

CALIFORNIA PUBLIC UTILITIES COMMISSION
Safety and Enforcement Division
Wildfire Safety and Enforcement Branch

Incident Investigation Report

Report Date: December 1, 2022

Incident Number: E20211223-01 (Brewer Fire)

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

Date and Time of the Incident: July 7, 2021 at 1800 hours

Location of Incident: 180 feet down Iron Horse Dr. from the intersection of Iron Horse Dr. and Brewer Rd. Grass Valley, Nevada County, CA. (39.058085, -121.087795)

Fatality/Injury: None/None

Property Damage: Greater than \$50,000

Regulated Utility Facilities Involved: Higgins 1103 12kV Distribution Circuit

I. Summary

On the evening of July 7, 2021, at 1800 hours, a fire broke out at the intersection of Brewer Road and Iron Horse Drive in Grass Valley, Nevada County, California. The California Department of Forestry and Fire Protection (CAL FIRE) responded and contained the fire to 5.5 acres; no structures were burned. At 2030 hours on July 7, 2021, the PG&E troubleman and CAL FIRE investigator observed a piece of metal equipment glowing red at the top of the pole on the side of Iron Horse Drive on the Higgins 1103 12kV circuit. CAL FIRE eliminated all other causes for the fire and although no physical evidence was found, CAL FIRE concluded that the cause was most likely a heated piece of metal from the electrical equipment, which must have fallen on the dry grass below. Pacific Gas and Electric (PG&E) did not report the fire to the California Public Utilities Commission (CPUC) at the time the incident occurred because the fire did not meet the reporting criteria – no structures had burned, there were no injuries or fatalities, and there was no significant media coverage at the time of the fire.

Months later, on December 22, 2021, PG&E received a claim for over \$50,000 in property damage at the incident location. Because PG&E received a claim for property damage in excess of \$50,000, the incident now met the criteria for reporting to the CPUC. PG&E reported the fire to the CPUC the following day, on December 23, 2021. The Safety Enforcement Division's (SED) investigation of the incident revealed that PG&E violated several requirements in General Order (GO) 95 Rules for Overhead Electric Line Construction. The violations identified are listed below.

A. Rules and Requirements Violated

	Rule	Violation
1.	GO 95, Rule 18	PG&E failed to complete a work order, which identified a safety hazard, within the prescribed timeline.
2.	GO 95, Rules 31.1	PG&E failed to use Infrared cameras in accordance with accepted good practices.
3.	GO 95, Rules 31.1	PG&E failed to comply with its internal procedures for repairing electrical facilities with elevated temperatures within the utility's prescribed timeline.
4.	GO 95, Rules 31.1	PG&E failed to comply with its internal procedures for replacing poles with excessive woodpecker damage.
5.	GO 95, Rules 31.1	PG&E failed to comply with its internal procedures for addressing work orders within an internally prescribed timeline.
6.	GO 95, Rules 31.1	PG&E's field safety reassessments are not in accordance with accepted good practices.

General Order 95, Rule 18 – Maintenance Programs and Resolution of Potential Violations of General Order 95 and Safety Hazards states in part:

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. Companies that are subject to GO 165 may maintain procedures for conducting inspections and maintenance activities in compliance with this rule and with GO 165.

General Order 95 Rule 31.1 – Design, Construction and Maintenance¹ states in part:

For all particulars not specified in these rules, design, construction, and maintenance should be done in accordance with accepted good practice for the given local conditions known at the time by those responsible for the design, construction, or maintenance of communication or supply lines and equipment.

B. Witnesses

	Name	Title
1.	Will Dundon	CPUC Lead Investigator
2.	John Lee	CAL FIRE Fire Captain
3.	[REDACTED]	PG&E Incident Investigator
4.	[REDACTED]	PG&E Troubleman

¹ The scope of this investigation with regard to GO 95 Rule 31.1 excludes the Wildfire Mitigation Plan (WMP) which investor-owned electric utilities are required to file with the Office of Energy Infrastructure Safety (OEIS).

C. Evidence

	Source	Title
1.	PG&E	Initial Incident Report, 12/23/2021
2.	PG&E	20-Day Report, 01/21/2022
3.	CAL FIRE	CAL FIRE Investigation Report, 07/13/2021 (sent by PG&E to CPUC with 20-Day Report)
3.	CPUC	Data Request SED-01 (DR-1), 03/29/2022
4.	PG&E	Data Request Response to DR-1, 05/02/2022 (partial)
5.	PG&E	Data Request Response to DR-1, 05/18/2022 (partial)
6.	PG&E	Data Request Response to DR-1, 05/31/2022 (partial)
7.	PG&E	Data Request Response to DR-1, 06/13/2022 (partial)
8.	CPUC	Data Request SED-02 (DR-2), 06/24/2022
9.	PG&E	Data Request Response to DR-2, 07/25/2022
10.	CPUC	Data Request SED-03 (DR-3), 08/02/2022
11.	PG&E	Data Request Response to DR-3, 08/11/2022

II. Background

The Brewer Fire occurred on July 7, 2021 at 1800 hours at the intersection of Brewer Road and Iron Horse Drive in Grass Valley, Nevada County, CA (the Incident Location). The incident originated at Pole 100018477 (the Incident Pole) on the Higgins 1103 12kV circuit. Pole inspections and Infrared (IR) inspections had identified issues on this pole within three years prior to the incident. The area of the Incident Location is in a Tier 2 High Fire Threat District (HFTD). Figure 1 shows a satellite view of the Incident Area. According to PG&E's troubleman, who spoke with the CAL FIRE investigator on site, the fire burned 5.5 acres of wildland, but no structures, and was contained by 2030 hours on July 7, 2021. A total of 100 customers sustained a 120-minute outage on July 8, 2021 during repairs to the Incident Pole after the fire was contained.²

² Pacific Gas and Electric Company. "Electric Incident Report Form" (20-Day Report for PG&E Incident EI210707A), Page 2. January 21, 2022.

