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

Incident Investigation Report

Report Date: February 18, 2022

Incident Number: E20200614-01

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

Date and Time of the Incident: June 14, 2020, 1240 hours

Location of the Incident: Drum Canyon Road north of Highway 246
Lompoc, CA 93436
County: Santa Barbara

Fatality / Injury: None

Property Damage: None Claimed

Utility Facilities Involved: Buellton 1101, 12 kV Circuit.

Violation: Yes

I. Summary

On June 14, 2020, at approximately 1240 hours, the Drum Fire started near the intersection of Highway 246 and Drum Canyon Road in the city of Lompoc in Santa Barbara County. The Drum Fire burned 696 acres, had no destroyed or damaged structures, and resulted in no fatalities or injuries. Santa Barbara County Fire Department's (SBCFD) investigation eliminated all other fire causes, except for an electrically-caused fire from a downed PG&E conductor.

Based on SED's review, SED found that PG&E violated the Commission's General Order (GO) 95; specifically, one violation of GO 95 Rule 38:

GO Rule	Violations
GO 95, Rule 38	Phase-to-phase contact under loading conditions

A. Rules Violated

GO 95, Rule 38 Minimum Clearances of Wires from Other Wires states in part:

> The minimum vertical, horizontal or radial clearances of wires from other wires shall not be less than the values given in Table 2 and are based on a temperature of 60° F. and no wind. Conductors may be deadended at the crossarm or have reduced clearances at points of transposition, and shall not be held in violation of Table 2, Cases 8–15, inclusive.
>
> The clearances in Table 2 shall in no case be reduced more than **10 percent**, except mid-span in Tier 3 of the High Fire-Threat District where they shall be reduced by no more than 5 percent, because of temperature and **loading as specified in Rule 43** or because of a difference in size or design of the supporting pins, hardware or insulators [emphasis added].

B. Witnesses

No.	Name	Title
1	Samuel Mandell	CPUC Investigator

C. Evidence

No.	Source	Description
1	PG&E	Initial Incident Report, 06/14/2020
2	PG&E	20-day Incident Report, 07/10/2020
3	SBCFD	Incident Investigation Report and Attachments, 12/23/2020
4	SBCFD	Evidence Photos, 06/17/2020
5	PG&E	Data Request Response #1, 08/28/2020
6	PG&E	Data Request Response #1 Supplemental, 09/29/2020
7	PG&E	Data Request Response #1 Supplemental 2, 10/12/2020
8	PG&E	Data Request Response #2, 11/23/2020
9	PG&E	Data Request Response #3, 08/02/2021

II. Background

On June 14, 2020, at approximately 1240 hours, the Drum Fire ignited northeast of the intersection of Highway 246 and Drum Canyon Road in Lompoc. The location is within a Tier 2 High Fire Threat District (HFTD). The fire did not destroy or damage any structures, nor were there any reported injuries or fatalities. The fire burned 696 acres of land and resulted in an outage to 345 customers.

The SBCFD received an alarm for the fire on June 14, 2020, at 1252 hours. The first fire truck arrived on scene at 1304 hours. The firefighters gained control of the fire on June 17, 2020, at 800 hours. The last unit was cleared from the scene on June 17, 2020, at 855 hours.

At 1235 hours on June 14, 2020, weather station Santa Ynez Airport KIZA, located approximately 14.1 miles east from the incident location, recorded a peak wind speed and gust of 15.0 miles per hour (mph) and 21.0 mph, respectively. The ambient condition around the time of ignition was approximately 81 degrees Fahrenheit with 32% relative humidity. The weather station is at an elevation of 673 feet above sea level.[1]

At 1245 hours on June 14, 2020, weather station Lompoc Airport KLPC, located approximately 12.0 miles west from the incident location, recorded a peak wind speed and gust of 21.0 mph and 33.0 mph, respectively. The ambient condition around the time of ignition was approximately 66 degrees Fahrenheit with a 68% relative humidity. The weather station is at an elevation of 89 feet above sea level.[1]

Weather station PG765, located approximately 1.5 miles northwest from the incident location, recorded a peak wind speed and gust of 15.0 mph and 25.0 mph, respectively. The ambient condition around the time of ignition was approximately 66 degrees Fahrenheit with a 13% relative humidity.[2]

The SBCFD reported a west wind of approximately 6mph with gusts up to 10 mph at the incident location and time.. Ambient conditions included temperature of approximately 70 degrees Fahrenheit with a relative humidity of 50%. These measurements were taken at an elevation of approximately 480 feet above sea level.[3]

[1] Weather conditions per MesoWest (www.mesowest.utah.edu)
[2] 20-day Incident Report Page 2
[3] SBCFD Drum Fire Investigation Report, Case number 20CASBC06759. Page 17.

