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

Incident Investigation Report

Incident No. E20201009-01
June 2, 2022

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Report Date: June 2, 2022

Incident Number: E20201009-01

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

Date and Time of Incident: September 27, 2020 at 1442 hours

Location of the Incident: Zogg Mine Road and Jenny Bird Lane
Igo, CA
County: Shasta

Fatality / Injury: 4 fatalities and 1 injury

Property Damage: >$50,000,000[1]

Utility Facilities Involved: Girvan 1101, 12 kV Circuit

Violation(s): Yes

I. Summary

On September 27, 2020, at approximately 1442 hours, a Gray Pine tree failed and fell onto PG&E 12 kV overhead conductors located a quarter mile southeast of the intersection of Zogg Mine Road and Jenny Bird Lane in Igo, located in Shasta County. The tree's contact with PG&E's conductors caused the ignition of the Zogg Fire, which burned 56,338 acres, destroyed 204 structures, and damaged 27 structures. The Zogg Fire caused four fatalities and one injury.

A. Rules Violated

Based on SED's review, SED found that PG&E violated the Commission's General Order (GO) 95 and 165, specifically, three violations of GO 95, Rule 31.1 and one violation of GO 165, Section III-B:

[1] Attachment A – CAL FIRE Investigation Report.

GO Rule	Violations
GO 95, Rule 31.1	Hazard Gray Pine tree was identified but not abated.
GO 95, Rule 31.1	Separate CEMA patrol not conducted in 2019.
GO 95, Rule 31.1.	Hard copy 2018-2019 VC map not retained.
GO 165, Section III-B	Pole was not subject to an intrusive inspection by 2007.

B. Witnesses

No.	Name	Title
1	Brandon Vazquez	CPUC Lead Investigator
2	Stephen Lee	CPUC Utilities Engineer
3	Shelby Chase	CPUC Regulatory Analyst
4	Darren Stewart	CAL FIRE – Fire Captain Specialist, Lead Investigator
5	Sims Hawkins	CAL FIRE – Battalion Chief, Investigator
6	Ivan Kaufner	CAL FIRE – Battalion Chief, Investigator
7	Alex Houston	Shasta County DA – Investigator
8	[redacted]	PG&E – Event Lead
9	[redacted]	PG&E – Claims Investigator
10	Andy Berasley	Fire Cause Analysis – Automotive Forensic Specialist
11	Dolfeen Berasley	Fire Cause Analysis – Forensic Specialist

C. Evidence

No.	Source	Description
1	CPUC	Field Investigation, 10/7/20
2	PG&E	Initial Online Incident Report, 10/9/20
3	CPUC	PG&E Evidence Collection, 11/4/20
4	PG&E	20-Day Incident Report, 11/6/20
5	CPUC	Data Request #1, 11/18/20
6	CPUC	Data Request #2, 12/4/20
7	CPUC	PG&E Evidence Collection, 12/14/20
8	PG&E	Data Request #1 Response, 12/19/20 through 8/5/21
9	PG&E	Data Request #2 Response, 1/23/21
10	CPUC	Data Request #3, 3/12/21
11	PG&E	Data Request #3 Response, 3/31/21
12	CPUC	Data Request #4, 6/24/21

No.	Source	Description
13	PG&E	Data Request #4 Response, 7/22/21 through 7/29/21
14	CPUC	Data Request #5, 11/12/21
15	PG&E	Data Request #5 Response, 12/3/21
16	CAL FIRE	Investigation Report and Attachments, 12/14/21
17	CAL FIRE	Arborist Report by McNeil Arboriculture Consultants LLC
18	CAL FIRE	Third Party Fire Investigation Report by JHNolt Associates
19	CPUC	Data Request #6, 2/3/22
20	PG&E	Data Request #6 Response, 2/10/22

II. Background

A. Incident Background

On September 27, 2020, a large Gray Pine tree (Subject Tree) failed and fell onto overhead conductors (Subject Conductors) of PG&E's Girvan 1101, 12 kV circuit (Subject Circuit), which ignited the Zogg Fire at approximately 1442 hours. Smoke potentially associated with the Zogg Fire appeared to become visible at approximately 1442 hours in footage recorded by an ALERTWildfire camera (owned by the University of Nevada, Reno) located approximately three miles east of the intersection of Zogg Mine Road and Jenny Bird Lane.[2] At approximately 1446 hours, two geostationary weather satellites operated by the National Oceanic and Atmospheric Administration (NOAA), GOES-16 and GOES-17, detected a fire in the area north of Igo.[3] The fire caused power interruptions to 405 customers.

The Zogg Fire burned 56,338 acres, destroyed 204 structures, and damaged 27 structures. In addition, the Zogg Fire caused four fatalities and one injury. See Figure 1 below for a diagram showing the fire origin area (Incident Location) and location of the Subject Tree with respect to PG&E's facilities.

The Clear Creek Weather Station (PG732), located approximately four miles south-southeast from the intersection of Zogg Mine Road and Jenny Bird Lane, recorded a temperature of 90 degrees Fahrenheit, north-northeast wind speeds of 11 miles per hour (mph), wind gusts up to 22 mph, and a relative humidity of 13% at 1450 hours, near the time of the incident.[4]

[2] http://www.alertwildfire.org/shastamodoc/index.html?camera=Axis-WestPeak1&v=fd40742

[3] https://www.goes.noaa.gov/

[4] Attachment A – CAL FIRE Investigation Report (Confidential). Note that due to the terrain of the Incident Location, the local wind speeds may have been significantly higher.

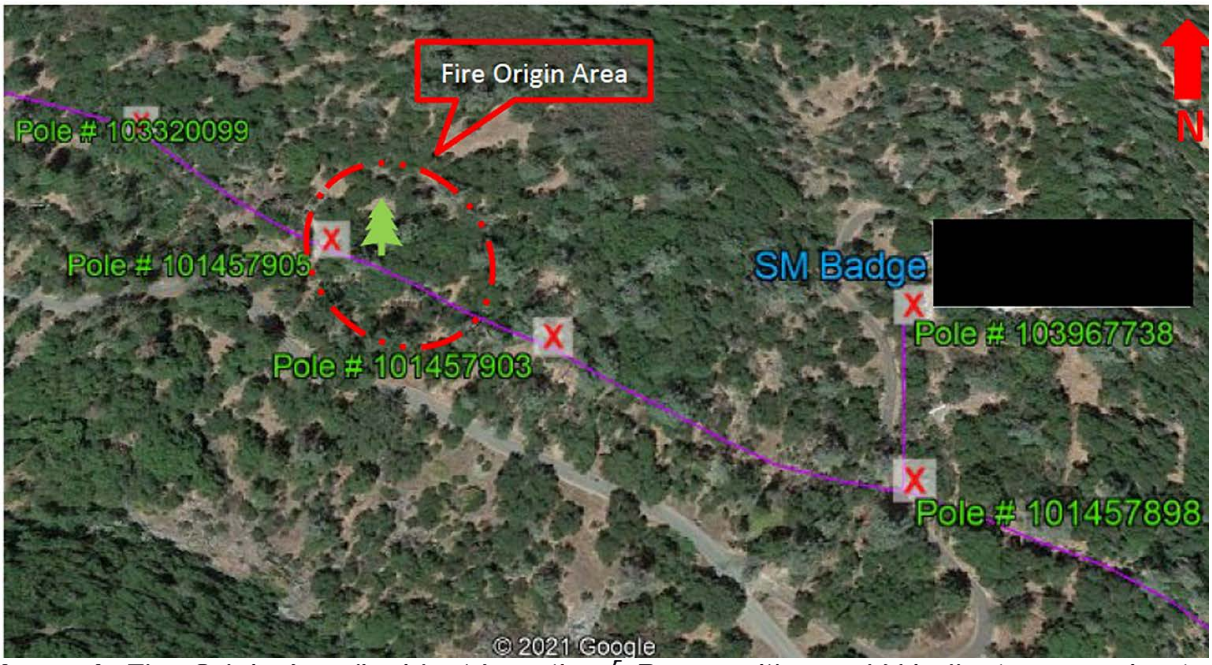

Figure 1: Fire Origin Area/Incident Location.[5] Boxes with a red X indicate approximate pole locations. The purple lines indicate approximate conductor path which continues west and east in both directions but is not marked.

B. SED Investigation Background

SED's investigation focused on the "Area of Interest" around the Incident Location. The Area of Interest refers to the three conductor spans between poles SAP IDs 103320099, 101457905, 101457903, and 101457898 as shown in Figure 1 above. The goal of SED's investigation is to identify whether there were any violations of the Commission's General Orders, the Public Utilities Code, and related requirements. SED conducted field visits at the Area of Interest and reviewed PG&E's operations and maintenance procedures and other relevant records. SED's field visits are summarized below:

- October 7, 2020 – SED conducted a field investigation at the Area of Interest with CAL FIRE and Shasta County DA investigators.
- November 4, 2020 – SED observed PG&E collect evidence from the Area of Interest.
- December 14, 2020 – SED observed PG&E collect root sections from the Subject Tree.

[5] PG&E Data Request SED-001-Zogg Fire, Question 6 Response (Bates PGE-ZOGG- CPUC-00005166).

SED submitted six data requests totaling 80 questions to PG&E. The questions included requests for procedures, records, forms, and responses to specific questions related to the Zogg Fire.

III. SED Review and Analysis

A. Event Timeline

Based on SED's collection and review of data, SED compiled the following event timeline.

September 27, 2020

At 1440 hours, a SmartMeter located at [redacted] (near the intersection of Jenny Bird Lane) recorded a Last Gasp[6] event.

At approximately 1442 hours, smoke potentially associated with the Zogg Fire appeared to become visible in footage recorded by a ALERTWildfire camera (owned by the University of Nevada, Reno) located approximately three miles east of the intersection of Zogg Mine Road and Jenny Bird Lane.

At 1443 hours, three SmartMeters located upstream to the Jenny Bird Lane intersection recorded a loss of voltage on one of the conductors. At 1444 hours, one of those meters recorded a Last Gasp event.