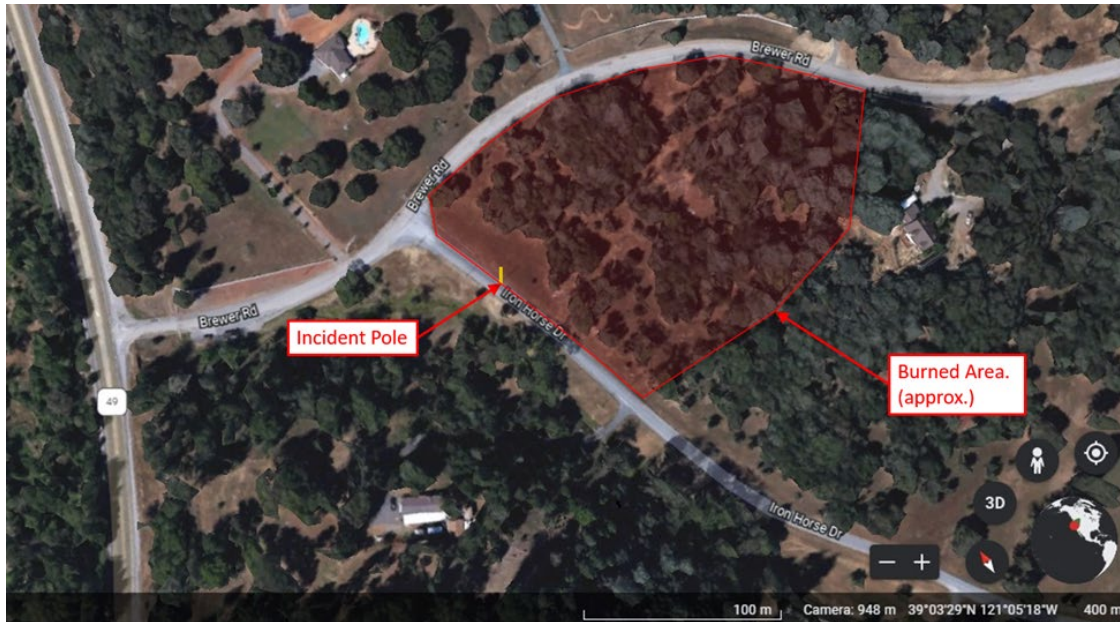


Figure 1: Map of the Incident Area

The nearest weather station to the Incident Area is 4.4 miles away and recorded temperatures of 91.9°F, relative humidity of 23%, wind speed of 3.7 miles per hour (MPH), and wind gust speed of 7.0 MPH on the day of the Brewer Fire. These conditions did not meet the PG&E requirements for a Public Safety Power Shutoff (PSPS) activation.³

On July 13, 2021, PG&E received an incident report from the Fire Authority (CAL FIRE) which indicated that electrical facilities were the most probable cause of the fire. Five months later, on December 22, 2021, the property owner near the Incident Location submitted a claim to PG&E alleging that PG&E equipment caused property damages which exceeded \$50,000. On December 23, 2021, PG&E reported the incident to the California Public Utilities Commission (CPUC) under the Property Damage criterion.

III. Fire Authority Report

CAL FIRE was the Fire Authority which responded to the Brewer Fire. The CAL FIRE report was filed on July 13, 2021 and listed no deaths or injuries and no estimated property losses. The report indicates that the fire was first identified on July 7, 2021 at 1800 hours, the fire was officially listed as controlled on July 10, 2021 at 1640 hours, and the fire was listed as cleared at 1840 hours. The CAL FIRE report further indicates that the material that first ignited was grass at the base of the power pole located near the intersection of Brewer Road and Iron Horse Drive in Grass Valley, California. According to the CAL FIRE report, when CAL FIRE arrived at the scene, they saw an approximately 0.5-acre fire spreading Southeast from the road. CAL FIRE responded and contained the fire to 5.5 acres.

CAL FIRE's report concluded that the Brewer fire was most probably caused by failure of the power pole hardware parts possibly arcing and/or melting and then falling onto the dry

³ Pacific Gas and Electric Company. "Data Request Response to DR-1", Response to Question 48. May 2, 2022.

vegetation below. The investigation at the Incident Pole revealed a hot glowing bolt at the top of the power pole. Other possible causes (lightning, children, vehicles, and smoking) were excluded, which left the most probable cause of the fire as the electrical distribution equipment.⁴

IV. SED Review and Analysis

A. Review of Event Timeline

SED reviewed the timeline of events reported by PG&E once the incident met the criteria for a CPUC reportable incident, which was five months after the fire.

