Company:	San Diego Gas & Electric Company (U 902 M)
Proceeding:	2024 General Rate Case – Track 3
Application No.:	A.22-05-016
Exhibit:	SDG&E-T3-WMPMA-16

HEARING EXHIBIT

OF SAN DIEGO GAS & ELECTRIC COMPANY

Appendix A

SED Incident Investigation Report for 2018 Camp Fire with Attachments

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

May 2026

SDG&E and PCF have stipulated to the introduction of this exhibit in exchange for the waiver of cross examination of PCF witness Bill Powers.

Appendix A

SED Incident Investigation Report for 2018 Camp Fire with Attachments

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

Incident Investigation Report

Report Date: November 8, 2019

Incident Number: E20181108-01

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

Date and Time of the Incident: November 8, 2018, 0629 hours

Location of the Incident: Tower :27/222
Pulga, CA
County: Butte

Concow Rd. and Rim Rd. intersection
Concow, CA
County: Butte

Fatality / Injury: 85 fatalities

Property Damage: Unknown

Utility Facilities involved: Caribou-Palermo 115 kV Transmission Line and Big Bend 1101 12 kV Distribution Circuit

Violation: Yes

I. Summary

In the early morning hours on November 8, 2018, a fire ignited near Camp Creek Road near the community of Pulga in Butte County. The California Department of Forestry and Fire Protection (CAL FIRE) determined that the fire was caused by electric transmission lines owned and operated by Pacific Gas and Electric Company (PG&E) near the Pulga area.[1] The CAL FIRE investigation identified that the fire started near Pulga and that there was a second ignition site near the intersection of Concow Road and Rim Road that was caused by vegetation contact with electrical distribution lines owned and operated by PG&E.[2] That fire was overtaken by the fire that started near

[1] CAL FIRE News Release on May 15, 2019.
[2] Id.

Pulga.[3] The resulting Camp Fire burned approximately 153,336 acres, destroying 18,804 structures and resulting in 85 fatalities.[4]

The Caribou-Palermo Transmission Line, identified as the transmission line which caused the Camp Fire,[5] remains de-energized since the fire.

Based on the Safety Enforcement Division's (SED) review, SED found that PG&E violated requirements in the Commission's General Order (GO) 95, GO 165, and Resolution E-4184; and California Public Utilities Code Section 451. SED identified the following PG&E violations:

General Order Rule, Public Utilities Code Requirements	**Violations**
GO 95, Rule 44.3	PG&E failed to replace or reinforce the C-hook on Tower :27/222 (Incident Tower) before its safety factor was reduced to less than two-thirds of the safety factor specified in Rule 44.1, Table 4, which is a violation of Rule 44.3
GO 95, Rule 31.1	PG&E failed to maintain the C-hook supporting the transposition jumper on the Incident Tower :27/222 for its intended use and regard being given to the conditions under which it was to be operated.
GO 95, Rule 31.2	PG&E failed to inspect Incident Tower thoroughly and failed to detect an immediate Safety Hazard or Priority A condition on the incident C-hook.
GO 165, Section IV	PG&E failed to follow its procedures by failing to document the factors and reasons that led to the delay in the repair work on the Incident Tower.
GO 165, Section IV	PG&E failed to conduct detailed climbing inspections when conditions to trigger climbing inspections were evident as specified in PG&E's procedures.

[3] CAL FIRE News Release on May 15, 2019.

[4] Butte County Sheriff's Camp Fire Update (September 25, 2019)

[5] PG&E's 20 Day Report (December 11, 2018) states, "On CAL Fire's website, CAL FIRE has identified coordinates for the Camp Fire near Tower :27/222 on PG&E's Caribou-Palermo 115 kV Transmission Line."

	Wear on the original working eyes that remained on the Incident Tower is an indication of a known condition with potential to recur on the added hanger plates with working eyes, which should have triggered detailed climbing inspection to examine the added hanger plates.
GO 95, Rule 31.1	The condition of the C-hook (material loss > 50%) supporting the transposition jumper on Tower :24/199 demonstrates that PG&E did not maintain the tower for its intended use.
GO 95, Rule 31.2	PG&E failed to inspect Tower :24/199 thoroughly and failed to detect an immediate Safety Hazard or Priority A Condition on the C-hook.
GO 165, Section IV	C-hook on Tower :24/199 had material loss of over 50%. PG&E failed to detect and correct the Priority A condition as specified in PG&E's procedures.
GO 95, Rule 18	PG&E assigned an incorrect priority for an immediate Safety Hazard (disconnected insulator hold-down anchor on Tower :27/221).
GO 165, Section IV	PG&E failed to follow its procedures by using an outdated inspection form during the detailed climbing inspections that PG&E conducted from September 19 to November 5, 2018.
D.06-04-055, as amended by Resolution E-4184	PG&E failed to report the reportable incident on the Big Bend 1101 12kV Distribution Circuit in a timely manner.
CA Public Utilities Code Section 451	PG&E failed to maintain an effective inspection and maintenance program to identify and correct hazardous conditions on its transmission lines in order to furnish and maintain service and facilities, as are necessary to promote the safety and health of its patrons and the public.

A. Rules and Other Requirements Violated

GO 95, Rule 18(A) [Resolution of Potential Violations of General Order 95 and Safety Hazards] states in part:

"Each company (including electric utilities and communications companies) is responsible for taking appropriate corrective action to remedy potential violations of GO 95 and Safety Hazards posed by its facilities."

"For the purposes of this rule, 'Safety Hazard' means a condition that poses a significant threat to human life or property."

"Each company (including utilities and CIPs) is responsible for taking appropriate corrective action to remedy Safety Hazards and GO 95 nonconformances posed by its facilities."

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

"Electrical supply and communication systems shall be designed, constructed, and maintained for their intended use, regard being given to the conditions under which they are to be operated, to enable the furnishing of safe, proper, and adequate service.

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."

GO 95, Rule 31.2 Inspection of Lines states in part:

"Lines shall be inspected frequently and thoroughly for the purpose of ensuring that they are in good condition so as to conform with these rules. Lines temporarily out of service shall be inspected and maintained in such condition as not to create a hazard."

GO 95, Rule 44.3 Replacement

"Lines or parts thereof shall be replaced or reinforced before safety factors have been reduced (due to factors such as deterioration and/or installation of additional facilities) in Grades "A" and "B" construction to less than two-thirds of the safety factors specified in Rule 44.1 and in Grade "C" construction to less than one-half of the safety factors specified in Rule 44.1. Poles in Grade "C" construction that only support communication lines shall also conform to the requirements of Rule 81.3A. ***In no case***

shall the application of this rule be held to permit the use of structures or any member of any structure with a safety factor less than one." **[*Emphasis added*]**

GO 165, Section IV, Transmission Facilities states in part:

"Each utility shall prepare and follow procedures for conducting inspections and maintenance activities for transmission lines."

Appendix B of Commission Decision (D.) 06-04-055, as amended by Resolution E-4184 on August 21, 2008, states in part:

"Within 2 hours of a reportable incident during normal working hours or within 4 hours of a reportable incident outside of normal working hours, the utility shall provide notice to designated CPUC staff of the general nature of the incident, its cause and estimated damage. The notice shall identify the time and date of the incident, the time and date of notice to the Commission, the location of the incident, casualties that resulted from the incident, identification of casualties and property damage, and the name and telephone number of a utility contact person….

2. Reportable incidents are those which: (a) result in fatality or personal injury rising to the level of in-patient hospitalization and attributable or allegedly attributable to utility owned facilities; (b) are the subject of significant public attention or media coverage and are attributable or allegedly attributable to utility facilities; or (c) involve damage to property of the utility or others estimated to exceed $50,000…"

California Public Utilities Code Section 451 states in part:

"Every public utility shall furnish and maintain such adequate, efficient, just, and reasonable service, instrumentalities, equipment, and facilities, including telephone facilities, as defined in Section 54.1 of the Civil Code, as are necessary to promote the safety, health, comfort, and convenience of its patrons, employees, and the public."

B. Witnesses

	Name	Title
1	Chris Lee	CPUC Lead Investigator
2	Anwar Safvi	CPUC Investigator
3	Andie Biggs	CPUC Investigator
4	Banu Acimis	CPUC Program and Project Supervisor
5	Lee Palmer	CPUC Deputy Director
6	Tom Kluge	CAL FIRE Fire Captain
7	Shawn Zimmermaker	CALFIRE Division Chief
8	[redacted]	Exponent Investigator
9	[redacted]	PG&E Technician
10	[redacted]	PG&E Technician
11	[redacted]	PG&E, Principal Events Lead

C. Evidence

	Source	Description
1	PG&E	Initial Incident Report, 11/08/18
2	CPUC	Pulga Evidence Collection, 11/14/18
3	PG&E	Second Incident Report, 11/16/18
4	CPUC	Concow Evidence Collection, 11/19/18
5	CPUC	Data Request 1 and 2, 12/06/18
6	PG&E	20-day Incident Report, 12/11/18
7	PG&E	Downloaded Data from Relays at Palermo, Oroville and Table Mountain Substations, 12/14/2018
8	CPUC	Data Request 3, 1/11/19
9	CPUC	Data Request 4, 1/16/19
10	PG&E	Data Request Response to DR 3, 1/17/19 and 1/25/19 (partial)
11	PG&E	Data Request Response to DR 1 and 2, 2/1/19 (partial)
12	CPUC	Data Request 3A, 2/6/19
13	PG&E	Data Request Response to DR 3A, 2/6/19
14	PG&E	Data Request Response to DR 1, 2 and 3, 3/1/19 (partial)
15	PG&E	Priority A Line Corrective Notifications from Enhanced Inspection of the Caribou-Palermo Transmission Line after November 8, 2018, 3/6/18
16	PG&E	Data Request Response to DR 1 and 4, 3/8/19 (partial)
17	PG&E	Data Request Response to DR 1 and 4, 3/18/19 (partial)
18	CPUC	Data Request 5, 3/19/19
19	CPUC	Data Request 6, 3/20/19