At approximately 1446 hours, two geostationary weather satellites operated by the NOAA, GOES-16 and GOES-17, detected a fire in the area north of Igo.

At 1500 hours, a PG&E troubleman who was responding to reports of voltage loss from SmartMeters observed a fire and smoke from his location on Knighton Road in Redding. The troubleman subsequently reported the fire to PG&E's Distribution Control Center.

Between September 27, 2020 and October 09, 2020, CAL FIRE restricted public access to Zogg Mine Road, starting from approximately three miles south of the intersection of Zogg Mine Road and Jenny Bird Lane.

November 6, 2020

At 0954 hours, PG&E restored power to customers on the Subject Circuit located downstream of Fuse 3489.

[6] A "Last Gasp" event is a recorded log event when a SmartMeter experiences a drop in voltage to a level below what is required for its continued operation (Source: PG&E).

November 19, 2020

At 1119 hours, PG&E restored power to customers on the Subject Circuit located between Fuse 1861 and Fuse 4855.

November 23, 2020

At 1506 hours, PG&E completed post-fire repair work and restored power to all remaining customers on the Subject Circuit.

B. PG&E's Distribution Facilities Inspection Program

PG&E's Distribution Facilities Inspection Program includes but is not limited to GO 165 patrol and detailed inspections, Wildfire Safety Inspection Program (WSIP) inspections, and intrusive pole inspections which are explained in further detail below. Facility inspections are PG&E's method to identify structural issues, hazards, etc. to maintain compliance with GO 95, 128, and 165. SED's review of PG&E's inspection records is discussed in further detail below. Based on SED's review of PG&E's inspection records, SED found PG&E in violation of GO 165, Section III-B for failing to conduct an intrusive inspection of Pole SAP ID 101457903 by 2007.

GO 165 Patrol and Detailed Inspections

Rural areas, such as the incident area, are defined by GO 165 as areas "with a population of less than 1,000 persons per square mile." The incident area is in a Tier 2 High Fire-Threat District (HFTD). Per Decision (D.)17-12-024, effective on December 14, 2017, GO 165 requires annual patrol inspections for rural areas in a HFTD. Additionally, GO 165 requires detailed inspections at five-year intervals for both rural and urban areas.

GO 165 defines a patrol inspection as a "simple visual inspection" meant to identify "obvious" structural problems and hazards (e.g., leaning poles, loose crossarms, etc.) and may be carried out during other company business. For the Area of Interest, SED reviewed PG&E's July 2018, August 2019, and May 2020 distribution aerial patrol inspection records.[7] PG&E documented no abnormal conditions or issues during these patrol inspections.

GO 165 defines a detailed inspection as one where facilities are "carefully examined" to gather and record conditions of overhead facilities. A detailed inspection is meant to identify obvious structural problems and hazards, in addition to issues such as loose hardware, transformer oil leaks, contaminated insulators, etc. SED reviewed PG&E's

[7] PG&E Data Request SED-001-Zogg Fire, Question 9 Response (Bates range PGE-ZOGG-CPUC-00008396 to PGE-ZOGG-CPUC-00008404).

September 2016 detailed inspection records for the Area of Interest.[8] PG&E identified no abnormal conditions during its 2016 detailed inspection of the Area of Interest.

WSIP Inspections

PG&E created the Wildfire Safety Plan (WSP) to reduce the likelihood of catastrophic wildfires in 2019 and beyond. As part of its WSP, PG&E implemented the WSIP in 2018 to perform accelerated and enhanced inspections of its electric transmission, distribution, and substation facilities located in a Tier 3, Tier 2, and Zone 1 HFTD. SED reviewed PG&E's April 2019 WSIP inspections conducted at the Area of Interest. See below for an itemized summary of those inspections:

1. Pole SAP ID 101457903
    - On April 16, 2019, PG&E conducted a WSIP inspection of the pole that identified no abnormal conditions.[9] See Figure 2 below for a photo of the pole.

Figure 2: Pole SAP ID 101457903

2. Pole SAP ID 103320099
    - On April 16, 2019, PG&E conducted a WSIP inspection that identified a damaged primary conductor on the pole (See

[8] PG&E Data Request SED-001-Zogg Fire, Question 10 Response (Bates PGE-ZOGG-CPUC-00008362 and PGE-ZOGG-CPUC-00008364).

[9] Id. (Bates PGE-ZOGG-CPUC-00008847).

Figure 3).[10] In addition, see Figure 4 below for a photo of the pole. PG&E created Electric Corrective (EC) notification #117043330 to replace the damaged conductor no later than April 16, 2020.[11] However, PG&E did not replace the conductor until after the Zogg Fire. Because PG&E did not replace the conductor prior to its required completion date, EC notification #117043330 was past due. See the section "Past Due EC Notifications" below for further details on past due EC notifications in the Zogg Mine Road area.[12]

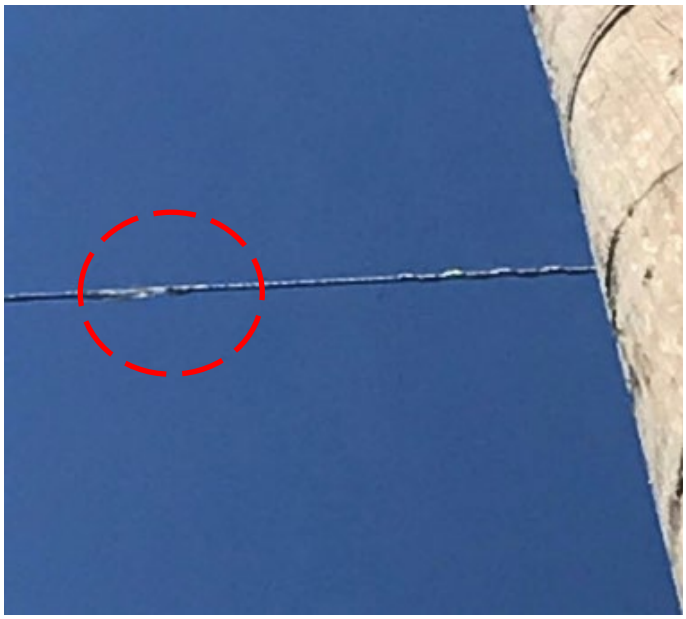

Figure 3: Damaged Conductor[13]

[10] Id. (Bates PGE-ZOGG-CPUC-00009115).

[11] PG&E Data Request SED-001-Zogg Fire, Question 30 Response (Bates PGE-ZOGG-CPUC-00013455).

[12] The "Zogg Mine Road area" is defined as the two tap lines on the Subject Circuit: one starting near the intersection of South Fork Road and Zogg Mine Road and ending south of Jenny Bird Lane; and one starting near the intersection of South Fork Road and Archer Road and running parallel to Zogg Mine Road through and beyond Jenny Bird Lane to the end of Zogg Mine Road.

[13] PG&E Data Request SED-001-Zogg Fire, Question 30 Response (Bates PGE-ZOGG-CPUC-00013459).

Figure 4: Pole SAP ID 103320099[14]

3. Pole SAP ID 101457898

   - On April 19, 2019, PG&E conducted a WSIP inspection that identified LAPP insulators on the pole (See Figure 5).[15] In addition, see Figure 6 below for a photo of the pole. PG&E created EC notification #117066503 to assess the LAPP insulators and crossarm, with a required completion date of April 19, 2020.[16] Upon further review of the notification, PG&E cancelled it on July 17, 2019 since no issues were identified with the insulators.

[14] PG&E Data Request SED-001-Zogg Fire, Question 10 Response (Bates PGE-ZOGG-CPUC-00009115).

[15] Id. (Bates PGE-ZOGG-CPUC-00009386).

[16] PG&E Data Request SED-001-Zogg Fire, Question 32 Response (Bates PGE-ZOGG-CPUC-00016327).

Figure 5: LAPP Insulators[17]

Figure 6: Pole SAP ID 101457898[18]

4. Pole SAP ID 101457905
    - On April 16, 2019, PG&E conducted a WSIP inspection of the pole that identified no abnormal conditions.[19] See Figure 7 below for a photo of the pole.

[17] Id. (Bates PGE-ZOGG-CPUC-00016332).

[18] PG&E Data Request SED-001-Zogg Fire, Question 10 Response (Bates PGE-ZOGG-CPUC-00009386).

[19] Id. (Bates PGE-ZOGG-CPUC-00010005).

Figure 7: Pole SAP ID 101457905[20]

Intrusive Pole Inspections

GO 165, Section III-B, Standards for Inspections requires utilities to conduct intrusive inspections within 10 years of wood poles older than 15 years that have not been subject to an intrusive inspection and at a 20-year interval after the first intrusive inspection has been conducted. See Table 1 below for pole installation dates.

Table 1: Pole Detail Information[21]

Identification Number	Class	Type	Height	Date of Installation
101457898	4	Wood	45'	1970
101457903	5	Wood	35'	1974
101457905	5	Wood	35'	2000
103320099	4	Through Bore	40'	2013

SED reviewed PG&E's intrusive pole inspection records for the Area of Interest. An itemized summary of the intrusive inspection records is provided below:

[20] Id.

[21] PG&E Data Request SED-001-Zogg Fire, Question 8 Response.

1. Pole SAP ID 101457898[22]

    - PG&E conducted intrusive inspections on April 8, 2002, September 22, 2011, and August 10, 2018 that assessed the pole to be in fair condition.

2. Pole SAP ID 101457903[23]

    - On February 25, 2002, PG&E conducted a visual inspection of the pole rather than an intrusive inspection. PG&E assessed the pole to be in fair condition.
    - PG&E also conducted intrusive inspections on September 22, 2011 and August 10, 2018 that assessed the pole to be in fair condition.

3. Pole SAP ID 101457905[24]

    - On February 25, 2002, PG&E conducted a visual inspection of the pole that assessed it to be in fair condition. The pole was installed in 2000, so an intrusive inspection was not required.
    - PG&E also conducted intrusive inspections on September 22, 2011 and August 10, 2018 that assessed the pole to be in fair condition.

