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

October 13, 2023 VIA ELECTRONIC FILING

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

RE: MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2023-2025 WILDFIRE MITIGATION PLANS R3 OF PG&E AND ASSOCIATED FILES

Dear Director Thomas Jacobs:

The Mussey Grade Road Alliance (MGRA or Alliance) files these comments pursuant to the October 6th Extension issued by the Office of Energy Infrastructure Safety (OEIS or Energy Safety) which authorizes public comment on the PG&E's Revision Notice Responses[1] by October 13th and reply comments by October 20, 2023.

Respectfully submitted this 13th day of October, 2023,

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

[1] Docket #2023-2025-WMPs; TN13172_20231006T135536_PGE_Supplemental_Response_to_Revision_Notice_Comment_Period_Extension; Revision to Comment Schedule for PG&E 2023-2025 WMP Supplemental Response to Revision Notice. (Extension).

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.

MUSSEY GRADE ROAD ALLIANCE COMMENTS ON PG&E'S REVISION NOTICE #3 AND ASSOCIATED FILES

The Mussey Grade Road Alliances (MGRA or Alliance) Comments on PG&E's Revision Notice Response 3[2] and associated files[3] are authored by MGRA's expert witness Joseph W. Mitchell, Ph.D.[4]

1. PG&E'S R3 REVISION DOES NOT ADDRESS ISSUES RAISED BY MGRA IN R2

On August 22, 2023, MGRA (as well as other intervenors) submitted comments on PG&E's R2 WMP revision.[5] Specific issues raised by MGRA and still not addressed in the current response include:

- A plan to accelerate PG&E's deployment of advanced technologies in order to come into line with similar programs being developed by SDG&E and SCE, specifically REFCL, EFD (Early Fault Detection), DFA (Distribution Fault Anticipation), and FCP (Falling Conductor Protection) / DCD (Downed Conductor Detection – PG&E's version of FCP.
- Adding advanced technologies (specifically REFCL and/or DCD) to covered conductor as a proposed alternative to undergrounding.
- PG&E needs to adjust its projected PSPS scores for higher wind threshold possible through the use of covered conductor and particularly the use of covered conductor in conjunction with complimentary advanced technologies.

---

[2] Docket #2023-2025-WMPs; September 27, 2023; TN13172_20231006T135536_PGE_Supplemental_Response_to_Revision_Notice_Comment_Period_Extension; 2023-2025 Wildfire Mitigation Plan Supplemental Response to Revision Notice. (RN3) September 27, 2023

[3] Attached files are:
TN13047_20230927T140615_PGE's_20232025_Wildfire_Mitigation_Plan_Supplemental_Response_to_Revision_Notice (WMP R3)
TN13049_20230927T140615_20230927_PGE_23_SRNR_R1_Tables_147
TN13050_20230927T140615_20230927_PGE_2305_SRNR_R0_Atch01_Redacted
TN13051_20230927T140615_20230927_PGE_2305_SRNR_R0_Atch02xlsx
TN13052_20230927T140615_20230927_PGE_2305_SRNR_R0_Atch03_Redactedxlsx

[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] Docket #2023-2025-WMPs; August 13, 2023; RE: MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2023-2025 WILDFIRE MITIGATION PLANS R2 OF PG&E AND REVISION NOTICE RESPONSE.

- PG&E needs to provide additional data about EPSS events triggered in areas of low fire risk.

2. PG&E'S UNDERGROUNDING LOGIC IS OPAQUE

On page 79 of its revision notice, PG&E changed the status of 13 percent of its circuit segments from undetermined to undergrounding:

> For the remaining 13 percent of circuit segments in the portfolio, we ~~have delayed~~selected undergrounding ~~in those~~ locations to maximize risk reduction for each dollar spent. ~~Instead of undergrounding these circuit segments at this time based on the risk-rank methodology,~~ PG&E determined that it would be more efficient to choose circuit segments based on the WFE score because undergrounding circuit segments with a lower feasibility score can be done more quickly with a lower cost. Please see the response to Critical Issue Remedy b. i for additional context.

PG&E reaches a totally different conclusion applying the same logic it had been using beforehand. This makes no sense and OEIS should require further explanation as to why this addition 13% was designated for undergrounding when it wasn't before. OEIS should require that this be clarified.

3. PG&E'S VALUE FOR COVERED CONDUCTOR RISK REDUCTION IS AN UNDERESTIMATE

PG&E estimates that covered conductor risk reduction is 62%,[6] which MGRA has demonstrated to be a substantial underestimate when compared with the results from PG&E, SCE and SDG&E. Referring to MGRA's 2023 WMP Comments:

"*PG&E reports a reduction in outages of approximately 70% for circuit segments with more than 80% covered conductor deployed*."[7]

For SCE, MGRA notes that its covered conductor program drastically reduces the drivers associated with catastrophic fire: vegetation ignitions by over 70%, other contact by over 77%, and conductor damage by 82%.[8]

PG&E's estimate also does not account for deploying advanced technologies such as REFCL, Downed Conductor Detection (DCD – PG&E), or Falling Conductor Protection (FCP –

[6] PG&E RN3; p. 91; Figure SRN-PG&E-23-05-07: Sample EASOP OUTPUT.
[7] 2023-2025 WMPs; MGRA Comments; p. 91.
[8] Id; p. 92; Table 6.

