



Preliminary Ignition Investigation Report

Ignition Database Index:	20240458
Electric Incident Investigation (EII) Number:	N/A
Incident Name:	Shafer
PG&E Facility Ignition?	Yes
CPUC Reportable Ignition?	Yes
Date & Time of Incident:	May 22, 2024 at approximately 0911 hours
Street Address:	Near [REDACTED]
City:	Willits
County:	Mendocino
Latitude/Longitude:	[REDACTED]
State Responsibility Area (SRA) / Local Responsibility Area (LRA) / Federal Responsibility Area (FRA)	SRA
PG&E Division:	Humboldt
High Fire Threat District (HFTD):	Tier 2
High Fire Risk Area (HFRA):	Yes
EPSS Buffer:	No
Fire Index Area (FIA):	154
Fire Potential Index (FPI) Rating: FIA	R1
Fire Potential Index (FPI) Rating: Circuit	R1
Was there a PSPS event at the time of ignition?	No
Suspected Initiating Event:	Utility Work/Operation
Failure Driver:	Utility Work/Operation
Failure Sub-driver:	Improper Construction
Circuit:	Willits 1104
Circuit Protection Zone:	Willits 1104 LR 341020
Nominal Voltage:	12kV
Pole SAP Equipment ID:	104203511
Subject to PRC 4292 Veg Pole Clearance:	No
PG&E Equipment associated with ignition:	2 aluminum conductor steel reinforce (ACSR)
EPSS enabled at time of ignition?	No
Fault Type:	Open Circuit per ILIS
Wire Down (Primary)?	Yes
Lead Agency/Agency Having Jurisdiction:	CAL FIRE
Fire Size:	10 x 10-feet
FAS Field Remarks:	Wire fell out of dead-end shoe on new construction, no cause found. Wire held by jumper

	and sagged down into oak tree top, small 10 x 10 fire on rock underneath tree. Crew to repair and re-sag conductor.
HAWC Summary:	N/A
Injuries / Fatalities / Property Damage / Media Attention:	No Injuries/Fatalities/Property Damage/Media Attention
Weather Conditions:	Fair and dry day at 60.8°F
Red Flag Warning (RFW) / High Wind Warning (HWW):	RFW – No HWW – No
911 Standby Relief Time:	40 minutes
OIS #:	2465033
ILIS #:	24-0068690
FAS #:	T006400233
TOTL #:	N/A
Assigned Attorney:	N/A
Ignition Investigator & Phone:	

Executive Summary

On May 22, 2024 at approximately 0911 hours, PG&E received a call from CAL FIRE requesting assistance with a small vegetation fire with reports of a wire-down. Shortly after, PG&E dispatched a troubleshooter to the two-phase primary overhead segment of the Willits 1104 12kV distribution circuit (See Figure 1) near Shafer Ranch Road in the Community of Willits. At approximately 0950 hours, the troubleshooter was onsite and found all fuses closed at Fuse 1355.¹ The troubleshooter opened Fuse 1355 to de-energize and make the location safe. The troubleshooter observed a phase of 2 ACSR dangling and in contact with a nearby oak tree (See Figure 2) and a small, extinguished vegetation fire measuring approximately 10 x 10-feet in size underneath the tree (See Figure 3) between Pole SAP ID 104203511 (Incident Pole) and towards SAP ID 102176104 and transformer CGC 216236961975. Upon further patrol, the troubleshooter identified the dead-end shoe associated to the Incident Pole had failed and that the wire had popped out (See Figure 4) and was only being held up by the jumper. The troubleshooter had no additional findings or observations as to what else could have contributed to the failure of the dead-end shoe. Per CAL FIRE, it is probable that the powerline arcing on the tree limb caused embers to drop and ignite a moss-covered rock.²