4. Pole SAP ID 103320099[25]

    - PG&E conducted a visual inspection on August 10, 2018 that assessed the pole to be in good condition. The pole was installed in 2013, so an intrusive inspection was not required.

GO 165 became effective in 1997. Per its requirements (refer to Attachment F), within 10 years of GO 165 taking effect, utilities were required to conduct intrusive inspections of wood electric poles over 15 years old that had not already been subject to an intrusive inspection, and to conduct another inspection at a 20-year interval after the first intrusive inspection was conducted. Accordingly, all wood electric poles over 15 years old were required to have an intrusive inspection by 2007. According to GO 165, Section III-B, PG&E was required to conduct an intrusive inspection of Pole SAP ID 101457903 by 2007 since the pole was installed in 1974. Therefore, SED found PG&E in violation of GO 165, Section III-B for failing to conduct an intrusive inspection of Pole SAP ID 101457903 by 2007.

[22] Id. (Bates range PGE-ZOGG-CPUC-00017576 to PGE-ZOGG-CPUC-00017578).

[23] Id. (Bates range PGE-ZOGG-CPUC-00017579 to PGE-ZOGG-CPUC-00017581).

[24] Id. (Bates range PGE-ZOGG-CPUC-00017582 to PGE-ZOGG-CPUC-00017584).

[25] Id. (Bates range PGE-ZOGG-CPUC-00017585 to PGE-ZOGG-CPUC-00017586).

Infrared (IR) Inspections

In July 2014, Osmose Utility Services, Inc. conducted an IR inspection of the Subject Circuit that identified no hot spots or thermal anomalies at the Area of Interest.[26]

Past Due EC Notifications

SED reviewed open, completed, and canceled EC notifications from September 27, 2015 to September 27, 2020 for the Zogg Mine Road area. Based on SED's review of PG&E's EC notification records, SED identified numerous past due EC notifications in the Zogg Mine Road area. Furthermore, this issue was not limited to only the Zogg Mine Road area but PG&E's entire North Valley Division. SED previously addressed these past due EC notification violations in its 2021 audit report for PG&E's North Valley Division. (See Attachment D – PG&E North Valley Division Audit Report for a statistical breakdown of past due EC notifications for the North Valley Division.) Accordingly, no separate violations were cited here.

SED Findings on PG&E's Distribution Facilities Inspection Program

Based on SED's review of PG&E's patrol inspection records, detailed inspection records, and IR inspection records, SED did not find PG&E in violation of applicable GO 95 and 165 requirements. However, based on SED's review of PG&E's intrusive pole inspection records, SED found that PG&E did not conduct an intrusive inspection of Pole SAP ID 101457903 by 2007. Per GO 165, Section III-B, all wood electric poles older than 15 years were required to have an intrusive inspection by 2007. Since the pole was installed in 1974, PG&E was required to conduct an intrusive inspection by 2007. Therefore, SED found PG&E in violation of GO 165, Section III-B for failing to conduct an intrusive inspection of Pole SAP ID 101457903 by 2007.

C. PG&E's Vegetation Management Program

The GO 95 rules applicable to Vegetation Management (VM) include:

1. Rule 31.1 – Design, Construction, and Maintenance.
2. Rule 35 – Vegetation Management.
3. Rule 37 – Minimum Clearances of Wires above Railroads, Thoroughfares, Buildings, Etc., Table 1 – Cases 13 and 14.

In order to comply with the applicable GO 95 rules, PG&E's Distribution Vegetation Management Standard (DVMS)[27] outlines the general strategy used to identify:

1. Conductor radial clearance issues;

[26] PG&E Data Request SED-001-Zogg Fire, Question 13 Response (Bates PGE-ZOGG-CPUC-00011186).

[27] PG&E Data Request SED-002-Zogg Fire, Question 8 Response (Bates PGE-ZOGG-CPUC-00016977). Utility Standard TD-7102S, Published on 9/4/15. Rev 1.

2. Trees that will encroach PG&E's minimum distance requirements; and
3. Hazard trees that have the potential to strike conductors.

In order to implement its strategy, PG&E's DVMS prescribes annual vegetation patrols and completion of identified vegetation work for all primary and secondary distribution facilities. PG&E's vegetation patrols include but are not limited to routine VM patrols, Catastrophic Event Memorandum Account (CEMA) patrols, and Vegetation Control (VC) patrols, which are described in further detail below. SED's review and analysis of PG&E's VM records and the Vegetation Analysis by McNeil Arboriculture Consultants LLC is discussed in further detail below. Based on SED's review of PG&E's VM records and the Vegetation Analysis, SED's investigation identified the following VM-related findings:

1. SED found PG&E in violation of GO 95, Rule 31.1 for failing to maintain its facilities safely and properly, by failing to abate the Subject Tree which was identified for removal during 2018 post-Carr Fire VM work.
2. SED found PG&E in violation of GO 95, Rule 31.1 for failing to properly follow its own procedures, by:
    a. Not conducting a separate CEMA patrol in 2019.
    b. Not retaining its hard copy 2018-2019 VC map.

1. Routine VM Inspections

PG&E's routine VM patrol program and SED's review of the routine VM patrol records are discussed in detail below. Based on SED's review of PG&E's routine VM patrol records, the Subject Tree was not identified for removal or trimming during any of these routine VM patrols.

PG&E's VM contractors, specifically Pre-Inspection (PI) personnel, work with Vegetation Program Managers (VPM) to create an annual plan for routine PI patrols. PI personnel prescribe vegetation work during PI patrols. PG&E's VPM then schedules the vegetation work to be completed on an annual basis by Tree Contractor (TC) personnel. PG&E also uses a combination of LiDAR[28] and spectral imagery to identify hazardous trees in high fire danger areas. Trees identified using these technologies are then inspected from the ground and abated as necessary. However, PG&E also allows the use of aerial patrols in place of ground patrols.

Vegetation PI patrols are performed by a Consulting Utility Forester (CUF), an individual qualified by PG&E. The CUF inspects all vegetation that has the potential to grow into or fall into distribution primary conductors before the next inspection and identifies vegetation that is causing strain/abrasion of secondary conductors.

[28] LiDAR (an acronym of Light Detection And Ranging) is a surveying technology that measures distance by illuminating a target with a laser light. (Source: Wikipedia.)

PG&E's PI contract specification[29] requires a CUF to have at least two years' experience in line clearance tree pruning work, or equivalent experience as determined by PG&E. The PI contract specification also notes that PG&E desires that a CUF have an associate degree in forestry, arboriculture, or a related field; however, an associate degree is not a requirement. The CUF should be "familiar with the Contractor's work practices, proper arboricultural techniques and practices, proper integrated pest management practices, PG&E's Tree Pruning Specification, PG&E's Pre-Inspection Specification and requirements, and all applicable legal and regulatory requirements."[30]

SED reviewed records for PG&E's eight most recent VM patrols that occurred prior to the fire at the Area of Interest. SED focused on documented VM patrols and accompanying vegetation work requests. Table 2 below provides a list of the eight most recent VM inspections. In this section, SED will only discuss the routine VM patrols.

Table 2: Eight most recent VM Patrols

Patrol	Date
CEMA Patrol	March 2016
Routine VM Patrol	June-July 2016
CEMA Patrol	March 2017
Routine VM Patrol	October-November 2017
CEMA Patrol	April 2018
Routine VM Patrol	October 2018
Routine VM Patrol	April 2019
Routine VM Patrol	April 2020

On October 12, 2018, a routine VM patrol at the Area of Interest identified one Gray Pine tree for removal, one Gray Pine tree for trimming, one Knobcone Pine tree for removal, one Live Oak tree for removal, and one Live Oak tree for trimming.[31] Tree work was completed on February 15, 2019 per Work Request #C1NV1001518.

PG&E stated that:

> PG&E does not believe that the Gray Pine from which CAL FIRE appears to have collected sections after the Zogg Fire was identified for removal or trimming as a result of any of the routine or

[29] Attachment E – PG&E October 2017 Fires Data Request 2, General Question 4 Response (Bates PGE-CPUC_DR-071918_General_Q04). PG&E Pre-Inspection contract specification, Section 3.2.

[30] Id.

[31] PG&E Data Request SED-004-Zogg Fire, Question 9 Response (Bates range PGE-ZOGG-CPUC-000023886 to PGE-ZOGG-CPUC-000023891).

> CEMA vegetation management patrols of the Girvan 1101 Circuit that took place in the years preceding or following the Carr Fire.[32]

Based on SED's review of PG&E's routine VM patrol records, the Subject Gray Pine Tree was not identified for removal or trimming during any of these routine VM patrols.

2. Enhanced VM Inspections

PG&E's CEMA patrol program and SED's review of PG&E's CEMA patrol records are explained in detail below. SED determined the Subject Tree was not identified for removal or trimming during any of these CEMA patrols. Based on SED's review of PG&E's CEMA patrol records, SED found PG&E in violation of GO 95, Rule 31.1 for failing to properly follow its own procedures by not conducting a separate CEMA patrol in 2019.

In addition to routine VM, per the Drought State of Emergency[33] and Commission Resolution ESRB-4 additional PI patrols and vegetation work were conducted under CEMA at the Area of Interest. CEMA is an account used to recover the cost associated with the restoration of service and facilities affected by catastrophic events that have been declared as disasters or states of emergency by federal or state authorities. Under CEMA, PG&E files an application to recover the expenditures through rates. The amount to be recovered are the reasonable costs incurred, which are determined after CPUC review and audit of the recorded CEMA balance.

SED reviewed records for the March 2016, March 2017, and April 2018 CEMA patrols of the Area of Interest. On April 11, 2018, a CEMA patrol at the Area of Interest identified a Gray Pine tree for removal.[34] Tree work was completed on May 15, 2018 per Work Request #CENV1000844.