20	PG&E	Additional 495 Notifications for the Caribou-Palermo Transmission Line from Enhanced Inspection, 3/20/19
21	CPUC	CP115 Tower :20/160 Evidence collection, 3/28/19
22	CPUC	CP115 Tower :24/199 Evidence collection, 3/29/19
23	PG&E	Data Request Response to DR 1, 2, and 4, 4/2/19 (partial)
24	PG&E	Data Request Response to DR 1, 2, 4 and 6, 4/5/19 (partial)
25	PG&E	Data Request Response to DR 1, 2, 4 and 5, 4/12/19 (partial)
26	PG&E	Data Request Response to DR 1,2, and 6, 4/16/19 (partial)
27	PG&E	Data Request Response to DR 4 and 6, 4/19/19 (partial)
28	PG&E	Data Request Response to DR 4, 5 and 6, 4/26/19 (partial)
29	PG&E	Data Request Response to DR 1 and 4, 5/13/2019 (partial)
30	PG&E	Data Request Response to DR 4 (partial), photos from 3/28/19 & 3/29/19 evidence collection, 5/23/19
31	PG&E	Data Request Response to DR 2 and 4, 6/3/19 (partial)
32	PG&E	Data Request Response to DR 2 and 4, 6/24/19 (partial)
33	CPUC	CPUC Data Request 7, 6/25/19
34	PG&E	Data Request Response to DR 2, 7/15/19 (partial)
35	PG&E	Data Request Response to DR 7, 7/23/19 (partial)
36	CPUC	Data Request 8, 8/2/19
37	PG&E	Data Request Response to DR 4 and 7, 8/5/19 (partial)
38	PG&E	Data Request Response to DR 4 and 7, 8/9/19 (partial)
39	PG&E	Data Request Response to DR 2 and 7, 8/16/19 (partial)
40	PG&E	Data Request Response to DR 7, 8/23/19 (partial)
41	PG&E	Data Request Response to DR 7 and 8, 8/30/19 (partial)
42	PG&E	Data Request Response to DR 7, 9/19/19 (partial)
43	PG&E	Data Request Response to DR 4, 9/26/19 (partial)
44	PG&E	Data Request Response to DR 8, 10/8/19 (partial)
45	CPUC	Data Request 9, 10/8/19
46	CPUC	Data Request 9 Supplemental, 10/15/19
47	PG&E	Data Request Response to DR 9, 10/18/19 (partial)
48	PG&E	Data Request Response to DR 7, 9, 9 Supplemental, 10/25/19 (partial)
49	CPUC	Data Request 10, 10/28/19
50	CPUC	Data Request 11, 10/29/19
51	PG&E	Data Request Response to DR 2, 4, 10, 11/05/19 (partial)
52	PG&E	Data Request Response to DR 10, 11, 11/07/19 (partial)

II. Background

SED investigated the involvement of PG&E facilities in the fire. 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 observations of evidence collection and reviews of PG&E's operations and maintenance procedures and relevant records.

SED's field visits are summarized below:

- November 14, 2018 – SED observed CAL FIRE collect evidence[6] from Tower :27/221 and Tower :27/222 (the "Incident Tower") along the Caribou-Palermo Transmission Line, near the town of Pulga.
- November 19, 2018 – SED observed CAL FIRE collect evidence[7] near the intersection of Concow Road and Rim Road.
- December 4, 2018 – SED and Exponent observed PG&E download relay data from Palermo, Table Mountain and Oroville Substations.
- March 28, 2019 – SED observed CAL FIRE and Butte County collect evidence[8] from Tower :20/160 on the Caribou-Palermo Transmission Line.
- March 29, 2019 – SED observed CAL FIRE and Butte County collect evidence[9] from Tower :24/199 on the Caribou-Palermo Transmission Line.

SED submitted eleven data requests totaling hundreds of questions to PG&E. The questions included requests for procedures, records, forms, and responses to specific questions related to the Camp Fire. In addition to the responses to the data requests, PG&E also provided results of enhanced inspections that were performed on the Caribou-Palermo Transmission Line subsequent to the Camp Fire. PG&E's enhanced inspections utilized aerial drones and climbing of the Caribou-Palermo Transmission Line.

SED's investigation focused on the first ignition point near the town of Pulga – specifically on the Incident Tower and its adjacent tower, Tower :27/221. SED limited its investigation of the second ignition point (the intersection of Concow Road and Rim Road) because the fire from the ignition point near Pulga consumed the fire that started at the second ignition point.

The Incident Tower and associated equipment were initially installed between 1919 and 1921 and were placed into service on May 6, 1921 by the Great Western Power

[6] Bates PGE-CAMP-CPUC-0000000001 (Evidence Collection List, Update 12/18/2018).
[7] Id.
[8] 11/5/2019 PG&E response to CPUC data request SED-010, Question 1.
[9] 11/5/2019 PG&E response to CPUC data request SED-010, Question 2.

Company.[10] PG&E took ownership of the Caribou-Palermo Transmission Line in 1930.[11]

The Caribou-Palermo Transmission Line connects PG&E's Caribou #1 Powerhouse to the Palermo Substation.[12] Circuit Breaker (CB) 112 is the protection device on the north end of the line, located at the Caribou #1 Powerhouse. CB 152 is the protection device on the south end of the line, located at the Palermo Substation.[13]

III. SED Review and Analysis

A. Timeline Summary of the Incident

November 8, 2018

- Wind speed and wind gusts recorded at 0610 hours at the Stirling City weather station were 10.27 mph and 36.39 mph respectively.[14] The Stirling City weather station is a PG&E weather station located closest to the two ignition points identified by CAL FIRE.

- At approximately 0457 hours on November 8, 2018, the Supervisory Control and Data Acquisition (SCADA) data from the Palermo Substation[15] showed the current in the line reached approximately 80 Amps[16] as shown in Figure 1.

- At 0615 hours, a Palermo Substation relay detected a ground fault current of 256 Amps and opened Circuit Breaker (CB) 152.[17]

- At 0615 hours, a Caribou #1 Powerhouse relay detected a ground fault current of 202 Amps and opened CB 112. The fault was isolated with both circuit breakers 152 and 112 opening.[18]

- According to CAL FIRE's website, the fire started at 0629 hours at 39.82° latitude and -121.44° longitude.[19] These coordinates correspond to a

[10] 2/1/2019 PG&E response to CPUC data request SED-001, Question 37.
[11] PG&E Response to Notice Re California Wildfires - Case 3:14-cr-00175-WHA, Document 956, Exhibit A (Filed 12/31/18).
[12] Bates PGE-CAMP-CPUC-0000002534.
[13] Bates PGE-CAMP-CF-0000000123.
[14] Bates PGE-CAMP-CPUC-0000012017 in response to Data Request SED-001, Question 49.
[15] Bates PGE-CAMP-CF-0000000121.
[16] Bates PGE-CAMP-CF-0000000121.
[17] 4/2/2019 PG&E response to CPUC data request SED-001, Caribou-Palermo, Question 4.
[18] 4/2/2019 PG&E response to CPUC data request SED-001, Caribou-Palermo, Question 4.
[19] CAL FIRE Incident Website at: https://inciweb.nwcg.gov/incident/6250/

location near the Incident Tower of the Caribou-Palermo 115 kV Transmission Line.[20]

- At 0630 hours, a PG&E employee observed fire in the vicinity of the Incident Tower, and this observation was reported to 911 by PG&E employees.[21]

- At 0645 hours, PG&E Big Bend 1101 12 kV Distribution Circuit experienced an outage.[22]

- The outage was a result of an open operation of Line Recloser 1704 - a protection device on PG&E's Big Bend 1101 12 kV Distribution Circuit.

- Between approximately 0900 and 1300 hours, PG&E conducted an aerial patrol of the Caribou-Palermo 115 kV Transmission Line. At the Incident Tower, the patrol identified a suspension insulator supporting a transposition jumper that had disconnected from an arm on the tower.[23,24]

- At 1806 hours, PG&E submitted an incident report to the CPUC, reporting the outage on the Caribou-Palermo Transmission Line, and an observation of damage to a transmission tower near Pulga, in the area of the Camp Fire.

November 15, 2018

- At approximately 1800 hours, CAL FIRE held a press conference during which it identified a "possible second origin related to the Camp incident in the Concow area."[25]

November 16, 2018

- At 1600 hours, PG&E reported the outage on the Big Bend 1101 12 kV Distribution Circuit.

[20] PG&E's 20 Day Report (December 11, 2018).
[21] PG&E's 20 Day Report (December 11, 2018).
[22] PG&E's 20 Day Report (December 11, 2018).
[23] PG&E's 20 Day Report (December 11, 2018).
[24] 2/1/2019 PG&E response to CPUC data request SED-001, Question 1.
[25] 2/1/2019 PG&E response to CPUC data request SED-001 – Big Bend 1101 Distribution, Question 1.

B. Field Review

1. Observations

SED visited the incident site on November 14, 2018 along with Tom Kluge and Shawn Zimmermaker of CAL FIRE. The incident site is located at 39.82º latitude and -121.44º longitude, near the town of Pulga.[26]

At first, SED made observations at Tower :27/221, adjacent to the Incident Tower. The distance between the two towers is approximately 845 feet.[27] SED observed that the hold-down anchor on Tower :27/221 had disconnected from the suspension insulator. This is shown in Figure 2.

The Incident Tower is a dead-end transposition tower. On the Incident Tower, SED observed that a suspension insulator supporting a transposition jumper had separated from an arm of the tower and remained suspended above the ground (Figure 3). Prior to the failure, two C-hooks provided mechanical support to the incident transposition jumper; and each C-hook carried a load of approximately 143 lbs.[28] One of the C-hooks failed at the point where it had been in contact with the hanger plate. SED made a close observation of the portion of the failed C-hook that remained attached to the separated suspension insulator. SED observed that most of the cross-section was flat and smooth. At the upper portion of the cross-section – approximately the top 20 to 25 % of the cross-section of the C-hook where the failure occurred – the surface of the metal was rough, and a small, sharp piece of the material jutted out. In SED's assessment: the smooth portion is an indication of wear that occurred over a long period of time prior to failure; the rough upper portion of the cross-section fractured at the time of the incident. The observations are confirmed by the photo in Figure 4. SED also observed flash marks on the transposition jumper which SED concluded were a result of arcing between the jumper and the tower (Figure 5).

SED observed that hanger plates had been added to the left and right runner arms on the Incident Tower. PG&E could not locate records that identify when the hanger plates were added.[29] However, both the original runner arms, which remained in place, and the added hanger plates showed signs of wear on the working eyes as shown by

[26] CAL FIRE Incident Website at: https://inciweb.nwcg.gov/incident/6250/

[27] 2/1/2019 PG&E response to the CPUC data request SED-001, Question 39.

[28] 7/23/2019 PG&E response to CPUC data request SED-007, Question 2: PGE-CAMP-CPUC-06252019-DR_SED-007_Q02_Camp Fire.

[29] In its July 23, 2019 response to CPUC data request SED-007, Question 12, PG&E states it has not been able to identify the installation date for the hanger plates. In its April 2, 2019 response to CPUC data request SED-002, Question 32, PG&E states that approximately around 2000-2001, it began using Systems Applications and Products (SAP), an electronic system for processing all work orders for distribution and transmission assets. Before that, work orders for transmission assets were maintained in hard copies.

elongated holes in Figure 6 and Figure 7. For reference, Figure 8 shows a typical location of runner arms on transmission towers that have them.

