Application No.: A.25-06-017
Exhibit No.: LIB-24

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(U 933-E)

Mountain View Fire Cost Recovery Application

Exhibit LIB-24

A.23-08-013 - Exhibit CA-01 Executive Summary

Docket	:	A.23-08-013
Exhibit Number	:	CA-01
Commissioner	:	Alice Reynolds
Admin. Law Judge	:	John Larsen
Witness	:	Henry Burton

PUBLIC ADVOCATES OFFICE

CALIFORNIA PUBLIC UTILITIES COMMISSION

Testimony for Thomas Fire and Debris Flow Cost-Recovery Application

Executive Summary

San Francisco, California
June 6, 2024

TABLE OF CONTENTS

PAGE

EXECUTIVE SUMMARY

I. INTRODUCTION

This testimony pertains to Southern California Edison Company's (SCE or Edison) application to recover costs associated with the December 2017 Thomas Fire and subsequent debris flows (Application 23-08-013). The Thomas Fire had two ignition sites, known as the Anlauf ignition and the Koenigstein ignition.

This testimony presents an executive summary of the prepared testimony served by the Public Advocates Office at the California Public Utilities Commission (Cal Advocates).

II. Exhibit CA-02: History of Utility-Related Wildfires (Witness: Aaron Louie)

SCE has been responsible for its infrastructure igniting multiple wildfires within its service territory prior to the December 2017 Thomas Fire. Cal Advocates presents information about 26 wildfires that occurred in SCE's territory from 1998 through 2017 that were or were likely associated with SCE's infrastructure. Several of these wildfires burned thousands of acres, and two of them damaged or destroyed over 100 structures.

Cal Advocates provides a map of the aforementioned utility-related wildfires. Eight of the wildfires occurred within a 50-mile radius of the Anlauf and Koenigstein ignition locations. One wildfire (the Goodenough Fire in 2013) occurred approximately eight miles from the Anlauf ignition.

The Malibu Canyon Fire in October 2007 was caused by three SCE poles that fell during a Santa Ana windstorm. SCE and the California Public Utilities Commission's (CPUC or Commission) Safety and Enforcement Division (SED) reached a settlement agreement, which the Commission approved in Decision (D.) 13-09-028. SCE admitted to violations of General Order 95 safety factor requirements, Public Utilities Code section 451, and Rule 1.1 of the Commission's Rules of Practice and Procedure. Pursuant to the adopted settlement agreement, SCE performed 8,728 pole-loading assessments in Malibu Canyon and surrounding areas and found 25 percent of the assessed poles to be noncompliant with safety factor standards. SCE subsequently has replaced over 2,000 poles.

III. Exhibit CA-03: Local Wind Conditions for the Castro Circuit (Witnesses: Aaron Louie, Benjamin Tang, and Mina Botros)

Prior to the Thomas Fire, SCE had limited situational awareness of the actual weather conditions – specifically wind conditions – at the Anlauf and Koenigstein ignition sites. As of December 2017, the nearest wind measurement station to either ignition location was station D7412 Santa Paula. Specifically, the Santa Paula D7412 weather station was located three miles from the Anlauf location and five miles from the Koenigstein location. A private citizen owns this weather station and makes data available through the Citizen Weather Observer Program (CWOP), a citizen science program.

The Santa Paula D7412 weather station does not provide reliable information about wind at the Anlauf and Koenigstein ignition sites. Santa Paula D7412 is located in a residential area and at a lower elevation than the ignition sites. Moreover, there is reason to doubt the accuracy of CWOP's wind measurements, generally, and the observations recorded by the Santa Paula D7412 weather station, specifically.

In September 2018, SCE installed a weather station in Anlauf Canyon (SCE Anlauf Canyon or MesoWest ID number SE082) that started to report data on September 15, 2018. The SCE Anlauf Canyon weather station is about 0.8 miles from the Anlauf ignition location and about three miles from the Koenigstein ignition location.

