



Preliminary Ignition Investigation Report

Ignition Database Index:	20240133N
Electric Incident Investigation (EII) Number:	N/A
Incident Name:	Highland - 27 Feb 2024
PG&E Facility Ignition?	Yes
CPUC Reportable Ignition?	Yes
Date & Time of Incident:	February 27, 2024 @ 1245 hours
Street Address:	Vicinity of Ridgecrest Place and Hillcrest Place
City:	Nipomo
County:	San Luis Obispo
Latitude/Longitude:	35.085381 -120.476268
State Responsibility Area (SRA) / Local Responsibility Area (LRA) / Federal Responsibility Area (FRA)	State Responsibility Area (SRA)
PG&E Division:	Los Padres
High Fire Threat District (HFTD):	Tier 2
High Fire Risk Area (HFRA):	Yes
EPSS Buffer:	No
Fire Index Area (FIA):	508
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:	Equipment - PG&E
Failure Driver:	All types of equipment / facility failure
Failure Sub-driver:	Conductor failure - all
Circuit:	Mesa 1101
Circuit Protection Zone:	Mesa 11016111
Nominal Voltage:	12kV
Pole SAP Equipment ID:	103405389
Subject to PRC 4292 Veg Pole Clearance:	No
PG&E Equipment associated with ignition:	Conductor - Primary
EPSS enabled at time of ignition?	No
Fault Type:	Line to ground
Wire Down (Primary)?	Yes
Lead Agency/Agency Having Jurisdiction:	CAL FIRE
Fire Size:	One-quarter acre
FAS Field Remarks:	axs-gate customer called to state that a wire went down in a vacant lot causing a fire. Sheriff's dept

	and fire dept on site. ridgecrest place xst highland hills rd, highland hills hoa. 20 acre parcels no pwr in area.
HAWC Summary:	This incident did not meet notification guidelines to any functional areas.
Injuries / Fatalities / Property Damage / Media Attention:	No/No/No/No
Weather Conditions:	Seasonable day with cloudy skies in the morning, and mostly sunny skies during the day. 61.3°F@ 1240 hours.
Red Flag Warning (RFW) / High Wind Warning (HWW):	No/No
911 Standby Relief Time:	19 Minutes
OIS #:	2389136, 2389137, 2389156, 2389312, 2389314, 2389316, 2389326, 2389423, 2389424, 2389425
ILIS #:	24-0034556
FAS #:	T006328752, T006328792, T006328754, T006328770
TOTL #:	N/A
Assigned Attorney:	N/A
Ignition Investigator & Phone:	

Executive Summary

On February 27, 2024, at approximately 1258 hours, PG&E dispatched a troubleshooter in response to multiple SmartMeter™ auto-generated outage reports in the vicinity of Ridgecrest Place and Hillcrest Place, in the city of Nipomo, CA. An ignition occurred below a two-phase primary overhead segment of the Mesa 1101 12kV distribution circuit, in a Tier 2 High Fire Threat District (HFTD), High Fire Risk Area (HFRA), and State Responsibility Area (SRA) during R1 FPI conditions (See figure 1). PG&E's Enhanced Powerline Safety Settings (EPSS) were not enabled for this circuit at the time of the incident.

The PG&E troubleshooter arrived at the Incident Location (vicinity of Ridgecrest Place and Hillcrest Place) at approximately 1341 hours and observed a hot broken overhead number 6 copper conductor down on the ground source side of the automatic dead-end at SAP Pole ID 103405389, and a fire in the grass below (see figure 2). On the way to the Incident Location, he observed one (#2 position) of three phases blown open at the Trip Saver Recloser 6111 located about 1.6 miles to the southwest of the Incident Location.

The troubleshooter traveled 0.55 miles to the west from the incident location and opened the jumpers at SAP Pole ID 101910542 to make the situation safe and isolate the trouble. The troubleshooter speculated that the ignition was caused by the number 6 copper overhead conductor that broke off at the automatic dead-end, which resulted in the still-hot conductor igniting the grass below (See figures 1, 3, and 4).