On March 29, 2019, SED observed evidence collected from Tower :24/199 on the Caribou-Palermo Transmission Line. SED observed significant wear on the right phase suspension insulator C-hook (Figure 9). By SED's conservative estimation, the area of the C-hook that rests on the hanger plate was worn over 50% through. The cross-section of the C-hook, where the material was worn away, was flat and smooth. The March 29, 2019 evidence collection was requested by the Butte County District Attorney in addition to CAL FIRE.

Tower :24/199 is a transposition tower, similar in configuration to the Incident Tower. It is located approximately three miles north of the Incident Tower.

2. Analysis

As C-hooks wear down, the load they can support decreases. The failure of the C-hook supporting the transposition jumper on the Incident Tower shows that it could not support the load it was intended to support. A safety factor of less than one means the point has been reached at which the load exceeds the strength of the material. SED determined that PG&E failed to inspect the tower and the C-hook thoroughly to identify the deterioration. According to Rule 44.3, lines or parts thereof must be replaced or reinforced before safety factors have been reduced to less than two-thirds of the safety factor specified in Rule 44.1 which shows safety factors in Table 4. PG&E was required to maintain the safety factor above 1.33, which is two-thirds of 2, at all times. PG&E violated GO 95, Rule 44.3 because it failed to maintain the safety factor of the C-hook above 1.33; in fact, the safety factor was less than one when it failed on November 8, 2018. In addition, PG&E violated GO 95, Rule 31.1, by not maintaining the Incident Tower on the Caribou-Palermo Transmission Line for its intended use to enable the furnishing of safe, proper, and adequate service.

The C-hook on Tower :24/199 showed material loss of over 50% in the cross section where it contacted the hanger plate. This assessment was based on SED's field observation of the C-hook, in addition to confirmation by the photo taken. Based on PG&E's Electric Transmission Preventive Maintenance (ETPM) Manual,[30] this is a hazardous Priority A[31] condition which requires immediate response and continued action until the condition is repaired or no longer presents a potential hazard. The hazardous condition of the C-hook demonstrates that PG&E did not maintain Tower :24/199 for its intended use, a violation of Rule 31.1. Further, PG&E's failure to follow

[30] TD-1001M Electric Transmission Preventive Maintenance Manual, Table 8, page 24 (Rev: 03).

[31] TD-1001M Electric Transmission Preventive Maintenance Manual, Table 7, page 18 (Rev: 03). Priority A requires immediate response and continued action until the condition is repaired or no longer presents a potential hazard. SAP due date will be 30 days to allow time for post-construction processes and notification close-out. Corrective actions are required within 3 months, 12 months, and 24 months for Priority levels B, E, and F respectively.

its procedures and detect and correct this Priority A condition is a violation of GO 165, Section IV, which states in part:

> "*Each utility shall prepare and follow procedures for conducting inspections and maintenance activities for transmission lines.*"[32]

C. Procedures and Records Review

1. PG&E's Applicable Procedures and Records

PG&E's ETPM Manual, Table 13 (May 12, 2016, Rev: 03)[33] lists PG&E's inspection frequencies for detailed inspections of 115 kV steel transmission towers.

PG&E procedures require detailed overhead transmission inspections – ground or aerial – at least once every 5 years. PG&E procedures do not require routine detailed climbing inspections but specify conditions that trigger such inspections.[34] Inspectors are required to look for abnormalities or circumstances that would negatively impact safety, reliability, or asset life. Per PG&E policy, each abnormal condition identified by PG&E inspectors must be assigned a Priority Code and recorded with a deadline for corrective action, if the problem is not corrected in the field when found.

In addition to detailed inspections, PG&E procedures require annual patrol inspections via walking, driving or flying over the assets. The inspector's primary responsibility when conducting an overhead electric facility patrol inspection is to visually observe the electric facilities, looking for obvious structural problems or hazards without using measuring devices, tools, or diagnostic tests, and to record that the facilities have been patrolled. Per PG&E policy,[35] abnormal conditions that, in the opinion of the inspector, warrant maintenance before the next scheduled patrol or inspection, must be identified, assigned a Priority Code, and recorded with a deadline for corrective action.

The following are some of the relevant PG&E documents that SED reviewed during its investigation:

- Incident reports for the Camp Fire[36]
- Aerial patrol records from 2014 – 2018[37]

[32] GO 165, Section IV.
[33] Bates PGE-CAMP-CPUC-0000002575.
[34] TD-1001M Electric Transmission Preventive Maintenance Manual, Table 13, page 41 (Rev :03).
[35] TD-1001M Electric Transmission Preventive Maintenance Manual, Section 3.1, page 51 (Rev :03).
[36] PG&E Incident Report No. 181108-9002, 181116-9015, 20-day report.
[37] Bates PGE-CAMP-CPUC-0000000443-0000000516.

- Detailed ground inspection reports for 2001, 2003, 2005, 2009 and 2014[38]
- A list of all patrols and inspections performed on the Caribou-Palermo Transmission Line from January 2001 to October 2018[39]
- A table of all work orders created by patrols and inspections on the Caribou-Palermo Transmission Line from January 2001 to October 2018[40]
- Records of detailed climbing inspections performed along the Caribou-Palermo Transmission Line from September 19 – November 5, 2018[41]
- TD-1001M-F04 Steel Structure Detailed Climbing Inspection Form (Non-500kV Structures) Rev 09/18[42]
- TD-1001M-F04 Steel Structure Detailed Climbing Inspection Form (Non-500kV Structures) Rev 03/16[43]
- TD-1001M-JA02 Detailed Climbing Inspection Job Aid (Effective 09/24/2018, Rev: 1)[44]

2. SED's Analysis

a) Incident Reporting

PG&E failed to report the outage as potentially related to the second CAL FIRE ignition point, near Concow Road/Rim Road, within the timeframe required by Appendix B of D.06-04-055, as amended by Resolution E-4184. On November 15, 2018, at approximately 1800 hours, CAL FIRE held a press conference during which it identified a "possible second origin related to the Camp incident in the Concow area."[45] On November 16, 2018, at approximately 1600 hours, PG&E submitted the Electric Incident Report[46] for this outage potentially related to the additional ignition point identified by CAL FIRE.[47] This incident report was sent approximately 22 hours after CAL FIRE's press conference, rather than the required 4 hours, a violation of Appendix B of D.06-04-055, as amended by Resolution E-4184.

b) Patrol Inspections

During an aerial patrol inspection of the Caribou-Palermo Transmission Line on September 11, 2018, a PG&E crew observed that an insulator hold-down anchor on

[38] 3/1/2019 PG&E response to CPUC data request SED-001, Question 4 (for 2009, 2014 reports). 4/2/2019 PG&E response to CPUC data request SED-002, Questions 21 (for 2001, 2003, 2005 reports). PG&E's data request response on 10/25/2019 states, "… the terms 'inspection' and 'patrol' appear to be used interchangeably" until 2005.
[39] 4/2/2019 PG&E response to CPUC data request SED-002, Question 20.
[40] 4/2/2019 PG&E response to CPUC data request SED-002, Question 21.
[41] 4/2/2019 and 6/24/2019 PG&E responses to CPUC data request SED-002, Questions 21.
[42] Bates PGE-CAMP-CPUC-0000019432.
[43] Bates PGE-CAMP-CPUC-0000020061.
[44] Bates PGE-CAMP-CPUC-0000019292.
[45] 2/1/2019 PG&E response to CPUC data request SED-001 – Big Bend 1101 Distribution, Question 1.
[46] Initial Electric Incident Report – PG&E Incident No: 181116-9015, November 16, 2018.
[47] CAL FIRE News Release, CAL FIRE Investigators Determine Cause of the Camp Fire, dated May 15, 2019.2019; PG&E EIR No. EI181108B and SED Incident No. E20181116-01.

Tower :27/221 had disconnected from a suspension insulator. PG&E assigned the condition a Priority Code E.[48] As defined in the ETPM Manual, the Priority E designation is for conditions which must receive corrective action within 12 months. SED notes that during additional enhanced inspections that PG&E performed after the Camp Fire, PG&E assigned a Priority A code for a separate broken hold-down insulator hardware on a different tower on the Caribou-Palermo Transmission line.[49] According to a PG&E lineman who was at the site on November 14, 2018 the hold-down anchor on Tower :27/221 was not broken, but rather had become unscrewed. Nevertheless, the hazardous condition created by an unscrewed hold-down anchor is similar to that created by a broken hold-down anchor. SED concludes that the unscrewed insulator hold-down anchor on Tower :27/221 should have been designated Priority A. This is a violation of GO 95, Rule 18.

c) Detailed Ground Inspections

PG&E procedures require detailed ground inspections at a minimum of once every 5 years. For the Caribou-Palermo Transmission Line, PG&E conducted detailed inspections on August 31, 2009[50] and August 28, 2014.[51] The Incident Tower is a lattice steel structure. As part of the detailed inspection of the line, PG&E inspected the Incident Tower on August 31, 2009 and August 28, 2014. During the August 31, 2009 inspection, PG&E created a maintenance tag (Line Corrective Notification #103995542) for replacement of 3-bolt connectors, a device joining conductors, which was required to be completed by November 30, 2015.[52] However, the corrective action was completed on June 18, 2016.[53] PG&E did not document the reason for the delayed work, which is a violation of its own policy.[54]

PG&E's failure to follow its procedures in the ETPM Manual by failing to document the factors and reasons that led to the delay in the repair work on the incident tower is a violation of GO 165, Section IV.

d) Detailed Climbing Inspections

SED reviewed PG&E's detailed climbing inspection records from September 19 to November 5, 2018 and found two instances of GO 165, Section IV violations.

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[48] TD-1001M Electric Transmission Preventive Maintenance Manual (Rev: 03). Priority A requires immediate corrective action, and resolution within 1 month. Corrective action is required within 3 months for Priority B, 12 months for Priority E, and 24 months for Priority F.

[49] For example, Notification 115410939 from March 6, 2018 letter from Meredith Allen of PG&E to Lee Palmer of the CPUC.

[50] Bates PGE-CAMP-CPUC 0000003928-0000003996.

[51] Bates PGE-CAMP-CPUC 0000003997-0000004056.

[52] 4/16/2019 PG&E response to CPUC data request SED-006, Question 2.

[53] 4/16/2019 PG&E response to CPUC data request SED-006, Question 2.

[54] TD-1001M Electric Transmission Preventive Maintenance Manual, Section 1.5.3, Page 19 (Rev :03). The section states in part "… notifications that go beyond the due date should be documented as to the factor(s) that led to the notification not being completed on time." LC notification #103995542 was completed more than 6 months late with no documentation explaining the cause of the delay.