Since SCE installed a weather station in Anlauf Canyon in 2018, it is now possible to compare the observed winds in Anlauf Canyon to those observed closer to Santa Paula. Data from September 2018 through 2023 shows that maximum monthly gusts are almost always higher at Anlauf Canyon SE082 than Santa Paula D7412. On average, over all months in this period, the monthly maximum gust recorded at the SCE Anlauf Canyon SE082 weather station was 35.6 mph, compared to 19.5 mph at Santa Paula D7412. Additionally, the difference in wind gusts tends to be greater during winter months (November, December, and January) than during summer months (June, July and August). In November 2021, SCE Anlauf Canyon SE082 recorded a maximum gust that was 51.7 mph higher than that recorded at Santa Paula D7412.

IV. Exhibit CA-04: Local Environmental Risk Factors (Witness: Benjamin Tang)

Cal Advocates presents information about the local geography and environmental risks in the area surrounding the Castro distribution circuit and the Anlauf and Koenigstein ignition locations. Environmental risks are illustrated with maps of high-fire threat districts, fire scar history, red flag warning days, and SCE-determined wind load ratings for assets located in the region.

The Commission developed fire risk maps in Rulemaking 15-05-006. The Commission developed high fire-threat district (HFTD) maps in 2017 (D.17-01-009 and D.17-12-024); the final maps became effective in January 2018. Most of the Castro circuit is in HFTD Tier 3, including the Anlauf and Koenigstein ignition areas.

From 2009 to 2017, the Commission relied on a fire-threat map prepared by the California Department of Forestry and Fire Protection (CAL FIRE) as part of its Fire Resource and Assessment Program (FRAP). The Commission adopted this map in D.09-08-029 and D.12-01-032. On the FRAP map, both the Anlauf and Koenigstein ignition areas were designated as “Very High” risk.

Using data from CAL FIRE, Cal Advocates presents a map of wildfire frequency in the area around the Castro circuit. This map shows a count of the number of historical wildland fires that have affected each location. Both ignition areas have experienced 3 previous wildfires.

The National Weather Service is responsible for issuing Red Flag Warnings that indicate times of increased fire danger. From 2013 to 2017, the National Weather Service issued 72 total Red Flag Warnings affecting the Castro circuit area. 40 of these affected both the Anlauf and Koenigstein ignition areas, while 32 affected the lower part of Anlauf Canyon (near the Anlauf ignition site).

SCE has designated certain areas in its service territory as high wind areas, subject to loading requirements that exceed General Order 95 minimum standards. SCE, with support from Reax Engineering, developed a wind map in 2014. Each grid cell on the map assigns a wind loading value from 6 to 24 pounds. Both ignition sites are located in the 18 pound loading factor space, while the Santa Paula D7412 weather station is in the lower 12 pound loading factor area.

V. Exhibit CA-05: Risk Factors for the Castro Circuit (Witness: Henry Burton)

This testimony presents information about ignitions, wire-down incidents, and outages on the Castro circuit in the period from 2013 up to the Thomas Fire.

Excluding the Thomas Fire ignitions, SCE recorded one ignition on the Castro circuit from 2013 through 2017. This ignition occurred on November 27, 2016, approximately one year before the Thomas Fire. SCE identified the cause as "weather."

SCE recorded 11 wire-down incidents on the Castro circuit from 2013 through December 3, 2017. One of these wire-down incidents led to the ignition on November 27, 2016. Eight of the 11 incidents occurred between late September and late January, which is the time of year when strong Santa Ana winds frequently occur. SCE's data suggests that wind was a principal driver of wire-down events on the Castro circuit.

SCE recorded 47 unplanned outages on the Castro circuit from January 1, 2013 through December 3, 2017. A majority of these outages (27 of 47) lasted four hours or more; eight outages lasted more than 20 hours. Overhead equipment failure was the most common cause of unplanned outages on the Castro circuit during this time period. Unplanned outages were disproportionately more frequent in the last quarter of the year than other times of the year.

Overall, about 27 percent of unplanned outages, 45 percent of wire-down incidents, and one ignition occurred in the months of November and December (in the period from January 1, 2013 to December 3, 2017).

Next, this testimony presents information about asset maintenance needs on the Castro circuit at the time of the Thomas Fire. Asset notifications indicate where SCE personnel have identified the need for asset maintenance. Each notification reflects an asset condition that does not conform to regulatory standards or SCE's internal standards and therefore requires repair or maintenance.

