Diane Conklin
Spokesperson
Mussey Grade Road Alliance
PO Box 683
Ramona, CA 92065

June 27, 2025 VIA ELECTRONIC FILING

Tony Marino, Deputy Director
Office of Energy Infrastructure Safety
715 P Street, 20th Floor
Sacramento, CA 95814

RE: MUSSEY GRADE ROAD ALLIANCE COMMENTS ON THE 2026 TO 2028 UPDATE OF THE WILDFIRE MITIGATION PLANS OF SCE

Dear Deputy Director Marino,

The Mussey Grade Road Alliance (MGRA or Alliance) files these comments pursuant to the February 24th Revised 2026-2028 Base Wildfire Mitigation Plan Update Schedule[1] provided by the Office of Energy Infrastructure Safety (OEIS or Energy Safety) which authorizes public comment for Southern California Edison's (SCE's) Wildfire Mitigation Plan (WMP)[2] by June 27, 2025.

The Mussey Grade Road Alliance is pleased to be able to continue to participate and provide substantive feedback on the Large IOU Wildfire Mitigation Plans.

For any reader curious as to how the Mussey Grade Road Alliance, a grass-roots citizen-based organization located in Ramona, California has become involved in reviewing and improving utility power line fire safety in California over the last 17 years we would refer them to our last full description of our history and activities in the 2020 Wildfire Mitigation Plans.[3] MGRA has been

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[1] Docket 2026-2028-WMPs; Office of Energy Infrastructure Safety; 2026-2028 Wildfire Mitigation Plan Update Schedule; p. 2; TN15409_20250224T170637_Revised_20262028_Base_WMP_Schedule.pdf (2025 Updated Schedule)

[2] Docket 2026-2028-Base-WMPs; Southern California Edison; 2026-2028 WILDFIRE MITIGATION PLAN; May 15, 2025. (SCE WMP)

[3] MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2020 WILDFIRE MITIGATION PLANS OF SDG&E, PG&E, SCE; April 7, 2020; pp. 1-3. (MGRA 2020 WMP Comments) https://energysafety.ca.gov/wp-content/uploads/docs/misc/wmp/public-comments/mussey-grade-comments-2020-wmp.pdf

involved in every WMP since their start, and in fact was the only intervenor providing comment on the "Fire Prevention Plans" early in the 2010's.

The Alliance comments are authored by the Alliance expert, Joseph W. Mitchell, Ph.D.[4] Many of the topics he raised in the previous years – wind and wildfire risk, covered conductor and undergrounding, power shutoff and shortcomings in utility modeling tools – remain active topics of discussion within both Energy Safety and CPUC frameworks. Dr. Mitchell presents additional data and analysis this year based on new data provided by the utilities.

While utilities continue to refine their risk models under additional constraint and guidance by Energy Safety, MGRA continues to focus on the shortcomings of these models and their basic assumptions. Many of these issues remain the same as those MGRA has raised in the past, such as the effect of extreme winds on ignition risk, and to some extent OEIS has accommodated some of the MGRA inputs.

While MGRA members are not SCE customers, MGRA has had an interest in Edison's wildfire mitigation for many years. As a much larger entity than SDG&E, our local electrical utility, CPUC and OEIS decisions regarding SCE are likely to carry over into SDG&E proceedings. In particular, SCE's stance on risk tolerance is an issue that MGRA has been opposing for some time. Additionally, much of SCE's high fire risk area is similar to the SDG&E service area. SCE's deployment of over 6,000 miles of covered conductor in this area has dramatically lowered wildfire risk, and MGRA has long maintained that SDG&E could learn from this lesson.

The MGRA area lost 60-70% of its homes in the 2003 Cedar fire and was threatened by the 2007 Witch/Guejito fire which originated from SDG&E power lines. The Mussey Grade neighborhood is economically diverse, with many residents having low incomes, and for whom the burden of utility rates is significant. MGRA has always supported cost-effective wildfire safety, SCE's successful covered conductor deployment provides an important lesson.

[4] M-bar Technologies and Consulting, LLC; http://www.mbartek.com; Email: jwmitchell@mbartek.com. Dr. Mitchell is also the Secretary of the Mussey Grade Road Alliance.

We thank Energy Safety for the opportunity to provide these comments and in particular its staff who diligently work through the massive quantity of utility filings, data request responses, and stakeholder comments.

Respectfully submitted this 27th day of June, 2025,

By: __/S/____***Diane Conklin***____________________

Diane Conklin
Spokesperson
Mussey Grade Road Alliance
P.O. Box 683
Ramona, CA 92065
(760) 787 – 0794 T
(760) 788 – 5479 F
dj0conklin@earthlink.net

By: __/S/____***Joseph W. Mitchell***____________________

Joseph W. Mitchell, Ph.D.
M-bar Technologies and Consulting, LLC
19412 Kimball Valley Road
Ramona, CA 92065
(858) 228 0089
jwmitchell@mbartek.com

On behalf of the Mussey Grade Road Alliance.

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WILDFIRE MITIGATION PLAN COMMENTS ON BEHALF OF THE MUSSEY GRADE ROAD ALLIANCE

The Mussey Grade Road Alliances' (MGRA or Alliance) Wildfire Mitigation Plan comments are authored by MGRA's expert witness Joseph W. Mitchell, Ph.D.[5]

1. INTRODUCTION AND SUMMARY

The Mussey Grade Road Alliance provides comment on the 2026-2028 Wildfire Mitigation Plan (WMP) for San Diego Gas and Electric Company (SDG&E).[6]

Thanks to the more expansive and prescriptive guidance by OEIS the utility WMPs have become easier to review and process. MGRA's comments are shorter for SCE than they were for SDG&E and PG&E's 2026-2028 Base WMPs, mostly because SCE's submission is more similar to those it has made in prior years, with fewer major changes. Some of the issues MGRA has previously raised, such as SCE's adoption of a consequence-only model for much of its remaining unhardened areas (IWMS), and mis-prioritization of drivers are restated but have been previously raised.

Importantly, SCE appears to have reduced more wildfire risk and at a faster rate than any other utility through its extensive covered conductor program. MGRA filings have tracked SCE's progress over the past years as it has now exceeded 6,000 miles of covered conductor, and historically found that this measure reduces ignition rates by up to 85% over bare wire. A dry season and slew of ignitions has dropped that to 81% this year. MGRA analysis of this data has been used in filings at both OEIS and the CPUC, for all three of the major utilities.

If SCE lags anywhere it is in its implementation of PSPS.

1.1. Organization

Sections generally follow the numbering scheme laid out in Energy Safety guidelines.

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[5] M-bar Technologies and Consulting, LLC; http://www.mbartek.com; Email: jwmitchell@mbartek.com. Dr. Mitchell is also Secretary of the Mussey Grade Road Alliance.

[6] Docket 2026-2028-BASE-WMPS; SDG&E; Wildfire Mitigation Base Plan; version R0; May 2, 2025.

MGRA is including utility data request responses as Appendix A of these comments. Even when we are not fully able to explore every issue that these cover in the comments, we hope that Energy Safety will review these responses from the utilities as well in order to inform its own evaluation.

MGRA Workpapers can be found at:
https://github.com/jwmitchell/Workpapers/

Additional code, specifically that related to MGRA's weather analysis may be found at:
https://github.com/jwmitchell/mbar-weather

Tools used in the preparation of workpapers and analysis include Microsoft Excel, Python 3.8.10 and additional open source modules, ESRI ArcMap 8, and OpenAI ChatGPT 4.0. All methodology suggested and code generated by AI was independently verified and customized.

1.2. Comparison with 2025 SDG&E WMP Update

MGRA made a number of recommendations as part of its comments on the 2025 WMP Update.[7] Some of these were acted upon by OEIS, either in its review of the WMP or in its comments on the utility quarterly report. Other recommendations may have been in one way or other implemented by utility actions. Some of MGRA's recommendations were not addressed and remain valid concerns. MGRA's primary 2025 Update recommendations are summarized below:

Recommendation	**OEIS Action**	**Utility Action**	**Status**
Utilities should use field data and continue to develop their estimates of covered conductor effectiveness.	IOUs must continue CC effectiveness workstream and include in-field effectiveness.	SCE still does not use its own ignition data as an effectiveness metric.	MGRA evaluates additional SCE field data and confirms higher CC effectiveness.
SCE's GRC documents indicated that it would be ramping down its covered	None	SCE's 2026-2028 WMP calls for 440-695 miles of	Postponed.

[7] MUSSEY GRADE ROAD ALLIANCE COMMENTS ON THE 2025 UPDATE OF THE WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; May 7, 2024.

conductor program. MGRA Recommended that SCE should continue its covered conductor program.		covered conductor and 260-440 miles of undergrounding, ramping down in 2029.	
MGRA had raised the issue that SCE and SDG&E risk models are biased because they do not include areas were PSPS is active in event history.	SCE-23-22	SCE is studying how to incorporate PSPS damage events (LL 3)	Active.
Utility risk models do not adequately represent correlation between ignition and spread due to extreme wind drivers.	Energy Safety requires extreme scenario evaluation.	SCE's equipment failure model ML features detect significant wind dependence. Section 5.2.2.	MGRA suggests framing for SCE extreme event scenarios. Section 5.3. PSPS events show little association with high risk but do match "High Wind" SRA. Section 7.1
SCE did not provide combined portfolio of mitigations with covered conductor and REFCL	SCE-25U-03. Continuation of Grid Hardening Joint Studies	SCE provided combined CC+REFCL efficiencies in DR response. Section 8.2.6.	SCE provided combined CC+REFCL efficiencies in DR response. Section 8.2.6.
SCE went from 8 hour simulations to a maximum consequence model primarily for use in its IWMS high consequence model. MGRA recommends incorporating IWMS classes into MARS and use of MARS rather than IWMS.	SCE-25U-01	SCE explores incorporating 24 hour simulations with full range of fire weather days. Section 5.2.3.1.	Active.

Table 1 - MGRA recommendations made as part of the 2025 WMP Update review, Energy Safety and utility action on these topics, and current status.

1.3. Significant Findings in the 2026-2028 Wildfire Mitigation Plans

A number of significant issues were identified in SDG&E's 2026-2028 WMP and will be addressed at length in the remainder of these comments. To summarize the most important of these issues identified in the MGRA review:

- SCE has two wildfire models: MARS, its risk-based model and IWMS, a consequence-only based model. SCE continues to use IWMS as the basis of its undergrounding plans, using MARS for regulatory compliance and prioritization.
- SCE's ranked ignition drivers in Table 3-1 has several inconsistencies with ignition data provided in its QDRs for the 2022-2024 period. "Other contact", "Equipment-Other", and "Transformer" drivers are relatively higher Table 3-1, while "Animal", "Balloon", and "Vegetation" drivers rank somewhat higher in the QDR sample. Examination of covered conductor versus bare wire did not reveal statistically significant differences in ignition drivers, though this was mostly due to low statistics.
- SCE's Likelihood of Ignition ML models, specifically its equipment failure model, have incorporated variables that track high winds as a feature related to equipment failure and these now show as the most predictive environmental variable.
- SCE is exploring 24 hour wildfire simulations and the use of mean value, and may adopt these as best practices in this WMP cycle.
- SCE needs to further explain how its 40 year climate history can be extrapolated to a 300 year return interval "extreme" Design Basis Scenario.
- Reported infrastructure damage events collected during post-PSPS patrols show that SCE's "High Wind" SRA classification is highly predictive of infrastructure damage, but that SCE's risk ranking is not. Most but not all damage events occurred at higher wind speeds, though some (especially those on covered conductor circuits) merit further explanation. There are inconsistencies between SCE's post-season PSPS report and QDR geospatial data from Q4 2024.
- Cal Advocates CPUC filings show that SCE notification failure rate is an order of magnitude (or more) higher than PG&E's.
- SCE's reporting of ignitions associated with bare wire is significantly different (lower) than what was provided in previous data requests and taken at face value would indicate a ignition reduction rate of 74% for covered conductor rather than 81% using its previous numbers of methodology. The difference between in reported bare wire ignitions in this WMP and in previous WMP and CPUC filings should be further investigated.
- SCE's REFCL program has been highly successful but slow and difficult to implement. It needs to be further encouraged.

2. RELATED ACTIVITY

2.1. Other Utility 2026-2028 Wildfire Mitigation Plans

2.1.1. MGRA Comments on PG&E 2026-2028 WMP

Energy Safety has already received MGRA's Comments on PG&E's 2026-2028 Wildfire Mitigation Plan.[8] The following sections are relevant to SCE's WMP and will be cited as appropriate. Unless otherwise noted the same section numbers will apply in this document.

Section 5.2.1 – Likelihood of Ignition: MGRA Comments show an analysis of large wildfires in the PG&E service area and demonstrate that there is a relationship between ignition of wildfires that become large and wind gusts that is statistically different for power line wildfires and wildfires from other causes. PG&E's machine learning (ML) model does not adequately capture the relationship between wind and ignitions.

Section 5.2.2 – Consequences of Wildfire Risk Event: PG&E increased its simulation time to 24 hours, and includes data supporting this decision. PG&E's supplemental WMP documents have provided an analysis that shows that 24 hour simulations provide, on the average, a more accurate estimate of final burn sizes for historical wildfires. SCE has also started evaluating 24 hour wildfire simulations. PG&E's third-party review (E3 consultants) suggested that their modeling should incorporate wildfire smoke health effects. However, SCE's model does not incorporate wildfire smoke health effects. PG&E makes an important observation regarding wildfire fatalities, noting that the elderly make up the majority of fatalities even when they are not the largest segment of the population.

Section 8.2 – MGRA shows that PG&E underestimates covered conductor wildfire ignition reduction efficiency based on SCE field data observations.

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[8] Docket: 2026-2028-Base-WMPs; MUSSEY GRADE ROAD ALLIANCE COMMENTS ON THE 2025 UPDATE OF THE WILDFIRE MITIGATION PLANS OF PG&E; May 23, 2025. (MGRA PG&E WMP Comments)
https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=58534
TN15885_20250523T090028_MGRA_20262028_WMP_PGE_Comments.pdf

2.1.2. MGRA Comments on SDG&E 2026-2028 WMP

SDG&E's 2026-2028 WMP was rejected on June 24, 2025,[9] citing numerous deficiencies including inconsistent replies regarding amount of covered conductor and undergrounding to be deployed.

Section 5.2.1 – SDG&E uses a regression model for its likelihood of ignition calculation, and applies a "wind gust" correction, but fails to capture the amplification effect caused by high winds due to increased outage rates. SDG&E also assigns wind as a factor to many ignition drivers for which wind is only a secondary driver, a mistake SCE also makes in its Table 3.1.

Section 5.2.2 – SDG&E has increased the duration of its wildfire simulation from 8 hours to 24 hours, a measure SCE is considering implementing as well. Like SCE, SDG&E has now constructed an elaborate egress model, however like SCE they do not quantify how it is incorporated into their planning model. Also, egress is not used for operational modeling, and MGRA argues that it should be because egress-constrained areas are more at risk if PSPS is not properly executed.

5. RISK METHODOLOGY AND ASSESSMENT

5.1. Risk Methodology

SCE currently has two parallel risk analysis frameworks, MARS and IWMS. MARS is compliant with the CPUC's Risk-informed Decision-making Framework (RDF), and calculates risk as the sum of the product of probability of risk and consequence of risk for every potential risk event and used to analyze potential mitigations. IWMS was developed by SCE as its preferred alternative for identifying various risk classes. IWMS is in fact not a risk calculation at all, as it only includes consequence. SCE does not conduct third-party reviews of its risk models.[10]

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[9] Docket 2026-2028-Base-WMPs; Rejection and Resubmit Order for the San Diego Gas & Electric Company 2026-2028 Base Wildfire Mitigation Plan; June 24, 2025.
[10] SCE WMP; p. 138.

SCE introduced its IWMS consequence-only risk model in its 2023-2025 WMP,[11] and MGRA fully analyzed SCE' model and its approach in its comments.[12] The concerns raised by the MGRA analysis are:

- The decision of what constitutes acceptable risk is a societal decision, and not one that should be left to an interested party. SCE has concurred in theory with this position in the CPUC RDF/SMAP proceeding, however lacking widely accepted risk tolerance standards it has set its own.
- IWMS is tied to SCE's undergrounding program, with the highest risk categories identified by IWMS slated by default for underground mitigation.
- IWMS is a consequence-only model and does not take into account the probability of ignition, potentially leading to emphasis on reducing the wrong drivers.

While all of these issues remain current, the urgency of addressing the issue drops with time as more and more of SCE's infrastructure is hardened, rendering the question of how to do proper risk modeling somewhat academic. In the MGRA 2025 Update WMP Comments, SCE's estimation of its risk reduction between 2017 and 2023 was shown to be 67%.[13] SCE projects that it will reduce its HFRA risk by and additional 18% between 2026 and 2029.[14]

During the May 19th WMP workshop, an SCE representative stated that SCE uses MARS for prioritization of the mitigation work, though categorization of mitigation type was to be done based on IWMS.

[11] Docket 2023-2025-WMPs; Southern California Edison Company; 2023-2025 WILDFIRE MITIGATION PLAN; March 27, 2023; TN11952-2_20230327T125844_20230327_SCE_2023_WMP_R0.pdf. (SCE 2023-2-2-25 WMP); p. 89-90.
[12] Docket 2023-2025-WMPs; MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2023-2025 WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; May 21, 2023; pp. 69-76. (MGRA 2023-2025 WMP Comments)
[13] Docket 2023-2025-WMPs; MUSSEY GRADE ROAD ALLIANCE COMMENTS ON THE 2025 UPDATE OF THE WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; May 7, 2024; p. 20; Figure 1. (MGRA 2025-Update WMP Comments)
[14] SCE WMP; p. 192; Figure 6-1.

Recommendations:

- Energy Safety should ensure that SCE's risk models adequately characterize risk, not just consequence, and therefore IWMS risk analyses such as egress model should be integrated into MARS.
- Energy Safety should require SCE to conduct an external third-party review of its data and risk models.

5.2. Risk Analysis Framework

SCE's ignition data is only utilized by its MARS model. Its IWMS model uses only consequence calculations.

5.2.1. Ignition Drivers

SCE's Table 3-1 shows the risk calculation for its ignition drivers, and ranks their priority in order of the fraction of ignitions related to that driver.[15] Energy Safety should note that the value requested was for *risk* and not percentage of ignitions. While raw percentage of ignitions is useful as well, SCE should also provide the estimated wildfire risk associated with each driver.