SDG&E) concurrent with or subsequent to overhead hardening with covered conductor. This step addresses the remaining major vulnerability of covered conductor, which is large tree fall-in. SCE is the only utility so far to attempt SME estimates for covered conductor + REFCL protection, and while there are oddities in these that suggest underestimation as well, they show that a higher degree of protection can be achieved particularly for circumstances in which covered conductor alone might not be effective. Vegetation contact is estimated at 85%, unknown contact at 90%, wire-to-wire at 99%, and conductor damage or failure at 95%.[9]

Therefore calculations provided by PG&E based on its EASOP output are inaccurate. I have attached two "alternative" EASOP outputs based on 70% CC effectiveness (alone) and 90% CC effectiveness (EASOP + advanced technology, conservative).

The original table from PG&E on page 91 is below:

FIGURE SRN-PG&E-23-05-7: SAMPLE EASOP OUTPUT

	Circuit Name (1 miles)		No System Hardening	Overhead Hardening	Under-Grounding	Hybrid
	Project Scope Risk Reduced After Mitigation		-	0.62	0.99	0.81
	Project Scope Residual Risk Value		**1.00**	**0.38**	**0.01**	**0.20**
	Overall Miles Installed		1 Existing OH	1.00	1.00	1.00
	Overall Miles Removed		-	-	-	-
	OH System Hardening Cost	$1M/risk-mile	-	$1M	-	$0.5M (0.5 mi)
	UG System Hardening Cost	$2.8M/risk-mile	-	-	$2.8M	$1.4M (0.5 mi)
	Line Removal Cost	$106k/risk-mile	-	-	-	-
	Total Capital Cost (AACE Class 5)			$1M	$2.8M	$1.9M
	Average O&M Cost (per year)			$15k	$3k	$9k
	NPV @ 6.8% discount rate			**($1.3M)**	**($2.9M)**	**($2.1M)**
Primary Filter	**$ NPV per unit of rise (RSE)**			**($2.15M) 1st**	**($2.89M) 3rd**	**($2.6M) 2nd**
	PSS Preference (Ingress/egress/fire history)			**Non-satisfactory**	**Satisfactory**	**Satisfactory**
Secondary Filter	**Strike Tree Potential**		**High Fall-In Risk**	**Moderate Fall-In Risk**	**No Fall-In Risk**	**Low Fall-In Risk**
	Ingress / Egress		**Non-satisfactory**	**Non-satisfactory**	**Preferred**	**Satisfactory**
	PSPS Mitigation (# custs * # event)					
	Execution timeline (2021, 2022, 2022+)			**2021**	**2022+**	**2022+**
	Other (Operational Considerations, etc.)					
						Recommended

Table 1 - PG&E SAMPLE EASOP OUTPUT provided in RN3; p. 91

Below is a calculation using covered conductor alone, with an estimated efficiency of 72%.

[9] Id; pp. 98-99; Table 11.

	Circuit Name (1 miles)		No System Hardening	Overhead Hardening	Under-Grounding	Hybrid
	Project Scope Risk Reduced After Mitigation		-	0.72	0.99	0.86
	Project Scope Residual Risk Value		**1.00**	**0.28**	**0.01**	**0.15**
	Overall Miles Installed		1 Existing OH	1.00	1.00	1.00
	Overall Miles Removed		-	-	-	-
	OH System Hardening Cost	$1M/risk-mile	-	$1M	-	$0.5M (0.5 mi)
	UG System Hardening Cost	$2.8M/risk-mile	-	-	$2.8M	$1.4M (0.5 mi)
	Line Removal Cost	$106k/risk-mile	-	-	-	-
	Total Capital Cost (AACE Class 5)			$1M	$2.8M	$1.9M
	Average O&M Cost (per year)			$15k	$3k	$9k
	NPV @ 6.8% discount rate			**($1.3M)**	**($2.9M)**	**($2.1M)**
Primary Filter	**$ NPV per unit of rise (RSE)**			**($1.85M) 1st**	**($2.89M) 3rd**	**($2.45M) 2nd**
	PSS Preference (Ingress/egress/fire history)			**Non-satisfactory**	**Satisfactory**	**Satisfactory**
Secondary Filter	**Strike Tree Potential**		**High Fall-In Risk**	**Moderate Fall-In Risk**	**No Fall-In Risk**	**Low Fall-In Risk**
	Ingress / Egress		**Non-satisfactory**	**Non-satisfactory**	**Preferred**	**Satisfactory**
	PSPS Mitigation (# custs * # event)					
	Execution timeline (2021, 2022, 2022+)			**2021**	**2022+**	**2022+**
	Other (Operational Considerations, etc.)					
						Recommended

Table 2 - MGRA modification of PGE_2305_SRNR-Atch02, 72% CC efficiency. Tab Decision Framework.[10]

Note that under these assumptions, the $NPV per unit of RSE drops from $2.15M to $1.85M. As seen in the table below, this drops further to $1.48M if the hardening efficiency is changed to 90% by including advanced technologies (this is a conservative estimate).