As a result of Line Corrective ("LC") Notification 114730861, which required a detailed [climbing] inspection of all steel structures on the Caribou-Palermo Transmission Line,[55] PG&E performed detailed climbing inspections on a portion of the towers of the Caribou-Palermo Transmission Line between September 19 and November 5, 2018. Before PG&E could inspect all the structures, the activity was halted by the Camp Fire. The Incident Tower was not one of the structures inspected within this timeframe. The reason for PG&E's inspections was to assess the condition of its lines for asset management strategy.[56] SED's review of PG&E's records for these inspections found that the inspectors had used an outdated inspection form TD-1001M-FXX 03/16 (Figure 10).[57] The form that was in effect at the time of the inspections was TD-1001M-F04 (09/18) (Figure 11).[58] Since PG&E did not follow its own procedure, it is in violation of GO 165, Section IV.

Also, the visible wear on the original runner arms on the Incident Tower (Figures 6 and 7) should have been an indication of the potential for similar problems with wear on the added hanger plates, triggering planned follow-up detailed climbing inspections. SED notes that during additional enhanced inspections that PG&E performed after the Camp Fire, PG&E assigned a Priority A code for 13 towers on the Caribou-Palermo Transmission Line where similar visible wear on the working eyes of the hanger plate was detected.[59]

Regarding the factors that trigger detailed climbing inspections, the ETPM Manual, page 41 states in part:

> "Triggers are specific conditions that require follow-up inspections and/or maintenance scheduled by the supervisor, independent of the routine schedule. The following triggers can be applied … [k]nown, recurring conditions that jeopardize line integrity …"[60]

However, based on PG&E's records of detailed climbing inspections that SED reviewed, PG&E did not perform any climbing inspections triggered by specific conditions on the Incident Tower between at least 2001 and the time of the Camp Fire. This omission is a violation of PG&E's own policy requiring climbing inspection on towers where recurring problems exist. SED notes that a climbing inspection of the Incident Tower during that time could have identified the worn C-hook before it failed, and that its timely replacement could have prevented ignition of the Camp Fire. For these reasons,

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[55] 4/23/2019 PG&E response to CAL FIRE data request.
[56] 10/18/2019 PG&E response to CPUC data request SED-008, Question 1.
[57] For example, Bates PGE-CAMP-CF-0000006474.
[58] Bates PGE-CAMP-CPUC-0000019432.
[59] Bates PGE-CAMP-CPUC-0000004144, Bates PGE-CAMP-CPUC-0000004297, Bates PGE-CAMP-CPUC-0000004270, Bates PGE-CAMP-CPUC-0000004439, Bates PGE-CAMP-CPUC-0000004232, Bates PGE-CAMP-CPUC-0000004359, Bates PGE-CAMP-CPUC-0000004327, Bates PGE-CAMP-CPUC-0000004371, Bates PGE-CAMP-CPUC-0000004255, Bates PGE-CAMP-CPUC-0000004218, Bates PGE-CAMP-CPUC-0000004430, Bates PGE-CAMP-CPUC-0000004237, Bates PGE-CAMP-CPUC-0000004337.
[60] TD-1001M Electric Transmission Preventive Maintenance Manual (Rev: 03).

PG&E's failure to conduct detailed climbing inspections of the Incident Tower is a violation of GO 165, Section IV.

e) PG&E's Transmission Infrastructure Patrol and Detailed Inspection Program

SED examined PG&E inspection records from January 2001 to October 2018 and found that PG&E inspected the Caribou-Palermo Transmission Line according to its own required time intervals. However, the inspections were not thorough. The C-hooks from the Incident Tower (Figure 4) and from Tower :24/199 (Figure 9) show significant wear that was not detected as part of PG&E's transmission infrastructure patrol and inspection program. For each of the two towers, this is a violation of GO 95, Rule 31.2, which states in part:

> *"Lines shall be inspected frequently and thoroughly for the purpose of ensuring that they are in good condition so as to conform with these rules."*

D. Adequacy of PG&E's Transmission Inspection and Maintenance Programs Before the Camp Fire

Public Utilities Code Section 451 states in part:

Every public utility shall furnish and maintain such adequate, efficient, just, and reasonable service, instrumentalities, equipment, and facilities … as are necessary to promote the safety, health, comfort, and convenience of its patrons, employees, and the public.

As set forth below, SED's investigation of the Camp Fire found that the identified shortcomings in PG&E's inspection and maintenance of the incident tower were not isolated, but rather indicative of an overall pattern of inadequate inspection and maintenance of PG&E's transmission facilities.

1. PGE's Electric Transmission Preventive Maintenance Manual

PG&E's ETPM Manual contains procedures for PG&E's transmission inspection and maintenance program. The version at the time of the Camp Fire incident and the previous two versions of the manual require detailed inspection (ground or aerial) every five years for transmission lines operating below 500 kV. All overhead transmission line facilities are patrolled annually. Detailed climbing or aerial lift inspection, while not routine, are required to be performed if triggered by specific conditions listed in the procedure.

The routine patrols and the ground and aerial inspections have been ineffective in finding cold-end hardware defects, which shows that the current and prior inspection and maintenance programs were inadequate.

Of particular importance, regarding the C-hook that failed and led to the Camp Fire, PG&E's historical patrol and detailed inspection forms did not specify or record results of cold-end hardware assessments. And climbing inspection forms did not contain assessment fields for such hardware until September 2018. See Figure 12 and Figure 13. This raises the question of whether inspectors were evaluating cold-end hardware even when they performed climbing inspections. As of September 2018, PG&E has made improvements and its current climbing inspection form includes assessment fields for cold-end hardware.

2. Enhanced Inspections Before and After the Camp Fire

PG&E performed detailed climbing inspections on a portion of the towers of the Caribou-Palermo Transmission Line, but not the Incident Tower, between September 19 and November 5, 2018.

In December 2018, PG&E launched what it called a Wildfire Safety Inspection Program (WSIP),[61] which included enhanced safety inspections of transmission, distribution, and other facilities in or near high fire threat areas. The inspections included climbing and/or drone inspections of overhead transmission facilities. The WSIP inspections, which were not part of PG&E's routine inspection program described in the ETPM Manual, found over 5,000 hazardous conditions that resulted in Priority A or Priority B tags on the inspected transmission lines, none of which had been identified previously by PG&E's routine patrol and detailed inspections.[62]

PG&E stated that it also performed climbing inspections of the Caribou-Palermo Transmission Line on or after November 8, 2018 but before the WSIP was launched.[63] As a result of the climbing inspections that PG&E performed after the Camp Fire but before WSIP, and the inspections performed as part of the WSIP program, PG&E found problems on the Caribou-Palermo Transmission line that led to 29 Priority A tags,[64] and also a total of 495 problems on the line that warranted Priority B, E, or F tags.[65]

In addition to the problems found on the Caribou-Palermo Transmission Line, SED notes in particular that PG&E's WSIP inspections found hazardous conditions on 22 towers of the Ignacio-Alto-Sausalito 60 kV Transmission Line that required emergency maintenance, including replacement of at least 10 steel lattice towers and reinforcement of 12 steel lattice towers.[66]

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[61] PG&E's presentation of Wildfire Safety Inspections, CPUC SED Meeting, June 18, 2019.
[62] PG&E's presentation of Electric Operations Prioritization to SED on August 20, 2019.
[63] March 6, 2019 letter from Meredith Allen of PG&E to Lee Palmer of the CPUC; March 20, 2019 letter from Erik Jacobson of PG&E to Lee Palmer of the CPUC.
[64] Id.
[65] March 20, 2019 letter from Erik Jacobson of PG&E to Lee Palmer of the CPUC.
[66] August 16, 2019 PGE-CPUC_06072019-DR_IgnacioAltoSausalito_Q04, PG&E's response to Data Request Question 4.

3. Exponent Study and SED Conclusions

PG&E retained Exponent to conduct an independent analysis of the cause of the relatively high number of high priority tags that the enhanced WSIP inspections found on the Caribou-Palermo Transmission Line compared to similar lines. Exponent has identified several items of note, including:

- From 2001 to November 2018, the Caribou-Palermo Transmission Line underwent patrol and detailed ground inspections at frequencies similar to the inspections of comparable transmission lines identified by Exponent. PG&E's routine patrol and detailed ground inspections yielded comparable numbers of normalized[67] high-priority tags for Caribou-Palermo and comparison lines.[68] However, the enhanced WSIP inspections found a much higher number of high priority tags for the Caribou-Palermo Line, relative to the comparable lines.[69]

  Based on these findings, SED concludes that PG&E's inspection and maintenance program before the Camp Fire was inadequate in identifying and correcting defects in the Caribou-Palermo Transmission Line.

- Cold-end insulator hardware-related problems were responsible for the highest number of Priority A tags that PG&E found post Camp Fire on the Caribou-Palermo Transmission Line.[70]

  Based on these findings, SED concludes that cold-end hardware defects were not being identified during routine inspection and maintenance activities, which is of particular concern because equipment failure of this type caused the Camp Fire.

- Tower foundation-related problems on the Caribou-Palermo Transmission Line accounted for the greatest number of Priority B tags that PG&E found on the line post Camp Fire.[71] Priority B tags require corrective action to be performed within 3 months.[72] Photographs show not only a buried foundation

[67] To best compare lines of different lengths with different numbers of structures, tag counts were normalized by dividing the number of tags by the number of single circuit steel lattice towers.
[68] Exponent Report on PG&E Caribou-Palermo Asset Condition Investigation, November 1, 2019, page 76, Conclusion 10.
[69] Exponent Report on PG&E Caribou-Palermo Asset Condition Investigation, November 1, 2019, page 75, Conclusion 1.
[70] Exponent Report on PG&E Caribou-Palermo Asset Condition Investigation, November 1, 2019, page 75, Conclusion 3.
[71] Exponent Report on PG&E Caribou-Palermo Asset Condition Investigation, November 1, 2019, page 75, Conclusion 3.
[72] TD-1001M Electric Transmission Preventive Maintenance Manual, Table 7, page 18 (Rev :03).

but also buried steel components.[73] This type of soil coverage can increase the risk of corrosion of steel components.[74]

The amount of soil movement shown in the photographs develops over time, so SED concludes that these problems were either undetected or ignored during routine inspections and maintenance.

- The Caribou-Palermo, Bucks Creek-Rock Creek, and Cresta-Rio Oso lines are located in the North Fork Feather River Canyon, and each of these lines exhibited high-priority cold-end hardware-related tag counts more than three times higher than the next highest comparison line when normalized for the number of steel lattice towers.[75] While the specific cause(s) of the cold-end hardware-related problems have not been identified, the Caribou-Palermo and the other North Fork Feather River Canyon lines appear to have some unique factors, such as exposure to high duration wind, structural characteristics, age, and/or historical inspection methodologies[76] that make them more susceptible to cold-end hardware-related problems.

  Regardless of the specific root causes of the problems, the fact is that PG&E had not identified this vulnerability. SED concludes that this indicates the inadequacy of PG&E's inspection and maintenance program to identify and account for local conditions in the North Fork Feather River Canyon.