The incident dead-end shoe was retained by the field and sent over to PG&E Applied Technology Services (ATS) along with a replicated sample of the shoe for further failure analysis on June 27, 2024. ATS engineering confirmed that the replicated sample was properly constructed. The replicated sample has the conductor held in place with jaws symmetrically mounted on the plate. Comparatively, the incident dead-end shoe was received at ATS with the jaws, mounting plate and spring disassembled from the shoe. Visibly, the mounting plate and spring from the incident shoe has noticeable bend and deformity. Per ATS, the mounting plate sustained permanent damage likely due to incorrect installation of the incident shoe. Incorrect installation of the mounting plate and misalignment of the jaws can produce varying degrees of weaker tension, hold and grip of the conductor comparative to if the jaws were aligned evenly in a proper construction. Proper construction of the shoe should have the same mechanical strength of the type of conductor it holds. ATS reconstructed the incident shoe with its component to show how the equipment was potentially installed prior to the failure (See Figure 5).

As a result of this incident, a priority “A” Electric Corrective (EC) tag (#128839263) was created to replace the dead-end shoe, make repairs to the burnt section of the 2 ACSR and to re-sag. All work was completed by a PG&E crew later that morning.

The Asset Failure Analysis (AFA) team investigated the history of the Incident Pole. Prior to the ignition event, the ancestor pole was recently replaced on January 12, 2024 by a PG&E crew under EC tag (#119367560) due to rotting/decay of the pole top. Additionally, there were issues with a missing high voltage sign as well as a loose guy wire that were all identified in July 2020. Within the construction package for the installation of the new pole, the materials list included the installation of two automatic dead-end shoes. However, wedge-type dead-end shoes were installed instead. Wedge-type dead-end shoes are subjected to a manual process that is capable of errors. Errors include the asymmetrical installation of the components (that make up the shoe) which can

¹ Fuse 1355 is located 0.5 miles northeast and upstream of the Incident Location.

² CAL FIRE Incident Number 24CAMEU0006786

cause permanent damage on the wedge that would then lessen the force holding a conductor in place. Per AFA review, there is not a significant record of this type of issue that would lead to a failure or an ignition. Although there is a precedent of conductors falling out from dead-end shoe connections without a known cause, the majority of cases are due to corrosion of the shoe, burnt connections to the shoe, or external factors such as a tree or vegetation strike. Wind is not identified as a common cause for conductors to disengage from a dead-end shoe.

A PG&E Standards and Work Methods Specialist opined that this ignition event may have potentially been avoided if an automatic dead-end shoe was installed instead of a wedge-type shoe. However, there is no current PG&E directive or program to remove wedge-type shoes. Per *Document 028851*, wedge-type shoes can be installed but are not to be installed within a corrosion district. The Incident Pole and its associated equipment is located within a non-corrosion area.

PG&E Meteorology data pulled from the MesoWest observation site located approximately 1.9 miles south-southwest of the Incident Location indicates it was a fair and dry day with temperatures at 60.8°F with a relative humidity of 60%. Wind speed measured up to 3.2 Miles Per Hour (MPH) with gusts up to 9.6 MPH from the north. The strongest wind speed recorded was up to 16.8 MPH at 0250 hours. There were no Red Flag or High Wind Warnings issued nor did this incident occur during a Public Safety Power Shutoff (PSPS) event.

System Protection Analysis

Although this ignition occurred within a Tier 2 High Fire Threat District (HFTD) and High Fire Risk Area (HFRA), PG&E's Enhanced Powerline Safety Settings (EPSS) was not enabled for the Willits 1104 distribution circuit at the time of the ignition. EPSS was not enabled due to the expected R1 FPI conditions for the circuit, the expected wind speeds, relative humidity and fuel moisture thresholds for the service area.

Ignition Impact

The ignition event on May 22, 2024 resulted in a small fire measuring approximately 10 x 10-feet in size. For the duration of the repair process by a PG&E crew, a total of 147 customers were de-energized for a total of 79 minutes. There were no reported injuries, fatalities, property damages or significant media attention associated to this event.