A	B	C	D	E	F	G
	Circuit Name (1 miles)		No System Hardening	Overhead Hardening	Under-Grounding	Hybrid
	Project Scope Risk Reduced After Mitigation		-	0.90	0.99	0.95
	Project Scope Residual Risk Value		**1.00**	**0.10**	**0.01**	**0.05**
	Overall Miles Installed		1 Existing OH	1.00	1.00	1.00
	Overall Miles Removed		-	-	-	-
	OH System Hardening Cost	$1M/risk-mile	-	$1.2M	-	$0.6M (0.5 mi)
	UG System Hardening Cost	$2.8M/risk-mile	-	-	$2.8M	$1.4M (0.5 mi)
	Line Removal Cost	$106k/risk-mile	-	-	-	-
	Total Capital Cost (AACE Class 5)			$1.2M	$2.8M	$2M
	Average O&M Cost (per year)			$15k	$3k	$9k
	NPV @ 6.8% discount rate			**($1.3M)**	**($2.9M)**	**($2.1M)**
Primary Filter	**$ NPV per unit of rise (RSE)**			**($1.48M) 1st**	**($2.89M) 3rd**	**($2.21M) 2nd**
	PSS Preference (Ingress/egress/fire history)			**Satisfactory**	**Satisfactory**	**Satisfactory**
Secondary Filter	**Strike Tree Potential**		**High Fall-In Risk**	**Low Fall-In Risk**	**No Fall-In Risk**	**No Fall-In Risk**
	Ingress / Egress		**Non-satisfactory**	**Satisfactory**	**Preferred**	**Satisfactory**
	PSPS Mitigation (# custs * # event)					
	Execution timeline (2021, 2022, 2022+)			**2021**	**2022+**	**2022+**
	Other (Operational Considerations, etc.)					
						Recommended

Table 3 - MGRA modification of PGE_2305_SRNR-Atch02, 90% CC efficiency. Tab Decision Framework AT.[11]

Even using PG&E's numbers, the highest efficiency for reducing risk can be found by selecting the Overhead Hardening option.

As to the secondary filters that are used to override the primary filter:

[10] See Attachment B; MGRAMod_20230927_PGE_2305_SRNR_R0_Atch02xlsx-jwm; Tab Decision Framework.
[11] See Attachment B; MGRAMod_20230927_PGE_2305_SRNR_R0_Atch02xlsx-jwm; Tab Decision Framework AT.

Tree Strike: Tree strike potential is a known wildfire risk driver can cause ignitions for covered circuits. However, advanced technologies used in conjunction with covered conductor – REFCL, DCD, FCP – are specifically designed to de-energize a broken wire (DCD, FCP) or to instantaneously stop current in the event of a high-impedance fault (REFCL). This configuration should therefore be determined to be "Low Fall-In Risk".

Ingress/Egress - MGRA served Data Request #7 in order to obtain details regarding the PSS Team and its deliberations used to make this determination. Analysis will be included in the final section.

PSPS Mitigations - In its 2023 WMP Comments, MGRA showed that the extent, duration, and frequency of PSPS shutoffs is a very strong function of the wind threshold used to make the PSPS determination. It showed, for example, that an increase of threshold from 55 mph to 70 mph would reduce the time over threshold of SDG&E's service area by 96%.[12] Therefore, if covered conductor and covered conductor in combination with advanced technologies can safely be operated at higher PSPS wind speed thresholds then they will substantively mitigate power shutoff.

4. PROPOSED CHANGES TO PG&E'S PGE_23_SRNR_R1_TABLES_147

4.1. TABLE 7-3-1 REVISED and Table 8-1, Line 6

Currently reads: "*Update the covered conductor recorded effectiveness calculation using 2023 and 2024 outage data on the lines that have Covered Conductors for consideration in future system hardening workplans*."

PG&E is not currently deploying enough covered conductor fast enough to get a statistically meaningful estimate of its effectiveness. By the time it would achieve such a milestone, its undergrounding program will have effectively supplanted any potential alternatives. Energy Safety should therefore require PG&E to incorporate data from Southern California Edison's mature covered conductor program to include in its estimates, being careful to compare similar areas and biomes (forest, oak woodland, etc.)

[12] MGRA 2023 WMP Comments; p. 109.

4.2. TABLE 7-3-2: PG&E'S WMP TARGETS

Recommendation:

Add to PG&E's targets:

- Full evaluation of the effectiveness of covered conductor in combination with PG&E's DCD technology
- Full evaluation of the effectiveness of covered conductor in combination with PG&E's DCD technology
- Deploy 2 additional REFCL systems. The fact that SCE has successfully deployed REFCL systems proves that PG&E's earlier failure to create an operational REFCL system is not a fundamental problem with the technology.
- Create more aggressive targets for deployment of DFA and EFD systems. These have the potential to substantially reduce systematic risk across PG&E's infrastructure.

5. EVALUATION OF PG&E'S INGRESS/EGRESS ANALYSIS

In order to evaluate PG&E's Ingress / Egress analysis used in its undergrounding determination, MGRA issued Data Request 7. PG&E's response is attached as Appendix A, at the end of this document.

5.1. Public Safety Specialist Team

In order to make determinations of whether there are ingress/egress issues associated with a circuit segment, PG&E uses input from its "Public Safety Specialist Team", a group of 30 subject matter experts who are "*a diverse group of safety specialists with varying degrees of experience in fire spread modeling, traffic control and evacuation, and wildland firefighting and suppression*."[13] These include former law enforcement and wildfire agency staff. According to PG&E they are "*often are very knowledgeable about traffic control and evacuation modeling*."[14]

[13] Appendix A; p. 2/9.
[14] Id.

