. Per the First Responders, from their vantage point, they could see 1 of 2 phases of the incident span down. At the request of CAL FIRE, they immediately left the area and returned to Partrick Road. On October 16, 2017 at 6:42 PM, Fuse 9295 was closed and tested.

On October 18, 2017, PG&E was granted access to the incident location and observed that a 20-inch diameter Coast Live Oak tree, approximately 50 feet tall and rooted approximately 40 feet uphill from the distribution conductors had broken near the base. One of the two phases of conductors was on the ground. The conductors were #4AR (aluminum conductor, steel reinforced), installed in 1981. On October 21, 2017, both of the conductors on the incident span were replaced. Based on PG&E records, a new smart meter was installed on February 1, 2018, and service was restored to the customer served by the incident location.

# PARTRICK WILDFIRE – PUEBLO 2103

## CPUC-SED EVIDENCE RECORD

**Utility Facilities Involved:** Pueblo 2103, 12 kV Circuit

**Violation:** Yes

### I. Summary

On October 8, 2017, at approximately 2348 hours, a Coast Live Oak tree fell and contacted overhead conductors of PG&E's Pueblo 2103 12 kV circuit at 1721 Partrick Road in the city of Napa in Napa County. One of the 12 kV conductors fell to the ground and, as a result, the Partrick Fire was ignited. The Partrick Fire burned a total of 8,283 acres and affected 283 parcels.

The Partrick Fire was combined with other fires, which were collectively called the Nuns<sup>1</sup> Fire. The Nuns Fire burned a total of 56,556 acres, destroyed 1,355 buildings, and damaged 172 buildings. Three fatalities occurred as a result of the Nuns Fire, with

<sup>1</sup> The Nuns Fire included the Nuns, Oakmont/Pythian, Norrbom, Adobe, Pressley and Partrick fires. SED investigated each of these incidents except the Pressley fire, which was a spot fire that ignited from an ember that originated from the Adobe Fire.

Based on SED's review, SED found that PG&E violated the Commission's General Order (GO) 95, specifically, GO 95, Rule 31.1 and GO 95, Rule 35:

GO Rule	Violations
GO 95, Rule 31.1	Hazardous tree not identified and abated
GO 95, Rule 35	Vegetation clearance not maintained

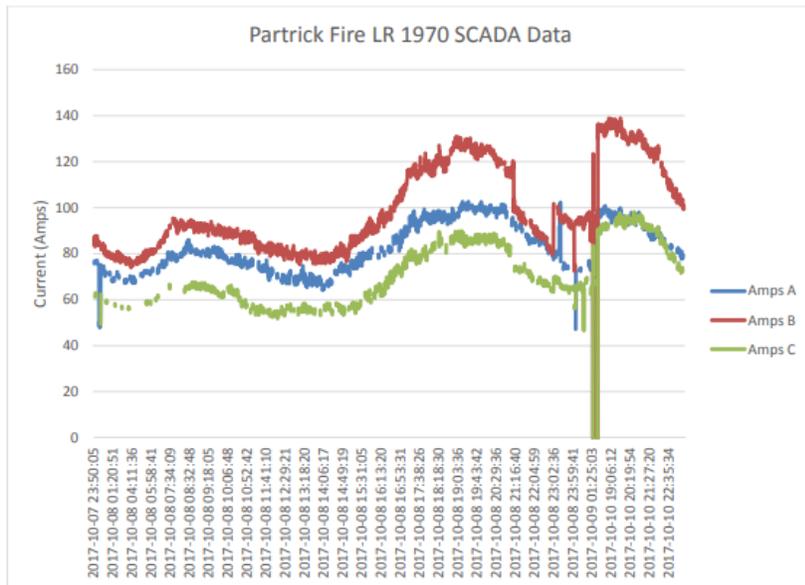
Disputed by PG&E

# PARTRICK WILDFIRE – PUEBLO 2103

## CPUC-SED EVIDENCE RECORD

SCADA is software that allows for local and remote data collection in real-time and for defined time periods. SCADA is provided in protection devices along circuits to alert personnel as soon as there is a fault or issue on the line. SCADA allows the fault or issue to be isolated quickly and helps mitigate downtime.

The SCADA data for the Partrick Fire is presented in Figure 5.



**Figure 5:** Plot of SCADA data from LR 1970 for each phase from 24 hours prior to and 48 hours after the CAL FIRE designated start time.

LR 1970 is the closest line recloser upstream from the incident location. Beginning at approximately 2100 hours on October 8, 2017, there is a noticeable drop in amperage across all phases. Around the incident start time at 2348 hours, there is a significant drop. On October 9, 2017, at approximately 0154 hours, all phases reported zero amps.

#### IV. CAL FIRE's Investigation

CAL FIRE's investigation report (Attachment 1) concludes that the Partrick Fire "was caused when an oak tree contacted a PG&E powerline conductor which ignited portions of the tree. Embers from contact with the conductor dropped in the fine dead fuels below igniting the wildland."

Regarding the conductor that fell to the ground: "Additionally, the energized powerline conductor made direct contact with the ground, igniting the dry dead surface fuels."

CAL FIRE cites Mr. Porter's report, "Based off the arborist report and lab results, the subject oak tree had obvious signs of rot and decay."

CAL FIRE found PG&E in violation of California Public Resources Code (PRC) §4292, §4293 and §4421.

# PARTRICK WILDFIRE – PUEBLO 2103

## CAL FIRE EVIDENCE RECORD

12 During the origin and cause investigation I, Brandon BERTOLINO, determined the fire  
13 was caused when an oak tree (Evidence Item 3&4) fell over and contacted a Pacific  
14 Gas and Electric (PG&E) powerline conductor. The oak tree broke one of the two  
15 powerline conductors and brought it to the ground. Embers from this contact with the  
16 conductor ignited the fine dead fuels that the powerline conductor and tree had fallen  
17 into. Additionally, when the energized conductor contacted the fine dead fuels on the  
18 ground it ignited the ground fuels. This resulted in a wildland fire which burned  
19 uncontrolled onto numerous properties not owned or controlled by PG&E, resulting in  
20 multiple violations (See part 1, Violations).

21  
22 During the investigation, I determined PG&E and/or its sub-contractors, Davey Tree  
23 Expert Company, conducted powerline vegetation management inspections and  
24 maintenance in June and September of 2017. PG&E had replaced a power pole that  
25 had broken in June 2017 in the same location of my general origin area (GOA).  
26 The land owner Jeff FONTANELLA expressed his concern about other trees in the area  
27 during the June incident (Attachment #7). PG&E and Davey Tree Expert Company  
28 failed to identify hazard trees during the repair in June 2017 as required pursuant to  
29 PRC 4293. The failure to identify the hazard oak tree resulted in the tree falling,  
30 contacting the powerline conductor operated by PG&E, and igniting the Partrick fire.

LE80 (Rev. 7/2011)

4

Officer Initials

BB

**Partrick 022**

Partrick Incident October 8, 2017 17CALNU010051

1 power off/on events. Fuse 9295 is the nearest fuse downstream from the SOA. The  
2 game camera data's initial photograph of the Partrick Fire was at 11:21 p.m., one  
3 minute after the reported power down event. The facts provided by PG&E support my  
4 investigation findings and conclusion.

5

#### 6 **Opinion and Conclusion:**

7 I believe based on my training, education, experience, observations, evidence, reports  
8 and witness statements the wildland fire (Partrick Incident) was caused when an oak  
9 tree (Evidence Item #4) contacted a PG&E powerline conductor which ignited portions  
10 of the tree. Embers from contact with the conductor dropped in the fine dead fuels  
11 below igniting the wildland. Additionally, the energized powerline conductor made direct  
12 contact with the ground, igniting the dry dead surface fuels. Based off the arborist report  
13 and lab results, the subject oak tree had obvious signs of rot and decay.

..

# PARTRICK WILDFIRE – PUEBLO 2103

## REFERENCE DOCUMENTS

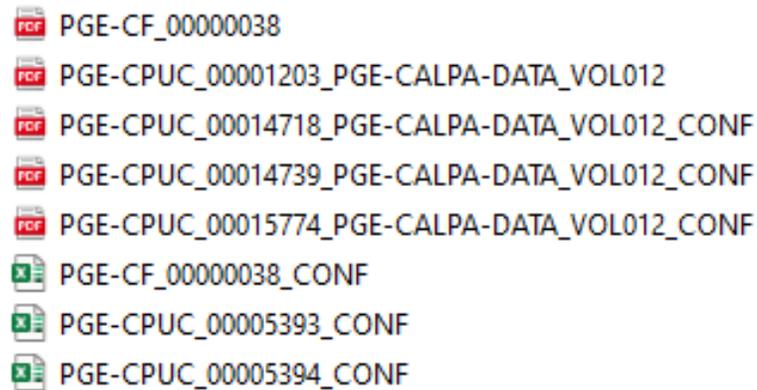
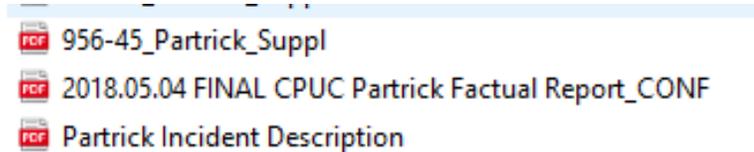
▶ PG&E Partrick Incident Description & Factual Summary, PG&E Partrick Supplemental Report

▶ CPUC-SED Incident Investigation Report – E20171020-02

▶ CAL FIRE Report – 17CALNU010051

▶ Case 3:14-cr-00175-WHA Document 956-24

▶ PG&E 17-0086365

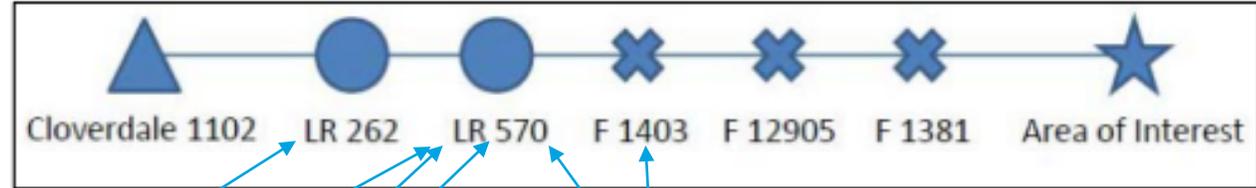


# POCKET WILDFIRE – CLOVERDALE 1102

# POCKET WILDFIRE – CLOVERDALE 1102

## Incident Observations

- ▶ Tree Contact From 15 Feet
- ▶ Possible Energized Conductor Down  
10/8/17 11:24 PM – 10/9/17 2:30AM
- ▶ Possible Failure of LR 570, Fuses  
1403,12905,1381



10/8/17 11:24 PM  
LR 570 Trips & Recloses  
LR 262 Trips & Recloses

10/9/2017 2:30 AM  
LR 570 Detects  
Fault Conditions  
Locks Out

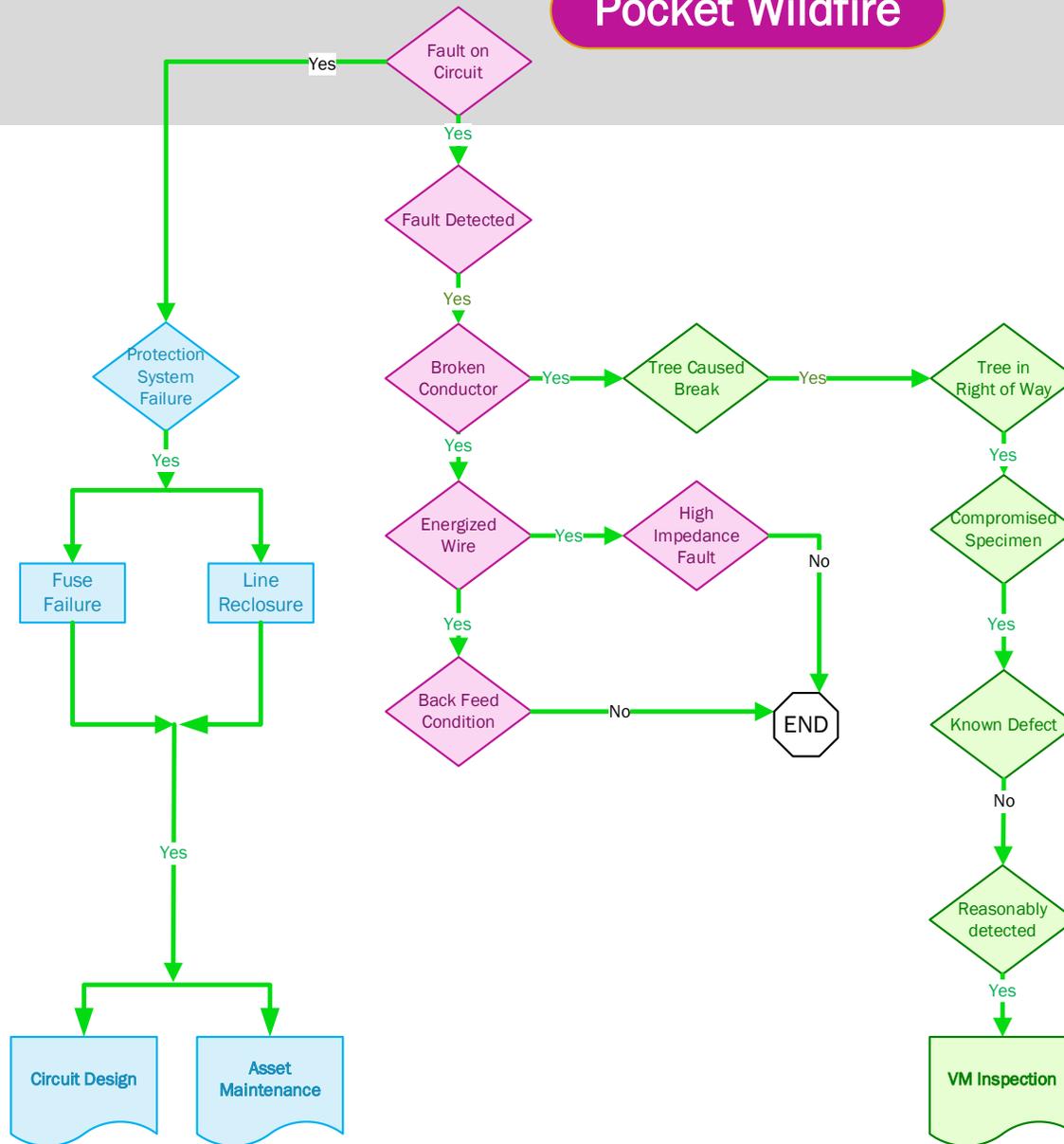
10/9/17 3:30AM  
Pocket Fire Starts  
Per Cal Fire

10/9/17 11:47 AM  
PG&E Closes LR 570

10/9/17 2:29 AM  
PG&E Closes LR 570

10/9/17 11:30 AM  
PG&E Opens  
Fuse 1403

# Pocket Wildfire

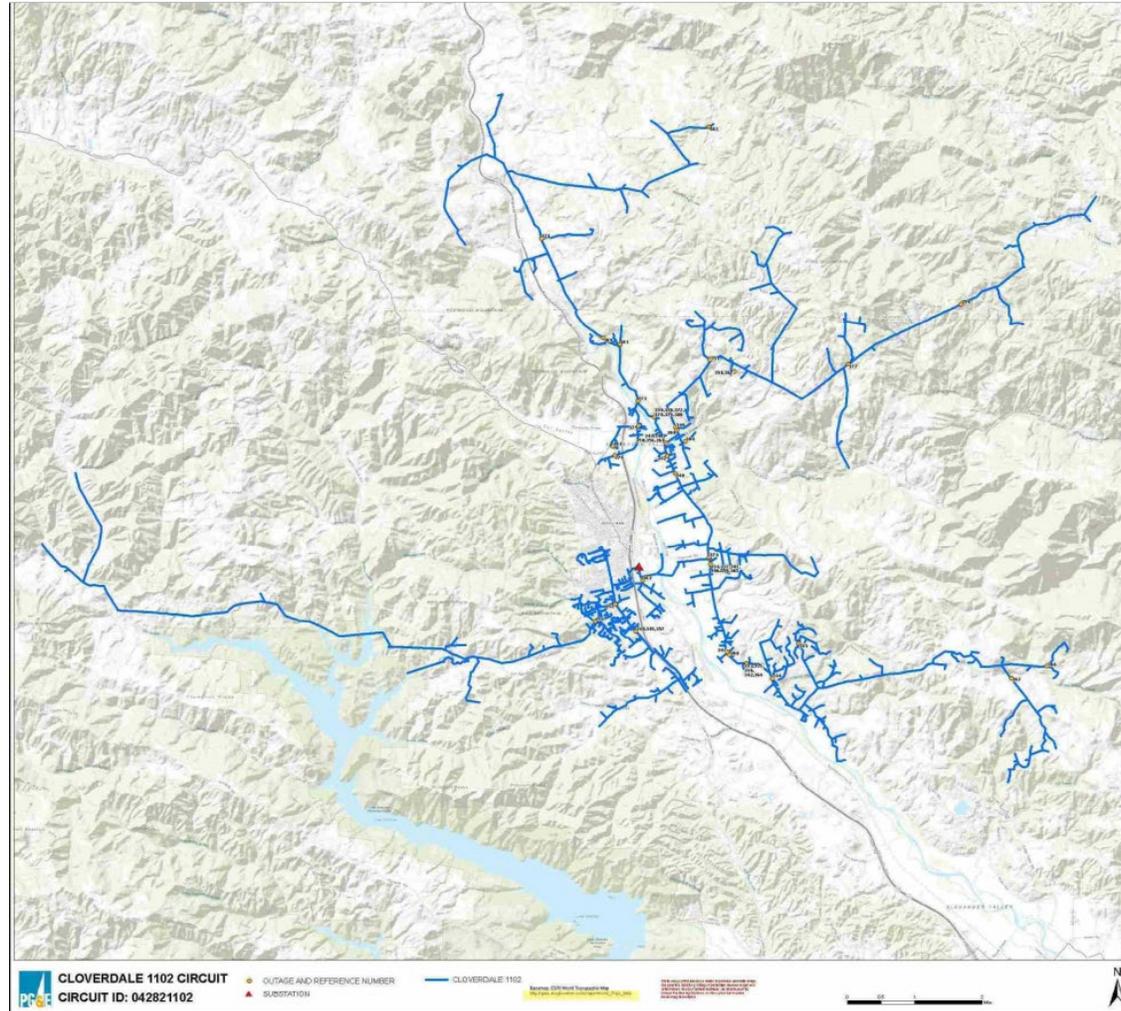


# POCKET WILDFIRE – CLOVERDALE 1102

## VEGETATION MANAGEMENT

Condition	
Tree-Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	Yes
Known Defect or Condition	No
Reasonably Detected	Yes
Wind Event	Extreme
Receptive Fuel Bed	Unknown

# POCKET WILDFIRE – CLOVERDALE 1102



# POCKET WILDFIRE – CLOVERDALE 1102

## PG&E EVIDENCE RECORD IDFS

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### POCKET INCIDENT DESCRIPTION & FACTUAL SUMMARY

For completeness, this incident description and factual summary should be read in conjunction with the Factual Report Guidance and the contemporaneously submitted response to Question 62.

#### Background:

On October 21, 2017, PG&E filed an Electric Safety Incident Report (Incident No. 171021-8592) concerning an incident that occurred near Ridge Ranch Road and Ridge Oaks Road, Geyserville, Sonoma County (the "incident location" as defined by the CPUC's December 7, 2017, letter). When PG&E accessed the incident location on October 17, 2017, PG&E observed that a top section of a California White Oak/Valley Oak tree had broken. At least one conductor of Cloverdale 1102 (12 kV) Circuit was on the ground. The California White Oak/Valley Oak was rooted approximately 15 feet from the distribution conductors.

According to CAL FIRE's website, the Pocket incident started at 3:30 AM on October 9, 2017.

#### Incident Overview:



The incident location is served by the Cloverdale 1102 Circuit. Line Recloser 570 and Line Recloser 262 are located upstream of the incident location. According to PG&E records, on October 8, 2017 at 11:24 PM, both Line Recloser 570 and Line Recloser 262 automatically opened due to a line-to-ground fault on the circuit. Line Recloser 262 automatically closed after a momentary outage, but Line Recloser 570 did not close. At this point, the Cloverdale 1102 Circuit downstream of Line Recloser 570 was de-energized, including the incident location. **The fuses downstream of Line Recloser 570 did not open.**

On October 9, 2017, at 2:29 AM, after PG&E linemen patrolled the Cloverdale 1102 Circuit, Line Recloser 570 was closed remotely via SCADA. However, based on PG&E records, because Line Recloser 570 indicated (via SCADA) that ground fault current was present when it was closed, Line Recloser 570 was re-opened by the line operator via SCADA at 2:30 AM, leaving the incident location de-energized.

Based on PG&E records, at 11:30 AM, PG&E linemen manually opened Fuse 1403, located three fuses upstream of the incident location. According to one of the linemen, the linemen patrolled the circuit and, after that patrol, Line Recloser 570 was closed remotely via SCADA at 11:47 AM. When Line Recloser 570 was closed, the line was re-energized up to Fuse 1403, restoring service to 221 customers. Fuse 1403 is located upstream of the incident location, so the incident location was not re-energized at this time.

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On October 9, 2017, according to PG&E records, a PG&E lineman was the first PG&E employee who attempted to access the incident location after the fire started. Per that lineman, he and another PG&E lineman attempted to patrol beyond Fuse 1403, but reported being turned away by CAL FIRE at 12:50 PM. According to the lineman, he and the other lineman patrolled the area up to a section of the circuit that CAL FIRE had blocked off. The lineman observed that fire was burning on the load side of Fuse 1403.

Based on PG&E records, on October 12, 2017, a PG&E lineman patrolled the circuit up to Fuse 12905 (located two fuses upstream from the incident location) and reported manually opening that fuse at 2:30 PM. According to PG&E records, the lineman returned to Fuse 1403 and manually closed it at 2:55 PM, re-energizing the line up to Fuse 12905.

On October 17, 2017, after CAL FIRE released the site, PG&E was permitted to access the incident location. At that time, PG&E observed that a top section of a California White Oak/Valley Oak tree had broken and was laying on at least one conductor serving the Cloverdale 1102 (12 kV) Circuit, near the intersection of Ridge Ranch Road and Ridge Oaks Road. The California White Oak/Valley Oak was rooted approximately 15 feet from the distribution conductors. At least one conductor was on the ground. The conductors were #6 Copper Wire installed in 1946.

# POCKET WILDFIRE – CLOVERDALE 1102

## PG&E EVIDENCE RECORD ILIS

Mis Operation  
17-0085349

EquipID	570	required
Equipment Type	Line Recloser	Construction OH Type
Equipment Condition	Conductor, Overhead, Broken, wire on ground	OIS Outage# 1894573, 1907376
Crew Notified Time		Targets C & GRD
Equipment Address	27250 RIVER RD	Supervisor DSR
Fault Location	BEYOND 1403, NO ACCESS DUE TO FIRE	Notified
Previous Switching	N/A FUS 1381 OPEN MO (DMS# 1906698) FUS 12907 OPEN MO (DMS# 1906431)	
Details	WIND STORM - POCKET FIRE	
Action Description	FUSES 1403 WERE STILL CLOSED, MISCORDINATED WITH LR 570	
Cause	Equipment Failure/Involved, Overhead	No Access Available Reason
Distribution Wire Down	Yes	Wire Down No Energized

# POCKET WILDFIRE – CLOVERDALE 1102

## PG&E EVIDENCE RECORD ILIS

LR 262 Reclose not here?

10/8/2017 5:23	(P01) 1-Geyserville sonoma lr 262 battery test is TEST
10/8/2017 5:23	(P01) 1-Geyserville sonoma lr 262 battery test is NORMAL
10/8/2017 5:54	(P01) 1-Geyserville sonoma lr 570 battery test is TEST
10/8/2017 5:55	(P01) 1-Geyserville sonoma lr 570 battery test is NORMAL
10/8/2017 23:24	(P03) 1-Geyserville sonoma lr 262 grd tgt is ALARM
10/8/2017 23:24	(P03) 1-Geyserville sonoma lr 262 c ph tgt is ALARM
10/8/2017 23:24	(P01) 1-Geyserville sonoma lr 262 rcl in progress is NORMAL
10/8/2017 23:24	(P01) 1-Geyserville sonoma lr 262 rcl in progress is ALARM
10/8/2017 23:24	(P04) 1-Geyserville sonoma lr 262 lr above mtt is NORMAL
10/8/2017 23:24	(P08) 1-Geyserville sonoma lr 262 lr position is CLOSED
10/8/2017 23:24	(P04) 1-Geyserville sonoma lr 262 lr above mtt is ALARM
10/8/2017 23:24	(P08) 1-Geyserville sonoma lr 262 lr position is OPEN
10/8/2017 23:25	(P03) 1-Geyserville sonoma lr 570 c ph tgt is ALARM
10/8/2017 23:25	(P01) 1-Geyserville sonoma lr 570 rcl in progress is NORMAL
10/8/2017 23:25	(P01) 1-Geyserville sonoma lr 570 rcl in progress is ALARM
10/8/2017 23:25	(P04) 1-Geyserville sonoma lr 570 system or control alarm is ALARM
10/8/2017 23:25	(P04) 1-Geyserville sonoma lr 570 fail to close is ALARM
10/8/2017 23:25	(P08) 1-Geyserville sonoma lr 570 lr position is OPEN
10/8/2017 23:25	(P04) 1-Geyserville sonoma lr 570 lr above mtt is NORMAL
10/8/2017 23:25	(P03) 1-Geyserville sonoma lr 570 grd tgt is ALARM
10/8/2017 23:25	(P08) 1-Geyserville sonoma lr 570 lr position is OPEN
10/8/2017 23:25	(P03) 1-Geyserville sonoma lr 570 lr lockout is ALARM
10/8/2017 23:25	(P04) 1-Geyserville sonoma lr 570 lr above mtt is ALARM
10/8/2017 23:25	(P08) 1-Geyserville sonoma lr 570 lr position is CLOSED
10/9/2017 2:12	(P02) Control Select 1-Geyserville sonoma lr 570 rcl rly for C/OUT by rtwsnorth at rkldccws03
10/9/2017 2:12	(P02) Control Execute 1-Geyserville sonoma lr 570 rcl rly by rtwsnorth at rkldccws03
10/9/2017 2:12	(P02) Commanded Change for 1-Geyserville sonoma lr 570 rcl rly is C/OUT
10/9/2017 2:12	(P02) Control Select 1-Geyserville sonoma lr 570 reset targets for RESET by rtwsnorth at rkldccws03
10/9/2017 2:12	(P02) Control Execute 1-Geyserville sonoma lr 570 reset targets by rtwsnorth at rkldccws03

# POCKET WILDFIRE – CLOVERDALE 1102

## PG&E EVIDENCE RECORD ILIS

User device name = LR\_570\_Rev28\_12kV

Evt	Relay Date	Relay Time	Adjusted Time	Type	IA	IB	IC	3I0
2	10/9/2017	11:53:24	10/9/2017 11:47	non-reclose off	47	32	40	0
3	10/9/2017	11:52:47	10/9/2017 11:46	MANUAL/EXT CLOSE	0	0	0	0
4	10/9/2017	2:36:34	10/9/2017 2:30	MAN/EXT TRIP/LO	40	25	39	2
5	10/9/2017	2:36:34	10/9/2017 2:30	CONTROL LOCKOUT	40	25	39	2
6	10/9/2017	2:35:12	10/9/2017 2:28	SEQUENCE RESET	0	0	0	0
7	10/9/2017	2:35:12	10/9/2017 2:28	MANUAL/EXT CLOSE	0	0	0	0
8	10/9/2017	2:26:33	10/9/2017 2:20	MANUAL/EXT CLOSE	0	0	0	0
9	10/9/2017	2:26:27	10/9/2017 2:20	MANUAL/EXT CLOSE	0	0	0	0
10	10/9/2017	2:20:14	10/9/2017 2:13	MANUAL/EXT CLOSE	0	0	0	0
11	10/9/2017	2:19:06	10/9/2017 2:12	MANUAL/EXT CLOSE	0	0	0	0
12	10/9/2017	2:18:13	10/9/2017 2:11	NON-RECLOSE ON	0	0	0	0
13	10/8/2017	23:30:21	10/8/2017 23:24	CLOSE FAILURE	0	0	0	0
14	10/8/2017	23:30:21	10/8/2017 23:24	CONTROL LOCKOUT	0	0	0	0
15	10/8/2017	23:30:16	10/8/2017 23:23	FAULT DATA (pri)	18	9	326	317
16	10/8/2017	23:30:16	10/8/2017 23:23	OVERCURRENT TRIP	17	8	156	149

# POCKET WILDFIRE – CLOVERDALE 1102

## CPUC-SED EVIDENCE RECORD

**Incident Number:** E20171021-01

**Utility:** Pacific Gas and Electric Company (PG&E)

**Date and Time of the Incident:** October 8, 2017, at approximately 0000 hours

**Location of the Incident:** Ridge Ranch Road and Ridge Oaks Road  
Geyserville, CA 95441  
County: Sonoma

**Fatality / Injury:** None reported

**Property Damage:** \$179 million (PG&E restoration costs in Sonoma Division)

**Utility Facilities Involved:** Cloverdale 1102, 12 kV Circuit

**Violation:** Yes

### I. Summary

On October 8, 2017, at approximately 0000 hours, a Valley Oak tree failed and fell onto PG&E's 12 kV overhead conductors near the intersection of Ridge Ranch Road and Ridge Oaks Road in the city of Geyserville, Sonoma County. The tree made contact with PG&E's conductors and caused the ignition of the Pocket Fire, which burned approximately 17,357 acres, destroyed six structures, and damaged two structures.

A visual single-line diagram, Figure 2, provided by PG&E shows all protective devices between Cloverdale Substation, which feeds the Cloverdale 1102 circuit, and the incident area. The symbols are defined in the legend in Figure 3. The incident span was protected upstream by fuses 1381, 12905, 1403, Line Recloser 570 (LR 570), Line Recloser 262 (LR 262) and finally the Cloverdale 1102 circuit breaker. The brand and type of each protection device is listed under Table 2. A detailed circuit map identifying the locations of the protection devices and the substation relative to the incident location can be found in Attachment E.

In addition, while Line Recloser 570 did open as a result of the line-to-ground fault from the incident, Fuses 1403, 12905, and 1381 did not operate. LR 570 was previously set with a fast time current curve to allow for fuse-saving for the first operation. A time current curve is a graphical representation of the interrupting time of a protective device based on the given current amount. The time current curve dictates the behavior and sensitivity of the protective device on when to operate. LR 570 automatically opened with this configuration and remained open, therefore de-energizing the line without operating the fuses.

PG&E Fuse Saving Philosophy

# POCKET WILDFIRE – CLOVERDALE 1102

## CPUC-SED EVIDENCE RECORD

### V. Conclusion

Based on the evidence that SED reviewed, SED's investigation found the following:

- ... PG&E violated GO 95, Rule 31.1, by failing to maintain its facilities to allow for safe, proper, and adequate service. PG&E failed to identify a hazardous tree condition despite the tree having visible defects, decay, and rot. PG&E failed to take the appropriate steps to prevent the subject tree from falling into the overhead. conductors. PG&E did not document the subject tree for trim or removal.
- ... PG&E violated GO 95, Rule 35, by failing to maintain the rule's minimum clearance requirements between the subject 12 kV conductors and the hazardous subject tree.

Disputed by PG&E

# POCKET WILDFIRE – CLOVERDALE 1102

## CAL FIRE EVIDENCE RECORD

POCKET 10-9-2017 17CALNU010057

1 **2 - SUMMARY:**

2 On October 9<sup>th</sup>, 2017, a vegetation fire was reported near Pocket Ranch Road  
3 east of the community of Geyserville, California (Attachment 1). The fire, named the  
4 Pocket Fire, began during a red flag warning issued by the National Weather Service  
5 (Attachment 2). The fire burned approximately 17,357 acres of vegetation in State  
6 Responsibility Area over the course of multiple days. The Pocket Fire also destroyed  
7 six structures and damaged two others. The fire started around the same time multiple  
8 other major fires started in northern California, creating a significant demand for  
9 resources.

10

11 I, Jeremy WARD, was assigned along with CAL FIRE Captain Specialist Matt  
12 FRANKLIN, to conduct the origin and cause investigation for the Pocket Fire.  
13 Examination of fire pattern indicators and information provided by witnesses showed  
14 the fire originated near an area of downed power lines at Pocket Ranch Road. Through  
15 continued investigation, a downed conductor was later determined to be the cause of  
16 the Pocket Fire. All other cause classes were excluded. The power lines belong to  
17 Pacific Gas and Electric Company (PG&E). The power lines broke and contacted the  
18 ground after a portion of the top of an oak tree broke and fell onto the power lines. An  
19 arborist's inspection of the tree determined the tree had rot and signs of weakness that  
20 should have been outwardly apparent prior to the Pocket Fire.

--

# POCKET WILDFIRE – CLOVERDALE 1102

## CAL FIRE EVIDENCE RECORD

POCKET 10-9-2017 17CALNU010057

1 a portion of the western conductor. The broken tree top was burnt. Other nearby tree  
2 tops of fallen trees were not burnt. This indicates the fire burned in the lower origin  
3 area while the broken tree top was on the ground. It did not fall after the fire passed  
4 through the area. Backing fire pattern indicators to the north (downhill) show the fire did  
5 not burn upslope to the broken tree top from somewhere downhill.

6  
7 PG&E outage data (Attachment 25) shows an outage at approximately 11:28 PM  
8 on October 8<sup>th</sup>, 2017 on the Cloverdale 1102 Circuit, within the Sonoma Division. The  
9 data provided by PG&E shows an operating device, Fuse 1381, was involved at that  
10 time. The address described for this device is shown as, "22000 POCKET RANCH RD  
11 1/2 MILE BEYOND GATE". This description is close to the fire's origin. The GPS  
12 coordinates included show this location at the switchbacks. Additional documentation  
13 provided by PG&E shows event data for related equipment on this circuit. These  
14 documents include data identified by PG&E as Supervisory Control and Data  
15 Acquisition (SCADA) data. SCADA data shows other equipment on the circuit recorded  
16 information apparently related to the outage beginning at 11:23 PM on October 8<sup>th</sup>,  
17 2017, and over the next several minutes. Some of the PG&E data included as  
18 attachments was formatted and converted to .pdf files to make the information more  
19 readable. None of the contents of spreadsheet cells were changed in this process.  
20 Other outage records (Attachment 26) were also provided by PG&E which are individual  
21 equipment records. These records included those for Line Reclosers 262 and 570, and  
22 Fuse 1381. Each of these records describe the equipment as open on October 8<sup>th</sup>,  
23 2017 at 11:24 PM. They each describe the equipment condition as: Conductor,  
24 Overhead, Broken, wire on ground. The line recloser records describe the cause as:  
25 Equipment Failure/Involved, Overhead, and the fault type as: Line to Ground. The  
26 record for Fuse 1381 describe the cause as: Environmental/External, Fire,  
27 Forest/Grass, and the fault type as: Open Circuit.

POCKET 10-9-2017 17CALNU010057

1 standing trees in the area so they could be compared to the canopy of the involved  
2 tree. Photo 0084 shows the overall canopy of the involved tree to have less dense  
3 foliage than some of the surrounding trees. Photo 0099 shows the involved tree at the  
4 right edge of the photo and a tree at the center having a greener appearance of the  
5 foliage than the involved tree. Photos 0101 through 0104 show other trees fallen over  
6 and near the conductor. The green leaves and unburned tops show these trees fell  
7 after the fire had burned through the area. I concluded use of FRANKLIN's camera by  
8 photographing some of the flagged indicators in the lower origin area (Photos 0105  
9 through 0168).

10  
11 Later, I collected a fulgurite from the portion of the road between the two origin  
12 areas as an example of the general characteristics of the fulgurites observed on Pocket  
13 Ranch Road. The location the fulgurite (Item 3) was found is shown in Photos 0273  
14 through 0275. Photos 0276 and 0277 show its approximate size. A hole, or tubular  
15 formation, was visible at one edge of the fulgurite (Photo 0277). I used the metal rod  
16 from an indicator flag to gauge the depth of the hole. Using a piece of tape to mark the  
17 depth, I found the rod went into the ground over two and one-half inches (Photos 0278  
18 and 0279). The fulgurite was found several inches from an area of discoloration on the  
19 nearby conductor (Photo 0280). The discoloration had the appearance of being caused  
20 by heat. The center of the discoloration appeared as a copper color. The edges were

# POCKET WILDFIRE – CLOVERDALE 1102

## REFERENCE DOCUMENTS

- ▶ PG&E Pocket Incident Description & Factual Summary, PG&E Pocket Supplemental Report
- ▶ CPUC-SED Incident Investigation Report – E20171021-01
- ▶ CAL FIRE Report – 17CALNU010057

 PGE-CF\_00000003\_PGE-CF-VOL001

 PGE-CF\_00000004\_PGE-CF-VOL001

 PGE-CF\_00000029\_PGE-CF-VOL001

 PGE-CF\_00000030\_PGE-CF-VOL001

 PGE-CF\_00136285\_PGE-CF-VOL006\_03

 PGE-CF\_00136288\_PGE-CF-VOL006\_03

 PGE-CPUC\_00005393\_PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00005394\_PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00007901\_PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00007902\_PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00014813\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00014816\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00014896\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00015777\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00015809\_PGE-CALPA-DATA\_VOL012

 PGE-CF\_00000003

 PGE-CPUC\_00007902

 Pocket3\_SCADA\_PGE-CPUC\_00007902

 PGE-CF\_00000004

 PGE-CF\_00000029\_CONF

 PGE-CF\_00000030\_CONF

 PGE-CPUC\_00005393\_CONF

 PGE-CPUC\_00005394\_CONF

 PGE-CPUC\_00007901

 PGE-CPUC\_00015809\_CONF

 Pocket4\_Q1\_LR570\_SOE\_DRU789\_PGE-CPUC\_00020750

 Pocket5\_PGE-CF\_00000029\_CONF

 Pocket5\_PGE-CF\_00000030\_CONF

# POINT WILDFIRE – WEST POINT 1102

# POINT WILDFIRE – WEST POINT 1102

## Incident Observations

- ▶ Possible Energized Downed Conductor From 10/9/17 1:00AM – 10/9/17 6:18AM
- ▶ Tree Contact From 50 Feet
- ▶ Possible Failure of Fuse L2005
- ▶ Possible High-Impedance Fault Condition
- ▶ Possible Back-Feed
- ▶ Possible Automatic Splice Failure (bump sleeve)



10/9/17 1:00AM  
Meters Off

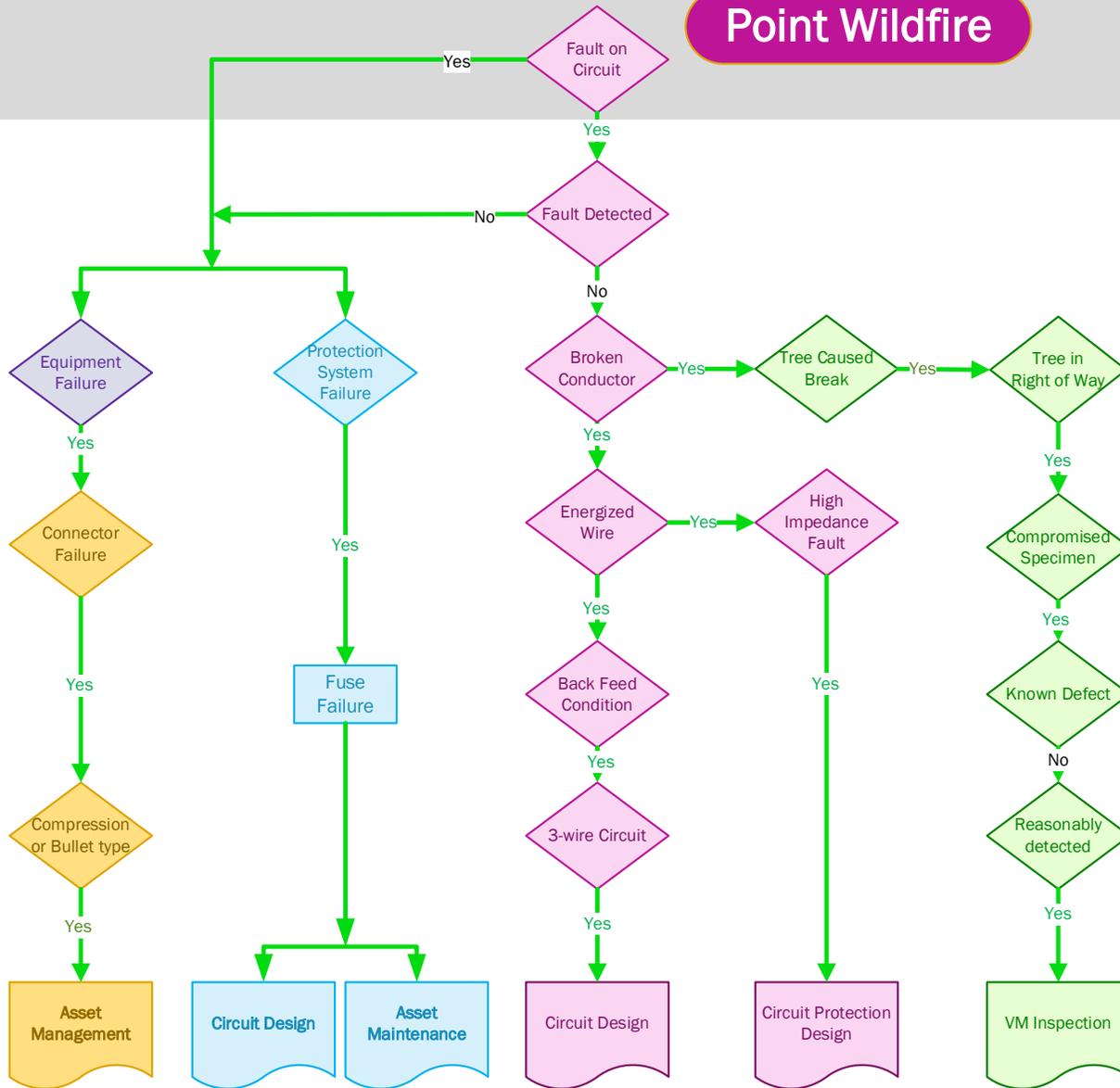
10/9/17  
Point Fire Starts  
1:10AM Per Cal Fire

10/9/17 6:18 AM  
PG&E Opens  
Switch 98191 (not shown)

10/9/17 7:10 AM  
PG&E Finds 1 of 2 Fuses Blown  
Opens Fuse L2005

10/9/17 9:13 AM  
PG&E Finds Downed Conductor  
And Broken Crossarm

# Point Wildfire

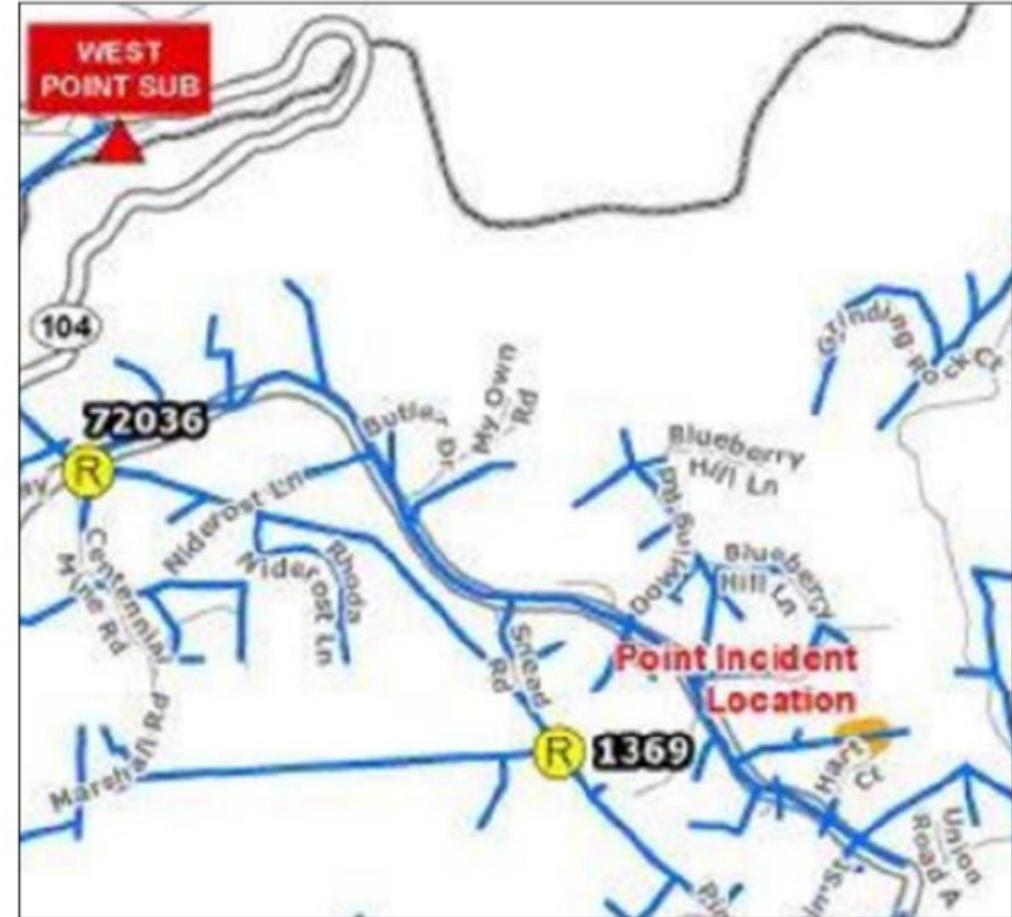
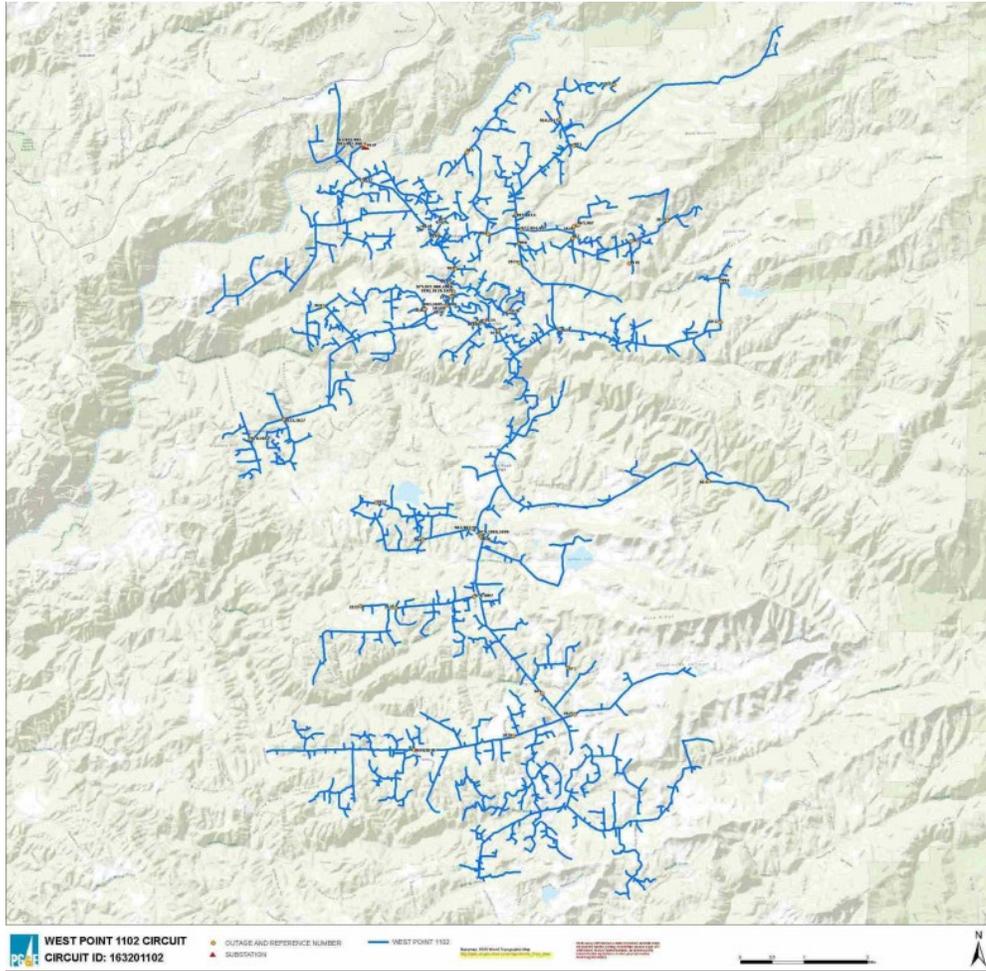


# POINT WILDFIRE – WEST POINT 1102

## VM

Condition	
Tree-Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	Yes
Known Defect or Condition	No
Reasonably Detected	Yes
Wind Event	Normal
Receptive Fuel Bed	Yes

# POINT WILDFIRE – WEST POINT 1102



# POINT WILDFIRE – WEST POINT 1102

## PG&E EVIDENCE RECORD IDFS

Case 3:14-cr-00175-WHA Document 956-26 Filed 12/31/18 Page 2 of 9

CLICK OR TAP HERE TO ENTER TEXT.

