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**RE: MUSSEY GRADE ROAD ALLIANCE COMMENTS ON OFFICE OF ENERGY SAFETY
INFRASTRUCTURE DRAFT DECISION ON SOUTHERN CALIFORNIA EDISON
COMPANY'S 2022 WMP UPDATE**

The Mussey Grade Road Alliance (MGRA or Alliance) files these comments pursuant to the Cover letter to the Stakeholders for Southern California Edison Company's 2022 Wildfire Mitigation Plan Update,¹ which authorizes replies to stakeholder comments on SCE's 2022 Wildfire Mitigation Plan Draft Decision by June 22, 2022. The Alliance filed comments on the 2022 Wildfire Mitigation Plans of all major IOUs April 11, 2022,² and filed Reply Comments on April 18, 2022.³

In keeping with Proposed Decisions and Proposed Resolutions that come before the California Public Utilities Commission, as this will, the Alliance restricts its comments to errors of fact and law in the documents under consideration. In general, the Alliance is pleased with the scope and detail of the Office of Energy Infrastructure Safety's review (Energy Safety or OEIS), and remedial steps. For example, we provided no comment on Energy Safety's review of the SDG&E Draft Decision. In retrospect, this was a mistake as will be shown because one of the errors in SCE's WMP is common to SDG&E as well. However, the remediation – continuation of risk working groups – seems likely to go forward into next year so this is likely to be addressed.

¹ OFFICE OF ENERGY INFRASTRUCTURE; SAFETY DRAFT EVALUATION OF 2022 WILDFIRE MITIGATION PLAN UPDATE; SOUTHERN CALIFORNIA EDISON; June 2, 2022. (Draft Decision)

² 2022-WMPs; 10759-4; MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2022 WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; April 11, 2022. (MGRA Comments)

³ 2022-WMPs; MUSSEY GRADE ROAD ALLIANCE REPLY TO STAKEHOLDER COMMENTS ON THE 2022 WILDFIRE MITIGATION PLANS; April 18, 2022. (MGRA Reply)

The issue specific to Southern California Edison is more clearly laid out in MGRA's 2022 WMP Comments, and we reiterate it in this document to demonstrate error of fact.

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

Respectfully submitted this 22nd day of June, 2022,

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**COMMENTS ON OFFICE OF ENERGY SAFETY INFRASTRUCTURE DRAFT
DECISION ON SOUTHERN CALIFORNIA EDISON COMPANY'S 2022 WMP
UPDATE ON BEHALF OF THE MUSSEY GRADE ROAD ALLIANCE**

The Mussey Grade Road Alliances' (MGRA or Alliance) Wildfire Mitigation Plan reply comments are authored by MGRA's expert witness Joseph W. Mitchell, Ph.D.⁴

1. INTRODUCTION

MGRA supports Energy Safety's Draft Decision for Southern California Edison, and appreciates that OEIS recommends adopting MGRA suggestions in the areas of covered conductor, rapid earth fault current limiter (REFCL), and consequence modeling.⁵ In general, OIES has shown an openness to stakeholder input and this input has greatly influenced the output.

However, one major area of MGRA effort during this WMP cycle has been in the analysis of utility risk models – specifically the risk models used at the enterprise level to measure risk mitigation programs and the risk models used to identify the riskiest segments of utility infrastructure in order to prioritize mitigations. MGRA identified problems with utility models during the 2021 Wildfire Mitigation Plan cycle.⁶ MGRA's 2021 work was to provide evidence that the majority of catastrophic fires in California were wind-driven, and that specifically the faults that ignited them were wind-driven. MGRA's initial focus was on machine learning models and how they could better incorporate a temporal component, since the variables that they used were all time-aggregated. In Energy Safety's Risk Modeling working groups however, it became clear that the root of the problem may not be fully on the probability modeling side, but rather on how the probability was coupled to the consequence, which has been up to now a simple multiplication of probability and consequence to obtain risk. All utilities in their 2022 WMPs used "worst case" weather days for modeling consequence, and while this is a reasonable shortcut to reduce computing time, it ignores the fact that some drivers only randomly occur on worst case weather days (balloons, vehicle accidents, animals) while others are much more likely to occur on worst

⁴ M-bar Technologies and Consulting, LLC; <http://www.mbartek.com>; Email: jwmitchell@mbartek.com. Dr. Mitchell is also a board member of the Mussey Grade Road Alliance.

⁵ Draft Decision; p. 13.

⁶ 2021-WMPs; MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2021 WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; March 29, 2021; pp. 14-38.

case weather days (vegetation contact, equipment failure). Hence, some drivers are assigned an artificially amplified risk. This was the focus of MGRA’s work on this topic in the 2022 WMPs.⁷

The Draft Decision, unfortunately, fails to incorporate this work, and worse, errs by accepting incorrect SCE conclusions about risk. These comments will suggest ways in which to correct this error.