Excluding notifications that were subsequently deleted (which can occur for various reasons), SCE reports that there were 828 open notifications on the Castro circuit on December 4, 2017. This includes two priority 1 notifications, 61 priority 2 notifications, and 764 priority 3 notifications.

The priority 2 notifications on the Castro circuit had due dates ranging from 2013 to 2022. At the time of the Thomas Fire, several priority 2 notifications were more than a year overdue for remediation. Notably, two notifications had due dates in 2013 and 2014, and both of these were in the extreme fire risk area.

SCE sometimes set due dates for priority 2 notifications that were several years in the future – even in the extreme fire risk area. For example, in September 2015, SCE created two priority 2 notifications involving poles that needed to be replaced based on pole loading assessments. Both of these notifications were located in the extreme fire-risk area (that is, HFTD Tier 3), and both were assigned due dates 59 months after the notifications were initially issued.

At the time of the Thomas Fire, SCE had 21 overdue asset notifications on the Castro circuit, over half of which were in the extreme fire-risk area. The overdue notifications included two priority 1 notifications (which were 46 days overdue, on average) and 19 priority 2 notifications (which were approximately two years overdue, on average).

The majority of the priority 2 notifications on the Castro circuit at the time of the Thomas Fire were created for pole strength and pole loading issues. Among priority 2 notifications, the most common issue was poles that needed to be replaced based on pole loading assessments. Other pole-related issues included poles with physical damage and guy wires that needed replacement.

VI. Exhibit CA-06: Situational Awareness and Preventative Measures for Wildfire Risk (Witness: Justin Hagler)

A. Situational Awareness

In October 2007, Santa Ana winds swept across Southern California and caused dozens of wildfires. Three of the wildfires were ignited by power lines in San Diego Gas & Electric Company's (SDG&E's) service territory.

After the 2007 wildfires, SDG&E began installing its own weather station network. By 2017, SDG&E had 170 utility-owned weather stations that provided wind, temperature and humidity information across SDG&E's territory.

The data from these stations supported SDG&E's meteorology department's situational awareness and operational decision-making. SDG&E also used other forecasting tools and weather data sources. In 2014, SDG&E began using the Santa Ana Wildfire Threat Index (SAWTI) to inform its grid operations. SAWTI is a predictive model that categorizes Santa Ana winds based on anticipated fire potential.

SCE installed 23 utility-owned weather stations in the late 1980s. After that, SCE did not install any new weather stations until after the 2017 Thomas Fire. Instead of deploying its own weather network, SCE primarily relied on publicly available weather data. SCE used Red Flag Warnings from the National Weather Service, which cover broad areas and are not specific enough to make operational, circuit-by-circuit safety decisions. SCE did not use SAWTI.

In December 2017, SCE had about one utility-owned weather station per 2,173 square miles of its service territory, whereas SDG&E had about one utility-owned weather station for every 24 square miles of its service territory.

B. Preventative Measures

This testimony presents information about the development of proactive power shut off programs and increased powerline sensitivity settings that were established or were under development during the period from 2003 up to the ignition of the 2017 Thomas Fire. Proactive power shut off programs (now known as Public Safety Power Shutoffs, or "PSPS") and increased sensitivity settings (commonly known as "Fast

Trip") are designed to de-energize power lines during dangerous conditions where electric infrastructure may cause an ignition.

After the October 2007 wildfires, SDG&E filed Application (A.) 08-12-021 for authority to shut off electric power as a fire-prevention measure. In 2009 the Commission denied SDG&E's application, but Decision (D.) 09-09-030 recognized that SDG&E has authority to shut off power when necessary to protect public safety.

SDG&E incorporated PSPS into its grid operations to reduce the likelihood that its electric lines would ignite a catastrophic wildfire. SDG&E executed its first PSPS event in 2013. By the fall of 2017, SDG&E had established a mature proactive de-energization plan, supported by 170 utility-owned weather stations. SDG&E forecasted the dangerous fire conditions associated with the December 4, 2017 Santa Ana Wind event and in response, conducted its largest proactive power shutoff event up to that time.