### POINT INCIDENT DESCRIPTION & FACTUAL SUMMARY

For completeness, this incident description and factual summary should be read in conjunction with the Factual Report Guidance and the contemporaneously submitted response to Question 62.

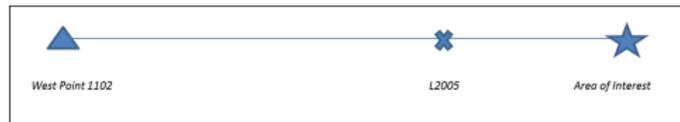
#### **Background:**

On October 9, 2017, PG&E filed an Electric Safety Incident Report (Incident No. 171009-8554) concerning an incident that occurred near 22894 Highway 26, West Point, Calaveras County (the "incident location" as defined by the CPUC's December 7, 2017, letter). When PG&E arrived at the incident location, PG&E observed that a branch from a green, healthy California White Oak/Valley Oak tree had failed and one primary conductor on the West Point 1102 (12kV) Circuit also had failed. Per one troubleman who responded on the morning of October 9 and a photo taken by him of the incident location, the branch was lying on top of a section of unbroken conductor on the ground. Per another troubleman who also responded on the morning of October 9 and photos taken by him of the incident location, a bump sleeve was on the ground with the conductor pulled out. The tree was rooted approximately 50 feet from the distribution conductors.

According to CAL FIRE's website, the location of the Point fire is Highway 26 and Higdon Road, West Point. The location on the CAL FIRE website for the Point fire is approximately 1.5 miles from the incident location.

According to CAL FIRE's website, the Point fire started at 1:10 AM on October 9, 2017.

#### **Incident Overview:**



The incident location is served by the West Point 1102 Circuit. Fuse L2005 is the source-side protective device for the incident location.

October 9, 2017, per PG&E records, the three smart meters (service points 9288350905, 9288351905, and 9288365505) downstream of Fuse L2005, including the one smart meter downstream of the incident location, recorded a series of power off/on events and/or Zero Volt readings between 1:00 AM and 6:18 AM.

Per a troubleman and PG&E records, a troubleman manually opened Switch 98191 at 6:18 AM on October 9, 2017, at the request of CAL FIRE. Switch 98191 is one span upstream of Fuse

L2005. Per PG&E records, opening Switch 98191 de-energized 2,345 customers and the incident location.

According to PG&E records, another troubleman was the first PG&E employee at the incident location after the Point fire started. According to the troubleman, he patrolled tap lines load-side of Switch 98191 to check for outage causes in order to restore power on the morning of October 9, 2017. At 7:10 AM, the troubleman stated that he found one of two fuses open at Fuse L2005; the troubleman stated that he subsequently opened the other fuse at 7:16 AM. After the troubleman manually opened Fuse L2005, he recalled that he began to patrol the tap line load-side of Fuse L2005. The troubleman stated that he found one conductor down and a broken cross-arm five poles east of Fuse L2005. According to the troubleman, when he arrived, CAL FIRE was already on the scene. The troubleman recalled that fire had already moved through the area when he arrived. The troubleman also observed that several branches from a nearby oak tree had broken off, and he stated that the leaves on fallen branches were still green and had not burned. Per the troubleman and a photo taken by him of the incident location, he observed a bump sleeve on the ground with the conductor pulled out. Per PG&E records, the troubleman reported the broken cross-arm at 9:13 AM. Per the troubleman, he cut the downed conductor at both ends and left it onsite.

Per the troubleman who opened Switch 98191 and PG&E records, another troubleman arrived at the incident location shortly after the first troubleman and manually closed Switch 98191 at 8:21 AM, re-energizing 2,337 customers. Per the same troubleman and a photo taken by him of the incident location, one oak branch was laying on top of a section of unbroken conductor on the ground. The nearby oak tree, which PG&E believes to be a California White Oak/Valley Oak, was rooted approximately 50 feet from the distribution conductors. The conductor was 2CU (copper), installed in 1948. The incident location remained de-energized because Fuse L2005 was still open.

Possible High Impedance Fault Condition  
& Back Feed

# POINT WILDFIRE – WEST POINT 1102

## PG&E EVIDENCE RECORD ILIS

PG&E CONFIDENTIAL UNDER NON-DISCLOSURE AGREEMENT

### L2005 Summary

3 meters on this fuse L2005 all powered on October 8th at midnight (before the event started)

Between 0:00:00 and 1:00:00 on October 9th a swell event happened to all three meters.

at 00:45:00 voltage data shows that all the meter were fully energized

at 01:00:00 voltage is 0 on all three meters (until 06:15:00), implying part out.

from some time after 01:00:00 (unknown) until 6:18:55 multiple on/off event sent by two (1005735085 and 5000008606) of the three meters indicating wire down with intermittent contact

Part out (Wire down) between 1am (sometimes between 0:45 and 1am) and 06:18:56 on all three meters

Power off from 10/9/2017 - 06:18:56 until 10/09/2017 - 15:26:27

From PG&E Point\_SSDL2005\_040518\_s0bi\_CONF

### Jackson

17-0085394

Outages					
<b>Circuit</b>	163201102, WEST POINT-1102	<b>District</b>	Jackson		
<b>Type</b>	Unplanned	<b>Customer Minutes</b>	Sus 312981 0 312981 CAIDI 127		
<b>Customers</b>	CEM0 2383 CEM0 0 ADJ 2466 Initial 121 CESO	<b>Weather</b>	Strong Winds, Clear; 32-90 F		
<b>Active Interval</b>	NO Sustained	<b>Fault Type</b>	Force Out		
<b>EquipID</b>	72036	<b>Action Required</b>	No		
<b>Equipment Type</b>	Line Recloser	<b>Construction Type</b>	OH		
<b>Equipment Condition</b>	Crossarm, Wood, Broken, wire on ground	<b>OIS Outage#</b>	1895984, 1895387, 1896948 PM Order#: 31359205		
<b>Crew Notified Time</b>	10/09/17 09:39	<b>Targets</b>	FORCE OUT		
<b>Equipment Address</b>	CENTENNIAL MINE RD AND HWY 26, WEST POINT	<b>Supervisor Notified</b>			
<b>Fault Location</b>	1236, 1274, 1276, 1308 SPINK RD, WEST POINT & 5 POLES E/OF L2005, MTR #1004936640				
<b>Previous Switching</b>	FUS 1311 OPEN (DMS# 1894788)				
<b>Details</b>	72036 FORCED OUT PER CAL FIRE REQUEST. POLE WAS ON FIRE AT 1308 SPINK ROAD. CAL FIRE REQUESTED LINE TO BE DE-ENERGIZED SE OF 98191. FUSES WERE OPENED ISOLATING FIRE & DAMAGE FROM MAINLINE (91029 & L6423). T-MAN FOUND SEVERAL TREE BRANCHES BROKE OFF DUE TO HIGH WINDS AT 5 POLES E/OF L2005, X-ARM WAS BROKEN THERE WITH WIRE ON THE GROUND. UNKNOWN IF THAT WAS THE CAUSE OF THE FIRE				
<b>Action Description</b>		<b>No Access Reason</b>	Available		
<b>Cause</b>	Vegetation, Tree - branch fell on line	<b>Wire Down Energized</b>	No		
<b>Distribution Wire Down</b>	Yes	<b># of Operations</b>	1		
<b>Multi Damage Location</b>	Yes	<b>Created By</b>	RFA8		
<b>Counter Read</b>	15	<b>Last Updated By</b>	SMBATCH_FO		
<b>Outage Level</b>	Distribution Circuit	<b>Fault Location Info</b>			
<b>Responsible Organization</b>	Distribution	<b>Latitude &amp; Longitude</b>			
<b>GPS MA Data</b>		<b>Reviewed By</b>	ZDF1		
<b>FNL</b>	10/09/17 04:46	<b>Reviewed By Date</b>	10/09/17 21:51		
<b>End Date</b>	10/09/17 18:49				
<b>Actions</b>					
Date	Description	Customers Restored	Customers Out	Minutes Out	Customer Minutes
10/09/17 04:46	LINE RECLOSER 72036 OPEN	0	121	-	-
10/09/17 05:44	FUSE L1289 OPEN	0	-	-	-
10/09/17 05:56	LINE RECLOSER 72036 CLOSE *Auto-Corrected: Original: 10/09/2017 05:56:00	103	18	70	8470
10/09/17 06:12	TRANSFORMER MTR#1004936644 DISCONNECT	0	-	-	-
10/09/17 06:18	SWITCH 98191 OPEN (DMS# 1895387) *Auto-Corrected: Original: 10/09/2017 06:19:00	-2345	2363	92	8866
10/09/17 06:58	TRANSFORMER MTR#1004936641 DISCONNECT	0	-	-	-
10/09/17 07:00	FUSE 91029 OPEN	0	-	-	-
10/09/17 07:15	FUSE L6423 OPEN	0	-	-	-
10/09/17 07:16	FUSE L2005 OPEN	0	-	-	-
10/09/17 07:24	TAMAN THOMAS REPORTS AT 1308 SPINK RD, THERE IS A POLE WITH A HUGE TREE 80 FEET TALL, FIRE HAS BURNED EVERYTHING AT THE BOTTOM -	0	-	-	-

[http://dodappwfspr02.comp.pge.com:8003/ilis\\_rpt/dailyeventlogdetail.jsp?odbeventid=17-0085394&numberofmonths=24&showchangehistorylog=1](http://dodappwfspr02.comp.pge.com:8003/ilis_rpt/dailyeventlogdetail.jsp?odbeventid=17-0085394&numberofmonths=24&showchangehistorylog=1) 1/6

CONFIDENTIAL

PGE-CPUC\_00015008

# POINT WILDFIRE – WEST POINT 1102

## CPUC-SED EVIDENCE RECORD

#### IV. CAL FIRE Investigation

CAL FIRE investigator, Nick Webb, found the downed conductor from PG&E's 1102 West Point, 12 kV circuit to be the cause of the fire. Mr. Webb stated that, "The failure could be attributed to limbs falling on the line in high winds." Additionally, Mr. Webb determined that the downed conductor exhibited signs of arcing. CAL FIRE's arborist found the subject limb to be sound with no evidence of disease or decay at the break point. CAL FIRE's arborist also observed the foliage along the limb to be healthy. The arborist stated, "In my professional opinion, the limb was healthy and the break resulted from the wind event."

SED's investigation correspondingly found that the subject conductor failed due to contact with the subject tree limb, fell to the ground, subsequently arced, and started the fire. SED's review of PG&E's outage reports found that one of the two fuses at Fuse L2005 (located immediately upstream of the incident location) had blown. Furthermore, SED's investigation correspondingly found the subject tree and limb to be healthy with

19

Point 019

#### E. Other Field Observations and Review of Physical Evidence

On October 9, 2017 at 0710 hours, a PG&E troubleman found one of two fuses open at Fuse L2005. The troubleman found a downed conductor and broken crossarm five poles east of Fuse L2005. The troubleman observed that several branches from the subject Valley Oak tree had broken off and that the leaves were still green. Additionally, the troubleman observed a bump sleeve on the ground with the conductor pulled out. Another PG&E troubleman found the subject Valley Oak limb lying on top of a section of conductor (See Figure 7).

In the course of evidence review, SED was informed that PG&E personnel had disposed of a broken crossarm and damaged section of the subject conductor during restoration work. PG&E stated, "After CAL FIRE had collected potentially relevant evidence at an area of interest for the Point Fire site, PG&E performed restoration work, which included replacing a broken cross-arm that CAL FIRE had not collected. PG&E did not retain the broken cross-arm. PG&E believes that the broken cross arm was

13

Point 013

---

discarded on October 9 or shortly thereafter..."<sup>18</sup> Furthermore, PG&E stated, "The damaged section of conductor, which may have also included a bump sleeve, was not retained following the restoration on October 9, 2017."<sup>19</sup>

# POINT WILDFIRE – WEST POINT 1102

## CPUC-SED EVIDENCE RECORD

**Utility Facilities involved:** West Point 1102, 12 kV Circuit

**Violations:** Yes

### I. Summary

On October 9, 2017, at approximately 0110 hours, a limb from a Valley Oak tree failed onto a PG&E 12 kV overhead conductor, which fell to the ground and caused ignition of the "Point Fire" near 22894 State Highway 26 in the city of West Point in Calaveras County. The fire burned 130 acres, destroyed 19 structures, and damaged three buildings.

Based on SED's review, SED found that PG&E violated General Order (GO) 95, Rule 19 by failing to retain the subject broken crossarm and the damaged section of the conductor:

GO Rule	Violations
GO 95, Rule 19	Evidence disposal

# POINT WILDFIRE – WEST POINT 1102

## CPUC-SED EVIDENCE RECORD



Figure 7: Vegetation on the Subject Conductor (Source: PG&E)

On October 11, 2017 at 1135 hours, SED arrived at the West Point CAL FIRE Station at 22670 Highway 26. SED met with Charles Filmer and [REDACTED], PG&E Liaison and PG&E Vegetation Management, respectively. The investigators drove northwest 0.15 miles on CA-26 to 22894 CA-26 and then walked about 0.2 miles northeast of CA-26 to the origin of the fire. Trees, Inc. was on scene clearing trees that were damaged by the fire and could impact PG&E's facilities.

[REDACTED] led the way and pointed out the Valley Oak tree that had a large limb break off and contact PG&E's West Point 1102, 12 kV conductors (See Figure 8). ACRT, Inc. did not prescribe any vegetation work for the subject Valley Oak during the last two inspections in September 2016 and March 2017.

<sup>18</sup> PG&E Evidence Collection Letter to Director Malashenko. Dated: February 16, 2018.

<sup>19</sup> PG&E Evidence Collection Letter to Director Malashenko. Dated: March 16, 2018.

### V. Conclusion

Based on the evidence reviewed, SED found PG&E in violation of GO 95, Rule 19 by failing to retain the subject broken crossarm and damaged section of conductor.

If SED becomes aware of additional information that could modify SED's findings in this Incident Investigation Report, SED may re-open the investigation and may modify this report or take further actions as appropriate.

### VI. Attachments

Attachment A – CAL FIRE Investigation Report – Case No. 17CATCU012170

Attachment B – CAL FIRE Arborist Report by Gary Whitson

Attachment C – PG&E Point Incident Description & Factual Summary

Attachment D – PG&E Evidence Collection Letter to SED, dated February 16, 2018

Attachment E – PG&E Evidence Collection Letter to SED, dated March 16, 2018

# POINT WILDFIRE – WEST POINT 1102

## CPUC-SED EVIDENCE RECORD



PGE-CPUC\_00016775



PGE-CPUC\_00016035

# POINT WILDFIRE – WEST POINT 1102

## CAL FIRE EVIDENCE RECORD

Point

10-9-2017

17CATCU012170



P-NW\_0025 Limbs on West end of line

Point

October 9, 2017

17CATCU012170

1 Playing with Fire- No children present.

2

3 Based on my training, experience, evidence observed at the scene. I

4 determined the cause of the Point fire to be the failure of the PG&E distribution line.

5 The failure could be attributed to limbs falling on the line in high winds. This caused the

6 live power line to contact the ground causing arcing in a receptive fuel bed. The result

7 was an approximately 130 acre fire that burned property adjacent to the PG&E right-of-

8 way and multiple structures.

9

# POINT WILDFIRE – WEST POINT 1102

## CAL FIRE EVIDENCE RECORD

Point

10-9-2017

17CATCU012170



P-NW\_0085 West side of Line facing East

Point

10-9-2017

17CATCU012170



P-NW 0089 Arcina West end line

# POINT WILDFIRE – WEST POINT 1102

## REFERENCE DOCUMENTS

- ▶ PG&E Point Incident Description & Factual Summary, PG&E Point Supplemental Report
- ▶ CPUC-SED Incident Investigation Report – E20171009-03
- ▶ CAL FIRE Report – Investigation Report, 17CALNU010057, 10/9/2017

-  PGE-CPUC\_00007963\_PGE-CALPA-DATA\_VOL012
-  PGE-CPUC\_00012215\_PGE-CALPA-DATA\_VOL012
-  PGE-CPUC\_00015008\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00015124\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00015780\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00016035\_PGE-CALPA-DATA\_VOL012
-  PGE-CPUC\_00016775\_PGE-CALPA-DATA\_VOL012

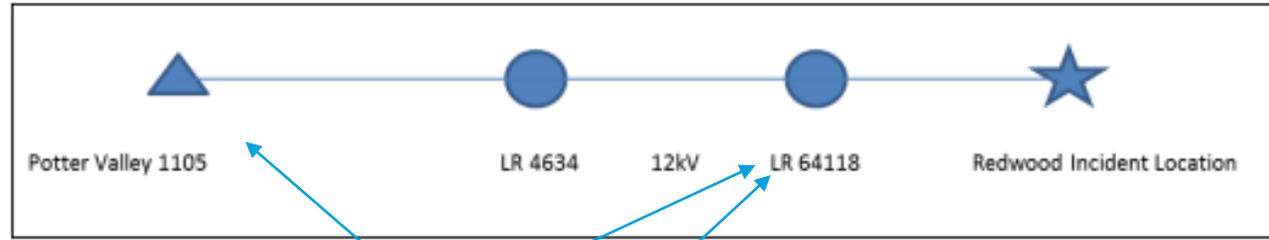
-  Point3\_SCADA\_PGE-CPUC\_00007903
-  PGE-CPUC\_00007963
-  PGE-CPUC\_00007963\_CONF
-  PGE-CPUC\_00012215\_CONF
-  Point4\_SSDL2005\_040518\_s0bi\_CONF
-  Point5\_Westpoint1102\_SSD\_L2005\_1311\_G2GQ\_Final\_CONF

# REDWOOD INCIDENT – POTTER VALLEY 1105

# REDWOOD INCIDENT – POTTER VALLEY 1105

## Incident Observations

- ▶ Tree Contact From 20 Feet
- ▶ Possible Energized Downed Conductor From 10/8/17 11:33 PM – 10/9/17 12:34 AM
- ▶ Possible High-Impedance Fault Condition
- ▶ Possible Back-Feed Conditions



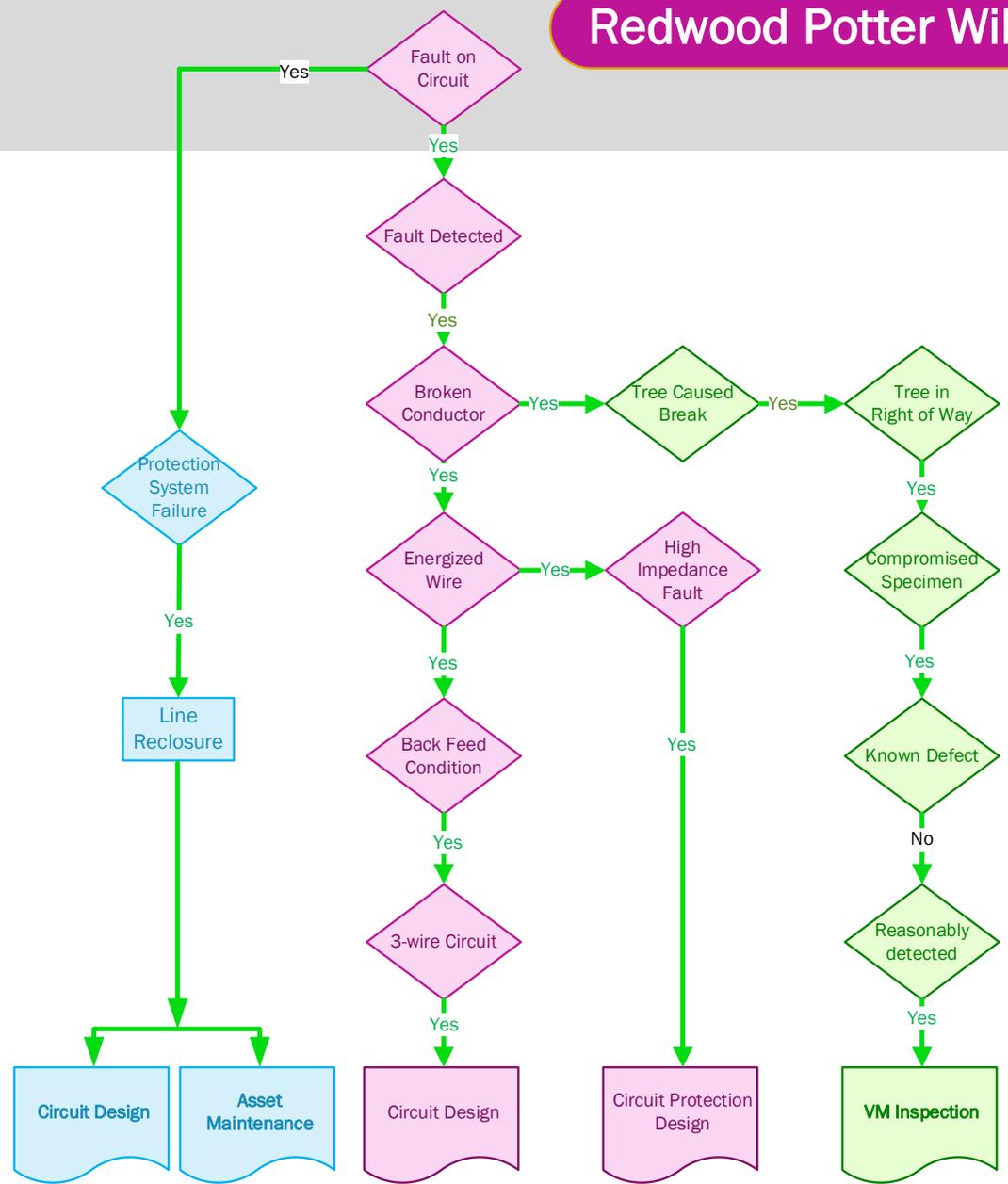
10/8/17 11:33 PM  
LR 64118 Trips & Recloses

10/8/17 12:27 AM  
Redwood Incident  
Starts Per Cal Fire

10/9/17 12:34 AM  
CB52G Not Shown  
Auto Opened and Remained Open

10/9/2017 12:00 AM-12:33 AM  
LR 64118 Multiple Operations  
Majority of Downstream  
Meters Off

# Redwood Potter Wildfire



# REDWOOD INCIDENT – POTTER VALLEY 1105

Condition	
Tree-Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	Yes
Known Defect or Condition	No
Reasonably Detected	No
Wind Event	Normal
Receptive Fuel Bed	Unknown

# REDWOOD INCIDENT – POTTER VALLEY 1105

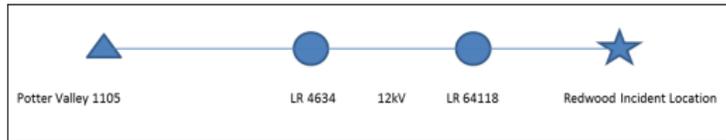
## PG&E EVIDENCE RECORD IDFS

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### REDWOOD LOCATION FACT REPORT

The Redwood incident location is the location on the PG&E system closest to the latitude and longitude coordinates (39°19.392, -123°07.867) which were provided in the April 20, 2018 communication from CAL FIRE to PG&E (the “Redwood incident location”). The electrical circuit that serves the Redwood incident location is the Potter Valley 1105 circuit.

#### Incident Overview



Per CAL FIRE, the Redwood incident location was first observed in the early morning hours of October 9, 2017. At the time of the incident, the Redwood Incident Location was on the 12kV Potter Valley 1105 Circuit.

The Redwood incident location is the location on the PG&E system closest to the latitude and longitude coordinates (39°19.392, -123°07.867) which were provided in the April 20, 2018 communication from CAL FIRE to PG&E (the “Redwood Incident Location”). The electrical circuit that serves the Redwood Incident Location is the Potter Valley 1105 circuit.

Line Recloser 64118 is a protective device upstream from the Redwood Incident Location on the Potter Valley 1105 circuit. According to PG&E records, on October 8, 2017 at approximately 11:33 PM, Line Recloser 64118 operated and reclosed, momentarily de-energizing the Redwood incident location. According to the CAL FIRE Investigation Report for the Redwood Incident, CAL FIRE started receiving reports of a vegetation fire in Potter Valley at 11:34 PM. Per PG&E records, on October 9, 2017 at approximately 12:00 AM, Line Recloser 64118 operated and reclosed, momentarily de-energizing the Redwood incident location. Per PG&E records, on October 9, 2017 at approximately 12:11 AM, Line Recloser 64118 operated and reclosed, momentarily de-energizing the Redwood incident location. Per PG&E records, on October 9, 2017 from 12:17 AM to 12:33 AM, a majority of smart meters on the Potter Valley 1105 circuit recorded a series of power off/on events. According to the CAL FIRE Investigation Report for the Redwood Incident, a CAL FIRE employee reported a small vegetation fire on the east side of Hawn Creek Road at 12:27 AM.

According to PG&E records, on October 9, 2017, at approximately 12:33 AM, the GCC remotely opened via SCADA Circuit Breaker 22 at the Potter Valley Powerhouse Substation. Then, at approximately 12:34 AM, Circuit Breaker 52G at

Case 3:14-cr-00175-WHA Document 956-28 Filed 12/31/18 Page 3 of 4

Potter Valley Powerhouse Substation automatically opened and remained open, de-energizing the Potter Valley Powerhouse. Per PG&E records, when both Circuit Breakers 22 and 52G were opened, the Redwood incident location was de-energized.

According to PG&E records, a PG&E troubleman was the first PG&E responder at the Redwood incident location when he drove down Hawn Creek Road around 1:12-1:32 AM on October 9, 2017. The PG&E troubleman drove south along Hawn Creek Road to look for downed wires or anything in the road that might be hazardous. The PG&E troubleman did not recall seeing any damage to PG&E equipment on Hawn Creek Road at that time. He did recall seeing fire activity on the west side of Hawn Creek Road, but saw no evidence that the fire burned any area on the east side of Hawn Creek Road.

Sometime later on October 9, 2017, during day light hours, the same PG&E troubleman recalled that he drove back down Hawn Creek Road. The PG&E troubleman recalled seeing one of three phases down between Pole 102176248 and the pole to the east. On October 10, 2017, PG&E crews completed repair work at the Redwood incident location.

#### Redwood Incident Location

The Redwood incident location is the location on the PG&E system closest to the latitude and longitude coordinates (39°19.392, -123°07.867), which were provided in the April 20, 2018 communication from CALFIRE to PG&E (the “Redwood incident location”).

# REDWOOD INCIDENT – POTTER VALLEY 1105

## PG&E EVIDENCE RECORD IDFS

According to PG&E records, on October 8, 2017 at approximately 12:00 AM, the distribution conductors of the Potter Valley 1105 circuit routed through the incident location experienced momentary outages because Line Recloser 64118 operated and reclosed.<sup>1</sup> Later, at approximately 12:11 AM, the distribution conductors of the Potter Valley 1105 circuit routed through the incident location experienced additional momentary outages because Line Recloser 64118 operated and reclosed.

According to PG&E records, a troubleman was the first PG&E responder at the incident location. Per the PG&E troubleman, at 12:26 AM on October 9, 2017, he called the PG&E Distribution Control Center in Rocklin to request that the Potter Valley Powerhouse Substation be de-energized due to fire in the area.

According to PG&E records, on October 9, 2017, at approximately 12:33 AM, the Grid Control Center (“GCC”) remotely opened via SCADA Circuit Breaker 22 at the Potter Valley Powerhouse Substation. Circuit Breaker 22 is the protective device for the Potter Valley-Willits transmission line located at the Potter Valley Powerhouse Substation. Then, at approximately 12:34 AM, Circuit Breaker 52G at Potter Valley Powerhouse Substation automatically opened and remained open, de-energizing the Potter Valley Powerhouse. Opening both Circuit Breaker 22 and 52G de-energized the distribution conductors at the incident location.

According to the PG&E troubleman, after the Potter Valley Powerhouse Substation was de-energized, CAL FIRE enlisted the troubleman to assist in cutting a downed conductor at the incident location. When he arrived at the Potter Valley incident location, the troubleman observed one conductor of the transmission line had come down near steel lattice structure number 0/8. The troubleman estimated about 100 yards of the transmission conductor to the south of the break point was laying on the ground, and the conductor span to the north of the break point was dangling above the ground. The troubleman also observed that a branch of a nearby tree had broken and was on the ground below the transmission line. Per the troubleman, he cut sections from both ends of the downed transmission conductor and provided them to CAL FIRE at CAL FIRE’s request. The troubleman also observed charred vegetation in the area.

# REDWOOD INCIDENT – POTTER VALLEY 1105

## PG&E EVIDENCE RECORD ILIS

User device name = 64118 -Potter Valley						
Evt	Real Time	Type	IA	IB	IC	310
12	10/9/2017 0:40	CONTROL ALARMS	0	0	0	0
13	10/9/2017 0:19	SEQUENCE RESET	27	17	24	2
14	10/9/2017 0:18	FAULT DATA (pri)	41	30	505	469
15	10/9/2017 0:18	OVERCURRENT TRIP	39	30	505	469
16	10/9/2017 0:17	FAULT DATA (pri)	34	25	523	489
17	10/9/2017 0:17	OVERCURRENT TRIP	34	25	523	489
18	10/9/2017 0:07	SEQUENCE RESET	31	16	87	64
19	10/9/2017 0:06	FAULT DATA (pri)	35	554	526	17
20	10/9/2017 0:06	OVERCURRENT TRIP	35	554	526	17
21	10/9/2017 0:06	FAULT DATA (pri)	37	22	171	141
22	10/9/2017 0:06	OVERCURRENT TRIP	37	21	171	141
23	10/8/2017 23:40	SEQUENCE RESET	30	18	26	1
24	10/8/2017 23:39	FAULT DATA (pri)	42	2134	41	2136
25	10/8/2017 23:39	OVERCURRENT TRIP	9	2134	2	2136

Potter Valley Line Recloser 64118  
Fault Recording

**Ukiah**

**17-0085311**

**Outages**

Circuit: 04228, POTTER VALLEY P H SUB District: Ukiah  
 Type: Unplanned Customer Minutes: Sub 6771009 0 Mem 6771009 Adj 6764  
 Customers: CESC 1001 CEMC 0 ADJ 1001 Initial 1001 Weather: Clear,32-90 F  
 Active Interval: NO Sustained Fault Type: Force Out Action Required: No  
 EquipID: POTTER VALLEY P H Construction Type: OH  
 Equipment Type: Substation OIS Outage#: 7316519  
 Equipment Condition: Conductor, Overhead, Broken, wire on ground Targets:  
 Crew Notified Time: Supervisor Notified:  
 Equipment Address: SUBSTATION  
 Fault Location: MULTIPLE LOCATIONS LD SIDE OF POTTER VALLEY SUB  
 Previous Switching Details: 1929 OPEN (DMS# 1896819)/4887 OPEN (DMS# 1896707)/443 OPEN (DMS# 1896818)  
 GOC FORCED OPEN POTTER VALLEY CB 12 DE-ENERGIZING POTTER VALLEY SUB AND ALL DISTRIBUTION CUSTOMERS -MULTIPLE FIRE LOCATIONS/ALSO SEE 17-0087562 TO INSTALL POWER PAK GENERATOR  
 Action Description Cause: Environmental/External, Fire, Forest/Grass No Access Reason:  
 Distribution Wire Down: No Wire Down Energized: No  
 Multi Damage Location: No # of Operations:  
 Counter Read: Created By: DALS  
 Outage Level: Transmission line Last Updated By: SMBATCH\_FO  
 Responsible Organization: Transmission Fault Location Info:  
 GPS MA Data: Latitude & Longitude  
 FNL: 10/09/17 00:33 Reviewed By: KKCA  
 End Date: 10/16/17 18:58 Reviewed By: 11/30/17 15:31 Date

**Actions**

Date	Description	Customers Restored	Customers Out	Minutes Out	Customer Minutes
10/09/17 00:33	GOC FORCED OPEN POTTER VALLEY CB 12 DE-ENERGIZING POTTER VALLEY SUB AND ALL DISTRIBUTION CUSTOMERS -	0	1001		
10/09/17 15:01	BARRINGTON OPENED LR95878 ON A DEAD LINE	0			
10/09/17 15:13	BARRINGTON OPENED LR84118 ON A DEAD LINE	0			
10/09/17 15:21	BARRINGTON OPENED LR76498 ON A DEAD LINE	0			
10/09/17 15:50	RESE OPENED 5925 ON A DEAD LINE NOT MAPPED ON DMS AT TIME OF OUTAGE, GIS TAG SUBMITTED BY NDCC	0			
10/10/17 09:21	GALETTI OPENED 5489 ON A DEAD LINE	0			
10/11/17 13:35	GALETTI OPENED LR37476 ON A DEAD LINE	0			
10/11/17 14:20	LAZARAVICH REPORTS FOUND LR4834 OPEN, GREEN FLAGGED CONT-NO TARGETS CTR-901	0			
10/11/17 14:20	LR 4834 OPEN	0			
10/11/17 14:20	LAZARAVICH REPORTS BK 42 OPEN - NO TARGETS	0			
10/11/17 14:58	LANDGOC REPORTS CB 13 CLOSED -POTTER VALLEY PH ENERGIZED	0			
10/11/17 14:58	SU POTTER VALLEY P H CLOSE	0			
10/11/17 15:15	GALETTI OPENED LR1904 ON A DEAD LINE	0			
10/11/17 17:00	LAND REPORTS POTTER VALLEY PH DE-ENERGIZED PER CAL FIRE REQUEST	0			

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PGE-CPUC\_00015121

# REDWOOD INCIDENT – POTTER VALLEY 1105

## CAL FIRE EVIDENCE RECORD

Redwood Incident      October 8, 2017      17CAMEU012169

1    **7 – EQUIPMENT:**

2    The equipment associated with the Redwood Fire is owned by PG&E. The conductor that  
3    broke at Origin 1 on the property of 13801 N. Busch Road is a 60kV conductor according to  
4    PG&E Transmission Troublemaker Rory MORGAN. This is one of six conductors that run  
5    from the PG&E substation located on Powerhouse Road south towards Highway 20 near  
6    Lake Mendocino. The break occurred between two transmission towers which are  
7    referenced below with the following Datum WGS 84 GPS coordinates.

8  
9    Origin #1: North Busch Road

11    North Transmission Tower	South Transmission Tower
12    N 39°20.953	N 39°20.841
13    W 123°07.882	W 123°07.880

14  
15    The conductor that broke at Origin 2 on the property of 9100 Main Street east of Hawn  
16    Creek Road is a 12kV conductor according to PG&E Subforeman Andrew DOMINGUEZ.  
17    This conductor is one of three that run northwest to southeast from Hawn Creek Road to  
18    Main Street. The break occurred between two power poles which are referenced below  
19    with the following Datum WGS 84 GPS coordinates.

20  
21    Origin #2: Hawn Creek Road

23    Northwest Power Pole	Southeast Power Pole
24    N 39°19.397	N 39°19.380
25    W 123°07.877	W 123°07.847

22    Electrical Power - Conductors were damaged due to falling tree branches. Evidence at N.  
23    Busch Road and Hawn Creek Road show that conductors broke and contacted the ground.  
24    Witnesses at N. Busch Road saw the conductors arc and a fire start immediately after.  
25    Witnesses saw a fire start on the eastside of Hawn Creek Road on the property of 9100  
26    Main Street. Fulgurite pieces and copper wire were found during the investigation of this  
27    fire. There was no electrical power in or near the SOA in Redwood Valley. Based on these  
28    facts, I included electrical power as a cause of the fires at N. Busch Road and Hawn Creek  
29    Road.

30  
LE80 (Rev. 7/2011)

31

Officer Initials ZRS

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Redwood Incident

October 8, 2017

17CAMEU012169

# REDWOOD INCIDENT – POTTER VALLEY 1105

## CAL FIRE EVIDENCE RECORD

29

30 GULYASH told me he was in his bathroom preparing for bed when he saw a huge arc

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16

Officer Initials ERB

PG&E CONFIDENTIAL UNDER NON-DISCLOSURE AGREEMENT

Redwood Incident                      October 8, 2017                      17CAMEU012169

1 towards the east. He said he saw a tree illuminate when the conductors arced. He told me  
2 he had lost power 15 minutes prior to witnessing the arc. He said he saw the fire start on  
3 the neighbor's property on the south side of the creek under the conductors. He described  
4 the initial size of the fire as a 5-yard burn pile. I asked GULYASH if he would show me the  
5 location of where he saw the fire start. I walked with him towards the southeast corner of  
6 his property. He showed me where the conductors were and where he saw them arc. On  
7 the southeast corner of his property was a transmission tower with six overhead conductors  
8 running north and south. The middle east conductor was broken and suspended on the  
9 bottom conductor. This conductor was not in contact with the ground. GULYASH pointed to  
10 the area on the neighbor's property where he saw the fire start. He pointed to the northeast  
11 corner of his neighbor's property, owned by Lorrie HURN at 13801 N. Busch Road. I asked  
12 GULYASH how fast he thought the wind was blowing when he saw the conductors arc. He  
13 said it was well over 45 mph from the northeast. He told me there was a wind event two

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Redwood Incident                      October 8, 2017                      17CAMEU012169

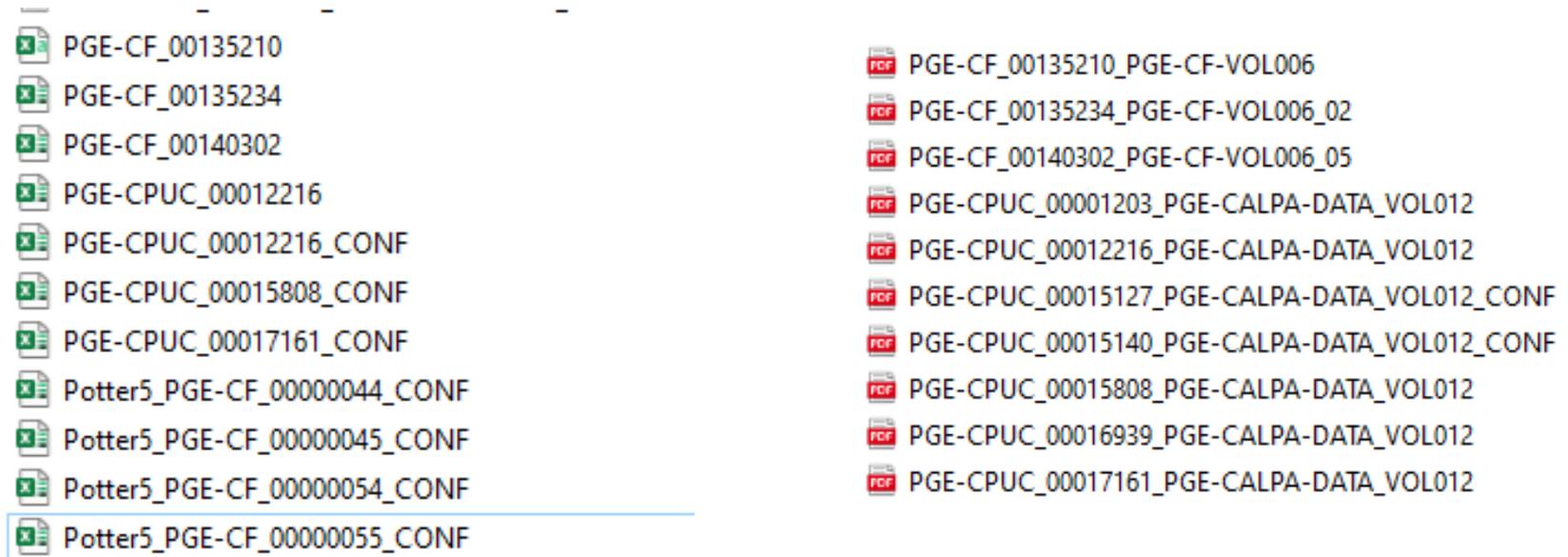
1 After gathering witness statements, receiving fire behavior data and conducting our  
2 investigations, I've concluded that the initial fire reported on North Busch Road was ignited  
3 when the top section of a valley oak tree broke and fell through the conductor at  
4 approximately 11:34 PM. The branch contacted the middle east 60kV overhead conductor  
5 and caused it to break. The conductor caught the blackberry bushes below on fire. The fire  
6 advanced west with the northeast wind towards Redwood Valley. A second fire started on  
7 the east side of Hawn Creek Road when a branch from an oak tree broke and contacted a  
8 12kV overhead conductor at approximately 12:27 AM. The conductor fell to the ground  
9 starting a vegetation fire in the annual grass east of Hawn Creek Road. The fire grew and  
10 spotted across the road and burned into the fire from N. Busch Road. The wind blew  
11 embers towards Redwood Valley and started a third fire in a grass field near East Road  
12 and Tomki Road at approximately 12:37 AM. The three fires burned together for a total of  
13 36,523 acres.