Figure 1: Weather Stations and Incident Location Approximated on Google

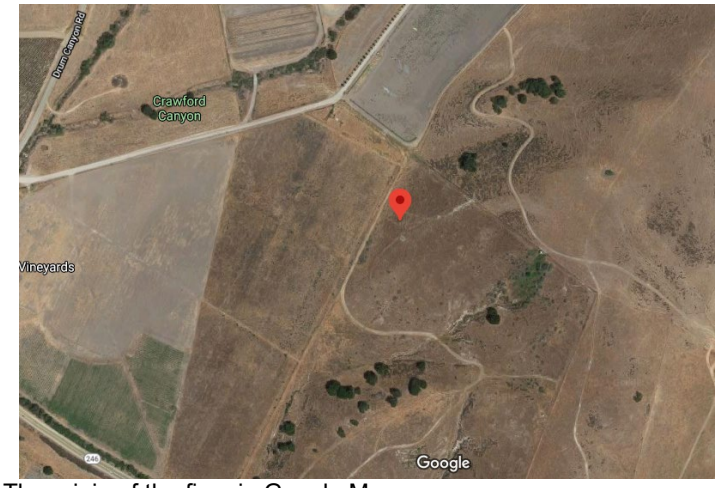

Figure 2: The origin of the fire via Google Maps.

On Sunday, June 14, 2020, at 1610 hours, approximately four hours after the fire started, PG&E reported the incident to the Safety and Enforcement Division (SED) under the media attention criterion.

The incident location near Highway 246 and Drum Canyon Road did not involve any vegetation or other foreign object contact. SBCFD provided a drawing of PG&E's facilities and evidence of electrical ignition in Figure 3.

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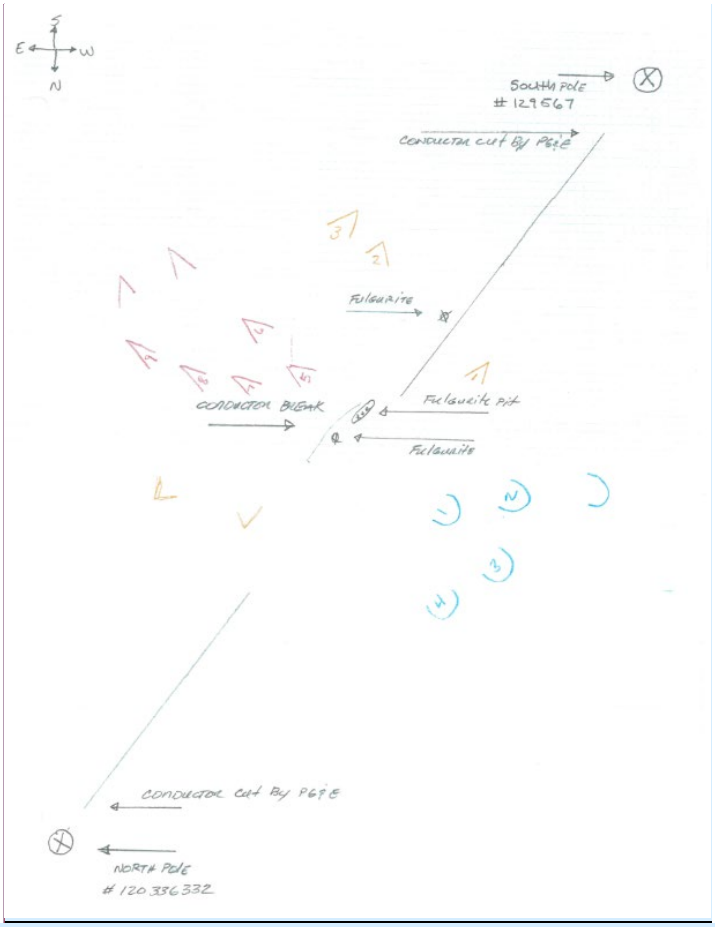

Figure 3: Drawing of incident location provided by SBCFD (not to scale)[4].