4. SED's Conclusion of the Adequacy of PG&E's Transmission Inspection and Maintenance Programs

The initial climbing inspections after the Camp Fire, the enhanced WSIP inspections, and Exponent findings all demonstrate that PG&E's inspection and maintenance program was inadequate in identifying and correcting defects in its transmission lines, and inadequate in identifying local conditions that might trigger a need for enhanced inspection and maintenance activities. SED concludes that PG&E's transmission inspection and maintenance program prior to the Camp Fire was inadequate to ensure that PG&E's transmission lines, including the Caribou-Palermo Transmission Line, were in good condition to allow them to operate in a safe manner, in violation of Public Utilities Code Section 451.

[73] March 20, 2019 letter from Erik Jacobson of PG&E to Lee Palmer of the CPUC.
[74] Exponent Report on PG&E Caribou-Palermo Asset Condition Investigation, November 1, 2019, page 20.
[75] Exponent Report on PG&E Caribou-Palermo Asset Condition Investigation, November 1, 2019, page 75, Conclusion 5.
[76] Exponent Report on PG&E Caribou-Palermo Asset Condition Investigation, November 1, 2019, page 76, Conclusion 14.

IV. Figures

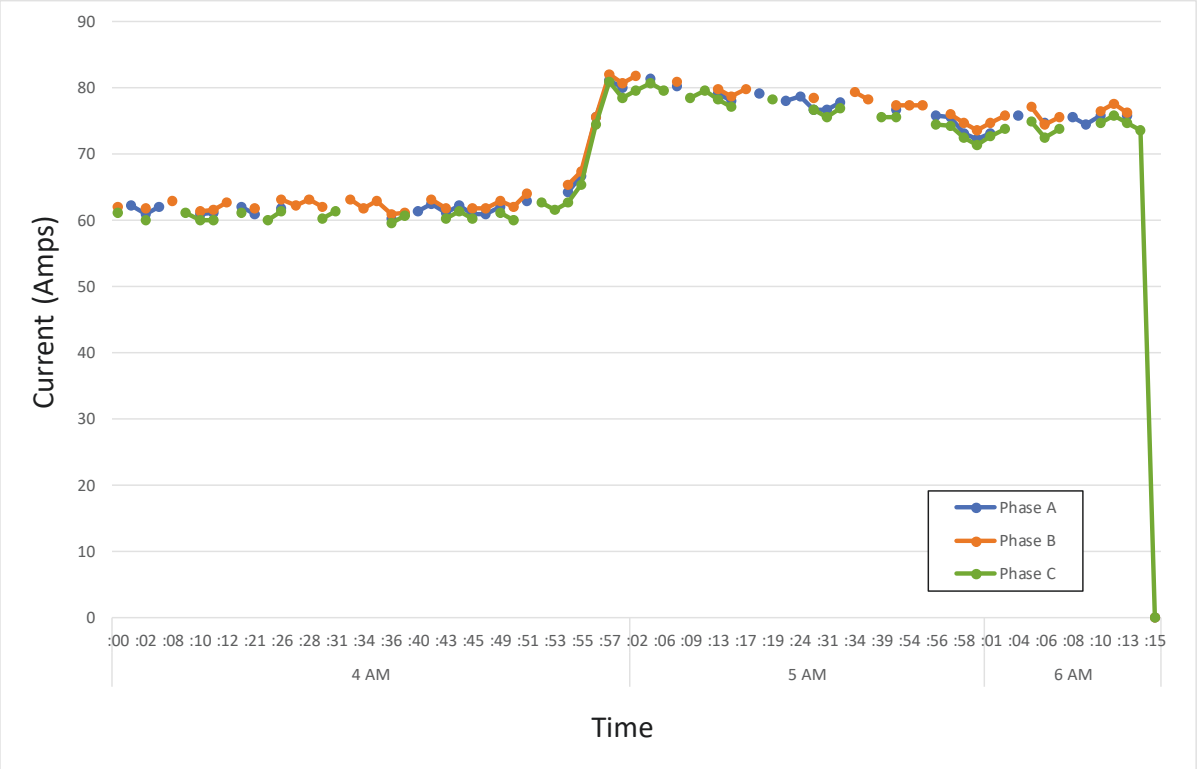


Figure 1: Chart of SCADA data recorded at Circuit Breaker 152 on the Caribou-Palermo 115 kV Transmission Line just before the incident.[77]

[77] For certain times in the SCADA data provided by PG&E, more than one load reading was recorded for certain phases. SED used the minimum load reading for each phase to produce Figure 1.

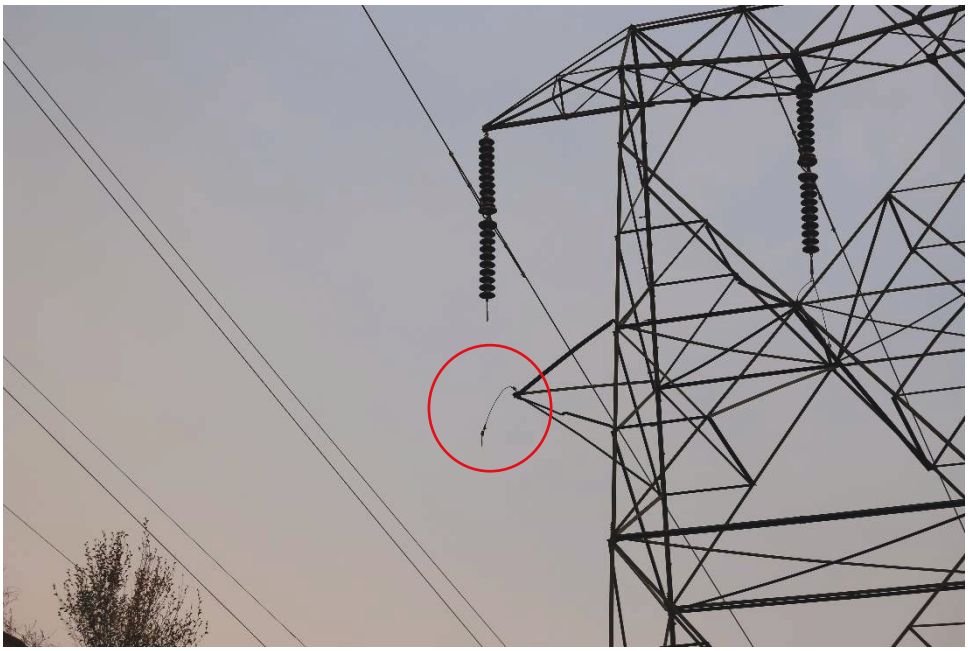


Figure 2. At Tower :27/221, an insulator hold-down anchor was disconnected. Photo provided by PG&E.[78]

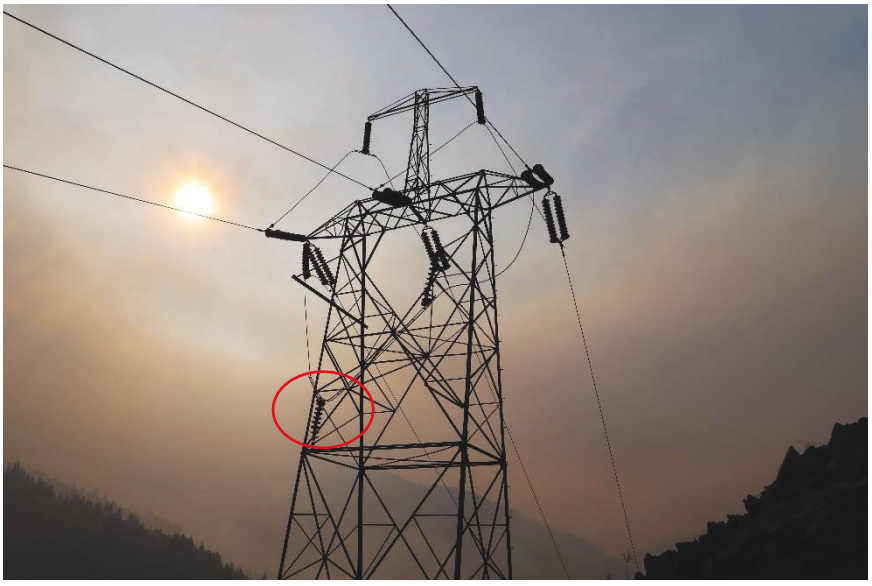


Figure 3. At the Incident Tower, an insulator detached from the hanger plate and hung upside down. Photo provided by PG&E.[79]

[78] 1/17/2019 PG&E response to CPUC data request SED-003 (IMG_0038).
[79] 1/17/2019 PG&E response to CPUC data request SED-003 (IMG-0123).

Figure 4. The failed C-hook on the Incident Tower. Photo provided by PG&E.[80]

Figure 5. Flash marks on the transposition jumper and steel member on the Incident Tower. Photo provided by PG&E.[81]

[80] 1/17/2019 PG&E response to CPUC data request SED-003 (IMG_0204).
[81] 1/17/2019 PG&E response to CPUC data request SED-003 (PB130051).

Figure 6. The left runner arm and the added hanger plate from the Incident Tower.[82]

Figure 7. The right runner arm and the added hanger plate from the Incident Tower prior to removal from the tower for evidence. Photo provided by PG&E.[83]

[82] Photo taken by Chris Lee of the CPUC on 11/14/2018.
[83] 1/17/2019 PG&E response to CPUC data request SED-003 (PB130077).