MGRA analyzed all SCE ignitions between 2022 and 2024 obtained from geospatial OEIS QDR provided via data request.[16] These ignitions were filtered to ensure that 1) they were primary and not secondary lines, 2) they were in the HFTD, and 3) they were associated with overhead equipment. Additionally, these ignitions were paired with the nearest primary circuit hardware type to determine whether the conductor type was covered conductor or bare wire. A pivot table was created to calculate statistics for different ignition causes. Results are in the Excel spreadsheet SCE_Ignitions_LineData_2022-24.xlsx in the MGRA Workpapers. As can be seen below, the driver ignition statistics shown by Table 3-1 are different than obtained from the SCE GIS data.

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[15] SCE WMP; pp. 12.
[16] Non-confidential version was provided in response to MGRA DR 1, as well as during WMP cycles in 2023 and 2024.

Driver	Bare, Other	Covered	Total	CC Exp	Bare, Other %	Covered%	Total%	Table 3-1 Rank	Table 3-1 %x Ignitions
Anchor/Guy		1	1	0.3	0%	6%	2%	19	0%
Animal	4	4	8	2.6	12%	25%	16%	5	7.1%
Balloon	4	1	5	1.6	12%	6%	10%	9	3.6%
Conductor	7	1	8	2.6	21%	6%	16%	4	10.7%
Connector Device	3		3	1.0	9%	0%	6%	8	4.3%
Contamination	1		1	0.3	3%	0%	2%	19	0%
Cross Arm								15	1.2%
Equipment - Other[17]	1	1	2	0.7	3%	6%	4%	3 6	11.9% 6.7%
Fuse		2	2	0.7	0%	13%	4%	13	1.8%
Lightning		1	1	0.3	0%	6%	2%		
Other Contact	1		1	0.3	3%	0%	2%	1	18.9%
Pole					0%	0%	0%	11	3.0%
Splice	1		1	0.3	3%	0%	2%		
Switch	1		1	0.3	3%	0%	2%	15	1.2%
Transformer	1	1	2	0.7	3%	6%	4%	2	12.5%
Vegetation	4	2	6	2.0	12%	13%	12%	7	5.4%
Vehicle	4	2	6	2.0	12%	13%	12%	10	3.4%
Wire-to-Wire	1		1	0.3	3%	0%	2%	17	0.7%
Grand Total	33	16	49		100%	100%	100%		

Table 2 – Ignition data from 2022-2024 for primary, HFTD, overhead circuits was analyzed from DRR SCE-MGRA-001 GIS files and paired with conductor data from the nearest circuit segment. SCE Table 3-1 data is also presented for the same drivers. The "CC Exp" column shows the number of covered conductor ignitions if one assumes the ratios of the Grand Total for bare wire and covered conductor (16/49 = 0.3) is representative of the entire sample.

[17] Insulator and bushing do not appear in the ignition classifiers, and account for 11.9% of ignitions in Table 3-1.

Recommendation:

- Table 3-1 should contain percentage risk as well as percentage ignitions.

5.2.1.1. SCE Ignition Results

There are a number of differences between the QDR geospatial data and the Table 3-1 data, and there hasn't been sufficient time to identify the source. These could result from secondary ignitions, or that the data is from a longer timeframe (2019-2024). In particular, SCE's Table 3-1 indicates that the largest number of ignitions (18.9%) come from "Other Contact", whereas this contributor is virtually absent in the primary system sample from 2022-24.

Potential reasons for these differences are:

- SCE GIS data analyzed by MGRA was restricted to the 2022-2024 period.
- There may be differences in the cause attribution between the SCE database and data in the QDR geospatial data submitted to OEIS.
- There may be different selection criteria applied to ignitions.

While Table 3 header is listed as a "priority" ranking, SCE states that it does not reflect their priority, which is instead set by IWMS: "*The information that is presented in Table 3-1 is ranked for reporting purposes and does not reflect the approach SCE takes to reduce risk on its system… SCE has implemented its IWMS approach to prioritize activity deployment based on the potential for catastrophic wildfire consequences*."[18] So while SCE lists its ignition drivers to comply with regulations, these drivers in no way influence its priority for mitigation.

For its "Topological and Climatological Risk Factors" in Table 3-1, SCE states that the "*risk factors use the following climatological risk factors: wind, temperature, water vapor, turbulence kinetic energy, humidity, rain, and snow. The data is processed by aggregating 10 years of hourly data and calculating several statistical measurements for each climatological factor. These values are then set based on location*."[19] However, virtually every driver has the same list of risk factors, which make these risk factors essentially non-predictive. It implies that "everything drives risk".

[18] SCE WMP; p. 17.
[19] SCE WMP; p. 12.

This is another missed opportunity to identify drivers that will be amplified under extreme wind conditions during fire weather.

Recommendations:

- Energy Safety should inquire further into ignition drivers for which large differences are seen between Table 3-1 and recent QDR geospatial data, specifically “Other Contact”, “Other Equipment”, “Insulator and bushing”, animal, balloon, vegetation, and transformer.
- SCE’s Table 3-1 needs to differentiate and prioritize primary risk factors in its “Topological and Climatological Risk Factors” column.

5.2.1.2. MGRA Ignition Driver Analysis

SCE’s covered conductor effectiveness in reducing ignitions over bare wire will be discussed in Section 8. The sample has grown large enough to provide some insight into which of the ignition drivers are most preventable, and that issue is discussed in this section.

Comparing the “Bare Wire” and “Covered Conductor” columns in Table 2, it’s important to keep in mind that in the 2022-2024 period, the amount of covered conductor installed in SCE’s HFRA increased from over 2,800 miles to over 6,200 miles, while the bare wire was reduced from 6,500 miles to 3,000 miles.[20] Covered conductor mileage surpassed bare wire mileage some time in 2022, so most of the ignitions listed above occurred in an area where more covered conductor was deployed. If the ignition rates were equal for bare wire and covered conductor then more ignitions would be expected for covered conductor, and the fact there are many fewer ignitions associated with covered conductor implies that the ignition rates are significantly lower on covered conductor associated circuits.

That being noted, there does not seem to be any particular ignition driver that shows a statistically significant reduction in ignition rate associated with covered conductor compared to other drivers. Because bare wire ignitions are from a wide variety of drivers, the number of

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[20] Workpapers; WMP26-8_MGRA-SCE-05_Q1-CCUG-WD-Ign-jwm.xlsx; Tab: Miles Installed. From DRRs MGRA-SCE-001; MGRA-SCE-003-1, and MGRA-SCE-005-2.

"expected" covered conductor ignitions never exceeds 2.6 (for conductor and animal related ignitions), making statistical significance hard to demonstrate. Residual covered conductor ignitions also come from a variety of causes, consistent with a hypothesis that covered conductor mitigates multiple risk drivers.

5.2.2. Likelihood of Ignition and SCE's EFF and CFO Models

SCE's Overhead Conductor (OH) model uses a random forest machine learning (ML) method for its equipment failure (EFF) and contact from object (CFO) submodels. In previous MGRA analyses of the SCE and PG&E machine learning models it was shown that wind was a minor contributor to ignition risk, raising concerns that the aggregation of weather data over yearly periods was leading to ignition models failing to capture the risk of the rare high wind events that are associated with the vast majority of catastrophic wildfires. Variables typically incorporated into machine learning included wind speed gust averages. Another issue plaguing ML models using outage or ignition is "PSPS blindness", wherein data taken during the most hazardous periods is not collected in the training or test data.

It is therefore reassuring that several years after the machine learning journey has started, some SCE weather variables have begun to evince the effect of extreme winds on infrastructure and objects. These include:

max_of_sum_of_seg_downforce: "*calculated as a 5-year sum on each wire attached to a pole, based on the hourly data. The pole data is merged with the segment data, and then the values associated with each segment are aggregated by the maximum to create max_of_sum_of_seg_downforce*."[21]

max_wind_magnitude: "*maximum windspeed recorded over a minute of observation at the ADS observation site is provided as an annual maximum by ADS. The ADS data is filtered to the most recent year after 2018, and then uses the 3 nearest neighbors to each segment to create a distance-weighted average value*."[22]

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[21] SCE DRR MGRA-SCE-007-4.

[22] SCE DRR MGRA-SCE-007-5.

Log_Windforce: "*the natural log of the final sum_of_sum_of_seg_downforce values for each segment plus one. The one is added so that all values are positive*."[23]

Significance of these and other variables is shown in Figures 9 and 10 of Appendix B,[24] with data provided in workpapers "2024 OHCM EFF Feature Importance-jwm.xlsx" and "2024 OHCM CFO Feature Importance-jwm.xlsx". The most significant environmental feature in the EFF model is "Log_WindForce" (0.46 max importance) which represents a force-related variable integrated over five years. This makes sense from a physics and engineering standpoint (due to Miner's rule), since the integration of strain over time is what in the end causes fatigue failures. The wind force is proportional to the square of the perpendicular component of the wind speed, but in fact if failures are primarily due to metal fatigue the velocity dependency is further increased to the third or fourth power of wind speed (see Mitchell 2009[25] for a derivation of this relationship). Another significant wind-related variable is max_wind_magnitude (0.43 max importance).

For the CFO components, it also makes sense that certain drivers for the submodels have no causal relationship with high winds: vehicle collisions, animal contact, and balloon contact are not wind-dependent. Vegetation will be, but that is a separate sub-model and is not addressed in these comments. However, one common ignition source has been contact with other equipment, such as communication equipment. Hence at some point breaking out "Other" contact as its own sub-driver may show higher explanatory power from summed wind-related variables.

Inclusion of summed/integrated features as explanatory variables helps to assuage the "PSPS blindness" issue and the insensitivity of mean values to short-duration extremes. Equipment accumulates damage and stress-related fatigue even when power is shut off, increasing the probability that it will fail under less extreme conditions. However, the most probable failure will still be under extreme conditions, so including PSPS damage events into the training sample would still be advantageous.

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[23] SCE DRR MGRA-SCE-007-6.

[24] Southern California Edison (SCE) Model Documentation Prepared for 2026-2028 WMP Appendix ; OH Conductor Sub-Models {CFO & EFF); May 16, 2025.

[25] Mitchell, J.W., 2009. Power lines and catastrophic wildland fire in southern California, in: Proceedings of the 11th International Conference on Fire and Materials. Interscience Communications, pp. 225–238. https://www.mbartek.com/images/FM09_JWM_PLFires_1.0fc.pdf

The discovery that wind and stress/strain related variables with explanatory power can be formulated helps to resolve one of the key issues that has plagued utility machine learning models – the well-established and obvious relationship between wind knocking things down, moving things around, or breaking things so as to create an electrical fault that triggers the ignition of a wildfire under conditions favoring catastrophic fire spread – the scenario that has described the great majority of California's catastrophic power line wildfires. It is unfortunate that SCE having made this advance now delegates probability and consequence based MARS model to a secondary status and uses a consequence-only categorization model, IWMS, to determine its mitigation classification categories. To the extent that SCE needs to base its upcoming revenue request on the risk-based decision-making framework, it should attempt to incorporate IWMS features into its MARS model as well in order to have a more complete characterization of risk.

The following improvements are suggested:

Recommendations:

- SCE should explore the explanatory power of variables representing material fatigue relationships, which may go as the third or fourth power of wind speed.
- SCE should break out "Other Contact" into its own sub-driver once sufficient statistics are available in order to capture integrated stress/strain damage (Log_WindForce or higher power of velocity), in order to identify the risk from wind damage to third-party equipment.
- SCE should attempt to create a complete risk model that incorporates both probability of ignition and still addresses extreme consequence potential identified by its IWMS framework.

5.2.2.1. PSPS Blindness

MGRA has for a considerable time been raising the issue of "PSPS blindness" or the fact that outage and ignition data is extremely biased in areas where PSPS is operative.[26] This is because PSPS prevents any ignitions or outages from occurring, and periods when PSPS is in operation are

[26] MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2021 WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; March 29, 2021; p. 33.

typically represent the very highest wildfire danger. As a result, frequent PSPS areas look "safer" than they really are if one uses outage and ignition history as a proxy for risk. This is potentially dangerous. It might be decided, for instance, to leave a particular area outside of a PSPS for a particular weather event, because the risk model shows the risk in the area is below threshold. However that area may have "hidden risk" such as old or faulty equipment that is more sensitive to wind gusts, but not measured because it has been typically de-energized during past fire weather events.

As per ACI SCE-23B-22, SCE is currently studying ways to incorporate PSPS damage events: "*SCE reviewed data on conductor and pole damage, for example, as key inputs into the model. The goal of this effort was to prototype and test an enhanced methodology that would update PSPS wind speed thresholds based on the probability of a wind-caused fault/outage at the circuit segment level. However, the prototype did not produce satisfactory results due primarily to machine learning model accuracy concerns. SCE is looking into alternative approaches to refine and simplify its existing PSPS threshold methodology*."[27]

Recommendation:

- SCE should issue an update to its attempts to incorporate PSPS damage data both in its planning and operational models in its 2026 WMP Update.

5.2.3. Consequence of Wildfire Risk Event

SDG&E has made modifications to its wildfire risk consequences model, described in this section. Some of these would benefit from improvements or further explanation.

5.2.3.1. Mean and Max Consequence with 8 or 24 hour simulations

One of SCE's areas for improvement was "SCE-25U-01. Calculating Risk Scores Using Maximum Consequence Values". SCE was instructed to re-evaluate its methodology, which uses an 8 hour wildfire simulation to obtain maximum consequence values, and instead move toward using mean values. PG&E's supplemental WMP documents have provided an analysis that shows

[27] SCE WMP; p. 601.

that 24 hour wildfire simulations provide, on the average, a more accurate estimate of final burn sizes for historical wildfires. PG&E's justification is discussed and validated in MGRA's PG&E WMP Comments.[28] The key figures are provided below:

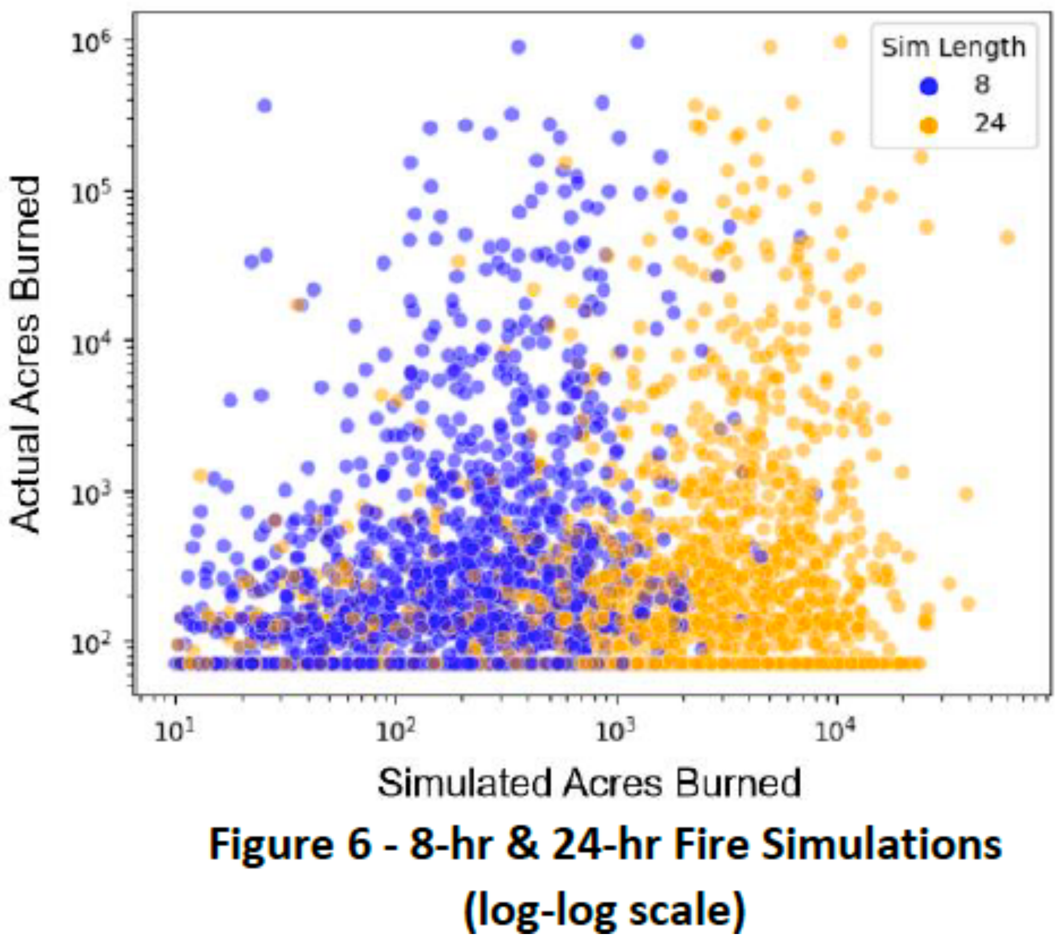

Figure 1 - This figure from PG&E's Wildfire Consequence model document "presents a log-log plot of the historical fire simulation pairs with 8-hr results in blue and 24-hr results in orange".[29] Note the cutoff at around 1,000 acres for 8 hour simulations, and how 24 hour simulations allow more realistic catastrophic fire sizes to be obtained.

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[28] MGRA PG&E WMP Comments; pp. 29-31.

[29] Wildfire Consequence Model Version 4; (WFC) Documentation; March 12, 2025; p. 13. Cited in MGRA PG&E Comments; p. 30.