The Applied Technology Services (ATS) analysis determined that the failure of the number 6 copper conductor occurred at the automatic dead-end connector. The visual inspection of the damaged conductor shows a flat fracture consistent with mechanical fatigue (See figure 5).

Meteorology data pulled from the MesoWest weather observation site that was approximately 3.93 miles southeast of the Incident Location indicates a seasonable day at 61.3°F with a relative humidity of 75%. Winds registered 6.3 Miles Per Hour (MPH) from the west-northwest with gusts up to 10.7 MPH at the approximate time of the incident. Relative humidity was as high as 94% at 0658 hours and as low as 63% at 2031 hours.

CAL FIRE responded to and extinguished the mostly self-extinguished approximately one-quarter acre fire known as the "Highland Fire" (See figures 2, 3, and 7).

An Electric Corrective (EC) A-Tag (#128221361) was submitted for remediation, including the repair of approximately 1,000 feet of the number 6 copper conductor and the installation of a new number 6 copper dead-end clamp. The material was collected by the repair crew and retained for further analysis by ATS (See figure 5).

The 856-minute outage from this fire had 269 customer interruptions. PG&E is unaware of any injuries, fatalities, media attention, or property damage associated with this ignition.

Extent of Condition Summary

The initial failure of the number 6 copper conductor occurred at the automatic dead-end connector. Examination of the damaged conductor revealed a flat fracture consistent with mechanical fatigue. Inside the conductor, patterns indicative of fatigue fracture development leading to ultimate failure were observed. X-ray imaging of the connector did not reveal substantial corrosion or material loss. Analysis of the historical span geometry suggests that the conductor was likely over-tensioned at the time of the incident, due to the need to achieve the correct sag over the long span length exceeding 1,300 feet. Additionally, the absence of vibration dampeners contributed to excessive line swaying, compounding the stress on the conductor. Tensile stress testing did not show material issues related to embrittlement.

Although construction document [072155](#) permits a maximum span of 1,000 feet for a number 6 copper conductor, this specific location, which exceeds that length, has been grandfathered in due to being constructed 26 years ago in 1998. The installation was carried out correctly at the time, with the only deviation being the absence of vibration dampeners at both ends. The construction document [015073](#) pertaining to vibration dampeners does not provide guidelines for installing dampeners for solid copper conductors. While new projects are no longer permitted to use number 6 copper conductors, they are still allowed for emergency repairs or replacements under the guidelines outlined in overhead lines document [059626](#), (See figure 6).

System Protection Analysis

The two-phase Mesa 1101 12kV primary distribution circuit was not enabled with EPSS due to not meeting the wind speed, relative humidity, and/or fuel moisture required for enablement during the R1 conditions in the Los Padres division at the time of the incident. The PG&E Distribution Planning and Protection Engineering Department performed a system protection assessment of this incident because fuses 14855 and 7641 did not

operate as expected. The Tripsaver 6111, upstream from both fuses 14855 and 7641, did operate as described above. It is anticipated that the fuses upstream from the wire-down, 14855 and 7641, should have operated before the TS. Testing of the tripsaver is now necessary and CAP issue # 000128572150 has been initiated to monitor this process.

Ignition Impact

This ignition resulted in an approximately one-quarter-acre fire known as the "Highland Fire," in the vicinity of Ridgecrest Place and Hillcrest Place, Nipomo. The 856-minute outage from this fire had 269 customer interruptions. PG&E is unaware of any injuries, fatalities, media attention, or property damage associated with this ignition.

Sequence of Events

February 27, 2024

- 1244 Hours – Multiple SmartMeter™ auto-generated complete outage reports began.
- 1245 Hours – First No Light (FNL). Trip Saver 6111 opens (260 customers de-energized).
- 1258 Hours – Troubleshooter dispatched for patrol.
- 1341 Hours – Troubleshooter arrives onsite at the Incident Location, SAP Pole ID: 103405389.
- 1344 Hours – The fire department called in the report of a wire down in the area of wildland fire and their request for our estimated time of arrival.
- 1530 Hours – Jumpers @ Meter #1007071472 opens.
- 1540 Hours – Troubleshooter reports @ 6111 found 1 of 3 blown #2 position, found wire down (Hot) @ CGC #512580958689 due to failed connector, opened jumpers @ Meter #1007071472.
- 1541 Hours – Troubleshooter given ok to close Trip Saver 6111 and check power.
- 1553 Hours – Trip Saver 6111 closed (240 customers restored).
- 1743 Hours – Repair crew requested.
- 2136 Hours – The repair crew arrived onsite and was given the okay to make repairs, close jumpers, and check power.