From 2003 to 2005, SCE implemented a narrow proactive de-energization plan called the Protective Outage Plan (POP) due to the impact on forest vegetation from a bark beetle infestation. Despite being an active participant in SDG&E's 2008 Application proceeding regarding SDG&E's request for authority to shut off electric power as a fire-prevention measure, SCE did not begin to consider a proactive power shutoff program again until November 2017. In the decade between the 2007 fires linked to SDG&E's equipment and the 2017 Thomas Fire, SCE did not analyze the efficacy of SDG&E's PSPS program for mitigating wildfire risk.

In D.12-04-024, the Commission directed SDG&E to examine alternatives to PSPS, including using "sensitive relay settings" (also known as "Fast Trip") to shut off power in milliseconds when an electrical fault occurs. SDG&E began deploying Fast Trip settings in 2011. In the fall of 2017, SDG&E had 105 unique circuits with Fast Trip capabilities, 63 of which had Fast Trip settings activated.

SCE was aware of SDG&E's Fast Trip program, participated in a workshop on the subject, and was a party to the proceeding that led to D.12-04-024. Nonetheless, SCE did not examine the Fast Trip practices of other utilities – including

SDG&E – prior to December 4, 2017. SCE began developing its Fast Trip program (which SCE calls “Fast Curve”) in November of 2017 and implemented it in February 2018.

VII. Exhibit CA-07: The Anlauf Ignition (Witness: Holly Wehrman)

This testimony examines evidence about where, when, and how the Anlauf ignition occurred.

SCE posits that the Anlauf ignition originated near a private residence in Santa Paula (the Dollar residence) at about 6:03 pm to 6:06 pm on December 4, 2017. This conflicts with the conclusions of the joint fire investigation led by the California Department of Forestry and Fire Protection (CAL FIRE) and the Ventura County Fire Department (VCFD), referred to here as the Anlauf Fire Agencies. The Anlauf Fire Agencies, whose team included several highly experienced, professional fire investigators, concluded that the ignition originated in the area of a cathodic protection rectifier (CP rectifier), approximately half a mile up Anlauf Canyon Road (to the northeast) from the Dollar residence.

The evidence supports the Anlauf Fire Agencies’ conclusions that the Anlauf ignition occurred at 6:17 pm on December 4, 2017 at the CP rectifier in Anlauf Canyon, and that it was most likely caused by phase-to-phase contact between two SCE conductors during severe winds (i.e., “line slap”) on a spur line connecting the CP rectifier to the main Anlauf Canyon line.

SCE’s expert, Mr. Thomas J. Fee, led a team that documented and analyzed fire movement indicators in and around Anlauf Canyon. However, Mr. Fee did not begin his investigation until February 8, 2018. In the intervening two months, the site had been disturbed by the Anlauf Fire Agencies’ personnel, intense rainfall, and SCE crews removing equipment. These known disturbances reduce the reliability of SCE’s investigation and conclusions. Moreover, SCE’s investigation determined an origin site that was outside of the general origin area and the eight areas of interest that the Anlauf Fire Agencies examined; therefore, accepting SCE's conclusion requires rejecting the entirety of the Anlauf Fire Agencies' investigatory work.

SCE provides an analysis of eyewitness photographs to support an ignition near the Dollar residence. However, only one photograph was taken early enough to be informative about the origin, and a shift of a few degrees in the estimated sightlines would alter the conclusion. SCE and the Anlauf Fire Agencies both examined this photograph and came to different conclusions. One photograph is not dispositive.

SCE contends that radar data identified a smoke plume at 6:07 pm from the Anlauf fire. However, the feature detected by the radar installation was not in Anlauf Canyon. The radar feature's location does not match either potential ignition location (the Dollar residence or the CP rectifier), nor was it downwind of those points. More broadly, SCE has not demonstrated the accuracy and validity of this method of identifying a wildfire's origin.

SCE analyzed images from two surveillance cameras to estimate the size of the Anlauf ignition in the first minutes after the fire became visible. SCE's methodology is imprecise and introduces several degrees of separation between the estimated size of the fire and the actual size of the fire. SCE's analysis created a computer model of the terrain. SCE then used physical surrogate cameras to develop virtual cameras (computer models). The real surrogate camera was a Canon camera that differed in numerous important ways from the surveillance camera. The resulting images from the two cameras are different.