1. Incident Timeline

PG&E's 20-Day Report for the Brewer Fire detailed the following timeline for the incident⁵: On July 7, 2021 at 1800 hours, a CAL FIRE Captain was dispatched by the Grass Valley Emergency Command Center to a vegetation fire located near the intersection of Brewer Road and Iron Horse Drive in Nevada County from the Higgins Corner fire station engine 2382. Upon arriving, the Fire Captain saw an approximately 0.5-acre fire spreading Southeast from the road. At 1915 hours a PG&E field supervisor arrived at the Incident location and called for a troubleman to come inspect and photograph the pole. The troubleman arrived between 1930 and 1945 hours but CAL FIRE denied access to the Incident Pole until the fire was completely out, and the CAL FIRE investigator had arrived. At 2030 hours, the CAL FIRE investigator asked the PG&E troubleman to observe a glowing red bolt at the paddle jumper⁶ at the top of the power pole. Figure 2 and Figure 3 below shows the photo taken by the troubleman on site.



Figure 2: Glowing bolt identified in 20 Day Report.



Figure 3: Glowing bolt and switch equipment from 20 Day Report.

⁴ California Department of Forestry and Fire Protection. "Investigation Report for Incident Number 21CANEU0017610", Pages 2-3. July 13, 2021.

⁵ 20-Day Report for PG&E Incident EI210707A, Page 2.

⁶ A jumper carries the electric current from one side of the pole to the other, without energizing the pole itself. On the Incident Pole, the jumper carries the electric current from through the electrical switch at the top of the pole. The paddle jumper extends from the switch and connects to the jumper conductor through a wedge connector.

At 2030 – 2045 hours, the PG&E supervisor called in a repair crew to fix the jumper on the Incident Pole. By 2300 hours, the repair crew arrived on site, the troubleman deenergized the line, and the repair crew began working.

Emergency repair work was completed on July 8, 2021 at 0100 hours, at which time the troubleman reenergized the line. At 0400 hours a notification was created to request the replacement of the switch 2295 at the Incident Pole, and at 0920 hours a notification was created calling for the replacement of the pole and switch equipment.

The fire was reported as controlled and cleared by 1840 hours on July 10, 2021. CAL FIRE submitted its Fire Report on July 13, 2021.

2. Timeline of Events Following the Incident

Based on the size of the Brewer fire, that no structures burned, and there were no injuries or fatalities, PG&E did not anticipate this would be a reportable incident to the CPUC. PG&E preserved the paddle jumper and bolt from the Incident Pole, but the 20-Day Report confirmed that in the months following the Incident, they were later discarded, when the utility thought the investigation was over.⁷ On December 22, 2021, the property owner at the Incident Location submitted a claim to PG&E alleging that PG&E equipment caused property damage of more than \$50,000. On December 23, 2021, PG&E reported the incident to the CPUC under the Property Damage criterion.

B. SED Field Observations

SED conducted a single site visit to the Incident Location. Since the fire occurred in July 2021, and the incident was not reported to the CPUC until December 2021, by the time of the SED site visit on March 10, 2022, the Incident Pole and electrical facilities had been replaced.

1. Site Visit at Incident Location

On Thursday, March 10, 2022, at 11:30 am, SED met with the PG&E Investigator, PG&E Case Manager, and PG&E troubleman who responded to the Brewer Fire Incident at 21866 Iron Horse Rd, Grass Valley, CA to observe the Incident Location. When SED first arrived at the Incident Location, the Incident Pole and equipment had already been replaced (Figure 4). The distribution line in the incident area was three phase 12kV. SED observed a new switch installed on the new incident pole (Figure 5 and Figure 6). SED also observed a Snuffer installed on the new pole (Figure 7). The PG&E troubleman explained that the Snuffer is a protective device that emits a fire suppressant powder when an arc occurs, and if an arc is detected, all three phases open at once. The PG&E incident investigator confirmed that the utility discarded the paddle jumper with the hot bolt collected from the Incident Pole because the incident was not anticipated to be reportable to the CPUC. Finally, SED observed burned trees and bushes in the wildland adjacent to the Incident Pole (Figure 8 and Figure 9).

⁷ Pacific Gas and Electric Company. “Data Request Response to DR-1”, Response to Question 4. May 18, 2022.



Figure 4: Incident Location and Incident Pole on Iron Horse Rd. in Grass Valley, CA.



Figure 5: New equipment on top of pole.



Figure 6: Troublemaker identifying new paddle jumper.



Figure 7: Close-up of new wedge connector (1), bolts on new paddle jumper (2), and switch equipment (3).



Figure 8: Burned trees looking towards Incident Pole.



Figure 9: Burned trees near property structures.