Per SED's review of PG&E's CEMA patrol records, SED determined the Subject Tree was not identified for removal or trimming during any of these CEMA patrols. SED also determined that PG&E failed to conduct a separate CEMA patrol of the Zogg Mine Road area in 2019. PG&E stated that:

> Based on a review of its records, PG&E has determined that no separate CEMA patrol of the Zogg Mine Road area of the Girvan 1101 Circuit was performed in 2019. The pre-inspector who conducted the routine patrol of the Zogg Mine Road area submitted two separate records: one for the routine patrol of the Zogg Mine

[32] PG&E Data Request SED-001-Zogg Fire, Question 12(a) Response.

[33] Governor Brown's Drought State of Emergency proclamation issued on January 17, 2014.

[34] PG&E Data Request SED-001-Zogg Fire, Question 11 Response (Bates PGE-ZOGG-CPUC-00000301).

> Road area from April 10 to April 29, and another for a CEMA patrol of the same area on the same dates. PG&E is producing the record associated with the CEMA patrol at Bates range PGE-ZOGG-CPUC-00000152 to PGE-ZOGG-CPUC-00000232.[35]

Based on SED's review of communications between CN Utility Consulting (CNUC) and PG&E regarding its 2019 VM schedule, SED determined that a CNUC Senior Consulting Utility Forester submitted a request to PG&E asking if the routine VM pre-inspector could mark both the 2019 routine VM patrol map and 2019 CEMA patrol map for the same patrol, which PG&E approved.[36] PG&E's Second Patrol – Scope of Work Requirements Procedure[37] outlines PG&E's scheduling requirements and work requirements for CEMA patrols and tree work. The procedure refers to "CEMA patrols" as "Second Patrols." Additionally, the procedure requires that the "PI inspects all lines at an interval of once per year, approximately 6 months from when routine patrol inspects these circuits." Per PG&E's Second Patrol – Scope of Work Requirements Procedure, PG&E is required to conduct the routine VM patrol and CEMA patrol separately, typically 6 months apart.

Per GO 95, Rule 31.1 (refer to Attachment F), PG&E is required to follow its own procedures and work schedule. According to PG&E's VM schedule, PG&E was required to conduct a CEMA patrol of the Zogg Mine Road area in 2019. PG&E's Second Patrol – Scope of Work Requirements Procedure requires the CEMA patrol to be conducted separately from the routine VM patrol, typically six months apart. Since PG&E failed to conduct a separate CEMA patrol in 2019, SED found PG&E in violation of GO 95, Rule 31.1.

3. 2018 Post-Carr Fire VM Work

SED's review of post-Carr Fire VM work by Mountain G Enterprises, Inc. (Mountain G), as it pertains to the Subject Tree, is discussed below. Based on SED's review of PG&E's and Mountain G's records pertaining to the post-Carr Fire VM work, SED determined that Mountain G identified the Subject Tree for removal, but due to interactions with an armed resident in late September and October in 2018, PG&E decided to stop the additional post-Carr Fire VM work at the Area of Interest and consequently PG&E failed to remove the Subject Tree.[38] Therefore, SED found PG&E

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[35] PG&E Data Request SED-001-Zogg Fire, Question 11 Response.

[36] PG&E Data Request SED-004-Zogg Fire, Question 10 Response (Bates range PGE-ZOGG-CPUC-000024207 to PGE-ZOGG-CPUC-000024212).

[37] PG&E Data Request SED-002-Zogg Fire, Question 8 Response (Bates PGE-ZOGG-CPUC-00016746). Utility Standard TD-7102B-007, Published on 7/17/17. Rev 0.

[38] PG&E Data Request SED-006-Zogg Fire, Question 5 Response states in part:

in violation of GO 95, Rule 31.1 for failing to properly maintain its facilities by not removing the Subject Tree which failed and caused the Zogg Fire.

Due to the 2018 Carr Fire, which affected the Area of Interest, PG&E contracted Mountain G to conduct post-Carr Fire VM work in the Zogg Mine Road area in August 2018. Per Work Order # CA_GI 1101_26, on August 23, 2018, Mountain G identified two Gray Pine trees (Tree IDs 6557 and 6558, respectively) as P2 (Priority 2) trees for removal consistent with the location of the Subject Tree that CAL FIRE collected sections of after the Zogg Fire.[39] Tree ID 6557 and Tree ID 6558 were located at the following respective latitudes and longitudes: (40.53899821, -122.562826) and (40.53897473, -122.5628353).

In regard to the P2 classifications, PG&E stated that:

> … the QC inspector identified the two Gray Pines for removal during the August 2018 review using the Collector app. When recording the work in Collector, the QC inspector … identified these as Priority 2 ("P2") trees, a designation inspectors were instructed to apply to trees that the inspector believed required work but did not pose an immediate risk to PG&E's facilities. The Collector data does not, however, provide any information specifying why the QC inspector identified the two Gray Pines for removal.[40]

Per PG&E's statement, the Mountain G QC inspector believed the two Gray Pine trees required removal but did not pose immediate risk to PG&E's facilities and did not specify why the trees required removal. Due to interactions with an armed resident who believed trees were being marked for work unnecessarily in late September and October in 2018, PG&E decided to stop the post-Carr Fire VM work and rely on routine VM patrols for the remaining work.[41] As a result of PG&E stopping the post-Carr Fire VM work, PG&E failed to remove the two Gray Pine trees. PG&E also did not identify the two Gray Pines for removal due to the routine VM patrols in October 2018, April 2019, and April 2020 following the post-Carr Fire VM work.

"PG&E is aware that post-Carr Fire work in the Zogg Mine Road area was interrupted in late September and October 2018 due to interactions with an armed resident who believed that PG&E crews were marking trees for work unnecessarily. Records indicate that post-Carr Fire work on Zogg Mine Road was stopped in October 2018 so that security support could be obtained." Bates PGE-CPUC_02102022_SED_006_Q05 Zogg Fire.

[39] PG&E Data Request SED-001-Zogg Fire, Question 12 Response (Bates PGE-ZOGG-CPUC-00005639).

[40] PG&E Data Request SED-002-Zogg Fire, Question 1 Response.

[41] PG&E Data Request SED-006-Zogg Fire, Question 5 Response.

In regard to the Subject Tree, PG&E stated that it "currently believes the Gray Pine of interest may have been identified for removal (but not removed) during restoration efforts following the Carr Fire in 2018."[42] Based on PG&E's review of Mountain G records, the quality control inspector "in August 2018 identified for removal two Gray Pine trees that have a location consistent with the location of the Gray Pine from which CAL FIRE appears to have collected sections after the Zogg Fire."[43]

Accordingly, PG&E believes the Subject Tree may have identified for removal (but not removed) since the two Gray Pine trees have a location consistent with the Subject Tree. PG&E did not specify why it failed to remove the two Gray Pines. However, PG&E also stated that it has not been able to confirm if the Subject Tree was one of the two Gray Pines because there were three other Gray Pines located near the Subject Tree.[44]

Figure 8 below shows plotted pins for Tree IDs 6557 and 6558, CAL FIRE's ignition area (point of contact of the Subject Tree and Conductors), Pole SAP ID 101457905, and the Subject Conductors. Figure 9 below is a diagram showing the location of the Subject Tree, point of contact, and Pole SAP ID 101457905 from the Vegetation Analysis. Comparing Figures 8 and 9, SED determined with a high degree of certainty that the Subject Tree was one of the two Gray Pines (Tree ID 6557 or 6558) Mountain G identified during post-Carr fire VM work. The latitudes (North to South) of Tree IDs 6557 and 6558 are slightly off from the base of the Subject Tree, but the longitudes (East to West) are in line with the Subject Tree. In addition, there were no trees in front of the Subject Tree that could have been the two Gray Pines based on PG&E's 2019 aerial photos (See Figures 10 and 11). Based on the 2019 aerial photos, SED determined with a high degree of certainty that the two trees in the photos are Tree IDs 6557 and 6558.

[42] PG&E Data Request SED-001-Zogg Fire, Question 12(a) Response.

[43] PG&E Data Request SED-001-Zogg Fire, Question 12(a) Response.

[44] *Id.*, (stating that "[due] to the fact that there were three other Gray Pines near the Gray Pine collected by CAL FIRE, PG&E has been unable…to confirm whether either of the two Gray Pines identified for removal were the Gray Pine from which CAL FIRE appears to have collected sections after the Zogg Fire.")

Figure 8: Diagram of the Subject Tree, Tree ID 6557, Tree ID 6558, Ignition Area, and PG&E Facilities.[45] Note that the lines marked in blue show approximate conductor path and continue east and west in both directions.

[45] Google Earth aerial view dated June 27, 2018.

Figure 9: Diagram of Subject Tree, point of contact, and Pole from the Vegetation Analysis.[46]

Based on SED's review of PG&E's and Mountain G's records pertaining to the post-Carr Fire VM work and SED's analysis of the location of the Subject Tree, SED determined that Mountain G identified the Subject Tree for removal, but for reasons not currently specified PG&E failed to remove the Subject Tree. Per GO 95, Rule 31.1 (refer to Attachment F), PG&E is required to properly maintain its facilities to ensure safe and reliable service. Because PG&E failed to remove the Subject Tree after identification for removal during the post-Carr Fire VM work, the Subject Tree failed and fell onto PG&E's 12 kV conductors causing the Zogg Fire. Therefore, SED found PG&E in violation of GO 95, Rule 31.1 for failing to properly maintain its facilities by not removing the Subject Tree.

4. VC Records

PG&E's VC program is PG&E's system-wide program for patrolling, prescribing work, and conducting work for vegetation around poles and towers to maintain compliance with California Public Resources Code (PRC) § 4292, as well as PG&E standards. At the Area of Interest, PG&E conducted annual VC inspections. SED reviewed PG&E's VC records from 2015 to 2020. Based on SED's review of PG&E's VC records, SED

[46] Attachment B – CAL FIRE Contracted Vegetation Analysis Report by McNeil Arboriculture Consultants LLC (Confidential).

determined that PG&E failed to retain the hard copy VC map from its 2018-2019 inspection.[47]

PG&E Inspection Mapping Procedure, Part 1.2 Index Map requires that hard copy maps be retained for 10 years.[48] Per GO 95, Rule 31.1 (refer to Attachment F), PG&E is required to follow its own procedures. In accordance with PG&E's Inspection Mapping Procedure, SED found PG&E in violation of GO 95, Rule 31.1 for failing to retain its hard copy 2018-2019 VC map.