February 28, 2024

- 0301 hours – Jumpers @ Meter #1007071472 closed and power ok (20 additional customers restored, 260 total).

Corrective Notification Associated with Ignition

An EC A-Tag (#128221361) was submitted for remediation, including the repair of approximately 1,000 feet of the number 6 copper conductor and the installation of a new number 6 copper dead-end clamp. The material was collected by the repair crew and retained for further analysis.

Pending Work

This report is preliminary and based on available information as of **April 18, 2024**; event data is subject to change based upon subsequently discovered information.

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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 SAP Pole ID: 103405389		
Info / Inspection	Most Recent Date	Findings
Install Date:	January 01, 1998	Douglas Fir, Class Unknown – 45-foot tall
Inspection:	June 15, 2021	GO165 Inspection identified one priority “E” EC tag that was created. EC tag (#121538856) was created for clearance/adjustment of the jumper. This work was completed on January 22, 2022.
	July 08, 2022	GO165 Inspection identified no compelling or abnormal conditions during this inspection. EC tag (#121538856) was still pending on this date (See figure 7).
Patrol:	N/A	
Corrective History:	February 27, 2024	A priority “A” EC tag was created. EC tag (#128221361) was created for a broken conductor repair. This work was completed on February 28, 2024.
Aerial Inspection Records:	May 01, 2019	Sharper Shape Aerial Imagery – identified no compelling or abnormal conditions of this pole and equipment (See figure 8).
VM Inspection:	N/A	
EVM Inspection:	N/A	
Equipment Test:	N/A	
Pole Intrusive Test:	December 14, 2020	Passed with 100% wood strength noted.
WSIP Inspection:	May 24, 2019	A priority “E” EC tag was created. EC tag (#117318596) was created to remove an overgrown tree and idle transformer (TX). This EC Tag was canceled on January 15, 2021. No trees or vines near the pole and TX was de-energized – no other issues exist.

*Incident Location: SAP Pole ID: 103405389

Hazard Barrier Analysis:

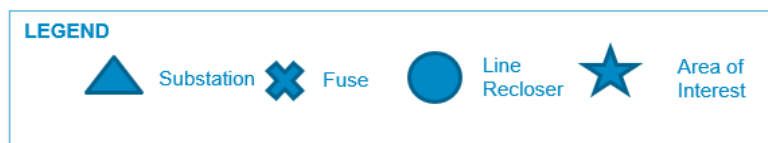
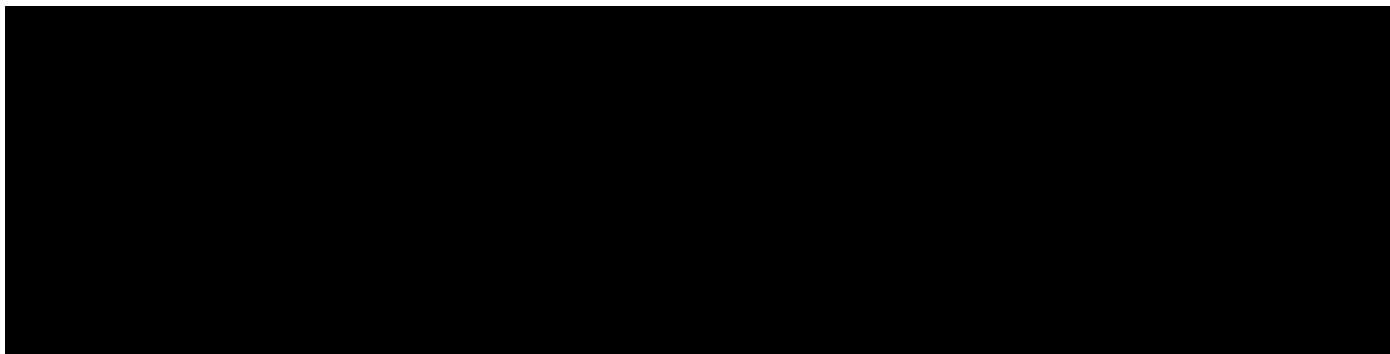
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Hazard	Equipment Failure	Sub-Hazard	Conductor failure-all
Target	Ignition was caused by the number 6 copper overhead conductor that broke off at the automatic dead-end, resulting in the hot conductor igniting the approximately one-quarter-acre fire known as the "Highland Fire."		
Barrier	Expected vs. Observed Performance	Why did the barrier not prevent the ignition event?	Opportunity
Barriers that were Assessed as Opportunities			
Distribution System Hardening Program	Expected Performance: Targets conductor replacement in high wildfire risk areas; Observed Performance: Barrier did not exist	[A1B1C2D3 - Limitation: Visibility Limitation; Equipment Condition Visibility; Fatigue damage not visually apparent]	Dampers being installed on each side of the long 1,353-foot span of the Number 6 copper conductors that broke at the dead-end could have reduced the likelihood of wind-induced metal fatigue.
Infrared Inspections	Expected Performance: Inspections to reduce potential for component failures and facility damage. Identify abnormal conditions such as connector temperatures greater than conductor temperatures.; Observed Performance: Barrier did not exist	[A1B1C2D3 - Limitation: Visibility Limitation; Equipment Condition Visibility; Fatigue damage not visually apparent]	IR Inspection may have helped identified that the conductor remnant inside of the connector showed patterns indicative of a developing fatigue fracture that transitioned to ultimate failure.

Potential Next Steps / Associated CAP Items:

- AFA XOC and corrective action: Recommendation that may include long small wire conductor replacement or installing dampers on each side of the long 1,353-foot span of the number 6 copper conductors that broke at the dead-end (most likely due to wind fatigue over time).
- The PG&E Distribution Planning and Protection Engineering Department performed a system protection assessment following the fault where fuses 14855 and 7641 were bypassed, leading to a trip at TS 6111. It is anticipated that the downstream fuses will clear the fault before the TS. Testing of the tripsaver is now necessary and CAP issue # 000128572150 has been initiated to monitor this process.