2. UTILITY RISK MODELS ARE STILL IN ERROR

2.1. SCE Has Not Yet Resolved Issue SCE-21-11

As a result of the work of MGRA and intervenors work during the 2021 WMPs, OEIS filed Issue SCE-21-11, which states that it is: “*Unclear how SCE’s ignition models account for correlations in wind speeds, ignitions, and consequence.*”⁸ While SCE provided further technical explanation of its machine-learning model in its quarterly updates, it did not explain how correlations with consequence were handled. Nevertheless, OEIS has marked this Issue as “*Utility sufficiently addressed the required remedy*”.

The matter of correlations between outages, ignitions, and consequences is a matter of active discussion within OEIS’s Risk Modeling Working Group, and it will likely remain so into the next WMP cycle.

Recommendation:

This Issue should instead be labeled as “Addressed in Areas for Continued Improvement in Section X.X”, since it is still an area of active development.

2.2. Inconsistent Treatment of SDG&E and SCE

In Energy Safety’s Proposed Decision for San Diego Gas and Electric Company’s (SDG&E’s) 2022 WMP, OIES created Issue SDGE-22-09:

⁷ MGRA Comments; pp. 17-43.

⁸ Draft Decision; Appendix A-3.

SDGE-22-09. Evaluation of Wind Gust Effects on Vegetation-Related Failures.

- *Description: SDG&E does not currently account for wind gust effects within its vegetation probability of failure (PoF) model.*
- *Required Progress: In its 2023 WMP, SDG&E must:*
 - *Provide a description of any analysis it has completed to evaluate the effects of wind gust effects on vegetation failures (including factors considered, weighing of various factors, and wind studies used) and provide a description of any additional analysis needed to evaluate wind gust effects on vegetation-related failures.*
 - *Provide an update on any changes made to its PoF model as a result of its analysis of wind gust effects on vegetation failures.*
 - *Provide a timeline for any future analyses on wind gust effects, as applicable, including reasoning for the need of future analysis, and cadence for performance of future analysis.*
 - *Provide a timeline for any future changes to its model related to wind gust effects.*

SCE, likewise, has no adequate model for vegetation failures in its probability of failure or probability of ignition models. For SDG&E to be “penalized” for being further ahead in its modeling is not fair to ratepayers and residents of either service area.

In fact, the same comment can be made regarding equipment failure, which is also a strong function of wind speed. All utility operational models take these effects into account, which is good, but their planning and enterprise risk models ignore these effects entirely.

Recommendation:

Construct an issue similar to SDGE-22-09 for SCE, including equipment failure as well as vegetation failure.

2.3. Balloons, Squirrels, and Cars Have Not Caused California’s Catastrophic Wildfires

What has been particularly frustrating with respect to the issue of catastrophic wildfire risks is that it is easy to show that the utility risk models are incorrect. Both SCE and SDG&E’s risk model clearly show that very high levels of wildfire risk come from vehicle collisions, balloon

contact, and animal contact. As the Draft Decision notes: “SCE lists distribution conductor damage or failure, animal contact, and balloon contact as the three top-ranked wildfire risk drivers.”⁹

Energy Safety’s Draft Decision for SDG&E similarly noted this, but unlike the SCE Draft Decision flags this finding as problematic:

“SDG&E still ranks vehicle and balloon contacts as top risks based on the high number of outages, even though vegetation contact (ranking second) and other equipment failure (tied for third⁵¹) have higher ignition rates. These rankings seemingly do not impact SDG&E’s actual analysis for risks in the field, and SDG&E accounts for third-party ignition sources within its modeling. However, these rankings are misleading regarding risks pertinent to catastrophic fires.”¹⁰

To demonstrate exactly how misleading, MGRA in its 2022 WMP Comments reviewed catastrophic wildfires allegedly associated with SCE equipment that had occurred between 2015 and 2019 as to their alleged cause.¹¹ These fire causes were compared with the expected number of fires based on the relative driver risk ranking estimated by the utility. The result is that SCE’s risk model very poorly describes observed dangerous and catastrophic fires:

Predicted and observed major fires for SCE, 2015-2020

Driver	Ign Risk %	Observed	Expected	Chi2	Yates
Vehicle	7	0	0.88	0.88	2.17
Balloon	13	0	1.52	1.52	2.69
Veg Contact	11	4	1.28	5.79	3.86
Other Contact	6	0	0.67	0.67	2.04
Animal	13	1	1.52	0.18	0.69
Wire Contact	5	2	0.55	3.85	1.65
Vandalism	5	0	0.55	0.55	2.00
Equipment	42	5	5.03	0.00	0.05
Total	100	12	12	13	15

P - Chi2 0.06213238

P - Yates 0.03409584

⁹ Draft Decision; p. 20.