5. Applicable PG&E VM Procedures

PG&E's Vegetation Management Hazard Tree Rating and Scoring (HTRS) Procedure[49] aids inspectors in prescribing work for potentially hazardous trees. The procedure indicates a Gray Pine tree as a tree with a "Very High" failure potential and most likely to fail from July to October.

PG&E's Distribution Routine Patrol Procedure[50] (DRPP), Section 2.6 "Hazard Trees/Facility Protection Trees," defines trees that should be identified as hazard trees/facility protection trees during VM patrols and/or pre-inspections as "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." Upon identification of hazard trees, the DRPP requires PG&E to "THEN PRESCRIBE work to make tree Facility Safe per Facility Protect and work Difficulty Classification Procedure."

6. Subject Tree

PG&E VM took aerial photos of the Subject Tree in July 2019 (See Figures 10 and 11). Regarding the photos, PG&E stated that "…as depicted in these photos, the Gray Pine of interest displayed a full, green canopy and, based on the limited information available in these photographs, did not display any apparent signs of disease, decay or fire damage."[51] Based on Figures 10 and 11, the Subject Tree shows a green canopy and noticeably leaned towards the Subject Conductors. CAL FIRE determined the Subject Tree had a lean of 23 degrees from vertical towards the Subject Conductors.[52]

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[47] PG&E Data Request SED-001-Zogg Fire, Question 12 Response.

[48] PG&E Data Request SED-005-Zogg Fire, Question 1(b) Response (Bates PGE-ZOGG-CPUC-000025047). Utility Procedure TD-7102P-06, Published on 7/6/16. Rev 2.

[49] PG&E Data Request SED-002-Zogg Fire, Question 9 Response (Bates PGE-ZOGG-CPUC-00017096). PG&E Vegetation Management Hazard Tree Rating and Scoring Procedure. Utility Procedure: TD-7102P-07. Rev: 3. Published: 8/14/19.

[50] PG&E Data Request SED-002-Zogg Fire, Question 8 Response (Bates PGE-ZOGG-CPUC-00016773). PG&E Distribution Routine Patrol Procedure. Utility Procedure TD-7102P-01. Rev: 1. Published: 10/27/15.

[51] PG&E Data Request SED-002-Zogg Fire, Question 3 Response.

[52] Attachment A – CAL FIRE Investigation Report (Confidential).

However, the photos do not provide a detailed view of the trunk, trunk base, or individual limbs/branches which could have shown signs of decay, disease, or damage. The condition of the Subject Tree prior to the fire is described in the Vegetation Analysis section below.

Figure 10: Aerial Photo of Subject Tree[53]

[53] PG&E Data Request SED-002-Zogg Fire, Question 3 Response (Bates PGE-ZOGG-CPUC-00016714).

Figure 11: Aerial Photo of Subject Tree[54]

7. Vegetation Analysis by McNeil Arboriculture Consultants LLC[55]

The arborist observed the Subject Tree laying on the ground and measured the Subject Tree to be 24.5 inches in diameter at 54 inches above grade and 105.5 feet tall (See Figure 10). The arborist measured roots approximately 12 inches in diameter which he stated were oversized relative to the Subject Tree's trunk diameter of 24.5 inches. In addition, the arborist observed no evidence of roots in the foreground (uphill, north) side of the Subject Tree leaving the tree vulnerable to a downhill failure (Figure 11). The arborist observed a boulder located a few feet uphill of the Subject Tree which impaired the formation of roots on the uphill side of the trunk. Per the Analysis, the lack of supporting uphill roots caused the oversized roots east and west of the Subject Tree to grow over time in response to stresses necessary to support the lean of the tree. However, the Analysis states the Subject Tree was vulnerable to downhill failure as it lacked uphill tension roots and the roots east and west were located in a disadvantaged position to support the tree.

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[54] Id. (Bates PGE-ZOGG-CPUC-00016715).

[55] All statements in this section referencing "arborist" and "Analysis" were taken from the Vegetation Analysis prepared by McNeil Arboriculture Consultants LLC (Confidential Attachment B – CAL FIRE Contracted Vegetation Analysis Report by McNeil Arboriculture Consultants LLC).

The arborist observed a large cavity on the uphill (north) side of the Subject Tree (See Figures 12, 13, and 14). The arborist measured the cavity to extend 14 to 15 inches into the trunk and approximately 4.5 feet up the trunk from the ground (See Figure 14). Per the Analysis, the cavity was too large to be the result of the Zogg Fire or Carr Fire; therefore, it existed sometime prior to the Carr Fire. Furthermore, the Analysis determined the large roots east and west of the trunk were integrated into the side of the cavity which indicates the cavity and large roots developed concurrently over many years.

The arborist observed pulled out fibers on a portion of the top of a 12.5-foot cross-section of the Subject Tree trunk CAL FIRE had cut with a saw (See Figure 15). Per the Analysis, healthy wood cuts cleanly; therefore, the Subject Tree was partially internally decayed. The Analysis stated that since the majority of the foliage was located on the upper half of the tree, it increased stress at the base of the tree.

Figure 12: Subject Tree on the Ground[56]

[56] Attachment B – Confidential CAL FIRE Contracted Vegetation Analysis Report by McNeil Arboriculture Consultants LLC.

Figure 13: Lack of Roots and Boulder on the Uphill Side of Subject Tree[57]

[57] Id.

Figure 14: Large Cavity in Subject Tree[58]

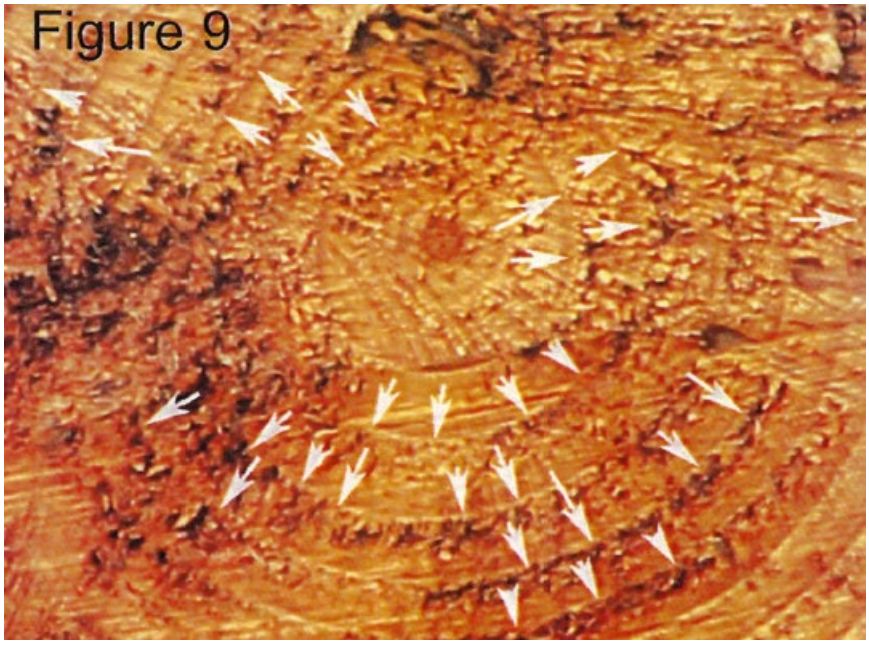

Figure 15: Pulled out Fibers on Trunk [59]

The Analysis concluded the Subject Tree was at least 80 years old and alive at the time of the incident but had partial internal decay. In addition, the Analysis found the gusty north winds to be a component of the failure of the Subject Tree. Moreover, the Analysis concluded the lean of the Subject Tree towards the Subject Conductors should have been obvious to a pre-inspector from any vantage point near the conductors. The Analysis indicated the cavity and absence of roots on the north side of the Subject Tree were not visible directly from under the conductors; however, the cavity and absence of roots would have been obvious to a pre-inspector inspecting from uphill of the tree or either side (east or west) of the tree. Therefore, the Analysis concluded a pre-inspector conducting a brief visual inspection near the Subject Tree should have identified the cavity and absence or supporting roots had required PI protocols been followed. Per the Analysis, the International Society of Arboriculture has a tree risk assessment protocol within its Tree Risk Assessment Qualification program. According to the Analysis, this protocol would have yielded a risk rating of High for Subject Tree. Based on the lean, cavity, absence of supporting roots, and partial internal decay, the Analysis determined that PG&E should have removed the Subject Tree prior to the fire.

[58] Id.

[59] Id.

8. SED Findings on Vegetation Management

Based in part on PG&E's VM documents and CAL FIRE's investigation, SED's investigation identified the following VM-related findings:

1. SED found PG&E in violation of GO 95, Rule 31.1 for failing to maintain its facilities safely and properly, by failing to abate the Subject Tree which was identified for removal during 2018 post-Carr Fire VM work.
2. SED found PG&E in violation of GO 95, Rule 31.1 for failing to properly follow its own procedures, by:
    a. Not conducting a separate CEMA patrol in 2019.
    b. Not retaining its hard copy 2018-2019 VC map.

PG&E's contractors and employees are obligated to follow PG&E's standards/procedures and should use them correctly to identify hazardous trees for removal. PG&E's DRPP describes various factors that contractors and employees should look for during VM patrols and/or pre-inspections. Section 2.6 of the DRPP, "Hazard Trees/Facility Protection Trees" describes trees that should be identified for removal as trees or portions of trees that are dead, diseased, or decayed and may fall into PG&E facilities. PG&E's VM HTRS Procedure describes a defect as a failure likelihood that causes "a reduction of wood strength (structural integrity)." Therefore, PG&E's VM procedures contained criteria that contractors and employees should have used to properly identify the lean, large cavity, and lack of supporting roots compromising the structural integrity of the Subject Tree during VM patrols. Based on the hazardous condition of the Subject Tree, PG&E should have removed it after it was identified for removal during 2018 post-Carr Fire VM work. Per GO 95, Rule 31.1, PG&E is required to properly maintain its facilities to ensure safe and reliable service. Due to PG&E not removing the Subject Tree after identification as a Hazard Tree during 2018 post-Carr Fire VM work, on September 27, 2020, the Subject Tree failed and fell onto the Subject Conductors causing the Zogg Fire. Therefore, SED found PG&E in violation of GO 95, Rule 31.1 for failing to properly maintain its facilities by not removing the Subject Tree.

