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

April 27, 2026 VIA ELECTRONIC FILING

Office of Energy Infrastructure Safety
California Natural Resources Agency
715 P Street, 20th Floor
Sacramento, CA 95814

RE: Mussey Grade Road Alliance Comments on Implementation of Cost-per-Avoided Ignition and Wildfire Mitigation Plan (WMP) Schedule Pursuant to Senate Bill 254 Requirements

The Mussey Grade Road Alliance (MGRA or Alliance) files these comments pursuant to the instructions in the email from Will Dundon of March 20, 2026,[1] stating that OEIS will be accepting comments on the question prompts used in the March 27, 2026 Senate Bill 254 Requirements workshop, to be filed on the WMP Guidelines docket.

The Alliance comments are authored by the Alliance expert, Joseph W. Mitchell, Ph.D.

Respectfully submitted this 27th day of April, 2026,

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

[1] Email: Re: RMWG March 2026 Slides; From: Dundon, Will@EnergySafety; 3/20/26, 9:12 AM.

Ramona, CA 92065
(858) 228 0089
jwmitchell@mbartek.com

MUSSEY GRADE ROAD ALLIANCE COMMENTS ON IMPLEMENTATION OF COST-PER-AVOIDED IGNITION AND WILDFIRE MITIGATION PLAN (WMP) SCHEDULE PURSUANT TO SENATE BILL 254 REQUIREMENTS

The Mussey Grade Road Alliances' (MGRA or Alliance) appreciates the invitation of the Office of Energy Structure to comment on the question prompts used in the March 27, 2026 workshop, originally posed to the California IOUs.

1. GENERAL POSITION

On behalf of MGRA I have been working on the issue of utility wildfire ignition for many years and have concerns regarding the value of a cost-per-avoided ignition metric. Improperly implemented and interpreted, this metric could incorrectly weight wildfire risk, increasing cost per avoided catastrophic wildfire, and could potentially degrade wildfire safety if funds are shifted more towards ignition avoidance rather than catastrophic wildfire avoidance. A metric based on prevention of ignitions from drivers likely to lead to catastrophic wildfires, on the other hand, could potentially augment existing benefit/cost analyses.

2. BACKGROUND OF MGRA WORK ON IGNITION

The history of ignition analysis I performed on behalf of MGRA can be found in MGRA's comments on the annual Wildfire Mitigation Plans going back to the creation of OEIS and before. The general conclusions that were reached in these analyses are:

- Catastrophic utility wildfires generally occur during high-wind events associated with fire weather. The vast majority of property damage and loss of life occurs as a result of wildfires started under these conditions. Dixie and Butte fires remain the exceptions.
- Ignitions occurring during high wind events and leading to catastrophic wildfire growth result from damage to utility equipment or contact with energized equipment from objects (such as vegetation or communications equipment) that have been damaged by wind.
- Probability of damage capable of causing an ignition rises as a very strong function of wind speed (power law, polynomial or exponential).

- Utility analyses that predict ignition probabilities based on aggregated weather data such as machine learning models currently in use by the IOUs do not adequately capture the temporal dependency of the ignitions most likely to cause catastrophic wildfire.
- Without restricting ignitions to catastrophic conditions, higher probabilities are calculated for wildfire risk from ignitions from external agents like balloons, animals, and vehicles than are merited from the observed history of catastrophic wildfire.

These factors being understood, a naïve emphasis on "ignition reduction" may be counterproductive. Eliminating all ignitions would result in the elimination of wildfire risk. However, this would include expending resources to eliminate ignition drivers that are statistically and historically unlikely to be causes of catastrophic wildfires.

A caveat is that the current use of PSPS and EPSS to address wildfire ignitions in combination with currently available overhead mitigations can provide risk reduction nearing that of undergrounding. In this context, ignitions occurring outside of PSPS and EPSS areas and periods may be looked at as the source of residual risk, and their cost per ignition may be calculated. However, ignitions occurring outside of PSPS and EPSS conditions have a much lower potential for large losses. Therefore, BCR for mitigations targeting drivers of these ignitions would remain significantly lower than if PSPS and EPSS are not taken into account.

2.1. History

Some of the MGRA filings that include substantive discussion of the ignition issue can be found in:

2022 MGRA WMP Comments[2]

Extensive discussion including PG&E and SCE plots of outage rate increases with wind speed. Also demonstrates amplification of ignition sources such as vehicles, balloons, and animals

[2] 2022-WMP; MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2022 WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; April 11, 2022; pp. 17-47.

and shows historic catastrophic wildfire drivers are statistically unlikely to derive from predictions based on utility ignition probability sources.