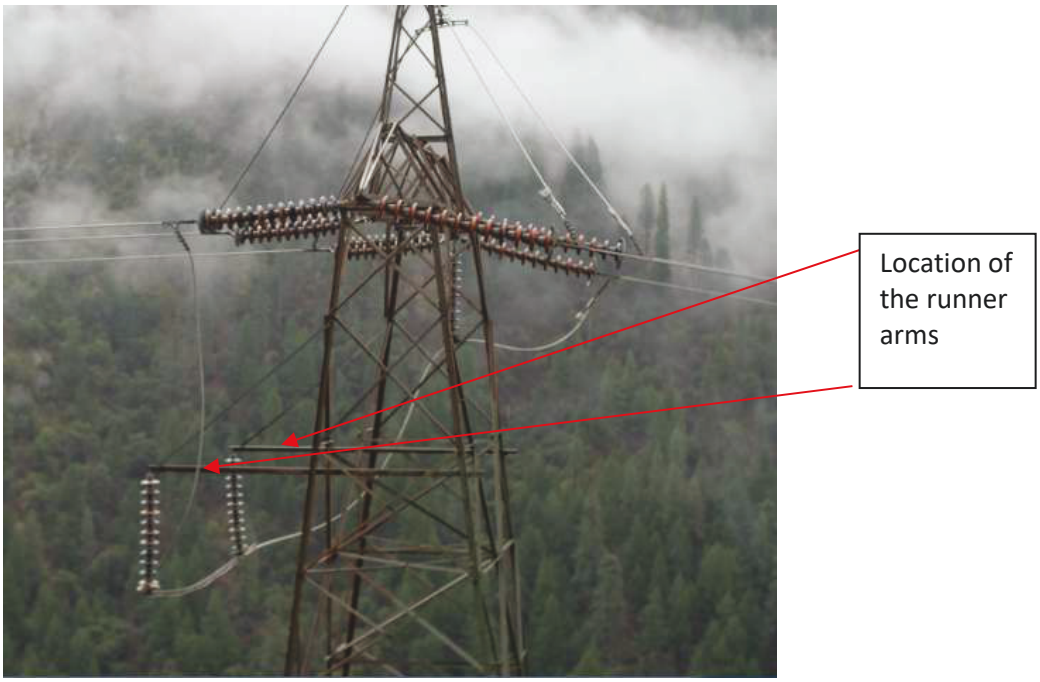
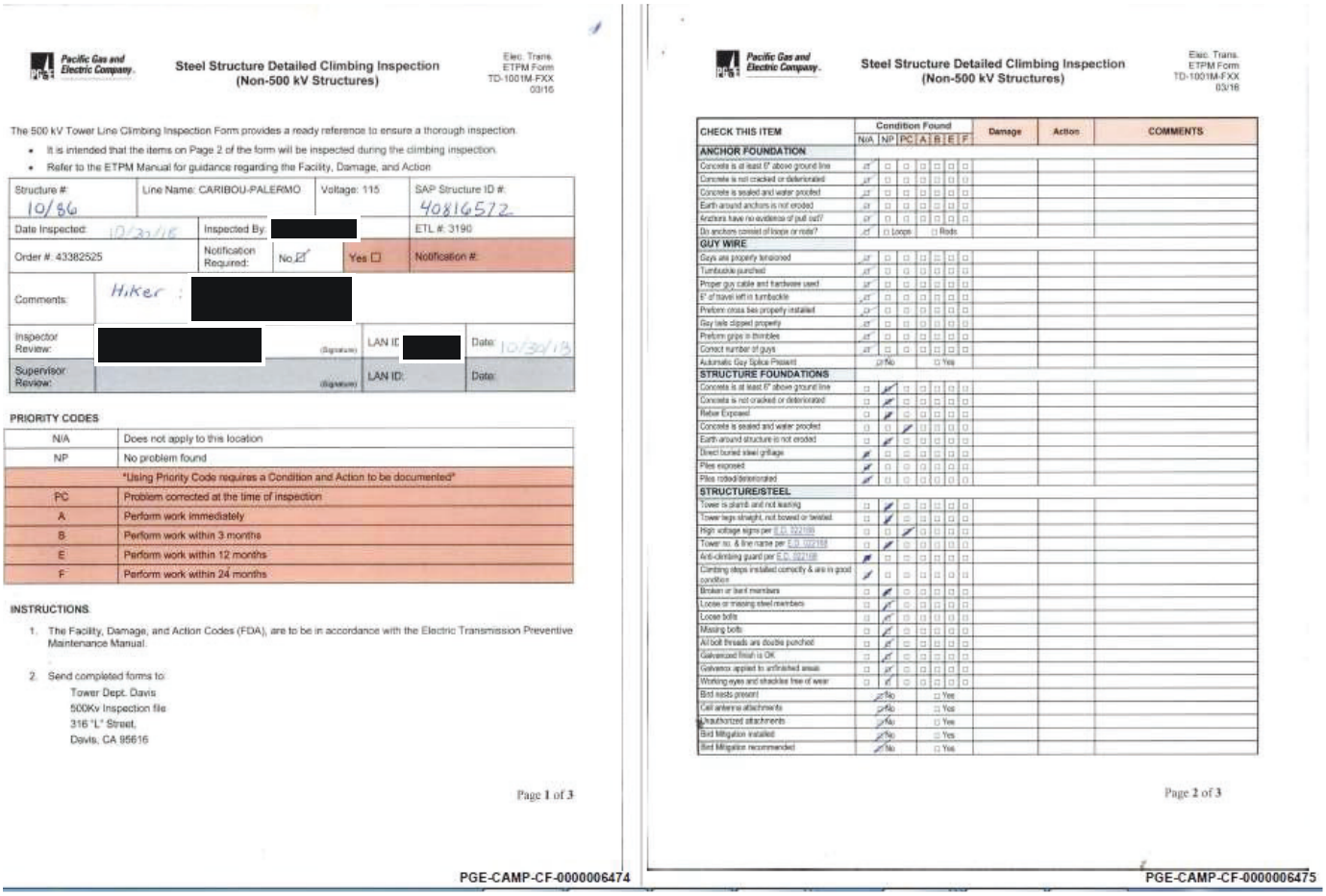


Figure 8. Typical location of runner arms on transmission towers similar to the Incident Tower. This is PG&E Tower :20/160 of the Caribou-Palermo 115 kV Transmission Line.[84]

Figure 9. The right phase suspension insulator C-hook removed from Tower :24/199.[85]

[84] Photo taken by Andie Biggs of the CPUC on 3/28/2019.
[85] Photo taken by Chris Lee of the CPUC on 3/29/2019.



Pacific Gas and Electric Company

Steel Structure Detailed Climbing Inspection (Non-500 kV Structures)

Elec. Trans. ETPM Form TD-1001M-FXX 03/16

The 500 kV Tower Line Climbing Inspection Form provides a ready reference to ensure a thorough inspection.

- It is intended that the items on Page 2 of the form will be inspected during the climbing inspection.
- Refer to the ETPM Manual for guidance regarding the Facility, Damage, and Action

Structure #: 10/86	Line Name: CARIBOU-PALERMO	Voltage: 115	SAP Structure ID #: 40816572
Date Inspected: 10/30/18	Inspected By: [redacted]		ETL #: 3190
Order #: 43382525	Notification Required: No ☑	Yes ☐	Notification #:
Comments: Hiker : [redacted]			
Inspector Review: [redacted] (Signature)		LAN ID: [redacted]	Date: 10/30/18
Supervisor Review: (Signature)		LAN ID:	Date:

PRIORITY CODES

N/A	Does not apply to this location
NP	No problem found
	Using Priority Code requires a Condition and Action to be documented
PC	Problem corrected at the time of inspection
A	Perform work immediately
B	Perform work within 3 months
E	Perform work within 12 months
F	Perform work within 24 months

INSTRUCTIONS

1. The Facility, Damage, and Action Codes (FDA), are to be in accordance with the Electric Transmission Preventive Maintenance Manual.
2. Send completed forms to:
   Tower Dept. Davis
   500Kv Inspection file
   316 "L" Street,
   Davis, CA 95616

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PGE-CAMP-CF-0000006474

Pacific Gas and Electric Company

Steel Structure Detailed Climbing Inspection (Non-500 kV Structures)

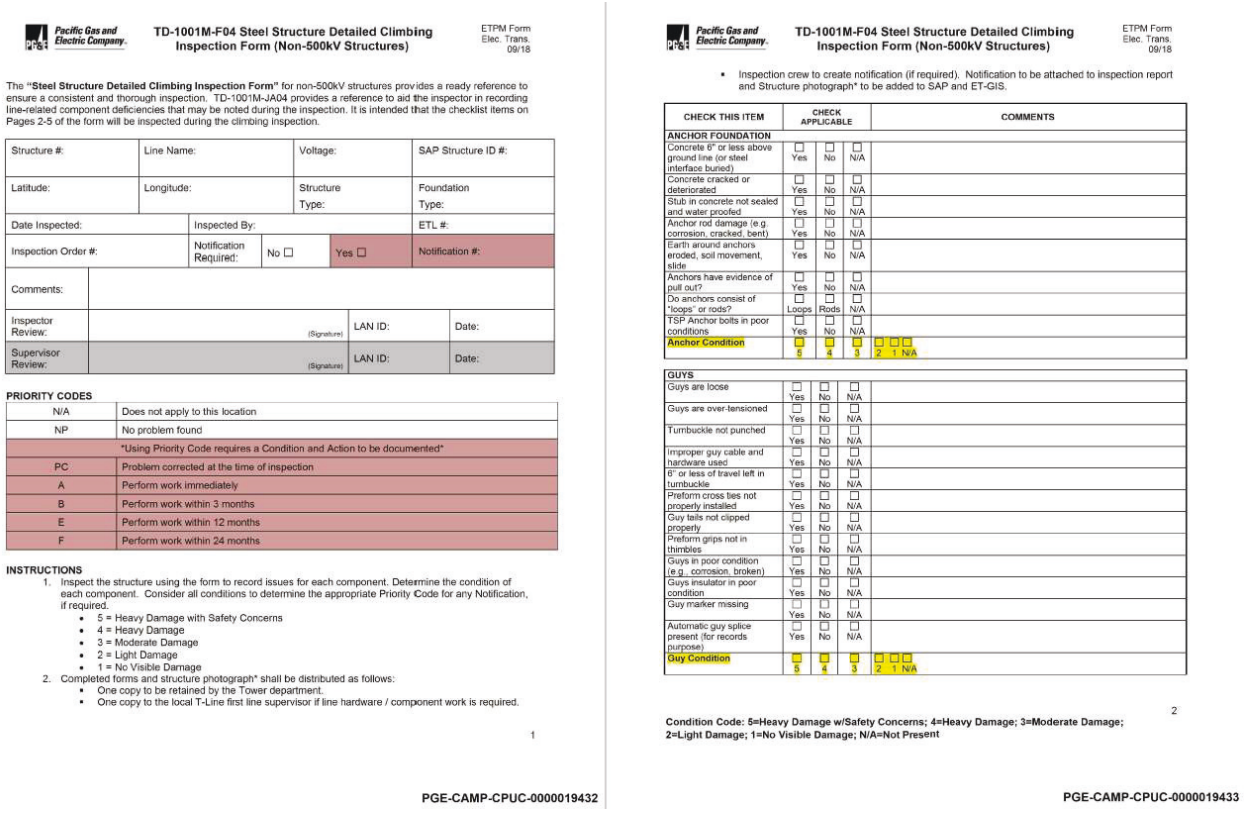
Elec. Trans. ETPM Form TD-1001M-FXX 03/16