Even if SCE's size estimates were correct, the ensuing analysis is fundamentally flawed. SCE fitted an exponential growth curve to the size estimates to show that the Anlauf ignition occurred between approximately 6:03 pm and 6:06 pm. However, a study of fire behavior shows that ignitions accelerate until they reach an equilibrium rate of spread, at which point the rate of spread becomes constant. SCE's analysis does not account for this transition.

Using SCE's own source material and equations, Cal Advocates shows that the fire in Anlauf Canyon would have reached an equilibrium rate of spread after about

14 minutes – or 6:17 pm according to SCE's equation – which is *before* SCE's first data point (the first size estimate taken from the surveillance camera analysis). By that time, the fire's growth would have been linear. In other words, SCE uses an exponential growth curve to model a linear phenomenon at that time.

SCE's exponential growth curve is based on two studies that evaluated fire spread under low to moderate wind conditions. Neither study examined fire behavior with strong wind gusts (such as those that occurred in Anlauf Canyon on December 4, 2017) and neither study takes terrain into account. The steep slopes in Anlauf Canyon may have affected the fire's rate of spread, as well as its shape. Finally, both studies demonstrate substantial variability in measured rate of spread. In short, these studies are useful in a general way but of limited value in determining the actual growth of the Anlauf Canyon fire specifically.

911 call records and witness statements do not support SCE's conclusions about the time and origin location of the Anlauf fire. Mr. Dollar called 911 at 6:32 pm to report a fire threatening his property. If the fire ignited at or near the Dollar residence between 6:03 pm and 6:06 pm, SCE's testimony does not explain why the Dollars would wait at least 26 minutes to call 911. Mr. Dollar's 911 call was nine minutes after the fire was large enough to be seen and reported from over two miles away, and about 15 minutes after the fire was visible on a surveillance camera located 14 miles away.

High wind in the Anlauf Canyon area is known to cause phase-to-phase faults. Following the Thomas Fire, SCE observed arc marks on its conductors that are consistent with possible phase-to-phase contact. SCE asserts that the oxidized arc marks near the CP rectifier occurred "long before" the Anlauf ignition. However, SCE did not examine the conductors until 16 months later, and exposure to fire and smoke can influence oxidation. It is possible that phase-to-phase contact at the time of the Anlauf ignition near the CP rectifier produced arc marks that appeared old and oxidized when SCE examined them.

SCE's construction design at the CP rectifier increased the risk of line slap. The Castro circuit in Anlauf Canyon mainly runs parallel to the prevailing winds, but the spur line at the CP rectifier is perpendicular to the prevailing winds. The Santa Ana winds would, therefore, impart a strong lateral force to the conductor span at the CP rectifier, which would create an increased risk of line slap.

In 2017, SCE mitigated the risk of aeolian vibration (wind-driven vibration that can damage conductors) by limiting conductor tensions, which can result in reduced clearances. Logically, SCE's practice of limiting conductor tension increased the risk of phase-to-phase contact. SCE did not check the tension of in-service conductors at the time, and does not possess contemporaneous LiDAR data for its facilities near the CP rectifier.

An independent study of winds during the Thomas Fire finds that maximum wind speeds on December 4, 2017 coincided almost precisely with the time of the Anlauf ignition. This supports an origin theory in which wind is a direct causal driver of the ignition, as would be the case if the fire was ignited by line slap on a span built perpendicular to the prevailing wind direction.

VIII. Exhibit CA-08: The Koenigstein Ignition (Witness: Holly Wehrman)

This testimony presents evidence about the origin and cause of the Koenigstein ignition.

SCE posits that the Koenigstein ignition originated when a conductor span between poles 565 and 566 on SCE's Castro circuit separated and fell to the ground. This conclusion is shared by the joint fire investigation led by CAL FIRE and VCFD, referred to here as the Koenigstein Fire Agencies. SCE's analysis indicates that the conductor reached temperatures of 1,600 to 2,700 degrees Fahrenheit, which is consistent with resistance heating on a damaged conductor. SCE states that it was unable to identify the nature of the damage to the conductor that led to the resistance heating.