5.2. Definition of Ingress / Egress Issues

According to PG&E, the PSS team considers a large number of factors when determining whether there is an ingress / egress issue that affects undergrounding decision making, including population density, time of day, evacuation time, road infrastructure, fuel types, weather conditions, topography, vulnerable populations, location of electrical assets, and firefighting ingress.[15]

PG&E has developed an EASOP evaluation tool to guide PSS Team members in scoring hardening projects:
"*When PG&E conducted the EASOP analysis, our PSS team members reviewed each system hardening project during the scoping process to determine if ingress/egress issues existed at the site. Given the time and effort required to repeat this type of analysis, PG&E is instead using a PSS proxy in this alternatives analysis. In place of a PSS team member reviewing each of the 2023-2024 project sites selected by WDRM v3, PG&E is using the PSS score for each circuit and applying it to each segment on that circuit. If the PSS score for a circuit is high (score = 105), then the model considers there to be an ingress/egress risk on each of the segments that make up that circuit*."[16]

For circuits that receive a score above threshold: "*The PSS score was used to advance work into the portfolio when the location was not also the highest risk in the WDRM risk model, but the location was understood to be high risk by our wildfire mitigation experts. A separate PSS evaluation for each project would be completed as part of the scoping process and was included as one element on the decision tree*."[17]

5.3. PG&E – Circuit Based Fire Risk Assessment Tool

The PG&E Circuit Based Fire Risk Assessment Tool is a grid-based scoring system, shown in the figure below:

[15] Id.; p. 3/9.
[16] Id.; p. 4/9.
[17] Id.; p. 5/9.

PG&E - Circuit Based Fire Risk Assessment Tool					
Evaluator	*Circuit*	*Primary*	*Secondary*	*Tier*	*Date*

	Fire History (40yr all fires)	Ingress/Egress Impacts	Resistance to Control	Community Risk Factors	Other Unique Local Factors
	Is there frequent return of catastrophic fire?	Can roads inundated by evacuees due to potential failure of overhead assets, vegetation and road design?	Do the fire fuels require more resources, change suppression strategies and create secondary ignition potential?	Are there potential impacts to commercial, industrial sites and critical infrastructure?	Evaluator identifies other local critical/unique factors. **See "notes" below.**
30 Points	Multiple major wildfire incidents in the project area.	Primary routes of travel may be impacted due to overhead asset failure, inadequate road design or vegetation.	Timber fuels require heavy commitment of suppression resources and may use "indirect" control strategy.	Multiple threats to economic values or critical infrastructure.	Multiple factors exist and significantly increase incident complexity and community risk.
15 Points	Single major wildfire incident in or near the project area.	Some primary routes of travel will be impacted due to overhead asset failure, inadequate road design or vegetation.	Brush fuels require heavy commitment of suppression resources and may use "indirect" control strategy.	Single threat to either economic value or critical infrastructure.	Multiple factors exist with minor/moderate increases to incident complexity and community risk.
5 points	Small occasional wildfire incidents in the project area.	Minimal Impacts to roads and travel routes	Grass/ Oak woodland fuels require fewer resources and direct control strategies are most effective.	Minimal threats present.	A single factor exists with little change to incident complexity or community risk.
0 Points	No wildfire incidents in the project area.	No roads or routes of travel impacted	Agricultural Crops or maintain landscaped vegetation	No threats present.	No additional factors.
Score:	**0**	**0**	**0**	**0**	**0**
Comments:					
Notes:					

Circuit Score:	**0**
Max Points:	**150**
Circuit Risk Rating:	**0.00%**

Figure 1 - PG&E Circuit Based Fire Risk Assessment Tool, Appendix A.

The guidelines given to the PSS to use the tool are:

"***Fire History*** *- Does the project/circuit have repeated, intense fire history in the last 40 years at or near the circuit? https://firemap.sdsc.edu/*

Ingress/ Egress Impacts *- Number, type and size of roads. Could fire weakened trees or PG&E overhead assets block primary/secondary ingress and egress routes for evacuation or first responders should they fail based on impacts of wind or wildfire? Will evacuation likely inundate the roads?*

Resistance to control *- Does the presence of heavy fuels contribute to increased difficulty to control requiring more resources and indirect strategy? Will there be a long duration, plume*

dominated/crown fire event with potential for long range spot fires and/or changing adverse weather conditions?

Community Risk Factors *- Industrial/Commercial businesses, watershed and timber resources, critical facilities such as water treatment, communications, recreational sites or other natural, historical or cultural resources. What will be the long term community impacts?*

Other Unique Local Factors *- Are there unique situations where Fire Behavior factors (Fuels, Weather and Topography) collide with human designs to create the "highest risk" or "worst case scenario". (Bug Kill, Non native tree species, dead end roads, high risk occupancies, sensitive sites etc.*)"

Each of these factors is associated with a point score of 0, 5, 15, or 30 points depending on conditions / severity of that particular factor. The point scores for the five factors are added together and if the total is 105 or more the circuit is put into the undergrounding bin.