2026-2028 WMP Comments[3]

Limitations of Table 3-1 responses in identifying wind-related risk drivers, discussed in SCE and SDG&E MGRA WMP comments.

2.2. References

Data regarding wildfire provided to MGRA in the course of CPUC and OEIS proceedings has been analyzed and published in refereed conference proceedings and journals.

2.2.1. Mitchell 2009

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

Analyzes relationship between fire, outages, and wind using SDG&E data. Analyzes physical mechanisms responsible for coupling wind to ignition and extreme wildfire growth. Suggests public access to utility fire, outage, and maintenance data.

2.2.2. Mitchell 2013

Mitchell, J.W., 2013. Power line failures and catastrophic wildfires under extreme weather conditions. Engineering Failure Analysis, Special issue on ICEFA V- Part 1 35, 726–735. https://doi.org/10.1016/j.engfailanal.2013.07.006

Discusses the "common-cause" failure conditions unique to power line firestorms. Analyzes events from Australia and California, showing that under extreme wind conditions a statistically

[3] 2026-2028-Base-WMPs; MUSSEY GRADE ROAD ALLIANCE COMMENTS ON THE 2026 TO 2028 UPDATE OF THE WILDFIRE MITIGATION PLANS OF SDG&E; June 13, 2025.
2026-2028-Base-WMPs; MUSSEY GRADE ROAD ALLIANCE COMMENTS ON THE 2026 TO 2028 UPDATE OF THE WILDFIRE MITIGATION PLANS OF SCE; June 13, 2025.

abnormal excess of major wildfires are due to power lines. Analyzes SDG&E data that shows a power-law level of steepness in the relationship between probability of outage and wind speed.

2.2.3. Mitchell 2023

Mitchell, J.W., 2023. Analysis of utility wildfire risk assessments and mitigations in California. Fire Safety Journal 140, 103879. https://doi.org/10.1016/j.firesaf.2023.103879

Analysis of Wildfire Mitigation Plan and CPUC rate case data for major California utilities, showing that their risk models underestimate the potential for wind-driven outages leading to ignition. Shows that utility models overpredict risk from risk drivers that are not coupled to extreme wind events, such as animals, vehicles, and balloons.

2.2.4. Coen 2026

Coen, J.L., 2026. Climate Influences Wildfire Activity Through Opportunity: An Event-Scale Perspective. Fire 9, 164. https://doi.org/10.3390/fire9040164

This recently published article observed that catastrophic wildfire growth occurs during very limited time windows when occasional synoptic weather conditions including high winds align with climactic conditions such as temperature, humidity, and vegetation moisture content.

"*At seasonal and regional scales, temperature and humidity influence fuel dryness, ignition likelihood, and fire-season length, explaining substantial interannual variability in area burned. These variables vary smoothly in space and retain signal under aggregation. By contrast, extreme fire growth occurs during short-lived synoptic configurations that organize winds, pressure gradients, and stability into discrete opportunity windows that permit sustained spread. The strongest winds governing rapid spread are intermittent, terrain-structured, and often unresolved in coarse datasets or aggregated indices*."

"Coarse datasets" refer to the relatively coarse-grained WRF model at the basis of utility meteorological modeling, and "aggregated indices" are what PG&E and SCE use as weather feature inputs to their machine learning model. If the short-lived wind event also drives outage probability, then a common-cause failure condition occurs as described in Mitchell 2013.

3. ENERGY SAFETY QUESTIONS

The Discussion Questions posed in the Workshop, and MGRA's input on these questions, are given below. Note that these are detailed questions to IOUs regarding methodology for obtaining ignition-related metrics, and the answers will be specific to the IOUs and their data collection and analytical methods. MGRA input is intended as high-level guidance rather than specific recommendations. Only questions that MGRA has input on will be addressed. Specifically, some questions address specific utility capabilities and cost methodology, and MGRA has no comment on these questions.

3.1. Ignition Likelihood Metric

1. How does a cost-efficiency metric focused on ignition likelihood, like the cost-per-avoided ignition, complement existing cost efficiency evaluation methodologies such as Benefit-Cost-Ratio?

As noted in the introductory sections, ignition likelihood can actually detract from overall wildfire safety unless the ignitions most likely to lead to catastrophic wildfire are emphasized. This can be so if ignitions less likely to lead to catastrophic wildfire are overweighted. Mitigation addressing these less-likely catastrophic drivers would be overweighted in terms of Benefit-Cost-Ratio (BCR), while mitigations addressing less frequent drivers that are more likely to lead to catastrophic loss would be potentially underweighted.

a. How can using both metrics together inform or improve mitigation selection strategy?