SCE replaced pole 566 in April 2015 and did not identify any conductor damage at the time. Accordingly, it is likely that the damage that led to the line separation occurred during or after the pole replacement work. SCE does not maintain quality control records from this time period, so it is not possible to determine whether SCE conducted quality control for the replacement of pole 566 in 2015.

Inspection records do not indicate that damage occurred between April 2015 and December 2017. At the time of the pole replacement, SCE installed an avian protection device (an opaque polymer sheath) at the separation location, which would have prevented SCE's inspectors from identifying damage at that location by using visual inspection methods. Only a non-visual inspection method, such as infrared, could have identified damage to the conductor under the avian protection device.

In 2017, SCE conducted an infrared inspection of the entire Castro circuit. However, SCE conducted its infrared inspection in March through May, when the electric load is typically relatively low. Higher loading amplifies temperature differences, which can make it easier to identify hot spots. Had SCE performed infrared inspections during heavy loading conditions, it is possible that such inspections would have detected the damaged conductor, which could have led to a repair or replacement.

SCE had a history of conductor separations prior to 2017. From 2015 through 2017, SCE recorded 831 wire-down incidents with unknown causes on its distribution lines, including 309 involving aluminum conductor with steel reinforcement (ACSR). During the years 2015 through 2017, SCE's data does not show any downward trend in such incidents.

SCE states that the line separation was preceded by a phase-to-phase contact. The Castro circuit had experienced a history of line-slap incidents. SCE had a practice of limiting conductor tension to mitigate aeolian vibration, which makes line slap more probable in windy conditions.

SCE cannot identify when the conductor was first installed or its manufacturer. Tracking age and manufacturer would have enabled SCE to analyze the risk associated with older conductors and potentially implement a more effective risk-informed approach to conductor replacement.

SCE's recloser settings did not provide sufficient protection during a Red Flag Warning. At 7:27:04 pm, a phase-to-phase contact occurred. The nearest upstream recloser, RAR 0179, registered the phase-to-phase fault but did not immediately operate to de-energize the line. Approximately two seconds later, the recloser recorded a phase-to-ground fault as a result of the separation of the conductor.

If SCE had employed Fast Trip settings in 2017 to address fire risk during Red Flag Warnings, it is possible that recloser RAR 0179 would have de-energized the line in response to the first fault at the Koenigstein location. Then, even if the conductor had still separated two seconds later, it would have been de-energized before it struck the ground.

IX. Exhibit CA-09: Prudence of Operations (Witness: Charles Madison)

This testimony presents evidence about the prudence of SCE's practices and operations in the time period leading up to the Anlauf and Koenigstein ignitions.

A. Infrared Inspections

SCE's infrared asset inspection practices were deficient. At the time of the Thomas Fire, SCE lacked established standards or procedures for infrared inspections and instead relied on contract documentation.

Infrared inspections are more likely to detect problematic asset conditions when a circuit is operating with a high load, because elevated loads generate higher temperatures in electrical conductors and components. As the load increases, the fault power increases exponentially. Industry standards and peer utilities recommend that infrared inspections should occur during peak loading months. However, in 2017, SCE did not have a policy or practice of scheduling infrared inspections during peak load periods.

From 2013 through 2017, SCE performed one infrared inspection of the Castro circuit, which occurred between March and May of 2017. However, in this period, SCE never conducted an infrared inspection at a time when the circuit was carrying a peak or near-peak electrical load.

Additionally, SCE recorded infrared inspection results only when hot spots were identified. Consequently, SCE was unable to effectively track changes over time and may have missed emerging problems.

B. Quality Control of Asset Inspections

Quality control entails auditing completed work (such as asset inspections) to ensure it has been performed properly and meets requirements. Between 2014 and 2017, SCE performed limited quality control (QC) of its asset inspections. SCE lacked a QC program for annual grid patrols. In this period, for the Castro circuit, SCE has evidence of performing QC audits only in the Pole Loading Program. For other types of inspections, SCE either performed zero QC audits or has not retained data.

For the Pole Loading Program, SCE conducted a total of 35 QC audits on the Castro circuit in this four year period. Two inspections failed the QC audits, resulting in a failure rate of about 5.7 percent.