5.4. Analysis of the PG&E Methodology and Recommendations

5.4.1. Principles of Ingress / Egress and Undergrounding

Ingress and egress issues are extremely important considerations with regard to wildfire mitigation, especially because the most severe mass casualty wildfire events occurred in areas where safe evacuation could not be done prior to the arrival of a wildfire – tragedies including the Tunnel fire, the Camp fire, and most recently the Lahaina fire all had limited ingress and egress as a factor that contributed significantly to their death tolls.

There are two separate considerations determining where a utility's responsibilities lie with respect to the ingress/egress vulnerability of an area:

1. If an ignition from utility equipment can lead to a wildfire that overruns an evacuation route before residents would have a reasonable chance to escape, this greatly increases the potential for a mass casualty event. Utility risk models should therefore incorporate ingress / egress as a factor that will amplify the assessed risk of any circuit segment that has this potential.

2. If utility equipment itself becomes involved in a wildfire (whether this is a utility-caused wildfire or not) and falls into the roadway and restricts evacuation (as happened in the Camp fire[18]), then the utility equipment can contribute to additional injuries and death from that wildfire.

With regard to the first consideration, the utility's responsibility is to mitigate the wildfire risk to the full extent possible. A consequence model that realistically captures the impacts of a mass casualty event should adequately indicate the risk level. *How* that utility reduces the risk to an acceptable level depends on the mitigation tools available to it. Undergrounding may be an optimal strategy for such circuits, but it is not by default the only option. Other effective options (CC + advanced technologies) might provide adequate protection, and should be evaluated by the utility.

With regard to the second issue, if the utility's equipment would present an evacuation problem in a wildfire, this is a very strong case for undergrounding. However, this would require close coordination with communication providers that are also using the poles, since pole removal would be the goal in these cases. Reinforcing or protecting the poles or equipment, or moving them away from the right-of-way could also be considered.

5.4.2. Evaluation of PG&E's PSS Methodology

Using subject matter expert opinion is somewhat fraught when these subject matter experts may have differing views as to how specific situations should be assessed. One issue is that each of these staff members is regional,[19] and therefore may be unfamiliar with other areas in the PG&E service area. How each of these assessment tools is then cross-calibrated and QA'd is not defined. It is not clear, therefore, that different parts of the PG&E service area supervised by different PSS staff will have this analysis applied in an identical manner.

Another concern is that with the large number of projects and circuits, the analysis is very coarse grained – on the circuit level. Risks may be very local in nature. This can result in 1) very

[18] Los Angeles Times; "Must Reads: Here's how Paradise ignored warnings and became a deathtrap"; December 30, 2018; Page St. John, Joseph Serna, Rong-Gong Lin II; https://www.latimes.com/local/california/la-me-camp-fire-deathtrap-20181230-story.html
[19] Op. Cite; p. 2/9.

local issues not typical of the circuit as a whole being ignored and 2) undergrounding being applied to projects based on conditions elsewhere in the circuit.

Recommendations:

- Require PG&E to come up with a methodology to cross-calibrate different PSS staff, possibly by having them randomly assigned to assess areas outside of their own area, and assigning multiple PSS staff to each evaluation.
- Require PG&E to develop a way to QA/QC the results of the tool evaluation, possibly through peer review.
- Find ways to automate and improve the evaluation so that it can be applied at a circuit segment level rather than a circuit level.

5.4.3. Evaluation of the Fire Risk Assessment Tool

The importance of the ingress / egress assessment tool is that it provides additional information that is not incorporated into PG&E's WDRM risk model. In a perfect risk model, ingress and egress issues would simply be another factor in assessing risk scores. Some factors are not incorporated in WDRM, and these are important additional information in determining risk and potential consequences.

The Tool is particularly useful for evaluating risk for Scenario #2 – the risk that utility equipment will be involved in blocking evacuation. Fire history, or recurrence interval, is necessary in that it helps to predict the likelihood of non-utility wildfires. Likewise, fuel type (resistance to control), helps to determine the likelihood of a severe wildfire. Communities at risk and population density, and other factors leading to the potential for a mass-casualty event are other reasonable scoring criteria.

However, for Scenario #1, the potential for a utility ignition trapping a community, the Tool is much less useful. The degree to which such a threat exists requires fire spread modeling, since the entrapped community can be some distance from the circuit, and can be obtained from the Technosylva consequence model. In Scenario #1, the fire history and resistance to control are redundant with the inputs to WDRM. However, the other factors – Ingress/Egress Impacts, Community Risk Factors, and Other Unique Local Features are not incorporated into WDRM and

yet definitely represent risk. One proposal that might properly incorporate both considerations - utility wildfire risk and community factors including evacuation – would be to use the combined scores of the Ingress/Egress Impacts, Community Risk Factors, and Other Unique Local Features as a multiplier for the WDRM score.

Recommendations:

- Divide the evaluation into two scenarios: one evaluating the potential for utility equipment blocking wildfire evacuation, and the other evaluating the potential for a utility wildfire ignition entrapping a community.
- The Circuit Based Fire Risk Assessment Tool is adequate for the first scenario and can be used as a decision-tree input.
- For the second scenario, obtain a score from the Ingress/Egress Impacts, Community Risk Factors, and Other Unique Local Features and use this to re-scale WDRM for communities potentially at risk of entrapment from rapidly spreading utility ignitions.

6. CONCLUSION

MGRA thanks Energy Safety for its efforts in improving the utility Wildfire Mitigation Plans and respectfully requests that our comments be carefully considered.