Single Line Diagram



Photos and Diagrams of Events

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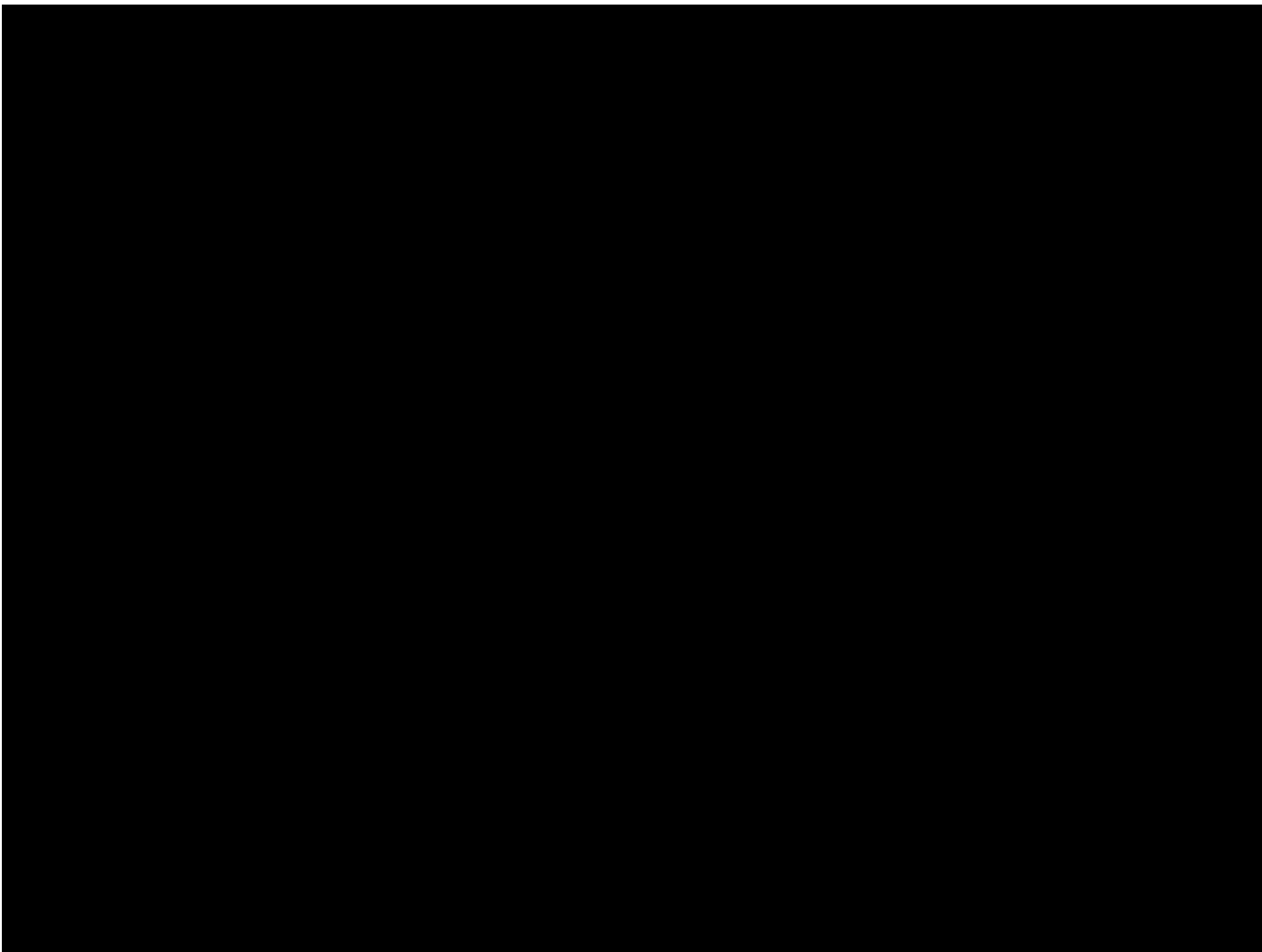


Figure 1 - ETGIS diagram of the Mesa 1101 12kV distribution line circuit. The location of the fire is approximately based on reports and pictures provided.



Figure 2 - SAP Pole ID: 103405389 and burn scar area. Picture taken by the troubleshooter on February 27, 2024.

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Figure 3 – Part of the burn scar area and one downed conductor phase of the Mesa 1101 12kV distribution circuit. Picture taken by the troubleshooter on February 27, 2024.



Figure 4 – Source side downed conductor phase end of the Mesa 1101 12kV distribution circuit. Picture taken by the troubleshooter on February 27, 2024.



Index 133N MESA 1101 Conductor

EQUIPMENT INFO

SAP Equipment: 103405389
Pole installed year: 1998
Conductor installed year: 2004

Lat: 35.085381
Long: -120.476268

Field Photos



As-Received Photos

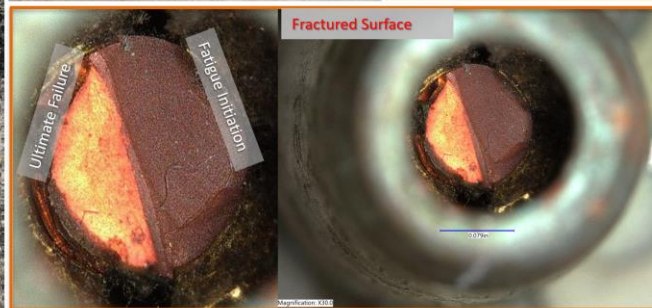
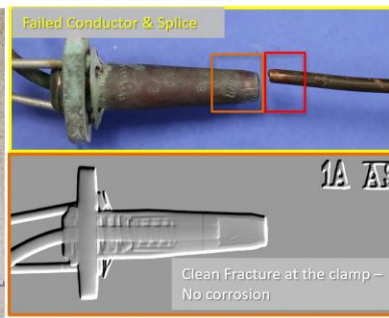


Figure 5 - The failure of the #6 copper conductor occurred at the automatic dead-end connector. The visual inspection of the damaged conductor shows flat fracture consistent with mechanical fatigue. Slide taken from the ATS Summary-Mesa 1101 Conductor Analysis.