Per GO 95, Rule 31.1, PG&E is required to follow its own procedures and work schedule. According to PG&E's VM schedule and PG&E's Second Patrol – Scope of Work Requirements Procedure, the CEMA patrol is required to be conducted separately from the routine VM patrol, typically six months apart. Therefore, PG&E was required to conduct a separate CEMA patrol of the Zogg Mine Road area in 2019. Consequently, SED found PG&E in violation of GO 95, Rule 31.1 for failing to conduct a separate CEMA patrol in 2019.

Moreover, PG&E's VM procedures include records retention requirements in PG&E's Inspection Mapping Procedure, Part 1.2 Index Map. Due to PG&E's failure to adhere to its VM records retention requirements in failing to retain a hard copy 2018-2019 VC map, SED found PG&E in violation of GO 95, Rule 31.1.

D. SED Assessment of PG&E's Infrastructure

SED assessed PG&E's physical infrastructure for compliance with GO 95 construction and maintenance standards. SED looked for abnormal damage to PG&E's facilities and clearance infractions not caused by the fire, such as decayed poles/crossarms, conductor clearance infractions, etc. Based on field observations described below, SED determined that PG&E's facilities were not in violation of applicable GO 95 construction and maintenance standards, since the observed damage was caused by the Subject Tree contacting the Subject Conductors and the resulting fire.

On October 7, 2020, at 0930 hours, SED conducted a field investigation with CAL FIRE and Shasta County DA investigators. At the Incident Location, SED observed that PG&E primary 12 kV conductors had snapped midspan due to contact with the Subject Tree and were lying on the ground and suspended in trees (See Figures 16.a. and 16.b.). The Subject Conductor span, installed in 1957, was #4 ACSR (Aluminum Conductor – Steel Reinforced). At approximately 30 feet south of the pole (SAP ID 101457905) located closest to the Subject Tree, SED observed the remains of two broken primary insulators and the supporting crossarm (See Figure 17). In addition, the pole top that held the crossarm appeared to have failed (See Figure 18). SED also inspected the next pole (SAP ID 103320099) located one conductor span northwest. The base of the pole showed signs of ground disturbance (See Figure 19) and the primary crossarm was broken in half (See Figure 20).

Figures 16.a. and 16.b.: Conductors at the Specific Origin Area[60]

[60] Figures 16-20 were taken by SED at the Incident Location.

Figure 17: Insulator Remains

Figure 18: Failed Pole

Figure 19: Ground Disturbance

Figure 20: Broken Crossarm

E. SED's Assessment of PG&E Equipment Operations and Maintenance

SED reviewed PG&E distribution equipment operations and maintenance records for compliance with GO 95, Rule 31.1. The Subject Conductor span was protected upstream by Fuse 4855, Fuse 1861, Line Recloser (LR) 1330, LR 1636, and the Girvan 1101 Circuit Breaker (CB). The line reclosers were set to not test due to fire season. See Figure 21 below for a single-line diagram of the Zogg Mine Road area.

Figure 21: *Single-line diagram of the Girvan 1101 Circuit.— It shows the protective devices upstream of the Incident Location/Area of Interest. (Not drawn to scale.)*

1. Event Timeline

The Girvan 1101 CB, LR 1636, LR 1330, and LR 323094 had data recording capability prior to, during, and after the fire. SED reviewed the Supervisory Control and Data Acquisition (SCADA) load data recorded at the Girvan 1101 CB, LR 1636, LR 1330, and LR 323094 from September 26 to 28, 2020. However, the Girvan 1101 CB, LR 1636, LR 1330, and LR 323094 did not record ground current, which is used to identify ground faults, at consistent time intervals or short enough time intervals for SED to make any significant determinations (See Figures 22 and 23). SED also reviewed records from SmartMeters on the Subject Circuit located downstream of the Incident Location.

[61] PG&E Data Request SED-001-Zogg Fire, Question 6 Response (Bates PGE-ZOGG-CPUC-00005165).

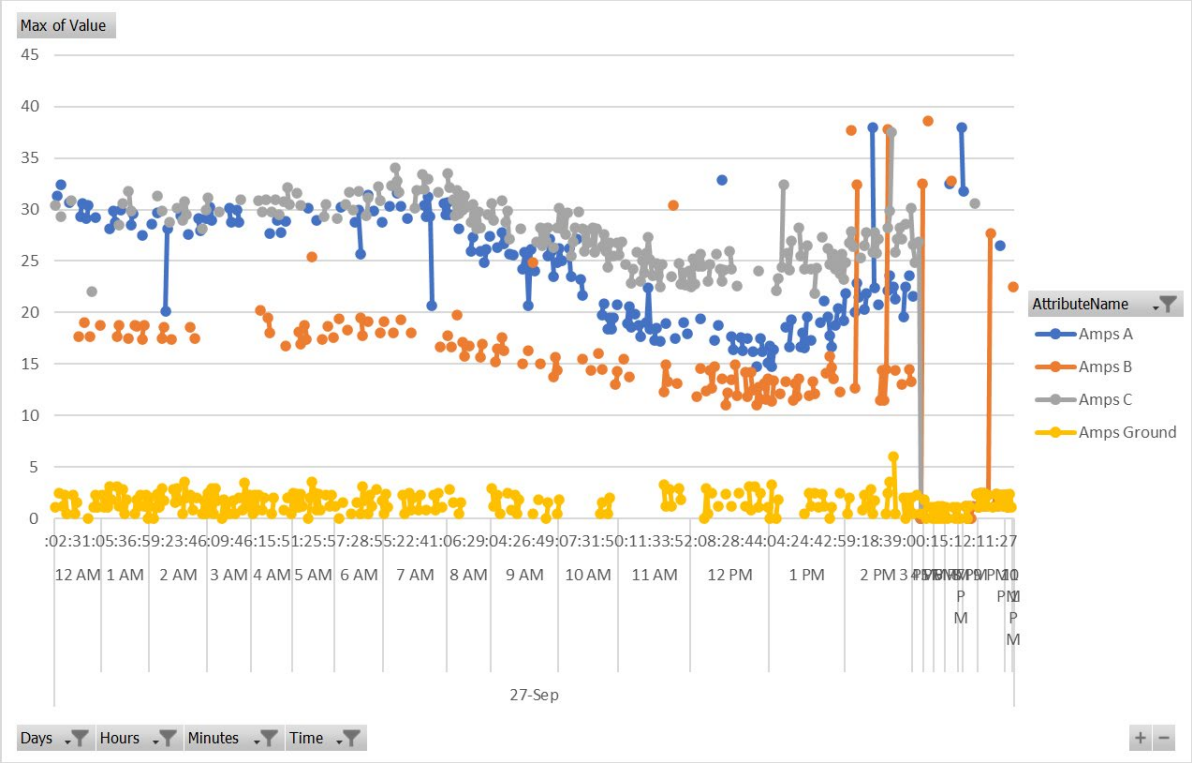

Figure 22: SCADA Load Graph for data recorded by LR 1330 on September 27, 2020.[62]

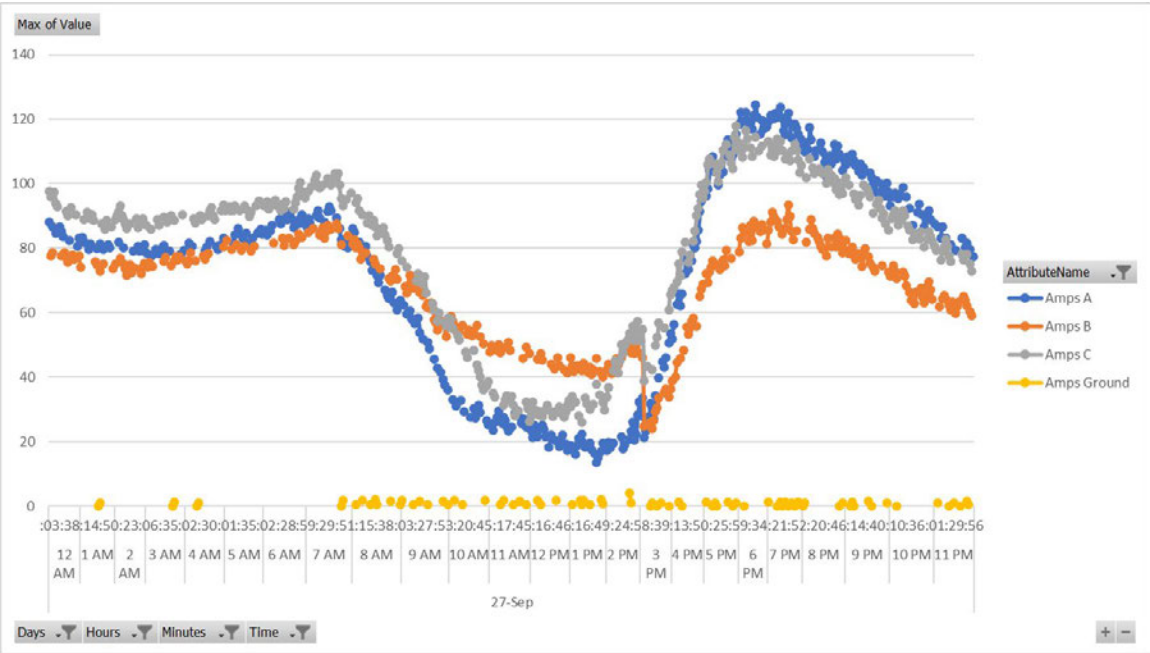

Figure 23: SCADA Load Graph for data recorded by LR 1636 on September 27, *2020.*[63]

[62] PG&E Data Request SED-001-Zogg Fire, Question 19 Response (Bates PGE-ZOGG-CPUC-00013191).