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

APPENDIX A – PG&E RESPONSE TO MGRA DATA REQUEST 7

PACIFIC GAS AND ELECTRIC COMPANY
Wildfire Mitigation Plans Discovery 2023
Data Response

PG&E Data Request No.:	MGRA_007-Q001		
PG&E File Name:	WMP-Discovery2023_DR_MGRA_007-Q001		
Request Date:	October 9, 2023	Requester DR No.:	MGRA Data Request No. 7
Date Sent:	October 12, 2023	Requesting Party:	Mussey Grade Road Alliance
PG&E Witness:		Requester:	Joseph Mitchell

Regarding PG&E's Revision R3 Specifically regarding p. 92 "improved ingress and egress concerns" and

> "PG&E chose to underground projects identified by the PSS team based on their subject matter expertise because, during a wildfire, distribution poles can fall into roads and streets and block fire suppression efforts and community egress."

QUESTION 001

Please list the titles and qualifications of the team members on the Public Safety Specialist team. Specifically please note the level of experience team members have in:

a. Fire spread modeling using Technosylva or other simulation tools

b. Traffic control and evacuation modeling

c. Wildland firefighting and suppression

Please include any specific work experience or accomplishments.

ANSWER 001

PG&E has 30 Public Safety Specialists (PSS) at the expert and senior levels. Below, we describe the general roles, levels, responsibilities, and qualifications of the PSS team. After the narrative, we provide a table that lists the minimum and desired qualifications for PSS experts and seniors.

Generally, a PSS is responsible for serving as the point of contact for county office of emergency services (OES), fire and law enforcement agencies. The PSS also facilitates conversations with and works with public works departments, contractors, excavators, tree trimmers, utilities and other specialized groups within PG&E's service territory and provides on-site support to PG&E and agency responders during emergencies. Additionally, the position supports gas and electric regulatory compliance mandates, the delivery of the Community Wildfire Safety Program and the Public Safety Power Shutoff Program, wildfire resiliency efforts, and emergency planning efforts across all Functional Areas.

PSS teams are structured regionally. Collectively, the teams are a diverse group of safety specialists with varying degrees of experience in fire spread modeling, traffic control and evacuation, and wildland firefighting and suppression. Experience in these areas is generally based on their previous emergency management experience.

PSS team members who previously worked in law enforcement have significant experience in traffic control and evacuation modeling because that task generally falls to law enforcement agencies during a wildland fire or other disaster. Team members who had previous careers in law enforcement generally held executive level positions within their respective agencies.

PSS staff who previously worked for wildland fire agencies, such as CALFIRE, USDA Forest Service, National Park Service, and the Bureau of Land Management have extensive experience in wildland firefighting and suppression, with some limited to moderate experience in fire spread modeling using Technosylva or other simulation tools. These team members often are very knowledgeable about traffic control and evacuation modeling. Most of our team members who had previous careers in firefighting held the position of Chief Officer and above.

PSS staff who came from firefighting within local government agencies such as counties, cities, and special districts have varying degrees of experience in fire spread modeling, traffic control and evacuation, and wildland firefighting and suppression based on the size or jurisdiction of the department in which they worked.

The below table lists the minimum and desired qualifications for PSS experts and seniors.

Title	Minimum Qualifications	Desired Qualifications
Expert PSS	• Bachelor's Degree in Communications, Information Management, Sociology • Completion of Incident Command System 100-700 Courses • Completion of Incident Command System (ICS) Fundamentals • Company Emergency Response Plan familiarization or completion of WBT • 8 years total related experience, including 5 years in an information management, communications, or related field.	• Master's Degree in related field • Certification as an instructor and/or emergency responder • Experience in a public safety organization
Senior PSS	• High School or GED-General Educational Development-GED Diploma • Completion of ICS-Incident Command System 100-700 courses • 6 years total related experience, including 5 years conducting training to diverse audience	• Bachelor's Degree in related field • FEMA-Federal Emergency Management Agency Emergency Responder Certification • Experience as a public safety organization training officer

PACIFIC GAS AND ELECTRIC COMPANY
Wildfire Mitigation Plans Discovery 2023
Data Response

PG&E Data Request No.:	MGRA_007-Q002		
PG&E File Name:	WMP-Discovery2023_DR_MGRA_007-Q002		
Request Date:	October 9, 2023	Requester DR No.:	MGRA Data Request No. 7
Date Sent:	October 12, 2023	Requesting Party:	Mussey Grade Road Alliance
PG&E Witness:		Requester:	Joseph Mitchell

QUESTION 002

Are ingress and egress concerns determined solely by the potential for falling poles or does the PSS team also analyze the potential for entrapment by fast moving wildfires and/or insufficient notice?

ANSWER 002

Ingress and egress concerns are not determined solely by the potential for falling poles. The PSS considers many factors when evaluating ingress and egress concerns in a complex or rapidly expanding wildland fire including:

- Population density
- Time of day (there are differences between evacuating communities at night when most people are at home compared to during the day when fewer people are at home).
- Amount of time the public would need to evacuate or shelter in place
- Notifications and information made available to the public
- Road infrastructure (e.g., road size, number of lanes, type of surface, destination)
- Fuel types along an evacuation corridor (e.g., grass vs. brush vs. timber)
- Elevated Weather conditions (e.g., red flag days including high temperatures, high winds, low relative humidities)
- Topography/terrain (do evacuation routes place evacuees in danger due to steep slopes, drainages, and chimneys along a corridor which are often associated with extreme fire behavior)
- Human factors (e.g., elderly, special needs, evacuating large and small pets, knowledge or experience of citizens living in high fire hazard areas)
- Location of overhead electrical assets (e.g., poles proximity to the road's shoulder and conductor crossings over those ingress/egress thoroughfares should they become impacted by fire and fail onto the evacuation corridor)
- Firefighting ingress (e.g., number, type, size of equipment, staging areas, etc.)