14  
15 The conductors at Origin #1 - N. Busch Road, is a 60kV overhead conductor. The  
16 conductor at Origin #2 - Hawn Creek Road, is a 12kV overhead conductor. Per California  
17 Public Resource Code 4293, except as otherwise provided in Sections 4294 to 4296,

# REDWOOD INCIDENT – POTTER VALLEY 1105

## REFERENCE DOCUMENTS

- ▶ PG&E Redwood Incident Description & Factual Summary, PG&E Redwood Supplemental Report
- ▶ CAL FIRE Report – 17CAMEU012169



# REDWOOD INCIDENT – 60 KV

# REDWOOD INCIDENT – POTTER VALLEY-MENDOCINO 60KV

## Incident Observations

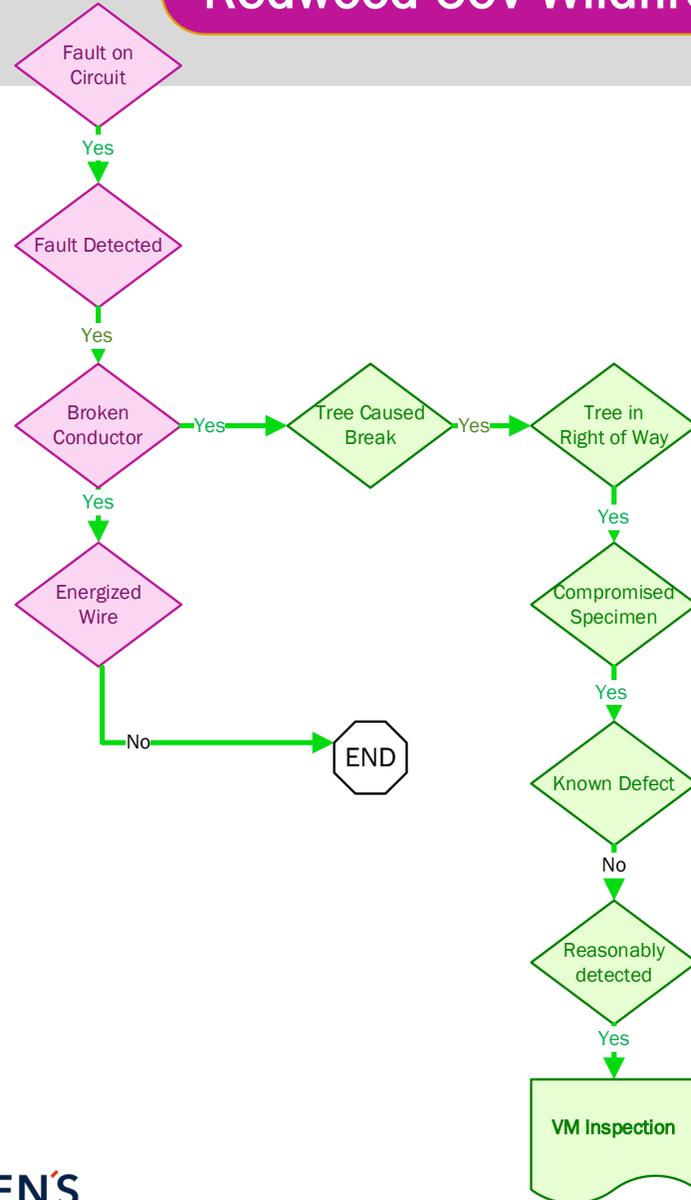
- ▶ Tree Contacted Middle Phase of 60kV Line From 15 Feet
- ▶ 60kV Center Phase Confirmed Broken and Down
- ▶ Circuit Breakers 12 and 62 Detect Fault and Trip



10/8/17 11:33PM  
CB 12 & CB 62  
Trip & Lock

10/8/17 11:36 PM  
Redwood Incident (60kV)  
Starts Per Cal Fire

# Redwood 60v Wildfire



# REDWOOD INCIDENT – 60 V

Condition	
Tree-Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	Yes
Known Defect or Condition	No
Reasonably Detected	Yes
Wind Event	Normal
Receptive Fuel Bed	Yes

# REDWOOD INCIDENT – POTTER VALLEY-MENDOCINO 60KV PG&E EVIDENCE RECORD IDFS

## POTTER VALLEY BUSCH RD. INCIDENT DESCRIPTION & FACTUAL SUMMARY

For completeness, this incident description and factual summary should be read in conjunction with the contemporaneously submitted response to Question 62.

### Background:

On October 9, 2017, PG&E filed an Electric Safety Incident Report (Incident No. 171009-8553) concerning an incident that occurred approximately 500 feet East of 13801 North Busch Road, Potter Valley, Mendocino County (the “incident location” as defined by the CPUC’s December 7, 2017, letter). At the incident location the Potter Valley-Mendocino 60kV transmission line is mounted on the east side of the steel lattice structures. When PG&E arrived at the incident location, PG&E observed that a branch from a green, healthy California White Oak/Valley Oak tree had broken and was laying on the ground below 2 of 3 intact transmission conductors. PG&E also observed the middle conductor of the Potter Valley-Mendocino 60kV transmission line had broken and was on the ground. Three of three distribution conductors of the Potter Valley 1105 circuit, mounted on the west side of the steel lattice structures, were intact. The California White Oak/Valley Oak tree was rooted approximately 15 feet from the transmission conductors.

According to CAL FIRE’s website, CAL FIRE has not identified a fire starting in Potter Valley. CAL FIRE has collected evidence at the incident location.

CAL FIRE has identified the Redwood Valley fire as occurring North of Highway 20, west of Mendocino National Forest, and south of Black Bart. According to CAL FIRE’s website, the Redwood Valley fire started at 11:36 PM on October 8, 2017.

### Incident Overview:



The transmission line at the incident location is the Potter Valley-Mendocino 60kV transmission line. Circuit Breaker 12 is a protective device north of the incident location, and is located at the Potter Valley Powerhouse Substation. Circuit Breaker 62 is a protective device south of the incident location, and it is located at the Mendocino Substation.

According to PG&E records, on October 8, 2017, Circuit Breaker 12 and Circuit Breaker 62 operated and locked out at approximately 11:33 PM. Per PG&E records, once Circuit Breakers 12 and 62 had automatically opened, the transmission conductors at the incident location were de-energized. Per PG&E records, the distribution conductors of the Potter Valley 1105 circuit routed through the incident location experienced a momentary outage at approximately the same

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According to PG&E records, on October 9, 2017, at approximately 12:33 AM, the Grid Control Center (“GCC”) remotely opened via SCADA Circuit Breaker 22 at the Potter Valley Powerhouse Substation. Circuit Breaker 22 is the protective device for the Potter Valley-Willits transmission line located at the Potter Valley Powerhouse Substation. Then, at approximately 12:34 AM, Circuit Breaker 52G at Potter Valley Powerhouse Substation automatically opened and remained open, de-energizing the Potter Valley Powerhouse. Opening both Circuit Breaker 22 and 52G de-energized the distribution conductors at the incident location.

According to the PG&E troubleman, after the Potter Valley Powerhouse Substation was de-energized, CAL FIRE enlisted the troubleman to assist in cutting a downed conductor at the incident location. When he arrived at the Potter Valley incident location, the troubleman observed one conductor of the transmission line had come down near steel lattice structure number 0/8. The troubleman estimated about 100 yards of the transmission conductor to the south of the break point was laying on the ground, and the conductor span to the north of the break point was dangling above the ground. The troubleman also observed that a branch of a nearby tree had broken and was on the ground below the transmission line. Per the troubleman, he cut sections from both ends of the downed transmission conductor and provided them to CAL FIRE at CAL FIRE’s request. The troubleman also observed charred vegetation in the area.

PG&E was granted access to the incident location again during daylight hours on October 9, 2017. At that time, PG&E identified that the tree was a California White Oak/Valley Oak tree and that it was rooted approximately 15 feet from the transmission line. The transmission conductor was #2CU (copper) installed in 1947.

# REDWOOD INCIDENT – POTTER VALLEY-MENDOCINO 60KV

PG&E EVIDENCE RECORD IDFS

	A	B	C	D	E
1	<b>Potter Valley - Mendocino Line Operation 10/08/2017 Events</b>				
2	Terminal	Relay Type	Time	Targets	Breaker Reclose/ Trip
3	Mendocino CB 62	GE D60	22:33:10	AB	Trip
4			22:33:41	BC	Reclose (Line Test)
5			22:33:41	BC	Trip (Breaker Lockout)
6					
7					
8					

# REDWOOD INCIDENT – POTTER VALLEY-MENDOCINO 60KV

*CPUC SED EVIDENCE RECORD*



PGE-CPUC\_00016939

# REDWOOD INCIDENT – POTTER VALLEY-MENDOCINO 60KV

## CAL FIRE EVIDENCE RECORD

Redwood Incident      October 8, 2017      17CAMEU012169

1 **7 – EQUIPMENT:**

2 The equipment associated with the Redwood Fire is owned by PG&E. The conductor that  
3 broke at Origin 1 on the property of 13801 N. Busch Road is a 60kV conductor according to  
4 PG&E Transmission Troubleshooter RORY MORGAN. This is one of six conductors that run  
5 from the PG&E substation located on Powerhouse Road south towards Highway 20 near  
6 Lake Mendocino. The break occurred between two transmission towers which are  
7 referenced below with the following Datum WGS 84 GPS coordinates.

8

9 Origin #1: North Busch Road

10

North Transmission Tower	South Transmission Tower
12 N 39°20.953	N 39°20.841
13 W 123°07.882	W 123°07.880

14

15 The conductor that broke at Origin 2 on the property of 9100 Main Street east of Hawn  
16 Creek Road is a 12kV conductor according to PG&E Subforeman Andrew DOMINGUEZ.  
17 This conductor is one of three that run northwest to southeast from Hawn Creek Road to  
18 Main Street. The break occurred between two power poles which are referenced below  
19 with the following Datum WGS 84 GPS coordinates.

20

21 Origin #2: Hawn Creek Road

22

Northwest Power Pole	Southeast Power Pole
24 N 39°19.397	N 39°19.380
25 W 123°07.877	W 123°07.847

26

22 Electrical Power - Conductors were damaged due to falling tree branches. Evidence at N.  
23 Busch Road and Hawn Creek Road show that conductors broke and contacted the ground.  
24 Witnesses at N. Busch Road saw the conductors arc and a fire start immediately after.  
25 Witnesses saw a fire start on the eastside of Hawn Creek Road on the property of 9100  
26 Main Street. Fulgurite pieces and copper wire were found during the investigation of this  
27 fire. There was no electrical power in or near the SOA in Redwood Valley. Based on these  
28 facts, I included electrical power as a cause of the fires at N. Busch Road and Hawn Creek  
29 Road.

30

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31

Officer Initials ZRS

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Redwood Incident

October 8, 2017

17CAMEU012169

# REDWOOD INCIDENT – POTTER VALLEY-MENDOCINO 60KV CAL FIRE EVIDENCE RECORD

29

30 GULYASH told me he was in his bathroom preparing for bed when he saw a huge arc

LE80 (Rev. 7/2011)

16

Officer Initials ERB

PG&E CONFIDENTIAL UNDER NON-DISCLOSURE AGREEMENT

Redwood Incident                      October 8, 2017                      17CAMEU012169

1 towards the east. He said he saw a tree illuminate when the conductors arced. He told me  
2 he had lost power 15 minutes prior to witnessing the arc. He said he saw the fire start on  
3 the neighbor's property on the south side of the creek under the conductors. He described  
4 the initial size of the fire as a 5-yard burn pile. I asked GULYASH if he would show me the  
5 location of where he saw the fire start. I walked with him towards the southeast corner of  
6 his property. He showed me where the conductors were and where he saw them arc. On  
7 the southeast corner of his property was a transmission tower with six overhead conductors  
8 running north and south. The middle east conductor was broken and suspended on the  
9 bottom conductor. This conductor was not in contact with the ground. GULYASH pointed to  
10 the area on the neighbor's property where he saw the fire start. He pointed to the northeast  
11 corner of his neighbor's property, owned by Lorrie HURN at 13801 N. Busch Road. I asked  
12 GULYASH how fast he thought the wind was blowing when he saw the conductors arc. He  
13 said it was well over 45 mph from the northeast. He told me there was a wind event two

PG&E CONFIDENTIAL UNDER NON-DISCLOSURE AGREEMENT

Redwood Incident                      October 8, 2017                      17CAMEU012169

1 After gathering witness statements, receiving fire behavior data and conducting our  
2 investigations, I've concluded that the initial fire reported on North Busch Road was ignited  
3 when the top section of a valley oak tree broke and fell through the conductor at  
4 approximately 11:34 PM. The branch contacted the middle east 60kV overhead conductor  
5 and caused it to break. The conductor caught the blackberry bushes below on fire. The fire  
6 advanced west with the northeast wind towards Redwood Valley. A second fire started on  
7 the east side of Hawn Creek Road when a branch from an oak tree broke and contacted a  
8 12kV overhead conductor at approximately 12:27 AM. The conductor fell to the ground  
9 starting a vegetation fire in the annual grass east of Hawn Creek Road. The fire grew and  
10 spotted across the road and burned into the fire from N. Busch Road. The wind blew  
11 embers towards Redwood Valley and started a third fire in a grass field near East Road  
12 and Tomki Road at approximately 12:37 AM. The three fires burned together for a total of  
13 36,523 acres.

14

15 The conductors at Origin #1 - N. Busch Road, is a 60kV overhead conductor. The  
16 conductor at Origin #2 - Hawn Creek Road, is a 12kV overhead conductor. Per California  
17 Public Resource Code 4293, except as otherwise provided in Sections 4294 to 4296,

# REDWOOD INCIDENT – POTTER VALLEY-MENDOCINO 60KV

## REFERENCE DOCUMENTS

- ▶ PG&E Redwood Incident Description & Factual Summary, PG&E Redwood Supplemental Report
- ▶ Cal Fire Report – 17CAMEU012169
- ▶ Case 3:14-cr-00175-WHA Document 956-
- ▶ PG&E 17- 0085311

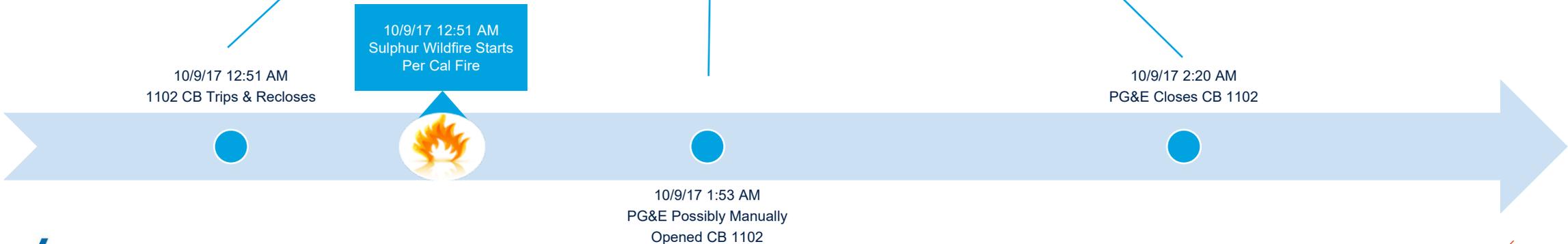
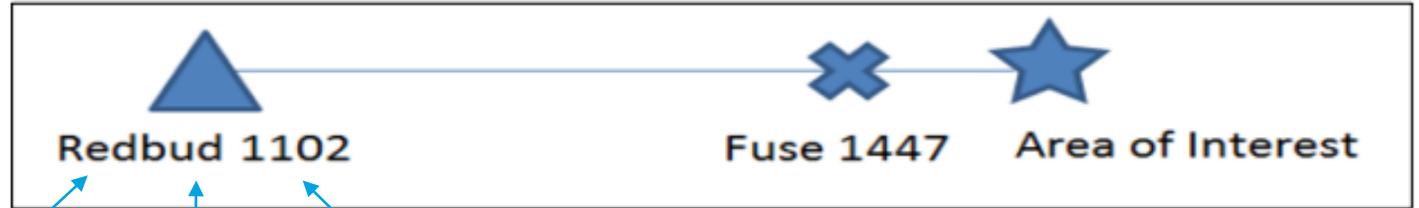
 PGE-CF_00135210	 PGE-CF_00135210_PGE-CF-VOL006
 PGE-CF_00135234	 PGE-CF_00135234_PGE-CF-VOL006_02
 PGE-CF_00140302	 PGE-CF_00140302_PGE-CF-VOL006_05
 PGE-CPUC_00012216	 PGE-CPUC_00001203_PGE-CALPA-DATA_VOL012
 PGE-CPUC_00012216_CONF	 PGE-CPUC_00012216_PGE-CALPA-DATA_VOL012
 PGE-CPUC_00015808_CONF	 PGE-CPUC_00015127_PGE-CALPA-DATA_VOL012_CONF
 PGE-CPUC_00017161_CONF	 PGE-CPUC_00015140_PGE-CALPA-DATA_VOL012_CONF
 Potter5_PGE-CF_00000044_CONF	 PGE-CPUC_00015808_PGE-CALPA-DATA_VOL012
 Potter5_PGE-CF_00000045_CONF	 PGE-CPUC_00016939_PGE-CALPA-DATA_VOL012
 Potter5_PGE-CF_00000054_CONF	 PGE-CPUC_00017161_PGE-CALPA-DATA_VOL012
 Potter5_PGE-CF_00000055_CONF	

# SULPHUR WILDFIRE – REDBUD 1102

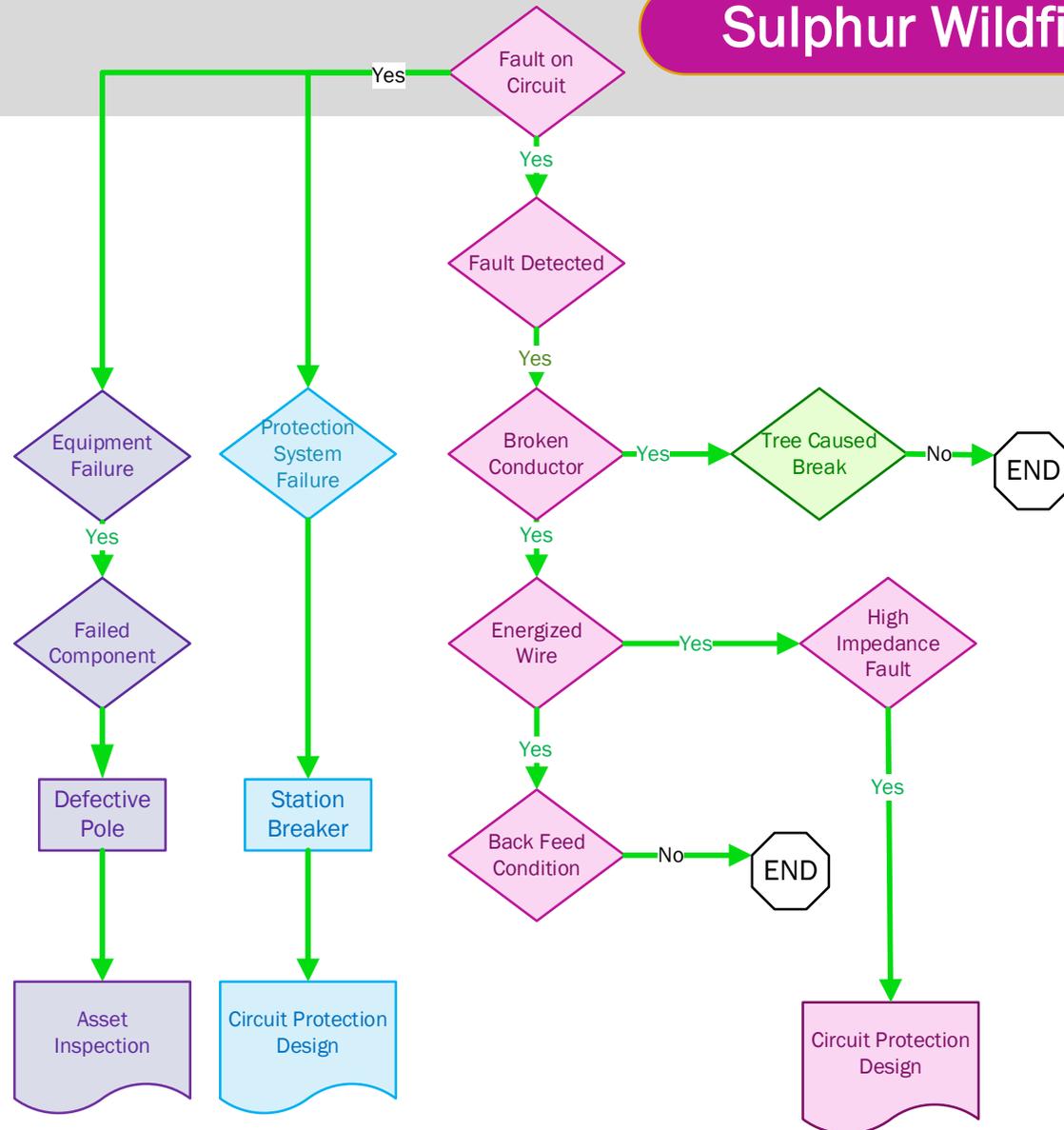
# SULPHUR WILDFIRE – REDBUD 1102

### Incident Observations

- ▶ Wildlife-Damaged Pole Failure (Woodpecker)
- ▶ Possible Energized Conductor Down 12:51 AM – 1:53 AM
- ▶ Possible High-Impedance Fault Condition



# Sulphur Wildfire



# SULPHUR WILDFIRE – REDBUD 1102

## VEGETATION MANAGEMENT

Condition	
Tree-Caused Break	No
Tree In or Along ROW	N/A
Compromised Specimen	N/A
Known Defect or Condition	N/A
Reasonably Detected	N/A
Wind Event	High Winds
Receptive Fuel Bed	Yes

# SULPHUR WILDFIRE – REDBUD 1102

## PG&E EVIDENCE RECORD IDFS

### SULPHUR INCIDENT DESCRIPTION & FACTUAL SUMMARY

For completeness, this incident description and factual summary should be read in conjunction with the contemporaneously submitted response to Question 62.

#### Background:

On October 11, 2017, PG&E filed an Electric Safety Incident Report (Incident No. 171011-8562) concerning an incident that occurred near Pomo Road and Sulphur Bank Road, Clearlake, Lake County (the “incident location” as defined by the CPUC’s December 7, 2017, letter). PG&E identified two poles on the Redbud 1102 (12kV) Circuit at this location that had broken. The top section of Fuse Cutout Pole 1447 had broken and fallen to the ground, and the pole one span to the west had burned at the base and fallen to the ground.

According to CAL FIRE’s website, CAL FIRE has identified the location of the Sulphur fire as off Highway 20 and Sulphur Bank Road, Clearlake Oaks, Lake County.

According to CAL FIRE’s website, the Sulphur incident started at 11:59 PM on October 8, 2017.

#### Incident Overview:



The Redbud 1102 Circuit Breaker is a protective device for the Redbud Circuit, upstream from the incident location, and is located at the Redbud Substation. Per PG&E records, on October 9, 2017 at 12:51 AM, the Redbud 1102 Circuit Breaker operated and locked out.

PG&E records indicate that at 2:14 AM on October 9, Switch 88137, a switch upstream of the incident location, was manually opened due to fire in the area, isolating the incident location. Per PG&E records, the Redbud 1102 Circuit Breaker then was remotely closed via SCADA at 2:20 AM on October 9, 2017.

Per a troubleman, the troubleman was the first PG&E employee at the incident location on October 9, 2017. According to the troubleman, he arrived at the incident location at approximately 9:00 AM. While at the incident location, the troubleman observed that fire had burned through the area. He also observed that Fuse Cutout Pole 1447 had broken near the communication line attachment. The portion of Fuse Cutout Pole 1447 below the break point was still standing. The portion of Fuse Cutout Pole 1447 above the break point was touching the ground only at the break point. No portion of Fuse Cutout Pole 1447 was lying on the ground.

The troubleman also observed that three out of three conductors of the tap line, load side of Fuse 1447, were lying on the ground and across a dirt access road. All three conductors of the tap line

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remained attached to Fuse Cutout Pole 1447 and the crossarm of the next pole. He observed that there were tire tracks of a dual wheel vehicle crossing the tap line conductors where they lay across the dirt access road. The troubleman cut three of three conductors of the tap line where they crossed the dirt access road and removed them from the road. Three of three conductors of the main line remained attached to Fuse Cutout Pole 1447 and the load and supply side poles adjacent to Fuse Cutout Pole 1447. The main line conductors were not in contact with the ground.

According to PG&E records, crews completed repair work on October 13, 2017, and a PG&E employee manually closed Switch 88137 at 8:20 PM, restoring power to the incident location.

#### Evidence Collection:

CAL FIRE collected approximately 12 feet of the center section of Fuse Cutout Pole 1447, portions of the wooden crossarm, and fuse cutouts. PG&E does not know whether CAL FIRE collected additional evidence at the incident location.

On October 12, 2017, PG&E collected the remaining portions of Fuse Cutout Pole 1447, the remaining portions of the crossarm, and both ends of the conductors. The conductors were 4AR (Aluminum Conductor, Steel Reinforced) installed in 1966. An examination of the remaining portion of Fuse Cutout Pole 1447 not collected by CAL FIRE revealed no damage that would have warranted replacement. There is a cavity located in the vicinity of the communications level, approximately 8 inches below the section of pole removed by CAL FIRE. The top of Fuse Cutout Pole 1447 was not rotten.

During efforts to restore service in the aftermath of the fire, the pole one span to the west of Fuse 1447 was replaced and not retained. PG&E previously informed the CPUC that a waste disposal company took the pole to a landfill in Clearlake, and the landfill manager reported that there is no way to locate it.

# SULPHUR WILDFIRE – REDBUD 1102

## PG&E EVIDENCE RECORD IDFS

10/8/2017 23:34 (P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is NORMAL  
10/8/2017 23:34 (P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 recent rly event is NORMAL  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 trip is ALARM  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 set a rly tgt is ALARM  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 inst oc tgt 50 is ALARM  
10/9/2017 0:51 (P09) 1-Lakeport/Clearlake Redbud Substation cb 1102 position is OPEN  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 trip is NORMAL  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 grd tgt is ALARM  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 c ph tgt is ALARM  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 a ph tgt is ALARM  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 bkr mtce tgt is ALARM  
10/9/2017 0:51 (P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is ALARM  
10/9/2017 0:51 (P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 recent rly event is ALARM  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 bkr mtce tgt is NORMAL  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 trip is ALARM  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 bkr mtce tgt is NORMAL  
10/9/2017 0:51 (P09) 1-Lakeport/Clearlake Redbud Substation cb 1102 position is CLOSED  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 set a rly tgt is NORMAL  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 time oc tgt 51 is ALARM  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 inst oc tgt 50 is NORMAL  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 set a rly tgt is ALARM  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 a ph tgt is NORMAL  
10/9/2017 0:51 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 bkr mtce tgt is ALARM  
10/9/2017 0:51 (P09) 1-Lakeport/Clearlake Redbud Substation cb 1102 position is OPEN  
10/9/2017 0:52 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 trip is NORMAL  
10/9/2017 0:52 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 trip is ALARM  
10/9/2017 0:52 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 bkr mtce tgt is ALARM  
10/9/2017 0:52 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 set a rly tgt is ALARM  
10/9/2017 0:52 (P09) 1-Lakeport/Clearlake Redbud Substation cb 1102 position is OPEN  
10/9/2017 0:52 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 set a rly tgt is NORMAL  
10/9/2017 0:52 (P09) 1-Lakeport/Clearlake Redbud Substation cb 1102 position is CLOSED  
10/9/2017 0:52 (P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 bkr mtce tgt is NORMAL  
10/9/2017 0:57 (P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 recent rly event is NORMAL  
10/9/2017 0:57 (P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is NORMAL  
10/9/2017 1:25 (P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 recent rly event is ALARM  
10/9/2017 1:25 (P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is ALARM  
10/9/2017 1:25 (P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 recent rly event is NORMAL  
10/9/2017 1:25 (P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is NORMAL  
10/9/2017 1:32 (P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is ALARM

CB 1102 Sequencing  
Trips 12:51AM  
Recloses 12:52 AM

Sulphur3\_SCADA\_PGE-CPUC\_0000790

# SULPHUR WILDFIRE – REDBUD 1102

## PG&E EVIDENCE RECORD IDFS

PG&E Manual Open ?

10/9/2017 0:52	(P09) 1-Lakeport/Clearlake Redbud Substation cb 1102 position is CLOSED
10/9/2017 0:52	(P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 bkr mtce tgt is NORMAL
10/9/2017 0:57	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 recent rly event is NORMAL
10/9/2017 0:57	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is NORMAL
10/9/2017 1:25	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 recent rly event is ALARM
10/9/2017 1:25	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is ALARM
10/9/2017 1:25	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 recent rly event is NORMAL
10/9/2017 1:25	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is NORMAL
10/9/2017 1:32	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is ALARM
10/9/2017 1:32	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 recent rly event is ALARM
10/9/2017 1:35	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is NORMAL
10/9/2017 1:35	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 recent rly event is NORMAL
10/9/2017 1:38	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 recent rly event is ALARM
10/9/2017 1:38	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is ALARM
10/9/2017 1:38	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is NORMAL
10/9/2017 1:38	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 recent rly event is NORMAL
10/9/2017 1:53	(P02) Control Select 1-Lakeport/Clearlake Redbud Substation cb 1102 rcl rly for C/OUT by rtwsnorth at rkldccws01
10/9/2017 1:54	(P02) Control Execute 1-Lakeport/Clearlake Redbud Substation cb 1102 rcl rly by rtwsnorth at rkldccws01
10/9/2017 1:54	(P02) Commanded Change for 1-Lakeport/Clearlake Redbud Substation cb 1102 rcl rly is C/OUT
10/9/2017 2:00	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 recent rly event is ALARM
10/9/2017 2:00	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is ALARM
10/9/2017 2:01	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 unread rly event is NORMAL
10/9/2017 2:01	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 recent rly event is NORMAL
10/9/2017 2:19	(P02) Control Select 1-Lakeport/Clearlake Redbud Substation cb 1102 position for CLOSE by rtwsnorth at rkldccws01
10/9/2017 2:20	(P02) Control Execute 1-Lakeport/Clearlake Redbud Substation cb 1102 position by rtwsnorth at rkldccws01
10/9/2017 2:20	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 scada close control is NORMAL
10/9/2017 2:20	(P03) 1-Lakeport/Clearlake Redbud Substation cb 1102 trip is NORMAL
10/9/2017 2:20	(P02) 1-Lakeport/Clearlake Redbud Substation cb 1102 scada close control is ALARM
10/9/2017 2:20	(P02) Commanded Change for 1-Lakeport/Clearlake Redbud Substation cb 1102 position is CLOSED

# SULPHUR WILDFIRE – REDBUD 1102

## CPUC-SED EVIDENCE RECORD



**Figure 7.** Break 18 inches above the communication conductor attachment on Fuse Cutout Pole 1447 with woodpecker holes (Source: CAL FIRE)

The bottom section of the subject failed pole was still standing and had burns at its base. CAL FIRE had cut out an approximately 4 to 6-foot pole section to retain as evidence. One cut was made on the top section, approximately 3 feet from where the break occurred. The other cut on the bottom section was approximately 1 foot from the break.

Chief Baldwin stated that he believes that the force of impact from the broken portion of the pole caused all three fuses to open and arc. SED viewed the three fuse insulators, three fuses and the section of the pole CAL FIRE had cut from Fuse Cutout Pole 1447. All three fuses were opened, and SED observed signs of arcing (greenish coloring) on all three fuse insulators.

#### IV. CAL FIRE Investigation

CAL FIRE's investigation report, case number 17CALNU01005, determined that the cause of the Sulphur Fire involved electric facilities. There were no other ignition sources near the Specific Origin Area (SOA) that caused the fire. PG&E Fuse Cutout Pole 1447 was full of acorns and woodpecker nesting cavities. The fuses used at this pole were non-exempt and should have had a firebreak clearance around the pole as required by Title 14 California Code of Regulations §1254 Minimum Clearance Provisions – PRC §4292.

The report concludes, "Based on the facts and information provided above, on the morning of October 9, 2017, at approximately 12:51 AM, the north winds caused the portion of PG&E pole 1447 which was severely weakened by woodpeckers to break. When the pole broke, the top portion containing the three universal fuses fell to the ground. The impact with the ground caused all three fuses to open and two of them to fail. This process caused the dried grass at the base of PG&E pole 1447 to ignite. When the grass ignited, the north wind caused the fire to quickly grow, crossing Pomo Road and Sulphur Bank Road, becoming both wind and topography driven. The resulting fire burned approximately 2207 acres of vegetation and 162 structures."

<sup>17</sup> Attachment D - PG&E letter to SED, dated February 16, 2018

<sup>18</sup> PGE-CPUC\_DR-081618\_Sulphur\_Q04

# SULPHUR WILDFIRE – REDBUD 1102

## CPUC-SED EVIDENCE RECORD



**Figure 10.** Top view of break on Fuse Cutout Pole 1447 full of acorns (Source CAL FIRE)

Chief Baldwin stated that he spoke with CAL FIRE Senior Environmental Scientist-Forest Practice Biologist Anastasi Stanish about the pole in question. Ms. Stanish mentioned that woodpeckers are usually looking for imperfections or soft spots in wood to make nests. The nests found on this pole could have been accomplished over a couple of days, but most likely occurred over the course of weeks or even months.

As a result of Chief Baldwin's discovery of woodpecker holes, SED reviewed PG&E's 2016 Electric Distribution Preventive Maintenance Manual (EDPM) regarding assessment of woodpecker damaged poles. The assessment gives conditions in which a pole may remain in service if it meets certain criteria for cavity size and shell thickness. PG&E did not use the woodpecker assessment guideline because they did not identify an issue with the subject pole being damaged by woodpeckers during inspections. PG&E's last patrol was on February 28, 2017; last detailed inspection was on October 3, 2013; and last intrusive pole inspection was on April 8, 2013. None of these inspections mention anything about woodpecker damage on the subject pole.

PG&E CONFIDENTIAL UNDER NON-DISCLOSURE AGREEMENT

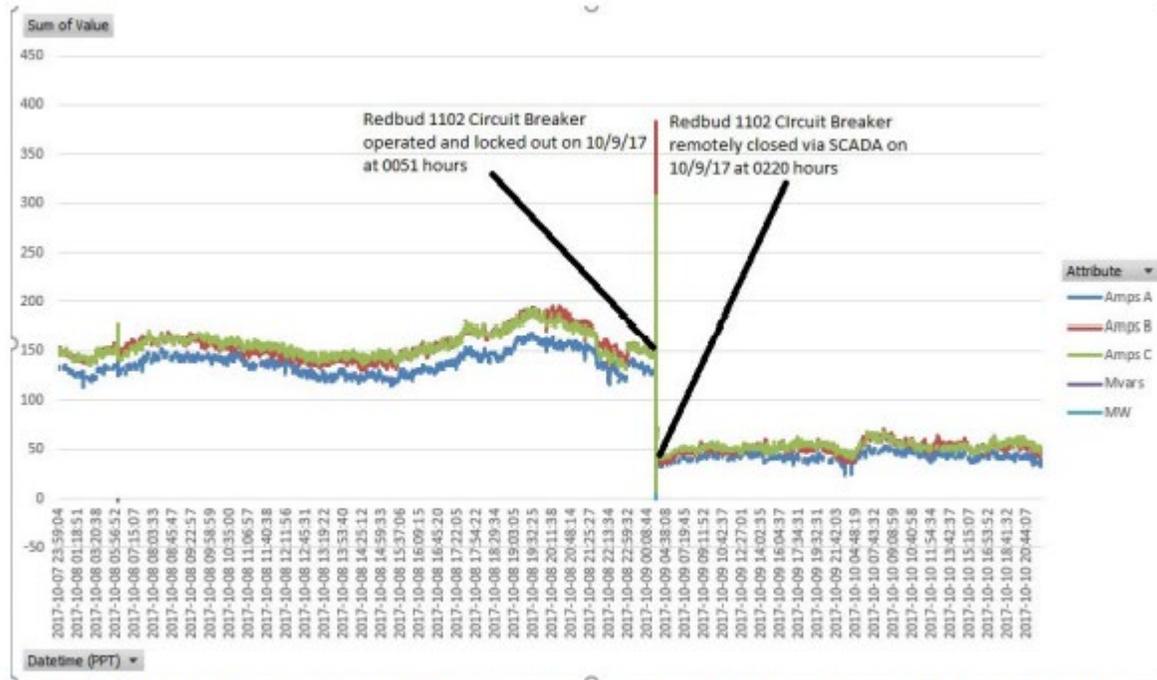


**Figure 6.** The subject pole (Fuse Cutout Pole 1447) found after arrival. (Source: CAL FIRE)

The bottom section of the pole was broken off at approximately 18 inches above the communication cable attachment. There were various woodpecker holes in this broken section of the pole. (Figure 7)

# SULPHUR WILDFIRE – REDBUD 1102

## CPUC-SED EVIDENCE RECORD



**Figure 5.** Plot of the Redbud 1102 Circuit Breaker SCADA load from October 7, 2017 to October 10, 2017.

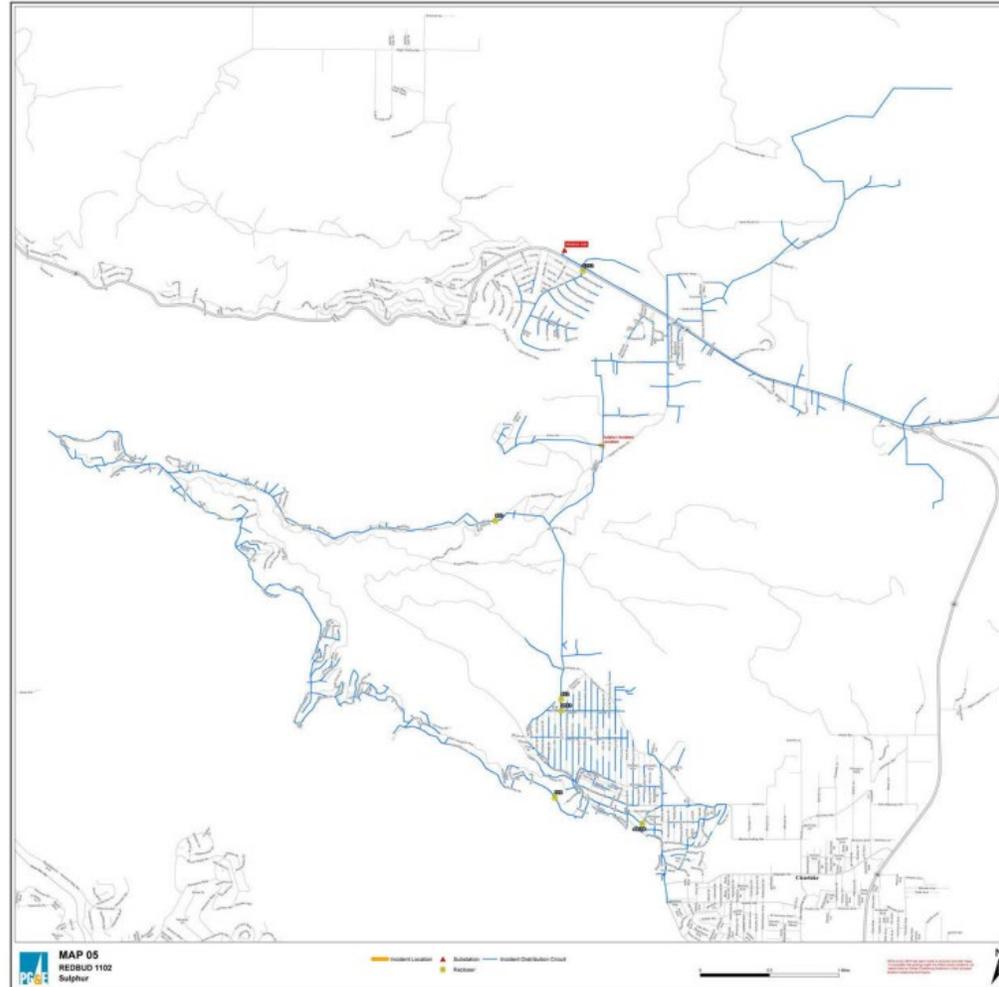
### V. Conclusion

Based on the evidence reviewed and CAL FIRE's investigation, SED found PG&E in violation of:

- ... GO 95, Rule 19 by failing to preserve a burnt pole as evidence related to a reportable incident and Commission investigation. PG&E stated in a data request response<sup>19</sup> that the pole may have been physical evidence related to the Sulphur Fire and that a contractor put the pole into waste collection bins on October 13, 2017.
- ... GO 95, Rule 31.1, for failure to maintain VM inspection records related to a 2016 CEMA patrol inspection according to best practices. PG&E could not locate records related to this inspection and informed SED of the lost records on March 30, 2018.

# SULPHUR WILDFIRE – REDBUD 1102

## CPUC-SED EVIDENCE RECORD



# SULPHUR WILDFIRE – REDBUD 1102

## CAL FIRE EVIDENCE RECORD

Sulphur PG&E CONFIDENTIAL UNDER NON-DISCLOSURE AGREEMENT October 9, 2017 17CALNU010055

1 (b) From 0-2.4 m (0-8 feet) above ground level -remove flammable trash, debris or other  
2 materials, grass, herbaceous and brush vegetation. All limbs and foliage of living trees  
3 shall be removed up to a height of 2.4 m (8 feet).

4 (c) From 2.4 m (8 feet) to horizontal plane of highest point of conductor attachment -  
5 remove dead, diseased or dying limbs and foliage from living sound trees and any dead,  
6 diseased or dying trees in their entirety. All limbs and foliage of living trees shall be  
7 removed up to a height of 8 feet. The vegetation surrounding the pole had not been  
8 cleared pursuant to PRC 4292 as evidence by the remaining burned grass surrounding  
9 the pole. The fire started in Local Responsibility Area and ultimately burned into the  
10 State Responsibility area which is within 300 yards of PG&E pole 1447. I spoke with  
11 North Shore Fire Protection Chief Jay BERISTIANOS and he told me North Shore Fire  
12 Protection District did not give any exemptions to PG&E regarding clearance  
13 requirements. The SOA for the Sulphur Fire was approximately eight feet by ten feet  
14 and within the SOA were both the bottom and the top of broken PG&E pole 1447.

15  
16 Based on the facts and information provided above, on the morning of October 9, 2017,  
17 at approximately 12:51 AM, the north winds caused the portion of PG&E pole 1447  
18 which was severely weakened by woodpeckers to break. When the pole broke, the top  
19 portion containing the three universal fuses fell to the ground. The impact with the  
20 ground caused all three fuses to open and two of them to fail. This process caused the  
21 dried grass at the base of PG&E pole 1447 to ignite. When the grass ignited, the north  
22 wind caused the fire to quickly grow, crossing Pomo Road and Sulphur Bank Road,  
23 becoming both wind and topography driven. The resulting fire burned approximately  
24 2207 acres of vegetation and 162 structures.