CHECK THIS ITEM	Condition Found N/A	NP	PC	A	B	E	F	Damage	Action	COMMENTS
ANCHOR FOUNDATION										
Concrete is at least 6" above ground line	☑	☐	☐	☐	☐	☐	☐			
Concrete is not cracked or deteriorated	☑	☐	☐	☐	☐	☐	☐			
Concrete is sealed and water proofed	☑	☐	☐	☐	☐	☐	☐			
Earth around anchors is not eroded	☑	☐	☐	☐	☐	☐	☐			
Anchors have no evidence of pull out?	☑	☐	☐	☐	☐	☐	☐			
Do anchors consist of loops or rods?	☑	☐ Loops		☐ Rods						
GUY WIRE										
Guys are properly tensioned	☑	☐	☐	☐	☐	☐	☐			
Turnbuckle punched	☑	☐	☐	☐	☐	☐	☐			
Proper guy cable and hardware used	☑	☐	☐	☐	☐	☐	☐			
6" of travel left in turnbuckle	☑	☐	☐	☐	☐	☐	☐			
Preform cross ties properly installed	☑	☐	☐	☐	☐	☐	☐			
Guy tails clipped properly	☑	☐	☐	☐	☐	☐	☐			
Preform grips in thimbles	☑	☐	☐	☐	☐	☐	☐			
Correct number of guys	☑	☐	☐	☐	☐	☐	☐			
Automatic Guy Splice Present	☑ No			☐ Yes						
STRUCTURE FOUNDATIONS										
Concrete is at least 6" above ground line	☐	☑	☐	☐	☐	☐	☐			
Concrete is not cracked or deteriorated	☐	☑	☐	☐	☐	☐	☐			
Rebar Exposed	☐	☑	☐	☐	☐	☐	☐			
Concrete is sealed and water proofed	☐	☐	☑	☐	☐	☐	☐			
Earth around structure is not eroded	☐	☑	☐	☐	☐	☐	☐			
Direct buried steel grillage	☑	☐	☐	☐	☐	☐	☐			
Piles exposed	☑	☐	☐	☐	☐	☐	☐			
Piles rotted/deteriorated	☑	☐	☐	☐	☐	☐	☐			
STRUCTURE/STEEL										
Tower is plumb and not leaning	☐	☑	☐	☐	☐	☐	☐			
Tower legs straight, not bowed or twisted	☐	☑	☐	☐	☐	☐	☐			
High voltage signs per E.D. 922199	☐	☐	☑	☐	☐	☐	☐			
Tower no. & line name per E.D. 922188	☐	☑	☐	☐	☐	☐	☐			
Anti-climbing guard per E.D. 922188	☑	☐	☐	☐	☐	☐	☐			
Climbing steps installed correctly & are in good condition	☑	☐	☐	☐	☐	☐	☐			
Broken or bent members	☐	☑	☐	☐	☐	☐	☐			
Loose or missing steel members	☐	☑	☐	☐	☐	☐	☐			
Loose bolts	☐	☑	☐	☐	☐	☐	☐			
Missing bolts	☐	☑	☐	☐	☐	☐	☐			
All bolt threads are double punched	☐	☑	☐	☐	☐	☐	☐			
Galvanized finish is OK	☐	☑	☐	☐	☐	☐	☐			
Galvanize applied to unfinished areas	☐	☑	☐	☐	☐	☐	☐			
Working eyes and shackles free of wear	☐	☑	☐	☐	☐	☐	☐			
Bird nests present	☑ No			☐ Yes						
Cell antenna attachments	☑ No			☐ Yes						
Unauthorized attachments	☑ No			☐ Yes						
Bird Mitigation installed	☑ No			☐ Yes						
Bird Mitigation recommended	☑ No			☐ Yes						

Page 2 of 3

PGE-CAMP-CF-0000006475

Figure 10. Steel /Structure Detailed Climbing Inspection (Non-500 kV Structures) form used during climbing inspections conducted on 10/30/2018.



Pacific Gas and Electric Company.

TD-1001M-F04 Steel Structure Detailed Climbing Inspection Form (Non-500kV Structures)

ETPM Form Elec. Trans. 09/18

The **"Steel Structure Detailed Climbing Inspection Form"** for non-500kV structures provides a ready reference to ensure a consistent and thorough inspection. TD-1001M-JA04 provides a reference to aid the inspector in recording line-related component deficiencies that may be noted during the inspection. It is intended that the checklist items on Pages 2-5 of the form will be inspected during the climbing inspection.

Structure #:	Line Name:	Voltage:	SAP Structure ID #:
Latitude:	Longitude:	Structure Type:	Foundation Type:
Date Inspected:	Inspected By:		ETL #:
Inspection Order #:	Notification Required: No ☐	Yes ☐	Notification #:
Comments:			
Inspector Review:	(Signature)	LAN ID:	Date:
Supervisor Review:	(Signature)	LAN ID:	Date:

PRIORITY CODES

N/A	Does not apply to this location
NP	No problem found
	Using Priority Code requires a Condition and Action to be documented
PC	Problem corrected at the time of inspection
A	Perform work immediately
B	Perform work within 3 months
E	Perform work within 12 months
F	Perform work within 24 months

INSTRUCTIONS

1. Inspect the structure using the form to record issues for each component. Determine the condition of each component. Consider all conditions to determine the appropriate Priority Code for any Notification, if required.
   - 5 = Heavy Damage with Safety Concerns
   - 4 = Heavy Damage
   - 3 = Moderate Damage
   - 2 = Light Damage
   - 1 = No Visible Damage
2. Completed forms and structure photograph* shall be distributed as follows:
   - One copy to be retained by the Tower department.
   - One copy to the local T-Line first line supervisor if line hardware / component work is required.

1

PGE-CAMP-CPUC-0000019432

Pacific Gas and Electric Company.

TD-1001M-F04 Steel Structure Detailed Climbing Inspection Form (Non-500kV Structures)

ETPM Form Elec. Trans. 09/18

- Inspection crew to create notification (if required). Notification to be attached to inspection report and Structure photograph* to be added to SAP and ET-GIS.

CHECK THIS ITEM	CHECK APPLICABLE			COMMENTS
ANCHOR FOUNDATION				
Concrete 6" or less above ground line (or steel interface buried)	☐ Yes	☐ No	☐ N/A	
Concrete cracked or deteriorated	☐ Yes	☐ No	☐ N/A	
Stub in concrete not sealed and water proofed	☐ Yes	☐ No	☐ N/A	
Anchor rod damage (e.g. corrosion, cracked, bent)	☐ Yes	☐ No	☐ N/A	
Earth around anchors eroded, soil movement, slide	☐ Yes	☐ No	☐ N/A	
Anchors have evidence of pull out?	☐ Yes	☐ No	☐ N/A	
Do anchors consist of "loops" or rods?	☐ Loops	☐ Rods	☐ N/A	
TSP Anchor bolts in poor conditions	☐ Yes	☐ No	☐ N/A	
Anchor Condition	☐ 5	☐ 4	☐ 3	☐ 2 ☐ 1 ☐ N/A

GUYS				
Guys are loose	☐ Yes	☐ No	☐ N/A	
Guys are over-tensioned	☐ Yes	☐ No	☐ N/A	
Turnbuckle not punched	☐ Yes	☐ No	☐ N/A	
Improper guy cable and hardware used	☐ Yes	☐ No	☐ N/A	
6" or less of travel left in turnbuckle	☐ Yes	☐ No	☐ N/A	
Preform cross ties not properly installed	☐ Yes	☐ No	☐ N/A	
Guy tails not clipped properly	☐ Yes	☐ No	☐ N/A	
Preform grips not in thimbles	☐ Yes	☐ No	☐ N/A	
Guys in poor condition (e.g., corrosion, broken)	☐ Yes	☐ No	☐ N/A	
Guys insulator in poor condition	☐ Yes	☐ No	☐ N/A	
Guy marker missing	☐ Yes	☐ No	☐ N/A	
Automatic guy splice present (for records purpose)	☐ Yes	☐ No	☐ N/A	
Guy Condition	☐ 5	☐ 4	☐ 3	☐ 2 ☐ 1 ☐ N/A

2

Condition Code: 5=Heavy Damage w/Safety Concerns; 4=Heavy Damage; 3=Moderate Damage; 2=Light Damage; 1=No Visible Damage; N/A=Not Present

PGE-CAMP-CPUC-0000019433

Figure 11. TD-1001M-F04 Steel Structure Detailed Climbing Inspection Form (Non-500kV Structures), Effective 09/18.

Pacific Gas and Electric Company.

TD-1001M-F04 Steel Structure Detailed Climbing Inspection Form (Non-500kV Structures)

Elec. Trans.
ETPM Form
TD-1001M-F04
03/16

CHECK THIS ITEM	Condition Found							Damage	Action	Comments
	N/A	NP	PC	A	B	E	F			
CONDUCTOR										
Conductor is in good condition, no broken strands or birdcaging at the connectors or in the span	☐	☐	☐	☐	☐	☐	☐			
All dampers are present?	☐	☐	☐	☐	☐	☐	☐			
All dampers are in good condition, not fatigued with drooping messenger or missing weight	☐	☐	☐	☐	☐	☐	☐			
OVERHEAD GROUND WIRE										
Shield wire or OPGW is grounded properly	☐	☐	☐	☐	☐	☐	☐			
Shield wire is in good condition, no broken strands at the connectors or in the span	☐	☐	☐	☐	☐	☐	☐			
All dampers are in present?	☐	☐	☐	☐	☐	☐	☐			
All dampers are in good condition?	☐	☐	☐	☐	☐	☐	☐			
HARDWARE & INSULATORS										
Insulator cap(s) are free of corrosion	☐	☐	☐	☐	☐	☐	☐			
All insulators are intact and in good condition, not chipped or broken?	☐	☐	☐	☐	☐	☐	☐			
VEGETATION										
Vegetation impact foundation	☐	☐	☐	☐	☐	☐	☐			
Vegetation impact structure	☐	☐	☐	☐	☐	☐	☐			

Figure 12. Detailed Climbing Inspection Form (03/16)[86]

[86] Bates PGE-CAMP-CPU-0000020061, page 3.

Pacific Gas and Electric Company.

TD-1001M-F04 Steel Structure Detailed Climbing Inspection Form (Non-500kV Structures)

ETPM Form Elec. Trans. 09/18

HARDWARE & INSULATORS				
Insulator cap(s) show signs of corrosion?	☐ Yes	☐ No	☐ N/A	
Suspension / Dead-end conductor hardware hot-end/shoe assembly in poor condition	☐ Yes	☐ No	☐ N/A	
Suspension / Dead-end conductor hardware cold-end in poor condition	☐ Yes	☐ No	☐ N/A	
Insulator hanger plate in poor condition?	☐ Yes	☐ No	☐ N/A	
Are insulators in poor condition and/or contaminated? (Chipped, cracked, broken, dirty or "flashed")	☐ Yes	☐ No	☐ N/A	
Insulators are out-of-plumb	☐ Yes	☐ No	☐ N/A	
Grading/Corona rings in poor condition	☐ Yes	☐ No	☐ N/A	
Clamps in poor condition	☐ Yes	☐ No	☐ N/A	
Connectors in poor condition	☐ Yes	☐ No	☐ N/A	
Hardware & Insulators Condition	☐ 5	☐ 4	☐ 3	☐ 2 ☐ 1 ☐ N/A

Figure 13. Detailed Climbing Inspection Form (09/18)[87]

V. Conclusion

Based on the evidence reviewed, SED's investigation has identified 12 violations of Commission General Orders and regulations and the California Public Utilities Code by PG&E:

1. PG&E failed to replace or reinforce the C-hook on the Incident Tower before its safety factor was reduced to less than two-thirds of the safety factor specified in Rule 44.1, a violation of **GO 95, Rule 44.3.**

2. The failure of the C-hook supporting the transposition jumper on the Incident Tower demonstrates that PG&E did not maintain the Incident Tower for its intended use and regard being given to the conditions under which it was to be operated; therefore, it is a violation of **GO 95, Rule 31.1.**

3. PG&E failed to inspect the Incident Tower thoroughly. Through its inspections, it failed to detect an immediate Safety Hazard or Priority A condition on the incident

[87] Bates PGE-CAMP-CPUC-0000019432, page 6.