PACIFIC GAS AND ELECTRIC COMPANY
Wildfire Mitigation Plans Discovery 2023
Data Response

PG&E Data Request No.:	MGRA_007-Q003		
PG&E File Name:	WMP-Discovery2023_DR_MGRA_007-Q003		
Request Date:	October 9, 2023	Requester DR No.:	MGRA Data Request No. 7
Date Sent:	October 12, 2023	Requesting Party:	Mussey Grade Road Alliance
PG&E Witness:		Requester:	Joseph Mitchell

FN60 - When PG&E conducted the EASOP analysis, our PSS team members reviewed each system hardening project during the scoping process to determine if ingress/egress issues existed at the site. Given the time and effort required to repeat this type of analysis, PG&E is instead using a PSS proxy in this alternatives analysis. In place of a PSS team member reviewing each of the 2023- 2024 project sites selected by WDRM v3, PG&E is using the PSS score for each circuit and applying it to each segment on that circuit. If the PSS score for a circuit is high (score = 105), then the model considers there to be an ingress/egress risk on each of the segments that make up that circuit.

QUESTION 003

How representative is the proxy PSS score of the entire circuit? Specifically,

a. How many hardening projects are there per circuit? Provide a distribution if possible.
b. What fraction does the hardening project typically take up of the circuit? Provide a distribution if possible.
c. Show how EPS scores are determined and how these compare against WDRM v3.
d. Is PSS ingress/egress scoring used as an element incorporated into the risk model or is it used as an independent decision tree branch point?
e. What fraction of undergrounding projects rely on PSS ingress/egress scores to make the determination to underground?
    i. Provide the fraction for cases where it was the only/primary determinant and
    ii. Provide the fraction for cases where PSS ingress/egress was only one of many factors used in the determination to underground.

ANSWER 003

a. The number of hardening projects per circuit varies depending on the length of the circuit, the number of circuit protection zones on the circuit, the load, and the needs of the circuit. There is no average distribution. Please note that the PSS score is not the sole driver for any mitigation decision and is only a driver for the inclusion of a circuit segment to be included in the portfolio. A more detailed PSS review is

concluded within the scoping process to understand the specific needs within a project.

b. The portion of the circuit taken up by a hardening project varies by circuit and depends on the risk distribution within the circuit and the needs of the circuit. There is no average distribution. CPZ system hardening projects can range from less than 1 mile to more than 50 miles. The decision for specific mitigation alternatives is typically made at a sub-project level. Because of this, a percentage of the circuit in a hardening project is not useful in this determination of the value of the PSS score.

c. PG&E assumes this question is referring to the PSS score. PSS scores are the output from a PSS Circuit Based Risk Assessment. A copy of the PSS assessment form, score sheet, and risk matrix is attached "*WMP-Discovery2023_DR_MGRA_007-Q003Atch01.xlsx*". In response to Question 1 of this data request, PG&E provided the qualifications for our PSS team members. Only select PSS team members were qualified by PG&E's Wildfire Governance Council to perform the PSS Circuit Based Risk Assessments. To perform an assessment, a PSS must have:

    - Minimum of 20 years of education, training, and experience in wildfire incident response.
    - Knowledge base including fire behavior, prevention standards, suppression tactics and strategies, all risk emergency response, command and control, and complex incident management.
    - Each evaluator has functioned as a Chief Officer within California Professional Wildland Firefighting Agencies.
    - Experience as members of a Local, State, or Federal Incident Management Teams.

    PSS scores do not compare to WDRM v3 risk scores. The PSS score was used as a supplemental review of risks that were not identified by or quantified by WDRM v2.

d. The PSS score is an independent element. The PSS score was used to advance work into the portfolio when the location was not also the highest risk in the WDRM risk model, but the location was understood to be high risk by our wildfire mitigation experts. A separate PSS evaluation for each project would be completed as part of the scoping process and was included as one element on the decision tree.

e. PSS ingress/egress recommendations were one of several elements discussed as part of the system hardening mitigation decision. While it is possible that ingress/egress concerns may have been a determining factor for some projects on individual portions of a circuit segment, other factors were reviewed and considered such as PSPS impact and tree fall-in risk for each project as well.

    i. Because each project is reviewed for a variety of factors information about the fraction of cases where a PSS ingress/egress score was the primary determinant is not centrally tracked and not readily available among PG&E's thousands of system hardening projects.

    ii. Similar to the response to subpart e.i.,information about the fraction of cases where PSS ingress/egress was only one of many factors used in the determination to underground is not readily available among PG&E's

thousands of system hardening projects. However, it is accurate that to say on all projects PSS ingress/egress was only one of many factors reviewed during the determination to underground or deploy other wildfire mitigation methods.