Sequence of Events

May 22, 2024

- 0911 Hours: First No Light (FNL). Customer notified CAL FIRE of fire and powerline in tree.
- 0916 Hours: Troubleshooter dispatched.
- 0944 Hours: Troubleshooter arrives onsite.
- 0950 Hours: Troubleshooter de-energizes line by opening the three-phase Fuse 1355.
- 1016 Hours: Troubleshooter reports failed dead-end shoe three spans source side of CGC #216236961975, conductor is in tree but being held up by jumper.
- 1032 Hours: Crew arrives onsite.

- 1109 Hours: Crew finishes repair and Fuse 1355 closed. Power restored to customers.

Corrective Notification Associated with Ignition

A priority “A” EC tag (#128839263) was created to repair/re-sag the conductor and to replace the dead-end shoe. The newly installed dead-end shoe is a like for like wedge-type shoe replacement.

Pending Work

Type	Number	Description	Priority	Date Identified	Due Date
EC Notification	N/A				
COE Notification	N/A				
LC Notification	N/A				
Veg Work Order	N/A				

Please note this may not include pending major program or project work at the incident location.

Asset Info & Most Recent Inspections and Tests

Source Side Structure	102176104	
Info / Inspection	Most Recent Date	Findings
Install Date:	January 1, 1983	45-foot, Class 4, Douglas Fir
Inspection:	June 13, 2022	Noted that pole is damaged. See “Corrective History” section below.
	July 11, 2021	Noted that pole is damaged. See “Corrective History” section below.
Patrol:	N/A	
Corrective History:	July 14, 2020	A priority “E” EC tag (#119368023) created to replace the decaying/rotten pole. Multiple Field Safety Reassessments (FSR) and tag is still open.
Aerial Inspection Records:	July 30, 2019	Aerial imagery of asset in Sharper Shape. No aerial imagery of asset within iHawk as of yet.
VM Inspection:	N/A	
EVM Inspection:	N/A	
Equipment Test:	N/A	
Pole Intrusive Test:	April 26, 2019	Passing results with the following: Pole top and bottom listed as fair. Wood strength testing at 100%.
WSIP Inspection:	May 22, 2019	No compelling abnormal conditions for the pole, equipment and its associated span.

Load Side Structure	104203511 (Ancestor SAP ID 102176108) (Incident Pole)	
Info / Inspection	Most Recent Date	Findings
Install Date:	Incident Pole January 12, 2024	50-foot, Class 1, Wood
	Ancestor Pole 1979	45-foot, Class 5, Douglas Fir
Inspection:	Ancestor Pole June 13, 2022	Noted that pole is damaged, missing high sign, and a loose guy. See “Corrective History” section below.
	Ancestor Pole July 11, 2021	Noted that pole is damaged, high sign is coming off, and a loose guy. See “Corrective History” section below.
Patrol:	N/A	
Corrective History:	Ancestor Pole March 22, 2022	A priority “E” EC tag (#123243388) created to replace the decaying/rotten pole, install a new high voltage sign and adjust guy. Tag appears to still be opened. However, the pole was replaced. See EC tag (#119367560) information below.
	July 14, 2020	A priority “E” EC tag (#119367560) created to replace the decaying/rotten pole, install a new high voltage sign and installation of new down guy. Pole replacement and work was completed on January 12, 2024. Pole is assigned new SAP ID 104203511.
Aerial Inspection Records:	Ancestor Pole July 30, 2019	Aerial imagery of asset in Sharper Shape.
		No aerial imagery of asset within iHawk as of yet, including ancestor pole.
VM Inspection:	N/A	
EVM Inspection:	N/A	
Equipment Test:	N/A	
Pole Intrusive Test:	Ancestor Pole November 5, 2021	Results indicates a status of “reinforce” with the following conditions: Poor pole top condition with pole bottom listed as “non-serviceable.”
WSIP Inspection:	Ancestor Pole May 22, 2019	No compelling abnormal conditions for the pole, equipment and its associated span.