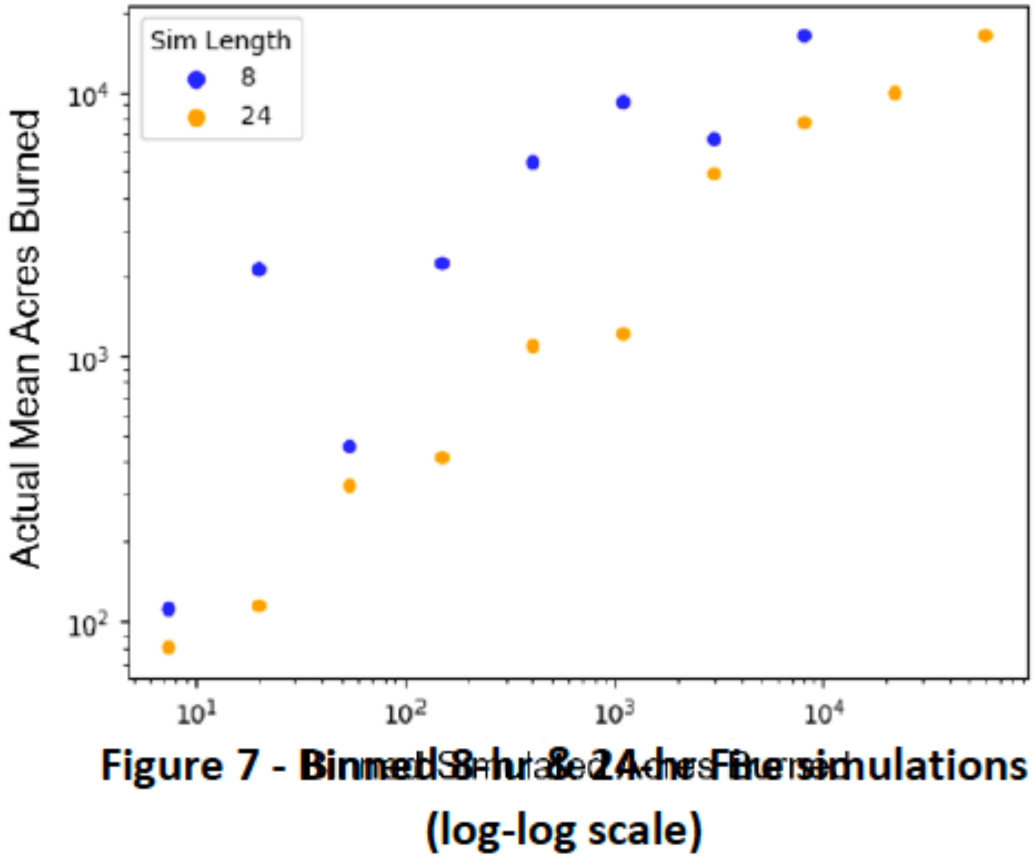

Figure 2 – PG&E analysis using "binned logarithmic transform" data for aggregations of fires. Technosylva simulation size is x axis, actual acres burned on the y. Garbling is in original.[30]

SCE acknowledges that:

"*The drawbacks of using mean value consequences in conjunction with 8-hour burn simulations is that it markedly underestimates the true risk present at various locations of SCE's system. SCE has presented a detailed explanation of this in its response to ACI SCE-23-02 in its 2025 WMP Update. Using mean value consequences based on 24-hour simulations, similar to other IOUs, presents higher risk values and may change SCE's current ranking of riskiest areas on its system. SCE is currently considering this methodology. On the one hand, it may capture more extreme events where suppression resources are limited. On the other hand, it also produces more uncertain results. SCE expects to reach a decision on the use of 24-hour simulations by the time its RAMP report is filed in 2026.*

Use of mean value consequences would impact the current IWMS framework in terms of how much grid hardening SCE would perform and how frequently SCE would inspect certain structures. Under 8-hour burn simulations, this approach would result in fewer mitigations. Under

[30] WFC; p. 13.

24-hour burn simulations, this approach would result in more mitigations. However, SCE still continues to use maximum consequences as opposed to mean value consequences. As such, currently there is no impact on SCE's wildfire mitigation strategy."[31]

While PG&E's analysis confirms SCE's claim that results of wildfire simulations are "uncertain", SCE does not demonstrate that its own threshold-based mechanism provides additional certainty. The 24 hour simulation better captures the extreme high-consequence risk events that have driven power line fire losses in California and it follows that risk should be distributed further from the ignition point.

Recommendations:

- SCE should adopt 24 hour burn simulations in its wildfire consequence model.

5.2.3.2. Egress

The egress model that SCE developed as part of its IWMS framework is sophisticated and uses several mechanisms to quantify risk to residents of egress constrained areas, including a "burn-in" buffer. It may be further improved in several ways:

- Using wildfire frequency history as a layer, as SCE does, implicitly includes ignitions as well. Places with little human activity will generally have lower wildfire frequencies due to lower number of ignitions, since most ignitions are human caused. This does not make those places any less dangerous if a fire starts. The current metric is optimized to show where people are likely to be trapped in *any* wildfire, rather than a *power line related* wildfire. Another metric reflecting potential wildfire intensity should be used instead of fire frequency.
- Further work should be done to quantify the egress metric so that it can be integrated as a scaling factor into the consequence model. Currently, it is used as input for a binary decision in IWMS.

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[31] SCE WMP; p. 573.

- Once scaled for use in risk modeling, egress should also be made part of operational models to determine power shutoff thresholds. Areas where ignitions may turn into rapidly moving wildfire and entrap populations may merit lower PSPS thresholds.

Recommendations:

- SCE's egress model should use a wildfire intensity/risk metric other than wildfire frequency.
- SCE's egress model should be incorporated into its MARS risk model and also used for operational decision-making.

5.2.3.3. Age and AFN Status

PG&E notes in its Wildfire Consequence Modeling document that of the Camp fire fatalities, 67 of the 85 victims were age 64 or above.[32] When asked to provide the equivalent age distribution of the Camp fire evacuation PG&E provided the following 2010 Census for Paradise:

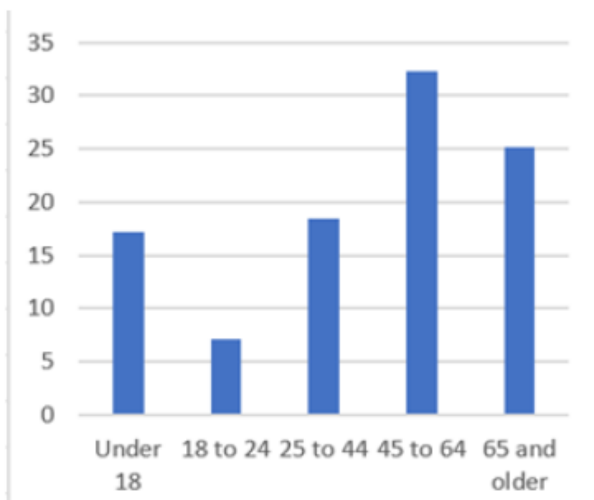

Figure 3 – PG&E in response to WMP-Discovery2026-2028_DR_MGRA_006-Q009 stated "we did consult the 2010 census results for Paradise: The age distribution was 4,501 people (17.2%) under the age of 18, 1,858 people (7.1%) aged 18 to 24, 4,822 people (18.4%) aged 25 to 44, 8,466 people (32.3%) aged 45 to 64, and 6,571 people (25.1%) who were 65 years of age or older. The median age was 50.2 years. The median age for the victims of the Camp fire is 72 years."

[32] MGRA PG&E WMP Comments; pp. 43-46. Cites
Wildfire Consequence Model Version 4; (WFC v4) Documentation; March 12, 2025; p. 24.

The median age for fire victims was 20 years older than the median age of the population. PG&E noted that many victims had mobility issues. This observation is not restricted to the Camp fire. The Northern California fires of 2017 shared a similar trend, with an average age of victims in the late 70s.[33]

SCE does not explicitly list age as an AFN factor in its Wildfire Vulnerability section,[34] but does so in Section 11.4.4.[35] Additionally, SCE filed its AFN plan with the Commission on January 31, 2025, and while the AFN plan includes older adults they are only classed as AFN if they "*self-identify as an older adult (65+)*."[36] Additionally the AFN plan is mostly concerned operational needs with regard to PSPS risk and wildfire. For consequence modeling, "*SCE adjusts the safety risk scores based on an AFN/NRCI multiplier to account for the relative social vulnerability of individual circuits compared to the social vulnerability of the total population of circuits within SCE's HFRA*."[37] It defines the AFN multiplier in Figure SCE 5-43 as a scaling factor that varies between 1 and 2:[38]

Figure SCE 5-43: AFN Multiplier Calculation

$$AFNCircuitMultiplier = 1 + \frac{AFN\ ScoreCircuit}{AFN\ Score\ Max}$$

SCE explains its reasoning for setting the maximum at 2.0 in a response to an MGRA data request:

"*The rationale for capping the AFN multiplier at a maximum value of 2 is to prevent overweighting the safety attribute risk score in relation to the financial and reliability attribute risk scores.*

For example, consider two locations with the same risk profiles (below).

MAVF Scenario 1

- Safety 50% weighting 10 risk score

[33] Tchekmediyian, A., Bermudez, E., October 17, 2017. California firestorm takes deadly toll on elderly; average age of victims identified so far is 79. Los Angeles Times. https://www.latimes.com/local/lanow/la-me-ln-norcal-fires-elderly-20171012-story.html
[34] SCE WMP; p. 97.
"*AFN customers include those customers which are subject one or more of the following criteria: Critical Care, disabled, Medical Baseline, Low Income, limited English, pregnant, children.*"
[35] SCE WMP; pp. 462-464.
[36] SCE 2025 AFN Plan: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M555/K961/555961239.PDF
[37] SCE WMP; p. 68.
[38] SCE WMP; p. 97.

- Financial 25% weighting 10 risk score

- Reliability 25% weighting 10 risk score

Location 1 (with lowest AFN score i.e. "1"):

- Safety 10 x 0.5 x 1 = 5

- Financial 10 x 0.25 = 2.5

- Reliability 10 x 0.25 = 2.5

Total Risk Score = 10

Location 2 (with highest AFN score i.e. "2"):

- Safety 10 x 0.5 x 2 = 10

- Financial 10 x 0.25 = 2.5

- Reliability 10 x 0.25 = 2.5

Total Risk Score = 15

In this scenario shown above, the overall risk score is amplified by 50%."[39]

While SCE's decision to more heavily weight consequence where there is additional AFN exposure is correct, as is its attempt not to overweight the safety attribute, its method is somewhat arbitrary. SCE will need to further justification when it submits its RAMP next year because that will require a more quantitative cost benefit analysis. Additionally the requirement that many AFN customers need to "self-identify", and this may lead to a underestimation of the elderly population, which as is evident from the Camp fire fatality statistics is substantially overrepresented in the number of fatalities.

One suggestion that utilities might want to consider in the future is to weight the number of fatalities per structure by relative AFN population and scaled to the AFN fraction of historical wildfire fatalities. This would apply a neutral weight to the safety attribute – while areas having a higher relative fraction of AFN population would have a relatively greater contribution to safety risk areas having a lower relative AFN contribution would have a smaller contribution to safety risk. This would avoid overweighting the safety attribute while still ensuring that areas with greater fractions of vulnerable populations are assigned a higher consequence.

[39] SCE DRR MGRA-SCE-004-15.

Recommendation:

- SCE should explore a more objective means to weight risk to AFN populations, one that accurately represents the overrepresentation of elderly and AFN in historical wildfire fatality statistics. For example, it could weight the number of fatalities per structure by relative AFN population and scaled to the AFN fraction of historical wildfire fatalities.

5.2.3.4. Wildfire smoke health effects

Historically SDG&E was the only utility that attempted to correct for wildfire smoke health effects. While MGRA has filed extensive comments regarding technical error in the details of SDG&E's calculations, it supported the overall approach used by SDG&E of using acres burned as a rough scaling factor for potential injuries and fatalities. MGRA recommended updating references and technique to do this more accurately.[40]

This issue was reviewed in the Risk Mitigation Working Group, and while all stakeholders acknowledge the importance of wildfire smoke health effects – it likely is the largest cause of health impacts and premature deaths from wildfire – the technical problem is difficult enough that there is widespread desire to defer this issue and to move it to another agency if possible.[41]

Accordingly, none of the 2026-2028 IOU WMPs refer to wildfire smoke health risks at all. Even SDG&E removed its wildfire smoke correction from its consequence model.[42]

MGRA has provided substantial evidence that wildfire smoke effects are likely the largest harm done by utility wildfires, larger even that direct casualties.[43] OEIS through the RMWG has de-emphasized the importance of this issue because it is hard to solve correctly and requires

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[40] MGRA 2022 WMP Comments; MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2022 WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; April 11, 2022; pp. 47-52.
[41] WMPs-2023-2025; MGRA WMP Comments; p. 125.
[42] SDG&E 2025 RAMP; p. RAMP-2-9.
[43] MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2022 WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; April 11, 2022; pp. 47-50. (MGRA 2022 WMP Comments)

external resourcing. Consulting group E3, however, in its review of PG&E's risk model agrees with the importance of wildfire smoke modeling and urges that some form of it be incorporated: "*E3 recommends that PG&E, in collaboration with the State and other IOUs, consider a simple, standardized statewide approach to model the consequences of smoke from utility-caused wildfires. Because smoke is a complex, computationally expensive consequence to model, standardizing a simple statewide modeling approach would prove beneficial to all utilities and State agencies considering the health consequences of wildfire smoke….*
If smoke were to be incorporated in the consequence score, careful consideration would need to be given to how this might impact the geospatial distribution of consequence. For example, the consequences related to smoke would likely be more concentrated in highly populated areas. The consequence score is main driver of the risk tranche assignment for circuit segments (e.g. only circuit segments in the top two quintiles of consequence are considered to be in the top eight risk tranches)."[44]

While using crude average approximations such as acres-to-fatality are likely to be highly inaccurate, and at some level wrong, including them is ***<u>significantly less wrong</u>*** than ignoring the problem entirely, as E3 acknowledges.

Recommendation:

- Energy Safety should revisit the issue of wildfire smoke risk in its RMWG, and devise an action plan that will lead to a methodology to approximate wildfire smoke health risks and a pathway that will lead to improving accuracy of the estimate over time.
- SCE and other utilities should in the meantime be encouraged to include in their consequence estimates wildfire smoke estimates using an acres-to-fatalities approximation linked to best available literature.

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[44] E3 Review of PG&E's Wildfire Risk Model Version 4; July 2024; pp. 57-58.
TN15651_20250416T163442_WMPDiscovery20262028_DR_OEIS_001Q027Atch01.pdf

5.3. Design Basis Scenarios

The "Design Basis Scenarios" instruction provided by Energy Safety is extensive and detailed. According to OEIS:

"*The design scenarios identified must be based on the unique wildfire risk and reliability risk characteristics of the electrical corporation's service territory and achieve the primary goal and stated plan objectives of its WMP. The design scenarios must represent statistically relevant weather and vegetative conditions throughout the service territory.*"[45] These scenarios include 1) wind conditions of increasing severity as timescale increases, 2) weather conditions including climate effects, and 3) vegetation conditions both current and projected. Energy Safety requests that the utility provide narrative discussion of how it will address scenarios as they arise.

SCE attempts to fulfil the WL4 Credible Worst Case Scenario by appealing to its climate history analysis: "*SCE FWD selection methodology uses weather and wind scenarios that meet these conditions for all FCZs based on observed wind and weather conditions in its 40+ year historical climatology. These include Credible Worst-Case conditions, (e.g., wind gusts with a probability of exceedance of 1 percent over the three-year WMP cycle (i.e., 300-year return interval)). See Section 5.2.2.2.2.2 and Appendix B: Supporting Documentation for Risk Methodology and Assessment for additional information*."[46]

MGRA requested additional technical information regarding the process SCE uses to project its 40+ year climate history to a 300 year return interval.[47] In its explanation, SCE describes how it computes its return interval for each of its separate Fire Climate Zones (FCZs), classifying these also by a Fire Behavior Outcome (FBO) in a Fire Behavior Matrix (FBM). Return interval for the windiest, driest FBO is calculated by counting the number of occurrences in the climate history. While this appears to be a valid way to estimate fire weather return intervals, it does not address the question of how this extrapolates from a 40+ year climate history to a 300 year return interval. It is likely that the 300 year event has not yet happened, and it is not contained in the 40+ year history. This is particularly true in light of changing climate.

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[45] SCE WMP; p. 109.
[46] SCE WMP; p. 113.
[47] DRR MGRA-SCE-004-11.

Energy Safety should probe SCE's methodology more deeply to see whether it has actually addressed the Worst Credible Event scenario.

An alternative scenario based approach for events more extreme than those in the historical record was proposed in our SDG&E and PG&E comments, and are reproduced below:

5.3.1. Extreme 100+ year fire wind event

An extreme 50+ year fire wind event would be potentially characterized by:

- Record-breaking wind gusts, sometimes in areas not typically affected by high winds
- Long duration of high winds, potentially many days.
- Potential for uncharacteristic or unstable weather behavior, including rapid changes in local weather conditions.

Primary utility response to such an event would be:

- Normal operation in areas where full path is undergrounded, however with greater potential for secondary line ignitions if these are not also undergrounded.
- General long-duration PSPS active throughout large portions of the service area.

Potential complications of such an event would be:

- Increased vulnerability to failures in circuit control systems due to the sheer number being affected.
- Areas requiring de-energization that may not have been fully sectionalized.
- Rapid changes in local weather conditions challenging operational response times.
- Extensive damage to above-ground electrical infrastructure potentially requiring mutual aid assistance.
- Long duration outages affecting the population in general, as well as critical facilities and AFN populations, potentially extending beyond current contingency plans.
- Increased dangers of sparking during re-energization and resulting wildfires.

5.3.2. Extended extreme drought exacerbated by climate change

It is also foreseeable that an extended drought, such as those California has suffered in the past decades but even more severe, may occur under climate change. In these circumstances, PG&E would face the following exacerbated risks:

- Increased tree mortality causing a greater rate of tree fall-in and vegetation contact on overhead lines.[48]
- Much greater vapor pressure deficits and dangerously low vegetation moisture for extended periods, leading to higher FPIs and extended EPSS enablement.
- Greater potential for fuel-driven rather than wind-driven catastrophic wildfires, meaning that ignition drivers unrelated to wind may make up a greater proportion of severe power line fires than observed historically.
- Greater potential for extended PSPS even in the absence of extreme winds.
- Greater potential for an extreme weather “fire siege” consisting of multiple simultaneous large wildfires (such as Southern California October 2003, Southern California October 2007, Bay and Northern California 2017, Los Angeles 2025). Even in the case that power line fires are prevented, there is the potential for multiple catastrophic large wildfires simultaneously threatening multiple transmission assets and significantly damaging distribution assets in affected areas.

Energy safety should require utilities to analyze these and other potential risks, and then for each of these fully describe the measures that the utility would take to mitigate each of those risks. Ideally these would be the subject of “tabletop” scenario exercises in coordination with Energy Safety and the Office of Emergency Services.

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[48] PG&E WMP; p. 24 ,and
WMP-Discovery2026-2028_DR_MGRA_003-Q003, cites:
Lessons from California’s 2012–2016 Drought. Jay Lund, Josue Medellin-Azuara, John Durand and Kathleen Stone. J. Water Resour. Plann. Manage., 2018:
“*Perhaps the greatest impact of California’s drought was the death of 1020 million forest trees, which depend on soil moisture accumulated in the wet season for growth during the spring and summer*.”

Recommendations:

- Energy Safety should obtain additional support from SCE explaining how it extrapolates from a 40+ year history to a 300 year return interval.
- Utilities should be at the least required to provide operational and contingency scenarios showing how they will be prepared to protect the public in the event of extreme events. Examples are 100+ year wind events and extreme extended drought.