C. SED Document Review and Investigation

1. Maintenance Programs

General Order (GO) 95 Rule 18 requires regulated utilities to establish maintenance programs for its facilities and sets maximum time periods to complete corrective actions associated with potential violations of GO 95⁸ or “Safety Hazards.”⁹ Priority Level 1 is defined as an immediate risk and requires corrective action immediately; Priority Level 2 is defined as a risk of moderate potential impact and requires corrective action within 6 months in Tier 3 HFTD, within 12 months in Tier 2 HFTD or if worker safety is compromised, and 36 months for all others; Priority Level 3 is any risk of low potential impact and generally requires corrective action within 60 months.¹⁰

PG&E has its own internal prioritization levels to comply with GO 95 Rule 18. When PG&E’s electrical utility assets are inspected, and repair or corrective work is needed, the work is prescribed by an Electrical Corrective Notification tag (EC Tag). Each tag has a specific number associated with it to track that work progress. EC Tags are given priority levels which correspond to different types of work and different required due dates. According to PG&E Procedure TD-8999B-001, Priority A tags require immediate response or stand-by; Priority B tags are required to be addressed between 30 and 90 days; Priority E and F tags are completed based on risk-based circuit prioritization; and Priority H tags are part of proactive/system hardening projects.¹¹

Based on the significant increase in volume of tags from the 2019 Wildfire Safety Inspection Program (WSIP) PG&E initiated, the utility anticipated that many EC Tags would not be completed by the initially scheduled completion date. PG&E Procedure TD-8999B-001 describes a modified execution approach where Priority E and F tags are subject to a safety re-assessment prior to the start of Fire Season (as determined by CAL FIRE). These incomplete Priority E and F tags subject to field safety re-assessments (FSRs) have a “trained and qualified inspector” re-assess the condition of the identified open corrective action by inspecting the utility facilities in the field.¹² The inspector documents that field condition, and determines if there is an urgency that would escalate the tag to Priority A or B. If the inspector does not determine there is urgency to escalate, the due date is extended, often by 12 months. Tags from any inspection (visual, IR, intrusive, etc.) can be subject to the FSR process.

⁸ California Public Utilities Commission. “Rules for Overhead Electric Line Construction.” (General Order No. 95, or GO-95), Page I-9 – I-11. Last revised January 16, 2020.

⁹ For purposes of GO 95, Rule 18, “Safety Hazard” means a condition that poses a significant threat to human life of property. (GO 95, Page I-8.)

¹⁰ GO 95, Page I-10.

¹¹ Pacific Gas and Electric Company. “PG&E’s 2019 Corrective Tag Execution Approach.” (Utility Bulletin: TD-8999B-001), Page 2. Last revised November 23, 2019. Provided to SED in PG&E’s Data Request Response to DR-1, Question 5, on June 13, 2022.

¹² Utility Bulletin: TD-8999B-001, Page 3.

2. Infrared Inspection

PG&E performs Infrared inspections of utility equipment as part of its mitigation efforts to reduce the impact of wildfires. Infrared inspections help identify potentially damaged or faulty components that cannot be detected by visual inspection methods alone.

On October 29, 2020, an Infrared (IR) inspection of the Higgins 1103 12kV circuit identified an abnormal condition (elevated temperature) at the wedge connector, paddle jumper, and bolts on the Incident Pole. On November 9, 2020 EC Tag #119998009 was created as Priority E, with a due date of April 28, 2021 to address the abnormal condition.¹³

The Forward Looking Infrared (FLIR) image attached to the October 29, 2020 IR inspection report (Figure 10) showed a hot spot temperature of 320.4°F at the overheating jumper connection, and a normal temperature of 75.2°F at a normal jumper connection, which equates to a 245.2°F temperature differential (ΔT).¹⁴ The image shows an elevated temperature which is not visible to the naked eye. PG&E Procedure TD-2022P-01 provides a table which indicates priority levels for overheating equipment based on the absolute hot spot temperature (Figure 11).¹⁵

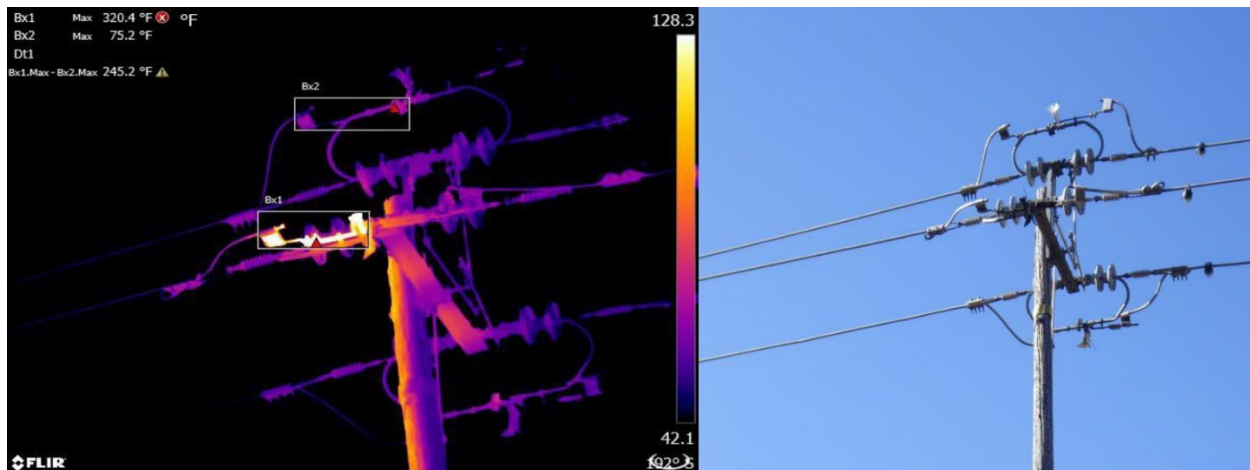


Figure 10: FLIR image from October 29, 2020 inspection of Switch 2295 showing maximum and differential temperature between two jumper connections. The temperature differential measured is 245.2°F.