Table 1. Maximum Span Limits

Conductor Size	Span Limitation (feet)		
	Standard Framing 061149 and 066196	10' 6" Dead-End Arms	12' Dead-End Arms
Bare	Light Loading		
#6, #4 Cu ²	475	900	1000
#2 Cu	600	1600	1800

Table 7 1700 Series Dampers for Copper Conductors

Conductor Size AWG or kcmil	Catalog Number ¹	Code	Spacing (inches) See Note 1 and Page 2				Maximum Protectable Span (feet)	
			S1	S2	D1	D2	Figure 4 on Page 2	Figure 5 on Page 2
#2 - 7 Str.	AFL-1701-2 CU	188686	10	12	12	12	400	800
1/0 - 7 Str.	AFL-1701-3 CU	188646	12	12	14	12	500	1,000
2/0 - 7 Str.	AFL-1702-4 CU	188647	14	13	16	13	600	1,200
3/0 - 7 Str.	AFL-1702-5 CU	188687	15	15	18	15	700	1,400
4/0 - 7 Str.	AFL-1702-5 CU	188687	16-1/2	17	19-1/2	17	800	1,600
250 - 19 Str.	AFL-1702-5 CU	188687	18	18-1/2	21-1/2	18-1/2	900	1,800

¹ The CU suffix adds the bronze clamp to the dampers shown on Table 7.

Table 4 Bare Copper MHD Conductors ASTM B2, B8, and B258

Conductor Size AWG or kcmil	Str.	Normal Dia. (inches)	Dia. Over Pref. Rods (inches)	Weight (lbs./ft)	Breaking Strength (lbs.)	Standard Coil Lbs. Code ⁴	Standard Reel Lbs. Code ⁵	Equiv. Al AWG or kcmil
6 ¹	1	0.162	0.366	79	1,010	10 290053	600 290205	4
4 ¹	1	0.204	-	126	1,642	- -	500 290052	2
4 ²	7	0.232	0.436	129	1,505	10 290180	600 290394	2
2	1	0.258	-	201	3,303	- -	1,000 290060	1/0
2 ⁶	7	0.292	0.496	205	2,360	10 290181	600 290393	1/0
1	7	0.328	-	258	3,154	- -	4,000 290035	2/0
1/0 ³	7	0.368	-	326	3,705	10 290182	600 290392	3/0
2/0	7	0.414	-	411	4,952	- -	4,200 290037	4/0
3/0 ³	7	0.464	-	518	5,812	- -	2,000 290038	266.8
250 ²	19	0.574	-	772	8,835	- -	2,000 290391	397.5
500 ²	37	0.813	-	1,544	17,550	- -	2,000 290390	715.5

¹ Restricted for emergency use only.

² Restricted for maintenance and emergency use only.

³ Restricted for riser common neutral, maintenance and emergency use only.

⁴ With the exception of the code for #6 AWG all other codes listed are PPC.

⁵ With the exception of the code for #6 AWG, #4 AWG Sol, #2 AWG Sol, #1 and 3/0 AWG all other codes listed in this column are PPC.

⁶ The temper for this legacy conductor is hard drawn not medium hard drawn. All other copper conductors are medium hard drawn.

Figure 6 - Construction document [072155](#) permits a maximum span of 1,000 feet for a number 6 conductor, this specific location, which exceeds that length, has been grandfathered in. The installation was carried out correctly at the time, with the only deviation being the absence of vibration dampeners at both ends.



Figure 7 - CAL FIRE San Luis Obispo responded to and extinguished the mostly self-extinguished approximately one-quarter acre fire known as the "Highland Fire." Picture taken by the troubleshooter on February 27, 2024.

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Figure 8 - SAP Pole ID: 103405389 - Picture taken from the GO165 Inspection record that was completed on July 08, 2022.