C. Quality Control of Distribution Construction

SCE had a distribution construction QC program to ensure that work by SCE and contractor crews met standards, regulations, and work order specifications. From 2016 to 2017, SCE conducted QC construction audits on 16 structures within the Castro circuit. Three audits identified nonconformances.

Additionally, SCE's sampling process had a bias toward non-rural areas, despite the majority of high-risk fire zones being located in rural regions.

SCE does not maintain records of construction QC activities prior to 2016. This limitation hampers efforts to conduct long-term trend analyses and evaluate the effectiveness of past corrective actions.

D. Case Study of an Asset Notification

Cal Advocates examines a case study of pole number OH-1041915E to illustrate deficiencies in SCE's asset management practices, including risk assessment. In July 2017, SCE identified three asset conditions on this pole in Anlauf Canyon, including a primary crossarm that was swinging "very loosely." The field inspector noted the fire risk in the area and recommended action to "replace as soon as possible."

Nonetheless, SCE categorized the asset notification as priority 2 and assigned a 9-month timeframe for corrective action. The priority 2 classification and the 9-month deadline understated the urgency of the problem.

In 2017, SCE used a Risk Assessment Matrix to determine the appropriate priority level and corrective action deadline for each asset notification. The two-dimensional matrix categorized asset conditions based on failure risk and safety impact. The loose crossarm on pole OH-1041915E should have been rated at the highest level of failure risk ("could lead to system failure"). The matrix had four levels of safety impact (from slight to high). The on-site inspector assessed the situation as high-impact. Therefore, the crossarm condition should have been classified as priority 1, which would have necessitated immediate action.

E. Response to Past Extreme Weather Events

SCE missed opportunities to learn from previous severe weather events and make strategic improvements. SCE showed a limited response to historical wind events, such as the 2007 Fire Siege and the 2011 Windstorm. After the 2007 and 2011 events, SCE made no changes to its weather station network.

After the severe wind event of October 9, 2017, SCE's records do not show any specific post-event patrol or vegetation clearance patrol (apart from regularly scheduled activities). Strong Santa Ana winds occurred again on October 24, 2017. SCE conducted a patrol of the Castro circuit only after an unplanned outage was detected. As in the earlier event, SCE performed no specific vegetation clearance patrol in response to the wind event. SCE's responses to the wind events in October

2017 show a lack of proactive measures to ensure safety, and a failure to learn from previous events.

F. Wind Study and Wind Loading Standards

In 2014, SCE commissioned Reax Engineering to conduct a wind study using historical data to characterize wind loads across its service territory. However, the study had two limitations: it did not include data on maximum recorded wind speeds, and SCE lacked localized wind data.

SCE claims that its wind loading standards have reduced the risk of infrastructure failures, such as broken poles and wire clashes. However, SCE has not presented empirical evidence to support this claim. SCE presents safety factors for different construction designs, but does not show that the safety factors are sufficient to withstand the maximum wind speeds that may occur in high-risk areas.

X. Exhibit CA-10: System Protection (Witness: Herman Eng)

This testimony addresses system protection settings on the Castro circuit. On Red Flag Warning days, in addition to disabling the reclose function of the reclosers, SCE should have adjusted the phase and ground current settings to be more sensitive. Sensitive protection settings would cause the reclosers to de-energize the lines quickly to minimize ignitions.

A. Reclosers and Overcurrent Relays

Auto reclosers are protective devices that can operate automatically when a circuit experiences abnormally high current. In the event of a fault or disturbance, such as a temporary short circuit or momentary overcurrent, the auto recloser acts as an automatic switch that opens and closes to isolate the fault and then to restore power quickly.

Reclosers can be programmed with a range of protective settings using the time-current characteristics curve. When the high current exceeds a preset current value and a preset time interval, the recloser acts as a switch and deenergizes the downstream circuit segment, to prevent equipment damage and reduce safety hazards.

The overcurrent relay operates in an inverse tripping characteristic, meaning that the higher the fault current, the faster (shorter) the tripping time.

B. Anlauf Ignition

In January 2014, SCE changed the protection settings on recloser RAR 1228. The new settings were less protective. SCE increased the amperage of current – both for the phase and the ground – that would cause the recloser to operate.