¹³ Pacific Gas and Electric Company. “Electric Overhead Tag Notification #119998009.” (EC Tag #119998009), Date Identified October 29, 2020. Latest comments added March 31, 2021.

¹⁴ Pacific Gas and Electric Company. “Infrared Data Sheet for October 29, 2020 Inspection of Higgins 1103 Circuit.” (FLIR image attachment). Provided to SED in PG&E’s Data Request Response to DR-1, Question 1, on May 18, 2022 as an attachment to PG&E’s “Grass Valley – Property Damage Event Analysis Report.” Page 21. May 5, 2022.

¹⁵ Pacific Gas and Electric Company. “Infrared (IR) Inspections of Electric Distribution Facilities.” (PG&E Procedure: TD-2022P-01), Page 6. Last revised May 15, 2018.

Differential Temperature (ΔT) Analysis			
Distribution Facilities	Condition	Temperature Differential (ΔT)	Priority/Due Date
Connector and switch	Normal	$\Delta T \leq 25^{\circ}\text{C}$ $\Delta T \leq 45^{\circ}\text{F}$	No maintenance required.
	Minor	$25^{\circ}\text{C} < \Delta T \leq 45^{\circ}\text{C}$ $45^{\circ}\text{F} < \Delta T \leq 81^{\circ}\text{F}$	Write EC tag with Priority E. Complete within 180 days.
	Medium	$45^{\circ}\text{C} < \Delta T \leq 60^{\circ}\text{C}$ $81^{\circ}\text{F} < \Delta T \leq 108^{\circ}\text{F}$	Write EC tag with Priority B. Complete within 90 days.
	Severe	$\Delta T > 60^{\circ}\text{C}$ $\Delta T > 108^{\circ}\text{F}$	Write EC tag with Priority B. Complete within 30 days.

Figure 11: Table from PG&E Procedure TD-2022P-01 showing prioritization of corrective action based on the temperature differential (ΔT) between overheating equipment and normally functioning equipment.

Based on PG&E Procedure TD-2022P-01, a ΔT greater than 108°F requires an EC Tag with Priority B and requires repair work to be completed within 30 days. However, EC Tag #119998009 was created from this IR inspection as Priority E and required the repair work be completed within 180 days instead of the required 30 days per PG&E Procedure TD-2022P-01.

PG&E explained in its Event Analysis Report (EAR) for the Brewer Fire that when the EC Tag #119998009 form was created, the clerk annotated the notification with an incorrect ΔT and initially assigned an incorrect due date for the tag Priority B due 90 days from the inspection.¹⁶ The EAR further explains that a PG&E gatekeeper, who was responsible for reviewing the work of the clerk who created the EC Tag that day, downgraded EC Tag #119998009 to be Priority E. According to the EAR, the gatekeeper annotated that the hot spot temperature was 128.3°F and that the ΔT was 57.2°F . The gatekeeper misidentified the FLIR image's temperature scale (the vertical bar on the right side of the display on Figure 10) for actual temperature readings. According to the table shown in Figure 11, this ΔT would require a Priority E tag with a due date of 180 days. The due date for EC Tag #119998009 was set for April 28, 2021, six months after the notification was created.

Since EC Tag #119998009 was downgraded to Priority E and was not expected to be completed by its due date, April 28, 2021, it was subject to a FSR on March 12, 2021. This visual inspection, that was performed without IR cameras, concluded that the equipment was in good condition and added comments to the EC tag stating "Ok to cancel tag. Switch is in good condition." On March 31, 2021 a PG&E gatekeeper subsequently cancelled EC Tag #119998009.¹⁷ On July 7, 2021, the PG&E troubleman and CAL FIRE investigator who responded to the Brewer Fire observed a glowing red bolt on the paddle jumper in the location that the IR inspection identified an elevated temperature on October 29, 2020.

¹⁶ Pacific Gas and Electric Company. "Grass Valley – Property Damage Event Analysis Report" (Event Analysis Report), Page 10. May 5, 2022.

¹⁷ Event Analysis Report, Page 10.

In addition, PG&E's EAR explains that after the Brewer Fire, PG&E performed a search for notifications that were canceled in similar circumstances to EC Tag #119998009. The search looked for EC Tags which were created from IR inspections and were later cancelled. This search returned 52 results between 2018 and 2021. Of those results, 16 EC Tags were discovered to have been cancelled without proper use of IR cameras to verify that the temperatures of electrical facilities were within accepted levels.¹⁸ The EAR notes that internal procedures have been changed to not allow EC Tags created from IR inspections to be cancelled by a visual only inspection.¹⁹ PG&E also confirmed that none of the other EC Tags discovered to have been inappropriately cancelled resulted in a fire captured in the PG&E ignition tracker.²⁰

SED asked PG&E if a similar search was performed for notifications created from IR inspections which were assigned incorrect due dates, since in the case of the Brewer Fire, the inappropriately assigned EC Tag led to the cancellation of the work order. PG&E stated that the utility did not perform any analysis into whether Priority E or F tags created from IR inspections should have been assigned higher priorities.²¹

In response to SED's second Data Request, PG&E attested that the only training provided by the utility for clerks and gatekeepers creating EC Tags and assigning priorities to tags related to IR inspection is PG&E Procedure TD-2022-P-01. Procedure TD-2022-P-01 provides guidance on how to perform Infrared inspections of electric distribution facilities but does not contain guidance on how to read the images produced by infrared cameras.²² Since the Brewer Fire, PG&E has also stated that the utility's Compliance Manager has provided guidance to PG&E gatekeepers, instructing them that EC tags created from IR inspections should not be cancelled without a new IR reading.²³ PG&E has not stated in its EAR or responses to SED Data Requests that any changes have been made to internal procedures that would reduce the likelihood of someone mistaking the temperature scale maximum for the hot spot temperature reading of an FLIR image, as the clerk and gatekeeper did on EC Tag #119998009 prior to the Brewer Fire.