¹⁰ SDG&E Draft Decision; p. 37.

¹¹ MGRA Comments; pp. 34-36.

Table 1 - Pearson Chi-squared goodness of fit¹² comparing observed major fire causes against ignition probabilities. It can be seen that the probability that the observed pattern arises from the predicted distribution is low. Using the "Yates" correction used for sparse bins the hypothesis that the ignition probability distribution predicts catastrophic fire probability can be excluded with statistical significance ($P < 0.05$).

It is not possible to do a similar analysis for SDG&E because they (fortunately) do not have an adequate number of destructive fires to analyze. However, the distribution of their risk looks extremely similar to that SCE:

Driver	Percentage	
	SDG&E	SCE
Vehicle	17	7
Balloon	17	13
Veg Contact	15	11
Other Contact	8	6
Animal	5	13
Wire Contact	3	5
Vandalism	2	5
Equipment	33	42

Table 2 - Percentage of ignition risk represented by different risk drivers as per SCE's and SDG&E's Table 4-6.

SDG&E also predicts that only half of risk should be due to ignitions from vegetation contact, equipment failure, and wire clashing. No catastrophic SDG&E fire to date has been due to vehicle collision, balloons, or animal contact.

PG&E, on the other hand uses a "Red Flag Warning" filter for its risk analysis, which while imperfect does create the missing causal link between the probability and consequence components. This produces a profoundly different ranking of risk drivers:¹³

¹² $\chi^2_{Pearson} = \sum (O - E)^2 / E$ where E is the expected number and O is the observed.
 $\chi^2_{Yates} = \sum (O - E - 0.5)^2 / E$. Probabilities were calculated with the Excel function CHISQ.DIST.RT, using 8 degrees of freedom.].

¹³ MGRA Comments; p. 36-37.

TABLE PG&E-4.2-2:
WILDFIRE RISK DRIVERS

% Risk Drivers	HFTD				Non-HFTD				Grand Total
	Distribution	Transmission	Substation	HFTD Total	Distribution	Transmission	Substation	Non-HFTD Total	
Vegetation Contact	59.7%	0.5%	0.0%	59.3%	0.4%	0.0%	0.0%	0.4%	59.7%
Equipment / facility failure	31.2%	1.2%	0.1%	32.5%	0.5%	0.0%	0.0%	0.5%	33.0%
Contact from object	2.8%	1.3%	0.0%	4.1%	0.2%	0.0%	0.0%	0.2%	4.2%
Wire-to-wire contact	1.3%	0.0%	0.0%	1.3%	0.0%	0.0%	0.0%	0.0%	1.4%
Unknown	0.8%	0.1%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.9%
Other	0.5%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	0.6%
Utility work / Operation	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%
Vandalism / Theft	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%
Contamination	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%
CC - Seismic Scenario	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grand Total	95.6%	3.2%	0.1%	98.9%	1.1%	0.0%	0.0%	1.1%	100.0%

Table 3 - PG&E Wildfire Risk Driver tables, assuming a RFW day filter. Note that Vegetation contact and Equipment Failure predominate and that "Contact from Object" (animals, balloons, vehicles) represents only 4% of the predicted risk.

Even accounting for differences in service areas, it is impossible for PG&E to obtain risk rankings for its drivers that are so profoundly different from those obtained by SCE and SDG&E. In a word, PG&E adds a correlation factor that links drivers to their likelihood on “worst weather days” (Red Flag Warnings), while SCE and SDG&E do not. The result is that SDG&E and SCE artificially amplify risk from drivers such as animals, vehicles, and balloons that are rarely if ever responsible for catastrophic fires. This is not a harmless problem: Different risk drivers are likely to have different distributions across the landscape, and “red herring” risk drivers will lead utilities to invest in mitigating areas of comparatively low wildfire risk.

Recommendation:

Risk Modeling Workshops should continue into 2023 with a goal of resolving how to incorporate correlations between outage drivers (such as wind) and consequence models. SCE should, in its RAMP, be required to perform sensitivity analysis similar to PG&E’s, in which it uses Red Flag Warning as a tranche identifier.

3. CONCLUSION

MGRA is currently involved in both SCE’s RAMP proceeding and SDG&E’s GRC proceeding and is planning to raise this issue of incorrect risk calculation in these fora. However, it would be helpful for our progress in those proceedings and for the safety, well-being, and economic health of Californians if the Office of Energy Safety were to recognize the problem, continue

evaluation through the Risk Modeling Working Group, and state that remediation by the utilities correctly incorporating driver-specific conditional probability linkages between outages and catastrophic outcomes will be required in future filings.

Respectfully submitted this 22nd day of June, 2022,

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