25

# SULPHUR WILDFIRE – REDBUD 1102

## REFERENCE DOCUMENTS

- ▶ PG&E Sulphur Incident Description & Factual Summary, PG&E Sulphur Supplemental Report
- ▶ CAL FIRE Report – 17CAMEU012169

 PGE-CPUC\_00007908

 Sulphur3\_SCADA\_PGE-CPUC\_00007908

 PGE-CPUC\_00012216\_CONF

 PGE-CPUC\_00017161\_CONF

 Sulphur5\_PGE-CF\_00000050\_CONF

 Sulphur5\_PGE-CF\_00000051\_CONF

 2018.05.18 CPUC Sulphur Factual Report (final-confi markings) (v3)\_CONF

 E20171011-02 Sulphur Report and Attachments.Highlighted\_CONF

 PGE-CPUC\_00001207\_PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00007908\_PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00012216\_PGE-CALPA-DATA\_VOL012

 PGE-CPUC\_00015148\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00015786\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00015791\_PGE-CALPA-DATA\_VOL012\_CONF

 PGE-CPUC\_00017161\_PGE-CALPA-DATA\_VOL012

 Sulphur Incident Description

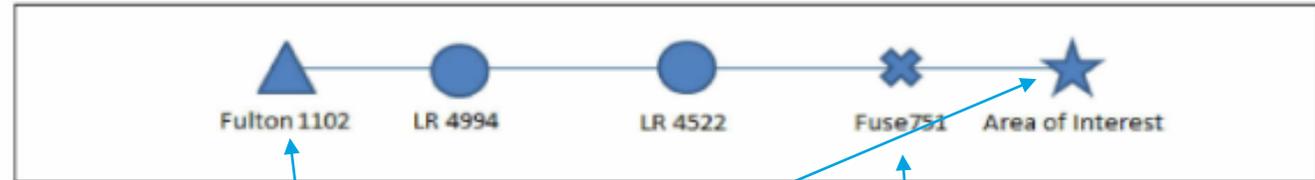
 Sulphur Supplemental Report

# YOUNGS (MAACAMA) WILDFIRE – FULTON 1102

# YOUNGS WILDFIRE – FULTON 1102

## Incident Observations

- ▶ Tree Contact From 20 Feet
- ▶ Possible Energized Downed Conductor From 9:39 PM – 10:17 PM
- ▶ Proper Fuse 751 Operation Time Unknown
- ▶ Possible Failure of LR 4522 & LR 4994



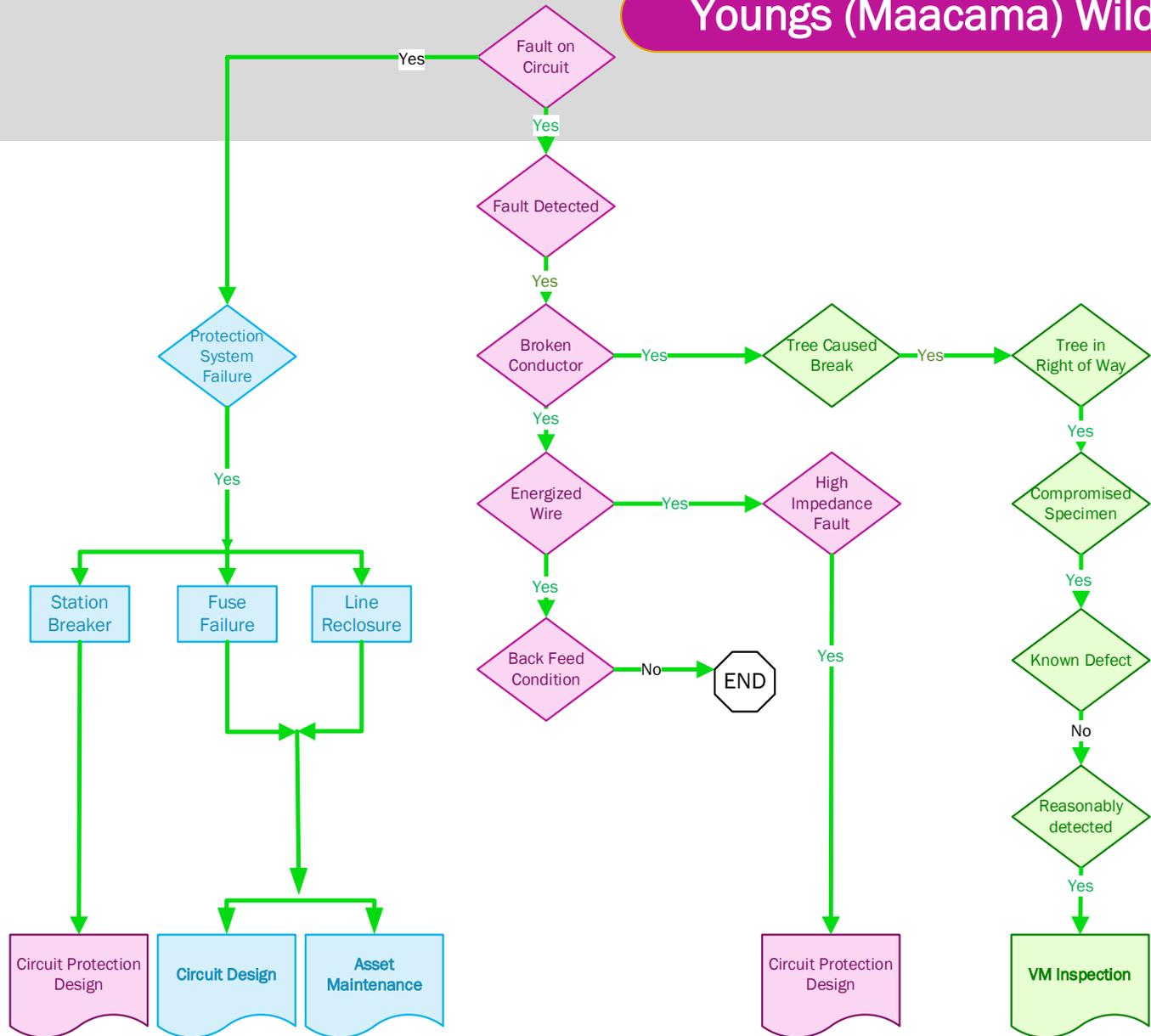
10/8/17 9:39 PM  
Meter Off

10/8/17 9:50 PM  
Maacama Fire Starts  
Per Cal Fire

10/8/17 10:58 PM PG&E  
Arrives Finds 3 Fuses  
Blown at Fuse 751

10/8/17 10:17 PM  
Fulton 1102  
Trips & Locks Out

# Youngs (Maacama) Wildfire



# YOUNGS (MAACAMA) WILDFIRE – FULTON 1102

## VEGETATION MANAGEMENT

Condition	
Tree-Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	Yes
Known Defect or Condition	No
Reasonably Detected	Yes
Wind Event	Normal
Receptive Fuel Bed	Unknown

# YOUNGS WILDFIRE – FULTON 1102

## PG&E EVIDENCE RECORD IDFS

Case 3:14-cr-00175-WHA Document 956-19 Filed 12/31/18 Page 2 of 9

CLICK OR TAP HERE TO ENTER TEXT.

### MAACAMA INCIDENT DESCRIPTION & FACTUAL SUMMARY

For completeness, this incident description and factual summary should be read in conjunction with the Factual Report Guidance and the contemporaneously submitted response to Question 29.

#### Background:

On October 20, 2017, PG&E filed an Electric Safety Incident Report (Incident No. 171020-8587) concerning an incident that occurred near **955 Maacama Lane, Healdsburg, Sonoma County** (the "incident location" as defined by the CPUC's December 7, 2017, letter). When PG&E visited the incident location to conduct an inspection, PG&E observed that a California White Oak/Valley Oak tree had broken near its mid-section and was laying on the ground near fallen conductors for the Fulton 1102 (12 kV) Circuit.

According to the CPUC's Data Request, dated November 16, 2017, the Maacama incident started at 9:50 PM on October 8, 2017.

#### Incident Overview:



The incident location is served by the Fulton 1102 (12 kV) Circuit. On October 8, 2017, at 9:39 PM, a smart meter (service point 7095533205) located approximately a quarter mile upstream from the incident location (but downstream of Fuse 751), recorded a NIC power down event. At that same time, four meters downstream of the incident location also recorded NIC power down events. From 9:39 PM to 9:45 PM, smart meter (service point 7095533205) and 7 other smart meters upstream of the incident location but downstream of Fuse 751 recorded a series of power off/on events. At 9:45 PM, 26 smart meters downstream of Fuse 751 (including the 7 that had recorded off/on events from 9:39 PM to 9:45 PM) recorded NIC Power Down events, making for a total of 31 smart meters recording NIC Power Down events. PG&E has not received messages from the other 4 smart meters downstream of Fuse 751.

Based on PG&E records, on October 8, 2017, at 10:17 PM, Fulton 1102 Circuit Breaker opened and remained open, de-energizing the circuit.

According to PG&E records, a troubleman was the first PG&E employee to access the incident location. Per the troubleman, on the night of October 8, 2017, he arrived on scene to patrol the incident location in response to a wire down. At 10:58 PM, the troubleman reported that three of three fuses at Fuse 751 were blown. Per the troubleman, he replaced the blown fuses but left them open and tagged them "Man on Line" and continued to patrol beyond Fuse 751. Per the troubleman, he continued to patrol and found three phases of conductor down approximately 12

Case 3:14-cr-00175-WHA Document 956-19 Filed 12/31/18 Page 3 of 9

spans downstream from Fuse 751, at the incident location. Per the troubleman, he cleared the wires and left them on site. Per the troubleman, he observed that fire was active in the area and that four or five fire engines were on site working to contain the fire.

Based on PG&E records, at 11:20 PM, Fulton 1102 Circuit Breaker was closed via SCADA by operators after the source of the outage (a wire down on Highway 101) was cleared. The incident location remained de-energized because based on PG&E records, Fuse 751 was open.

On October 10, 2017, a PG&E lineman arrived at the incident location to replace the downed conductor. Based on PG&E records, at 1:11 PM, Fuse 751 was closed, restoring power to the incident location.

On October 18, 2017, PG&E visited the incident location to conduct an inspection. PG&E observed that a California White Oak/Valley Oak tree had broken near its mid-section and was laying on the ground near fallen conductors for the Fulton 1102 (12 kV) Circuit. The conductors were #6 Copper Wire installed in 1941. The California White Oak/Valley Oak tree had a diameter at breast height of approximately 30 inches and was rooted uphill approximately 20 feet from the distribution conductors. The California White Oak/Valley Oak tree is estimated to be approximately 50 feet tall. PG&E believes the California White Oak/Valley Oak tree broke at a height of approximately 19 feet above ground. PG&E also observed damage to a dwelling, structures and vehicles.

Three Fuses Blown

# YOUNGS WILDFIRE – FULTON 1102

## PG&E EVIDENCE RECORD ILIS

LR 4522 & 4994  
Record MTT Alarms  
Beginning @ 9:39 PM

Date	LogDescription
10/8/2017 4:32	(P01) 1-Santa Rosa sonoma lr 4522 ac pwr fail is ALARM
10/8/2017 4:33	(P01) 1-Santa Rosa sonoma lr 4522 ac pwr fail is NORMAL
10/8/2017 5:07	(P01) 1-Santa Rosa sonoma lr4994 battery test is TEST
10/8/2017 5:08	(P01) 1-Santa Rosa sonoma lr4994 battery test is NORMAL
10/8/2017 5:27	(P01) 1-Santa Rosa sonoma lr 4522 battery test is TEST
10/8/2017 5:28	(P01) 1-Santa Rosa sonoma lr 4522 battery test is NORMAL
10/8/2017 16:31	(P01) 1-Santa Rosa sonoma lr 4522 ac pwr fail is ALARM
10/8/2017 16:31	(P01) 1-Santa Rosa sonoma lr 4522 ac pwr fail is NORMAL
10/8/2017 21:39	(P04) 1-Santa Rosa sonoma lr 4522 lr above mtt is ALARM
10/8/2017 21:39	(P04) 1-Santa Rosa sonoma lr 4522 lr above mtt is NORMAL
10/8/2017 21:39	(P04) 1-Santa Rosa sonoma lr4994 lr above mtt is NORMAL
10/8/2017 21:39	(P04) 1-Santa Rosa sonoma lr4994 lr above mtt is ALARM
10/8/2017 21:45	(P04) 1-Santa Rosa sonoma lr 4522 lr above mtt is ALARM
10/8/2017 21:45	(P04) 1-Santa Rosa sonoma lr 4522 lr above mtt is NORMAL
10/8/2017 21:45	(P04) 1-Santa Rosa sonoma lr4994 lr above mtt is ALARM
10/8/2017 21:45	(P04) 1-Santa Rosa sonoma lr4994 lr above mtt is NORMAL

# YOUNGS WILDFIRE – FULTON 1102

## PG&E EVIDENCE RECORD ILIS

Amps A	2017-10-08 22:16:15	219.2938017
Amps B	2017-10-08 22:16:30	228.0831324
Amps B	2017-10-08 22:16:45	225.8857997
Amps C	2017-10-08 22:16:45	224.2744224
Amps A	2017-10-08 22:16:45	218.0242317
Amps A	2017-10-08 22:16:51	0
Amps B	2017-10-08 22:16:51	0
Amps C	2017-10-08 22:16:51	0
Mvars	2017-10-08 22:16:51	0
MW	2017-10-08 22:16:51	0
Amps A	2017-10-08 23:20:09	251.9119846
Amps B	2017-10-08 23:20:09	249.8611408
Amps C	2017-10-08 23:20:09	245.7106235

Fulton 1102 CB  
Sequence to Lock Out

Fulton 1102 CB  
Open @ 22:16:51

10/8/2017 22:16	(P03) 1-SANTA ROSA Fulton Substation cb 1102 ph time tgt is ALARM
10/8/2017 22:16	(P09) 1-SANTA ROSA Fulton Substation cb 1102 position is OPEN
10/8/2017 22:16	(P03) 1-SANTA ROSA Fulton Substation cb 1102 ph time tgt is NORMAL
10/8/2017 22:16	(P02) 1-SANTA ROSA Fulton Substation cb 1102 trip is ALARM
10/8/2017 22:16	(P02) 1-SANTA ROSA Fulton Substation cb 1102 trip is ALARM
10/8/2017 22:16	(P03) 1-SANTA ROSA Fulton Substation cb 1102 grd time tgt is NORMAL
10/8/2017 22:16	(P09) 1-SANTA ROSA Fulton Substation cb 1102 position is OPEN
10/8/2017 22:16	(P03) 1-SANTA ROSA Fulton Substation cb 1102 grd time tgt is ALARM
10/8/2017 22:16	(P09) 1-SANTA ROSA Fulton Substation cb 1102 position is CLOSED
10/8/2017 22:16	(P02) 1-SANTA ROSA Fulton Substation cb 1102 trip is NORMAL
10/8/2017 22:16	(P01) 1-Santa Rosa sonoma lr 4522 b ph pot is DEAD
10/8/2017 22:16	(P01) 1-Santa Rosa sonoma lr 4522 ac pwr fail is NORMAL
10/8/2017 22:16	(P01) 1-Santa Rosa sonoma lr 4522 ac pwr fail is ALARM
10/8/2017 22:16	(P01) 1-Santa Rosa sonoma lr 4522 pwr flow is REVERSE
10/8/2017 22:16	(P01) 1-Santa Rosa sonoma lr 4522 b ph pot is DEAD
10/8/2017 22:16	(P01) 1-Santa Rosa sonoma lr 4522 a ph pot is HOT
10/8/2017 22:16	(P01) 1-Santa Rosa sonoma lr 4522 pwr flow is NORMAL
10/8/2017 22:16	(P01) 1-Santa Rosa sonoma lr 4522 ac pwr fail is ALARM
10/8/2017 22:16	(P01) 1-Santa Rosa sonoma lr 4522 b ph pot is HOT
10/8/2017 22:16	(P01) 1-Santa Rosa sonoma lr 4522 a ph pot is DEAD
10/8/2017 22:17	(P02) 1-Santa Rosa sonoma lr 4522 control stat is ALARM
10/8/2017 22:17	(P04) 1-Santa Rosa sonoma lr 4522 system or control alarm is ALARM
10/8/2017 22:17	(P02) 1-SANTA ROSA Fulton Substation cb 1102 trip is NORMAL
10/8/2017 22:17	(P09) 1-SANTA ROSA Fulton Substation cb 1102 position is CLOSED
10/8/2017 22:17	(P03) 1-SANTA ROSA Fulton Substation cb 1102 grd time tgt is ALARM
10/8/2017 22:17	(P02) 1-SANTA ROSA Fulton Substation cb 1102 trip is ALARM
10/8/2017 22:17	(P03) 1-SANTA ROSA Fulton Substation cb 1102 grd time tgt is NORMAL
10/8/2017 22:17	(P09) 1-SANTA ROSA Fulton Substation cb 1102 position is OPEN

# YOUNGS WILDFIRE – FULTON 1102

## REFERENCE DOCUMENTS

- ▶ PG&E Maacama Incident Description & Factual Summary, Maacama Supplemental Report
- ▶ Case 3:14-cr-00175-WHA Document 956-19
- ▶ Cal Fire Report
- ▶ CPUC
- ▶ PGE-CPUC\_00015697
- ▶ PG&E 17- 0085251

-  PGE-CPUC\_00007964
-  PGE-CPUC\_00007965
-  PGE-CPUC\_00012215\_CONF
-  PGE-CPUC\_00012217\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00015643\_PGE-CALPA-DATA\_VOL012\_CONF
-  PGE-CPUC\_00015697\_PGE-CALPA-DATA\_VOL012\_CONF
-  2018.05.04 FINAL CPUC Maacama Factual Report\_CONF
-  Maacama Incident Description
-  Maacama Supplemental Report

# CAMP 1 WILDFIRE – CARIBOU-PALERMO 115KV

# CAMP 1 WILDFIRE – CARIBOU-PALERMO 115 KV TRANSMISSION LINE

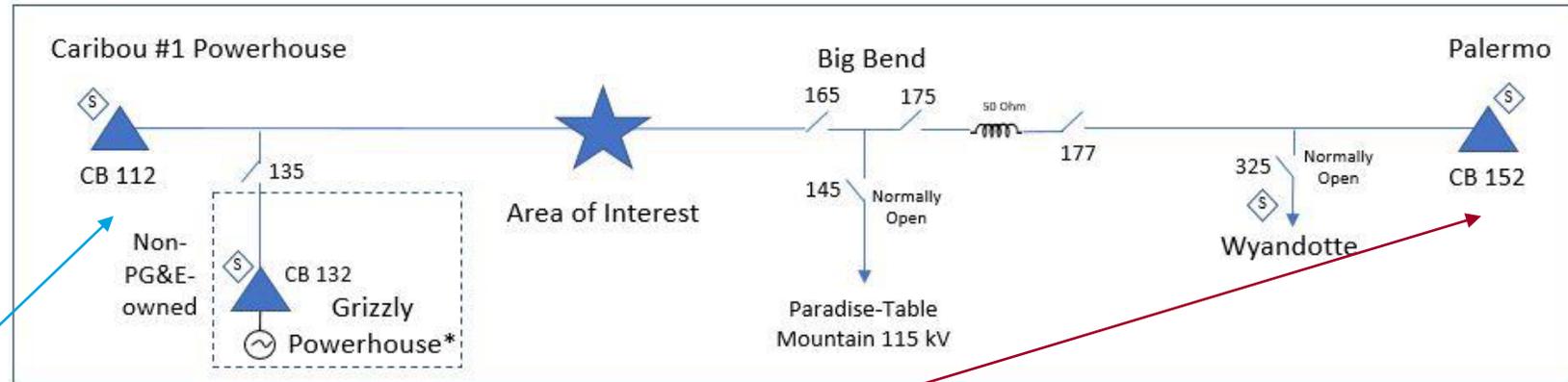
## Incident Observations

- ▶ Auto-reclosing disabled for PG&E PSPS.
- ▶ Foreseeable Equipment Failure (Cal Fire)
- ▶ Inadequate Asset Inspection
- ▶ Receptive fuel bed

Title 14 California Code of regulations section 1254 minimum clearance provisions PRC 4292:

The firebreak clearances required by PRC 4292 are applicable within an imaginary cylindroid space surrounding each pole or tower on which a switch, fuse, transformer or lightning arrester is attached and surrounding each dead end or corner pole

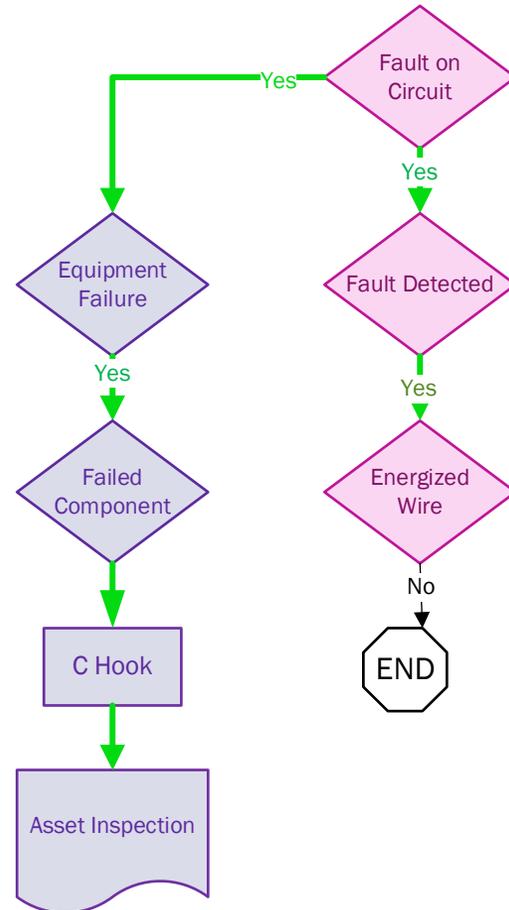
## Camp 1 Incident Location



Single Line Diagram of the Caribou-Palermo 115 kV Transmission Line



# Camp 1 Wildfire



# CAMP #1 WILDFIRE – CARIBOU-PALERMO 115KV

## VEGETATION MANAGEMENT

Title 14 California Code of regulations section 1254 has minimum firebreak clearance provisions (PRC-4292) including “an imaginary cylindroid radius of 10 feet surrounding each pole or tower on which a switch, fuse, transformer or lightning arrester is attached.

In the case of the Caribou-Palermo tower 27/222, the CAL FIRE investigation concluded that the hot metal fell to the ground onto a receptive fuel bed...

# CAMP #1 WILDFIRE – CARIBOU-PALERMO 115KV

## VEGETATION MANAGEMENT

Condition	
Tree-Caused Break	No
Tree In or Along ROW	N/A
Compromised Specimen	N/A
Known Defect or Condition	N/A
Reasonably Detected	N/A
Wind Event	High
Receptive Fuel Bed	Yes

# CAMP #1 WILDFIRE – CARIBOU-PALERMO 115KV PG&E EVIDENCE RECORD

## CAMP FIRE INCIDENT DESCRIPTION & FACTUAL SUMMARY

### Background:

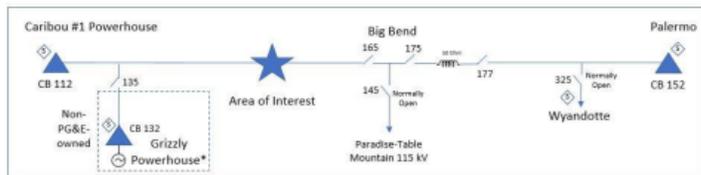
CAL FIRE’s website identifies the start time of the Camp Fire as November 8, 2018 at 6:33 a.m. The website lists the location of the fire as Pulga Road at Camp Creek Road near Jarbo Gap. CAL FIRE provides coordinates for the fire that are one mile northeast of the unincorporated town of Pulga, which is near Tower :27/222 on PG&E’s Caribou-Palermo 115 kV Transmission Line (the “Camp 1 incident location”).

On November 8, 2018, PG&E filed with the California Public Utilities Commission (“CPUC”) an Electric Safety Incident Report (“EIR”) (Incident No. 181108-9002) concerning an outage on the Caribou-Palermo 115 kV Transmission Line in Butte County that occurred on the same day at approximately 6:15 a.m. On November 16, 2018, PG&E filed with the CPUC an EIR (Incident No. 181116-9015) concerning an outage on the Big Bend 1101 12 kV Circuit in Butte County at approximately 6:45 a.m. on November 8, 2018 (“Camp 2 incident location”). On December 11, 2018, PG&E filed with the CPUC a 20-Day Supplemental Report providing additional information related to the events described in the foregoing EIRs.

As described in the 20-Day Supplemental Report and as described below, PG&E observed damage to PG&E equipment at both incident locations during patrols that took place after the onset of the Camp Fire and when PG&E assisted CAL FIRE with evidence collection at the incident locations.

### Incident Overview:

#### Camp 1 Incident Location



Single Line Diagram of the Caribou-Palermo 115 kV Transmission Line

On November 8, 2018, at approximately 6:15 a.m., the PG&E Caribou-Palermo 115 kV Transmission Line relayed and de-energized. What is now referred to as the Caribou-Palermo 115 kV transmission line was placed into service in the 1920s by the Great Western Power Company, which PG&E acquired in 1930. One customer, the Grizzly Powerhouse, was impacted by the transmission outage. Auto-reclosing on the line had been disabled previously as part of PG&E’s wildfire mitigation program. As a result, the line did not test after it de-energized.

On the morning of November 8, 2018, certain PG&E employees and contractors observed fire in the Feather River Canyon area near Pulga. At about 6:28 a.m., a PG&E Hydro Generation Supervisor, then traveling northeast on Highway 70, radioed the Rock Creek Switching Station to report an approximately 100’ x 100’ fire in a clearing beneath PG&E transmission lines about one mile north of Pulga, near Poe Dam, which is near Tower :27/222 on PG&E’s Caribou-Palermo 115 kV Transmission Line. PG&E’s Rock Creek Switching Station reported the fire to authorities.

A PG&E Electrical Machinist heard the Hydro Supervisor’s radio transmission while driving north from Chico along Highway 70. The Electrical Machinist pulled into a station operated by the California Department of Transportation located along Highway 70 south of Poe Dam. From that vantage point, the Electrical Machinist took two photos of the fire, both timestamped 6:44 a.m., November 8, 2018. These photographs have been provided by PG&E to CAL FIRE.

At approximately 6:48 a.m. on November 8, 2018, two other PG&E employees, a Hydro Electrician and a Hydro Sub-foreman, then staging at the PG&E Cresta Powerhouse, were alerted by two PG&E contractors affiliated with Syblon Reid of a nearby fire. Those employees observed a fire from their vantage point, from which they took photos and videos of the fire. The Sub-foreman provided to PG&E eight photos and three videos of the fire bearing timestamps ranging from 6:48 a.m. to 7:53 a.m., November 8, 2018. The Hydro Electrician also took photos of the fire from Cresta Dam and provided to PG&E 13 photos bearing timestamps ranging from 7:05 a.m. to 7:53 a.m., November 8, 2018. These photographs and videos have been provided by PG&E to CAL FIRE.

At approximately 7:00 a.m. on November 8, 2018, a PG&E Operating Clerk was driving south along Highway 70 when the Operating Clerk observed smoke rising from Feather River Canyon. The Operating Clerk pulled over at mile marker 42.87 on Highway 70, where the Operating Clerk took two photos of the smoke, each bearing a timestamp of 7:01 a.m., November 8, 2018. The Operating Clerk then continued down Highway 70 to a retaining wall near mile marker 42.66, where the Operating Clerk pulled over and took two photos of the flames, each bearing a timestamp of 7:03 a.m., November 8, 2018. These photographs have been provided by PG&E to CAL FIRE.



# CAMP WILDFIRE – CARIBOU-PALERMO 115 KV TRANSMISSION LINE

## PG&E EVIDENCE RECORD IDFS

On November 8, 2018, at approximately 6:15 a.m., the PG&E Caribou-Palermo 115 kV Transmission Line relayed and de-energized. What is now referred to as the Caribou-Palermo 115 kV transmission line was placed into service in the 1920s by the Great Western Power Company, which PG&E acquired in 1930.

At approximately 6:48 a.m. on November 8, 2018, two other PG&E employees, a Hydro Electrician and a Hydro Sub-foreman, then staging at the PG&E Cresta Powerhouse, were alerted by two PG&E contractors affiliated with Syblon Reid of a nearby fire.

Steel structures on PG&E's 115 kV transmission lines, such as Tower :27/222, are subject to maintenance patrols annually and detailed inspections every five years. During a detailed inspection of a transmission line, PG&E personnel are instructed to look for and document abnormalities or circumstances that will negatively impact safety, reliability, or asset life. Detailed inspections are typically done by ground.

Inspection

# CAMP WILDFIRE – CARIBOU-PALERMO 115 KV TRANSMISSION LINE

## PG&E EVIDENCE RECORD

Event-Time	Text			
11/8/2018 6:15:14	CARIBOU CB 112	115	cb 112 pri rly trp	ALARM
11/8/2018 6:15:14	CARIBOU CB 112	115	cb 112 bu rly trp	ALARM
11/8/2018 6:15:14	CARIBOU CB 112	115	cb 112 palermo line bkr trp	ALARM
11/8/2018 6:15:14	CARIBOU CB 112	115	cb 112 open/close	OPEN
11/8/2018 6:15:14	CARIBOU CB 112	115	cb 112 pri rly trp	NORMAL
11/8/2018 6:15:14	CARIBOU CB 112	115	cb 112 bu rly trp	NORMAL
11/8/2018 6:15:14	CARIBOU CB 112	115	cb 112 palermo line bkr trp	NORMAL
11/8/2018 6:15:15	CARIBOU		LINE CRBU-PLRM_1NEAR TERMINAL	OPENED
11/8/2018 6:15:16	PALERMO CB 152	115	cb 152 open/close	OPEN
11/8/2018 6:15:16	PALERMO CB 152	115	cb 152 trp	ALARM

Substation	PIPOINT	Description	Value	TimeStamp
CARIBOU	EO.SUBSTN.CARIBOU.LINE.CRBU-PLRM_1.AA	caribou-palermo cb 112	0	11/8/2018 6:15
CARIBOU	EO.SUBSTN.CARIBOU.LINE.CRBU-PLRM_1.AB	caribou-palermo cb 112	0	11/8/2018 6:15
CARIBOU	EO.SUBSTN.CARIBOU.LINE.CRBU-PLRM_1.AC	caribou-palermo cb 112	0	11/8/2018 6:15
GRIZZPH	EO.SUBSTN.GRIZZPH.LINE.GRIZZLY_TAP.V	grizzly tap cb 132 kv	0	11/8/2018 6:15
PALERMO	EO.SUBSTN.PALERMO.LINE.CRBU-PLRM_6.AA	caribou-palermo cb 152	0	11/8/2018 6:15
PALERMO	EO.SUBSTN.PALERMO.LINE.CRBU-PLRM_6.AB	caribou-palermo cb 152	0	11/8/2018 6:15
PALERMO	EO.SUBSTN.PALERMO.LINE.CRBU-PLRM_6.AC	caribou-palermo cb 152	0	11/8/2018 6:15

No SED Report

# CAMP WILDFIRE – CARIBOU-PALERMO 115 KV TRANSMISSION LINE

## CAL FIRE EVIDENCE RECORD

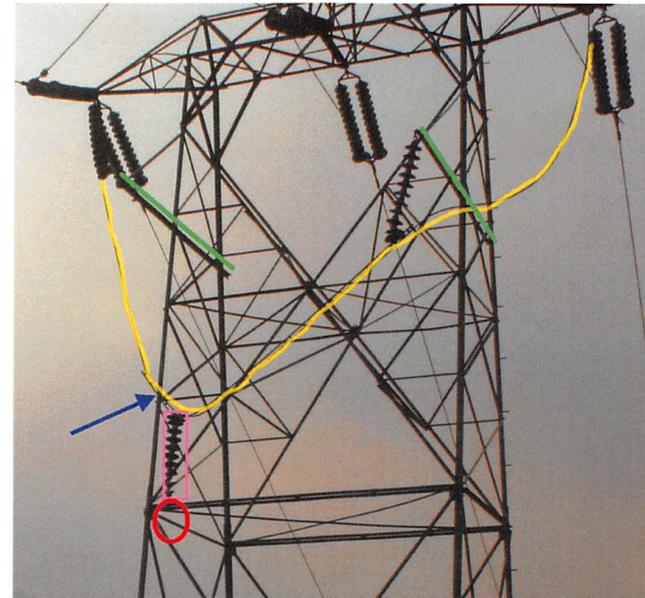
CAMP November 8, 2018 18CACNR000320

### 1 2 - SUMMARY:

2 On November 8, 2018, at approximately 6:15 AM, the Camp Fire ignited near the  
3 remote community of Pulga, CA. The Camp Fire ignited at the base of the Pacific Gas  
4 and Electric (PG&E) Caribou-Palermo 115 KV transmission circuit, tower 27/222  
5 (CP27/222). The Camp Fire ignited when a critically worn C-hook catastrophically  
6 failed. The energized conductor that fell as a result of the failure, made contact with  
7 CP27/222, a metal transmission tower. The resulting arc melted both conductor and  
8 tower. Hot metal fell to the ground onto a receptive fuel bed of dried brush and annual  
9 grasses resulting in three separate fire ignitions. The Camp Fire burned in a remote

THOMPSON told me CP27/222 appeared to be damaged. I observed a section of conductor (later identified as a transposition conductor) in contact with a tower support member (highlighted in yellow in the photograph on the next page). I observed an insulator string, comprised of ten ceramic insulators, was hanging inverted from the conductor and appeared to be damaged (pink) under the left phase (LΦ) conductor. I observed four of the ten ceramic insulator sections were broken. I observed a piece of metal support hardware (later identified as a C-hook) appeared to be damaged with a portion missing (red). The C-hook was located at the end of the inverted insulator string. There was a black mark consistent with a high voltage discharge discoloration on the tower within the immediate area of the transposition conductor contact point (blue arrow). Above the damaged insulation bells was a support arm (green) with no insulator attached. Under the right phase (RΦ) of the tower was a support arm with a string of insulators attached to the transposition conductor.

CAMP November 8, 2018 18CACNR000320



# CAMP WILDFIRE – CARIBOU-PALERMO 115 KV TRANSMISSION LINE CAL FIRE EVIDENCE RECORD

The November 6, 2018 PSPS advisement email (attachment 10-16) identified all the same criteria used in the October 14, 2018 PSPS. With the October 14, 2018 PSPS high success, it is unclear why PG&E did not initiate a PSPS at 4:00 AM on November 8, 2018, as expected. The November 27, 2018 report to CPUC was vague and nonspecific in regards to weather conditions leading up to the Camp Fire ignition. Had PG&E initiated the PSPS on November 8, 2018, and included all circuits in the effected forecasted areas, neither the Camp Fire nor the Camp B Fire would have ignited.

No PSPS  
initiated

PG&E demonstrated their knowledge of the predicted weather and fire severity in the Feather River Canyon and warned the public they intended to de-energize their equipment. On November 8, 2018, PG&E decided not to initiate a PSPS despite several criteria having been met to do so.

Receptive  
Fuel Bed

I examined all the items as they came into my custody. I observed wear patterns on every C-hook collected. The C-hooks that were attached to either a support arm or an ST20 bracket appeared to have the most wear. See the cropped photographs below:



Failed "C"  
hook

plate. Per the report the rating for a 115 KV line is 30,000 lbs. Both J-hooks tested had visible grooves and wear and failed at 11,500 lbs. The attachment plate eye with visible grooves and wear failed at 19,600 lbs. A third hook with no visible damage or scratches was also tested and failed at 6,900 lbs. Figure 4 of the report shows the worn hook

Based on my training, experience, evidence, witness reports, and 911 reports I determined the Camp Fire was the result of a foreseeable PG&E transmission line component failure. At approximately 6:15 AM on November 8, 2018, the supporting hook of the right to left phase transposition conductor of the Caribou-Palermo 115 KV transmission tower 27/222 catastrophically failed after a prolonged period of wear. This caused the insulation string to fall along with the energized conductor it supported. The energized conductor contacted the grounded tower structure causing a fault to ground. The resulting plasma from the arc super-heated both the conductor and the tower member causing both to melt. The hot metal fell to the ground onto a receptive fuel bed of annual grasses and brush. High winds caused the hot metal to be spread over a

# CAMP #1 WILDFIRE – CARIBOU-PALERMO 115KV

## REFERENCE DOCUMENTS

### ▶ PG&E Camp Incident Description & Factual Summary, PG&E Camp Supplemental Report

### ▶ Cal Fire Report –

### ▶ Case 3:14-cr-00175-WHA Document 956-

### ▶ PG&E

- PGE-CAMP-CF-0000000121
- PGE-CAMP-CF-0000000509\_CONF
- PGE-CAMP-CF-0000000755
- PGE-CAMP-CF-0000000756
- PGE-CAMP-CF-0000000757
- PGE-CAMP-CF-0000000758
- PGE-CAMP-CF-0000000759
- PGE-CAMP-CF-000000180\_CONF
- PGE-CAMP-CF-0000000295
- PGE-CAMP-CF-0000000760

- PGE-CAMP-CF-0000000544.F6E
- PGE-CAMP-CF-0000000726.F6E
- PGE-CAMP-CF-0000000728.F6S
- PGE-CAMP-CF-0000000772\_CONF
- PGE-CAMP-CF-0000000774\_CONF
- PGE-CAMP-CF-0000000775\_CONF
- PGE-CAMP-CF-0000000776\_CONF
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- PGE-CAMP-CF-000000012-16\_CONF
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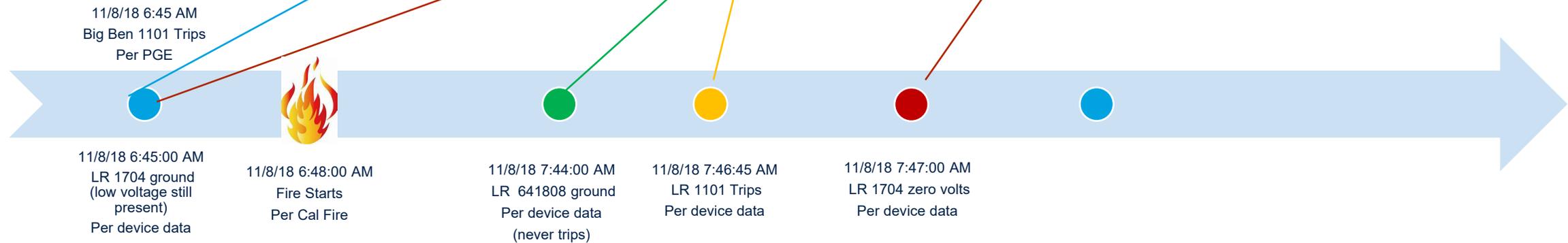
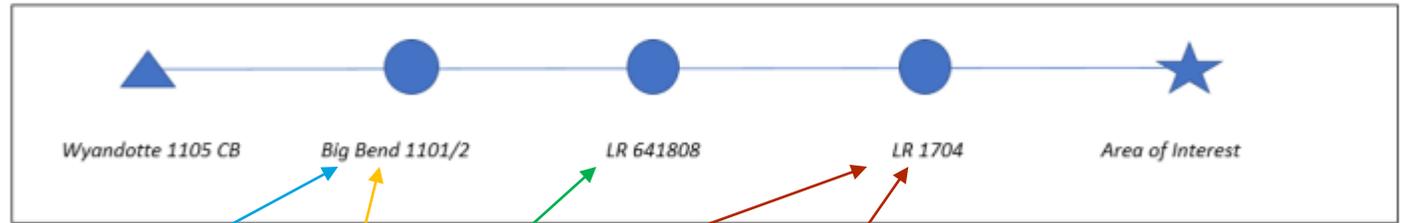
# CAMP #2 WILDFIRE – WYANDOTTE 1105

# CAMP #2 WILDFIRE – WYANDOTTE 1105

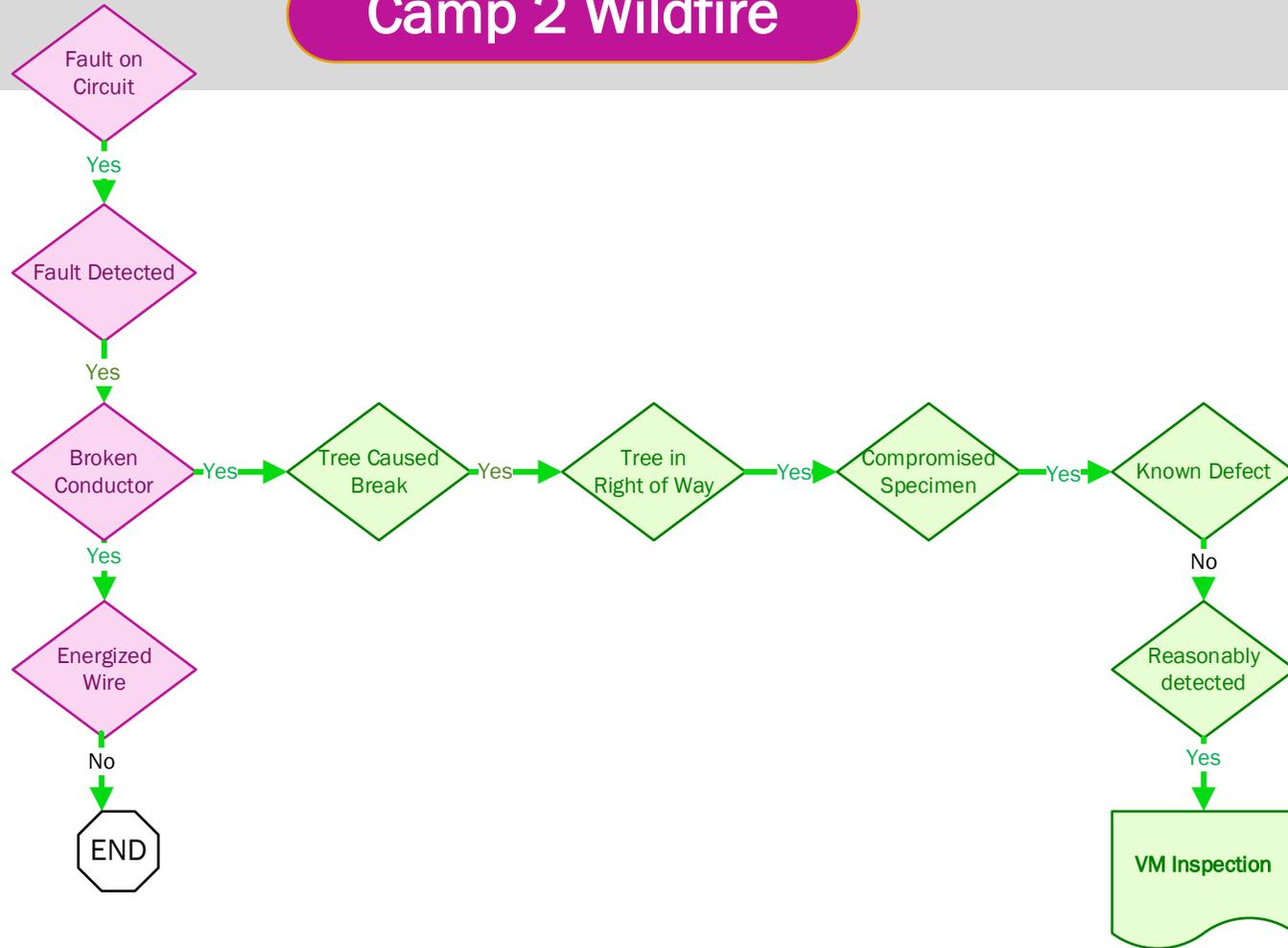
## Incident Observations

- ▶ Tree caused downed conductor
- ▶ Inconclusive Circuit Review

## Camp 2 Incident Location



# Camp 2 Wildfire



# CAMP #2 WILDFIRE

## Vegetation Management Data

Condition	
Tree-Caused Break	Yes
Tree In or Along ROW	Yes
Compromised Specimen	Yes
Known Defect or Condition	No
Reasonably Detected	Yes
Wind Event	Strong Breeze
Receptive Fuel Bed	Yes

# CAMP #2 WILDFIRE – WYANDOTTE 1105

## PG&E EVIDENCE RECORD

DeviceName	AttributeName	Value	Time
LR 1704	Volts A	120.0463363	11/8/2018 6:41
LR 1704	Volts C	117.1964232	11/8/2018 6:41
LR 1704	Volts A	1.583285012	11/8/2018 6:45
LR 1704	Volts B	6.049815363	11/8/2018 6:45
LR 1704	Volts C	0.683312479	11/8/2018 6:45
LR 1704	Volts B	5.933152257	11/8/2018 6:59
LR 1704	Volts B	6.066481521	11/8/2018 7:31
LR 1704	Volts B	5.949818415	11/8/2018 7:38
LR 1704	Volts B	6.066481521	11/8/2018 7:42
LR 1704	Volts A	0.066664632	11/8/2018 7:44
LR 1704	Volts B	0.266658528	11/8/2018 7:44
LR 1704	Volts C	9.966362499	11/8/2018 7:44
LR 1704	Volts B	0	11/8/2018 7:47
LR 1704	Volts C	0	11/8/2018 7:47

Duration Energized

C phase normal

LR 1101 trips

Time Of Event	Log Priority	Log Description
11/8/2018 6:45	(P04)	(P04) 1-Paradise LR 1704 lr above mtt is ALARM
11/8/2018 6:45	(P04)	(P04) 1-Paradise LR 1704 lr above mtt is NORMAL
11/8/2018 6:45	(P08)	(P08) 1-Paradise LR 1704 lr position is OPEN
11/8/2018 6:45	(P03)	(P03) 1-Paradise LR 1704 lr lockout is ALARM
11/8/2018 6:45	(P01)	(P01) 1-Paradise LR 1704 a ph pot is DEAD
11/8/2018 6:45	(P01)	(P01) 1-Paradise LR 1704 c ph pot is DEAD
11/8/2018 6:45	(P03)	(P03) 1-Paradise LR 1704 c ph tgt is ALARM
11/8/2018 6:45	(P03)	(P03) 1-Paradise LR 1704 sgf tgt is ALARM
11/8/2018 6:50	(P03)	(P03) 1-Paradise LR 1704 sgf tgt is NORMAL
11/8/2018 6:51	(P03)	(P03) 1-Paradise LR 1704 c ph tgt is NORMAL

# CAMP #2 WILDFIRE – WYANDOTTE 1105

## PG&E EVIDENCE RECORD

DeviceName	AttributeName	Value	Time
CB 1105	MW	1.29	11/8/2018 5:49
CB 1105	MW	1.5	11/8/2018 6:42
CB 1105	MW	1.6	11/8/2018 6:44
CB 1105	MW	1.46	11/8/2018 6:45
CB 1105	MW	1.9	11/8/2018 7:43
CB 1105	MW	2.1	11/8/2018 7:43
CB 1105	MW	1.3	11/8/2018 7:43
CB 1105	MW	0.27	11/8/2018 7:45
CB 1105	MW	0.05	11/8/2018 9:36

Station Breaker  
remains energized

LR trips

DeviceName	AttributeName	Value	Time	Time	Time
LR 1101	KW Total	0	11/08/18	7:46:45 AM	11/8/2018 7:46
LR 1101	KW C	0	11/08/18	7:46:45 AM	11/8/2018 7:46
LR 1101	KW B	0	11/08/18	7:46:45 AM	11/8/2018 7:46
LR 1101	KW A	0	11/08/18	7:46:45 AM	11/8/2018 7:46
LR 1101	KW Total	1023	11/08/18	7:44:30 AM	11/8/2018 7:44
LR 1101	KW C	346	11/08/18	7:44:30 AM	11/8/2018 7:44
LR 1101	KW B	447	11/08/18	7:44:30 AM	11/8/2018 7:44
LR 1101	KW A	229	11/08/18	7:44:30 AM	11/8/2018 7:44

B Phase ground?  
Reason for LR  
1101 tripping?