[63] Id.

September 27, 2020

At 1440 hours, a SmartMeter located at [redacted] (near the intersection of Jenny Bird Lane) recorded a Last Gasp event. Additionally, at 1440 hours, LR 323094 recorded a temporary reduction of voltage.

At 1441 hours, LR 1330 and LR 1636 recorded current levels exceeding their Minimum to Trip (MTT)[64] that did not last long enough to open the reclosers. LR 1636 and LR 1330 both have a sensitive ground fault (SGF) setting which detects high-impedance faults. A high-impedance fault occurs when there is a line-to-ground fault; however, less fault current is drawn since the energized conductor's contact to earth has high resistance. The SGF MTT threshold was 20 amps for LR 1330 and 25 amps for LR 1636. In addition, the reclosers will not open unless that current threshold is continuously exceeded for 20 seconds for LR 1330 and 25 seconds for LR 1636. This delay prevents the operation of line reclosers due to transient conditions, such as normal changes in load.

Also, at 1441 hours, CB 1101 recorded current levels exceeding its MTT, but not for a duration long enough to open CB 1101. At 1442 hours, LR 1330 again recorded current levels in exceeding its MTT, but not for a duration long enough to open the recloser.

At 1443 hours, three SmartMeters located upstream to the Jenny Bird Lane intersection recorded a loss of voltage on one of the conductors. At 1444 hours, one of those meters recorded a Last Gasp event.

From 1444 to 1447 hours, LR 1636 and LR 1330 both recorded current levels exceeding their MTT, but not for a duration long enough to open the reclosers.

At 1506 hours and 1507 hours, respectively, LR 1330 and LR 1636 recorded current levels exceeding their MTT. However, the current exceeding the MTT recorded by LR 1330 lasted long enough to open the recloser and deenergize the conductors downstream of LR 1330. Since automatic reclosing was disabled for LR 1330 during the fire season, it did not automatically reclose and reenergize the conductors. LR 1636 did not open because LR 1330 had already deenergized the affected portion of the circuit.

November 6, 2020

At 0954 hours, PG&E restored power to customers on the Subject Circuit located downstream of Fuse 3489.

[64] MTT is a current threshold setting on line reclosers. When the MTT is exceeded for a prescribed amount of time, it will cause the line recloser to open, resulting in the de-energization of the downstream line it protects.

November 19, 2020

At 1119 hours, PG&E restored power to customers on the Subject Circuit located between Fuse 1861 and Fuse 4855.

November 23, 2020

At 1506 hours, PG&E completed post-fire repair work and restored power to all remaining customers on the Subject Circuit.

F. Timeline of SED's Field Observations and Review of Physical Evidence

October 7, 2020

During SED's field investigation on October 7, 2020, at the Incident Location, SED observed the remains of a tree stump from the Subject Tree and its fallen trunk.[65] SED estimated that the stump was rooted approximately 60 feet north and uphill of PG&E facilities. SED also noted that the stump appeared burned and had a large open cavity at the north side of the trunk, away from PG&E facilities. Since the large open cavity was on the north-facing side of the trunk, it was not visible when standing from the south where PG&E's facilites were located. Furthermore, SED observed a tree branch from the fallen trunk with an indentation and burn marks potentially caused by contact with an energized conductor (See Figure 24).

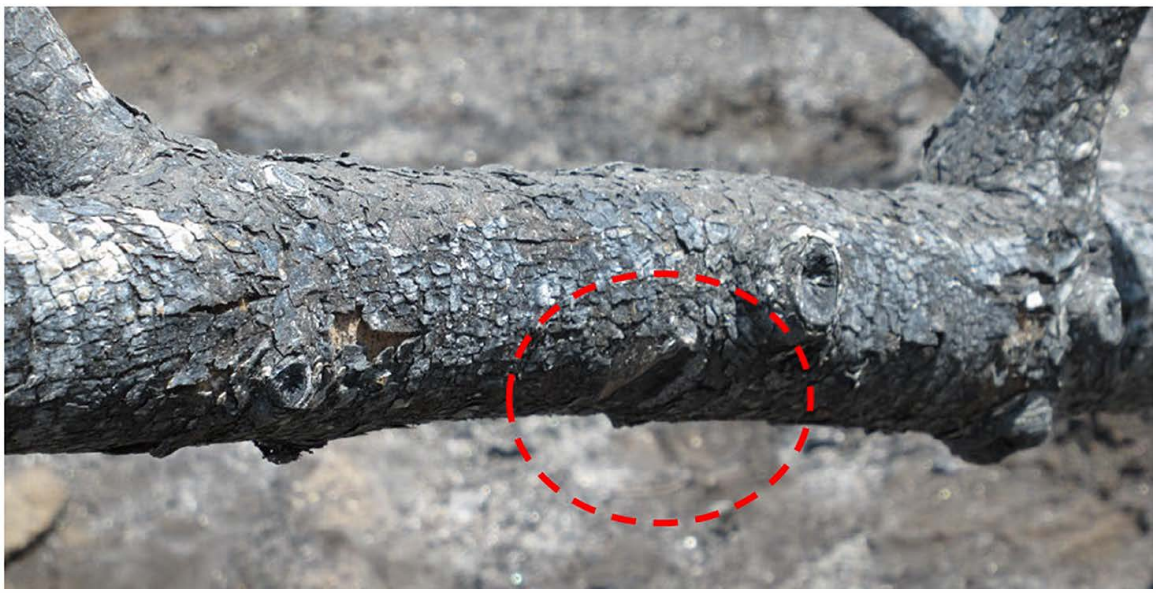

Figure 24: Tree Branch with Indentation Marks[66]

[65] See Figures 12-14 above.

[66] Picture taken by SED at the Incident Location.

October 9, 2020

On October 09, 2020, CAL FIRE informed PG&E that it had taken possession of certain PG&E equipment at the Area of Interest and allowed PG&E access to the Area of Interest. PG&E proceeded to conduct a site visit at the Area of Interest. PG&E observed that the Area of Interest had been altered due to CAL FIRE's investigation. In addition, PG&E noted signs of heavy equipment and vegetation work in the area. PG&E observed that CAL FIRE had collected a portion of a Gray Pine tree (Subject Tree) that was rooted north of Pole SAP ID 101457905 and the conductor span between Pole SAP ID 101457905 and Pole SAP ID 101457903. PG&E also estimated that the Subject Tree was rooted approximately 60 feet from PG&E conductors. PG&E proceeded to collect its facilities left by CAL FIRE at the Area of Interest and the remainder of the Subject Tree as evidence.[67]

Per CAL FIRE's property report,[68] CAL FIRE collected three SmartMeters at three properties on Zogg Mine Road. In addition, CAL FIRE collected a section of primary conductor from Pole SAP ID 103320099 to a point midspan between Pole SAP ID 101457903 and Pole SAP ID 101457898, two shattered insulators, one piece of crossarm hardware, and a burned crossarm. The CAL FIRE property report does not state the pole(s) from which the pieces of equipment were collected; however, PG&E observed that Pole SAP ID 101457905 was missing its crossarm, insulators, and crossarm hardware.

December 14, 2020

On December 14, 2020, at 0830 hours, SED arrived at the meeting location at 13976 S Fork Rd in Igo for a PG&E evidence collection. Once all personnel from PG&E, CAL FIRE, Shasta County DA, Fire Cause Analysis, and Wright Tree Service arrived, a safety tailboard was held and plans for how the root excavation of the Subject Tree would occur were discussed. All parties then went to the Incident Location. Root excavation work began at 0945 hours. Wright Tree Service excavated roots from each quadrant of the Subject Tree (See Figures 25 - 29). According to arborists from all parties, analysis and testing on roots from each quadrant of the Subject Tree can determine the health of the tree. If all quadrants are healthy, then the Subject Tree was healthy, and if one quadrant is unhealthy, then the Subject Tree was unhealthy. However, no determinations were made based on the initial observations by arborists from all parties since further analysis and testing needed to occur.

[67] See PG&E Data Request SED-001-Zogg Fire, Question 2 Response for a complete evidence collection list.

[68] Bates PGE-ZOGG-CPUC-00008353

Figure 25: Location of Root Excavation[69]

Figure 26: Root Sections from Quadrant 1

Figure 27: Root Sections from Quadrant 2

[69] Figures 25-29 were taken by SED at the Incident Location.

Figure 28: Root Sections from Quadrant 3 **Figure 29:** Root Sections from Quadrant 4

IV. CAL FIRE's and SED's Findings are Consistent[70]

Based on observations of weather conditions, topography, witness statements, and macro-scale fire pattern indicators, CAL FIRE determined the general origin area to be approximately 900 feet by 600 feet in size (12 acres) starting 250 feet south of the gate located at [redacted] and continuing 600 feet northeast and 900 feet northwest forming a general rectangle. CAL FIRE observed fire pattern indicators within the general origin area and determined the specific origin area to be approximately 20 feet by 20 feet in size starting 510 feet northwest of [redacted] and 60 feet northeast of the north roadway edge of Zogg Mine Road. Within the specific origin area, CAL FIRE observed burned grass, leaves, and a large gray pine (Subject Tree) that had fallen to the ground in a north to south direction.

CAL FIRE measured the Subject Tree to be approximately 105 feet in length. In addition, CAL FIRE observed a pre-existing cavity located on the uphill/north side of the tree measuring approximately 4 feet in height and 3 feet in width at the widest point. CAL FIRE estimated the cavity had taken approximately 1/3 or more in diameter of the Subject Tree's holding wood at the base of the tree, an area which is critical for structural integrity. CAL FIRE determined the lean of the Subject Tree was 23 degrees from vertical in a southward direction based on LiDAR data gathered during the incident and PG&E's 2019 LiDAR survey. At the base of the Subject Tree, CAL FIRE observed an approximately 9 foot horizontal (east to west) fracture of disturbed dirt. The disturbed dirt had evidence of being exposed to heat, fire, and smoke indicating that the Subject Tree had fallen prior to the fire.