7. PUBLIC SAFETY POWER SHUTOFF (PSPS AND EPSS)

The addition of PSPS to the wildfire mitigation portfolio significantly reduces the potential for catastrophic wildfire ignitions. In PG&E's service territory, where tree fall-ins constitute a higher overall risk to covered conductor, PG&E estimates that covered conductor, EPSS+DCD, and PSPS can reduce wildfire risk by 97%.[49] Similarly, SDG&E estimates that covered conductor + PEDS + FCD + PSPS can reduce wildfire risk by 97.7%.[50] SCE estimates that its CC++ mitigation suite in combination with REFCL can reduce ignition risk by 95%,[51] so net benefit with PSPS would be expected to be significantly higher for that of SDG&E, reaching near equivalence of undergrounding risk reduction.

Once the wildfire risk is reduced, PSPS and PEDS risk constitute a larger component of overall risk. Reduction of PSPS risk and EPSS risk in a cost-effective manner without increasing wildfire risk would be a great benefit. Last year's MGRA WMP comments showed that for PG&E and SDG&E undergrounding projects to date, the reduced PSPS/EPSS risk was insignificant compared to the substantial costs of undergrounding, introducing the notion that it would be most cost efficient in many if not most cases to provide remote rural residents on sparsely populated circuits with the capacity to go off grid rather than spend the money on undergrounding projects.[52]

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[49] PG&E WMP TABLE PG&E-6.1.3-1; p. 126.
[50] SDG&E DRR MGRA-2026-8-04-13.
[51] SCE DDR MGRA-SCE-004-5.
[52] MGRA 2025 WMP Update Comments; pp. 29-39. Also see workpaper WMP25/ SDGE Response MGRA-SDGE-2025WMP-03_Q2_Revised 4.19.24-TUGCustomers-jwm.xlsx. This shows an imputed CMI break-even for undergrounding using historical customer outages between $0.54 and $29.

Recently, the independent HAAS group working out of Berkeley performed an independent analysis of PG&E's wildfire issue and found that dynamic EPSS (PEDS) was an economically more efficient way to reduce risk than vegetation management or hardening.[53]

It is essential to understand as additional hardening projects are planned that while improving reliability and preventing unnecessary power loss is a public good, the power of PSPS and EPSS (particularly with REFCL which partially addresses the tree fall-in vulnerability of covered conductor) cannot be easily and cheaply dispensed with. Raising shutoff thresholds on hardened systems can go a long way to reducing the scope, duration, and frequency of PSPS events. Monitoring effectiveness using post-event damage surveys as a probe provides feedback as to where these changes can be made safely.

Recommendations:

- SCE should further investigate the feasibility of further raising thresholds on circuits where both covered conductor and REFCL are installed.

7.1. Recent PSPS Effectiveness

In 2024, SCE issued six CPUC Post Event Reports for which circuits were de-energized.[54] Two of these events, the November 4th and December 9th events entailed widespread and prolonged outages. SCE's Post-Season Report lists damage reports for 11 circuits associated with its November 4, 2024 outage.[55] However, examination of SCE's QDR data shows three additional reports from the November 18th and December 4th events not mentioned in its Post-Season Report.

In addition to measures to reduce PSPS impacts SCE lists in Section 7.1, it should provide in updates and QDRs:

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[53] Warner, C., Callaway, D., Fowlie, M., n.d. Dynamic Grid Management Technologies Reduce Wildfire Adaptation Costs in the Electric Power Sector (No. WP-347R). https://haas.berkeley.edu/wp-content/uploads/WP347.pdf

[54] R.18-12-005; SOUTHERN CALIFORNIA EDISON COMPANY'S (U 338-E) 2024 PSPS POST-SEASON REPORT; May 1, 2025. (SCE Post-Season Report)

[55] Id; p. 17.

- Visibility into wind speed measurement used for triggering shutoff (specifying station or LFO location and wind speed) in reporting and QDRs.
- Reporting on sectionalization and projected reductions of PSPS impacts for each circuit.
- Reporting on deployment of additional weather stations to support sectionalization in diverse topography.

As with the MGRA PG&E and SDG&E WMP Comments, MGRA analyzed weather station data in the vicinity of the reported damage points (within 3 miles), and calculated peak wind gust recorded by any station in the 72 hours prior to the reported damage time. MGRA's analysis also incorporates cause data from SCE's 2024 Post-Season Report.

The results from the MGRA analysis are shown below. Damage/risk events are color coded by SCE's ranked risk tier for the circuit on which the damage occurred (Top 5% and Bottom 80%).[56] The numeric values show the maximum wind speed measured by any weather station within 3 miles of the damage within 72 hours of the damage report.[57] SCE's "High Wind" Severe Risk Area from its IWMS categorization is also shown. Events with nearest primary circuit designated as "Covered Conductor" are displayed as circles, whereas those designated as bare wire are shown as squares. The SCE PSPS damage report sometimes does not indicate whether the damage occurred to primary or secondary equipment, and does not describe the damage with the specificity of the ignition reports. Providing additional specificity in the damage reports, whether the damage might have led to an ignition, and whether mitigation would have prevented ignition (for CC and CC + REFCL/DCD/FCD) will further help determine whether and where shutoff thresholds might be raised further.

[56] Obtained in SDG&E DRR MGRA-2026-8-04-19.
[57] See supplemental file SCE_PspsEventDamagePoint_2024.xlsx, Tab SCE24WIND. Wind analysis was performed using the M-bar Technologies and Consulting, LLC wind analysis suite.

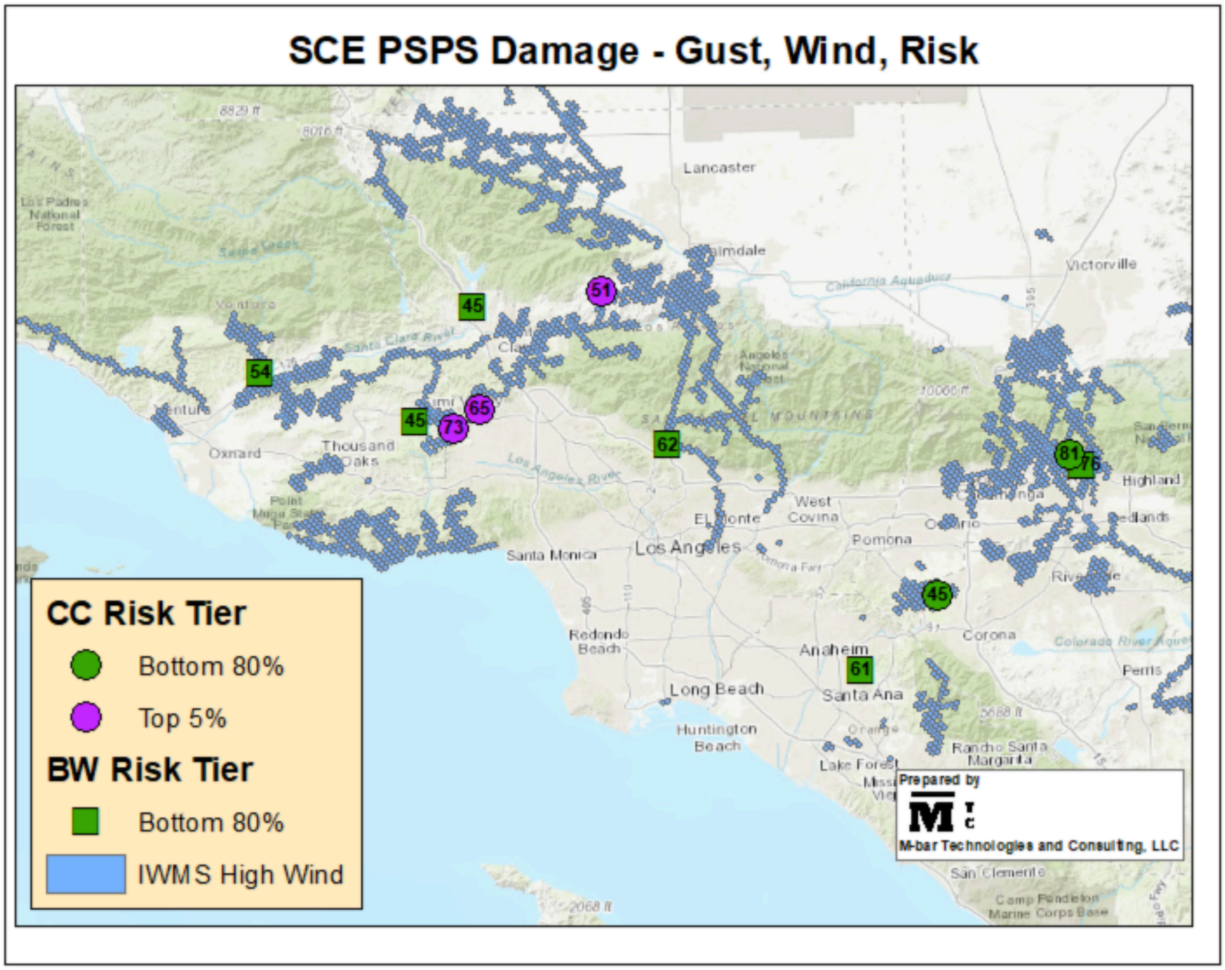

Figure 4 - SCE damage events identified in post-PSPS inspections. SCE's circuit risk tier is identified by color coding. The numeric values are the maximum wind gust speed in mph recorded by ground weather stations within three miles of the event in the 72 hour period prior to the damage report. Boxes indicate that nearest primary conductor is bare wire, circles indicate covered conductor.

All but two of the instances of damage reported from the post-PSPS patrols occurred in SCE's "High Wind" Severe Risk Area, indicating that this designation is predictive of potential ignition points. However, all but three of the events occurred in the bottom 80% of SCE's risk ranking. The other three events were ranked in SCE's highest 5% risk tier, and furthermore were all associated with covered conductor circuits. One of these events occurred with local wind speeds not exceeding 51 mph, and should be investigated further as this is below SCE's threshold for shutoff of hardened circuits. A list of the events, wind speeds, and causes is shown below. No causes were specified for events from the mid-November or December shutoffs.

ID: Date_Circuit	Max Gust (mph)	CC?	Cause
11-04-2024_ARABIA	61	BW	Secondary pole down by wind
11-04-2024_BROADCAST	62	BW	Damaged equipment
11-04-2024_CALSTATE	62	Covered	Damaged/Broken OH Primary Wire
11-04-2024_CARMELITA	76	BW	Damaged wire
11-04-2024_CASTRO	54	BW	Damaged wire and equipment
11-04-2024_DAVENPORT	51	Covered	Broken wire
11-04-2024_ENERGY	73	Covered	Damaged Broken OH Primary Connections
11-04-2024_GUITAR	45	BW	Broken tap and transformer
11-04-2024_MORELAND	45	BW	Damaged/Broken OH Primary Wire
11-04-2024_STUBBY	69	BW	Broken primary tap
11-04-2024_WARHAWK	45	Covered	Broken wire
11-18-2024_BIRCHIM	74	BW	
12-14-2024_CALSTATE	81	Covered	
12-14-2024_ENERGY	65	Covered	

Table 3 - SCE 2024 PSPS risk events, along with causes listed in SCE's Post-Season Report and wind gusts calculated using M-bar Technologies and Consulting, LLC analysis available in Github. Wind gusts are the maximum measured at any weather station reported by Synoptic in the 72 hours before the damage event was attributed by SDG&E and within 3 miles of the reported damage event. Complete results can be found in Workpaper SCE_PspsEventDamagePoint_2024.xlsx, tab SCE24WIND. Nearest primary conductor type was obtained by finding nearest primary conductor segment to the damage point using GIS (Arc Map 8.2).

Damage events found during patrols after PSPS events are an important tool for probing risk in the service area where and when ignition and outage events are not collected due to PSPS. Analysis of these events can help to determine whether shutoff thresholds are reasonable and whether equipment failures are occurring below design tolerances. It is also an indication of whether vegetation management has been adequate. It can also indicate whether the utility's risk calculation is adequately representing probability of ignition in its risk calculations. Regarding SCE's 2024 PSPS damage reports:

- SCE's "High Wind" SRE is highly predictive of damage locations.
- Most damage nevertheless occurs in areas outside of SCE's highest risk tiers.
- No vegetation-related damage was reported.
- Damage in areas with moderate to high rather than extreme winds occurred on a number of circuits, meriting further attention.

- In two instances damage was reported on equipment with covered conductor being the nearest primary circuit and for which wind gust speeds above PSPS threshold for covered conductor occurred within the previous 72 hours within 3 miles.
- There are inconsistencies between SCE's Post-Season report and SCE's QDR GIS data reported to Energy Safety.

Recommendations:

- Energy Safety should require that PSPS damage reports display the same level of specificity as ignition reports, and include whether it occurred on primary or secondary equipment, and also the type of conductor on the nearest segment. It should also inquire whether 1) the damage may have led to ignition 2) covered conductor would have prevented the ignition, and 3) covered conductor + REFCL/DCD/FCD would have prevented the ignition.
- The 11-04-2024_DAVENPORT and 11-04-2024_WARHAWK events should be investigated further because they occurred when local wind speeds did not exceed SCE shutoff thresholds and possibly design standards.
- SCE should resolve the difference between its Post-Season Report list of damage reports from post-PSPS patrols and the ignition damage report geospatial data reported to Energy Safety in the QDRs.

7.2. PEDS effectiveness

SCE does not explicitly state the effectiveness of PEDS in risk reduction in combination with other mitigations.[58] However: "*SCE found an ignition reduction per fault of 41% in 2021, 18% in 2022, and 55% in 2023*."[59]

7.3. Frequently De-Energized Circuits and CMI Costs

Unlike PG&E and SDG&E, SCE provided minimal data in OEIS Table 4-3. It did not project potential reductions due to mitigation, stating that "*PSPS are a function of future weather conditions and cannot be predicted with a meaningful level of certainty. Between 2023 and 2025,*

[58] SCE DRR MGRA-SCE-004-6,13.
[59] SCE WMP; p. 318.

SCE's service territory saw more extreme fire weather with each subsequent year prompting an annual increase in PSPS. If in future years current trends of extreme weather and fire conditions continue, PSPS events will continue and may increase in frequency and duration as an essential mitigation to protect public safety."[60] While possibly true, the SCE response fails to achieve Energy Safety's goal of identifying the circuits having the greatest potential gains in PSPS risk reduction through mitigation.

SCE's Table 4-3 also may be missing some 2024 data, since PSPS damage reports were submitted for the ACOSTA, CASTRO, and DAVENPORT circuits, and these were mentioned in SCE's post-season report, but Table 4-3 does not indicate any customer outage data for 2024 for those circuits..

Finally, PSPS costs should be calculated using the ICE calculator, rather than SCE's current PSPS Reliability Consequences Calculation.[61] SCE will be required to make this update for its 2026 RAMP filing, and so Energy Safety should require that SCE update its 2026 WMP Update accordingly.

Recommendations:

- SCE should be required to use historical data most expected to be predictive of future conditions (i.e. 2023 and after) to predict future PSPS risk for its circuits.
- SCE should be required to explain inconsistencies between Table 4-3 and its Post-Season Report with regard to customer hours of PSPS outage and update Table 4-3 if necessary.
- Energy Safety should require SCE to update all calculations and tables related to PSPS risk once it has the ICE model into its PSPS consequence framework.

7.4. Notifications

SCE notes in its Lessons Learned that "*The 2023 and 2024 PSPS seasons had PSPS events in which SCE experienced a high volume of missed notifications. Some of the missed notifications were due to emergent weather that resulted in SCE de-energizing without enough time to send*

[60] SCE WMP; p. 618.
[61] SCE WMP; p. 98.

notifications within the required timeframe. To improve its notifications during a PSPS event, SCE is expanding its machine learning modeling capabilities to enhance forecast accuracy with the goal of being able to more precisely predict when and where PSPS thresholds might be met so that appropriate notifications can be sent to customers in the required timeframes."[62]

Cal Advocates is not participating in this phase of the WMP review, however within the Commission framework they issued comments that were highly critical of SCE's notification process and has called for the Safety and Enforcement Division to submit a Corrective Action Plan for SCE.[63] Cal Advocates compares SCE's performance with regard to notification with SDG&E and PG&E in the table below:

Table 1: Total Notification Failure Counts for PG&E, SCE, and SDG&E since 2022.[10]

Year	PG&E	SCE	SDG&E
2022	4,198	34,171	0
2023	4,738	82,212	0
2024	10,561	64,435	6,330
2025[11]	640	385,588	12,266

Table 4 - PSPS notification failure counts for the three major California utilities from 2022 to January of 2025.

It is evident that SCE has serious issues with its notification procedures that far exceeds that of other IOUs. As notification is critical for customer safety and convenience, Wildfire Safety should also require SCE to report on how it will improve its notification performance.

Recommendation:

- Energy Safety should require SCE to file a corrective action plan to address its notification failures, potentially the same plan requested by Cal Advocates in Commission proceeding R.18-12-005.

[62] SCE WMP; p. 212.

[63] A.18-12-005; COMMENTS OF THE PUBLIC ADVOCATES OFFICE ON SOUTHERN CALIFORNIA EDISON COMPANY'S 2024 PUBLIC SAFETY POWER SHUTOFF POST-SEASON REPORT; May 21, 2025.

7.5. Fast Curve / PEDS Consequences

MGRA requested that SCE further explain its calculation of Fast Curve / PEDS consequences, which in its WMP it states it: "*derived PEDS likelihood by using the last 5-year historical outages on Fast Curve-enabled circuits, while also considering that Fast Curve settings were installed and are enabled at different times of the year. These historical events are used to establish a baseline regarding the frequency and duration of outage conditions on individual circuits…*"[64]

SCE provided the following detail:

"*PEDS likelihood is calculated at the circuit level by averaging the last 5 years of historical outages on Fast Curve-enabled circuits. The detailed process is as follows:*

1. Filter for the last 5 years of historical outages on Fast Curve-enabled circuits.

2. For each circuit and each year,

a. Calculate the proportion of the year that the circuit had Fast Curve installed.

• i.e., If Fast Curve was installed July 1, 2021, then the 2021 percentage would be 0.5. It would be 0 for previous years and 1 for subsequent years.

b. Count the number of historical outages that occurred while Fast Curve was enabled.

• If the circuit did not have Fast Curve installed in that year, the count would be N/A.

3. For each circuit and each year, multiply the proportion of the year with Fast Curve (step 2a) by the outage count (step 2b) to get the outage value of the portion of the year.

4. Finally, calculate the average of the adjusted outage count (step 3) across the years for each circuit."[65]

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[64] SCE WMP; p. 78.