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III. SED Review and Analysis

A. Vegetation Management

The incident location is an area dominated by grasses and low-lying shrubs. There was no vegetation relevant to the cause of the incident.

[4] SBCFD Drum Fire Investigation Report, Case number 20CASBC06759. Page 84.

B. PG&E's Distribution Facilities Inspection Program

Rural areas, such as the incident area, are defined by GO 165 as "those areas with a population of less than 1,000 persons per square mile." GO 165 requires biennial patrol inspections and detailed inspections at five-year intervals for rural areas. In Tier 2 or Tier 3 HFDT areas, such as the incident location, GO 165 requires patrol inspections to be done annually.

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.) that may be carried out during other company business. For the incident, SED reviewed the May 2018 and June 2019 PG&E distribution patrol inspection records. PG&E identified no conditions or issues.[5]

GO 165 defines a detailed inspection as one where facilities are "carefully examined" to gather and record conditions of overhead facilities. For the incident, SED reviewed the October 2010 and February 2016 PG&E distribution patrol inspection records. PG&E identified no conditions or issues.[6]

The following PG&E categories were used to prioritize any work orders created as a result of the patrol or detailed inspection:

- Priority B work orders require a completion date within 30 days.
- Priority E work orders require a completion date within 3-12 months.
- Priority F work orders require a completion date by the next detailed inspection which would be five years after the most recent detailed inspection was conducted.[7]

C. PG&E's Infrastructure

The incident conductors were size #6AWG bare copper wire. PG&E determined that the one of the phases was installed in 1965 as part of PG&E's Buellton 1101 12 kV circuit. However, PG&E stated that it was unable to determine the installation date for the other conductors at the incident location.[8]

The subject conductors spanned between poles 101906729 and 101906728, which are approximately 497 feet apart. The conductor sag for each subject conductor at the time of the incident is unknown. The ground clearance for each subject conductor at the time of the incident is also unknown, but PG&E provided LiDAR measurements of the line-to-ground clearance and the radial clearance between each phase, as of April 29, 2019. On that date, the lowest clearance of the conductor to ground was 29.8 feet. The east phase and the center phase conductors (incident conductors) had a clearance of 1.8

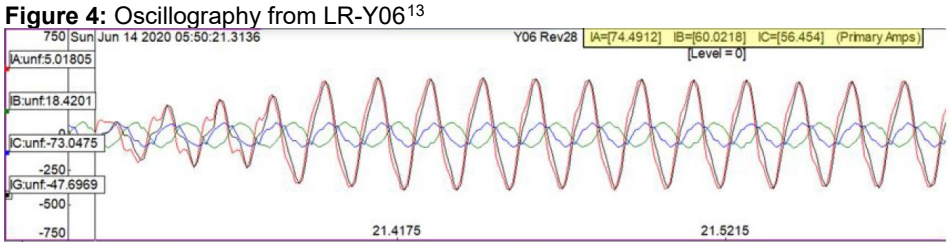
[5] 20-Day Incident Report, Attachments 01 and 02.
[6] 20-Day Incident Report, Attachments 03 and 04.
[7] PG&E TD-2305M Electric Distribution Preventative Maintenance (EDPM) Manual. Revised 04/01/16.
[8] Data Request Response 1 Q8

feet between them at mid-span, and the west phase and center phase conductors had a clearance of 4.7 feet between them.[9]

When asked for the peak load on the Buellton 1101 12 kV circuit at the time of the incident, PG&E stated that "the load at the circuit breaker and LR Y06 was not recorded during or immediately prior to the incident" due to poor network connectivity.[10] Instead, PG&E estimated the load at the subject span "using available combined SmartMeter data…from the noon meter reads on June 14, 2020."[11] Using this methodology, PG&E estimated a peak load on the incident span of 1.7 amps.[12]

PG&E was able to provide oscillography from the nearest upstream line recloser, LR-Y06, when the South PG&E Distribution and Control Center (DCC) tried to remotely close the recloser at 1250 hours on June 14, 2020. The recloser detected a fault and automatically reopened. The A, B, and C phase conductors recorded loads of 74, 60, 56 amps, respectively. The oscillography in Figure 4, below, shows the spike in current on the A phase and ground, indicating a line-to-ground fault on the A phase. Measurements of the current are shown at the black vertical line on the left of the image, between Sun and Jun in the date heading.