C-hook which required replacement before its safety factor fell below 1.33, prior to the Camp Fire. This is a violation of **GO 95 Rule 31.2.**

4. PG&E failed to follow its procedures in the ETPM Manual by failing to document the factors and reasons that led to the delay in the repair work on the Incident Tower which was scheduled to be completed by November 2015; however, it was delayed until June 2016. PG&E did not document the reason for the delayed work, which is a violation of its own policy; therefore, a violation of **GO 165, Section IV.**

5. PG&E failed to conduct detailed climbing inspections when conditions to trigger climbing inspections were evident as specified in PG&E's procedures. Wear on the original working eyes that remained on the Incident Tower is an indication of a known condition with potential to recur on the added hanger plates with working eyes, which should have triggered detailed climbing inspection to examine the added hanger plates. This is a violation of **GO 165, Section IV**.

6. The condition of the C-hook (material loss > 50%) supporting the transposition jumper on Tower :24/199 demonstrates that PG&E did not maintain Tower :24/199 for its intended use; therefore, it is a violation of **GO 95, Rule 31.1.**

7. PG&E failed to inspect Tower :24/199 thoroughly. Through its inspections, it failed to detect a Safety Hazard or Priority A condition, which requires immediate response until the condition no longer presents a potential hazard. Based on ETPM Manual, Table 8 (Rev :03), the amount of wear (> 50%) on the C-hook on Tower :24/199 warranted Priority Code A. This is a violation of **GO 95 Rule 31.2.**

8. Based on PG&E EPTM Manual, Table 8 (Rev :03), the amount of material loss (> 50%) on the C-hook on Tower :24/199 warranted Priority Code A and immediate response until the condition no longer presents a potential hazard. PG&E's failure to detect and correct this Priority A condition as specified in PG&E's procedures is a violation of **GO 165, Section IV.**

9. PG&E assigned an incorrect priority for an immediate Safety Hazard represented by a disconnected insulator hold-down anchor. On September 11, 2018, a PG&E crew observed that an insulator hold-down anchor on Tower :27/221 had come apart. PG&E assigned the condition a Priority Code E. As defined in the ETPM Manual, the Priority E designation is for conditions which must receive corrective action within 12 months. However, several broken insulator hold-down anchors found during enhanced inspections after the Camp Fire were assigned Priority A. Incorrect prioritization is a violation of **GO 95, Rule 18.**

10. PG&E failed to follow its procedure by using an outdated inspection form during the detailed climbing inspections that PG&E conducted from September 19 to

November 5, 2018. It used TD-1001M-FXX that was implemented in March 2016, even though the form, effective as of September 2018, was TD-1001M-F04. Since PG&E did not follow its own procedure, it is in violation of **GO 165, Section IV.**

11. PG&E failed to report the reportable incident on Big Bend 1101 12kV Distribution Circuit in a timely manner. After learning of a possible second origin of fire through a CAL FIRE press conference on November 15, 2018, at approximately 1800 hours, PG&E submitted an electric incident report to the CPUC on November 16, 2018, at approximately 1600 hours, which was 22 hours later. This is a violation of **Appendix B of D.06-04-055, as amended by Resolution E-4184**, which requires reporting within 4 hours outside of normal working hours.

12. PG&E failed to maintain an effective inspection and maintenance program to identify and correct hazardous conditions on its transmission lines. This is a violation of **PU Code Section 451.** SED determined that PG&E's transmission inspection and maintenance program prior to the Camp Fire was inadequate to ensure that the Caribou-Palermo Transmission Line in particular, transmission lines in the North Fork Feather River Canyon, or PG&E's transmission lines in general were in good condition to furnish and maintain service, as is necessary to promote the safety and health of its patrons and the public.

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

VI. Attachments

Attachment A – Definitions

Attachment B - CAL FIRE News Release on May 15, 2019

Attachment C - PG&E Incident Report No. 181108-9002

Attachment D - PG&E Incident Report No. 181116-9015

Attachment E - PG&E's 20 Day Report, December 11, 2018

Attachment F - 2/1/2019 PG&E response to CPUC data request SED-001, Question 1 (timeline of the events)

Attachment G - Evidence Collection List, Update 12/18/2018, Bates PGE-CAMP-CPUC-0000000001

Attachment H - 11/5/2019 PG&E response to CPUC data request SED-010, Question 1 (list of evidence collected on March 28, 2019)

Attachment I - 11/5/2019 PG&E response to CPUC data request SED-010, Question 2 (list of evidence collected on March 29, 2019)

Attachment J - PG&E Response to Notice Re California Wildfires - Case 3:14-cr-00175-WHA, Document 956, Exhibit A, Filed 12/31/18

Attachment K - TD-1001M Electric Transmission Preventive Maintenance Manual, Rev: 03, Bates PGE-CAMP-CPUC-0000002535

Attachment L - March 6, 2019 letter from Meredith Allen of PG&E to Lee Palmer of the CPUC

Attachment M - March 20, 2019 letter from Erik Jacobson of PG&E to Lee Palmer of the CPUC

Attachment N - Exponent Report on PG&E Caribou-Palermo Asset Condition Investigation, November 1, 2019

Attachment O - 2/1/2019 PG&E response to CPUC data request SED-001 Big Bend Question 1

Attachment P - TD-1001M-F04 Steel Structure Detailed Climbing Inspection Form (Non-500kV Structures) Rev 09/18, Bates PGE-CAMP-CPUC-0000019432

Attachment Q - TD-1001M-F04 Steel Structure Detailed Climbing Inspection Form (Non-500kV Structures) Rev 03/16, Bates PGE-CAMP-CPUC-0000020061

Attachment R - TD-1001M-JA02 Detailed Climbing Inspection Job Aid (Effective 09/24/2018, Rev: 1), Bates PGE-CAMP-CPUC-0000019292

Attachment S - Aerial patrol records from 2018, Bates PGE-CAMP-CPUC-0000000516

Attachment T - LC Notification # 103995542, Bates PGE-CAMP-CPUC-0000000553

Attachment U - LC Notification # 105375996, Bates PGE-CAMP-CPUC-0000017701

Attachment V – PGE-CAMP-CPUC-0000004159 (enhanced inspection, disconnected insulator hold-down anchor)

Attachment W – PGE-CAMP-CPUC-0000004188 (enhanced inspection, disconnected insulator hold-down anchor)

Attachment X - 4/16/2019 PG&E response to CPUC data request SED-006 Caribou-Palermo 115 kV Transmission, Question 2 (PG&E records do not

identify the reason that the replacement work identified in LC Notification 103995542 was completed late)

Attachment Y - 10/25/2019 PG&E response to CPUC data request SED-009. Question 1(Detailed ground inspection reports for 2001, 2003, 2005)

Attachment Z - 3/1/2019 PG&E response to CPUC data request SED-001, Question 4(Detailed ground inspection reports for 2009 and 2014)

Attachment AA - 10/18/2019 PG&E response to CPUC data request SED-009, Question 2 (Detailed Climbing Records from September 19, 2018 – November 5, 2018)

Attachment AB - 10/8/2019 PG&E response to CPUC data request SED-008, Question 1 (Detailed climbing inspections from September 19, 2018 to November 5, 2018 were performed to assess the condition of the transmission line for asset management strategy)

Attachment AC – PG&E's Wildfire Safety Inspection Program Compliance Plan

Attachment A

Definitions

ATTACHMENT A

Definitions

Aerial Patrol – Visual observations to identify abnormalities (i.e., obvious structural problems or hazards) or circumstances that will negatively impact safety; aerial patrols are conducted by helicopter.

C-hook – Hardware that is part of an insulator assembly used to attach an insulator assembly to a structure or tower. It is part of the cold-end hardware.

Cold-End hardware - Components used to attach the nonconductor end (cold-end) of the insulator to the tower. Both the tower and the insulator attachment components are considered cold-end hardware.

Dead-end Tower - A dead-end tower is a fully self-supporting structure used in construction of overhead power lines. A dead-end transmission tower uses horizontal strain insulators at the end of conductors.

Insulator Assembly – A string of insulators and associated attachment hardware between a high-voltage conductor and a tower structure used to provide mechanical support and electrically isolate the conductor from the tower and other support structures.

Detailed Climbing Inspection – A detailed supporting-structure-based observation involving climbing of a structure to determine if there are any abnormal or hazardous conditions that adversely impact safety, service reliability, or asset life.

Detailed Ground Inspection – A detailed visual observation used to look for abnormalities or circumstances that will negatively impact safety, reliability, or asset life, typically done from the ground with binoculars. Individual elements and components are examined carefully through visual and/or routine diagnostic tests, and each abnormal condition is graded and/or recorded

Foundation: Components associated with the footings at the tower base.

Hanger plate – A part of a tower that serves as an attachment point from which insulator assemblies are suspended.

Hold-down anchor – Hardware used to anchor an insulator assembly from excessive movement, typically when the insulator assembly is subject to the effects of upward tension because of its location on a tower with lower elevation than an adjacent tower.

Runner arm – A steel cross-member on a structure that can be used to suspend insulator assemblies.

Suspension Insulator – A type of insulator that is suspended from the cross-members of a tower and is used to support conductors while electrically insulating them from the tower.

Tags – Corrective work orders on transmission facility. There are priority A, B, E and F tags in PG&E's ETPM.[1] Priority A requires immediate response and continued action until the condition is repaired or no longer presents a potential hazard. SAP due date will be 30 days to allow time for post-construction processes and notification close-out. Corrective actions are required within 3 months, 12 months, and 24 months for priority levels B, E, and F respectively, from the date the condition is identified.

Transposition Jumper – A conductor used to complete a phase reconfiguration of the transmission line. The phase reconfiguration consists of a realignment of a phase conductor from the position it occupies on one side of the tower to a different position on the opposite side of the tower for the purpose of improving the electrical characteristics of the transmission line.

[1] TD-1001M Electric Transmission Preventive Maintenance Manual, Table 7, page 18 (Rev :03)