3. Woodpecker Damage Inspection

PG&E is required to perform regular inspections of its electrical facilities in accordance with GO 165.²⁴ On June 6, 2018, a PG&E inspection, performed pursuant to GO 165, requested that the Incident Pole be assessed for woodpecker damage and created EC Tag #114668140 with a due date of June 6, 2019 to perform the work. On February 14, 2019, EC Tag #114668140 was recorded as complete and noted that the woodpecker holes were fixed on January 31, 2019.²⁵

¹⁸ Event Analysis Report, Pages 4-5.

¹⁹ Event Analysis Report, Page 3.

²⁰ Pacific Gas and Electric Company. "Data Request Response to DR-3", Response to Question 1b. August 10, 2022.

²¹ Pacific Gas and Electric Company. "Data Request Response to DR-3", Response to Question 1a. August 10, 2022.

²² Pacific Gas and Electric Company. "Infrared (IR) Inspections of Electric Distribution Facilities." (PG&E Procedure: TD-2022P-01), Last revised May 15, 2018.

²³ Pacific Gas and Electric Company. "Data Request Response to DR-2", Response to Question 4b. July 25, 2022.

²⁴ California Public Utilities Commission. "Inspection Requirements for Electric Distribution and Transmission Facilities." (General Order No. 165, or GO-165), Page 2. Last revised December 14, 2017.

²⁵ Pacific Gas and Electric Company. "Electric Overhead Tag Notification #114668140." (EC Tag #114668140), Date Identified June, 6, 2019. Latest comments added August 25, 2019.

PG&E clarified in response to SED's second Data Request that only a single large woodpecker hole was identified and repaired under EC Tag #114668140.

After EC Tag #114668140 was marked as completed, the Incident Pole was inspected again as part of the PG&E Wildfire Safety Inspection Program (WSIP) that began in 2019. PG&E performed an intrusive test and inspected the Incident Pole once again on March 27, 2019. This intrusive test, performed two months after the single large woodpecker hole was repaired, noted excessive woodpecker and insect damage on the Incident Pole. EC Tag #116854528 was created with a due date of March 27, 2020.²⁶ On May 9, 2020, after PG&E failed to meet the due date, a FSR was performed on EC Tag #116854528 noting significant bird damage and shell rot and recommended that the pole and switch be changed out ahead of the 2021 fire season. On March 12, 2021 a second FSR was performed on EC Tag #116854528 and the PG&E inspector initially noted that the pole was in good condition and did not need replacement based on a visual inspection.

The comments noted on EC Tag #116854528 from this second FSR recommended the EC Tag be cancelled. However, a PG&E gatekeeper who reviews these inspection comments blocked the cancelation of EC Tag #116854528 noting that the recommendation for replacement was based on intrusive data, and a visual FSR could not overturn that recommendation. Final comments added to EC Tag #116854528 called for the pole to be replaced by May 31, 2022 (prior to the 2022 Fire Season). The Incident Pole was replaced after it was damaged by the Brewer Fire.

SED reviewed PG&E's Overhead Inspection Job Aid, TD-2305M-JA02, which outlines procedures for woodpecker hole inspection and repair. The procedure lists criteria that must be met to determine that a pole is suitable for repair of its woodpecker damage, rather than requiring a full replacement. One of the requirements is as follows: "The maximum sum of the diameters of the [woodpecker starter] holes must be less than 9 inches wide in a 1-foot vertical section."²⁷

A photograph provided by PG&E in response to SED's second Data Request showing the Incident Pole after the single large hole repair work performed under EC Tag #114668140 also shows several starter holes less than 3 inches in diameter (Figure 12).²⁸

²⁶ Pacific Gas and Electric Company. "Electric Overhead Tag Notification #116854528." (EC Tag #116854528), Date Identified March 27, 2019. Latest comments added July 19, 2021.

²⁷ Pacific Gas and Electric Company. "Job Aid: Overhead Inspection." (PG&E Procedure TD-2305M-JA02), February, 2021.

²⁸ Pacific Gas and Electric Company. "Data Request Response to DR-3." Response to Question 5. July 25, 2022.



Figure 12: Incident Pole with repair of the single large woodpecker hole indicated and showing the excessive woodpecker damage which was noted after that repair.

As quoted above, PG&E Procedure TD-2305M-JA02 states that multiple starter holes totaling over 9 inches in diameter in a single 1-foot vertical section, requires pole replacement rather than repair, and Figure 12 shows the completed repair work for EC Tag #114668140. Figure 12 also shows what appears to be a cluster of starter holes totaling more than 9 inches in diameter in a single 1-foot vertical section on the Incident Pole. SED finds that, according to PG&E Procedure TD-2305M-JA02, the Incident Pole should have been replaced, rather than repaired, under EC Tag #114668140. This is further evidenced by the fact that 2 months after the repair of the single large woodpecker hole, the pole was scheduled for replacement by PG&E under EC Tag #116854528.