Figure 4: Oscillography from LR-Y06[13]



PG&E identified no abnormal configurations on the Buellton 1101 circuit within 24 hours prior to the incident start time. An abnormal configuration occurs when additional customers are temporarily added to a circuit. In addition, an abnormal circuit configuration can exist within the same circuit, where a loop exists on a circuit and electricity is sourced from a different section of the same circuit to feed that loop from a different location.

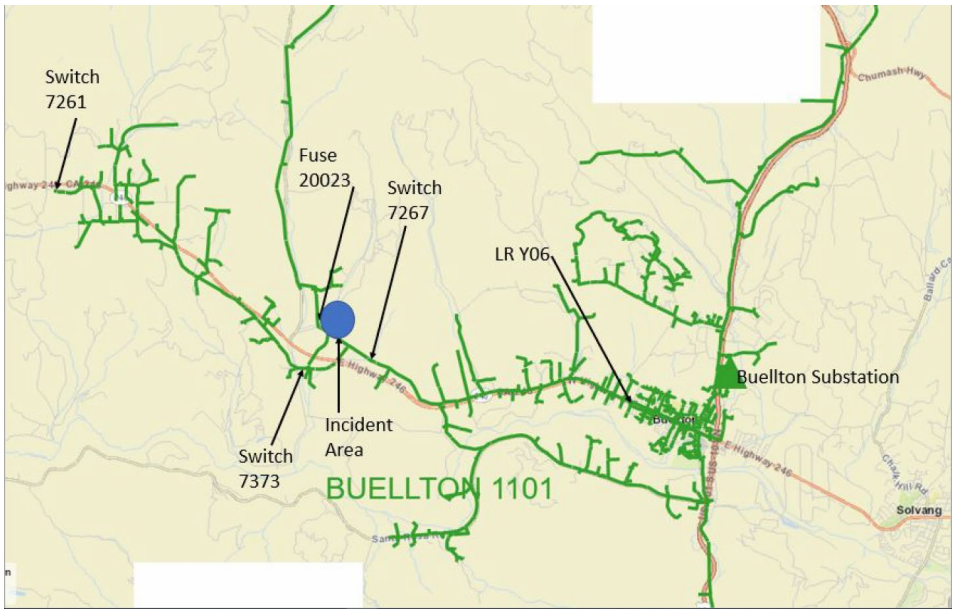
D. PG&E Equipment Operations and Timing

[9] Data Request Response 2 Attachment 2 Q4
[10] Data Request Response 1 Q17
[11] Data Request Response 1 Q17
[12] Data Request Response 1 Q17
[13] Add seven hours to the cursor time to obtain Pacific Standard Time (PST). 20-Day Incident Report, Attachment 09.

PG&E could not provide the timed data for the SCADA (Supervisory Control and Data Acquisition) devices upstream of the incident location to the substation circuit breaker.[14] The SCADA data for the nearest protection device from the incident location, LR-Y06, was not recorded due to network issues that lasted from June 12 0300 hours to June 15 0800 hours. The SCADA data for the Buellton 1101 substation circuit breaker was not recorded due to the same network issues that affected LR-Y06.

Figure 5, below, shows a circuit map of the equipment and incident area.