DeviceName	AttributeName	Value	Time
LR 641808	Amps C	19.00	11/8/2018 7:38
LR 641808	Amps A	16.90	11/8/2018 7:38
LR 641808	Amps B	11.30	11/8/2018 7:41
LR 641808	Amps A	15.60	11/8/2018 7:41
LR 641808	Amps Ground	7.00	11/8/2018 7:44
LR 641808	Amps Ground	7.00	11/8/2018 7:44
LR 641808	Amps C	15.80	11/8/2018 7:44
LR 641808	Amps A	21.20	11/8/2018 7:44

# CAMP #2 WILDFIRE – WYANDOTTE 1105

▶ VM here

The Subject Tree was examined and tested by Joe McNEIL, certified arborist. McNEIL determined the Subject Tree was decadent and rotten. McNEIL's report stated the Subject Tree was likely damaged in the Humboldt Fire of 2008. Signs of decay and disease would have been easily identified with a visual inspection and mallet test. McNEIL quantified these findings with Bore Density Probe tests of the tree trunk and visual inspection of the growth rings. McNEIL told me he consulted with

Dendrochronologist Professor Jim SPEERS, Indiana State University Dendro Lab to validate the findings. A thorough examination of the surrounding tree stand exemplified other trees with similar signs of decay and decadence (See McNEIL's report. in the LOHSE Camp B Origin and Cause Report, attachment 10-02.2.31)

# CAMP #2 WILDFIRE – WYANDOTTE 1105

## PG&E EVIDENCE RECORD IDFS

On November 8, 2018, at approximately 6:45 a.m., the PG&E Big Bend 1101 12 kV Distribution Circuit experienced an outage. At that time, LR 1704 (which protects assets downstream of it on the Big Bend 1101 12 kV Distribution Circuit) opened. Four customers on Flea Mountain were affected by the outage (PG&E, AT&T Inc., DigitalPath, Inc. and Yankee Hill Fire Council). At the time of the Camp Fire, auto-reclosing for LR 1704 was disabled as part of PG&E's wildfire mitigation program.

According to certain November 16, 2018 media reports, a review of first responder radio transmissions on the morning of November 8, 2018 indicated a possible second ignition point for the Camp Fire on Rim Road east of Concow Reservoir.

On November 9, 2018, a PG&E Lineman patrolling the Big Bend 1101 12 kV Distribution Circuit arrived at LR 1704. The Lineman had been dispatched to identify a means of isolating the fault detected on the line. The Lineman observed that the LR 1704 pole and other equipment were on the ground.

On November 11, 2018, a PG&E General Construction ("GC") Sub-foreman and Lineman patrolled the Big Bend 1101 12 kV Distribution Circuit from an area a few

3

On November 12, 2018, a PG&E Troublemán patrolled the Big Bend 1101 12 kV Distribution Circuit from an area several spans south of LR 1704 up to Flea Mountain. The Troublemán observed fallen trees, wires down, and poles that were damaged and/or down near the intersection of Concow Road and Rim Road. The Troublemán observed that some of the fallen trees lay on top of the downed conductors. The location at which the Troublemán observed trees on conductors is approximately two-thirds of a mile north of LR 1704. The Troublemán took photos from multiple locations along Concow Road. These photographs have been provided by PG&E to CAL FIRE.

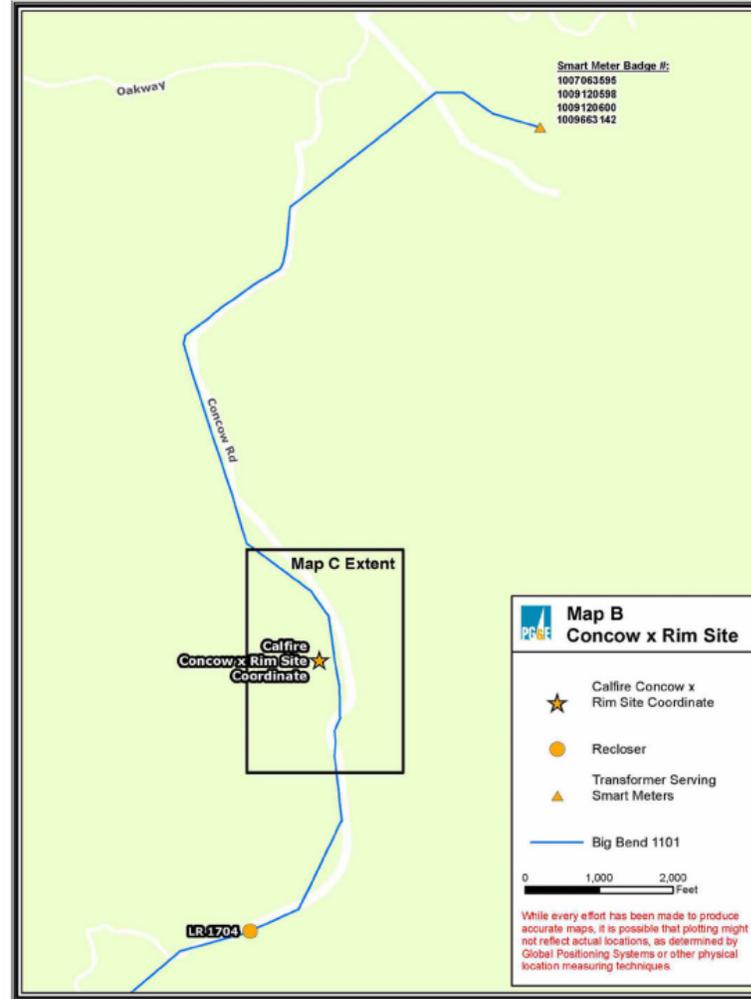
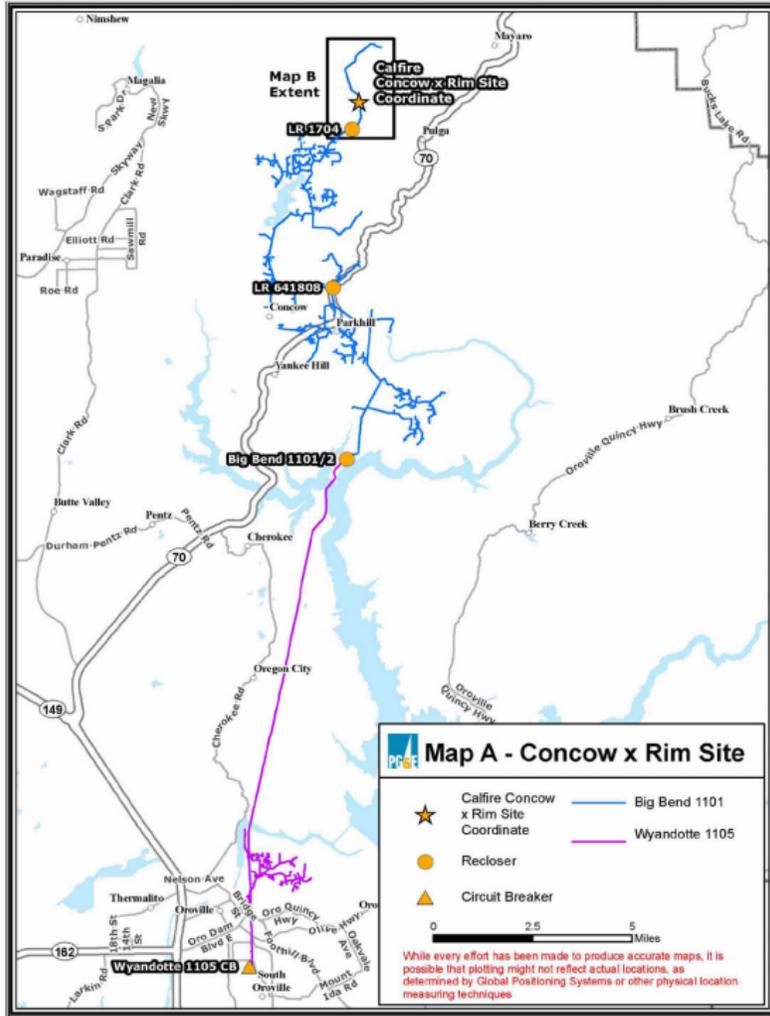
On November 16, 2018, PG&E filed with the CPUC an EIR (Incident No. 181116-9015) concerning an outage on the Big Bend 1101 12 kV Circuit in Butte County at approximately 6:45 a.m. on November 8, 2018 ("Camp 2 incident location").

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spans south of LR 1704 up to Flea Mountain. The Sub-foreman noted bullets and bullet holes at the break point of the LR 1704 pole and bullet dents on the LR 1704 control box. He also noted shotgun pellets embedded in the LR 1704 pole. The Sub-foreman took photos from multiple locations along Concow Road. These photographs have been provided by PG&E to CAL FIRE.

# CAMP #2 WILDFIRE – WYANDOTTE 1105

## CPUC-SED EVIDENCE RECORD



# CAMP #2 WILDFIRE – WYANDOTTE 1105

## CPUC-SED EVIDENCE RECORD

CAMP November 8, 2018 18CACNR000320

1 member causing both to melt. The hot metal fell to the ground onto a receptive fuel bed  
2 of annual grasses and brush. High winds caused the hot metal to be spread over a  
3 larger area as it fell resulting in multiple ignitions in the GOA. The resulting fire burned  
4 uncontrolled into Flea Canyon and subsequently overtook the Camp B Fire.

5  
6 The Camp B Fire cause was determined to be electrical. The Big Bend 1101 12  
7 KV circuit conductors in the location south of Rim Road and west of Concow Road were  
8 struck by a disease weakened and decadent Ponderosa Pine tree. The falling tree  
9 contacted the conductor lines, creating a fault to ground through the tree, and ignited  
10 the tree's outer bark. The diseased and decadent Ponderosa Pine tree was determined  
11 to be likely detectable with a simple visual inspection and mallet test. The origin of the  
12 Camp B Fire was within the projected PSPS. Had PG&E initiated the PSPS as they  
13 had advised, the illegally ignored Ponderosa Pine tree would not have started a fire  
14 when it fell.

PSPS not  
activated

# CAMP #2 WILDFIRE – WYANDOTTE 1105

## CAL FIRE EVIDENCE RECORD

6           The Camp B Fire cause was determined to be electrical. The Big Bend 1101 12  
7 KV circuit conductors in the location south of Rim Road and west of Concow Road were  
8 struck by a disease weakened and decadent Ponderosa Pine tree. The falling tree  
9 contacted the conductor lines, creating a fault to ground through the tree, and ignited  
10 the tree's outer bark. The diseased and decadent Ponderosa Pine tree was determined  
11 to be likely detectable with a simple visual inspection and mallet test. The origin of the  
12 Camp B Fire was within the projected PSPS. Had PG&E initiated the PSPS as they  
13 had advised, the illegally ignored Ponderosa Pine tree would not have started a fire  
14 when it fell.

At the completion of the origin and cause investigation, the cause of the Camp B Fire was determined to be electrical. The Big Bend 1101 conductors in the location south of Rim Road and west of Concow Road were struck by the disease weakened subject Ponderosa Pine tree. The falling tree contacted the conductors, creating a fault to ground through the tree, and ignited the tree's outer bark. This sequence of events created a fault within the PG&E distribution system, opening the recloser on Concow Road at approximately 6:47 AM. An EIR indicated this conductor circuit experienced an outage at 6:45 AM. In McFADDEN's report, the conductors severed after the circuit was de-energized. Smoke became visible in this area from Flea Mountain Fire Watch

A thorough and systematic origin and cause investigation of the Camp B Fire was completed. During the investigation, it was determined a down Ponderosa Pine tree (*Pinus ponderosa*) (Subject Tree) fell prior to the Camp B Fire ignition. LOHSE determined the Subject Tree fell into the Big Bend 12 KV distribution circuit. Two conductor burn marks, Strike #1 and Strike #2, were identified along the trunk of the Subject Tree. Analysis of the 12KV conductors, west of the Subject Tree's original stump, was conducted by metallurgist Sam MCFADDEN. MCFADDEN identified multiple locations on both the east and west conductors (referenced as conductors B and D) where arcing had occurred (see MCFADDEN's, attachment 10-02.2-28). The location of Strike #1 was identified as the Specific Origin Area of the Camp B Fire.

# CAMP #2 WILDFIRE – WYANDOTTE 1105

## REFERENCE DOCUMENTS

- ▶ PG&E Camp Incident Description & Factual Summary, PG&E Camp Supplemental Report
- ▶ CAL FIRE Report –
- ▶ Case 3:14-cr-00175-WHA Document 956-
- ▶ PG&E

-  PGE-CAMP-CF-0000000121
-  PGE-CAMP-CF-0000000509\_CONF
-  PGE-CAMP-CF-0000000755
-  PGE-CAMP-CF-0000000756
-  PGE-CAMP-CF-0000000757
-  PGE-CAMP-CF-0000000758
-  PGE-CAMP-CF-0000000759
-  PGE-CAMP-CF-0000000180\_CONF
-  PGE-CAMP-CF-0000000295
-  PGE-CAMP-CF-0000000760

Youngs (Maacama) Wildfire – Fulton 1102

## B. Compliance Matrix

The project scope includes preparation of a compliance matrix indicating where the RCA Team determines PG&E did, or did not, meet state regulations. The RCA Team's findings follow. PG&E has requested that the report include the table summarizing alleged and disputed violations from the CPUC's OII order; it is also included.

Procedure		Did Not Meet State Regulations	Did Meet State Regulations
GO 95 Rule 19 <sup>80</sup>	Cooperation and Preservation of Evidence	Point, Sulphur	
GO 95 Rule 31.1 <sup>81</sup>	Design, Construction and Maintenance	Adobe, Atlas, Camp 2, Lobo, McCourtney, Norrbom, Nuns, Partrick, Pocket, Redwood 1, Sulphur, Youngs	Cascade, Point, Oakmont/Pythian, LaPorte
GO 95 Rule 35 <sup>82</sup>	Vegetation Management	Atlas, Lobo, McCourtney, Norrbom, Nuns, Partrick, Pocket, Youngs	Cascade, Point, Oakmont/Pythian, LaPorte, Cherokee
PRC 4292 <sup>83</sup>	Maintenance of Powerline Vegetation Clearance	Camp, Sulphur	
PRC 4293 <sup>84</sup>	Hazard Tree Clearance	Adobe, Atlas, Camp 2, Lobo, McCourtney, Norrbom, Nuns, Partrick, Pocket, Redwood 1, Redwood 2	Point, Oakmont/Pythian, LaPorte, Cherokee

<sup>80</sup> Point: SED Incident report E20171009-03, Sulphur: SED Incident Report E20171011-02.

<sup>81</sup> Adobe: SED Incident report E20171010-02, Atlas: SED Incident Reports, Atlas 1: 171023-8596 & Atlas 2: 171020-8589, Camp 2: Cal Fire investigation report number 18CACNR0000320, Lobo: SED Incident Report E20171012-02, McCourtney: SED Incident Report E20171011-03, Norrbom: SED Incident Report E20171020-05, Nuns: SED Incident Report E20171016-01, Partrick: SED Incident Report E20171020-02, Pocket: SED Incident Report E20171021-01, Redwood: SED Incident Report E20171009-02, Sulphur: SED Incident Report E20171011-02, Youngs: SED Incident Report E20171020-01

<sup>82</sup> Atlas: SED Incident Reports, Atlas 1: 171023-8596 & Atlas 2: 171020-8589, Lobo: SED Incident Report E20171012-02, McCourtney: SED Incident Report E20171011-03, Norrbom: SED Incident Report E20171020-05, Nuns: SED Incident Report E20171016-01, Partrick: SED Incident Report E20171020-02, Pocket: SED Incident Report E20171021-01, Youngs: SED Incident Report E20171020-01

<sup>83</sup> Sulphur: SED Incident Report E20171011-02

<sup>84</sup> Adobe: SED Incident Report E20171010-02, Atlas: SED Incident Reports, Atlas 1: 171023-8596 & Atlas 2: 171020-8589, Camp 2: Cal Fire Investigation Report 18CACNR0000320, Lobo: SED Incident Report E20171012-02, McCourtney: SED Incident Report E20171011-03, Norrbom: SED Incident Report E20171020-05, Nuns: SED Incident Report E20171016-01, Partrick: SED Incident Report E20171020-02, Pocket: SED Incident Report E20171021-01, Redwood: SED Incident Report E20171009-02

Procedure		Alleged Violations	Disputed Violations
GO 95 Rule 19	Cooperation and Preservation of Evidence	Point, Sulphur	
GO 95 Rule 31.1	Design, Construction and Maintenance	Adobe, Atlas, Camp 2, Lobo, Norrbom, Nuns, McCourtney, Oakmont/Pythian, Partrick, Pocket, Redwood 1, Sulphur, Youngs/Maacama	Adobe, Atlas, Lobo, McCourtney, Norrbom, Oakmont/Pythian, Partrick, Pocket, Youngs/Maacama,
GO 95 Rule 35	Vegetation Management	Atlas, Lobo, McCourtney, Norrbom, Nuns, Partrick, Pocket, Youngs/Maacama	Atlas, Lobo, McCourtney, Norrbom, Nuns, Partrick, Pocket, Youngs/Maacama
GO 95 Rule 38	Conductor Clearance Not Maintained	Cascade	Cascade
Resolution E-4184	Fire Not Reported	Camp 2, Potter/Redwood	Potter/Redwood

Note: Data Source: OII I.19-06-015 Exhibit B, Table B, Violations Related to the 2017 Wildfires

## C. Details on the 17 Wildfires

Fire	Acres Burned	Buildings Destroyed	Civilian Deaths	CAL FIRE Assigned Fault	CAL FIRE Tree/Vegetation Summary	SED Reported GO95 Violation	SED Reported Violation and Rules	Temp. °F	Dew Point °F	RH %	Wind (mph)	Gusts (mph)
Adobe	56,556	1,355	1	Eucalyptus tree falling into PG&E power lines.	Tree was green, 109 feet tall, rooted approximately 60 feet from the distribution conductors.	X	<p><b>GO 95, Rule 31.1</b>, for PG&amp;E's failure to maintain its 12 kV overhead conductors safely and properly. PG&amp;E did not identify a hazardous tree condition and take the appropriate steps to prevent the subject Eucalyptus tree from striking the overhead conductors. SED found that PG&amp;E did not document the subject Eucalyptus tree for trim or removal.</p> <p><b>GO 95, Rule 31.1</b>, for PG&amp;E's failure to maintain VM inspection records related to a 2015 CEMA inspection according to best practices. PG&amp;E could not locate records related to this inspection and notified SED of the lost record on March 30, 2018.</p> <p><b>GO 95, Rule 31.1</b> for PG&amp;E completing work order #103891848 15 days late.</p>	72	23	16	16	24

Fire	Acres Burned	Buildings Destroyed	Civilian Deaths	CAL FIRE Assigned Fault	CAL FIRE Tree/Vegetation Summary	SED Reported GO95 Violation	SED Reported Violation and Rules	Temp. °F	Dew Point °F	RH %	Wind (mph)	Gusts (mph)
Atlas	51,624	120	6	Tree fell to ground, breaking conductor; Another tree branch struck conductor, causing insulator to break.	Black Oak tree fell on Pueblo 1104 12kV conductors bringing down one span igniting fire (Atlas 1). Valley Oak branch fell on Pueblo 1104 12kV conductor igniting fire (Atlas 2).	X	<b>GO 95, Rule 31.1</b> , for failing to identify and abate a decaying Black Oak tree in the Atlas 1 incident area. <b>GO 95, Rule 31.1</b> , for failing to identify and perform correctional pruning on a hazardous Valley Oak codominant stem in the Atlas 2 incident area. Two violations of <b>GO 95, Rule 35</b> , for failing to maintain the minimum required clearance for PG&E 12 kV overhead conductors at the Atlas 1 and Atlas 2 sites. <b>GO 95, Rule 31.1</b> for completing work order #102506022 676 days late. This violation did not directly contribute to the ignition of the Atlas fire but still signifies an unsafe act by PG&E.	64	15	15	11	32
Camp	153,336	18,804	85	PG&E Transmission lines in Pulga; vegetation fell into distribution lines near intersection of Concow & Rim Roads.	Decayed Ponderosa Pine Tree failed and fell onto PG&E Big Bend 1101 12kV (Camp B).	X	Rule 44.3, 31.1, 31.2, 18, GO 165 Section IV, D.06-04-055 resolution E-4184, CA Public Utilities Code Section 451				10	39
Cascade	9,989	264	4	PG&E line sag; lines touched in high winds; arcing dropped molten material on ground.		X	<b>GO 95, Rule 38</b> by not maintaining the minimum distance of 6 inches between two 12-kV conductors on the same crossarm, which eventually contacted each other.	65	14	14	10	29

Fire	Acres Burned	Buildings Destroyed	Civilian Deaths	CAL FIRE Assigned Fault	CAL FIRE Tree/Vegetation Summary	SED Reported GO95 Violation	SED Reported Violation and Rules	Temp. °F	Dew Point °F	RH %	Wind (mph)	Gusts (mph)
Cherokee	8,417	6		Tree limbs coming into contact with PG&E lines.	42-foot Oak, good health. Nearby trees with evidence of pruning within the prior three months. Branches approximately 6 feet minimum from lines.			71		9	3	29
La Porte	6,151	74		Oak limb fell upon energized conductor wires; pole to crossarm attachment catastrophically failed as did wire; receptive fuel bed.	Approximately 7-inch Valley Oak tree limb.			68	15	13	6	30
Lobo	821	47		Tree contacting PG&E lines; violation of 4293.	Ponderosa Pine tree failed and fell onto PG&E 21kV conductors.	X	<b>GO 95, Rule 31.1</b> , Failing to maintain its facilities safely and properly by: 1) failing to properly identify and abate the subject tree which had an extended open cavity 2) Improper VM practices by not identifying and abating the hazardous condition by removing surrounding trees. <b>GO 95, Rule 35</b> , Failing to maintain the rules minimum clearance requirements between 12kV conductors and subject tree. <b>GO 95, 31.1</b> , for failure to maintain VM inspection records related to a 2014 CEMA inspection. PG&E could not locate the records.	62	8	15	8	25

Fire	Acres Burned	Buildings Destroyed	Civilian Deaths	CAL FIRE Assigned Fault	CAL FIRE Tree/Vegetation Summary	SED Reported GO95 Violation	SED Reported Violation and Rules	Temp. °F	Dew Point °F	RH %	Wind (mph)	Gusts (mph)
McCourtney	76	15		Diseased 80-foot Ponderosa Pine fell on 12k line and started limited fire.	Diseased Ponderosa Pine tree fell onto PG&E 12kV conductors. Second fire ignited nearby due to broken conductor clamp.	X	<b>GO 95 Rule 31.1</b> , Hazardous tree not identified and abated; <b>GO 95 Rule 35</b> , Vegetation clearance not maintained.	61	13	15	10	24
Norrbom	1,836			Tree falling into PG&E electrical conductors.	Black Oak tree failed, fell, and contacted the overhead conductors of PG&E's Sonoma 1103 12kV circuit.	X	<b>GO 95, Rule 31.1</b> , by failing to maintain their facilities to allow for safe, proper, and adequate service. PG&E failed to identify a hazardous tree condition despite the tree having visible defects, decay, and rot. PG&E did not take the appropriate steps to prevent the subject tree from falling into the overhead conductors. PG&E did not document the subject tree for trim or removal. <b>GO 95, Rule 35</b> , by failing to maintain the rule's clearance requirement	72		10	10	30

Fire	Acres Burned	Buildings Destroyed	Civilian Deaths	CAL FIRE Assigned Fault	CAL FIRE Tree/Vegetation Summary	SED Reported GO95 Violation	SED Reported Violation and Rules	Temp. °F	Dew Point °F	RH %	Wind (mph)	Gusts (mph)
Nuns	56,556	1,355 (per SED)	3 (per SED)	Alder tree limb fell contacting energized power lines.	Alder tree fell and contacted overhead, secondary voltage conductors of PG&E's Dunbar 1101 circuit.	X	GO 95, Rule 35 relating to PG&E's discovery during a September 22, 2017 detailed inspection of a tree that was in contact with and straining a secondary conductor and for which PG&E improperly prioritized the needed vegetation work to correct this immediate safety hazard. PG&E inspectors found the unsafe condition on September 22, 2017 and produced work order #113271607. Although this violation did not directly contribute to the ignition of the Nuns fire, it represents an unsafe practice conducted by PG&E.	72		12	17	45

Fire	Acres Burned	Buildings Destroyed	Civilian Deaths	CAL FIRE Assigned Fault	CAL FIRE Tree/Vegetation Summary	SED Reported GO95 Violation	SED Reported Violation and Rules	Temp. °F	Dew Point °F	RH %	Wind (mph)	Gusts (mph)
Oakmont/ Pythian				Fire started when PG&E re-energized downed lines. Burned into Nuns.	Douglas Fir tree fell and contacted overhead conductors of PG&E's Dunbar 1101 12kV circuit.	X	<p><b>GO 95, Rule 31.1</b> for unsafely and incompletely patrolling the circuit after a sustained outage and unsafely re-energizing. The PG&amp;E inspectors did not complete a thorough patrol of all the spans downstream of a faulted span prior to re-energizing the circuit. This violation may have directly contributed to the ignition of the Oakmont/Pythian fire.</p> <p><b>GO 95, Rule 31.1</b> for failing to follow PG&amp;E procedures<sup>52</sup> for reinforcement of a weakened pole. This violation existed from September 4, 2012 when PG&amp;E incorrectly documented that the reinforcement had occurred at least until October 23, 2017 when SED found that the reinforcement had not occurred.</p> <p><b>GO 95, Rule 31.1</b> for failing to complete a work order by its due date.</p>	74	35	24	17	

Fire	Acres Burned	Buildings Destroyed	Civilian Deaths	CAL FIRE Assigned Fault	CAL FIRE Tree/Vegetation Summary	SED Reported GO95 Violation	SED Reported Violation and Rules	Temp. °F	Dew Point °F	RH %	Wind (mph)	Gusts (mph)
Partrick	8,283			Oak tree fell into PG&E lines.	Coast Live Oak tree fell and contacted overhead conductors of PG&E's Pueblo 2103 12kV circuit.	X	<p><b>GO 95, Rule 31.1</b>, by failing to maintain their facilities to allow for safe, proper, and adequate service. PG&amp;E failed to identify a hazardous tree condition despite the tree having visible defects, decay, and rot. PG&amp;E did not take the appropriate steps to prevent the subject tree from falling into the overhead conductors. PG&amp;E did not document the subject tree for trim or removal.</p> <p><b>GO 95, Rule 35</b>, by failing to maintain the clearances required for the hazardous subject tree that fell into the overhead conductors.</p>	62		16	13	28

Fire	Acres Burned	Buildings Destroyed	Civilian Deaths	CAL FIRE Assigned Fault	CAL FIRE Tree/Vegetation Summary	SED Reported GO95 Violation	SED Reported Violation and Rules	Temp. °F	Dew Point °F	RH %	Wind (mph)	Gusts (mph)
Pocket	17,357	6		Oak tree breaking and contacting PG&E lines.	Valley Oak tree failed and fell onto PG&E 12kV.	X	<b>GO 95, Rule 31.1</b> , by failing to maintain its facilities to allow for safe, proper, and adequate service. PG&E failed to identify a hazardous tree condition despite the tree having visible defects, decay, and rot. PG&E failed to take the appropriate steps to prevent the subject tree from falling into the overhead. conductors. PG&E did not document the subject tree for trim or removal. <b>GO 95, Rule 35</b> , by failing to maintain the rule's minimum clearance requirements between the subject 12 kV conductors and the hazardous subject tree.	64		12	48	79
Point	130	19		Valley Oak tree fell onto PG&E 12kV lines, arced, and caused vegetation ignition.		X	<b>GO 95, Rule 19</b> by failing to retain the subject broken crossarm and damaged section of conductor.	62		8	3	17

Fire	Acres Burned	Buildings Destroyed	Civilian Deaths	CAL FIRE Assigned Fault	CAL FIRE Tree/Vegetation Summary	SED Reported GO95 Violation	SED Reported Violation and Rules	Temp. °F	Dew Point °F	RH %	Wind (mph)	Gusts (mph)
Potter/Redwood	36,523	587	9	Two starts, trees falling into PG&E wires.	Two Valley Oak trees failed, fell onto PG&E 60kV overhead transmission and 12kV overhead conductors.	X	<b>Appendix B of Commission Decision (D) 06-04-055</b> , as amended by Resolution E-4184, for not reporting the incident at 9100 Main Street, Potter Valley to the CPUC. GO 95, Rule 31.1 for not adhering to accepted good maintenance practice of keeping maintenance records. PG&E failed to keep the work order for the repair work performed on October 10, 2017. PG&E notified SED of the lost record on September 21, 2018. <b>GO 95, Rule 31.1</b> for failing to maintain VM inspections related to the 2016 CEMA inspection according to best maintenance practice of keeping map records. PG&E could not locate records related to this inspection. PG&E notified SED of the lost record on March 30, 2018.	69		12	25	35
Sulphur	2,207	162		PG&E Pole, weakened by woodpecker, broke and fell, caused arcing; molten material dropped into fine dead fuels causing vegetation to catch fire.		X	<b>GO 95, Rule 19</b> by failing to preserve a burnt pole as evidence related to a reportable incident and Commission investigation. <b>GO 95, Rule 31.1</b> , for failure to maintain VM inspection records related to a 2016 CEMA patrol inspection according to best practices.	60		16	7	28

Fire	Acres Burned	Buildings Destroyed	Civilian Deaths	CAL FIRE Assigned Fault	CAL FIRE Tree/Vegetation Summary	SED Reported GO95 Violation	SED Reported Violation and Rules	Temp. °F	Dew Point °F	RH %	Wind (mph)	Gusts (mph)
Youngs	89	1		Valley Oak tree fell onto PG&E 12kV lines, arced, and caused ignition of vegetation.	Valley Oak tree failed and fell onto PG&E 12kV overhead conductors.	X	<b>GO 95, Rule 31.1</b> , by failing to maintain its facilities to allow for safe, proper, and adequate service. <b>GO 95, Rule 35</b> , by failing to maintain the rule's minimum clearance requirements for the hazardous subject tree that fell into the overhead conductors.	74	23	15	5	14

## D. PSPS Details To Date

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
10/14/2018 (20:24) – 10/17/2018 (8:47)	2.5 days	<b>60,086</b>	<ul style="list-style-type: none"> <li>• 51,618 residential</li> <li>• 2,529 medical baseline</li> <li>• 5,925 commercial</li> <li>• 2,543 other customers</li> </ul>	7 (Amador, Calaveras, El Dorado, Lake, Napa, Placer, Sonoma)	<ul style="list-style-type: none"> <li>• 10/13, 22:00 (pre-event notification)</li> <li>• 10/14, 07:00 (pre-event notification)</li> <li>• 10/14, 16:00 (shutoff notification)</li> <li>• 10/15, 10:00 (cancelling PSPS)</li> <li>• 10/15, 14:30 (update post shutoff)</li> </ul>	
11/6/2018 – 11/8/2018	<b>No PSPS. The weather improved and PSPS was cancelled.</b>					
6/8/2019 (6:18) – 6/9/2019 (17:57)	1.5 days	<b>22,474</b>	<ul style="list-style-type: none"> <li>• 19,645 residential</li> <li>• 1,571 medical baseline</li> <li>• 2,567 commercial</li> <li>• 262 other customers</li> </ul>	8 (3 in North Bay: Napa, Yolo, Solano) and 5 in the Sierra Nevada Foothills: (Butte, El Dorado, Nevada, Placer, Yuba)	<p>Location 1 – North Bay:</p> <ul style="list-style-type: none"> <li>• 6/7, 11:00 (first notification alert): 1,433 customers</li> <li>• 6/7, 14:45 (medical baseline): 114 customers</li> <li>• 6/7, 20:39 (second notification alert): 1,101 customers</li> <li>• 6/8, 1:31 (third notification alert): 39 customers</li> <li>• 6/8, 2:31 (fourth notification alert): 554 customers</li> <li>• 6/8, 2:31 (medical baseline): 31 customers</li> <li>• 6/8, 8:00 (shutoff notification): 1,301 customers</li> <li>• 6/8, 20:55 (restoration notification): 1,001 customers</li> </ul> <p>Location 2 – Sierra Nevada Foothills:</p>	1,500 customers de-energized and not notified

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
					<ul style="list-style-type: none"> <li>• 6/7, 12:33 (T-48 notification): 18,221 customers</li> <li>• 6/7, 20:35 (T-24 notification): 27,627 customers</li> <li>• 6/8, 8:00 (medical baseline): 1,203 customers</li> <li>• 6/8, 17:10 – 6/9, 8:00 (shutoff notification): 24,398 customers</li> <li>• 6/9, 2:22 – 8:00 (shutoff notification, medical baseline): 400 customers</li> <li>• 6/9, 10:55 (post-weather notification): 9,239 customers</li> <li>• 6/9, 12:20 (proactive shutoff cancellation): 7,516 customers</li> <li>• 6/9, 15:56 – 18:27 (restoration notification): 11,118 customers</li> </ul>	
9/23/2019 (10:55) – 9/25/2019 (2:46)	2 days	<b>70,826</b>	<ul style="list-style-type: none"> <li>• 63,498 residential</li> <li>• 4,410 medical baseline</li> <li>• 6,714 commercial</li> <li>• 614 other customers</li> </ul>	8 counties: Sept. 23 (Location Alpha): Sierra (Butte, Nevada, El Dorado, Placer, Yuba) Sept. 24 (Location Bravo): Sierra (same counties) and North Bay (Lake, Napa, Sonoma)	Location Alpha (Sierra): <ul style="list-style-type: none"> <li>• 9/21, 20:27 (first all-customer notification to Sierra Foothills): 56,915 customers</li> <li>• 9/21, 20:45 (first all-customer notification to add'l customers in Sierra Foothills): 3,775 customers</li> <li>• 9/22, 8:05 (medical baseline): 880 customers</li> <li>• 9/22, 8:05 (first master meter medical baseline notification): 31 customers</li> <li>• 9/22, 20:52 (second all-customer notification (North Bay added): 103,425 customers</li> <li>• 9/23, 8:05 (first notification for new master meter medical baseline customers added): 111 customers</li> </ul>	2,120 customers de-energized and not notified

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
					<ul style="list-style-type: none"> <li>• 9/23, 8:56 (first customer notification for new customers added to scope): 360 customers</li> <li>• 9/23, 14:42 (medical baseline customers with no previously confirmed contact): 66 customers</li> <li>• 9/23, 15:50 (all-customer shutoff notice): 20,001 customers</li> <li>• 9/23, 17:00 (all-customer shutoff notice – Oroville Substation customers added): 5,363 customers</li> </ul> <p>Location Bravo (Sierra and North Bay):</p> <ul style="list-style-type: none"> <li>• 9/24, 8:01 (follow-up notice for Alpha customers to be restored but may be shut off again for Bravo): 13,519 customers</li> <li>• 9/24, 17:57 (all-customer overnight notification for Sierras and North Bay): 45,056 customers</li> <li>• 9/25, 8:00 (post de-energization medical baseline calls): 102 customers</li> <li>• 9/25, 15:34 (post-weather event notice in Southern Sierra Foothills): 9,593 customers</li> <li>• 9/25, 16:41 (post-weather event notice in North Bay region): 1,009 customers</li> <li>• 9/25, 17:22 (post-weather event notice in Northern Sierra Foothills): 11,035 customers</li> <li>• 9/25, 18:43 (restoration complete notice in North Bay): 1,298 customers</li> <li>• 9/25, 20:48 (post-weather event notice in Northern Sierra Foothills): 1,932 customers</li> </ul>	

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
					<ul style="list-style-type: none"> <li>• 9/26, 8:00 (restoration complete notice in Sierra Foothills): 38,604 customers</li> <li>• 9/26, 13:55 (restoration complete notice in all remaining areas): 2,934 customers</li> </ul>	
10/5/2019 (22:04) – 10/6/2019 (15:41)	18 hours	<b>11,609</b>	<ul style="list-style-type: none"> <li>• 10,250 residential</li> <li>• 730 medical baseline</li> <li>• 1,286 commercial</li> <li>• 73 other customers</li> </ul>	3 (Butte, Plumas, and Yuba)	<ul style="list-style-type: none"> <li>• 10/4, 19:30 (notification to customers and public safety partners): 12,000 customers and partners</li> <li>• 10/5, morning (additional notification to medical baseline customers): 180 customers</li> <li>• 10/5, 16:36 (cancellation notices to those customers removed from scope): 1,700 customers</li> <li>• 10/5, 18:17 (second notification to those still in scope): 10,300 customers</li> <li>• 10/6, 12:19 (update notification): 10,300 customers</li> <li>• 10/6, 14:46 (restoration complete notice): 8,400 customers</li> <li>• 10/6, 16:43 (restoration complete notice): 1,900 customers</li> </ul>	
10/9/2019 (0:09) – 10/12/2019 (17:41)	3.5 days	<b>735,405</b>	<ul style="list-style-type: none"> <li>• 647,656 residential</li> <li>• 30,301 medical baseline</li> <li>• 78,041 commercial</li> <li>• 9,710 other customers</li> </ul>	35 (Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, El Dorado, Glenn, Humboldt, Kern, Lake,	<ul style="list-style-type: none"> <li>• 10/7, afternoon (Phase 1, 2, and 3 customers and partners)</li> <li>• 10/8 (second notification to previously identified customers and partners, first notification for customers added to scope)</li> <li>• 10/9 (notification that shutoff would begin that morning, including Phase 4 customers)</li> <li>• 10/9, evening (cancellation notice to some Phase 4 customers)</li> </ul>	Approximately 23,000 customers de-energized did not receive direct notifications prior to de-energization (approximately 600 were medical baseline) due to: no customer contact information; some

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
				Marin, Mariposa, Mendocino, Merced, Napa, Nevada, Placer, Plumas, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Tehama, Trinity, Tuolumne, Yolo, Yuba)		customers are tied to a circuit operationally, but their notifications are tied to a different circuit; and challenges related to a manual process of taking high-risk areas and correlating to impacted customers.
10/23/2019 (14:14) – 10/25/2019 (18:28)	2 days	<b>178,809</b>	<ul style="list-style-type: none"> <li>• 158,798 residential</li> <li>• 7,939 medical baseline</li> <li>• 18,133 commercial</li> <li>• 1,878 other customers</li> </ul>	18 (Alpine, Amador, Butte, Calaveras, El Dorado, Kern, Lake, Mendocino, Napa, Nevada, Placer, Plumas, San Mateo,	<ul style="list-style-type: none"> <li>• 10/21, afternoon (Time Periods 1, 2, and 3 customers and partners)</li> <li>• 10/22, morning (Time Period 4 customers)</li> <li>• 10/22, evening (Time Periods 1-4 customers)</li> <li>• 10/23, morning (Time Periods 1 and 2 – notification of de-energization)</li> <li>• 10/24, midday (Time Periods 1-3 – notification of weather clearing)</li> </ul>	Approximately 2,100 customers de-energized did not receive direct notifications prior to de-energization (22 were medical baseline customers) for these reasons: No customer contact information; and locations with

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
				Shasta, Sierra, Sonoma, Tehama, Yuba)		customer's service point identification (SPID) number were not mapped to the local transformer.
2 weather events: 10/26 and 10/29/2019 PSPS: 10/26/19 (08:26) to 11/1/19 (16:21)	6 days	<b>967,705</b>	<ul style="list-style-type: none"> <li>• 855,057 residential</li> <li>• 35,950 medical baseline</li> <li>• 102,157 commercial</li> <li>• 10,491 other customers</li> </ul>	29 (Alameda, Alpine, Amador, Butte, Calaveras, Contra Costa, El Dorado, Humboldt, Kern, Lake, Marin, Mendocino, Napa, Nevada, Placer, Plumas, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Tehama, Trinity, Tuolumne, Yolo, Yuba)	<ul style="list-style-type: none"> <li>• 10/24 (first notifications to customers and partners in Time Periods 1-6)</li> <li>• 10/25 (notification to Time Period 6 customers)</li> <li>• 10/25 (second notifications to Time Periods 1-6 customers)</li> <li>• 10/26 (notifications to Time Periods 1-5 customers)</li> <li>• 10/26 (notification to Time Period 7 customers)</li> <li>• 10/27 (notifications to Time Period 6 and 7 customers)</li> <li>• 10/28 (notifications to Time Periods 1-2 and 4-5 customers)</li> <li>• 10/29 (notifications to Time Period 3, and 6-9 customers)</li> <li>• 10/29 (all-clear notification to Time Period 5 customers)</li> <li>• 10/29 (notifications to Time Period 7-9 customers)</li> <li>• 10/30 (cancellation notification to Time Period 6-8 customers)</li> <li>• 10/30 (all-clear notifications to Time Period 1, 1-A, and 2-5 customers)</li> </ul>	Approximately 25,900 customers de-energized did not receive advanced notification and experienced an outage longer than five hours. Approximately 500 were medical baseline. Reasons for missed notifications: No customer contact info; locations with customer's SPID number were not mapped to the local transformer; some customers operationally tied to one circuit but notifications connected to a different circuit; and challenges related

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
					<ul style="list-style-type: none"> <li>10/31 – 11/1 (restoration notifications to people impacted by the Kincade Fire)</li> </ul>	to manual processes.
11/20/2019 (6:20) – 11/21/2019 (21:56)	1.5 days	<b>49,202</b>	<ul style="list-style-type: none"> <li>42,453 residential</li> <li>2,432 medical baseline</li> <li>5,409 commercial</li> <li>1,340 other customers</li> </ul>	11 (, Butte, Colusa, Glenn, Lake, Mendocino, Napa, Shasta, Solano, Sonoma, Tehama, Yolo)	<ul style="list-style-type: none"> <li>11/17, evening (public safety partners)</li> <li>11/18, morning (notifications to partners and Time Period 1-8 customers)</li> <li>11/18, afternoon (notification to Time Period 9 customers)</li> <li>11/19, morning (notifications to Time Period 1, 3, 3.1, 5, 6, and 8 customers)</li> <li>11/19, morning (cancellation notifications to Time Period 4, 7, and 9 customers)</li> <li>11/19, morning (notification to Time Period 10 customers)</li> <li>11/20, morning (cancellation notification to Time Period 2 customers)</li> <li>11/20, morning (notifications to Time Period 1, 3, 3.1, and 5 customers)</li> <li>11/20, afternoon (cancellation notifications to Time Period 5, 6, and 8 customers)</li> <li>11/20, evening (all-clear and power restoration notifications)</li> <li>11/21, morning (all-clear and power restoration notifications)</li> </ul>	Approximately 800 customers de-energized did not receive direct notifications prior to de-energization. Reasons: no customer contact info; and challenges related to manual processes.
9/7/2020 (4:25) – 9/13/2020 (14:02)	6.5 days	<b>168,581</b>	<ul style="list-style-type: none"> <li>148,675 residential</li> <li>10,383 medical baseline</li> <li>18,418 commercial</li> <li>1,444 other customers</li> </ul>	22 (Alpine, Amador, Butte, Calaveras, El Dorado, Humboldt, Kern, Lake, Lassen,	<ul style="list-style-type: none"> <li>9/5, 9:00 (notification to public safety partners): 1,300 partners</li> <li>9/5, 20:00 – 9/6, 9:00 (early notification): 103,000 customers + 500 local community representatives</li> <li>9/6, 18:00 (watch notification): 102,500 customers + 450 local community representatives</li> </ul>	