*Incident Location: Near Pole SAP ID 104203511

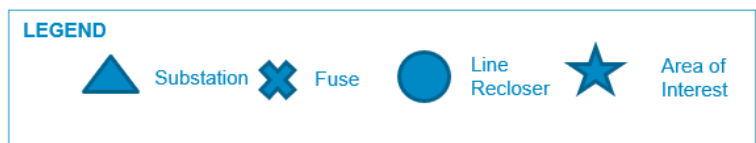
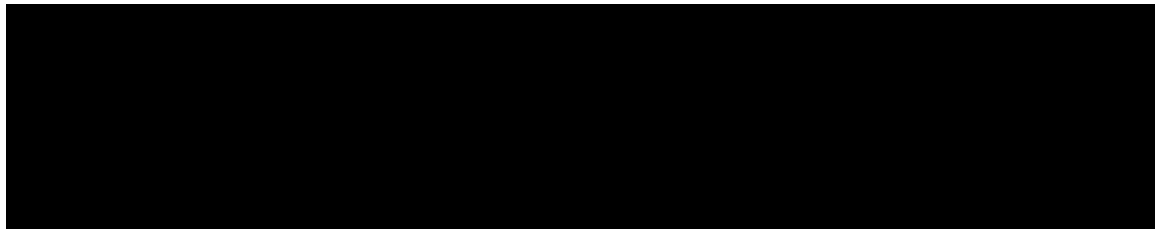
Hazard Barrier Analysis:

Hazard	Equipment Failure	Sub-Hazard	Connector Failure (Primary Distribution)
Target	Construction of Wedge-Type Dead-End Shoes Causes Wire Down		
Barrier	Expected vs. Observed Performance	Why did the barrier not prevent the ignition event? (See ICF Codes)	Opportunity
Barriers that Negatively Affected Ignition			
Distribution Construction Completion Standards Checklist (CCSC)	Expected Performance: Ensure electric maintenance and construction (M&C) work is completed in accordance with PG&E's overhead (OH) construction standards and requirements; Observed Performance: Barrier did not perform as expected	A1B1C2D3 - Limitation: Visibility Limitation; Equipment Condition Visibility; Fatigue damage not visually apparent	Potential improper installation of wedge-type dead-end shoe components during pole replacement in January 2024.
Proper Construction & Installation	Expected Performance: Manufacturing and installation guidelines for connectors; Observed Performance: Barrier did not perform as expected	A2B1C1D1 - Malfunction: Operational Malfunction; Installation Malfunction; Equipment improperly installed	Potential improper installation of wedge-type dead-end shoe components during pole replacement in January 2024.
Barriers that were Assessed as Opportunities			
Distribution System Hardening Program	Expected Performance: Targets conductor replacement in high wildfire risk areas and areas most impacted by PSPS; Observed Performance: Barrier did not exist	N/A	Although incident was not the result of a conductor failure, upgrades to insulated wires would have potentially prevented this ignition.

Potential Next Steps / Associated CAP Items:

- None at this time.