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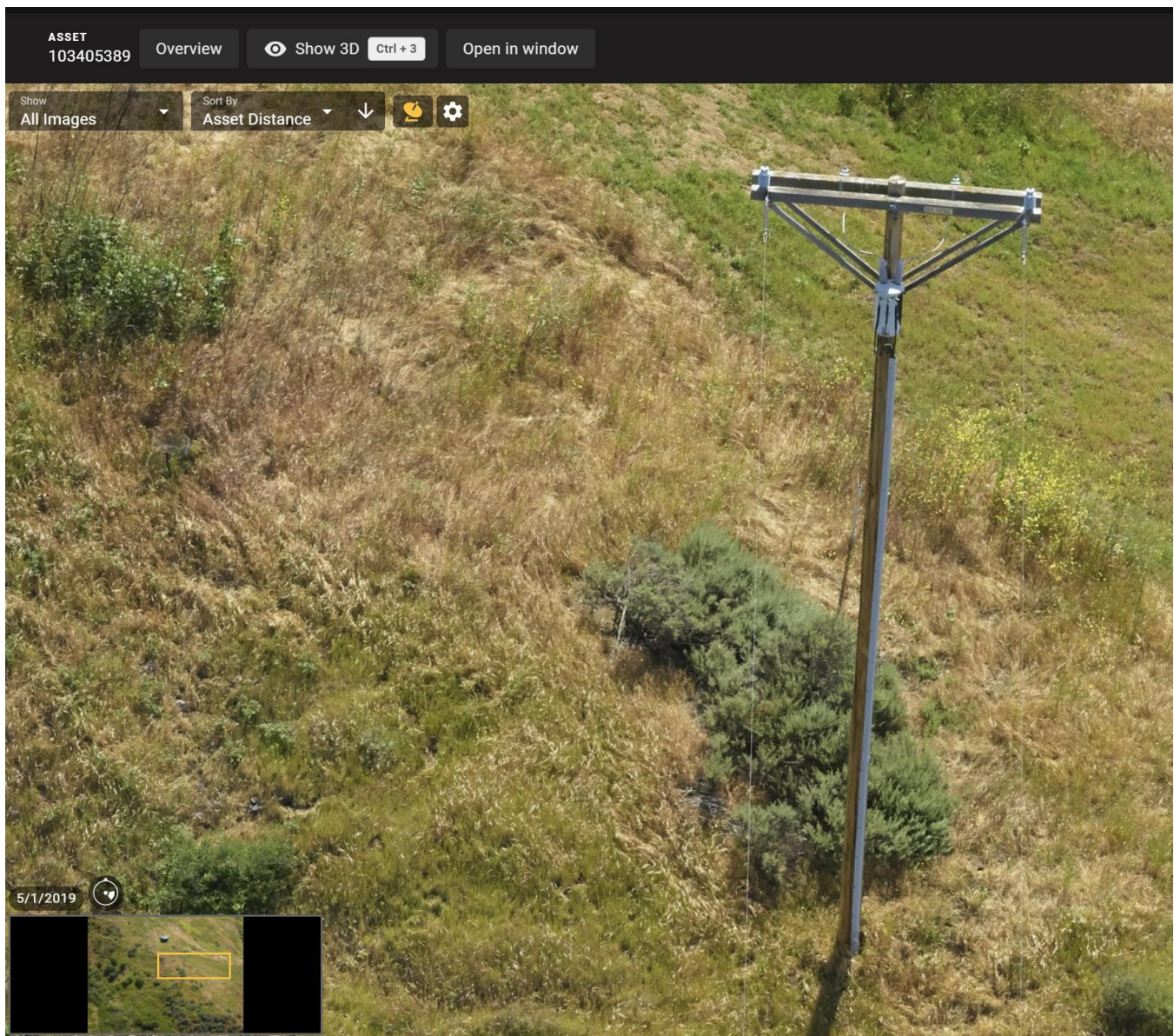


Figure 9 - SAP Pole ID: 103405389 (Incident pole), picture taken by Shaper Shape dated May 1, 2019.

Attachments

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



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

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