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
				Mariposa, Napa, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Trinity, Tuolumne, and Yuba)	<ul style="list-style-type: none"> <li>• 9/7, 9:00 (watch notification to new customers in scope): 66,000 customers</li> <li>• 9/7, 19:00 (warning notification): 172,000 customers + 600 local community representatives</li> <li>• 9/8, 14:00 (warning notification to Kern County): 600 customers</li> <li>• 9/8, 16:12 (restoration notification): 94,981 customers</li> <li>• 9/8, 16:25 – 18:25 (ETOR): 57,169 customers</li> <li>• 9/8, 18:36 – 9/9, 8:00 (Microgrid): 7,178 customers</li> <li>• 9/11, 8:23 (restoration): 568 customers</li> </ul>	
9/27/2020 (4:02) – 9/29/2020 (9:52)	2.5 days	<b>64,297</b>	<ul style="list-style-type: none"> <li>• 58,453 residential</li> <li>• 4,358 medical baseline</li> <li>• 5,512 commercial</li> <li>• 332 other customers</li> </ul>	15 (Alpine, Amador, Butte, Calaveras, El Dorado, Lake, Napa, Nevada, Placer, Plumas, Shasta, Sierra, Sonoma, Tehama, Yuba)	<ul style="list-style-type: none"> <li>• 9/23, 21:00 (public safety partners): 500 customers</li> <li>• 9/24, 19:45 (watch notification): 21,000 customers + 55 local community representatives</li> <li>• 9/25, 16:30 (watch notification): 97,000 customers + 200 local community representatives</li> <li>• 9/26, 10:00 (watch notification): 89,000 customers + 100 local community representatives</li> <li>• 9/26, 18:00 (warning notification): 15,000 customers + 100 local community representatives</li> <li>• 9/27, 9:00 (warning notification): 4,000 customers</li> </ul>	

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
					<ul style="list-style-type: none"> <li>• 9/27, 12:30 (warning notification): 51,000 customers + 200 local community representatives</li> <li>• 9/27, 17:45 (warning notification): 15 customers</li> </ul>	
10/14/2020 (10:30) – 10/17/2020 (10:57)	3 days	<b>40,574</b>	<ul style="list-style-type: none"> <li>• 35,360 residential</li> <li>• 2,431 medical baseline</li> <li>• 4,375 commercial</li> <li>• 839 other customers</li> </ul>	19 (Alameda, Butte, Contra Costa, Humboldt, Lake, Monterey, Napa, Nevada, Plumas, San Mateo, Santa Clara, Santa Cruz, Shasta, Tehama, Solano, Sonoma, Trinity, Yolo, Yuba)	<ul style="list-style-type: none"> <li>• 10/12, 10:00 (advance notification to public safety partners): 1,600 customers</li> <li>• 10/12, 18:00 (watch): 49,000 customers + 400 local community representatives</li> <li>• 10/13, 16:30 (watch): 54,000 customers + 500 local community representatives</li> <li>• 10/14, 13:00 (cancellation): 3,800 customers</li> <li>• 10/14, 13:30 (warning): 33,000 customers + 450 local community representatives</li> <li>• 10/14, 15:30 (warning): 19,000 customers + 100 local community representatives</li> <li>• 10/14, 17:30 (warning): 700 customers + 50 local community representatives</li> <li>• 10/15, 16:00 (outage update): 6,200 customers + 100 local community representatives</li> <li>• 10/15, 19:30 (cancellation): 3,600 customers</li> </ul>	
10/21/2020 (4:00) – 10/23/2020 (15:52)	2.5 days	<b>30,153</b>	<ul style="list-style-type: none"> <li>• 27,256 residential</li> <li>• 2,477 medical baseline</li> <li>• 2,690 commercial</li> </ul>	7 (Butte, Colusa, Glenn, Plumas, Shasta, Tehama, Yolo)	<ul style="list-style-type: none"> <li>• 10/19, 8:30 (advance notification to public safety partners): 1,200 customers</li> <li>• 10/19, 17:30 (watch): 50,400 customers + 340 local community representatives</li> <li>• 10/20, 14:00 (watch): 53,500 customers + 350 local community representatives</li> </ul>	

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
			<ul style="list-style-type: none"> <li>• 207 other customers</li> </ul>		<ul style="list-style-type: none"> <li>• 10/21, 15:00 (warning): 36,900 customers + 270 local community representatives</li> <li>• 10/21, 15:00 (cancellation): 20,000 customers + 50 local community representatives</li> <li>• 10/22, 9:00 (cancellation): 4,300 customers + 150 local community representatives</li> <li>• 10/22, 16:00 (cancellation): 1,600 customers + 40 local community representatives</li> </ul>	
10/25/2020 (10:02) – 10/28/2020 (22:25)	3.5 days	<b>345,467</b>	<ul style="list-style-type: none"> <li>• 306,665 residential</li> <li>• 22,124 medical baseline</li> <li>• 35,249 commercial</li> <li>• 3,553 other customers</li> </ul>	35 (Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, El Dorado, Fresno, Glenn, Humboldt, Lake, Madera, Marin, Mariposa, Mendocino, Napa, Nevada, Placer, Plumas, San Joaquin, San Mateo, Santa	<ul style="list-style-type: none"> <li>• 10/23, 8:00 (advance notification to public safety partners and local community representatives): 9,600</li> <li>• 10/23, 17:45 (watch): 465,000 customers + 20 local community representatives</li> <li>• 10/24, 10:30 (watch): 390,000 customers + 800 local community representatives</li> <li>• 10/24, 19:00 (warning): 27,000 customers + 100 local community representatives</li> <li>• 10/24, 9:15 (cancellation): 7,500 customers</li> <li>• 10/25, 10:30 (warning): 330,000 customers + 800 local community representatives</li> <li>• 10/25, 14:00 (cancellation): 103,000 customers + 100 local community representatives</li> <li>• 10/25, 20:00 (cancellation): 6,000 customers</li> <li>• 10/26, 8:00 (cancellation): 600 customers + 15 local community representatives</li> <li>• 10/26, 21:00 (warning): 1,500 customers</li> </ul>	

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
				Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Tehama, Trinity, Tuolumne, Yolo, Yuba)		
12/2/2020 (17:46) – 12/3/2020 (16:04)	1 day	<b>617</b>	<ul style="list-style-type: none"> <li>• 481 residential</li> <li>• 33 medical baseline</li> <li>• 120 commercial</li> <li>• 16 other customers</li> </ul>	1 (Kern)	<ul style="list-style-type: none"> <li>• 12/1, 13:00 (advance notification to public safety partners and local community representatives): 40 customers</li> <li>• 12/1, 16:00 (watch): 600 customers</li> <li>• 12/2, 9:45 (watch): 600 customers + 14 local community representatives</li> <li>• 12/2, 15:15 (warning): 600 customers + 14 local community representatives</li> </ul>	
12/7/2020	<b>No PSPS. The weather improved and PSPS was cancelled.</b>					
1/18/2021 (23:02) – 1/26/2021 (16:10)	8 days (1/26 was an outlier; there was a 1/23 and a 1/24 but most were	<b>5,099</b>	<ul style="list-style-type: none"> <li>• 4,515 residential</li> <li>• 274 medical baseline</li> <li>• 518 commercial</li> <li>• 66 other customers</li> </ul>	7 (Fresno, Kern, Madera, Mariposa, San Luis Obispo, Santa Barbara, Tulare)	<ul style="list-style-type: none"> <li>• 1/16, 9:00 (advance notification to public safety partners and local community representatives): 440 customers</li> <li>• 1/16, 17:00 (advance notification to public safety partners and local community representatives): 30 customers</li> <li>• 1/16, 17:10 (watch): 21,800 customers</li> <li>• 1/17, 13:40 (watch): 6,100 customers + 300 local community representatives</li> <li>• 1/18, 8:10 (watch): 650 customers + 70 local community representatives</li> </ul>	

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
	1/20 or 1/21)				<ul style="list-style-type: none"> <li>• 1/17, 13:30 (cancellation): 15,700 customers + 180 public safety partners and local community representatives</li> <li>• 1/18, 15:10 (warning): 5,200 customers + 210 public safety partners and local community representatives</li> <li>• 1/18, 17:20 (cancellation): 1,330 customers</li> <li>• 1/19, 12:30 (cancellation): 220 customers</li> </ul>	
8/17/2021 (17:28) – 8/19/2021 (18:27)	2 days	<b>48,155</b>	<ul style="list-style-type: none"> <li>• 42,686 residential</li> <li>• 3,856 medical baseline</li> <li>• 4,387 commercial</li> <li>• 1,082 other customers</li> </ul>	13 (Butte, Colusa, Glenn, Lake, Lassen, Mendocino, Napa, Plumas, Shasta, Solano, Sonoma, Tehama, Yolo)	<p>NOTE: With the new report format, numbers of customers and public safety partners notified at each point are not reported. Table 10 has slightly more info on notifications, but not numbers of people.</p> <ul style="list-style-type: none"> <li>• 8/15/2021: Advanced Notification (48-72 hours prior to de-energization): public safety partners and transmission-level customers</li> <li>• Watch Notification (24-48 hours prior to de-energization): public safety partners, all customers</li> <li>• Warning Notification (1-4 hours prior to de-energization): public safety partners, all customers</li> <li>• Power-Off Notification (when de-energization is initiated): public safety partners, all customers</li> <li>• Weather All-Clear/ETOR Update Notification (immediately before re-energization begins): public safety partners, all customers</li> </ul>	

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
					<ul style="list-style-type: none"> <li>Restoration Notification (when re-energization is complete): public safety partners, all customers</li> </ul>	
9/20/2021 (5:30) – 9/21/2021 (16:46)	1.5 days	<b>2,968</b>	<ul style="list-style-type: none"> <li>2,483 residential</li> <li>234 medical baseline</li> <li>405 commercial</li> <li>80 other customers</li> </ul>	8 (Colusa, Glenn, Kern, Lake, Napa, Solano, Tehama, Yolo)	<p>NOTE: With the new report format, numbers of customers and public safety partners notified at each point are not reported. Table 10 has slightly more info on notifications, but not numbers of people.</p> <ul style="list-style-type: none"> <li>Advanced Notification (48-72 hours prior to de-energization): public safety partners</li> <li>Watch Notification (24-48 hours prior to de-energization): public safety partners, all customers</li> <li>Warning Notification (1-4 hours prior to de-energization): public safety partners, all customers</li> <li>Power Off Notification (when de-energization is initiated): public safety partners, all customers</li> <li>Weather All-Clear/ETOR Update Notification (immediately before re-energization begins): public safety partners, all customers</li> <li>Restoration Notification (when re-energization is complete): public safety partners, all customers</li> </ul>	
10/11/2021 (6:00) – 10/14/2021 (15:22)	3.5 days	<b>23,504</b>	<ul style="list-style-type: none"> <li>19,975 residential</li> <li>1,738 medical baseline</li> </ul>	23 (Alameda, Butte, Colusa, Contra Costa, Fresno,	<p>NOTE: With the new report format, numbers of customers and public safety partners notified at each point are not reported. Table 10 has slightly more info on notifications, but not numbers of people.</p>	

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
			<ul style="list-style-type: none"> <li>• 2,718 commercial</li> <li>• 811 other customers</li> </ul>	Glenn, Kern, Kings, Lake, Merced, Monterey, Napa, Plumas, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Shasta, Solano, Sonoma, Stanislaus, Tehama, Yolo)	<ul style="list-style-type: none"> <li>• Advanced Notification (48-72 hours prior to de-energization): public safety partners</li> <li>• Watch Notification (24-48 hours prior to de-energization): public safety partners, all customers</li> <li>• Warning Notification (1-4 hours prior to de-energization): public safety partners, all customers</li> <li>• Power Off Notification (when de-energization is initiated): public safety partners, all customers</li> <li>• Weather All Clear/ETOR Update Notification (immediately before re-energization begins): public safety partners, all customers</li> <li>• Restoration Notification (when re-energization is complete): public safety partners, all customers</li> </ul>	
10/15/2021 (1:00) – 10/16/2021 (16:32)	1.5 days	<b>666</b>	<ul style="list-style-type: none"> <li>• 505 residential</li> <li>• 34 medical baseline</li> <li>• 134 commercial</li> <li>• 27 other customers</li> </ul>	1 (Kern County)	<p>NOTE: With the new report format, numbers of customers and public safety partners notified at each point are not reported. Table 10 has slightly more info on notifications, but not numbers of people.</p> <ul style="list-style-type: none"> <li>• Advanced Notification (48-72 hours prior to de-energization): public safety partners</li> <li>• Watch Notification (24-48 hours prior to de-energization): public safety partners, all customers</li> <li>• Warning Notification (1-4 hours prior to de-energization): public safety partners, all customers</li> </ul>	

Date(s) and Time(s): Earliest to Latest	Duration in Days (Longest)	TOTAL # of Customers Impacted	Types of Customers Impacted (Medical Baseline is a subset of Residential)	COUNTIES Affected	Notification Time to Customers (if available, number of customers contacted represents <i>successful</i> notifications)	Notes
					<ul style="list-style-type: none"> <li>• Power-Off Notification (when de-energization is initiated): public safety partners, all customers</li> <li>• Weather All-Clear/ETOR Update Notification (immediately before re-energization begins): public safety partners, all customers</li> <li>• Restoration Notification (when re-energization is complete): public safety partners, all customers</li> </ul>	

## E. Interviews

The RCA Team conducted 101 interviews including PG&E employees and contractors, CAL FIRE, CPUC, and other state government staff and three local officials for feedback on PSPS. Some requested interviews did not occur as a result of PG&E's and the CPUC's agreed-upon scope limitations.

<b>PG&amp;E Employees</b>		
Tracy Maratukulam	Director Customer Care	Interviewed 10/4/2021
Shawn Holder	Director, Public Safety Power Shutoff	Interviewed 10/7/2021
Dave Gabbard	Sr. Director, Transmission Asset Management	Interviewed 10/8/2021
Shawn Holder	Director, Public Safety Power Shutoff	Interviewed 10/13/2021
Jonathan Seager	Sr. Director, Operation Risk Validation	Interviewed 10/14/2021
[REDACTED]	Senior Manager, Vegetation Management	Interviewed 10/14/2021
Tim Bedford	Chief of Operations – Preventative Fire-Retardant Pilot	Interviewed 10/15/2021
[REDACTED]	Manager, Enterprise LEAN	Interviewed 10/18/2021
Angie Gibson	Director, Emergency Prep & Response – Strategy & Execution	Interviewed 10/19/2021
Sandra Cullings	Director, Core Programs	Interviewed 10/19/2021
Scott Strenfel	Director, Meteorology Operations and Fire Science	Interviewed 10/19/2021
Alisa Okelo-Odongo	Director, Compliance and Governance and Reporting	Interviewed 10/20/2021
[REDACTED]	Manager, Public Safety Power Shutoff PMO	Interviewed 10/20/2021
[REDACTED]	Senior Manager, Risk Management & Safety	Interviewed 10/21/2021
Ben Almario	Director, Wildfire Safety Operations	Interviewed 10/26/2021
[REDACTED]	Manager, Electric Program Management	Interviewed 10/26/2021
[REDACTED]	Manager, Distribution Control Center	Interviewed 10/26/2021
[REDACTED]	Electrical Engineer, Principal	Interviewed 10/27/2021
[REDACTED]	Senior Design Engineer	Interviewed 10/28/2021
[REDACTED]	Supervisor, QA Vegetation Management	Interviewed 11/30/2021
[REDACTED]	Supervisor, Veg Mgmt. Program Management	Interviewed 12/1/2021
Heather Duncan	Director, System Inspections	Interviewed 12/6/2021
Michael Kress	Senior Director, GC and Contractors	Interviewed 12/7/2021
[REDACTED]	Program Manager, Principal	Interviewed 12/7/2021
[REDACTED]	Supervisor, Engineering Standards Distribution Automation	Interviewed 12/8/2021
[REDACTED]	PG&E Supervisor, Incident Investigator – Principal	Interviewed 12/10/2021
Robert Cupp	Director, EP&R Field Operations	Interviewed 12/10/2021
[REDACTED]	Supervisor, Vegetation Program Manager	Interviewed 12/13/2021
Bryan Furtado	Director, Substation M&C	Interviewed 12/13/2021

PG&E Employees		
[REDACTED]	Business Analyst, Principal	Interviewed 12/15/2021
[REDACTED]	Superintendent, T-Line M&C	Interviewed 12/16/2021
[REDACTED]	Superintendent, T-Line M&C	Interviewed 12/16/2021
[REDACTED]	Sr. Mgr., Dist. OH/UG Asset Strategy	Interviewed 12/16/2021
[REDACTED]	Program Manager, Principal	Interviewed 12/16/2021
[REDACTED]	Sr. Manager, GIS Asset Data Management & Improvement	Interviewed 12/17/2021
[REDACTED]	Senior Manager, Field Safety	Interviewed 12/20/2021
[REDACTED]	Technical Writer, Expert	Interviewed 12/20/2021
[REDACTED]	Compliance & Risk Consultant, Principal	Interviewed 12/21/2021
Shawn Holder	Director, Public Safety Power Shutoff	Interviewed 1/28/2022
[REDACTED]	Supervisor, Electric Distribution	Interviewed 1/31/2022
[REDACTED]	Superintendent, Field Operations Sierra	Interviewed 1/31/2022
[REDACTED]	Principal Protection Engineering Performance	Interviewed 2/1/2022
[REDACTED]	Manager, Wildfire Safety Operations Center	Interviewed 2/1/2022
[REDACTED]	Supervisor, Electric Distribution	Interviewed 2/1/2022
[REDACTED]	Electric Distribution Engineer, Senior	Interviewed 2/2/2022
[REDACTED]	Supervisor, Electric Distribution	Interviewed 2/2/2022
[REDACTED]	Supervisor, Electric Distribution	Interviewed 2/7/2022
[REDACTED]	Human Performance Specialist, Senior	Interviewed 2/7/2022
[REDACTED]	Supervisor, Field Operations	Interviewed 2/7/2022
[REDACTED]	Substation Specialist, Expert	Interviewed 2/11/2022
[REDACTED]	Senior Manager, Vegetation Management Operations	Interviewed 2/11/2022
[REDACTED]	Principal Electrical Engineer	Interviewed 2/14/2022
[REDACTED]	Standards & Work Methods Specialist, Principal	Interviewed 2/17/2022
[REDACTED]	Electrical Engineer, Principal	Interviewed 2/17/2022
[REDACTED]	Supervisor, Vegetation Program Manager	Interviewed 2/22/2022
[REDACTED]	Manager, Distribution Asset Planning	Interviewed 2/24/2022
Jadwinder Singh	Director, Asset Knowledge Management	Interviewed 2/25/2022
[REDACTED]	Principal, Compliance & Risk Consultant	Interviewed 3/14/2022
[REDACTED]	Safety Vegetation Program Manager, Senior	Interviewed 3/14/2022
[REDACTED]	Manager, Vegetation Management	Interviewed 3/14/2022
[REDACTED]	Electric Distribution Engineer, Senior	Interviewed 3/15/2022
[REDACTED]	Supervisor, Elect. Distribution Planning	Interviewed 3/16/2022
[REDACTED]	Senior Program Manager, Vegetation Management Operational Excellence	Interviewed 3/21/2022
[REDACTED]	Electric Distribution Engineer	Interviewed 3/22/2022
Satvir Nagra	Director – T&D Asset Planning	Interviewed 3/22/2022
Shawn Holder	Director, Public Safety Power Shutoff	Interviewed 4/5/2022
Mark Esguerra	Senior Director, Electric Asset Strategy	Interviewed 5/18/2022
[REDACTED]	Senior Manager, System Protection	Interviewed 5/19/2022

<b>CAL FIRE</b>		
Peter Leuzinger	Forester II	Interviewed 12/20/2021
Shane Larson	Forester I	Interviewed 12/21/2021
Charlie Laird	Battalion Chief	Interviewed 12/21/2021
Anastasia Stanish	Senior Environmental Scientist	Interviewed 12/21/2021
Gary Whitson	Arborist	Interviewed 12/21/2021
Mike Rufenacht	Battalion Chief	Interviewed 12/21/2021
Joseph Baldwin	Battalion Chief	Interviewed 12/21/2021
Brandon Bertolino	Battalion Chief	Interviewed 12/22/2021
Nick Webb	Battalion Chief	Interviewed 12/22/2021
Russel West	Battalion Chief	Interviewed 12/22/2021
Tom Kluge	Fire Captain	Interviewed 1/6/2022
Jeremy Ward	Battalion Chief	Interviewed 1/7/2022
David Sapsis	Wildland Fire Scientist	Interviewed 1/26/2022
Vince Bergland	Battalion Chief	Interviewed 1/5/2022

<b>PG&amp;E Contractors</b>		
██████████	President, ACRT Pacific	Interviewed 2/28/2022
██████████	President, PM Utility Vegetation Management Consulting	Interviewed 3/1/2022
██████████	CEO, AERI – Asoemo Environmental Restoration Industry	Interviewed 3/15/2022
██████████	T&D Manager Grid Assets – Vegetation Management, SMUD	Interviewed 3/16/2022
██████████	President, ACRT Pacific	Interviewed 3/16/2022
██████████	Vice President, CN Utility Consulting	Interviewed 4/12/2022

<b>California Public Utilities Commission</b>		
Anthony Noll	Program Manager	Interviewed 12/15/2021
Raymond Cho	Sr. Utilities Engineer	Interviewed 1/12/2022
Chris Lee	Utilities Engineer	Interviewed 1/18/2022
Wilson Tsai	Utilities Engineer	Interviewed 1/18/2022
Wendy al-Mukdad	Senior Utilities Engineer	Interviewed 3/14/2022

<b>Office of Energy Infrastructure Safety</b>		
Koko Tomassian	Program Manager, Compliance Assurance Division	Interviewed 3/18/2022

<b>United States District Court Federal Monitor</b>		
Charles Kalil	Partner, Kirkland & Ellis	Interviewed 9/28/2021
Christopher Keegan	Partner, Kirkland & Ellis	Interviewed 9/28/2021

<b>Local Officials</b>		
Kip Harkness	San Jose Deputy City Manager	Interviewed 12/10/2021
Sean McGlynn	Former City Manager, City of Santa Rosa	Interviewed 12/10/2021
Christopher Godley	Sonoma County Emergency Management Director	Interviewed 2/18/2022

<b>Northstar Consulting (Safety culture consultant)</b>		
██████████	Managing Director	Interviewed 10/1/2021
██████████	Independent Energy Consultant	Interviewed 10/1/2021

## F. Document and Data Requests

The RCA forensic engineering team obtained documents from PG&E, and from public sources such as CAL FIRE and CPUC-SED reports for the individual fires. In cases where public documents were redacted, unredacted versions of those documents were requested. For specific information requests related to PG&E records, procedures, manuals, and other operational documents, the RCA Team requested the information directly from PG&E.

PG&E processed data requests through a dedicated Electric Data Response Unit (DRU). The RCA Team submitted formal requests tabulated in a Request for Information (RFI) spreadsheet and issued the RFIs to the DRU at PG&E. A total of 37 formal RFIs were issued with 295 individual request categories. Each request category was assigned a reference number when issued to PG&E. Responses from the DRU added a unique PG&E identification number in addition to the RCA Team reference number.

The RCA Team submitted RFI requests by e-mail to PG&E and the DRU. Responses from PG&E were issued by e-mail to the RCA Team with a summary of the data and documents produced for the specific request categories. PG&E posted data response cover sheets and any attachments on a secure file transfer site. The response messages could have included multiple request categories for multiple reference numbers. PG&E's responses were not processed strictly in the order of our requests. For example, the first set of 42 request categories and reference numbers included in RFI #1 was issued on June 9, 2021. PG&E responses to the first group of requests in RFI #1 were not received in order and were issued over the period beginning on June 28, 2021 up through July 27, 2021.

Our initial understanding was that the DRU would process data requests from the RCA Team with a goal of responding within 10 days after receipt. For the initial set of 42 reference items, the average response time was 32 days. In some cases, PG&E provided no written response to a specific RCA Team request. Outstanding data requests were discussed during weekly calls with PG&E, but no formal written response for these items was provided to the RCA Team stating that the information was not available or that PG&E would not respond to those specific requests.

We also encountered situations where the response from PG&E did not directly answer the RCA Team request. An example of a request where no direct answer was provided is duplicated below for Ref #232 issued with RFI #22 on January 14, 2022:

Ref#	Scope of Request	Response
232	QDP7 - Did the 2017-2018 PG&E distribution planning process studies identify the 4-wire (21kV) circuits as less hazardous due to superior performance with respect to fault detection? Provide all pre-2017 technical studies related to the 12kV and 21kV 4-wire distribution system in use at PG&E.	Response noted: Per our discussion on January 20, 2022, please reference our response in DRU-4618.6 to address this request (Ref #232). The response to Ref #231 included a table of circuit configurations, 3-wire or 4-wire, for 14 circuits, and a paper by Scott Hayes, "Understanding Ground Fault Detection Sensitivity and Ways to Mitigate Safety Hazards in Power Distribution Systems."

The request highlighted above from Ref #232 was part of a series of specific questions related to circuit settings and circuit protection performance in the areas near the origin of each of the fires. Rather than providing a direct answer in response to the question, PG&E referred the RCA Team to a paper originally presented at the 46<sup>th</sup> Annual Western Protective Relay Conference in October 2019. The response did not identify specific sections or statements in that paper and did not answer the question.

Throughout the course of the project, the RCA Team requested any internal reports from PG&E analyzing their equipment involved in the ignition of the wildfires. Initially, the Team requested "after-action reports," a common term utilized in the utility industry for post-incident reviews; PG&E responded that such reports did not exist. We learned that PG&E is required to provide an Incident Report to the CPUC after all significant incidents and requested and received such; but these documents did not include detailed analyses of the equipment involved.

Some of the types of data and documentation that the RCA Team requested and received from PG&E included the following:

- The RCA Team requested and received a substantial number of documents detailing PG&E procedures and plans including those for electric operations, vegetation management, and risk and emergency management.
- The RCA Team requested and received detailed organization charts from the years in question; however, the charts were incorrect in many instances and, in some cases, excluded a substantial number of individual positions in the area of interest.
- The RCA Team requested a substantial amount of technical data regarding the operations of the circuits involved in the ignitions; although extraordinarily voluminous and challenging to parse, the data from such documents proved very helpful in the determination of root cause analyses.

- The RCA Team requested a substantial amount of Vegetation Management records, and documentation of job descriptions, qualifications for job categories, policies and procedures for contractors performing pre-inspection, QA, QC, and line clearance contractors.

It is worth detailing the situation that the RCA Team encountered with the organization charts data request. There were other similar instances in the data request process where the RCA Team made a request and PG&E's response or the documentation produced was incomplete or did not provide the information requested. In the case of the organization charts data request, during interviews, the RCA Team discovered that many of the position listings in the organization charts provided in response to our request were incorrect or that individuals interviewed did not appear anywhere in the organization charts provided. The Team again requested complete organization charts but the documents produced were also incomplete.

Note, however, that where data requests and the documents produced had been previously vetted by PG&E and had been produced to other parties, that information was more readily available to the RCA Team and PG&E's response was timelier. The RCA Team was provided a spreadsheet from PG&E summarizing previous data requests that allowed for these previously prepared responses to be produced with reduced response time. As an example of the timeliness of these requests, the RCA Team reviewed the list of these previous data requests and included 28 of these in RFI #5 issued on August 26, 2021. These specific requests were processed on average within 12 days or as little as 5 days.

The table below is an overview of the RFIs issued to PG&E and includes reference numbers and the dates submitted to PG&E. The complete list of RCA Team data requests is also included below

### Overview of RCA Data Requests

RFI #	Reference Numbers			Request Date
1	Reference #1	to	Reference #42	June 9, 2021
2	Reference #43	to	Reference #51	June 29, 2021
3	Reference #52	to	Reference #58	July 29, 2021
4	Reference #59	to	Reference #74	August 5, 2021
5	Reference #75	to	Reference #135	August 26, 2021
6	Reference #136	to	Reference #137	September 3, 2021
7	Reference #138	to	Reference #139	September 8, 2021
8	Reference #140	to	Reference #145	September 21, 2021
9	Reference #146	to	Reference #147	September 24, 2021
10	Reference #148			September 27, 2021
11	Reference #149			October 7, 2021
12	Reference #150	to	Reference #163	October 12, 2021
13	Reference #164	to	Reference #179	October 19, 2021
14	Reference #180			October 22, 2021
15	Reference #181	to	Reference #187	October 25, 2021
16	Reference #188			October 26, 2021
17	Reference #189	to	Reference #190	October 28, 2021
18	Reference #191			November 8, 2021
19	Reference #192	to	Reference #199	November 12, 2021
20	Reference #200	to	Reference #201	November 24, 2021
21	Reference #202	to	Reference #225	December 20, 2021
22	Reference #226	to	Reference #232	January 14, 2022
	Reference #233			January 24, 2022
23	Reference #234	to	Reference #245	January 27, 2022
24	Reference #246	to	Reference #247	January 28, 2022
25	Reference #248	to	Reference #253	February 4, 2022
	Reference #254			February 14, 2022
26	Reference #255	to	Reference #263	February 22, 2022
27	Reference #264	to	Reference #265	February 25, 2022
28	Reference #266			March 4, 2022
29	Reference #267			March 8, 2022
	Reference #268			March 8, 2022
	Reference #269			March 4, 2022
30	Reference #270	to	Reference #271	March 10, 2022
31	Reference #272	to	Reference #274	March 15, 2022
32	Reference #275			March 16, 2022
33	Reference #276	to	Reference #291	March 17, 2022
34	Reference #292			March 22, 2022
35	Reference #293			March 23, 2022

RFI #	Reference Numbers			Request Date
36	Reference #294			March 24, 2022
37	Reference #295			April 12, 2022

### Complete List of Data Requests

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
1	Emergency Response Plan(s) 2015-2021	06/09/21	Closed	07/07/21	DRU-3867.01
2	After-Action Reports – Response to Natural Disaster Events (2015-2021)	06/09/21	Closed	07/21/21	DRU-3867.02
3	After-Action Reports – Response to Transmission Outage Events (2015-2021)	06/09/21	Closed	07/21/21	DRU-3867.03
4	Annual Filing Submissions of PG&E ERP to CPUC (2015-2021)	06/09/21	Closed	07/13/21	DRU-3867.04
5	Media Book Contents (2015-2021)	06/09/21	Closed	07/09/21	DRU-3867.05
6	Tree Service Contracts (2015-2021)	06/09/21	Closed	07/21/21	DRU-3867.06
7	Root Cause and Corrective Action Procedures	06/09/21	Closed	07/06/21	DRU-3867.07
8	Transmission Event Exercise/Drill Scenarios	06/09/21	Closed	07/21/21	DRU-3867.08
9	Corporate Policy on Emergency Preparedness	06/09/21	Closed	07/13/21	DRU-3867.09
10	Crisis Management Plan	06/09/21	Closed	07/13/21	DRU-3867.10
11	Customer Outreach Plan	06/09/21	Closed	07/13/21	DRU-3867.11
12	Public Communication Plan	06/09/21	Closed	07/09/21	DRU-3867.12
13	Enterprise-Wide Risk Assessment Plan/Program	06/09/21	Closed	07/06/21	DRU-3867.13

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
14	Enterprise-Wide Risk Mitigation Plan/Program	06/09/21	Closed	07/06/21	DRU-3867.14
15	Momentary Outages Report 2007-2012	06/09/21	Closed	07/09/21	DRU-3867.15
16	Vegetation Management Plan	06/09/21	Closed	07/09/21	DRU-3867.16
17	Vegetation Management maintenance contract(s) 2007-2012	06/09/21	Closed	07/22/21	DRU-3867.17
18	Inventory resources and type (categorized) by capability	06/09/21	Closed	07/15/21	DRU-3867.18
19	Outage Management System description	06/09/21	Closed	07/07/21	DRU-3867.19
20	Emergency response facility layouts/diagrams	06/09/21	Closed	07/08/21	DRU-3867.20
21	Emergency response facility standby power procedure	06/09/21	Closed	07/08/21	DRU-3867.21
22	Letters of Agreement (LOA): non-company resources	06/09/21	Closed	07/21/21	DRU-3867.22
23	Position Descriptions for Emergency Response Personnel	06/09/21	Closed	07/13/21	DRU-3867.23
24	Annual Qualification Records for Emergency Response Personnel	06/09/21	Closed	07/13/21	DRU-3867.24
25	Corporate Organization Charts (2015-2021)	06/09/21	Closed	07/07/21	DRU-3867.25
26	Transmission Organization Chart (2015-2021)	06/09/21	Closed	07/07/21	DRU-3867.26
27	Annual Risk Assessment Report to Board	06/09/21	Closed	07/07/21	DRU-3867.27
28	CAL FIRE Reports on Each of the 17 Fires (unredacted versions)	06/09/21	Closed	07/07/21	DRU-3867.28

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
29	Order I.19-06-015, dated June 27, 2019	06/09/21	Closed	06/28/21	DRU-3867.29
30	Downed Wire Procedure (2015-2021)	06/09/21	Closed	07/15/21	DRU-3867.30
31	Transmission Repair work packages (2015-2017)	06/09/21	Closed	07/21/21	DRU-3867.31
32	Cal PUC Safety and Enforcement Division Report on October 2017 Fire Siege including attached incident investigation reports including photos and all emails pertaining to O&C; report issued June 13, 2018 with follow-ups for Lobo & McCourtney Fires	06/09/21	Closed	Marked Closed, No Response	
33	Cal PUC General Order 95, current version	06/09/21	Closed	06/28/21	DRU-3867.33
34	Cal PUC General Order 95, version in place October 2017	06/09/21	Closed	06/28/21	DRU-3867.34
35	CAL PUC Organization Charts October 2017 and current	06/09/21	Closed	Sourced Elsewhere	
36	PG&E informal procedures re power shutoff process in October 2017	06/09/21	Closed	07/13/21	DRU-3867.36
37	PG&E Public Safety Power Shutoff Process: Current Procedures	06/09/21	Closed	07/07/21	DRU-3867.37
38	PG&E Public Safety Power Shutoff Process: After-Action Reports	06/09/21	Closed	07/27/21	DRU-3867.38
39	California High-Threat District Zones and reports on such	06/09/21	Closed	06/28/21	DRU-3867.39
40	GIS Fire Maps for each identified loss location	06/09/21	Closed	Marked Closed, No Response	

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
41	Evidence Chain of Custody documentation for all items under CAL FIRE authority	06/09/21	Closed	Marked Closed, No Response	
42	NIFRS for each of the 17 identified locations	06/09/21	Closed	Marked Closed, No Response Submitted CAL FIRE FOIA	
43	Documentation of "Near Hit" Potential Fire Incidents	06/29/21	Closed	07/15/21	DRU-3887.01
44	Drought and Tree Mortality Response Program	06/29/21	Closed	07/22/21	DRU-3887.02
45	Wildfire Safety Plan	06/29/21	Closed	07/01/21	DRU-3887.03
46	Independent Safety Evaluations of PG&E's Tree Tracker Application	06/29/21	Closed	07/16/21	DRU-3887.04
47	Light Detection and Ranging ("LiDAR") data-based methodology	06/29/21	Closed	07/16/21	DRU-3887.05
48	Independent Safety Evaluations of overhead distribution and transmission preventive maintenance program	06/29/21	Closed	07/16/21	DRU-3887.06
49	Semi-Annual Wildfire Mitigation Meeting agendas & minutes	06/29/21	Closed	07/23/21	DRU-3887.07
50	Quarterly Reporting on Electric Maintenance Work	06/29/21	Closed	07/08/21	DRU-3887.08
51	Independent Study of Distribution and Transmission System	06/29/21	Closed	07/16/21	DRU-3887.09
52	PG&E Catalog of Physical Evidence	07/29/21	Closed	08/06/21	DRU-4031.01

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53	PG&E "Stop the Job Policy"	07/29/21	Closed	08/11/21	DRU-4031.02
54	Reports of The California Fire Safety Council	07/29/21	Closed	08/12/21	DRU-4031.03
55	Officer Safety Town Halls – PG&E PowerPoint Presentation & Handouts	07/29/21	Closed	08/05/21	DRU-4031.04
56	SED's 2013 Liberty Consulting Report on Distribution & Transmission System	07/29/21	Closed	08/05/21	DRU-4031.05
57	Progress Status Updates for WF OII "Exhibit C" System Enhancement Initiatives	07/29/21	Closed	08/6/21	DRU-4031.06
58	CPUC Resolution M-4852 "Enhanced Oversight and Enforcement Process" adopted in decisions 20-05-053	07/29/21	Closed	08/05/21	DRU-4031.07
59	SCADA communications OOS reports > 5 days 2017 & 2020 (NBF Related DRU-50.4)	08/05/21	Closed	08/30/21	DRU-4059.01
60	SCADA communications monthly availability (unavailability) statistics 2017 & 2020 (NBF Related DRU-50.4)	08/05/21	Closed	08/19/21	DRU-4059.02
61	SED's 2013 Liberty Consulting Report (PG&E SYSTEM ENHANCEMENT INITIATIVES 20. Study of Distribution and Transmission System)	08/05/21	Closed	08/11/21	DRU-4031.03
62	Transmission outage incident reports during the 2015-2021 timeframe lasting more than 15 minutes (Follow up to DRU-3867.3, Ref #03)	08/05/21	Closed	09/08/21	DRU-4059.04
63	"Quick-Look Report" (QLR) & "After-Action Report" (AAR) for Attachment 01_EF-8_2021 PG&E PSPS TTX 2 SitMan FINAL v3_CONF (Follow-up to DRU-3867.08, Ref #08)	08/05/21	Open	08/10/21	DRU-4059.05

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
64	"Quick-Look Report" (QLR) & "After-Action Report" (AAR) for Attachment 03 EF-* PG&E 2021 Wildfire TTX 04212021 (Follow-up to DRU-3867.08, Ref #08)	08/05/21	Closed	08/27/21	DRU-4059.06
65	"Quick-Look Report" (QLR) & "After-Action Report" (AAR) for Attachment 04_EF-8_2021 PG&E PSPS TTX SitMan FINAL_1_CONF (Follow-up to DRU-3867.08, Ref #08)	08/05/21	Closed	02/16/22	DRU-4059.07
66	"Quick-Look Report" (QLR) & "After-Action Report" (AAR) for Attachment 05_EF-8_2021 PSPS EX Plan Final 05212021 v2 CONF (Follow-up to DRU-3867.08, Ref #08)	08/05/21	Closed	02/16/22	DRU-4059.08
67	"Quick-Look Report" (QLR) & "After-Action Report" (AAR) for Attachment 06_EF-8_PGEPSPS FSE ExPlan20200709 (1) CONF (Follow-up to DRU-3867.08, Ref #08)	08/05/21	Closed	08/30/21	DRU-4059.09
68	"Quick-Look Report" (QLR) & "After-Action Report" (AAR) for Attachment 07_EF-8_PGEPSPS FSE3 ExPlan CONF (Follow-up to DRU-3867.08, Ref #08)	08/05/21	Closed	08/30/21	DRU-4059.10
69	"Quick-Look Report" (QLR) & "After-Action Report" (AAR) for Attachment 08_EF-8_PG&E PSPS Full-Scale Exercise ExPlan 20201617 Conf (Follow-up to DRU-3867.08, Ref #08)	08/05/21	Closed	08/30/21	DRU-4059.11
70	Follow-up to request Ref #04, DRU-3867.04 for Annual Filing Submissions of PG&E ERP to CPU. Please provide missing Exhibits from 2015 and 2018 Reports. Specific exhibits requested: Exhibit C, D, E, F1, F3, F5, F6, G, H, and I from the 2016 List of PUBLIC Exhibits, and Exhibit C, D, E, F, G, H, I, and J from the 2019 List of PUBLIC Exhibits.	08/05/21	Closed	08/18/21	DRU-4059.12
71	Crisis Management Officer Position Procedure (Guide) – CERP Section 9.2.6 National Response Event (NRE)	08/05/21	Closed	08/16/21	DRU-4059.13

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
72	Follow-up to DRU-3867-16, Ref #16 – The documents provided in response to Ref #16, DRU-3867-16, outline the vegetation management (VM) projects that were scheduled, not the overall VM plan. Please provide the document(s) that outline the standard operating procedures for vegetation management operations rights-of-way that detail the VM Program standards, practices, and procedures.	08/05/21	Closed	08/10/21	DRU-4059.14
73	Please provide Additional list of VM Projects for the years 2018, 2019 & 2020 including CEMA, FRR PSR & Other categories (Follow-up to DRU-3867-16, Ref #16, and Ref #72)	08/05/21	Closed	08/18/21	DRU-4059.15
74	2017 PG&E Organization Chart	08/05/21	Closed	08/09/21	DRU-3867.06
75	Engineering Design Manuals in word-searchable PDF format, i.e. copies of the approved original and current PG&E corporate Engineering Department design manuals pertaining to the design and construction of the company's various electric supply systems, including for example: overhead electric lines of any voltage level (transmission lines operating at 69 kV and above, sub-transmission lines, distribution lines), and electric switching and electric transformer stations at any voltage level.	08/26/21	Closed	09/13/21	DRU-4144.01
76	Equipment Standards Manuals in word-searchable PDF format, i.e. copies of the approved original and current PG&E corporate manuals pertaining to the specification, selection, and application of equipment installed and utilized on its systems including overhead transmission and distribution line equipment, and station equipment.	08/26/21	Closed	09/29/21	Text missing

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
77	Facility Construction Manuals in word-searchable PDF format, i.e. copies of the approved original and current PG&E corporate manuals pertaining to the acquisition of equipment and construction of overhead transmission, sub-transmission and distribution lines, and stations.	08/26/21	Closed	09/20/21	DRU-4144.03
78	DRU-17.3 – Understanding and expectation is that PG&E proactively monitors weather conditions in its service territory and takes proactive steps to mitigate risks of weather conditions, such as performing additional inspections and staging crews in areas that may be impacted (as per your emergency preparedness plans and operating procedures): 3.a: Was PG&E monitoring weather conditions in its territory prior to October 8th?	08/26/21	Closed	08/31/21	DRU-4144.04
79	DRU-17.4 - 3.b: What was PG&E's assessment of risks to fires for the counties that are now experiencing fires?	08/26/21	Closed	08/31/21	DRU-4144.05
80	DRU-17.5 - 3.c: What steps, if any, did PG&E take to mitigate risks associated with forecasted weather conditions prior to October 8th?	08/26/21	Closed	08/31/21	DRU-4144.06
81	DRU-204.64 – Please provide all new and modified vegetation management procedures/bulletins/standards added after the October 2017 fires. Please explain if any of the above new and modified procedures/bulletins/standards were implemented due to the October 2017 fires and show the changes.	08/26/21	Closed	08/31/21	DRU-4144.07
82	DRU-204.79 – Please provide a copy of Compliance and Risk Management Vegetation Management – Quality Assurance Report for 2016, 2017 for all Divisions.	08/26/21	Closed	08/31/21	DRU-4144.08
83	DRU-204.22 – When was the Vegetation Management Program Manager last audited? Please provide audit findings/report for the past five (5) years.	08/26/21	Closed	08/31/21	DRU-4144.09

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84	<p>DRU-204.93 – In 2004, 2005, and 2006, CPSD (predecessor of SED) managed an independent audit, conducted by Jacobs Consultancy, of PG&amp;E’s vegetation management programs pursuant to the term of a 1999 settlement agreement, approved by Decision 99-07-029. In October 2006, Jacobs Consultancy submitted a final report from that audit. Pursuant to the terms of the settlement agreement, CPSD and PG&amp;E met to examine the final report on October 11, 2006. The final report made numerous recommendations on PG&amp;E’s vegetation management program. On May 7, 2007, CPSD sent you a letter requesting PG&amp;E to reply by stating which recommendations PG&amp;E does and does not agree with. Additionally, the letter asked PG&amp;E to identify which recommendations were implemented by PG&amp;E, and to provide the detailed action plan containing dates of major milestones and completion. Please provide us with your reply to CPSD’s letter dated May 7, 2007, and a copy of the May 7, 2007 letter from CPSD.</p>	08/26/21	Closed	09/02/21	DRU-4144.10
85	<p>DRU-204.23 – Was the incident location randomly selected for an audit to confirm compliance with GO 95 Rule 35, PRCs 4292 and 4293? If yes, please provide all records and findings of the audit for the past five (5) years. If a recurring or systemic issue was identified as a result of these audits, please provide PG&amp;E’s action plans for its contractors to prevent recurrence.</p>	08/26/21	Closed	9/2/21	DRU-4144.11