Single Line Diagram



Photos and Diagrams of Events

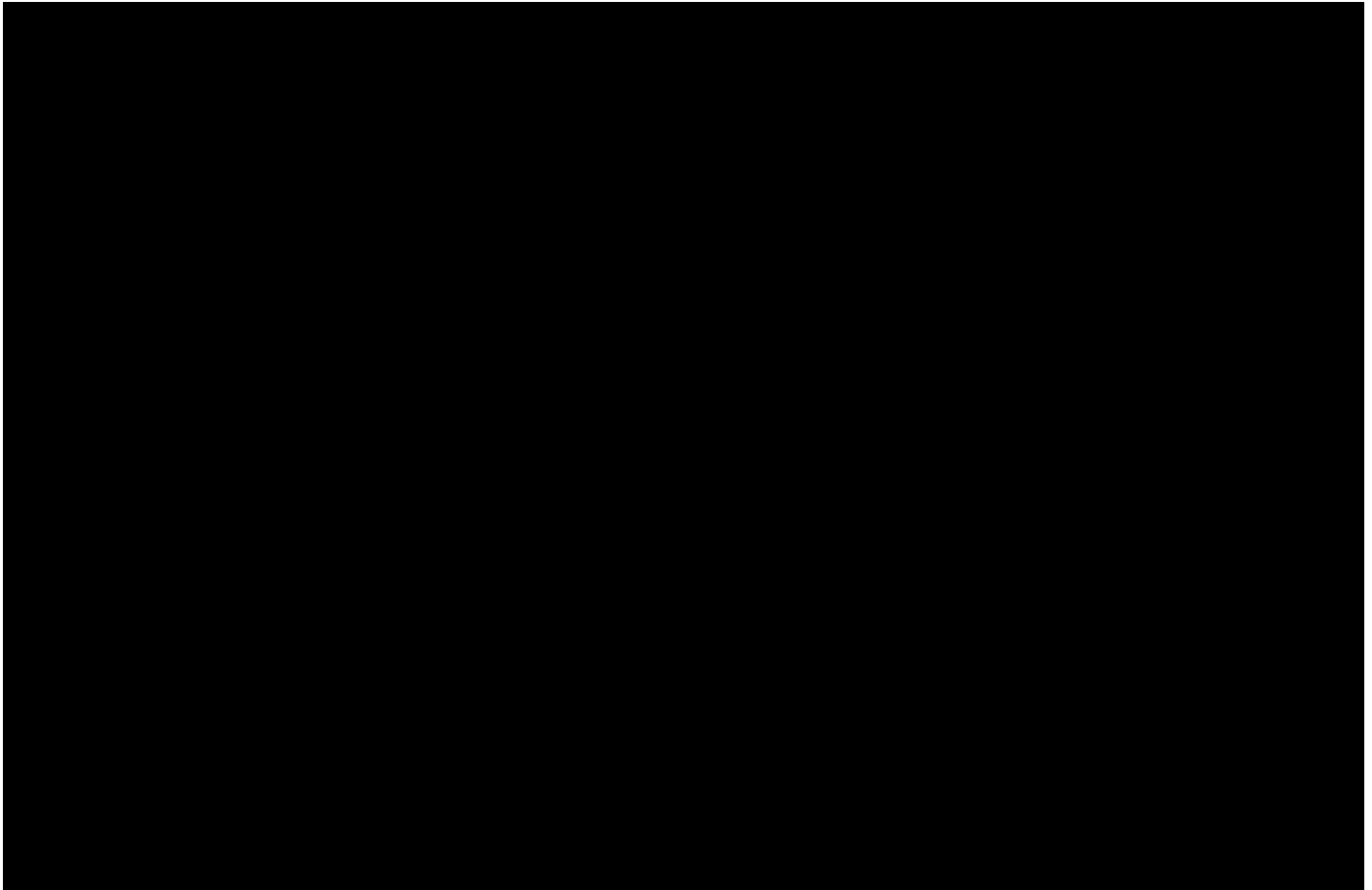


Figure 1 – EDGIS diagram of Incident Location. The black X indicates the point in which the conductor detached from the dead-end shoe. The red X indicates approximate location of fire.



Figure 2 – Wire dangling in oak tree. Photo taken by the troubleshooter.

This report is preliminary and based on available information as of **August 9, 2024**; event data is subject to change based upon subsequently discovered information.

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Internal



Figure 3 – Fire footprint below oak tree. Photo taken by the troubleshooter.



Figure 4 – Incident span shown with wire detached from dead-end shoe. Photo taken by the troubleshooter.

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Internal



Figure 5 – Replica sample with proper installation (left), incident dead-end shoe assembled by ATS to intentionally show misalignment of components (middle), and mounting plate shown with permanent damage (right). Photos taken at ATS.

Attachments

Attachments and references can be located in the ESA folder, located below:



-----END of REPORT-----