[65] DRR SCE MGRA-SCE-004-12.

8. GRID DESIGN AND SYSTEM HARDENING

8.2. SCE's Covered Conductor Program

8.2.1. Covered conductor and undergrounding

In its 2025 Update WMP comments, MGRA raised the concern that based on SCE's GRC request it appeared to be ramping down its covered conductor program, and recommended that Energy Safety support continuing that program. MGRA's Comments also reiterated a suggestion made in SCE's GRC that SCE reduce its targeted undergrounding program by 2/3 and instead deploy covered conductor.[66]

In the current WMP, SCE has moved toward a balance of covered conductor and undergrounding. SCE writes that it "*is planning to replace 440 overhead circuit miles with covered conductor. Under its targeted undergrounding program, SCE is also planning to convert 260 miles of overhead distribution lines to underground lines*"[67] in the 2026-2028 timeframe. SCE is also not planning at this time to submit a 10-year undergrounding plan (EUP) under provisions of Senate Bill 884.[68] However, "*SCE plans to be substantially finished with proactive covered conductor installation in its HFRA by the end of this WMP cycle*."[69]

SCE expresses a "default to underground" preference in its designated Severe Risk Areas: "*Therefore, undergrounding is preferred unless covered conductor has already been installed or specific terrain or local issues require alternatives such as covered conductor with supplementary mitigations*."[70] As discussed in Section 5.1, SCE's IWMS model is not really a risk model, but a consequence-only model. SCE's MARS risk model should be modified to incorporate valid considerations that are identified in the IWMS framework. Specifically, egress models should be quantified so that they can be incorporated into risk models. Also, when high wind areas are analyzed with an ignition model that incorporates the amplifying effect of wind on outage probability high wind areas will have large associated risk. As discussed in previous filings, there is

[66] MGRA 2025 WMP Update Comments; pp. 39-42.
[67] SCE WMP p. 3.
[68] SCE DRR MGRA-SCE-004-2.
[69] SCE WMP; p. 225.
[70] SCE WMP; p. 176.

no dispute that areas with limited egress and areas with high winds need highly effective mitigation and need to be prioritized. That undergrounding is the best choice for these circuits still needs to be demonstrated.

8.2.2. SCE covered conductor ignition reduction efficiency

Covered conductor is a highly effective wildfire mitigation. As SCE states: "*Zero ignitions have occurred from the drivers mitigated by covered conductor at locations where covered conductor is deployed.*"[71] Nevertheless, ignitions occur from many causes and it is important to quantitatively estimate how much covered conductor reduces this risk.

MGRA provided its analysis of SCE's ignition data for both covered conductor and unhardened overhead lines in its 2025 WMP Update comments.[72] SCE has provided additional data for 2024[73] and MGRA presents it and its analysis in the following sections.

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[71] SCE WMP; p. 223.
[72] MGRA 2025 WMP Update Comments; pp. 21-23.
[73] SCE did not provide data consistent with data provided in past proceedings, and a workaround was attempted using GIS ignition data. SCE DRR MGRA-SCE-003-1, MGRA-SCE-005-2. Workpapers are in WMP26/SCE. MGRA analyzed GIS data with regard to primary distribution lines and ignitions provided in response to SCE DRR MGRA-SCE-001 to determine number of actual ignitions by conductor type. MGRA requested additional validation and a complete list of reported ignitions and received them in DRR MGRA-SCE-007-2. The results are tallied in WMP26-8_MGRA-SCE-05_Q1-CCUG-WD-Ign-jwm.xlsx. Further description of the analysis is on the README tab. Previous version without SCE validation is stored as WMP26-8_MGRA-SCE-05_Q1-CCUG-WD-Ign-SDGE-jwm.xlsx.

8.2.2.1. Using previous data, GIS, and SCE validation

	2019	2020	2021	2022	2023	2024	Total/Avg
Bare Wire (BW) Miles	8,952	7,992	6,492	5,093	3,873	3,077	
CC Installed Miles	372	1,332	2,832	4,231	5,451	6,247	
Total	9,324	9,324	9,324	9,324	9,324	9,324	
BW HFTD Ignitions	37	49	46	36	15	12	191
CC HFTD Ignitions	0	1	2	5	3	10	15
BW Ignitions/mi-yr	0.0041	0.0061	0.0071	0.0071	0.0039	0.0039	0.00550
CC Ignitions/mi-yr	0.00000	0.00075	0.00071	0.00118	0.00055	0.00160	0.00103
BW/CC		8.17	10.03	5.98	7.04	2.44	5.36
Reduction %		87.8%	90.0%	83.3%	85.8%	59.0%	80.8%

Table 5 – SCE data on ignitions for its bare wire (BW) and covered conductor (CC) circuits updated to include 2024 data. See fn. 73. Calculations assume that the total mileage of covered conductor deployed is tracked accurately, and that remaining conductor is bare wire. SCE provided 2019-2023 data in previous proceedings. SCE's 2024 deployed mileage is calculated from their DR responses, while number of reportable HFTD ignitions on bare wire and covered conductor was calculated from SCE's GIS data. Entries are weighted for amount of CC and BW deployed each year, allowing an ignition rate for each to be calculated, and an estimate of CC ignition reduction. See WMP26-8_MGRA-SCE-05_Q1-CCUG-WD-Ign-jwm.xlsx, Tab Ignitions_2024Method.

The 2024 data continues to show a high efficiency of ignition reduction for covered conductor, though not as high as in previous years, at 59% in 2024 compared to bare wire as opposed to a historical average of 80.8%. SCE explains that "*2024 also saw an increase in ignitions across California due to drier vegetation after more precipitation in 2022 and 2023, which can be seen by taking the delta in the bare wire HFRA & Non-HFRA tabs irrespective of covered conductor being installed*."[74] This is shown in the figure below:

[74] SCE DRR MGRA-SCE-007-1.

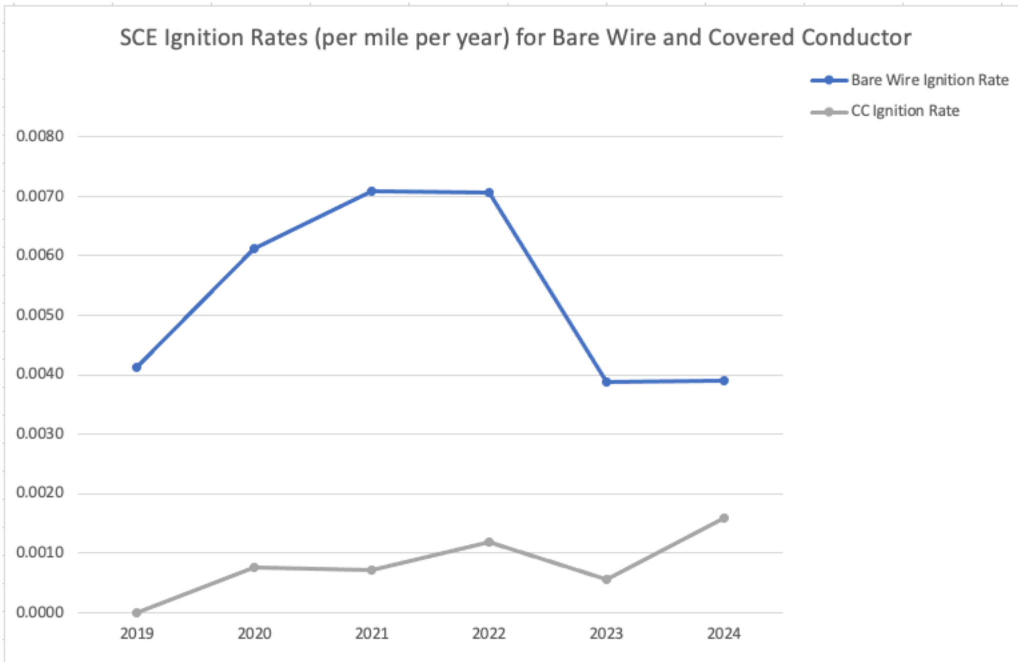

Figure 5 – SCE HFTD ignition rates per mile for covered conductor and bare wire from 2019 to 2024.[75]

SCE does not believe that this is due to a negative trend in covered conductor but rather that "*over time, more covered conductor is installed in our system and therefore a higher number of ignitions where covered conductor is installed can occur from failures such as vehicles hitting poles, lightning strikes, and other non-covered conductor equipment failures*."[76] Indeed, the causes of the 2024 covered conductor ignitions were animal contact (3), vehicles (2), lightning, fuse, and transformer. Two ignitions merit attention, since they might be expected to be from drivers related to high winds: one from vegetation contact and the other from an anchor/guy failure.

Since the submission of MGRA's PG&E WMP Comments and MGRA's SDG&E WMP Comments, further clarification of the definition of conductor type and reportable events was made and additional ignitions added to the history. This resulted in the predicted ignition reduction effectiveness dropping from 85% in the previous filings to 80.8% in the current filing.

8.2.2.2. Using SCE 2025 methodology for ignition rates

SCE ignition data from later MGRA data requests shows fewer historical ignitions than previous data request responses, particularly in bare wire data. The exact difference in how SCE is

[75] Op. Cite.
[76] SCE DRR MGRA-SCE-007-1.

now filtering its ignition data versus its previous method has not been clarified. The data is provided in workpapers MGRA_SCE_006_6_1a.xlsx and WMP26-8_MGRA-SCE-05_Q1-CCUG-WD-Ign-jwm.xlsx Tab Ignitions_SCE_DR6-7, and summarized below:

	2019	2020	2021	2022	2023	2024	Total/Avg
Bare Wire (BW) Miles	8,952	7,992	6,492	5,093	3,873	3,077	
CC Installed Miles	372	1,332	2,832	4,231	5,451	6,247	
Total	9,324	9,324	9,324	9,324	9,324	9,324	
BW HFRA Ignitions	38	31	25	23	9	16	142
CC HFRA Ignitions	0	1	2	3	2	13	15
BW Ignitions/mi-yr	0.0042	0.0039	0.0039	0.0045	0.0023	0.0052	0.00400
CC Ignitions/mi-yr	0.00000	0.00075	0.00071	0.00071	0.00037	0.00208	0.00103
BW/CC		5.17	5.45	6.37	6.33	2.50	3.90
Reduction %		80.6%	81.7%	84.3%	84.2%	60.0%	74.4%

Table 6 - SCE HFRA ignition data provided in MGRA_SCE_006_6_1a.xlsx. This classifies according to "nearest conductor". Ignition rates, particularly for bare wire are significantly lower than in previous data. Differences in method from previous data releases has not yet been ascertained.

The resulting ignition rate plot is shown in Figure 6.

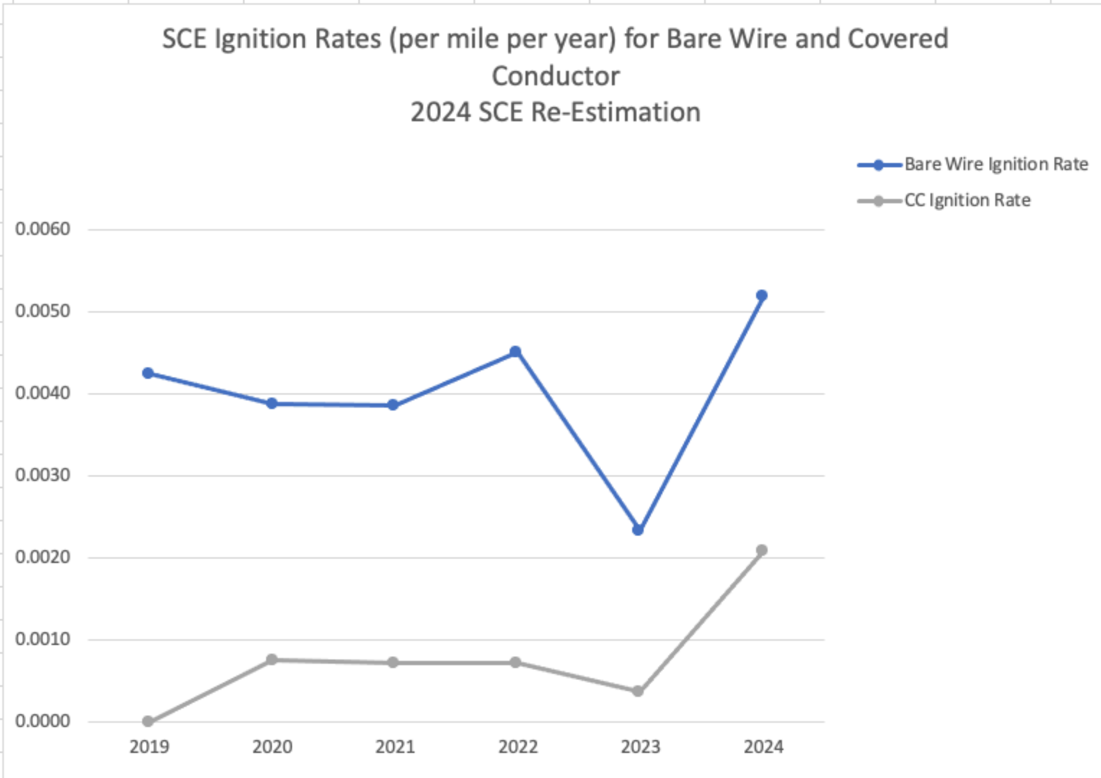

Figure 6 - SCE HFRA ignition rates from Table 6.

While the number of ignitions related to covered conductor circuits remains about the same as in previous data request responses, the number of reported "bare wire" ignitions in the 2020-2023 period has dropped substantially, leading to an average drop from 85% reported previously to 74%. The source of the discrepancy is not known at this time. There was some confusion in earlier MGRA data requests this year as to the definition of a "bare wire" and "covered conductor" circuit, but this was thought to be resolved by attributing ignitions to "nearest" conductor type. The discrepancy merits further examination.

The increase in overall ignitions in 2024 was discussed previously and attributed by SCE to increased dry conditions after a wet 2022 and 2023.

Additionally, SCE reports that the geospatial ignition data reported in its quarterly data reports (QDRs) is sometimes found to be incomplete due to the fact that further data refinement occurs after submission of the QDR. "*The QDR data includes ignitions captured at a snapshot in time and has a cut-off date near the beginning of each new quarter. The ignition review process can take time to validate information and gather additional fields associated with the ignition. In-flight reviews, based on needing to validate whether the ignition was Reportable, may limit the count* *around the time of these cut-off dates*."[77] If this process is a general statement of how SCE maintains its database and prepares QDRs, then it may be that SCE is underreporting risk events to Energy Safety. Energy Safety should inquire if this the case and if so require SCE to "true up" its historical risk event records so that OEIS has an accurate accounting.

Recommendations:

- SCE should be required to verify that the sum total of risk events provided in its QDRs match the values in its database, and to provide any "true up" deltas annually, in order to ensure Energy Safety has a full and accurate record, and that all stakeholders have access to accurate data.
- As understanding covered conductor risk reduction efficiency is a key part of wildfire safety, SCE should be required to explain bare wire ignition rate calculations that it has provided in the past and differentiate these from those it provided in its most recent data request response.
- Energy Safety should request that SCE provide information regarding how many miles of its "Severe Risk Areas" will be mitigated by the end of this WMP cycle, when SCE plans to ramp down its covered conductor program.
- High wind areas and areas with egress constraints should be given the highest priority for hardening, potentially including undergrounding.

8.2.6. Rapid Earth Fault Current Limiter (REFCL)

SCE estimates that the risk/spend efficiency for REFCL is roughly 15 times that of undergrounding or covered conductor.[78] While only 50% effective as a wildfire mitigation on its own, in combination with covered conductor SCE estimates that the ignition reduction efficiency is 95%.[79] Further coupling this combination with PSPS is likely to achieve levels of risk reduction comparable to undergrounding.

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[77] SCE DRR MGRA-SCE-007-1.
[78] SCE WMP; p. 195.
[79] SCE DRR MGRA-SCE-004-5.

Field tests have been highly successful. SCE's Ground Fault Neutralizer can act on faults as small as 0.5 ampere, and is SCE's preferred design for large substations. It has achieved 850 miles of coverage over 10 circuits as of the end of 2024.[80] So far, there has been only one ignition on a REFCL-enabled circuit, a phase-to-phase ignition caused by a mylar balloon, which REFCL GFN is not designed to mitigate.[81] However, balloon ignitions are effectively mitigated by covered conductor and on a fully hardened and equipped circuit this ignition would have been unlikely to occur. On circuits with REFCL Grounding Conversions, SCE has observed no ignitions.[82]

So far, "*SCE does not consider the presence of REFCL in PSPS thresholds. SCE may revisit this approach as REFCL deployment expands and more experience is gained with the technology*."[83]

MGRA's past WMP Comments have reviewed SCE's REFCL technical documents and noted the significant technical challenge that REFCL presents. The technology is not "plug and play" and requires highly skilled personnel. SCE's three-year target is to install 5 GFNs with a strive goal of 12 GFNs, and 8 grounding conversions with a strive goal of 18.[84] Given the positive results once REFCL is operational, Energy Safety should encourage SCE to be bold in its commitment of resources to this mitigation, particularly when planning its revenue request for its 2028 General Rate Case.

As SCE makes further progress in eliminating its wildfire risk, PSPS risk will remain for above ground circuits. Requiring the collection of additional PSPS damage data will help to assess whether mitigations such as covered conductor and REFCL can enable higher thresholds.

Recommendations:

- Energy Safety should encourage SCE to push for its strive goals for REFCL installations and to ensure its upcoming GRC requests funding for a robust program.
- Energy Safety should require that PSPS damage reports display the same level of specificity as ignition reports, and include whether it occurred on primary or

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[80] SCE WMP; pp. 246-247.
[81] Id.
[82] SCE WMP; p. 252.
[83] SCE WMP; p. 248.
[84] SCE WMP; p. 218.

secondary equipment, and also the type of conductor on the nearest segment. It should also inquire whether 1) the damage may have led to ignition 2) covered conductor would have prevented the ignition, and 3) covered conductor + REFCL/DCD/FCD would have prevented the ignition.

14. CONCLUSION

Southern California Edison's wildfire risk reduction program has been aggressive, particularly for its distribution system, and has demonstrated substantial risk reduction through its deployment of covered conductor over several thousand miles of its service area. Its REFCL program, which addresses risk drivers that are covered conductor vulnerabilities, promises further risk reduction. Like the other IOUs, SCE seeks to expand its undergrounding program and reduce dependence on covered conductor in the longer term. Unlike them, SCE does not appeal to a "risk-averse" scaling function, nor does it currently intend to submit an application for additional funding of undergrounding under the provisions of SB 884. And its undergrounding proposal is modest compared to its brethren. It has, however created a parallel risk management framework that does not represent risk at all, and is a consequence-only model. Nevertheless, this framework quantitatively flags areas of high wind risk and potential egress problems.