Figure 5: Partial Buellton 1101 Circuit Map[15]



[14] SCADA is software that allows for local and remote data collection in real-time and for defined time periods. SCADA is provided in protection devices along circuits to alert personnel as soon as there is a fault or issue on the line. SCADA allows the fault or issue to be isolated quickly and helps mitigate downtime.
[15] 20-Day Incident Report Attachment 10

i. Event Timeline

PG&E established a timeline of specific equipment operations and actions of its employees at or near the incident location during the 12 hours prior to the incident start time until the date when SBCFD obtained PG&E facilities for evidence, SBCFD released the incident scene, or repair and/or restoration work was completed, whichever event came last:[16]

1. June 14, 2020, 1239 hours – PG&E line recloser LR-Y06 opened and sent a SCADA alarm to the South PG&E DCC of a line-to-line fault, resulting in an outage to 345 customers.
2. June 14, 2020, 1250 hours – A PG&E South DCC operator attempted to remotely close LR-Y06, but it immediately detected a fault and reopened.
3. June 14, 2020, 1335 hours – A PG&E Troubleman opened Switch 7267.
4. June 14, 2020, 1342 hours – PG&E South DCC closed LR-Y06, restoring 155 customers.
5. June 14, 2020, 1348 hours – A PG&E Troubleman opened Switch 7373.
6. June 14, 2020, 1424 hours – A PG&E Troubleman closed Switch 7261, restoring 148 customers.
7. June 14, 2020, 1518 hours – Based on PG&E records, Fuse 150273 was opened for SBCFD, resulting in an outage for 2 customers.
8. June 14, 2020, 1544 hours – Based on PG&E records, Fuse 20985 was opened to stay ahead of the fire, resulting in an outage to 3 customers.
9. June 14, 2020, 1634 hours – Based on PG&E records, Fuse 20985 was closed, restoring 3 customers.
10. June 15, 2020, 0320 hours – Based on PG&E records, Fuse 150273 was closed, restoring 2 customers.
11. June 15, 2020, 0400 hours – PG&E completed repairs to affected facilities, and closed Switch 7267, restoring the final 43 customers.
12. June 17, 2020, 0855 hours – SBCFD cleared the fire. No structures were damaged or destroyed, and no fatalities or injuries were reported. 696 acres were reported burned.

E. SBCFD Evidence Photos

On June 17, 2020, SBCFD provided SED with photographs of the evidence collected from the incident location. SBCFD collected the east and center conductors from the incident location, and fulgurites[17] found near the downed conductors near the mid-span.

[16] 20-Day Report Attachment 06

[17] Fulgurites are natural tubes, clumps, or masses of sintered, vitrified, and/or fused soil, sand, rock, organic debris, and other sediments that sometimes form when lightning or electrical arcs discharge into ground.

The east and center conductors both had damage indicating electrical arcing. The damage can be seen in Figures 6 and 7.

Figure 6: Damaged east conductor.

Figure 7: Damaged center conductor.

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IV. SBCFD's Investigation

SBCFD's investigation report concluded that the origin and cause of the Drum Fire was a conductor owned and operated by PG&E. It was determined that the fire was ignited when an electrical conductor failed and arced to ground. The SBCFD eliminated all other potential causes of the fire.[18] The faulted east conductor, and the center conductor that later failed while SBCFD was on scene, were determined to have sustained damage consistent with electrical arcing during a conductor-to-conductor contact.[19]

SBCFD found PG&E in violation of the following:

i. Health and Safety Code Section 13001, Misdemeanor

Every person is guilty of a misdemeanor who, through careless or negligent action, throws or places any lighted cigarette, cigar, ashes, or other flaming or glowing substance, or any substance or thing which may cause a fire, in any place where it may directly or indirectly start a fire, or who uses or operates a welding torch, tar pot or any other device which may cause a fire, who does not clear the inflammable material surrounding the operation or take such other reasonable precautions necessary to insure against the starting and spreading of fire.

ii. General Order 95, Rule 31.1

[18] SBCFD Drum Fire Investigation Report, Case number 20CASBC06759. Page 06
[19] SBCFD Drum Fire Investigation Report, Case number 20CASBC06759. Page 20

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.

V. Conclusion

Based on the evidence reviewed and SBCFD's investigation, SED found PG&E in violation of **GO 95, Rule 38** for failing to maintain the minimum wire-to-wire clearance while under loading conditions lower than described in Rule 43.

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

VI. Attachments

Attachment A – SBCFD Drum Fire Investigation Report, Case number 20CASBC06759

Attachment B – SBCFD Evidence Photos