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
86	<p>DRU-483.1 – For the 10 largest unplanned outages in 2017, please provide: 1. A description of the event (cause, location, etc.) (██████████) 2. Dates of the event (██████████) 3. The number of customers affected by the event (██████████) 4. Longest customer interruption in hours (██████████) 5. # of utility staff and other utility staff (mutual assistance) to restore service (Angie Gibson) 6. Coordination with other electric, gas, and telecommunication companies (Angie Gibson) 7. The number of customers who have repeated power interruptions during the event (due to weather, equipment failure, etc.) (██████████) 8. The number of customers whose power was interrupted in order to restore power service. (██████████) 9. The number of customers without power during the event in hourly intervals (██████████) 10. The factors that affect the restoration of power (lesson-learned, communication, safety, access, weather, etc.) (Angie Gibson) 11. Estimated cost for the utility to restore electric services for the event (Angie Gibson).</p>	08/26/21	Closed	08/31/21	DRU-4144.12
87	<p>DRU-1041.37 – Why did PG&amp;E not determine the incident reportable on October 18, 2018 or earlier? Please explain in detail.</p>	08/26/21	Closed	09/08/21	DRU-4144.13
88	<p>DRU-1041.10 – How often over the last 28 years has PG&amp;E changed its recloser policy?</p>	08/26/21	Closed	09/08/21	DRU-4144.14
89	<p>DRU-1041.11 – When was the last time that PG&amp;E changed its recloser policy and why?</p>	08/26/21	Closed	08/31/21	DRU-4144.15
90	<p>DRU-1041.12 – Did PG&amp;E change its recloser policy after the Butte Fire? If not, why not? If yes, why?</p>	08/26/21	Closed	08/31/21	DRU-4144.16
91	<p>DRU-1152.3 – Why did PG&amp;E only create a de-energization plan/program in 2018?</p>	08/26/21	Closed	08/31/21	DRU-4144.17

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92	Camp-240.1 – Is PG&E proposing any new risk programs in this GRC proceeding that were not previously identified in 2017 RAMP filing? If yes: a) Please list out those newly proposed risk programs. b) Explain why these programs were not previously introduced. c) Describe how these new programs will contribute to risk reductions.	08/26/21	Closed	09/17/21	DRU-4144.18
93	Camp-201.20 – Refer to “PG&E Public Safety Power Shutoff Report to the CPUC”, sent to SED Director Malashenko on November 27, 2018. On Page 3, it states that at 13:00 on November 8, 2018, and that based on “forecasted information, PG&E no longer anticipated a possible need to de-energize” and informed stakeholders “that no lines would be pro-actively de-energized.” Confirm that date and time. If accurate, explain why PG&E provided such information at that time.	08/26/21	Closed	09/02/21	DRU-4144.19
94	Camp-201.7 – As of November 1, 2018, does PG&E contend that there was in place a Commission or other state prohibition against PG&E de-energizing, under any circumstances, Caribou-Palermo or other transmission circuits? If yes, cite the prohibition or prohibitions.	08/26/21	Closed	09/02/21	DRU-4144.20
95	DRI-1204.1 – Please provide the names of all individuals most knowledgeable about PG&E’s operations and maintenance practices, specifically the individual(s) in charge of overseeing operations & maintenance (O&M) work on any/all of PG&E’s facilities involved in the 2017 Fire Siege.	08/26/21	Closed	09/02/21	DRU-4144.21
96	DRI-1204.4 – Please provide the names of all individuals most knowledgeable about PG&E’s vegetation maintenance (VM) practices, specifically the individual(s) in charge of overseeing VM work on or around any/all of PG&E’s facilities involved in the 2017 Fire Siege.	08/26/21	Closed	09/02/21	DRU-4144.22

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97	Camp-201.18 – Refer to the October 26, 2018 CalOES letter to Geisha Williams and other utility executives, pertaining to Public Safety Power Shutoff. Were the PG&E person or persons responsible for deciding whether to order a power shutoff familiar with this communication by November 3, 2018? Did the communication in any way contribute to PG&E’s decision not to de-energize in the Paradise area in November 2018? Explain PG&E’s answer, and provide a copy of the October 26, 2018 CalOES letter.	08/26/21	Closed	09/08/21	DRU-4144.23
98	Camp-107.25 – From PG&E’s Utility Standard: VEG-2000S, pages 16, Section 7.1 Program Description, it states in part: “If a reoccurring or systemic issue is identified, the VM Operations group, working in conjunction with QA, develops long-term action plans for its contractors to reduce or prevent recurrence.” Have there been any recurring or systemic compliance-related issues identified related to the Vegetation Management program anywhere in PG&E’s service territory? If yes, please provide action plans that address these recurring/systemic issues for the past five (5) years. Please specify all corrective actions and preventive measures that PG&E has taken with dates related to the recurring and systemic issues that were identified as a result of audits. Please also specify other actions that have not been implemented since the identification of the issues.	08/26/21	Closed	09/15/21	DRU-4144.24
99	DRI-1480.7 – As a result of WSIP, how did PG&E change its overhead inspection and patrol procedures for transmission and distribution lines? Please provide a copy of all updated procedures, standards, job aids etc.	08/26/21	Closed	09/15/21	DRU-4144.25
100	DRI-1480.8 – As a result of WSIP, how did PG&E change its training of personnel who conduct overhead inspections and patrols of transmission and distribution lines? Please provide a copy of all new training material.	08/26/21	Closed	09/15/21	DRU-4144.26

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101	DRI-1494.10 – Describe actions taken in response to the Governor’s January 17, 2014 State of Emergency proclamation, a February 8, 2014 letter from SED, and the Commission’s June 12, 2014 Resolution ESRB-4.	08/26/21	Closed	09/17/21	DRU-4144.27
102	DRI-1494.98 – Describe and provide all documents and communications regarding any changes to PG&E’s policies and practices with respect to local area vulnerability to wildfires since January 1, 2013 to May 31, 2019.	08/26/21	Closed	09/15/21	DRU-4144.28
103	DRI-1983.1 – Please provide the following information for each of the 2017 wildfires that are currently within the scope of this proceeding: (1) government expenditures for responding to the fire, (2) property and all other damages and financial costs from the fire (exclusive of CEMA), and the referenced accompanying table.	08/26/21	Closed	09/03/21	DRU-4144.29
104	Data Request No. Cal Advocates-PGE-I1906015-003 – Question 5. Please provide a detailed explanation of all improvements or changes in PG&E’s vegetation management practices from January 1, 2007 until October 8, 2017. a) Please identify whether PG&E had identified any tree species prone to breakage in high-wind events, and/or involved in fires due to line contact.	08/26/21	Closed	09/17/21	DRU-4144.30
105	Data Request No. Cal Advocates-PGE-I1906015-003 – Question 6. Please provide, in Microsoft Excel spreadsheet format, recorded adjusted annual O&M expenses and capital expenditures for (1) vegetation management, (2) tree trimming, and (3) pole brushing from January 1, 1988 until October 8, 2017.	08/26/21	Closed	09/24/21	DRU-4144.31

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106	<p>(Revised) PSPS improvement Project – Sectionalizing Devices: The PSPS Improvement goals include 879 sectionalizing devices installed during 2018-2020.</p> <p>Please provide the following information for one example of a sectionalizing device installation: circuit name (installed on), locations (city/town), device type, date energized, expected benefit (# of customers isolated) and a one-line circuit diagram.</p>	08/26/21	Closed	10/06/21	DRU-4144.32
107	<p>(Revised) PSPS improvement Project – System Hardening: The PSPS Improvement goals include 547 miles of system hardening measures installed during 2018-2020.</p> <p>Please provide the following information for one example of a system hardening installation: circuit name (installed on), locations (city/town), device type, date completed/energized, expected benefit (mitigation type) and a one-line circuit diagram (if applicable).</p>	08/26/21	Closed	10/06/21	DRU-4144.33
108	<p>(Revised) PSPS improvement Project – Transmission Switches: The PSPS Improvement goals include 54 transmission switches that have been installed during 2018-2020.</p> <p>Please provide the following information for one example of a transmission switch installation: circuit name (installed on), location (city/town), device type, date energized, expected benefit, mitigation type, and a one-line circuit diagram.</p>	08/26/21	Closed	10/04/21	DRU-4144.34

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
109	<p>(Revised) PSPS improvement Project – Vegetation Management: The PSPS Improvement goals include 4,374 miles of vegetation trimming completed during 2018-2020.</p> <p>Please provide the following information for one example of a vegetation trimming project: circuit name, location (city/town), miles and type of work.</p>	08/26/21	Closed	10/04/21	DRU-4144.35
110	<p>(Revised) PSPS improvement Project – Weather Stations: The PSPS Improvement goals include 1,005 weather stations installed during 2018-2020.</p> <p>Please provide the following information for one example of a weather station installation: station name, location (city/town), capability (wind, precip., etc.) date in service, and availability from service date to current date.</p>	08/26/21	Closed	10/07/21	DRU-4144.36
111	<p>(Revised) PSPS improvement Project – High-definition cameras: The PSPS Improvement goals include 347 high-definition cameras installed during 2018-2020.</p> <p>Please provide the following information for one example of a high-definition camera installation: location (street), location (city/town), device capability (fixed or PTZ), battery back-up, memory capability (min/hrs), date in service and availability from service date to current date.</p>	08/26/21	Closed	10/07/21	DRU-4144.37

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112	<p>PSPS improvement Project – 2021 Goals: The 2021 PSPS Improvement goals include:</p> <ul style="list-style-type: none"> <li>- 250 sectionalizing devices</li> <li>- 180 miles system hardening improvements</li> <li>- 29 transmission switches</li> <li>- 1,800 miles vegetation trimming</li> <li>- 300 weather stations</li> <li>- 135 high-definition cameras</li> </ul> <p>Please provide a current status of each of the specific actions:</p> <ul style="list-style-type: none"> <li>- current # completed</li> <li>- schedule for remaining work</li> <li>- date completed</li> <li>- revised goal, if applicable</li> </ul>	08/26/21	Closed	09/15/21	DRU-4144.38
113	<p>PSPS Events – 2019: Provide list of 2019 PSPS events, including counties involved, number of customers, dates, and copies of after-action reports.</p>	08/26/21	Closed	09/15/21	DRU-4144.39
114	<p>PSPS Events – 2020*: Provide list of 2020 PSPS events, including counties involved, number of customers, dates, and copies of after-action reports (except those that occurred after Sep 7, 2020; *PG&amp;E already provided AARs for PSPS events Sep 7, Sep 27, Oct 14, Oct 21, Oct 25, Dec 2, Dec 7, 2020).</p>	08/26/21	Closed	09/08/21	DRU-4144.40
115	<p>PSPS Events – 2021*: Provide list of 2021 PSPS events, including counties involved, number of customers, dates, and copies of after-action reports (except the Jan 16-22 PSPS event; *PG&amp;E already provided AARs for PSPS events Jan 16-22, 2021).</p>	08/26/21	Closed	09/10/21	DRU-4144.41

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
116	Job descriptions for each of PG&E's VM program positions identified within the organization chart, including all field personnel VM management team, directly or indirectly related to PG&E's VM program (i.e. Corporate Executives job description may be restricted to those that directly or indirectly administer or otherwise regulate the VM program).	08/26/21	Closed	09/15/21	DRU-4144.42
117	Minimum requirements to qualify a candidate as competent for the defined role for each of PG&E's VM program positions identified within the organization chart. Includes all VM management field personnel directly or indirectly related to PG&E's VM program (i.e. Corporate Executive qualifications may be restricted to those that directly or indirectly qualify that person to administer or otherwise regulate the VM program). At a minimum, must include specific, minimum requirements to be considered competent within the defined position including, but not limited to: a. Education, b. Training, c. Experience.	08/26/21	Closed	09/15/21	DRU-4144.43
118	Documents that provide the policy, procedures, and specifications that define PG&E's audit process to ensure that all contractor employees, including pre-inspectors, QA and QC and tree clearance employees, possess the required minimum knowledge of utility assets, arboriculture and line clearance-related education, training, skill, and ability in conformance with PG&E requirements to assess tree growth and risk of tree or tree part failure and to then specify appropriate mitigation.	08/26/21	Closed	09/24/21	DRU-4144.44
119	Documents that provide the policy, procedures, specifications, and program content for all training provided by PG&E to its internal and external VM team including, but not limited to, Vegetation Program Managers, pre-inspectors, post-work verification inspectors, QA, QC, and line clearance contractors.	08/26/21	Closed	09/21/21	DRU-4144.05

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120	Documents that describe the methodology, processes, procedures, and enforcement criteria and penalties applied by PG&E to audit, assess, develop performance findings and conclusions, and apply nonconformance penalties and corrective actions.	08/26/21	Closed	09/10/21	DRU-4144.46
121	Documents that provide the policy, procedures, and specifications for PG&E's post-work verification, QA and QC program, including policy, procedures, and specifications developed and applied by external contractors.	08/26/21	Closed	09/24/21	DRU-4144.47
122	Records of all PG&E and external auditor QA, QC and post-work verification inspections findings, conclusions, and recommendations for corrective action from 2017 to present.	08/26/21	Closed	09/21/21	DRU-4144.48
123	Records of audits that record follow-up inspections to determine if corrective actions for QA/QC and post-work verification inspection findings have been successfully achieved since 2017 to present.	08/26/21	Closed	11/12/21	DRU-4144.49
124	PI inspection process documents: a. Distribution Routine Patrol Standard, b. Transmission Routine Patrol Standard.	08/26/21	Closed	09/08/21	DRU-4144.50
125	Documents that provide the policy, procedures, and specifications for PG&E's organizational structure, administration, and implementation of the Enhanced Vegetation Management program (EVM), Catastrophic Event Memorandum Account (CEMA) and Routine VM programs for transmission and distribution.	08/26/21	Closed	09/21/21	DRU-4144.51

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126	All reports and documents prepared by the Kirkland & Ellis LLP group consisting of certified arborists and attorneys (collectively, the “Independent Monitor”) who have been evaluating PG&E’s vegetation management program in response to an order in an ongoing proceeding before Judge Alsup.	08/26/21	Closed	10/27/21	Text missing
127	All documents from the CPUC’s Safety and Enforcement Division’s (“SED”) that identified “matters of concern” related to PG&E’s vegetation management procedures and practices, including its training and qualification of inspectors, record-keeping and other practices that present a risk to public safety related to PG&E’s VM program from 2017 to present.	08/26/21	Closed	01/11/22	Text missing
128	All documents that provide all contractor’s schedules for pre-inspection patrol and Routine Cycle tree clearance and Hazard Tree removal work from 2017 to present.	08/26/21	Closed	09/21/21	DRU-4144.54
129	Work Aging Reports and all documents and correspondence that describe PG&E’s and contractor’s plan to address and correct schedule nonconformance.	08/26/21	Closed	10/01/21	DRU-4144.55
130	Community Wildfire Safety Program document.	08/26/21	Closed	09/10/21	DRU-4144.56
131	Documents that provide the policy, procedures, specifications, and data recording forms for PG&E’s tree risk assessment and risk management programs.	08/26/21	Closed	09/21/21	DRU-4144.57
132	Documents and internal communications that describe the rationale for modification of PG&E’s tree risk assessment program from the Hazard Tree Rating System (HTRS).	08/26/21	Closed	09/10/21	DRU-4144.58
133	Documents that provide the policy, procedures, and specifications for VM contractors to apply PG&E’s HTRS and/or comparable hazard tree identification and Facility Protect Trees (FPT) program during pre-inspection and routine tree clearance operations.	08/26/21	Closed	09/21/21	DRU-4144.59

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
134	Documents that provide the policy, procedures, and specifications to mitigate hazard trees and Facility Protect Trees (FPT) that are identified during QC audits.	08/26/21	Closed	09/08/21	DRU-4144.60
135	Documents that provide the policy, procedures, and specifications for PG&E's Vegetation Management Incentive Initiative.	08/26/21	Closed	09/10/21	DRU-4144.61
136	PG&E Repair and Maintenance Employee actual staffing has been provided in response to Ref #18. Please provide human resource budget level by region for the Repair and Maintenance Employees as of January 1st for budget year 2017, 2018, 2019, 2020, and 2021.	09/03/21	Closed	10/07/21	DRU-4178.01
137	Please provide the unredacted version of the Incident Description and Factual Summary report including all attachments for each of the 2017 fires which CAL FIRE determined that PG&E was responsible for the ignition of the fire. Please also provide the unredacted versions of the Incident Description and Factual Summary reports including all attachments for the 2018 Camp Fire. We understand that these reports are the responsibility of a department other than the PG&E Emergency Management office.	09/03/21	Closed	09/09/21	DRU-4178.02
138	Please provide the missing attachments from response to Ref #22 for the Letters of Agreement (LOA): non-company resources, including the following: Western Region Mutual Assistance Agreement attachments: B, C, C-1, D, E.	09/08/21	Closed	09/29/21	DRU-4189.01
139	(Revised) Please provide 2016, 2017, and 2018 training records for individuals filling the ICS (electric) roles (Ref #24) of EOC Commander, Liaison Officer, Customer Strategy Officer, Public Information Officer (PIO), Operations Section Chief, Plans Section Chief, Veg Branch Director, PSPS Plans Chief, Logistics Section Chief, F&A Section Chief. Please include individual filling deputy roles for the aforementioned positions (where applicable).	09/08/21	Closed	10/27/21	DRU-4189.02

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
140	Follow-up to DRU-3867.16 (Ref #16). Documents provided only include lists of scheduled circuit projects and dates. Please provide all documentation that provides policy, procedures, and specifications for PG&E's transmission and distribution Vegetation Management Plan including Compliance Vegetation Management, Pre-Inspection, CEMA, EVM, QA/QC and work verification. Please also provide the two Excel files that were not included in the response package: Attachment 01_Routine Annual VM Plans_2018-21.xlsx, and Attachment 02_CEMA Annual VM Plans_2018-21.xlsx.	09/21/21	Closed	10/06/21	DRU-4241.01
141	Follow-up to DRU-3867.25 and DRU-3867.26 (Ref #25 and Ref #26). Please provide complete organization charts for the 2021 VM team including new positions defined and/or created in 2019 and 2020. The organization charts provided in response to DRU-3867.25 and DRU-3867.26 do include Vegetation Contract Management and VM Quality Verification within the 2021 year, however, the goal of this supplemental request is to identify the current structure and incumbents for VM Operations, VM Execution, VM Program Managers, Pre-Inspection, CEMA, EVM, QA, QC, and all other positions and various components of the VM team.	09/21/21	Closed	01/11/22	Text missing
142	Reports associated with each of the 81 incidents in the attached spreadsheet. These incidents were identified from the list of all unplanned outages from 2015-2020 that have available reports.	09/13/21	Closed	10/01/21	DRU-4241.03
143	Follow-up to Ref #6 (DRU-3867.06). Please provide the most current Policy, Procedures, and Specifications documents for each of the VM contractor work types (assuming that all the companies doing comparable work are using the same Specifications).	09/21/21	Closed	10/04/21	DRU-4241.04

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
144	<p>Follow-up to Ref #75 (DRU-4144.01). Links to referenced documents are broken. Please provide PDF versions of the following referenced documents:</p> <ol style="list-style-type: none"> <li>1. ESD Section 11.2.2, Numbered Document 015221, "Sags and Tensions Conductors on Wood Line Poles."</li> <li>2. ESD Section 11.2.3, Numbered Document 054330, "Snow loading Map."</li> <li>3. The Electric Overhead Construction Manual, both current and two-decade pre-2017 versions.</li> <li>4. State of California General Order 95 (G.O. 95), "Rules for Overhead Electric Construction", both current and two-decade pre-2017 versions.</li> <li>5. Numbered Document 015191, "Vertical Primary Construction Wood Pole Distribution Lines."</li> <li>6. Numbered Document 059690, "General Applications of Conductors for Overhead Distribution Lines."</li> <li>7. Numbered Document 059626, "Conductors for Overhead Lines."</li> <li>8. Numbered Document 036229, "Common Neutral Overhead Construction."</li> </ol>	09/21/21	Closed	09/29/21	DRU-4241.05

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
145	<p>Please provide unredacted CPUC/SED Incident Investigation Reports for the following fires/events/incidents. Documents previously produced all have redacted witness names in the “witnesses” section of the reports. Most of these redactions include PG&amp;E-related personnel.</p> <p>Atlas  Adobe  Camp  Cherokee  Cascade  LaPorte  Lobo  McCourtney  Nuns  Norrbum  Oakmont  Patrick  Pocket  Sulphur  Tubbs</p>	09/21/21	Closed	10/05/21	DRU-4241.06

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
146	<p>Follow-up to Ref #57 (DRU-4031.06, DRU-4031.08, and DRU-4031.10): Progress Status Updates for WF OII “Exhibit C” System Enhancement Initiatives.</p> <p>The response to DRU-4031.10 included the August 2021 SEI Updates with the attached documents, however, there were no updates provided for: Initiative No. 6 LiDAR Asset Analysis; Initiative No. 8 Fuel Reduction Funding; and Initiative No. 10 Funding to California Foundation for Independent Living Centers.</p> <p>Correspondence with PG&amp;E noted that these three items were all completed prior to the August status update. If these initiatives are in-fact “completed” please provide the “final” reports or documents describing the “success” of these initiatives, or any other documents and reports that clarify or describe the close-out or completion of each initiative.</p>	09/24/21	Closed	11/29/21	Text missing
147	<p>The PG&amp;E Incident Description and Factual Summary reports (the “Reports”) for each incident location refer to a December 7, 2017 letter that is noted to address a November 21, 2017 Commission Data request. Based on the language in the Reports, there are at least 62 questions included in that letter, and PG&amp;E provides responses to certain questions from that letter in each of the Reports.</p> <p>Please provide the referenced December 7, 2017 letter (12/7/17 Letter Regarding Clarification for Commission’s November 21, 2017 Data Request) along with a copy of the November 21, 2017 Data Request document, and any other relevant documents.</p>	09/24/21	Closed	09/29/21	DRU-4254.02

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
148	Provide SCADA communications OOS reports > 24 hours for 2017 & 2018.	09/27/21	Closed	11/01/21	DRU-4259.01
149	Please provide the CAD (Computer-Aided Dispatch) information/logs/events related to the 2017 fires and 2018 (Camp) fires for a time period from the date the fire occurred to 24 hours prior.	10/07/21	Closed	11/24/21	DRU-4305.01
150	<p>Following the 2017 Wildfires, the Federal Monitor that was previously created as a result of the guilty verdict in United States of America v. Pacific Gas &amp; Electric Company, expanded their scope to include assessment of PG&amp;E's vegetation management programs for its electric distribution system. We understand that at that time, the Monitor team's assessment was intended to be forward-looking and was not attempting to identify cause of any fire.</p> <p>In their December 31, 2018 letter to the court, the Monitor team responded to a series of questions including what specific steps were taken to "monitor and improve PG&amp;E safety and reporting with respect to power lines and wildfires?" As noted in that letter, the Monitor performed field and site visits, including observation of emergency command operations during simulated PSPS training exercises, pole inspections, observations of base camp operations during the Camp Fire, and "real-time wildfire risk monitoring at PG&amp;E's Wildfire Safety Operations Center."</p> <p>Findings reported by the Monitor note that quality control field inspections found numerous trees in contact with power lines in high-risk areas. What specific modification and initiatives has PG&amp;E implemented to ensure there are no trees in contact with power lines?</p>	10/12/21	Closed	10/26/21	DRU-4322.01

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
151	<p>(See Ref #150 for additional background relevant to this request)</p> <p>Findings reported by the Monitor note that PG&amp;E contractors were missing numerous trees that should have been identified and worked under applicable regulations and the EVM program. What specific modifications and initiatives has PG&amp;E implemented to prevent missing trees that should be listed for work?</p>	10/12/21	Closed	10/26/21	DRU-4322.02
152	<p>(See Ref #150 for additional background relevant to this request)</p> <p>Findings reported by the Monitor note numerous issues with the Arc Collector software application used to record and track vegetation management work, including:</p> <ul style="list-style-type: none"> <li>a. inconsistent use of Arc Collector to record work;</li> <li>b. conductor lines are not accurately depicted in Arc Collector and are not consistently corrected;</li> <li>c. inconsistent use of physical markings for prescribing work;</li> <li>d. challenges associated with identifying or observing physical markings;</li> <li>e. lack of clarity regarding justifications for potential exceptions, such as customer refusals and</li> <li>f. inconsistent recording of post-work verification.</li> </ul> <p>What has PG&amp;E done to correct these issues?</p>	10/12/21	Closed	10/28/21	DRU-4322.03
153	<p>Has PG&amp;E met its mileage goals for the EVM program? What were those goals from 2017 to 2020?</p>	10/12/21	Closed	10/26/21	DRU-4322.04
154	<p>What areas were identified and worked under the EVM program from 2017 to 2020?</p>	10/12/21	Closed	10/26/21	DRU-4322.05

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
155	How many trees were delisted from 2017 to 2020 within EVM, CEMA, Routine, and why?	10/12/21	Closed	10/26/21	DRU-4322.06
156	Do all the PG&E VM team members and contractors have education, training, and experience in VM? If not, why not?  a. Director b. VPM c. PIs d. QA e. QC f. Contract tree workers and supervisors	10/12/21	Closed	10/27/21	DRU-4322.07
157	Are PG&E VM teams' members and contractors currently meeting these defined qualifications?  a. If not, what percent are not qualified and why not? b. How do you know? c. What is the process PG&E applies to ensure contractors meet the contract qualification requirements?	10/12/21	Closed	10/26/21	DRU-4322.08
158	What specific actions and initiatives has PG&E implemented to ensure that contractors are qualified?	10/12/21	Closed	10/26/21	DRU-4322.09
159	What training and documentation does PG&E provide to the contractors to identify high-risk trees since 2017?	10/12/21	Closed	10/27/21	DRU-4322.10

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
160	<p>VM department has identified high-risk tree species in your database that have historically been causing outages and wildfires.</p> <p>a. How is the VM department using this information to reduce these risks? b. Does PG&amp;E share data with the contractors?</p>	10/12/21	Closed	10/26/21	DRU-4322.11
161	<p>Does PG&amp;E still perform random samplings of pre-inspection and VM work?</p> <p>a. What is the statistical basis for this process? b. What is the threshold for unsatisfactory work? c. What does PG&amp;E do when work does not meet the threshold?</p>	10/12/21	Closed	10/26/21	DRU-4322.12
162	<p>Why doesn't PG&amp;E do a 100% audit of pre-inspection and VM work in Tier 2 and 3 areas?</p>	10/12/21	Closed	10/26/21	DRU-4322.13
163	<p>Does PG&amp;E still retain and manage VMII or comparable?</p> <p>a. If discontinued, why? b. If modified, how?</p>	10/12/21	Closed	10/26/21	DRU-4322.14
164	<p>A Word document containing the identifying name, distribution feeder circuit number, and associated named fire for every PG&amp;E electric distribution feeder that has been identified and implicated – by PG&amp;E, CPUC-SED, CAL FIRE, a court of law, any other agency, etc. – as being the initiating event in any fire from 1/1/2014 to the present.</p>	10/19/21	Closed	11/08/21	DRU-4340.01

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
165	One or more high-resolution topographical maps of the State of California marked to identify the outline of PG&E's overall electric franchise area and the outline of each of PG&E's electric operations areas or districts.	10/19/21	Closed	11/09/21	DRU-4340.02
166	<p>A Word document or PDF document containing:</p> <p>a. the total number of distribution feeders in PG&amp;E's entire franchise area and in each individual divisional, regional, or district operating area.</p> <p>b. The total number of distribution stations in PG&amp;E's entire franchise area and in each individual divisional, regional, or district operating area.</p>	10/19/21	Closed	11/15/21	DRU-4340.03
167	A high-resolution topographical map for each operating area showing the location and name of every distribution substation.	10/19/21	Closed	11/16/21	DRU-4340.04
168	By divisional, regional or district operating area: a. A Word document and Excel file containing the name, city/town, street location, and identifying number of every source station (i.e., Smith Road, Fresno, Sta #123);	10/19/21	Closed	11/12/21	DRU-4340.05

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
169	<p>By divisional, regional or district operating area: b. For each source station, a PDF of its “station operating diagram” showing:</p> <ul style="list-style-type: none"> <li>i. high/low-side voltage</li> <li>ii. number of transformers &amp; station’s long-time rated capacity,</li> <li>iii. for stations with multiple power transformers, are the respective low-side feeder breaker buses interconnected by bus-tie breakers, and if so, how are they configured: normally open or normally closed?</li> <li>iv. the circuit numbers of each individual emanating distribution feeder;</li> </ul>	10/19/21	Closed	11/16/21	DRU-4340.06
170	<p>By divisional, regional, or district operating area: c. For each individual feeder in each station, a Word document and Excel file containing the feeders’:</p> <ul style="list-style-type: none"> <li>i. identifying feeder name and circuit number</li> <li>ii. Operating voltage and rated current carrying capacity</li> <li>iii. Mainline length</li> <li>iv. Conductor material type(s);</li> </ul>	10/19/21	Closed	11/12/21	DRU-4340.07

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
171	<p>By divisional, regional or district operating area: c. For each individual feeder in each station, a Word document and Excel file containing the feeders': v. Feeder type and configuration, for example,</p> <p>1). 4-wire multi-grounded wye neutral system: a feeder where the neutral of the station transformer wye secondary winding is grounded and bonded to the overhead neutral conductor that travels along the entire feeder and is periodically grounded every <u>  X  </u> number of poles (fill in X).</p> <p>2). 4-wire uni-grounded wye neutral system: a feeder where the neutral of the station transformer wye secondary winding is grounded and bonded to the overhead neutral conductor and travels along the entire feeder but is not grounded at any pole.</p> <p>3). 3-wire uni-grounded wye neutral system: a feeder where the neutral of the station transformer wye secondary winding is grounded but the feeder carries no (fourth) overhead neutral wire.</p> <p>4). 3-wire system ungrounded systems:</p> <p>a. a feeder consisting only of three overhead phase conductors energized by the ungrounded delta-connected secondary of the station transformer.</p> <p>b. a feeder consisting only of three overhead phase conductors energized by the ungrounded wye-connected secondary of the station transformer.</p>	10/19/21	Closed	11/15/21	DRU-4340.08

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
172	<p>Current organization chart for all corporate organizations that interact with Electric Operations and that identify the following individuals' position in the organization:</p> 	10/19/21	Closed	10/25/21	DRU-4340.09
173	Clear Sky LEAN Playbook	10/19/21	Closed	01/11/22	Text missing
174	<p>Wildfire Risk Process maps</p> <p>1/11/2022 PG&amp;E proposed CLOSED "This document was created after the scope of the review."</p> <p>1/13/2022 Response: The Project Scope specifically requires the Project Team to "Evaluate the incorporation of California Fire High (Fire) Threat District Zones into PG&amp;E's risk-reduction planning" and therefore this request is valid and within the project scope.</p> <p>1/25/22: PG&amp;E Response in process.</p>	10/19/21	Closed	02/04/22	DRU-4340.11
175	Distribution Wildfire Reflection documents.	10/19/21	Closed	01/11/22	Text missing

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
176	Provide names of the individuals responsible for distribution system Construction PMO, Compliance, Construction who have similar responsibilities to Sr. Director Transmission Substation E&P (David Gabbard).	10/19/21	Closed	11/12/21	DRU-4340.13
177	Documentation associated with the annual PSPS end-of-year “deep feedback” session with external agencies for each year it has been held and any documentation associated with plans for the 2021 session.	10/19/21	Closed	11/19/21	DRU-4340.14
178	PSPS “de-energization” Playbooks for PSPS events for 2018-2020.	10/19/21	Closed	11/09/21	DRU-4340.15
179	Provide the lesson plans, instructor guide, and student guide for the Web-based Training Modules for VM inspectors.	10/19/21	Closed	10/28/21	DRU-4340.16

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
180	<p>Incident Action Plans (IAP) form(s) ICS 203 for the operation periods of the following fires (Angie Gibson interview):</p> <ul style="list-style-type: none"> <li>Adobe</li> <li>Atlas</li> <li>Cascade</li> <li>Cherokee</li> <li>Camp</li> <li>Lobo</li> <li>LaPorte</li> <li>McCourtney</li> <li>Oakmont</li> <li>Norrbom</li> <li>Nuns</li> <li>Partrick</li> <li>Pocket</li> <li>Point</li> <li>Potter/Redwood</li> <li>Sulphur</li> <li>Youngs</li> </ul>	10/22/21	Closed	11/17/21	DRU-4358.01
181	After-action reports for full-scale 5-day exercise 2018-2020 (Angie Gibson interview).	10/25/21	Closed	11/16/21	DRU-4361.01
182	Documents outlining past efforts to incorporate Resource Typing into the emergency response plans (Angie Gibson interview).	10/25/21	Closed	11/16/21	DRU-4361.02

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
183	Screenshots or demo of the PSPS “portal” – update and information site, i.e. map updates, agency communications, etc. (Angie Gibson interview).	10/25/21	Closed	11/01/21	DRU-4361.03
184	Quarterly Executive Commitment Tracking Reports 2018-2020 (Alisa Okelo-Odongo interview).	10/25/21	Closed	11/08/21	DRU-4361.04
185	PG&E Self-Reports to CPUC 2016-2020 (Alisa Okelo-Odongo interview).	10/25/21	Closed	11/17/21	DRU-4361.05
186	List of current risks and responsible owner – i.e. “Risk Owners” and/or the “Risk Register” (██████████ interview).	10/25/21	Closed	11/19/21	DRU-4361.06
187	ERM Risk Registers for 2016-2020 (██████████ interview).	10/25/21	Closed	11/09/21	DRU-4361.07
188	Current and complete organization charts showing all positions for the entire company without limitations, inclusive of the 9/30/2021 monthly snapshots. Previous requests as indicated above were included in Ref #25 and Ref #26, where the complete historic and current organization charts were requested, and the response documents produced were limited, and did not include all LOBs and all positions in the entire organization. The additional request included in Ref #172 was intended to again address the incomplete organization charts received in response to Ref #25 and #26, with a list of specific names included in this OII interview process, as general guidance to understand that the organization charts received were incomplete, and for example, those people interviewed do not appear in the previously produced organization charts. The current organization charts produced to date are incomplete and do not capture the entire company and all positions in the company.	10/26/21	Closed	11/02/21	DRU-4377.01

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
189	Maps locating and identifying control centers and control center districts, including the control center locations relative to the locations of the 2017 fires, the 2018 fire, and the Dixie Fire.	10/28/21	Closed	11/24/21	DRU-4382.01
190	<p>Ref #159 Supplemental Request: Please provide copies of the program syllabus/presentation slides/training manuals, or other documents included in and as part of each of the four courses listed in response to DRU-4322.10:</p> <p>VEGM-0101 – Pre-Inspection basics;  VEGM-0410 – Enhanced Vegetation Management inspection process;  TAT – Tree Assessment Tool;  VEGM-9068 – Strike Tree Training.</p> <p>1/11/2022 PG&amp;E proposed CLOSED  These courses were not in existence during the time period of review.</p> <p>1/14/2022 Revised Request: What training did PG&amp;E give its employees and contractors on vegetation management, which includes pre-inspection, hazard tree identification, vegetation management work, and compliance with federal and state regulations?</p> <p>1/25/2022: PG&amp;E Revised response in progress.</p>	10/28/21	Closed	02/15/22	DRU-4322.15

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
191	<p>PSPS Today – 2019 and 2020 ICS training records for individuals who were assigned to the following EOC positions:</p> <p>Command.....EOC Commander                      OIC.....Officer-In-Charge                      Planning Section.....PSPS Plans Chief                      Planning Section.....PSPS Tech Leader                      Planning Section.....PSPS Tech Specialist                      Planning Section.....PSPS Data Analyst                      Planning Section.....PSPS Portal Leader                      Planning Section.....PSPS Portal Support                      Planning Section.....PSPS Recorder                      Planning Section.....PSPS External                      Communication Coordinator                      Planning Section.....PSPS CalOES Reporter                      Planning Section.....PSPS Process Unit Leader                      Planning Section.....PSPS Process Specialist                      PSPS Intel &amp; Investigation Section.....PSPS Intel &amp; Investigation                      Section Chief                      PSPS Intel &amp; Investigation Section.....REC Liaison                      PSPS Intel &amp; Investigation Section.....Data Lead                      PSPS Intel &amp; Investigation Section.....Data Analyst 1                      PSPS Intel &amp; Investigation Section.....Data Analyst 2                      PSPS Intel &amp; Investigation Section.....Data Analyst 3                      PSPS Intel &amp; Investigation Section.....Data Analyst 4</p>	11/08/21	Closed	11/16/21	DRU-4418.01

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
192	<p>Follow-up to Ref #122 (DRU-4144.48). Request in Ref #122 was for “Records of all PG&amp;E and external auditor QA, QC, and post-work verification inspections findings, conclusions, and recommendations for corrective action from 2017 to present.”</p> <p>Response provided was an Excel file with 42,500 lines for one company, “Atlas” with regions, circuit names, and segment lengths. The spreadsheet provided includes “status” but no context and no record of findings or recommendations.</p> <p>This supplemental request is provided to clarify Ref #122 and to again request all compliance and risk management reports (noted previously as records) for vegetation management quality assurance, including findings, conclusions, and recommendations, from 2017 to present.</p>	11/12/21	Closed	11/24/21	DRU-4438.01
193	<p>Follow-up to Ref #128 (DRU-4144.54). Request in Ref #128 was for “All documents that provide all contractor’s schedules for pre-inspection patrol and Routine Cycle tree clearance and Hazard Tree removal work from 2017 to present.”</p> <p>Response provided data for routine work, but no clear response for the schedule of Hazard Trees was included. Note that if the response to this supplemental request contemplates that Hazard Trees are “addressed during routine work,” please clarify, as our understanding is that this would not align with EVM or CEMA programs which are designed to “catch” Hazard Trees as well as nonconformance in defined areas.</p> <p>As clarification, and supplemental to Ref #128, please provide all Hazard Tree removal schedules, CEMA schedules, and EVM schedules for work from 2017 to present.</p>	11/12/21	Closed	11/29/21	DRU-4438.02

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
194	Please authorize access to the PSPS Portal for the following Envista/WOB individuals ( <a href="https://pspsportal.pge.com/?WT.mc_id=Vanity_pspportal">https://pspsportal.pge.com/?WT.mc_id=Vanity_pspportal</a> ):	11/12/21	Closed	11/19/21	DRU-4438.03
195	Provide "Work Group Evaluation" report describing the evaluation of CAP# 113217033 incident, and the attachments that were not included with the documents provided in response to Ref #142, identified below.  File Name: 000113217033_██████████_09112017134448_113217033_Picture 000113217033_██████████_10172017125924_113217033_WGE_Rep 000113217033_██████████_09112017134449_MARICOPACOPU.S._201	11/12/21	Closed	11/19/21	DRU-4438.04
196	Provide "ATS" report describing the evaluation of CAP# 114064376 incident, and the attachments that were not included with the documents provided in response to Ref #142, identified below.  File Name: 000114064376_██████████_02092018082243_413_6218_3_Donnel	11/12/21	Closed	11/19/21	DRU-4438.05
197	Provide Electric Incident Report from the CAP# 115341843 incident, and the attachments that were not included with the documents provided in response to Ref #142, identified below.  File Name: 000115341843_██████████_11132018095225_Initial_EIR EI18 000115341843_██████████_12122018085821_PGE2CPUC_CARIBOUP 000115341843_██████████_12132018120914_20DayRprt EI18110	11/12/21	Closed	11/19/21	DRU-4438.06

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
198	<p>Provide Electric Incident Reports from the CAP# 115675907 incident, and the attachments that were not included with the documents provided in response to Ref #142, identified below.</p> <p>File Name:  000115675907 [REDACTED]_01112019092411 2 VasonaMetcalf 2  000115675907 [REDACTED]_01112019092414_Padd  000115675907 [REDACTED]_01112019092413_4VasonaMetcalf_23  000115675907 [REDACTED]_01112019092412_3_VasonaMetcalf_2  000115675907 [REDACTED]_01112019092415 NG Padd VasonaMet  000115675907 [REDACTED]_01112019092410_VasonaMetcalf_230  000115675907 [REDACTED]_03252019102628_413_6219_20_v0</p>	11/12/21	Closed	11/19/21	DRU-4438.07
199	<p>Provide Electric Incident Reports from the CAP# 115675959 incident, and the attachments that were not included with the documents provided in response to Ref #142, identified below.</p> <p>File Name:  000115675959 [REDACTED]_03112019141231_413_6219_4_Newark  000115675959 [REDACTED]_01112019094834_NewarkAmes_Distri</p>	11/12/21	Closed	11/19/21	DRU-4438.08

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
200	<p>Follow-up to Ref #164 (DRU-4340.01). Request in Ref #162 was for “[a] Word document containing the identifying name, distribution feeder circuit number, and associated named fire for every PG&amp;E electric distribution feeder that has been identified and implicated – by PG&amp;E, CPUC-SED, CAL FIRE, a court of law, any other agency, etc. – as being the initiating event in any fire from 1/1/2014 to the present.” Response to DRU-4340.01 included a spreadsheet identifying CPUC reportable incidents with distribution feeder circuit numbers and associated named fire if indicated.</p> <p>As a supplemental request, for each of the nineteen (19) named fire incidents identified in the spreadsheet, please provide the associated report, the feeder number supplying the incident location, the station diagram for each of the identified feeders, and indicate where the sole cause of the fire was determined to be 1) phase-to-phase (conductor to conductor) arcing initiated by direct wind force-caused conductor contact or indirect wind-related tree or tree limb forces, or 2) phase-to-ground (conductor to neutral) arcing initiated by tree or tree limb contact, or equipment failure-related earth-conductor contact.</p>	11/24/21	Closed	12/07/21	DRU-4476.01
201	<p>Follow-up to Ref #180 (DRU-4358.01). Request in Ref #180 was for Incident Action Plans (IAP) form(s) ICS 203 for operation periods of the 2017 and 2018 fires. Response provided only the ICS 203 forms that were extracted from the full Incident Action Plan documents.</p> <p>As a supplemental request, will you provide the complete Incident Action Plans that these ICS 203 forms were extracted from please?</p>	11/18/21	Closed	11/23/21	DRU-4358.01

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
202	<p>a. What was the annual program budget and spending totals for electric distribution in 2017?</p> <p>b. What was the annual program budget and spending totals for electric distribution in 2018?</p>	12/20/21	Closed	01/19/22	DRU-4546.01
203	How many Corrective Action issues (CAP items) were related to electric distribution systems in 2017 & 2018? Please provide a list of these for 2016 through 2018.	12/20/21	Closed	01/06/22	DRU-4546.02
204	Please provide a description of the CAP process with illustrative examples related to distribution systems wires down and vegetation management. Please also provide a narrative of CAP "big success" stories and a narrative of CAP "failures" related to distribution systems.	12/20/21	Closed	01/06/22	DRU-4546.03
205	Please describe the process used for tracking CAP items from "cradle to grave."	12/20/21	Closed	01/06/22	DRU-4546.04
206	Are there performance metrics related to the CAP program that are used in the PG&E compensation plan?	12/20/21	Closed	01/05/22	DRU-4546.05
207	<p>Please provide the PG&amp;E 12 kV and 21kV distribution "planning circuit data" for distribution circuits involved in each of the 2017 and 2018 fires. "Circuit data" for this request can be defined as the distribution system planning studies associated with "circuit models" in (Cyme or tool used) to include all in 2016 through 2018.</p> <p>The purpose of this request is to examine and define the 3-wire circuit characteristics, including the studies and models that precisely show the parameters PG&amp;E planning engineers "assigned," allowed on the system(s). The data will be used for comparison to the more commonly used 4-wire systems.</p>	12/20/21	Closed	01/06/22	DRU-4546.06

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
208	<p>The interview with [REDACTED] identified some of PG&amp;E's system enhancement programs, including one to upgrade reclosers to arc-sealed vacuum units with special controllers that can detect and de-energize downed feeder conductors.</p> <p>Did PG&amp;E document and identify challenges with extinguishing high-impedance faults, located possibly on dry soils, far from the station coupled with poor or no local grounding of the electric system neutral? Please provide any documents related to studies, initiatives, reports, or other internal communication related to similar system enhancements.</p>	12/20/21	Closed	01/06/22	DRU-4545.07
209	<p>Follow-up to Ref #200 (DRU-4476.01 and DRU-4476.02).</p> <p>Please submit PG&amp;E's "planning circuit data" for each distribution circuit involved in the seventeen 2016-2017-2018 fires.</p> <p>Planning circuit data specifically means and includes a) PDF versions of drawings showing, at least, the three-phase mainline portion(s) of each feeder, and b) the distribution system planning studies and study reports, including associated "circuit models" in Cyme or another tool format that the Company had performed on each feeder.</p>	12/20/21	Closed	01/06/22	DRU-4546.08

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
210	<p>Follow-up to Ref #200 (DRU-4476.01 and DRU-4476.02).</p> <p>Regarding the distribution stations that energize the seventeen feeders – please provide confirmation that the diagrams provided include full information on the power transformer rating, delta/wye winding arrangement, and the neutral grounding device type and impedance, and/or provide diagrams that include full information on the power transformer rating, delta/wye winding arrangement, and the neutral grounding device type and impedance.</p>	12/20/21	Closed	01/06/22	DRU-4546.09
211	<p>Matrix used by Electric Incident Investigations to determine if or what type of RCA (Root Cause Analysis, or whatever name/title/reference is used by PG&amp;E to describe the Root Cause Analysis process, required evaluations, and subsequent documentation/reports) is needed for their reporting of incidents investigated, and provide the matrices developed for each investigation of the 2017 and 2018 fires. (ref: ██████ interview).</p>	12/20/21	Closed	01/07/22	DRU-4546.10
212	<p>The interview with ██████ also revealed that local Maintenance Supervisors are involved in the response to an incident/outage in their area, but couldn't confirm the procedure at that time on the protocol and organization of the responses.</p> <p>Please provide the name of the Local Maintenance Supervisor responsible for the areas involved and who would have been contacted regarding response for each of the fires in 2017 and 2018 (Atlas, Adobe, Camp, Cherokee, Cascade, LaPorte, Lobo, McCourtney, Nuns, Norrbum, Oakmont, Partrick, Pocket, Potter/Redwood, Point, Sulphur, Youngs).</p>	12/20/21	Closed	01/25/22	DRU-4546.11