SCE will need to submit a RAMP application next year and will need to utilize a risk framework that can accurately calculate cost/benefit ratios, and this should be used to update its 2026 WMP. SCE should at the least incorporate its egress and AFN models into its risk framework, thus creating a complete risk model and obviating the motivation for a consequence-only framework. Risk also includes probability, including the higher probability of fault-caused ignitions during high wind events. Aggregation of weather data for consumption by machine learning models has in the past prevented PG&E and SCE ML models from accurately identifying this risk, as has "PSPS blindness" which excludes data from the most dangerous places during the riskiest periods. In this year's WMP, some of the variables associated with this wind amplification effect, specifically time-integrated force and peak winds, have shown to be the most predictive environmental variables for equipment failure, meaning that high wind areas are being given higher risk values. Despite this, equipment damage occurring during PSPS events is not well predicted by SCE's risk model but is accurately found by SCE's "High Wind" SRA designation, indicating that weighting of wind amplification in SCE's ML model may still not be sufficient.

Proving whether SCE's model of extensive covered conductor deployment is the correct path for other utilities requires that its data be accurately analyzed. Using data requests, MGRA has for several years been tracking SCE's deployment of covered conductor and ignitions that SCE associates with bare wire and covered conductor, and analysis has suggested a reduction of 85% lower rate of ignitions on circuit segments associated with covered conductor compared to bare wire. An increase in overall ignitions in 2024 would reduce this to 81%, but a different analysis by SCE has reduced the reported number of historical bare wire ignitions by a significant amount, which would lead to a lower estimate of 74%. This difference needs to be understood, as it is important for the evaluation of SDG&E and PG&E hardening programs.

Respectfully submitted this 27th day of June, 2025,

By: __/S/____***Joseph W. Mitchell, Ph.D.***____________________

Joseph W. Mitchell
M-bar Technologies and Consulting, LLC
19412 Kimball Valley Rd.
Ramona, CA 92065
(858) 228-0089
jwmitchell@mbartek.com
on behalf of the Mussey Grade Road Alliance

15. RECOMMENDATION SUMMARY

Recommendations:

- Energy Safety should ensure that SCE's risk models adequately characterize risk, not just consequence, and therefore IWMS risk analyses such as egress model should be integrated into MARS.
- Energy Safety should require SCE to conduct an external third-party review of its data and risk models.
- Table 3-1 should contain percentage risk as well as percentage ignitions.
- Energy Safety should inquire further into ignition drivers for which large differences are seen between Table 3-1 and recent QDR geospatial data, specifically "Other Contact", "Other Equipment", "Insulator and bushing", animal, balloon, vegetation, and transformer.
- SCE's Table 3-1 needs to differentiate and prioritize primary risk factors in its "Topological and Climatological Risk Factors" column.
- SCE should explore the explanatory power of variables representing material fatigue relationships, which may go as the third or fourth power of wind speed.
- SCE should break out "Other Contact" into its own sub-driver once sufficient statistics are available in order to capture integrated stress/strain damage (Log_WindForce or higher power of velocity), in order to identify the risk from wind damage to third-party equipment.
- SCE should attempt to create a complete risk model that incorporates both probability of ignition and still addresses extreme consequence potential identified by its IWMS framework.
- SCE should issue an update to its attempts to incorporate PSPS damage data both in its planning and operational models in its 2026 WMP Update.
- SCE should adopt 24 hour burn simulations in its wildfire consequence model.
- SCE's egress model should use a wildfire intensity/risk metric other than wildfire frequency.
- SCE's egress model should be incorporated into its MARS risk model and also used for operational decision-making.

- SCE should explore a more objective means to weight risk to AFN populations, one that accurately represents the overrepresentation of elderly and AFN in historical wildfire fatality statistics.
- Energy Safety should revisit the issue of wildfire smoke risk in its RMWG, and devise an action plan that will lead to a methodology to approximate wildfire smoke health risks and a pathway that will lead to improving accuracy of the estimate over time.
- SCE and other utilities should in the meantime be encouraged to include in their consequence estimates wildfire smoke estimates using an acres-to-fatalities approximation linked to best available literature.
- Energy Safety should obtain additional support from SCE explaining how it extrapolates from a 40+ year history to a 300 year return interval.
- Utilities should be at the least required to provide operational and contingency scenarios showing how they will be prepared to protect the public in the event of extreme events. Examples are 100+ year wind events and extreme extended drought.
- SCE should further investigate the feasibility of further raising thresholds on circuits where both covered conductor and REFCL are installed.
- Energy Safety should require that PSPS damage reports display the same level of specificity as ignition reports, and include whether it occurred on primary or secondary equipment, and also the type of conductor on the nearest segment. It should also inquire whether 1) the damage may have led to ignition 2) covered conductor would have prevented the ignition, and 3) covered conductor + REFCL/DCD/FCD would have prevented the ignition.
- The 11-04-2024_DAVENPORT and 11-04-2024_WARHAWK events should be investigated further because they occurred when local wind speeds did not exceed SCE shutoff thresholds and possibly design standards.
- SCE should resolve the difference between its Post-Season Report list of damage reports from post-PSPS patrols and the ignition damage report geospatial data reported to Energy Safety in the QDRs.
- SCE should be required to use historical data most expected to be predictive of future conditions (i.e. 2023 and after) to predict future PSPS risk for its circuits.

- SCE should be required to explain inconsistencies between Table 4-3 and its Post-Season Report with regard to customer hours of PSPS outage and update Table 4-3 if necessary.
- Energy Safety should require SCE to update all calculations and tables related to PSPS risk once it has the ICE model into its PSPS consequence framework.
- Energy Safety should require SCE to file a corrective action plan to address its notification failures, potentially the same plan requested by Cal Advocates in Commission proceeding R.18-12-005.
- SCE should be required to verify that the sum total of risk events provided in its QDRs match the values in its database, and to provide any "true up" deltas annually, in order to ensure Energy Safety has a full and accurate record, and that all stakeholders have access to accurate data.
- As understanding covered conductor risk reduction efficiency is a key part of wildfire safety, SCE should be required to explain bare wire ignition rate calculations that it has provided in the past and differentiate these from those it provided in its most recent data request response.
- Energy Safety should request that SCE provide information regarding how many miles of its "Severe Risk Areas" will be mitigated by the end of this WMP cycle, when SCE plans to ramp down its covered conductor program.
- High wind areas and areas with egress constraints should be given the highest priority for hardening, potentially including undergrounding.
- Energy Safety should encourage SCE to push for its strive goals for REFCL installations and to ensure its upcoming GRC requests funding for a robust program.
- Energy Safety should require that PSPS damage reports display the same level of specificity as ignition reports, and include whether it occurred on primary or secondary equipment, and also the type of conductor on the nearest segment. It should also inquire whether 1) the damage may have led to ignition 2) covered conductor would have prevented the ignition, and 3) covered conductor + REFCL/DCD/FCD would have prevented the ignition.

APPENDIX A - MGRA DATA REQUESTS

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 1

To: MGRA
Prepared by: Jessica Vibbert
Job Title: GIS Advisor
Received Date: 3/17/2025

Response Date: 4/1/2025

Question MGRA-1-1:
Please provide for Asset Point data for Camera, Fuse, Support Structure, and Weather Station.

Response to Question MGRA-1-1:
Data is organized by quarter. See this response for all non-confidential data requested.

SCE has provided the following requested data layers deemed non-confidential for Q1 2024 in the zipped geodatabase, SCE_2024_Q1_NonConfidential.gdb:

- SCE_PrimaryDistributionLine_2024_Q1
- SCE_SecondaryDistributionLine_2024_Q1
- SCE_Camera_2024_Q1
- SCE_WeatherStation_2024_Q1
- SCE_GridHardeningPoint_2024_Q1
- SCE_Ignition_2024_Q1
- SCE_UnplannedOutage_2024_Q1
- SCE_WireDownEvent_2024_Q1

SCE has provided the following requested data layers deemed non-confidential for Q2 2024 in the zipped geodatabase, SCE_2024_Q2_NonConfidential.gdb:

- SCE_PrimaryDistributionLine_2024_Q2
- SCE_SecondaryDistributionLine_2024_Q2
- SCE_Camera_2024_Q2
- SCE_WeatherStation_2024_Q2
- SCE_GridHardeningPoint_2024_Q2
- SCE_RedFlagWarningDayPolygon_2024_Q2
- SCE_Ignition_2024_Q2
- SCE_UnplannedOutage_2024_Q2
- SCE_WireDownEvent_2024_Q2

SCE has provided the following requested data layers deemed non-confidential for Q3 2024 in the zipped geodatabase, SCE_2024_Q3_NonConfidential.gdb:

- SCE_PrimaryDistributionLine_2024_Q3
- SCE_SecondaryDistributionLine_2024_Q3
- SCE_Camera_2024_Q3
- SCE_WeatherStation_2024_Q3
- SCE_GridHardeningPoint_2024_Q3
- SCE_RedFlagWarningDayPolygon_2024_Q3
- SCE_PspsEventLine_2024_Q3
- SCE_PspsEventPolygon_2024_Q3
- SCE_PspsEventLog_2024_Q3
- SCE_Ignition_2024_Q3
- SCE_UnplannedOutage_2024_Q3
- SCE_WireDownEvent_2024_Q3

SCE has provided the following requested data layers deemed non-confidential for Q4 2024 in the zipped geodatabase, SCE_2024_Q4_NonConfidential.gdb:

- SCE_PrimaryDistributionLine_2024_Q4
- SCE_SecondaryDistributionLine_2024_Q4
- SCE_Camera_2024_Q4
- SCE_WeatherStation_2024_Q4
- SCE_GridHardeningPoint_2024_Q4
- SCE_RedFlagWarningDayPolygon_2024_Q4
- SCE_PspsEventDamagePoint_2024_Q4
- SCE_PspsEventLine_2024_Q4
- SCE_PspsEventPolygon_2024_Q4
- SCE_PspsEventConductorDamageDetail_2024_Q4
- SCE_PspsEventDamagePhotoLog_2024_Q4
- SCE_PspsEventLog_2024_Q4
- SCE_PspsEventOtherAssetDamageDetail_2024_Q4
- SCE_PspsEventSupportStructureDamageDetail_2024_Q4
- SCE_Ignition_2024_Q4
- SCE_UnplannedOutage_2024_Q4
- SCE_WireDownEvent_2024_Q4

Southern California Edison
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DATA REQUEST SET M G R A - S C E - 0 0 1

To: MGRA
Prepared by: Jessica Vibbert
Job Title: GIS Advisor
Received Date: 3/17/2025

Response Date: 4/1/2025

Question MGRA-1-2:
Provide Asset Line data for Transmission Line (as permitted as non-confidential), Primary Distribution Line, and Secondary Distribution Line.

Response to Question MGRA-1-2:
Please see the response to Question MGRA-1-1.

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 1

To: MGRA
Prepared by: Jessica Vibbert
Job Title: GIS Advisor
Received Date: 3/17/2025

Response Date: 4/1/2025

Question MGRA-1-3:
Provide PSPS Event data. Include Event Log, Event Line, Event Polygon data. Please exclude customer meter data. Provide all PSPS Event Asset Damage data. Data should include time, duration

Response to Question MGRA-1-3:
Please see the response to Question MGRA-1-1.

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 1

To: MGRA
Prepared by: Jessica Vibbert
Job Title: GIS Advisor
Received Date: 3/17/2025

Response Date: 4/1/2025

Question MGRA-1-4:
Provide Risk Event Point data, including Wire Down, Ignition, Transmission unplanned outage (as classified non-confidential), Distribution Unplanned Outage data, Distribution Vegetation Caused Unplanned Outage, Risk Event Asset Log. Attributes should include location, time, and cause information.

Response to Question MGRA-1-4:
Please see the response to Question MGRA-1-1.

DATA REQUEST SET M G R A - S C E - 0 0 1

To: MGRA
Prepared by: Jessica Vibbert
Job Title: GIS Advisor
Received Date: 3/17/2025

Response Date: 4/1/2025

Question MGRA-1-5:
Under Initiatives, please provide Grid Hardening data, including Hardening Log, Hardening Point, and Hardening Line data. Inspection data is not requested at this time.

Response to Question MGRA-1-5:
Please see the response to Question MGRA-1-1.

DATA REQUEST SET M G R A - S C E - 0 0 1

To: MGRA
Prepared by: Jessica Vibbert
Job Title: GIS Advisor
Received Date: 3/17/2025

Response Date: 4/1/2025

Question MGRA-1-6:
Under Other Required Data, please provide Red Flag Warning Day polygon data including dates and duration.

Response to Question MGRA-1-6:
Please see the response to Question MGRA-1-1.

DATA REQUEST SET M G R A - S C E - 0 0 1

To: MGRA
Prepared by: Jessica Vibbert
Job Title: GIS Advisor
Received Date: 3/17/2025

Response Date: 4/1/2025

Question MGRA-1-7:
Please provide a layer indicating calculated circuit-level risk using the methodology presented in the WMP.
a. If independent probability and consequence layers exist, please provide these independently as well.

Response to Question MGRA-1-7:
Please see the response to Question MGRA-1-1.

Southern California Edison
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DATA REQUEST SET M G R A - S C E - 0 0 1

To: MGRA
Prepared by: Jessica Vibbert
Job Title: GIS Advisor
Received Date: 3/17/2025

Response Date: 4/1/2025

Question MGRA-1-8:
If SCE maintains that providing specific data in response to the above requests would violate confidentiality as it has asserted it please provide a justification for each of the asserted violations. Likewise, if requested data cannot be provided for other reasons please provide justifications. Please expedite response to this data request to the extent required by applicable OEIS process documents.

Response to Question MGRA-1-8:
Please see the response to Question MGRA-1-1.

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 2

To: MGRA
Prepared by: Jessica Vibbert
Job Title: GIS Advisor
Received Date: 4/21/2025

Response Date: 5/5/2025

Question MGRA-2-1:
As a follow up to Data Request Response 1-5, please include grid hardening initiatives including conductor that has been undergrounded and for conductor replaced with covered conductor in 2024 and provide this as GIS data.

Response to Question MGRA-2-1:
In response to Data Request 1-5, SCE provided GIS data for Grid Hardening Point, which shows the location of grid hardening initiatives including covered conductor.

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DATA REQUEST SET M G R A - S C E - 0 0 2

To: MGRA
Prepared by: Jessica Vibbert
Job Title: GIS Advisor
Received Date: 4/21/2025

Response Date: 5/5/2025

Question MGRA-2-2:
As a follow up to Data Request Response 1-3, please reissue PSPS Event Asset Damage data, in this case including cause any sub-cause information.

Response to Question MGRA-2-2:
In response to Data Request 1-3, SCE provided GIS data for PSPS Damages where applicable. No PSPS Damages occurred during Q1 to Q3 of 2024. All PSPS Damage Feature Classes and Feature Tables were submitted for Q4 2024 as part of Data Request 1-3.

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DATA REQUEST SET M G R A - S C E - 0 0 3

To: MGRA
Prepared by: Arianne Luy
Job Title: Engineering Manager
Received Date: 5/23/2025

Response Date: 5/29/2025

Question MGRA 3-1:
Please provide an excel spreadsheet table that provides for 2023, and 2024:

a. Number of miles of fully covered conductor circuit segments in SCE's HFRA.
b. Number of miles of fully "bare wire" conductor circuit segments in SCE's HFRA
c. Number of wires down for fully covered conductor circuit segments in the HFRA.
d. Number of wires down for fully "bare wire" conductor circuit segments in the HFRA,
e. Number reportable ignitions for fully covered conductor circuit segments in the HFRA.
f. Number reportable ignitions for fully "bare wire" conductor circuit segments in the HFRA.

Response to Question MGRA 3-1:

Please see the attached file labeled *MGRA-SCE-003 Q1.xlsx*. The spreadsheet includes two tabs: "HFRA Only Events" and "HFRA & Non-HFRA Events." The "HFRA Only Events" tab includes wire down and ignition information that occurred only in HFRA; however, note that the miles of fully covered and fully bare circuits will include miles in both HFRA and non-HFRA areas since some of the HFRA circuits may traverse through non-HFRA. The "HFRA & Non-HFRA Events" tab includes wire down and ignition information that occurred in HFRA and non-HFRA areas. The "HFRA Only Events" tab can be considered as a subset of the totals in the "HFRA & Non-HFRA Events" tab.

Note that previous data provided for "Year End 2019" through "Year End 2022" are included in the spreadsheet. The mileage counts of fully covered and fully bare circuits for these years were updated in the spreadsheet to reflect the current mileage counts of these circuits. There may be some differences in the miles due to changes in SCE's system (e.g., circuit extensions, line removals, etc.).

Please also note the following:

- SCE tracks this data at the HFRA circuit level. Therefore, the data provided will be provided at the HFRA circuit level.
- HFRA circuits are circuits that are completely in HFRA or have any portion of circuit miles in HFRA.

- A circuit is considered fully covered if covered conductor is installed on the entire circuit, including applicable non-HFRA portions. Therefore, the miles provided may include installations in non-HFRA areas.
- A circuit is considered fully bare if covered conductor is not installed on any portion of the circuit. Note that fully bare HFRA circuit miles will include miles outside of HFRA.
- Fully covered and fully bare circuit classifications are based on their status as of January 1st for each year.

DATA REQUEST SET M G R A - S C E - 0 0 3

To: MGRA
Prepared by: Trang L Woo
Job Title: Engineer 3
Received Date: 5/23/2025

Response Date: 5/29/2025

Question MGRA 3-2:
Please provide an excel spreadsheet table that provides for 2019, 2020, 2021, 2022, 2023, and 2024:

a. Number of outages attributable to infrastructure on fully "bare wire" conductor circuit segments in the HFRA.
b. Number of outages attributable to infrastructure on fully covered conductor circuit segments in the HFRA.

Response to Question MGRA 3-2:

Number of Outages (HFRA)		
Year	Fully Covered Conductor	Not Covered Conductor[1]
2019	0	10,545
2020	0	5,707
2021	77	4,116
2022	120	2,701
2023	193	1,803
2024	312	1,248

***Includes both momentary and sustained outages**

[1] The figures in this column include outages attributable to infrastructure on circuit segments that are not fully Covered Conductor, including but are not limited to circuit segments with bare wire such as aerial cable.

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DATA REQUEST SET M G R A - S C E - 0 0 3

To: MGRA
Prepared by: Kevin Arlic
Job Title: Senior Manager
Received Date: 5/23/2025

Response Date: 5/29/2025

Question MGRA 3-3:
Has SCE analyzed or studied covered conductor degradation over time? If so please provide data and analysis.