In order for the use of cost-per-avoided ignition to improve or inform mitigation selection strategy, drivers need to be classified as *potentially wind-induced* and *wind-independent*. Reduction of ignitions from drivers related to outages that are potentially wind-induced should be the primary metric used for informing mitigation priorities, since this will have the greatest impact in reducing catastrophic wildfire ignitions from power lines.

3.2. Methodology

2. What mathematical formula and methodology would you (electrical corporations) use to estimate the cost-per-avoided ignition for a particular project, for the purpose of understanding the cost efficiency of a type of wildfire mitigation being considered?

The methodology ultimately adopted should classify ignition drivers into *potentially wind-induced* and *wind-independent* categories. Drivers that are potentially wind-induced should be given a higher weight in decision-making. Consequently, mitigations that show a low cost per avoided ignition for potentially wind-induced drivers should be given a higher relative weight during decision-making.

a. Would you be able to use this formula to estimate the cost-per-avoided ignition for a specific circuit segment, as well for that type of mitigation for the entire service territory?

Utilities regularly collect and analyze ignitions at the circuit segment level. There may be statistical limitations as to the number of ignitions from various drivers, however, and depending on the available statistics some level of aggregation may be necessary.

b. How would you estimate the cost-per-avoided ignition for each risk in the Prioritized List of Wildfire Risk Drivers as defined in the WMP Guidelines Table 3-1? What would the limitations of this estimate be?

An important observation that needs to be closely studied in this effort is that the Table 3-1 column E, *Topographical and Climatological Risk Factors*, is not sufficiently granular to identify the effect of wind-induced ignition. This was noted in the 2026-2028 WMPs for all utilities. For example in MGRA's 2026-2028 SDG&E WMP Comments,[4] MGRA provides a comparison of actual wind-related risk drivers versus the drivers SDG&E states are associated with wind. For example, SDG&E states that ignitions induced by animals are wind-related. This is due to a differing interpretation of ignition likelihood.

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[4] pp. 25-27

Utilities (PG&E and SCE as well) state that ignition is the initiation of a wildfire. However, this likelihood is a conditional likelihood:

P(wildfire ignition) = P(outage) * P (wildfire ignition given outage)

Indeed, the likelihood that an outage will result in a wildfire ignition is dependent on wind and other climactic variables such as temperature, humidity, and vegetation moisture content. In this sense, SDG&E is correct that the probability that an animal-related wildfire ignition occurs under windy conditions is higher. However, wind does not affect the P(outage) for animal-related ignitions. P(outage), nevertheless is an extremely strong function of wind for certain drivers such as equipment damage and object contact, and is not for other drivers such as animal contact. Table 3-1 does not currently address the difference between ignition-related environmental effects and outage-related environmental effects, and so these are conflated in utility responses in Table 3-1.

Introducing ignition-related metrics provides an opportunity to further clarify this issue and provide additional decision-making information. To this extent Table 3-1 can be a starting point but additional information regarding outage probabilities should be incorporated.

c. When estimating the cost-per-avoided ignition for a particular project, how would you estimate the baseline number of ignitions, prior to implementing the new wildfire mitigation planned for the project? How confident would you be in the estimate?

Utilities will need to incorporate previous mitigations, which could change the baseline ignition probability over time. This introduces challenges. Utilities should estimate uncertainty levels, or at the least provide the statistical basis (number of ignitions used for estimate) for their calculations.

d. Would this calculation be comparable across each electrical corporation?

Ideally, yes. All California residents should benefit from optimal reduction of wildfire risk, and Energy Safety should ensure all IOUs meet applicable standards. While there may be inherent differences in the methodologies used by IOUs, Energy Safety should push for unity in the approach to adding additional ignition-related metrics. This will help Energy Safety itself and also stakeholders in their assessment of multiple utility WMPs and ensure that they are providing equivalent results.

3. For the purpose of estimating cost-per-avoided ignition, how would you estimate the avoided ignitions?
a. Would your (electrical corporation) probability of ignition model be capable of calculating the following:
iii. Estimating the probability of ignition before and after implementing a mitigation historically, based on data collected from completed mitigation projects?

One example of this being possible is SCE's comprehensive record of ignitions as its covered conductor program was deployed. This shows a substantial reduction in ignitions due to the introduction of covered conductor. Analysis of this data is presented in a number of MGRA WMP analyses.

4. CONCLUSION

While additional cost metrics regarding ignitions could be beneficial to ratepayers and residents, if naively applied they could result in less optimal mitigations being chosen. The vast majority of life and property losses have been due to wind-driven utility ignitions. The drivers related to these ignitions should be more heavily weighted in the selection of utility mitigations.

Respectfully submitted this 27th day of April, 2026,

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