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
213	<p>In PG&amp;E's RESPONSE TO REQUEST FOR A FINAL REPORT (Case No. 14-CR-00175-WHA, Document 1524-1), PG&amp;E stated that "PG&amp;E's current PSPS models—had they been in place between 2012 and 2020—would have de-energized PG&amp;E equipment that CAL FIRE has determined caused numerous catastrophic fires, including the fires that account for over 96% of the structures destroyed during that time period."</p> <p>Please provide the basis for this statement and supporting documentation including: analysis, statistics, reports, and associated references.</p>	12/20/21	Closed	01/07/22	DRU-4546.12
214	<p>In response to Rulemaking 08-11-005 (11/06/08 – Order Instituting Rulemaking To Revise and Clarify Commission Regulations Relating to the Safety of Electric Utility and Communications Infrastructure Provider Facilities) provide action taken including correspondence, procedures (including revisions), plans developed (including revisions), operational changes, and design modifications.</p>	12/20/21	Closed	01/21/22	DRU-4546.13
215	<p>In response to D.09-08-029 GO95 (8/20/09 – High Fire-Threat Maps Southern California) provide action taken including correspondence, procedures (including revisions), plans developed (including revisions), operational changes, and design modifications.</p>	12/20/21	Closed	01/21/22	DRU-4546.14
216	<p>In response to D.09-09-030 (9/10/09 – California Public Utilities Code Section 451 gives IOUs authority for power shutoffs to protect public safety) provide actions taken including applicable responses to the CPUC, procedures (including revisions), plans developed (including revisions), operational changes, and design modifications.</p>	12/20/21	Closed	01/05/22	DRU-4546.15

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
217	In response to D.12-01-032 (1/8/12 – GO166 require IOUs in Southern California to prepare fire prevention plans) provide actions taken including applicable responses to the CPUC, procedures (including revisions), plans developed (including revision), operational changes, and design modifications.	12/20/21	Closed	01/21/22	DRU-4546.16
218	In response to Decision 12-04-024 (4/26/12 – providing authority for a utility to operate its system safely, which can include shutoff in emergency conditions) provide actions taken including applicable responses to the CPUC, procedures (including revisions), plans developed (including revisions), operational changes, and design modifications.	12/20/21	Closed	01/05/22	DRU-4546.17
219	In response to California Governor’s Proclamation No. 1-17-2014 (1/17/14 – Drought State of Emergency) provide actions taken including applicable responses to the CPUC, procedures (including revisions), plans developed (including revisions), operational changes, and design modifications.	12/20/21	Closed	01/07/22	DRU-4546.18
220	In response to CPUC D.14.02.015 (2/5/14 – Adopting Regulations to Reduce the Fire Hazards Associated with Overhead Electric Utility Facilities) provide actions taken including applicable responses to the CPUC, procedures (including revisions), plans developed (including revisions), operational changes, and design modifications.	12/20/21	Closed	01/21/22	DRU-4546.19
221	In response to the February 18, 2014, Letter from Denise Tyrell, Director of Safety Enforcement Division (SED) directing PG&E “to reduce the likelihood of wildfires”, provide actions taken including applicable responses to the CPUC, procedures (including revisions), plans developed (including revisions), operational changes, and design modifications.	12/20/21	Closed	01/07/22	DRU-4546.20

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
222	In response to Resolution ESRB-4 (6/12/14 – directed Investor-Owned Electric Utilities to take remedial measures to reduce the likelihood of fires started by or threatening utility facilities), provide actions taken including applicable responses to the CPUC, procedures (including revisions), plans developed (including revisions), operational changes, and design modifications.	12/20/21	Closed	01/07/22	DRU-4546.21
223	In response to Governor Brown Declares Tree Mortality State of Emergency (10/30/2015), provide action taken including applicable responses to the CPUC, procedures (including revisions), plans developed (including revisions), operational changes and design modifications	12/20/21	Closed	01/10/22	DRU-4546.22
224	In response to SB 1028 (9/24/16 – Requires Utilities to Minimize Risk of Wildfires), provide actions taken including applicable responses to the CPUC, procedures (including revisions), plans developed (including revisions), operational changes, and design modifications.	12/20/21	Closed	01/10/22	DRU-4536.23

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
225	<p>PG&amp;E’s Risk Register dated February 25, 2016 does not specifically include “Wildfires.” Given the multi-year drought conditions at the time, on February 18, 2014, the CPUC issued an order to “reduce wildfire likelihood” and on June 12, 2014 directed all IOUs to take remedial action.</p> <p>The 2017 PG&amp;E Risk Register, dated March 14, 2017, included the following:  Risk LOB: Electric Operations  Risk Name: Wildfire* (*Indicates this item is a RAMP risk)  Risk Description: PG&amp;E Assets may initiate a wildland fire that is not easily contained and that endangers the public, private property, sensitive lands, and/or leads to long-duration.  Identical language is included in the 2018 PG&amp;E Risk Register (no date included).</p> <p>a. Why was this language added in March 2017?  b. Was there a significant/reportable wildfire incident in 2016?  c. What is the date of the 2018 PG&amp;E Risk Register?</p>	12/20/21	Closed	01/04/22	DRU-4546.24
226	<p>QDP1 – How did PG&amp;E ensure the 2017-2018 distribution planning function comports with or exceeds industry leading practices?</p> <p>PG&amp;E Revised: “Ref #226-REVISED: I.19-06-015QDP1 – Per our discussion on January 20, 2022 this request was clarified. Describe PG&amp;Es Engineering Organization functions (e.g. Planning and Protection) and responsibilities. How is success measured for each of the functions/responsibilities (e.g. performance, metrics, best practices, benchmarking)?”</p>	01/14/22	Closed	02/18/22	DRU-4618.01
227	<p>QDP2 – Was the 2017-2018 PG&amp;E distribution planning function effective? Provide the evidence.</p>	01/14/22	Closed	02/17/22	DRU-4618.02

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
228	<p>QDP3 – Did the 2017-2018 PG&amp;E distribution planning process complete circuitry analysis on the 17 wildfire circuits correctly? Provide the actual studies and any evidence of adequate technical rigor and review.</p> <p>PG&amp;E Revised: “Ref #228 - REVISED - QDP2 – Per our discussion on January 20, 2022 this request was clarified. What is the review/approval process for Planning and Protection functions?”</p> <p>“Did the 2017-2018 PG&amp;E distribution planning process complete circuitry analysis on the 17 wildfire circuits correctly? Provide the actual studies and any evidence of adequate technical rigor and review.”</p> <p>“PG&amp;E NOTE: The sequence of the above question is not clear as to what the actual question is. Suggest resequencing the order of the sentences to show the question(s) below.”</p> <p>“QDP2 – Per our discussion on January 20, 2022 this request was clarified. What is the review/approval process for Planning and Protection functions?”</p>	01/14/22	Closed	02/18/22	DRU-4618.03
229	<p>QDP4 – Did the 2017-2018 PG&amp;E distribution planning process apply distribution automation and protective devices properly on the 17 wildfire circuits? Provide the evidence.</p> <p>PG&amp;E REVISED – Per our discussion on January 20, 2022 this request was clarified. Were there Protection reviews completed for the 17 relevant circuits prior to 2017-2018? Provide relevant documentation.</p>	01/14/22	Closed	02/22/22	DRU-4618.04

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
230	QDP5 – Did the 2017-2018 PG&E distribution planning process produce the appropriate system protection settings for the 17 circuits involved in wildfires? Provide the evidence.	01/14/22	Closed	03/07/22	DRU-4618.05
231	QDP6 – Did the 2017-2018 PG&E distribution planning process studies find the 3-wire (12kV) circuits are generally more hazardous due to high-impedance fault conditions? Provide all pre-2017 technical studies related to the 12kV 3-wire distribution system in use at PG&E.	01/14/22	Closed	02/17/22	DRU-4618.06
232	QDP7 – Did the 2017-2018 PG&E distribution planning process studies identify the 4-wire (21kV) circuits as less hazardous due to superior performance with respect to fault detection? Provide all pre-2017 technical studies related to the 12kV and 21kV 4-wire distribution system in use at PG&E.	01/14/22	Closed	02/17/22	DRU-4618.07
233	Provide the latest published organization chart as of 12/31/2021. The last org. chart we received was dated 9/30/2021, and had a placeholder for Angie Gibson’s organization (Emergency Preparedness & Response) because we were told it was still being organized. Several of the individuals we spoke to have changed positions in the last three months (e-mail request).	01/24/22	Closed	02/12/22	DRU-4647.02
234	DRU-204.28 – Please provide the response PG&E issued to CPUC for Question 28 from the Data Request For October 2017 Wildfires, dated November 21, 2017.  For each electric safety incident, fire, and circuit indicated by the CPUC in their data request, please mark on a single-line diagram showing the location of the fire location, the location of the closest protection devices from the incident location(s), and provide the brand, type, and operation manual of the protection devices.	01/27/22	Closed	02/04/22	DRU-4662.01

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
235	<p>DRU-789.86 – Please provide the response PG&amp;E issued to CPUC for Question 29 in the Data Request For October 2017 Wildfires, dated November 21, 2017.</p> <p>For each electric safety incident, fire, and circuit indicated by the CPUC in their data request, did any protection devices operate on the subject circuit 12 hours prior to or during the life of the subject fire (CAL FIRE start time)? Please provide times and locations.</p>	01/27/22	Closed	02/04/22	DRU-4662.02
236	<p>DRU-204.30 – Please provide the response PG&amp;E issued to CPUC for Question 30 in the Data Request For October 2017 Wildfires, dated November 21, 2017.</p> <p>For each electric safety incident, fire, and circuit indicated by the CPUC in their data request, did any protection devices operate on the subject circuit during the time of the fire? Please provide times and locations.</p>	01/27/22	Closed	02/04/22	DRU-4662.03
237	<p>DRU-204.31 – Please provide the response PG&amp;E issued to CPUC for Question 31 in the Data Request For October 2017 Wildfires, dated November 21, 2017.</p> <p>For each electric safety incident, fire, and circuit indicated by the CPUC in their data request, did the protection scheme work as designed on the subject circuit? E.g., did the ground fault trigger the proper relays and open breakers to sectionalize/isolate the downed portion of the subject circuit? Or did PG&amp;E have to manually trip-open breakers?</p>	01/27/22	Closed	02/04/22	DRU-4662.04

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
238	<p>DRU-204.32 – Please provide the response PG&amp;E issued to CPUC for Question 32 in the Data Request For October 2017 Wildfires, dated November 21, 2017.</p> <p>For each electric safety incident, fire, and circuit indicated by the CPUC in their data request, when were the subject circuits de-energized, if at all?</p>	01/27/22	Closed	02/09/22	DRU-4662.05
239	<p>DRU-204.33 – Please provide the response PG&amp;E issued to CPUC for Question 33 in the Data Request For October 2017 Wildfires, dated November 21, 2017.</p> <p>For each electric safety incident, fire, and circuit indicated by the CPUC in their data request, did PG&amp;E change any of the protective devices’ settings and/or sensors (CTs, PTs, etc.) in the last two years on the subject circuit? If yes, please provide records and explanations/details.</p>	01/27/22	Closed	02/10/22	DRU-4662.06
240	<p>DRU-204.34 – Please provide the response PG&amp;E issued to CPUC for Question 34 in the Data Request For October 2017 Wildfires, dated November 21, 2017.</p> <p>For each electric safety incident, fire, and circuit indicated by the CPUC in their data request, when was the last time the settings of protective devices and/or sensors changed on the subject circuit? If changes were made, please provide why the settings were changed and what the settings were before and after the change?</p>	01/27/22	Closed	02/04/22	DRU-4662.07

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
241	<p>DRU-204.35 – Please provide the response PG&amp;E issued to CPUC for Question 35 in the Data Request For October 2017 Wildfires, dated November 21, 2017.</p> <p>For each electric safety incident, fire, and circuit indicated by the CPUC in their data request, what type of conductor(s) was installed for each subject circuit prior to the incident?</p>	01/27/22	Closed	02/02/22	DRU-4662.08
242	<p>DRU-204.36 – Please provide the response PG&amp;E issued to CPUC for Question 36 in the Data Request For October 2017 Wildfires, dated November 21, 2017.</p> <p>For each electric safety incident, fire, and circuit indicated by the CPUC in their data request, when was the subject conductor(s) installed?</p>	01/27/22	Closed	02/02/22	DRU-4662.09
243	<p>DRU-204.37 – Please provide the response PG&amp;E issued to CPUC for Question 37 in the Data Request For October 2017 Wildfires, dated November 21, 2017.</p> <p>For each electric safety incident, fire, and circuit indicated by the CPUC in their data request, what was the ground clearance of each subject conductor(s) at the time of the incident?</p>	01/27/22	Closed	02/02/22	DRU-4662.10
244	<p>DRU-204.78 – Please provide the response PG&amp;E issued to CPUC for Question 78 in the Data Request For October 2017 Wildfires, dated November 21, 2017.</p> <p>For each electric safety incident, fire, and circuit indicated by the CPUC in their data request, please run a simulation of a ground fault and phase-to-phase fault for the worst-case scenario for subject circuit and provide the results.</p>	01/27/22	Closed	02/02/22	DRU-4662.11

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
245	<p>DRU-204.90 – Please provide the response PG&amp;E issued to CPUC for Question 90 in the Data Request For October 2017 Wildfires, dated November 21, 2017.</p> <p>For each electric safety incident, fire, and circuit indicated by the CPUC in their data request, please provide material failure analysis reports for failed equipment.</p>	01/27/22	Closed	02/02/22	DRU-4662.12
246	Risk Registers and Session “D” reports and presentations from 2015-2018 (annual and/or quarterly as applicable). Session “1” and Session “2” reports and presentations from 2015-2018 (annual and/or quarterly as applicable). Source: Shawn Holder interview 1/28/2022.	01/28/22	Closed	02/15/22	DRU-4666.01
247	Transmittal documents to the President and Board submitting the annual (or quarterly, as applicable) Risk Registers, Session “D” reports and presentations, and Session “1” and Session “2” reports and presentations from 2015-2018. Source: Shawn Holder interview 1/28/2022.	01/28/22	Closed	03/07/22	DRU-4666.02
248	Please provide the exact time-stamped protection operation sequence record for each of the 17 wildfire circuits. Please include all circuit protection operation data aspects including station circuit breakers, line reclosers, fuses, and smart meters.	02/04/22	Closed	03/03/22	DRU-4693.01
249	Did PG&E determine in each case, the 17 wildfire circuits protection schemes worked as designed and if not why?	02/04/22	Closed	02/17/22	DRU-4693.02
250	Please provide PG&E’s Tree Line U.S.A applications leading up to and including 2017 and 2018.	02/04/22	Closed	02/16/22	DRU-4693.03
251	Please provide PG&E’s Right-of-Way Stewardship documentation leading up to and including 2017 and 2018.	02/04/22	Closed	02/15/22	DRU-4693.04

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
252	Please provide the Overhead Primary Conductor study performed by the National Electric Energy Testing, Research, and Applications Center (NEETRAC), as discussed with ██████ in the interview on 2/2/2022, that is noted to have been commissioned by PG&E in 2017 and submitted in a General Rate Case filing in December 2018. Source: Interview with ██████ and 2020 Wildfire Mitigation Plan Remedial Compliance Plan, Rulemaking 18-10-007.	02/04/22	Closed	02/09/22	DRU-4639.05
253	Please provide the Quanta Technology study commissioned by PG&E as discussed with ██████ in the interview on 2/1/2022. ██████ referred to a Quanta Technology report that may have been in response to, subsequent to, corollary to, and/or produced around or about the time that the Liberty Consulting Study of Risk Assessment and PG&E's GRC was produced for the CPUC and dated May 6, 2013. Source: Interview with ██████, interview with ██████.	02/04/22	Closed	02/17/22	DRU-4639.06
254	What impact does the length of the circuit have on the Planning and Protection process?  Per our discussion on January 20, 2022 this request was added.	01/14/22	Closed	02/17/22	DRU-4618.08

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
255	<p>How did PG&amp;E confirm the contractors were meeting the contract specifications for trainer experience, education, and knowledge?</p> <p>Pre-inspection service contracts require that contractors provide a minimum training for contractor personnel which is prescribed in the tables included in Section 6.0 TRAINING FOR CONTRACTOR PERSONNEL [for an example reference refer to DRU-3867.06 contract Attachment 025_Redacted_CONF.pdf, ARCT Pre-Inspection Services – Distribution and Systemwide Reliability].</p> <p>Trainer requirements listed in contract Section 6.0 include general requirements such as experience with PG&amp;E facilities, tree defects, and knowledge of species-specific failure patterns (partial list of general requirements included here). Trainer Education requirements in the contract specify that the Trainer “must have a bachelor’s degree or a 2-year degree in Forestry, Horticulture, or related field and three (3) years of field experience. Trainer must be an I.S.A.-Certified Arborist (and/or Utility Specialist) or Registered Professional Forester (RPF).”</p>	02/22/22	Closed	03/04/22	DRU-4725.01

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
256	<p>How did PG&amp;E confirm CUFs and SCUFs were meeting the contract specifications for experience, education, and knowledge?</p> <p>Pre-inspection service contracts require that contractors provide a minimum training for contractor personnel that is prescribed in the tables included in Section 6.0 TRAINING FOR CONTRACTOR PERSONNEL [for an example reference refer to DRU-3867.06 contract Attachment 025_Redacted_CONF.pdf, ARCT Pre-Inspection Services - Distribution and Systemwide Reliability].</p> <p>Section 7.4 of the Pre-Inspection service contract specifies the Employee Qualifications for Senior Consulting Utility Forester (SCUF) and Consulting Utility Forester (CUF) and specifies the requirements for education/experience and basic responsibilities [for an example reference refer to DRU-3867.06 contract Attachment 025_Redacted_CONF.pdf, ARCT Pre-Inspection Services – Distribution and Systemwide Reliability].</p>	02/22/22	Closed	03/04/22	DRU-4725.02
257	<p>Did PG&amp;E vegetation staff know contractors were hiring employees that didn't meet these requirements?</p> <p>Refer to the background and questions that are included in Ref #255 and Ref #256 above, which describe the Pre-Inspection service contract and contract requirements [for an example reference refer to DRU-3867.06 contract Attachment 025_Redacted_CONF.pdf, ARCT Pre-Inspection Services – Distribution and Systemwide Reliability].</p>	02/22/22	Closed	03/04/22	DRU-4725.03

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
258	<p>For each of the fire incidents, for VM work in the location and general area of interest where the fire initiated, did the VM contractor add any work for pruning or removals on the Vegetation Request Form, or Notice of Tree Work form to the PG&amp;E VPM where any of the 2017 or 2018 fires started?</p> <p>Please provide backup documentation, including but not limited to reports, incident correspondence, maps, and other relevant documentation justifying the answers provided, including the Vegetation Request Forms and Notice of Tree Work forms.</p> <p>The Scope of Work for Tree Pruning Around Overhead Electric Distribution and Transmission Lines is specified in Section 2 of PG&amp;E's Vegetation Management Specification for Tree Pruning and Tree and Brush Removal in PG&amp;E's Service territory, Specification 5404. Section 2.2 of that specification prescribes THE TREE PRUNING PROCESS and contractor work requirements. Subsection 2.2.6 specifies that the contractor "shall perform the Work only at locations identified on the Vegetation Work Request Form" and that it is the "Contractor's responsibility to note any changes to the Work prescribed on the completed Vegetation Work Request Form returned to PG&amp;E, if requested by the VPM detailing any added Work. Any tree to be removed must be authorized by the Vegetation Program Manager or have a Notice of Tree Work Form (attached as Exhibit 6) and signed by the customer or the VPM."</p>	02/22/22	Closed	03/04/22	DRU-4725.04

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
259	<p>For each of the fire incidents, for VM work requests in the location and general area of interest where the fire initiated, did the VPM decline any additional work for pruning or removals where the fires started?</p> <p>Please provide backup documentation, including but not limited to reports, incident correspondence, maps, and other relevant documentation justifying the answers provided, including the Vegetation Request Forms and Notice of Tree Work forms.</p> <p>The Scope of Work for Tree Pruning Around Overhead Electric Distribution and Transmission Lines is specified in Section 2 of PG&amp;E's Vegetation Management Specification for Tree Pruning and Tree and Brush Removal in PG&amp;E's Service territory, Specification 5404. Section 2.2 of that specification prescribes THE TREE PRUNING PROCESS and contractor work requirements. Subsection 2.2.6 specifies that the contractor "shall perform the Work only at locations identified on the Vegetation Work Request Form" and that it is the "Contractor's responsibility to note any changes to the Work prescribed on the completed Vegetation Work Request Form returned to PG&amp;E, if requested by the VPM detailing any added Work. Any tree to be removed must be authorized by the Vegetation Program Manager or have a Notice of Tree Work Form (attached as Exhibit 6) and signed by the customer or the VPM."</p>	02/22/22	Closed	03/07/22	DRU-4729.09
260	<p>For each of the fire incidents, for the location and general area of interest where the fire initiated, please provide pre-inspection and VM contractors post-audit documents where the 2017 and 2018 fires started.</p>	02/22/22	Closed	03/18/22	DRU-4725.06

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
261	For each of the fire incidents, for the location and general area of interest where the fire initiated, please provide post-audit documents prepared by Vegetation Management Inc. where the 2017 and 2018 fires occurred.	02/22/22	Closed	03/18/22	DRU-4725.07
262	For each of the fire incidents, for the location and general area of interest where the fire initiated, please provide PG&E vegetation management audit documents where the 2017 and 2018 fires started.	02/22/22	Closed	03/22/22	DRU-4725.08
263	<p>For each of the fire incidents, were any of the delisted trees located near the origin of each of the wildfires? For each of the fire incidents, if a tree was delisted in a location near the origin of the 2017 and 2018 fires, please explain why they were delisted?</p> <p>Refer to PG&amp;E's response to DRU-4322.06 for request Ref #155, "How many trees were delisted from 2017 to 2020 within EVM, CEMA, Routine, and why?" The "Trees Delisted by Year" tab included in the Attachment 01_Envista DRU-4322 Q6.xlsx spreadsheet provided with the DRU-4322.06 response identified a total of 93,973 trees delisted in the 2017-2018 timeframe.</p>	02/22/22	Closed	03/04/22	DRU-4725.09
264	<p>For each of the fire incidents, provide all notes, reports, photographs or other documents related to the tree outage and fire investigations, and evidence collection and storage that were performed by PG&amp;E VM staff in the area of interest where the trees impacted distribution lines at the ignition location.</p> <p>Source: During the interview with [REDACTED] on 2/22/22, [REDACTED] stated that PG&amp;E VM staff collected tree evidence and that PG&amp;E VM staff investigate every tree-caused outage.</p>	02/25/22	Closed	03/23/22	DRU-4742.01

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
265	<p>Identify the individuals and the contractors who performed the pre-inspections for routine, second patrol, CEMA, and FPT where the subject fires occurred for the period from 2015 and up to the subject fire at each site. Provide the corresponding records and documentation of the education, training, certifications (certified arborist and other applicable credentials) and utility vegetation management experience of the individual inspectors. Explain how PG&amp;E documented and verified the qualifications of these individuals and contractors, and provide similar documentation for the qualifications (education, training, certifications, and utility vegetation management experience) of the PG&amp;E auditors.</p>	02/25/22	Closed	04/21/22	DRU-4742.02
266	<p>Ref #248 Supplemental Request. Provide the source documents that are the basis for the "Timeline" summarized in the Incident Description and Factual Summary documents. Refer to Ref #248 for the specific information requested. The response to Ref #248 included the previously produced Incident Description and Factual Summary documents and supplemental updates, and did not provide the requested data.</p> <p>Please provide the exact time-stamped protection operation sequence records for each of the 17 wildfire circuits. Please include all circuit protection operation data aspects including station circuit breakers, line reclosers, fuses, and smart meters.</p> <p>3/18/2022: Attached are the files for 10 of the requested Wildfire circuits. These files are the source documents that are the basis for the timelines summarized in each fire Incident Description and Factual Summary documents. The attached files for each fire contain the time-stamped protection operation sequence records covering circuit breakers, line reclosers, and smart meters. The other fire source documents will be provided in a supplemental response.</p>	03/04/22	Closed	03/30/22	DRU-4693.07

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
267	DRI-1494.65 – Provide the document entitled “Summary and Analysis of Vegetation-Related Fire Incidents on PG&E Electric Power Lines 2007-2012” authored by [REDACTED] and dated February 7, 2013, and also provide any documents that describe updates to the information, analysis, or recommendations in this document.	03/08/22	Closed	03/09/22	DRU-4768.01
268	General Order 165 requires each utility to submit to the CPUC an annual maintenance report describing its inspection activities for the prior year, no later than July 1st every year. Please provide copies of the 2015, 2016, 2017 and 2018 annual maintenance reports submitted to the CPUC.	03/08/22	Closed	03/15/22	DRU-4768.02
269	Provide a list of individuals identified during PG&E’s review of the inspection and repair records.	03/04/22	Closed	03/08/22	DRU-4769.01
270	<p>Ref #155 Supplemental Request (DRU-4322.06): Provide all data attributes for the delisted trees identified in attachments “Attachment 01_Envista DRU-4322 Q6.xlsx” and “Attachment 02_Envista_DRU-4322_Q6_TreesNWbyYr_20211018.xlsx” that were produced in response to Ref #155.</p> <p>No location data or circuit names were included in the attachment files. The information provided is limited to data columns for tree identification numbers (iTreeRecsID), Work type (sAcctType), Tree Species (sTreeCode), Job needed to complete (sTrimCode), and date delisted (dtWorkDate). Please provide all record data including tree location, tree location coordinates, circuit name, and all other attributes.</p> <p>Ref #155 – How many trees were delisted from 2017 to 2020 within EVM, CEMA, Routine, and why?</p>	03/10/22	Closed	03/29/22	DRU-4322.16

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
271	<p>Ref #251 Supplemental Request: Please provide the complete Right-of-Way Stewardship Audit reports with all attachments and associated documents. The November 24, 2014 audit report is incomplete and includes only highlights and recommendations.</p> <p>Please provide PG&amp;E's Right-of-Way Stewardship documentation leading up to and including 2017 and 2018.</p>	03/10/22	Closed	03/22/22	DRU-4693.08
272	<p>Vegetation Management and Tree Work Records previously produced to CAL FIRE by PG&amp;E as described in PG&amp;E's letter to Chief Zimmermaker dated February 2, 2018 (Lobo 0106-0109):</p> <p>PGE-CF_000009971-000038632 – Vegetation Management Inspection and Tree Work</p> <p>PGE-CF_000009308-000009847 – Vegetation Management Quality Assurance Audits</p> <p>PGE-CF_000009848-000009970 – Supplemental GO 165 Patrol &amp; Inspection</p>	03/15/22	Closed	03/25/22	DRU-4785.01

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
273	<p>Vegetation Management and Tree Work Records previously produced to CAL FIRE by PG&amp;E as described in PG&amp;E's letter to Chief Zimmermaker dated March 5, 2018 (Lobo 0110-0115):</p> <p>PGE-CF_000133588-000133737 – Vegetation Inspection Maps  PGE-CF_000082265-000082280 – Vegetation Control Records  PGE-CF_000132488-000132494 – Vegetation Management Refusals  PGE-CF_000082313-000082313 – Vegetation Outage Investigation Records  PGE-CF_000082281-000082312 – Vegetation Management Quality Control Records  PGE-CF_000038635-000082264 – Vegetation Inspection and Tree Work – McCourtney  PGE-CF_000082355-000132368 – Vegetation Inspection and Tree Work – McCourtney  PGE-CF_000132499-000132825 – Supplemental Vegetation Inspection and Tree Work</p>	03/15/22	Closed	04/01/22	DRU-4785.02

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
274	<p>Vegetation Management and Tree Work Records previously produced to CAL FIRE by PG&amp;E as described in PG&amp;E's letter to Chief Zimmermaker dated March 30, 2018 (Lobo 0118-0122):</p> <p>PGE-CF_000136920-000137062 – Vegetation Control and Drought Tree Maps  PGE-CF_000140303-000140315 – Vegetation Control and Drought Tree Maps  PGE-CF_000137063-000137616 – PS&amp;R drought tree mortality (CEMA) inspections  PGE-CF_000140181-000140301 – PS&amp;R, Veg. Control (CEMA) inspections  PGE-CF_000135482-000135501 – Vegetation Outage Investigations  PGE-CF_000135502-000135504 – Vegetation Management Customer Cases  PGE-CF_000135505-000135547 – Vegetation Management Quality Assurance Reports  PGE-CF_000133738-000134187 – GO 165 Patrol and Inspection Records  PGE-CF_000137644-000140180 – GO 165 Patrol and Inspection Records  PGE-CF_000134199-000135209 – Vegetation Management and Tree Work Records</p>	03/15/22	Closed	03/30/22	DRU-4785.03

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
275	<p>The planning protection engineers conduct a detailed study and analysis following any distribution circuit event and/or the misoperation of the protection scheme.</p> <p>Please provide the detailed studies and analyses of the protection scheme for each of the 17 wildfires that are within the scope of this project.</p> <p>3/28/2022: The requested analysis is privileged as it was prepared at the direction of counsel. We have provided the underlying data used for this analysis in response to previous data requests.</p>	03/16/22	Closed	04/15/22	DRU-4790.01
276	<p>Equipment Event Information previously produced to CAL FIRE by PG&amp;E as described in PG&amp;E's letter to Chief Zimmermaker dated February 2, 2018 (Lobo 0106-0109):</p> <p>PGE-CF_000000001-000000026 – SCADA data PGE-CF_000000027-000000055 – AMI data</p>	03/17/22	Closed	03/22/22	DRU-4798.01
277	<p>Single-Line Diagrams and associated protective device event information previously produced to CAL FIRE by PG&amp;E as described in PG&amp;E's letter to Chief Zimmermaker dated February 2, 2018 (Lobo 0106-0109):</p> <p>PGE-CF_000004954-000005018 – Single-line diagrams, and device event information PGE-CF_000038633-000038634 – Single-line diagrams, and device event information PGE-CF_000005019-000009211 – Protective device manuals</p>	03/17/22	Closed	03/24/22	DRU-4798.02

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
278	Provide the settings data for each identified protective device included in the single-line diagrams produced to CAL FIRE by PG&E as described in PG&E's letter to Chief Zimmermaker dated February 2, 2018 (Ref #277).	03/17/22	Closed	03/31/22	DRU-4798.03
279	Critical Operating Equipment Notifications for Protective Devices & Maintenance Notifications for Substations, Critical Operating Equipment Notifications, and Electric Corrective Notifications produced to CAL FIRE by PG&E as described in PG&E's letter to Chief Zimmermaker dated February 2, 2018 (Lobo 0106-0109):  PGE-CF_000009212 – CE Notifications for distribution line equipment, CS Notifications for substations, EC Notifications for distribution line equipment, LC Notifications for substations.	03/17/22	Closed	03/22/22	DRU-4798.04
280	Critical Operating Equipment Notifications for Protective Devices & Maintenance Notifications for Substations, Critical Operating Equipment Notifications, and Electric Corrective Notifications previously produced to CAL FIRE by PG&E as described in PG&E's letter to Chief Zimmermaker dated March 5, 2018 (Lobo 0110-0115):  PGE-CF_000132827 – Electric Corrective Notifications	03/17/22	Closed	03/22/22	DRU-4798.05
281	Equipment Test Records for both distribution line equipment and substation circuit breakers on the single-line diagrams previously produced to CAL FIRE by PG&E as described in PG&E's letter to Chief Zimmermaker dated March 5, 2018 (Lobo 0110-0115):  PGE-CF_000132829-000133583 – Equipment Test Records	03/17/22	Closed	03/24/22	DRU-4798.06

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
282	<p>Critical Operating Equipment Notifications for Protective Devices &amp; Maintenance Notifications for Substations, Critical Operating Equipment Notifications, and Electric Corrective Notifications previously produced to CAL FIRE by PG&amp;E as described in PG&amp;E's letter to Chief Zimmermaker dated March 5, 2018 (Lobo 0110-0115):</p> <p>PGE-CF_000132826 – LC Notifications and COE Notifications  PGE-CF_000132828 – LC Notifications and COE Notifications</p>	03/17/22	Closed	03/22/22	DRU-4798.07
283	<p>Outage Records from the Integrated Logging Information System Operations Database, ILIS, PG&amp;E's system of record for distribution of transformer-level outages previously produced to CAL FIRE by PG&amp;E as described in PG&amp;E's letter to Chief Zimmermaker dated March 30, 2018 (Lobo 0118-0122):</p> <p>PGE-CF_000135953-000136919 – ILIS records  PGE-CF_000135211-000135215 – Transmission Outage Daily Office Items Reports</p>	03/17/22	Closed	03/30/22	DRU-4798.08
284	<p>SCADA Data and Equipment Event Information previously produced to CAL FIRE by PG&amp;E as described in PG&amp;E's letter to Chief Zimmermaker dated March 30, 2018 (Lobo 0118-0122):</p> <p>PGE-CF_000135216-000135235 – SCADA data  PGE-CF_000137634-000137639 – SCADA data  PGE-CF_000140302-000140302 – Mendocino Substation Circuit Breaker 62 event data  PGE-CF_000135210-000135210 – Line Recloser 64118 event data</p>	03/17/22	Closed	03/23/22	DRU-4798.09

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
285	<p>Single-Line Diagrams previously produced to CAL FIRE by PG&amp;E as described in PG&amp;E's letter to Chief Zimmermaker dated March 30, 2018 (Lobo 0118-0122):</p> <p>PGE-CF_000134191-000134198 – Single-line diagrams, and device event information  PGE-CF_000137640-000137643 – Single-line diagrams, and device event information  PGE-CF_000140316-000140316 – Revised single-line diagram Potter Valley Sites</p>	03/17/22	Closed	03/25/22	DRU-4798.10
286	<p>Provide the settings data for each identified protective device included in the single-line diagrams produced to CAL FIRE by PG&amp;E as described in PG&amp;E's letter to Chief Zimmermaker dated March 30, 2018 (Ref #285).</p>	03/17/22	Closed	03/31/22	DRU-4798.11
287	<p>Critical Operating Equipment Notifications, EC Notifications, and Equipment Test Records previously produced to CAL FIRE by PG&amp;E as described in PG&amp;E's letter to Chief Zimmermaker dated March 30, 2018 (Lobo 0118-0122):</p> <p>PGE-CF_000134188-000134189 – COE Notifications and addendum  PGE-CF_000140317-000140317 – Electric Corrective Notifications  PGE-CF_000135236-000135481 – Equipment Test Records</p>	03/17/22	Closed	03/31/22	DRU-4798.12
288	<p>Equipment Test Records previously produced to CAL FIRE by PG&amp;E as described in PG&amp;E's letter to Chief Zimmermaker dated March 30, 2018 (Lobo 0118-0122):</p> <p>PGE-CF_000135236-000135481 – Distribution and Transmission Circuit Breaker Testing</p>	03/17/22	Closed	03/28/22	DRU-4798.13

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
289	AMI/SmartMeter Data responsive to Request No. 1 produced on December 8, 2017 to CAL FIRE by PG&E as described on Page 4 of PG&E's letter to Chief Zimmermaker dated March 30, 2018 (Lobo 0118-0122).	03/17/22	Closed	03/29/22	DRU-4798.14
290	AMI/SmartMeter Data responsive to Request No. 3 produced to CAL FIRE by PG&E as described in PG&E's letter to Chief Zimmermaker dated March 30, 2018 (Lobo 0118-0122):  PGE-CF_000137617-000137617 – AMI/SmartMeter Data and interpretation chart	03/17/22	Closed	03/24/22	DRU-4798.15
291	LC Notifications responsive to Request No. 3 produced to CAL FIRE by PG&E as described in PG&E's letter to Chief Zimmermaker dated March 30, 2018 (Lobo 0118-0122):  PGE-CF_000134190-000134190 – LC Notifications	03/17/22	Closed	03/25/22	DRU-4798.16

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
292	<p>Ref #207 (DRU-4546.06) Supplemental Request: Please provide the following Cyme files that we were unable to locate in the data provided:</p> <p>Narrows 2102  Fulton 1102  Grass Valley 1103  Rincon 1101  West Point 1102  Wyandotte 1105</p> <p>Ref #207: Please provide the PG&amp;E 12 kV and 21kV distribution “planning circuit data” for distribution circuits involved in each of the 2017 and 2018 fires. “Circuit data” for this request can be defined as the distribution system planning studies associated with “circuit models” in (Cyme or another tool used) to include all in 2016 through 2018.</p>	03/22/22	Closed	04/05/22	DRU-4546.30
293	<p>Ref #265 (DRU-4742.02) Supplemental Request. The response provided in DRU-4742.02 did not address or include identification of the individuals and the contractors as requested.</p> <p>Please identify the individuals and the contractors who performed the pre-inspections for routine, second patrol, CEMA, and FPT where the subject fires occurred for the period from 2015 and up to the subject fire at each site.</p>	03/23/22	Closed	04/13/22	DRU-4742.03

Ref #	Scope of Request	Request Date	Status	Date Received	PG&E Ref #
294	<p>Please provide PG&amp;E's overall vegetation management spend by year for 2017 and 2018.</p> <p>Please also provide PG&amp;E's:</p> <ul style="list-style-type: none"> <li>a. Vegetation management spend by year for routine work which includes pre-inspection, VM work, and audits.</li> <li>b. Vegetation management spend by year for the facility protect program (FPP).</li> <li>c. Vegetation management spend by year for CEMA.</li> <li>d. Vegetation management spend by year for AWRR.</li> <li>e. Vegetation management spend by year for the reliability program.</li> </ul>	03/24/22	Closed	04/07/22	DRU-4823.01
295	<p>Please provide the distance on each circuit from the substation to the incident location for each of the wildfires.</p>	04/12/22	Closed	04/20/22	DRU-4869.01

## G. The Root Cause Analysis Team

### The Root Cause Analysis Team

#### **Envista Forensics**

Andrew Bennett, Project Oversight & Fire  
Forensics Lead

Matthew Steiner, Project Infrastructure &  
Interviewer

Kevin Eckert, Vegetation Management SME

Robert Gage, Electric Utility SME

Michael Neal, Vegetation Management SME

#### **Witt O'Brien's**

Charlie Fisher, Project Manager

J. Mark Drexel, Electric Utility Specialist / Lead  
Interviewer

Matthew Olearczyk, Electric Circuitry RCA Lead

Julia Alejandre, Editor

Norberto Dueñas, Stakeholder Feedback SME

Vince Hobbs, California Fire Fighting SME

Doug Mayne, Emergency Management SME

Jason Sirney, Cal. Emergency Management SME

SME: Subject Matter Expert

#### **Julia Alejandre**

Julia Alejandre is an emergency manager with more than 15 years' experience in healthcare and public health. She brings extensive experience bringing together stakeholders with diverse perspectives to create effective and user-friendly documents that are still utilized today. She participated in the after-action review processes and writing of the public health response to H1N1 (2009), Ebola (2015), Zika (2016), and COVID (2022). Julia has led and supported projects in all aspects of emergency preparedness, including plan development, training and exercise, program assessments, and workgroup facilitation. Her industry experience prior to working with Witt O'Brien's includes private industry, nonprofits, and a state health department. Julia is based in Austin, Texas.

#### **Andrew Bennett**

Andrew Bennett oversaw this root cause analysis project for Envista Forensics. He is an Assistant Technical Director of the company's Fire & Explosion division. He has more than 20 years of experience in the public and private sector, conducting approximately 1,600 fire and explosion investigations globally. He is an International Association of Arson Investigators Certified Fire Investigator and a Certified Fire and Explosion Investigator under the National Association of Fire Investigators. He is based in Southern California.

**J. Mark Drexel**

J. Mark Drexel, a senior utility specialist for Witt O'Brien's, has over 40 years of utility leadership experience including nuclear power generation, electric transmission & distribution, emergency management, support operations and project management office. He is a graduate civil engineer, holds a Professional Engineering (PE) license, Project Management Profession (PMP) certification, and an M.S. in Organizational Leadership (MSOL). He is based in the greater New York City area.

**Norberto Dueñas**

Norberto Dueñas is an Emergency Management and Disaster Recovery specialist for Witt O'Brien's with more than 35 years of professional experience in municipal government. As a Senior Project Manager with Witt O'Brien's, Norberto led a team of disaster recovery experts in support of the United States Virgin Islands efforts to receive a \$1.8 billion allocation from the Department of Housing and Urban Development to fund housing, infrastructure, and economic revitalization initiatives. He currently provides COVID-19 advisory support connecting government and business with response initiatives in the areas of continuity of essential services and crisis communication. Prior to joining Witt O'Brien's, he served in a wide range of senior administrative positions with the City of San Jose including as City Manager during a period of severe fiscal and service challenges.

**Kevin Eckert**

Kevin Eckert is a vegetation management expert for Envista. He has 20 years of active, hands-on program research, design, implementation, and management experience. He has developed a high level of knowledge, skills, and abilities with the diversity of issues and challenges encountered in tropical and temperate arboriculture and vegetation management. He is an International Society of Arboriculture (ISA)-Certified Arborist and an ISA-Certified Utility Specialist. He is based in Hawaii.

**Charlie Fisher**

Charlie Fisher, a senior advisor for Witt O'Brien's, served initially as deputy project manager, and later assumed the project manager role, for this project. He has served in several roles for Witt O'Brien's including Senior Managing Director. He led the Illinois Commerce Commission, the state public utility commission from 1995-2001, and has been a consultant on utility, emergency, and crisis management issues for over 20 years on five continents. He is based in North Carolina.

**Robert Gage**

Robert Gage is an independent consulting engineer with Envista Forensics. In addition to forensic investigations, he provides clients with electric utility subject matter expertise for their electric station projects, including design and facilitating design through the System Impact Study process to achieve grid interconnection. His experience was gained during a 40-year career with Niagara Mohawk Power Corporation, where he was a Principal Engineer. He holds a BS in Electrical Engineering, an MBA, and is a Registered Professional Engineer in NY State.

**Vince Hobbs**

Vince Hobbs is a senior emergency management planner and subject matter expert for Witt O'Brien's with 36 years of response and planning experience, including all phases of response to all-risk emergency and disaster incidents. His previous response and planning experience includes working in all phases of large wildland and all-risk incidents from firefighter to Deputy Incident Commander. He has developed training and exercises for state-level response for a wide range of potential incidents. He is based in the central valley of California.

**Doug Mayne**

Doug Mayne is a senior disaster management consultant for Witt O'Brien's. He has worked in all aspects of disaster management at the local, state, and federal level and has supported preparedness, response, and training activities in 8 countries. Doug previously worked for the Federal Emergency Management Agency and as the Director of Emergency Management for the State of Hawaii. He is based out of the Pacific Northwest.

**Michael Neal**

Michael Neal is a vegetation management expert for Envista. He is an ISA-Certified Arborist and Utility Specialist. He provides solutions and strategic planning in integrated vegetation and asset management for clients in the electric and gas industries across the U.S. He holds a BS in Forestry from West Virginia University and has spent a total of 42 years working in vegetation management programs. For 20 of those years, Michael managed the Vegetation Management program at Arizona Public Service Company. He also worked for the Florida Division of Forestry as a county and urban forester, as well as a wildland firefighter. He is based in Idaho.

**Matthew Olearczyk**

Matt Olearczyk is a senior utility specialist for Witt O'Brien's, has 35 years of electric utility power systems experience including electric distribution, planning, engineering, construction, operations, emergency management, and R&D. His previous utility experience includes working at a large investor-owned utility. His industry experience includes managing the Electric Power Research Institute's (EPRI) distribution systems R&D portfolio. He is based in the Research Triangle Region of North Carolina.

**Jason Sirney**

Jason Sirney is Associate Managing Director and Deputy Practice Lead for Witt O'Brien's. On this project he served as the lead California Emergency Management subject matter expert. He has had an extensive career initially as a firefighter for the U.S. Forest Service and for California municipalities and 18 years as the emergency management director serving the City and County of Sacramento. He has served as an assessor for the Emergency Management Accreditation Program for 12 years. He is based in the Sacramento area.

**Matthew Steiner**

Matthew Steiner is a Principal Consultant for Envista Forensics with over 25 years of experience in the investigation and analysis of complex forensic evaluations. He is a licensed Professional Engineer and Structural Engineer in the State of California, and a registered California Safety Assessment Program (SAP) Evaluator and DSW Coordinator. Matthew was the point of contact for document requests, review, organization, research, interviews, and management. He is based in Southern California.