Response to Question MGRA 3-3:
Please see the section titled "Joint IOU Grid Hardening Working Group Report" in SCE's 2026-2028 Wildfire Mitigation Plan (WMP). Beginning on page 658 of SCE's WMP is a summary of SCE's research on covered conductor degradation over time. SCE also participated in certain third-party testing of covered conductor in 2022. Please see the "IOU CC Testing Report Redacted (PDF)" under supporting documents on sce.com/wmp for the related data and analysis from that testing.

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DATA REQUEST SET M G R A - S C E - 0 0 3

To: MGRA
Prepared by: Boonping Goh
Job Title: Advisor
Received Date: 5/23/2025

Response Date: 5/29/2025

Question MGRA 3-4:
With regard to OEIS Table 4-3, please provide a version adding columns that specify the number of Residential, Small Commercial and Medium/Large Commercial customers associated with each circuit current as of 2024.

Response to Question MGRA 3-4:
SCE objects to MGRA's request on the basis that SCE does not have readily available information responsive to this request. SCE tracks and provides information in its PSPS reports consistent with the CPUC's requirements. SCE does not generate or use in the ordinary course of its PSPS operations or record-keeping all the data as requested by MGRA. More specifically, SCE's customer data by circuit does not currently differentiate between small/medium/large commercial customers. Customer types provided in SCE's publicly filed ESRB-8 Post Event Reports provide the lowest granularity currently available. As such, this request seeks the creation of new studies, analyses, and/or presentation of data in formats that do not exist.

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DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Scott Scudder
Job Title: Senior Manager
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-1:
MGRA-4-1 With regard to SCE's response to MGRA-SCE-003-Q.3-4 and OEIS Table 4-3, please provide a version of the Excel file adding columns that specify the number of Residential and Commercial (of any type) customers associated with each circuit current as of 2024.
Hardening

Response to Question MGRA-4-1:

The customer counts provided in this request represent the total number of unique customer identifiers currently present on the circuit. SCE provides the following attachment "MGRA-SCE-004 4-1 Circuit_Residential_Commercial.xlsx" which is a list of circuits provided in 2025-06-02 SCE 2026-2028 Base WMP Errata updated Table 4-3 with the total circuit "Residential" and "Commercial" customer counts provided. Note that circuits with fewer than 15 customers are marked as "Confidential" under the "15/15 Rule."

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DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Kyle Ferree
Job Title: Senior Advisor
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-2:
MGRA-4-2 Is SCE currently planning to submit a 10-year undergrounding plan as permitted under SB-884?
a. If the answer is 'yes', provide a projected timeframe if possible.

Response to Question MGRA-4-2:
At this time, SCE does not plan to submit a 10-year undergrounding plan under SB-884.

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DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Tae H Kim
Job Title: Data Scientist
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-3:
MGRA-4-3 Table 6-3 shows that SCE has determined that forward-looking effectiveness of covered conductor (CC) will be 60% versus its historically calculated 72%.
Please provide a table that shows for each of SCE's ignition risk drivers, using its historical estimates:
a. SCE's calculated effectiveness of covered conductor for the driver,
b. Percent of wildfire risk represented by the driver (these should total to 100%),
c. Residual risk percentage after CC mitigation of that driver (these should total to 28%).

Response to Question MGRA-4-3:
To derive a mitigation effectiveness value for covered conductor, SCE first evaluates the ability for covered conductor to mitigate each risk sub-driver. In most cases, these sub-driver effectiveness values for covered conductor have not changed (refer to the ME % columns in the table below). However, to produce an overall mitigation effectiveness value, SCE weights these sub-driver mitigation effectiveness values against the distribution of historical ignitions associated with each sub-driver.

As seen in the table below, the sub-driver mitigation effectiveness values developed in the past are very similar to those from SCE's 2026-28 WMP. The weighting factors, though, are not the same; the 72% historical estimate used weights based on a historical range of CPUC reportable ignitions from 2015-2018, whereas the weights applied in this 2026-2028 WMP are based on a historical range of all ignitions associated with SCE equipment (not just those that reach the level of CPUC reportable) from 2019-2024. As seen in the table below, weights for CFO-related sub-drivers have decreased, generally in line with SCE's deployment of covered conductor.

Finally, SCE applied a quality factor to the mitigation effectiveness values for covered conductor to account for potential issues in the field. SCE will re-evaluate this factor and mitigation effectiveness values on a regular basis to account for new information and more recent ignition data.

Table 3-1 of SCE's 2026-28 WMP provides a list of Risks and Risk Drivers.

Driver Type	Subdriver	Subdriver ID	ME% 26-28 WMP	ME% w/QC Factor 26-28 WMP	Weight Factor 26-28 WMP	Historical ME%	Historical Weight Factor
D-CFO	Veg. contact - Distribution	DCFOVEG	71%	65%	*3%*	71%	*16%*
D-CFO	Animal contact - Distribution	DCFOANI	65%	60%	*6%*	65%	*12%*
D-CFO	Balloon contact - Distribution	DCFOBAL	99%	91%	*5%*	99%	*16%*
D-CFO	Vehicle contact - Distribution	DCFOVEH	82%	75%	*4%*	82%	*10%*
D-UNK	Unknown - Distribution	DUNKUNK	65%	60%	*2%*	65%	*10%*
D-CFO	Other contact from object - Distribution	DCFOOTH	77%	71%	*18%*	77%	*6%*
D-WTW	Wire-to-wire contact / contamination - Distribution	DWTWWTW	99%	91%	*1%*	99%	*3%*
D-EFF	Conductor damage or failure - Distribution	DEFFCON	90%	83%	*8%*	90%	*7%*
D-EFF	Connection device damage or failure - Distribution	DEFFCDV	90%	83%	*3%*	90%	*5%*
D-EFF	Crossarm damage or failure - Distribution	DEFFXRM	50%	46%	*4%*	50%	*1%*
D-EFF	Fuse damage or failure - Distribution	DEFFFUS	2%	2%	*2%*	0%	*1%*
D-EFF	Insulator and bushing damage or failure - Distribution	DEFFINS	90%	83%	*23%*	90%	*4%*
D-EFF	Other - Distribution	DEFFOTH	15%	14%	*6%*	15%	*5%*
D-EFF	Recloser damage or failure - Distribution	DEFFREC	5%	5%	*0%*	0%	*0%*
D-EFF	Switch damage or failure - Distribution	DEFFSWI	2%	2%	*2%*	0%	*1%*
D-EFF	Transformer damage or failure - Distribution	DEFFXFR	20%	18%	*15%*	0%	*3%*
D-OTH	All Other - Distribution	DOTHOTH	0%	0%	*0%*	0%	*2%*
			Weighted Mean	**60%**		**72%**	

Southern California Edison
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DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Tae H Kim
Job Title: Data Scientist
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-4:
MGRA-4-4 Repeat MGRA-4-3 but using its forward-looking (60%) estimate of covered conductor effectiveness. (Residual risk should total to 40%.)

Response to Question MGRA-4-4:
Please see file "MGRA 4-3, 4-4.xlsx" attached to the response to Question 4-3. That table shows the mitigation effectiveness by sub driver for both the 60% and 72% effectiveness calculations. Further explanation of the calculation methodology is available in the response to Question 4-3.

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DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Tae H Kim
Job Title: Data Scientist
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-5:
MGRA-4-5 Repeat MGRA-4-4 (future effectiveness estimate) except using SCE's estimated effectiveness of a combined CC++/REFCL combination.

Response to Question MGRA-4-5:
Please see attachment "MGRA-SCE-004 4-5.xlsx", which shows SCE's estimate for the combined mitigation effectiveness of CC++/REFCL. SCE estimates this to be up to approximately 95%, when calculated using 2025-2018 CPUC reportable ignitions as the weighting basis and applying no QC factor. As SCE deploys more REFCL onto its system, particularly in areas with covered conductor installed, and SCE is able to evaluate the effectiveness of this mitigation combination in the field, this estimate may change.

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2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Tae H Kim
Job Title: Data Scientist
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-6:
MGRA-4-6 Repeat MGRA-4-4 except using SCE's estimated effectiveness of a combined CC++/REFCL/PSPS/PEDS combination.

Response to Question MGRA-4-6:
SCE objects to this Question on the grounds that SCE does not have readily available information directly responsive to this request. SCE has not modeled a similar mitigation effectiveness value for the combination of CC++/REFCL/PSPS/PEDS. This request seeks the creation of new studies, analyses, and/or presentation of data in formats that do not exist. SCE is not obligated to conduct new studies or analyses in response to data requests; rather, SCE is only required to produce existing, relevant data and information, to the extent that compiling and producing that information is not unduly burdensome or otherwise legally objectionable. *See* Cal. Code Civ. Proc. § 2031.230 (stating that a representation of an inability to comply with a discovery demand shall "specify whether the inability to comply is because the particular item or category has never existed.")

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Tae H Kim
Job Title: Data Scientist
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-7:
Provide a description of the factors that lead SCE to lower its CC effectiveness estimates for future covered conductor deployment.

a. Which of these factors also apply to undergrounding?

Response to Question MGRA-4-7:
As discussed in response to Question MGRA 4-3, SCE's "Activity Effectiveness – Overall Risk" value presented in the 2026-2028 WMP does not represent a wholesale lowering of the effectiveness for covered conductor to mitigate sub-drivers. In fact, most mitigation effectiveness values at the sub-driver level remain the same. However, SCE has applied weights to these sub-driver mitigation effectiveness values using an updated and expanded ignition dataset, and this results in a change to the calculated value for "Activity Effectiveness – Overall Risk."

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DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Bryan Landry
Job Title: Senior Advisor, Enterprise Risk Management
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-8:
Extreme Winds
MGRA-4-8 Provide technical documentation and description for the following models shown in Figure 5-2:
a. Gust Statistical Model
b. Ignition Likelihood Model

Response to Question MGRA-4-8:

a. SCE objects to this Question as vague and ambiguous. SCE does not reference a "Gust Statistical Model" in Figure 5-02 on page 48 of the 2026-2028 WMP.

b. SCE objects to this Question as vague and ambiguous. By "Ignition Likelihood," SCE interprets this Question to refer to "Wildfire Likelihood" and associated consistent driver sub-models. Please see attached technical documentation and descriptions of the sub-models that constitute SCE's Wildfire Likelihood model.

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DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Elim Li
Job Title: Data Science, Senior Specialist
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-9:
MGRA-4-9 What wind variables are used in SCE's current gust and ignition models, and over what period are these aggregated?

Response to Question MGRA-4-9:
SCE objects to this Question as vague and ambiguous. Subject to these objections, SCE responds as follows:

SCE's ignition sub-models use the variables N_hours_windgust_gt46 (number of hours that wind gust was greater than 46 mph), N_hours_sustwind_gt30 (number of hours that sustained wind was greater than 30 mph), surface_wind_gust, and wind_magnitude. These wind measurements are tracked as hourly weather data points between 2013 and 2022 and are then aggregated to a single metric by various statistical measures such as mean and standard deviation.

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DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Elim Li
Job Title: Data Science, Senior Specialist
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-10:
MGRA-4-10 For each SCE ignition submodel, please provide a list of the 20 most significant variables ordered from the most explanatory to the least, and for each provide the metric determining significance. Provide this in an Excel spreadsheet as well as the PDF. (Note: SCE has provided similar information in its 2025 WMP Update and in its GRC proceedings. If these calculations have not substantively changed since its previous DR responses simply referring to these will be responsive.)

Response to Question MGRA-4-10:
Please see the attached Excel spreadsheet and PDF for the list of the top 20 significant variables for each ignition sub-model. The scores show the relative importance of each feature, with higher scores indicating a greater influence on the model's predictions. Note, the magnitudes differ across the models and should not be directly compared.

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DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Bryan Landry
Job Title: Senior Advisor, Enterprise Risk Management
Received Date: 6/2/2025

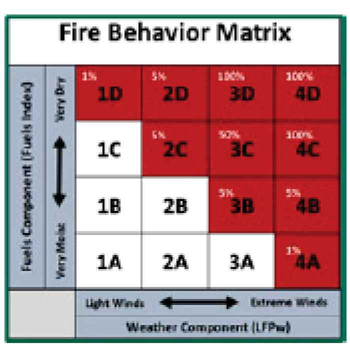
Response Date: 6/5/2025

Question MGRA-4-11:
MGRA-4-11 Scenario WL4: Credible Worst Case
"SCE states that: "SCE FWD selection methodology uses weather and wind scenarios that meet these conditions for all FCZs based on observed wind and weather conditions in its 40+ year historical climatology. These include Credible Worst-Case conditions, (e.g., wind gusts with a probability of exceedance of 1 percent over the three-year WMP cycle (i.e., 300-year return interval)). See Section 5.2.2.2.2.2 and Appendix B: Supporting Documentation for Risk Methodology and Assessment for additional information."
The referenced sections do not provide a technical description of how SCE derives its credible worst case weather conditions such as 300-year return interval return probabilities (such as extreme value statistics). Please provide a technical description of how SCE derives its worst-case values from the observed weather history.

Response to Question MGRA-4-11:

SCE's wildfire risk model (i.e., FireSight 8) considers Fire Weather Days (FWDs) in which an ignition could result in a significant wildfire event. These FWDs are selected from SCE's 40+ year historical climatology. Fire Climate Zones (FCZ) represent regions in SCE's service territory with homogenous weather, vegetation, topography, and fire history.

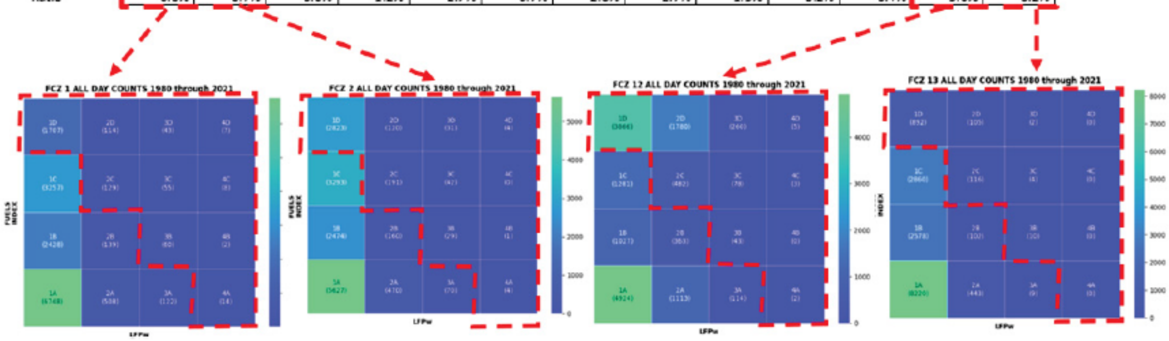
Using SCE's Fire Behavior Matrix (FBM), depicted in the figure below, SCE selects FWD that are substantially dry, windy, or a combination of dry and windy germane to each FCZ and can result in a wildfire event at 2x2 kilometer spatial resolution over SCE's 40+ year historical climatology.



Individual quadrants of the FBM are referred to as Fire Behavior Outcomes (FBOs). Each FCZ is represented by a single FBM. Each FBM contains 16 individual FBOs. Each FBO represents a specific ranking of fuel dryness and windiness relative to other weather conditions in each FCZ. Quadrants 1D, 2D, 3D, 4D, 2C, 3C, 4D, 3B, 4B, 4A are FBO which represent fire weather conditions.

The count or frequency of FWD in each quadrant can be divided by the Total Weather Days (TWDs) in SCE's historical climatology to determine the frequency (or return interval) of these types of fire weather conditions for each FCZ.

	FCZ 1 Coast/ Catalina	FCZ 2 Inland Coastal Valleys	FCZ 3 Western Mountains	FCZ 4 Eastern Mountains	FCZ 5 Eastern Mojave	FCZ 6 Antalope Valley/ High Desert	FCZ 7 Central Mojave	FCZ 8 Northern Desert/ Death Valley	FCZ 9 Eastern Siera/ Owens Valley	FCZ 10 Central Sierras	FCZ 11 San Joaquin/ Sierra Foothills	FCZ 12 Tehachapi	FCZ 13 Santa Barbara
FWD Selected	122	105	97	191	419	115	422	412	236	29	66	464	28
TWD	15342	15342	15342	15342	15342	15342	15342	15342	15342	15342	15342	15342	15342
FWD/TWD Ratio	*0.8%*	*0.7%*	*0.6%*	*1.2%*	*2.7%*	*0.7%*	*2.8%*	*2.7%*	*1.5%*	*0.2%*	*0.4%*	*3.0%*	*0.2%*



See example below:

The formula for deriving a return interval is as follows:

Return interval = (n+1)/m

Where:

"n" number of time periods (e.g., years, days, months) on record

"m" is the rank of observed occurrences when arranged in descending order

Count of FWD in quadrant 4D (windiest and dry conditions) for FCZ 1 = 7

Count of TWD in SCE's Historical Climatology = 15,342

= (15,342+1)/7

The return interval for this type of FWD in FCZ is 1 in ~2,192 days.

Southern California Edison
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DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Elim Li
Job Title: Data Science, Senior Specialist
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-12:
PSPS and PEDS
MGRA-4-12 On p. 78 of its WMP, SCE describes its analysis of Fast Curve and PEDS: "SCE derived PEDS likelihood by using the last 5-year historical outages on Fast Curve-enabled circuits, while also considering that Fast Curve settings were
installed and are enabled at different times of the year. These historical events are used to establish a baseline regarding the frequency and duration of outage conditions on individual circuits…" Please provide a technical description of SCE's analysis of its outage data used to derive PEDS likelihood.

Response to Question MGRA-4-12:
PEDS likelihood is calculated at the circuit level by averaging the last 5 years of historical outages on Fast Curve-enabled circuits. The detailed process is as follows:

1. Filter for the last 5 years of historical outages on Fast Curve-enabled circuits.
2. For each circuit and each year,
    a. Calculate the proportion of the year that the circuit had Fast Curve installed.
        - i.e., If Fast Curve was installed July 1, 2021, then the 2021 percentage would be 0.5. It would be 0 for previous years and 1 for subsequent years.
    b. Count the number of historical outages that occurred while Fast Curve was enabled.
        - If the circuit did not have Fast Curve installed in that year, the count would be N/A.
3. For each circuit and each year, multiply the proportion of the year with Fast Curve (step 2a) by the outage count (step 2b) to get the outage value of the portion of the year.
4. Finally, calculate the average of the adjusted outage count (step 3) across the years for each circuit.