On December 4, 2017, at 6:17:02.064 pm, RAR 1228 recorded a phase-to-phase fault. The fault current exceeded the minimum-to-trip value (200 amps), but did not last long enough for the recloser to trip. RAR 1228 did not trip at 6:17 pm on December 4, 2017. If SCE had retained the original (pre-2014) recloser settings, RAR 1228 might have tripped at the first phase-to-phase fault, rapidly shut off power to Anlauf Canyon, and thereby reduced the amount of energy released by the fault at 6:17 pm.

C. Koenigstein Ignition

The Koenigstein Ignition occurred at approximately 7:27 pm on December 4, 2017. Recloser RAR 179 recorded four faults over a period of about 4.3 seconds.

First, there was contact between the A and C phases at 7:27:03.8 pm. After the initial phase-to-phase fault, the C-phase conductor separated and hit the ground in about 2 seconds. The recloser recorded phase-to-ground faults at 7:27:05.7 and 7:27:06.4 pm. Although these fault currents exceeded the recloser's ground fault setting of 120 amps, they did not last long enough to meet the time and current combination that would cause the recloser to trip. RAR 179 finally tripped at 7:27:08.1 pm and deenergized the circuit segment.

SCE changed the settings of RAR 179 to a less sensitive ground current setting (165 amps) in January 2014. SCE then changed the recloser to a more sensitive ground current setting of 120 amps in May 2014, but it was still less sensitive than the original setting of 100 amps prior to January 2014. This change may have delayed the tripping action of the overcurrent relay when phase-to-ground faults occurred on December 4, 2017.

Additionally, in December 2017, RAR 179 had a phase-fault current setting of 280 amps. If SCE had adjusted the phase fault current setting on RAR 179 to a lower value, the recloser could have tripped and deenergized the circuit segment at the first phase-to-phase fault. This could have prevented the subsequent phase-to-ground faults.

RAR 179 and RAR 1228 were located in a high fire-risk area. SCE's choices of fault current settings increased the likelihood that faults would not cause the protective devices to trip. This, in turn, increased ignition risk.

XI. WITNESS QUALIFICATIONS – HENRY BURTON

My name is Henry Burton. My business address is 505 Van Ness Avenue, San Francisco, California. I am employed by the California Public Utilities Commission as a Program and Project Supervisor in the Public Advocates Office, Safety Branch.

I earned a Master of Public Affairs degree with a concentration in Economics and Public Policy from the Princeton School of Public and International Affairs at Princeton University, with highest honors. Previously, I earned a Bachelor of Arts, magna cum laude, from Williams College, with high honors in Philosophy. I also studied at Exeter College of Oxford University.

I joined the Public Advocates Office in 2018 as a Public Utilities Regulatory Analyst V in the Electricity Pricing and Customer Programs Branch, in which role I primarily worked on energy efficiency issues. In my role as senior energy efficiency analyst, I litigated rulemakings, applications, and advice letters regarding energy efficiency, as well as other demand-side energy programs. I sponsored testimony on avoided costs in R.14-10-003, the Integrated Distributed Energy Resources rulemaking.

Since December 2019, I have been the supervisor of the Wildfire Safety Section in the Safety Branch. My work in this role principally concerns wildfire mitigation plans (WMPs) and related issues such as WMP guidelines and safety certifications. I have led the Public Advocates Office's review of investor-owned electric utility WMPs each year since 2020. In my role as supervisor, I provide strategic and policy guidance to staff, suggest topics to examine, assist staff with analytical challenges, and provide feedback to improve work products. Since the end of 2022, I have also worked on implementation and policy development for long-term electric undergrounding plans pursuant to Senate Bill 884 (McGuire, 2022).

In the Safety Branch, I have worked on several enforcement matters related to wildfires. I led our work on Investigation 19-06-015, the Commission's investigation regarding wildfires in Pacific Gas and Electric Company's territory in 2017 and 2018, as well as the Enhanced Oversight and Enforcement process for PG&E. I have worked on administrative consent orders and administrative enforcement orders regarding the Dixie, Zogg, and Kincade Fires.

In 2021, I served as a Fulbright Public Policy Fellow in Cote d'Ivoire for seven months. I also served as a Peace Corps Volunteer in Benin from 2011 to 2013.

This concludes my statement of qualifications.