The woodpecker damage EC Tag #116854528 had two FSRs conducted, which cumulatively resulted in delaying the due date for replacing the Incident Pole by over two years. The original due date was March 27, 2020 and the final comments on the tag extended that due date to May 31, 2022. The Incident Pole was replaced prior to that final due date because of the Brewer Fire. PG&E's EAR also noted that the visual inspection of the Incident Pole during the second FSR almost resulted in the cancellation of the EC Tag. The EAR states that the "notification was updated on March 12, 2021, during an FSR which suggested the pole condition was good."²⁹ Notes in the comment section of EC Tag #116854528 state "Ok to cancel tag." However, the recommendation to cancel the work order to replace the pole was not approved by the gatekeeper who later noted in the comment section of EC Tag #116854528 that the original notification was based on pole test data (intrusive) which cannot be dismissed by a visual inspection. Unlike the

²⁹ Event Analysis Report, Page 10.

misreading of the FLIR image, this time the PG&E gatekeeper correctly identified that the intrusive test inspection should not be able to be cancelled by a visual inspection alone.

V. Violations

SED reviewed and analyzed inspection and maintenance records and investigation reports related to this incident to determine compliance with Commission regulations. SED's investigation discovered six violations as detailed below.

General Order 95, Rule 18 – Maintenance Programs and Resolution of Potential Violations of General Order 95 and Safety Hazards states in part:

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. Companies that are subject to GO 165 may maintain procedures for conducting inspections and maintenance activities in compliance with this rule and with GO 165.

Violation 1

GO 95 Rule 18 states that CPUC regulated utilities must establish auditable maintenance programs which record inspections and provide timelines 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. EC Tag #119998009 identified a Safety Hazard: the severely elevated temperature of the paddle jumper and bolts on the Incident Pole observed with an IR camera. In addition, the corrective action work order to fix the overheating equipment was eventually cancelled and therefore not completed in the prescribed timeline.

PG&E's maintenance program failed to ensure that the Safety Hazard identified in EC Tag #119998009 was fixed and in good condition. This failure resulted in the cancellation of EC Tag #119998009 and is a violation of GO 95 Rule 18. PG&E acknowledged and identified this violation in its EAR for the Brewer Fire.

General Order 95 Rule 31.1 – Design, Construction and Maintenance states in part:

For all particulars not specified in these rules, design, construction, and maintenance should be done in accordance with accepted good practice for the given local conditions known at the time by those responsible for the design, construction, or maintenance of communication or supply lines and equipment.

Violation 2

GO 95 Rule 31.1 states that CPUC regulated utilities must maintain its facilities in accordance with accepted good practices. The cancellations of EC Tag #119998009 and the 15 other EC Tags which were created with IR cameras but cancelled without the use of an IR camera to

verify field conditions, are failures of PG&E's maintenance program. The IR camera is specifically used to identify conditions that are frequently not visible to the naked eye. The cancellation of EC Tags via visual inspection only (without using the IR camera) is in direct contradiction of the purpose of the IR camera.

These cancellations are not safe operation of IR camera equipment and do not meet accepted good practices as they are a failure of common sense, and a clear misunderstanding of the purpose, intent, and appropriate use of IR camera. The failure to use IR cameras in accordance with accepted good practices is a violation of GO 95 Rule 31.1.

Violation 3

GO 95 Rule 31.1's requirement to use accepted good practices extends to requiring regulated utilities to follow their internal procedures, as those are accepted as good practices by the utility. PG&E Procedure TD-2022P-01 requires that elevated temperature differentials at connectors and switches greater than 108°F ΔT require an EC Tag with Priority B and require repair work to be completed within 30 days. However, EC Tag #119998009 was given Priority E and was required to be completed within 180 days when it should have been given Priority B and completed within 30 days of identification, based on its temperature differential reading of 245.2°F. PG&E's clerk and gatekeeper who created the EC Tag did not understand how to read the hot spot temperature on the FLIR image, which is the output of the IR camera.

This failure to read the FLIR directly led to the EC Tag being assigned the wrong priority for repair work for a distribution facility with a condition noted as "severe" per PG&E Procedure TD-2022P-01 "Infrared (IR) Inspections of Electrical Distribution Facilities. PG&E's failure to comply with the utility's internal procedures for repairing equipment hot spot temperatures is a violation of GO 95 Rule 31.1.

Violation 4

GO 95 Rule 31.1's requirement to use accepted good practices extends to requiring regulated utilities to follow their internal procedures, as those are accepted as good practices by the utility. PG&E Overhead Inspection Job Aid, Procedure TD-2305M-JA02, states that utility poles with woodpecker damage must be replaced, not repaired, if the sum of the diameters of the woodpecker starter holes is greater than 9 inches in a given one-foot vertical section. The photo provided by PG&E showing the repair work which patched a single, large woodpecker hole on January 31, 2021 also shows excessive woodpecker damage which meets the criteria to require the pole be replaced, rather than repaired. This is further evidenced by the fact that within two months of the repair work being completed under EC Tag #114668140, another PG&E inspection called for the pole to be replaced under EC Tag #116854528.