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DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Elim Li
Job Title: Data Science, Senior Specialist
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-13:
MGRA-4-13 Does SCE take PEDS into account in its probability of ignition analysis?

Response to Question MGRA-4-13:
SCE objects to this Question as vague and ambiguous. Subject to these objections, SCE responds as follows:

While outages on Fast Curve-enabled circuits are included in the subset of outages used to study the overhead conductor probability of failure and ignition, the sub-models do not directly consider the presence or impact of PEDS into their predictions.

DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Bryan Landry
Job Title: Senior Advisor, Enterprise Risk Management
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-14:
Consequence Models
MGRA-4-14 Regarding the Building Loss Factor (BLF) described in Section 5.2.2.2.6: Provide a technical description how the BLF was derived and calibrated from Cal Fire DINS data.

Response to Question MGRA-4-14:

The specific algorithm used to derive and calibrate the Building Loss Factor (BLF) is the confidential intellectual property of Technosylva.

In general, the BLF uses Machine Learning (ML) methods to estimate the relative damage buildings impacted by simulated wildfires based on surrounding environmental conditions in their relation to building impacts recorded by the California Department of Forestry and Fire Protection (CalFire) Damage Inspection Program (DINS) Database.

The DINS database contains records of structures impacted by wildland fire inside or within 100 meters of the fire perimeter and includes information such as structure type, construction features, and some defensible space attributes.

DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Bryan Landry
Job Title: Senior Advisor, Enterprise Risk Management
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-15:
MGRA-4-15 On p. 97, SCE describes its AFN multiplier correction, and states that the maximum multiplier is 2.0.
Provide the rationale and any underlying calculations or analysis justifying setting the maximum AFN multiplier at 2.0.

Response to Question MGRA-4-15:

The rationale for capping the AFN multiplier at a maximum value of 2 is to prevent overweighting the safety attribute risk score in relation to the financial and reliability attribute risk scores.

For example, consider two locations with the same risk profiles (below).

MAVF Scenario 1

- Safety 50% weighting 10 risk score
- Financial 25% weighting 10 risk score
- Reliability 25% weighting 10 risk score

Location 1 (with lowest AFN score i.e. “1”):

- Safety 10 x 0.5 x 1 = 5
- Financial 10 x 0.25 = 2.5
- Reliability 10 x 0.25 = 2.5

  Total Risk Score = 10

Location 2 (with highest AFN score i.e. “2”):

- Safety 10 x 0.5 x 2 = 10
- Financial 10 x 0.25 = 2.5
- Reliability 10 x 0.25 = 2.5

  Total Risk Score = 15

In this scenario shown above, the overall risk score is amplified by 50%.

Southern California Edison
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DATA REQUEST SET M G R A - S C E - 0 0 4

To: MGRA
Prepared by: Bryan Landry
Job Title: Senior Advisor, Enterprise Risk Management
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-4-16:
GIS data
MGRA-4-16 Please provide GIS data supporting the following figures:
a. Figure SCE 5-05
b. Figure SCE 5-09
c. Figure SCE 5-10
d. Figure SCE 5-13
e. Figure SCE 5-29
f. Figure SCE 5-38

Response to Question MGRA-4-16:

a. Regarding Figure 5-05, see attached zipped geodatabase file: MGRA_SCE_004_4_16.gdb.zip.
b. b. Regarding Figure 5-09, see attached zipped geodatabase file: MGRA_SCE_004_4_16.gdb.zip.
c. c. Regarding Figure 5-10, see attached zipped geodatabase file: MGRA_SCE_004_4_16.gdb.zip
d. d. Regarding Figure 5-13, the data is publicly available for download https://www.sce.com/safety/wild-fire-mitigation in the Section entitled "Supporting Documents."
e. The information contained in Figure 5-29 is for illustrative purposes only. There are several million individual ignition points used in the actual wildfire consequence model. The GIS files of those ignition points along with associated consequence scores in proximity to our assets are considered confidential.
f. The information contained in Figure 5-38 has not been implemented at this time. The modeling algorithms used as well as the GIS files with associated scores are considered confidential.

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DATA REQUEST SET M G R A - S C E - 0 0 5

To: MGRA
Prepared by: Arianne Luy
Job Title: Engineering Manager
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-5-1:
Covered Conductor Program / Follow up to MGRA-SCE-003-Q.1

SCE provided a response containing data for circuits that were fully covered conductor and full bare. Additionally, please provide a file containing the same data provided in file 2-1.af_MGRA-SCE-002_Q2-1.xlsx, obtained during the GRC proceeding and assuming that miles that are partially covered are "covered conductor" circuits. Update the data in that table up through 2024.

Response to Question MGRA-5-1:
SCE objects to the premise of this Question because the assumption that "partially covered [circuits] are covered conductor circuits" mischaracterizes ignitions and wire downs on bare wire as potentially attributed to covered conductor circuits. Subject to that objection, SCE has provided counts of wire downs and ignitions for fully covered and partially covered circuits combined, as requested. Please see the attached file labeled *2-1.a-f_MGRA-SCE-002_Q2-1*.

Also note that these events may be associated with risk drivers that covered conductor was not expected to be effective against or can be on the secondary system and do not interact with the covered conductor.

Additionally, the covered conductor and bare miles provided were updated to reflect SCE's current information on CC miles installed and total miles in HFRA.

Southern California Edison
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DATA REQUEST SET M G R A - S C E - 0 0 5

To: MGRA
Prepared by: Jonathan Brownstein
Job Title: Engineering Manager
Received Date: 6/2/2025

Response Date: 6/5/2025

Question MGRA-5-2:
The SCE response to MGRA-SCE-003-Q.1 indicated reportable ignitions on covered conductor in the HFRA. Please provide non-confidential summaries of root cause analysis reports for all covered conductor-related ignitions in the HFRA in 2024.

Response to Question MGRA-5-2:
SCE objects to this Question as vague and ambiguous. SCE interprets this Question to seek information relating to the three items listed under the "Number of reportable ignitions for fully covered conductor HFRA Circuits" for year-end 2024 listed in the attachment to SCE's response to MGRA-SCE-003, Question 1. Subject to these objections, SCE responds as follows:

Please see the attached Excel file titled "MGRA_SCE_005_Q2.xlsx." Please note that upon further review, the ignition listed in row 3 of the attached spreadsheet was on a portion of the circuit containing bare wire, though greater than 95% of structures on the circuit contained covered conductor.

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 6

To: MGRA
Prepared by: Jonathan Brownstein
Job Title: Engineering Manager
Received Date: 6/10/2025

Response Date: 6/13/2025

Question MGRA-6-1.a-b:
Data Request Follow-Ups

Response to 5-1 correctly noted that the original request "mischaracterizes ignitions and wire downs on bare wire as potentially attributed to covered conductor circuits".

a. Requested information is for the specific conductor type of the infrastructure nearest the ignition (i.e. if a fire resulted from a transformer on a pole having covered conductor on both sides of the pole, that would be associated with "covered conductor"). Ignitions should also be 1) primary conductor only and 2) CPUC reportable. Results should be consistent with historically reported results in file 2-1.a-f_MGRA-SCE-002_Q2-1.xlsx.

b. An attempt was made to derive aforementioned ignition data from the GIS data provided in DR MGRA-1. These results are in attached in file SCE_Ignitions_JoinedLineData_2024.xlsx.

Please validate the following Ignition ID summary for consistency with reported SCE CPUC data:

Covered conductor:
FIPA_2024_0303_2336
FIPA_2024_0516_0930
FIPA_2024_0718_1136
FIPA_2024_0727_1933

Bare wire:
FIPA_2024_0309_0614
FIPA_2024_0310_2232
FIPA_2024_0405_0840
FIPA_2024_0728_1243
FIPA_2024_0730_0000
FIPA_2024_0815_0853_1
FIPA_2024_0818_1730
FIPA_2024_0827_1411

Response to Question MGRA-6-1.a-b:

6.1.a) Please refer to the associated Excel file titled "MGRA_SCE_006_6_1a.xlsx" for the counts by year of Primary system CPUC Reportable ignition events where the nearest conductor was bare versus covered conductor. The numbers include non-conductor ignitions, such as equipment related ignitions and may not have involved covered conductor.

6.1.b) Please refer to the associated Excel file titled "MGRA_SCE_006_6_1b.xlsx" for verification on provided FIPA events and covered conductor status. To be clear, all attempts to identify conductor type were correct except for FIPA_2024_0310_2232.

A column was also added to distinguish if the ignition was on the Primary Distribution system. These events can include ignitions related to other assets/equipment and not solely involving the covered conductor itself.

DATA REQUEST SET M G R A - S C E - 0 0 6

To: MGRA
Prepared by: Jonathan Brownstein
Job Title: Engineering Manager
Received Date: 6/10/2025

Response Date: 6/13/2025

Question MGRA-6-2:
MGRA 5-2 requested that root cause information be provided for the 2024 reportable ignitions. The provided response does not contain cause information.

Provide non-confidential root cause summaries for these ignitions.

Response to Question MGRA-6-2:
SCE objects to this Question as vague and ambiguous. Subject to these objections, SCE responds as follows:

For the three line items referenced in SCE's previous response to data request MGRA-5-2, SCE provided suspected initiating events in columns P, Q, and R and contributing factors in column T of the spreadsheet attachment. Below is additional information for each of the "suspected initiating events" in column P of the spreadsheet for each of those three line items:

- Line [1] – "Contact From Object" refers to a vehicle hitting our pole.
- Line [2] – "Equipment/Facility Failure" refers to a splice failure.
- Line [3] – "Contact From Object" refers to a vegetation tree fall-in.

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DATA REQUEST SET M G R A - S C E - 0 0 6

To: MGRA
Prepared by: Bryan Landry
Job Title: Senior Advisor, Enterprise Risk Management
Received Date: 6/10/2025

Response Date: 6/13/2025

Question MGRA-6-3:
Regarding SCE's response to MGRA 4-16, MGRA is not requesting the data points shown in Figure 5-29, but rather the demarcations that are clearly drawn on the map to designate climate zones. This is not confidential data. Please provide designated climate zones as a GIS file.

Response to Question MGRA-6-3:
Please see the attached zipped file entitled "Fire_Climate_Zones_v3.zip" which contains a GIS file of SCE's Fire Climate Zones represented in Figure 5-29.

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 7

To: MGRA
Prepared by: Jonathan Brownstein
Job Title: Engineering Manager
Received Date: 6/17/2025

Response Date: 6/20/2025

Question MGRA-7-1:
MGRA-7-1 Additional information is requested regarding responses to DRs 1, 5-1, and 6-1:

Regarding Response 6-1a and associated file MGRA_SCE_006_6_1a.xlsx, the file shows for 2024 16 nearest covered conductor and 13 nearest bare wire reportable primary HFTD ignitions, a total of 29 ignitions.

a. Analyzing the ignitions reported in DR1 shows a total of 33 HFTD ignitions in 2024. Coupling these to line data shows that only 22 are on primary conductors. Some of these travelled < 3 meters or self-extinguished and it is not known whether they are reportable. Please resolve this discrepancy.

b. The 16 covered conductor conditions shown for 2024 are substantially more than any other year. Does this represent an actual increase in the number of covered conductor ignitions or is it a result of different methods being used for previous
years? If an actual increase, what is the cause?

Response to Question MGRA-7-1:

This data request inaccurately states there were 16 ignitions nearest covered conductor and 13 ignitions nearest to bare wire, when it is actually 16 nearest bare wire and 13 nearest covered conductors.

7-1a) The ignition information provided in DR1 used Quarterly Data Report (QDR) geospatial data in its response. The QDR data includes ignitions captured at a snapshot in time and has a cut-off date near the beginning of each new quarter. The ignition review process can take time to validate information and gather additional fields associated with the ignition. In-flight reviews, based on needing to validate whether the ignition was Reportable, may limit the count around the time of these cut-off dates. The delta of 7 primary ignitions between the two data sets is attributed to the ignition review being completed after each QDR quarter's cut-off date (e.g., ignition happened in March but review completed mid-April). The data provided in recent requests is provided from our database for ignitions rather than from a QDR.

7-1b) The 13 ignitions on our primary system being higher than previous years can be attributed to various factors. For example, over time, more covered conductor is installed in our system and therefore a higher number of ignitions where covered conductor is installed can occur from failures such as vehicles hitting poles, lightning strikes, and other non-covered conductor equipment failures. 2024 also saw an increase in ignitions across California due to drier vegetation after more precipitation in 2022 and 2023, which can be seen by taking the delta in the bare wire HFRA & Non-HFRA tabs irrespective of covered conductor being installed.

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 7

To: MGRA
Prepared by: Jonathan Brownstein
Job Title: Manager
Received Date: 6/17/2025

Response Date: 6/20/2025

Question MGRA-7-2:
Regarding the response to 6-1b,

a. Confirm that FIPA_2024_0310_2232 occurred on or associated with covered conductor and not bare wire.
b. Is the list provided by MGRA of 13 ignitions in the HFTD a complete set of the reportable ignitions on primary circuits in 2024? If not please provide additional ignition IDs that are in HFTD, reportable, and on primary lines.

Response to Question MGRA-7-2:

7-2a) It can be confirmed that FIPA_2024_0310_2232 occurred where covered conductor was installed and not bare wire.

7-2b) The list provided by MGRA is not a complete set of reportable ignitions on primary circuits in 2024. Please see the attached Excel file titled “MGRA_SCE_WMP26_7_2b.xlsx” for reportable ignition IDs that are in HFRA and associated with our Distribution Primary system in 2024.

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 7

To: MGRA
Prepared by: Thayne K Dye
Job Title: Data Scientist Advisor
Received Date: 6/17/2025

Response Date: 6/20/2025

Question MGRA-7-3:
Is the WRF model data, particularly downforce, and u and v components of wind used as hourly data to train SCE's sub-model, or is it used as an aggregate? If aggregated, what period is it aggregated over?

Response to Question MGRA-7-3:
Downforce variables start as hourly maximum downforce data for each wire on each pole. This is calculated using hourly u and v wind components. These values are summed across 5 years of observation.

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 7

To: MGRA
Prepared by: Thayne K Dye
Job Title: Data Science Advisor
Received Date: 6/17/2025

Response Date: 6/20/2025

Question MGRA-7-4:
How is the variable max_of_sum_of_seg_downforce calculated? Over what period is the maximum determined?

Response to Question MGRA-7-4:
Downforce data is calculated as a 5-year sum on each wire attached to a pole, based on the hourly data. The pole data is merged with the segment data, and then the values associated with each segment are aggregated by the maximum to create max_of_sum_of_seg_downforce.

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 7

To: MGRA
Prepared by: Thayne K Dye
Job Title: Data Science Advisor
Received Date: 6/17/2025

Response Date: 6/20/2025

Question MGRA-7-5:
How is the variable max_wind_magnitude calculated? Over what period is the maximum determined?

Response to Question MGRA-7-5:
The maximum windspeed recorded over a minute of observation at the ADS observation site is provided as an annual maximum by ADS. The ADS data is filtered to the most recent year after 2018, and then uses the 3 nearest neighbors to each segment to create a distance-weighted average value.

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 7

To: MGRA
Prepared by: Thayne K Dye
Job Title: Data Science Advisor
Received Date: 6/17/2025

Response Date: 6/20/2025

Question MGRA-7-6:
How is the variable Log_Windforce calculated?

Response to Question MGRA-7-6:
The Log_Windforce data is the natural log of the final sum_of_sum_of_seg_downforce values for each segment plus one. The one is added so that all values are positive.

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 7

To: MGRA
Prepared by: Thayne K Dye
Job Title: Data Science Advisor
Received Date: 6/17/2025

Response Date: 6/20/2025

Question MGRA-7-7:
Please provide the data used to create Figure 9 and Figure 10 in a spreadsheet.

Response to Question MGRA-7-7:
Please refer to the attached documents: 2024 OHCM EFF Feature Importance.xlsx for Figure 9 and 2024 OHCM CFO Feature Importance.xlsx for Figure 10.

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 7

To: MGRA
Prepared by: Thayne K Dye
Job Title: Data Science Advisor
Received Date: 6/17/2025

Response Date: 6/20/2025

Question MGRA-7-8:
Can scaled importance as a function of variable (CFO, Figure 9) be calculated for individual drivers? If so please provide tabular data for animal, vehicle, and vegetation drivers.

Response to Question MGRA-7-8:
The version of H2O in Rstudio on which the model was created does not support exporting contributions by class for multinomial models.

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 8

To: MGRA
Prepared by: Kyle Ferree
Job Title: Senior Advisor
Received Date: 6/18/2025

Response Date: 6/23/2025

Question MGRA-8-1:
Risk Tiers and PSPS Damage

Provide a GIS file equivalent to Figure 5-54 showing SCE top and bottom risk tiers. This does not have to be detailed down to the circuit segment level.

Response to Question MGRA-8-1:
Regarding Figure 5-54, the data is publicly available for download from www.sce.com/wmp in the "Supporting Documents" section, entitled "SCE 2026-2028 WMP GIS Layers (ZIP)".

Southern California Edison
2026-WMPs – 2026-WMPs

DATA REQUEST SET M G R A - S C E - 0 0 8

To: MGRA
Prepared by: Kyle Ferree
Job Title: Senior Advisor
Received Date: 6/18/2025

Response Date: 6/23/2025

Question MGRA-8-2:
Risk Tiers and PSPS Damage

Below is a list of the IDs of SCE 2024 PSPS damage events. Please assign the risk tier as shown in Figure 5-54 that applied to each of the circuit segments involved with these damage events.

EventID
11-04-2024_ARABIA
11-04-2024_WARHAWK
11-04-2024_BROADCAST
11-18-2024_BIRCHIM
11-04-2024_CALSTATE
12-14-2024_CALSTATE
11-04-2024_CARMELITA
12-14-2024_ENERGY
11-04-2024_CASTRO
11-04-2024_DAVENPORT
11-04-2024_ENERGY

Response to Question MGRA-8-2:
Below are the risk tiers assigned to each circuit requested, as shown in Figure SCE 5-54.

11-04-2024_ARABIA - Bottom 80% Risk
11-04-2024_WARHAWK - Bottom 80% Risk
11-04-2024_BROADCAST - Bottom 80% Risk
11-18-2024_BIRCHIM - Bottom 80% Risk
11-04-2024_CALSTATE - Bottom 80% Risk
12-14-2024_CALSTATE - Bottom 80% Risk
11-04-2024_CARMELITA- Bottom 80% Risk
12-14-2024_ENERGY- Top 5% Risk
11-04-2024_CASTRO - Bottom 80% Risk
11-04-2024_DAVENPORT - Top 5% Risk
11-04-2024_ENERGY - Top 5% Risk