[70] All statements in this section referencing "CAL FIRE" were taken from CAL FIRE's Investigation Report (See Attachment A – CAL FIRE Investigation Report (Confidential)).

Approximately 67 feet south from the base of the tree CAL FIRE observed three branches still attached to the tree that had indentations approximately the size of conductor wire and which showed signs of electrical arcing. Furthermore, CAL FIRE observed a PG&E pole (Pole SAP ID 101457905) located 25 feet west of the Subject Tree missing its crossarm and insulators, as well as split ends of PG&E conductors located east and west of the Subject Tree either on the ground or suspended on trees. Due to the fallen Subject Tree and downed PG&E conductors, CAL FIRE determined the center of the ignition area (where the Subject Tree contacted the Subject Conductors) to be located at N 40° 32.333, W -122° 33.771. Based on witness statements and physical evidence (Subject Tree with cavity, weather conditions, fire damage, and fire pattern indicators) found at the scene, CAL FIRE determined that the fire was caused by the Subject Tree falling downhill (southward) onto PG&E conductors resulting in an electrical arc that subsequently ignited dry vegetation on the ground.

Similar to CAL FIRE's determination, SED's investigation found that the contact between the Subject Tree and Conductor span caused an electrical arc which ignited dry vegetation on the ground and started the fire. During the field investigation on October 7, 2020, SED observed a large cavity located on the north side of the trunk of the Subject Tree. In addition, SED observed a tree branch from the Subject Tree with an indentation and burn marks that appeared to have been caused by contact with an energized conductor.

CAL FIRE interviewed multiple witnesses who stated they experienced a power outage on September 27, 2020 between 1440 to 1500 hours. The witnesses observed smoke and/or flames afterwards. SED's review of an ALERTWildfire camera, two geostationary weather satellites (GOES-16 and GOES-17), PG&E SmartMeter data, and PG&E SCADA data correspondingly found that the fire occurred at approximately 1442 hours.

CAL FIRE recommended Shasta County DA prosecute PG&E for the following:

1. 452(a) Penal Code for recklessly causing a fire that caused the death of four civilians.
2. 452(b) Penal Code for recklessly causing fire damage to inhabited structures.
3. 452(c) Penal Code for recklessly causing a fire that burned forest land and property.
4. 454(a) Penal Code for violating Section 452 during a state of emergency.
5. 13001 Health and Safety Code for causing a fire through the negligent action of not removing the Subject Tree which was leaning towards PG&E conductors and had a large cavity.

6. 4293 Public Resources Code for not removing the Subject Tree which was leaning towards PG&E conductors and had a large cavity.
7. 4421 Public Resources Code for causing a fire to land not owned by PG&E.
8. 2110 Public Utilities Code for failing to follow GO 95 by not removing the Subject Tree and allowing it to contact PG&E conductors.

Additionally, CAL FIRE recommended the following enhancements:

1. 452.1(a)(1) Penal Code for recklessly causing a new fire despite previous conviction of Section 452.
2. 452.1(a)(2) Penal Code for recklessly causing a new fire which caused great bodily injury to a firefighter despite previous conviction of Section 452.
3. 452.1(a)(3) Penal Code for recklessly causing a new fire which caused four civilian deaths despite previous conviction of Section 452.
4. 452.1(a)(4) Penal Code for recklessly causing a new fire which damaged and destroyed structures despite previous conviction of Section 452.

V. Third Party Fire Investigation Report by JHNolt Associates[71]

JHNolt Associates observed fire damage and mechanical damage to the conductors on the west side of the fallen Subject Tree. Additionally, JHNolt Associates observed fire damage, mechanical damage, and electrical arc fault damage to the conductors on the east side of the Subject Tree (See Figure 30). JHNolt Associates determined the mechanical damage to the Subject Conductors is a result of failure due to excessive tension which is consistent with the conductors breaking due to the Subject Tree falling on them. JHNolt Associates found the electrical arc damage to the conductor on the east (source) side to be consistent with the conductor being energized for a few minutes after the Subject Tree fell (See Figure 30). JHNolt Associates indicated the Subject Tree branches showed clear evidence of contact with at least one, possibly two conductors (See Figure 31). Furthermore, JHNolt Associates concluded the electrical arc damage on the trunk and branches indicates the Subject Tree fell onto the Subject Conductors while they were still energized.

[71] All statements in this section referencing "JHNolt Associates" were taken from the Investigation Report prepared by JHNolt Associates (See Attachment C – CAL FIRE Contracted Third Party Fire Investigation Report by JHNolt Associates [Confidential]).

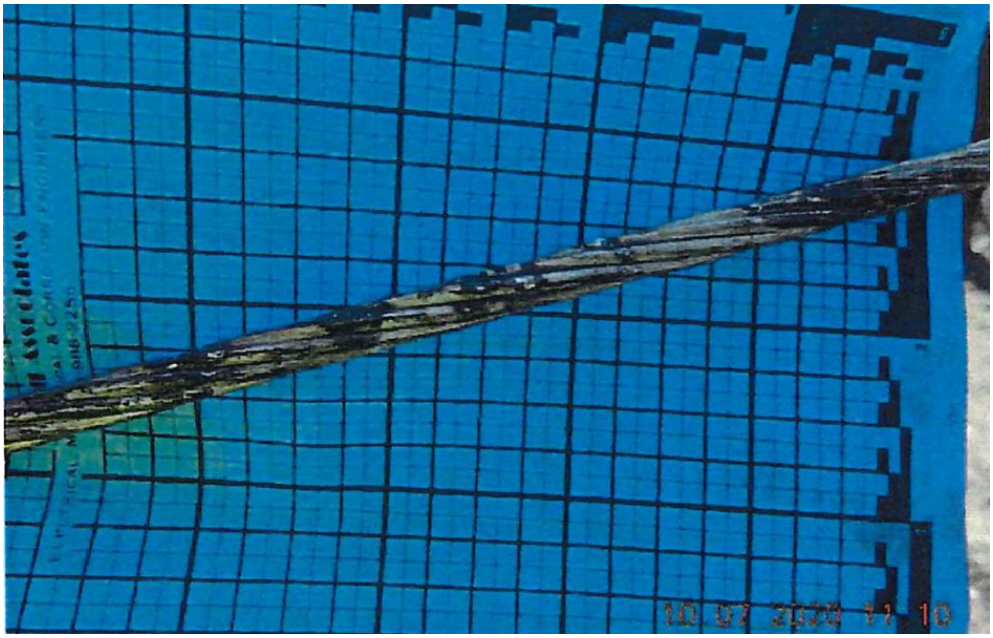

Figure 30: Electrical Arc Damage on East Conductor[72]

Figure 31: Tree Branch with Electrical Arc Damage from Conductor[73]

[72] Attachment C – CAL FIRE Contracted Third Party Fire Investigation Report by JHNolt Associates (Confidential).

[73] Id.

SED's investigation correspondingly found that the Subject Conductors failed due to the Subject Tree falling onto them. Similar to JHNolt Associates' determination, SED determined the electrical arc damage on the Subject Tree to be consistent with the Subject Conductors being energized after the tree fell.

JHNolt Associates reviewed PG&E SmartMeter data for the meter at [redacted] Road (located west of the Incident Location) which showed it recorded a Last Gasp event at 14:40:32 hours on September 27, 2020. JHNolt Associates indicated this date and time stamp recorded by the SmartMeter is most likely the exact time the Subject Conductors were broken by the Subject Tree.

SED's investigation correspondingly found that the SmartMeter at [redacted] recorded a Last Gasp event on September 27, 2020 at 1440 hours. Therefore, this date and time is likely the time the Subject Conductors were broken by the Subject Tree.

VI. Conclusion

Based on the evidence reviewed and CAL FIRE's investigation, SED found PG&E in violation of the following:

1. GO 95, Rule 31.1 for failing to maintain its facilities safely and properly, by failing to abate the Subject Tree which was identified for removal during 2018 post-Carr Fire VM work. The Subject Tree had a 23 degree lean from vertical towards the Subject Conductors, a large open cavity, no uphill supporting roots, and partial internal decay. This weakened the trunk and caused the Subject Tree to fail, fall onto the Subject Conductors, and ignite the fire.
2. GO 95, Rule 31.1 for failing to properly follow its own procedures, by:
    a. Not conducting a separate CEMA patrol in 2019.
    b. Not retaining its hard copy 2018-2019 VC map.
3. GO 165, Section III-B for failing to conduct an intrusive inspection of Pole SAP ID 101457903 by 2007.

If SED becomes aware of additional information that could modify SED's findings in this Incident Investigation Report, SED may re-open its investigation and may modify this report or take further actions as appropriate.

VII. List of Attachments

Attachment A – CAL FIRE Investigation Report (Case No. 20CASHU009978)

Attachment B – CAL FIRE Contracted Vegetation Analysis Report by McNeil Arboriculture Consultants LLC

Attachment C – CAL FIRE Contracted Third Party Fire Investigation Report by JHNolt Associates

Attachment D – PG&E North Valley Division Audit Report

Attachment E – PG&E October 2017 Fires Data Request 2, General Question 4 Response (Bates PGE-CPUC_DR-071918_General_Q04).

Attachment F – General Orders

Attachment F – General Orders

GO 95, Rule 31.1, Design, Construction and Maintenance states in part:

> *A supply or communications company is in compliance with this rule if it designs, constructs, and maintains a facility in accordance with the particulars specified in General Order 95, except that if an intended use or known local conditions require a higher standard than the particulars specified in General Order 95 to enable the furnishing of safe, proper, and adequate service, the company shall follow the higher standard.*
>
> *For all particulars not specified in General Order 95, a supply or communications company is in compliance with this rule if it designs, constructs and maintains a facility in accordance with accepted good practice for the intended use and known local conditions.*

GO 165, Section III-B, Standards for Inspection states:

> *Each utility subject to this General Order shall conduct inspections of its distribution facilities, as necessary, to ensure reliable, high-quality, and safe operation, but in no case may the period between inspections (measured in years) exceed the time specified in Table 1.*