Based on the excessive woodpecker damage to the Incident Pole, PG&E should have replaced, rather than repaired, the pole under EC Tag #114668140. PG&E's failure to comply with the utility's internal procedures for replacing poles with excessive woodpecker damage is a violation of GO 95 Rule 31.1.

Violation 5

GO 95 Rule 31.1's requirement to use accepted good practices extends to requiring regulated utilities to follow their internal procedures, as those are accepted as good practices by the utility. From the 2019 WSIP inspection of the Incident Pole, PG&E created EC Tag #116854528, a Priority E tag with a 12-month timeline to complete the work per PG&E Procedure TD-8999B-001. The due date was March 27, 2020 and PG&E did not perform a FSR until May 9, 2020, two months after the due date. PG&E failed to meet the due date, required by its internal procedure. PG&E's failure to comply with the utility's internal procedures for maintenance due dates is a violation of GO 95 Rule 31.1.

Violation 6

PG&E's field safety re-assessment (FSR) program outlined in PG&E Procedure TD-8999B-001 allows the utility to perform inspections after the corrective action deadlines. This defies the purpose of the corrective action deadline, which is to promote risk-reduction.

In the instance of the Brewer Fire, if a FSR had not been performed on March 31, 2021, and the work for EC Tag #119998009 had been completed by its due date of April 28, 2021 (which was already approximately five months late due to misreading the FLIR images), the fire on July 7, 2021 could have been averted.

In addition, EC Tag #116854528 was created on March 27, 2019 and called for the Incident Pole to be replaced due to excessive woodpecker damage by March 27, 2020 (within 12 months of the inspection.) However, FSRs were performed on this EC Tag two years in a row and each FSR delayed the due date for pole replacement by an additional 12 months. The last due date for the replacement work noted in the comment section of the EC tag is May 31, 2022 (over 2 years later than the original due date).

This process is not logical, nor is it in line with good risk-reduction practices. PG&E's failure to maintain equipment according to PG&E's internal procedures for maintenance due dates and flawed FSR program is not in accepted good practices and is a violation of GO 95 Rule 31.1.

VI. Conclusion

SED's investigation finds multiple gaps in PG&E's maintenance program which resulted in several GO 95 violations regarding the Brewer Fire incident. The violations include failure to repair a Safety Hazard in a timely manner, failure to use inspection equipment properly, failure to comply with internal maintenance deadlines, failure to comply with internal procedures for pole replacement, and a failure of the Field Safety Reassessment program to reduce risk and safely maintain facilities.

PG&E uses technical equipment and methods to inspect its electrical facilities. General Order (GO) 165 mandates regular inspections, and PG&E has conducted additional inspections since 2019 specifically to increase safety and prevent wildfires. Technical inspection methods, such as infrared cameras and intrusive pole tests, are critical to understanding the reliability of electrical facilities because many abnormalities and faults are not detectable to the naked eye. However, despite using these techniques and detecting faulty equipment, PG&E's maintenance programs has gaps in it that can lead to critical work being substantially delayed and even cancelled. In the

case of the Brewer Fire, the delay and subsequent cancellation of the work order to repair a jumper cable with an elevated temperature of 320.4°F led to a 5.5-acre wildfire and over \$50,000 worth of property damage.

SED finds that many of the gaps in PG&E's maintenance program are tied to the Field Safety Reassessment (FSR) program. Although the FSR's program's intent is to evaluate work that cannot be completed on time prior to fire season, and assess if it needs to be expedited, SED finds these reassessments allow PG&E to inappropriately cancel critical maintenance work with visual inspections, rather than inspections using technical methods, and allow PG&E to delay work by 12 months annually before fire season.

For example, in the case of overheating equipment noted from PG&E's October 2020 Infrared (IR) inspection of a power pole, multiple human errors caused the repair work to be delayed, but it was the visual FSR conducted in March 2021 that caused the work to be cancelled entirely. Additionally, in the case of the excessive woodpecker damage noted from PG&E's March 2019 Wildfire Safety Inspection Program (WSIP) inspection, a PG&E inspection recommended a power pole for replacement within 12 months, by March 2020, due to findings from an intrusive test on the pole. However, a visual FSR conducted in May 2020 delayed that work to April 2021. Then a second visual FSR conducted in March 2021 delayed that work again to May 2022.

PG&E's flawed FSR program has resulted in inappropriate work cancellation and maintenance delays of at least 2 years. Most strikingly, there is no limit to how many times PG&E can delay work by using the FSR program, so long as it is deemed "Priority E" or "Priority F" according to the utility's standards. These failures allow PG&E to evade their own maintenance due dates and provides PG&E with an outlet to not be held accountable to maintaining their electrical facilities in a timely manner. In the case of the excessive woodpecker damage mentioned above, the pole was never replaced due to woodpecker damage. Instead, PG&E was able to delay that work until a wildfire damaged the pole and brought enough attention to warrant replacement. To provide safe and reliable service, PG&E's maintenance program should be proactive and require that maintenance deadlines are met, rather than allow these deadlines to be delayed until something as catastrophic as a wildfire occurs. However, the Brewer Fire incident demonstrates the flaws of PG&E's maintenance program and its failure to provide safe and reliable service.

Finally, if SED becomes aware of additional information that could modify SED's findings in this report, SED may re-open the investigation. If so, SED may modify this report and take further actions as appropriate.