PG&E - Circuit Based Fire Risk Assessment Tool

Evaluator	*Circuit*	*Primary*	*Secondary*	*Tier*	*Date*

	Fire History (40yr all fires)	Ingress/Egress Impacts	Resistance to Control	Community Risk Factors	Other Unique Local Factors
	Is there frequent return of catastrophic fire?	Can roads inundated by evacuees due to potential failure of overhead assets, vegetation and road design?	Do the fire fuels require more resources, change suppression strategies and create secondary ignition potential?	Are there potential impacts to commercial, industrial sites and critical infrastructure?	Evaluator identifies other local critical/unique factors. **See "notes" below.**
30 Points	Multiple major wildfire incidents in the project area.	Primary routes of travel may be impacted due to overhead asset failure, inadequate road design or vegetation.	Timber fuels require heavy commitment of suppression resources and may use "indirect" control strategy.	Multiple threats to economic values or critical infrastructure.	Multiple factors exist and significantly increase incident complexity and community risk.
15 Points	Single major wildfire incident in or near the project area.	Some primary routes of travel will be impacted due to overhead asset failure, inadequate road design or vegetation.	Brush fuels require heavy commitment of suppression resources and may use "indirect" control strategy.	Single threat to either economic value or critical infrastructure.	Multiple factors exist with minor/moderate increases to incident complexity and community risk.
5 points	Small occasional wildfire incidents in the project area.	Minimal Impacts to roads and travel routes	Grass/ Oak woodland fuels require fewer resources and direct control strategies are most effective.	Minimal threats present.	A single factor exists with little change to incident complexity or community risk.
0 Points	No wildfire incidents in the project area.	No roads or routes of travel impacted	Agricultural Crops or maintain landscaped vegetation	No threats present.	No additional factors.
Score:	**0**	**0**	**0**	**0**	**0**
Comments:					
Notes:					

Circuit Score:	**0**
Max Points:	**150**
Circuit Risk Rating:	**0.00%**

Considerations:

Fire History - *Does the project/circuit have repeated, intense fire history in the last 40 years at or near the circuit? https://firemap.sdsc.edu/*

Ingress/ Egress Impacts - *Number, type and size of roads. Could fire weakened trees or PG&E overhead assets block primary/secondary ingress and egress routes for evacuation or first responders should they fail based on impacts of wind or wildfire? Will evacuation likely inundate the roads?*

Resistance to control - *Does the presence of heavy fuels contribute to increased difficulty to control requiring more resources and indirect strategy? Will there be a long duration, plume dominated/crown fire event with potential for long range spot fires and/or changing adverse weather conditions?*

Community Risk Factors - *Industrial/Commercial businesses, watershed and timber resources, critical facilities such as water treatment, communications, recreational sites or other natural, historical or cultural resources. What will be the long term community impacts?*

Other Unique Local Factors - *Are there unique situations where Fire Behavior factors (Fuels, Weather and Topography) collide with human designs to create the "highest risk" or "worst case scenario". (Bug Kill, Non native tree species, dead end roads, high risk occupancies, sensitive sites etc.)*

Local Support and Input:

Name/ Title		*Date:*	*LAN ID:*	*Phone #:*
Name/ Title		*Date:*	*LAN ID:*	*Phone #:*
Name/ Title		*Date:*	*LAN ID:*	*Phone #:*

Evaluator Qualification Statement:

All evaluations have been completed by wildland fire experts with a minimum of 20 years of education, training and experience. Knowledge base includes fire behavior, prevention standards, suppression tactics and strategies, all risk emergency response, command and control and complex incident management. Each evaluator has functioned as chief officers with California Professional Wildland Firefighting agencies and have worked as members of Local, State and Federal Incident Management Teams. Each risk factor has been carefully considered, weighted and scored based on the evaluators experience and knowledge of fire behavior, utility and community risk factors.

Evaluator Signature	*Date:*	*LAN ID:*	*Phone #:*

Circuit Risk Scoring (from assessment tool)	
Fire History (40 Years all fires)	**0**
Ingress/ Egress Impacts	**0**
Resistance to Control	**0**
Community Risk Factors	**0**
Other Unique Local Factors	**0**

Circuit Risk Rating
0.00%

Circuit Risk Rating Guide		
96%- 100%	Severe Risk	
90%-95%	Very High Risk	
80%- 89%	High Risk	
70%-79%	Moderate Risk	
60%-69%	Medium Risk	
50%-59%	Low Risk	

Risk	Almost Certain					
	Likely					
	Possible					
	Rare					
	Unlikely					
		May impact one of the following: Safety, assets or equipment, reliability, affordability, compliance, environmental, customer or government relations, business operations or lines of business.	Safety concern. Limited or no damage to assets. No threat to continuity of service. Minimal financial cost or liability. Self reported inspection to regulator with out fines or violation. Limited or no environmental impacts. Limited or no media coverage.	Minor injuries and safety concerns. Damage and degradation of critical assets. Threat to continuity of service. Financial loss. Warning letter or notice of violation from regulators. Local environmental impacts. Limited local media coverage.	Severe to Minor Injuries. Major damage to critical assets. Limited loss of service. Financial loss. Regulatory penalties and legal actions. Environmental damage. Extended state media coverage.	Fatality or Serious Injury. Catastrophic Damage to critical assets. Widespread loss of service. Financial loss. Shut down by regulatory agency. Severe environmental impacts. Negative national/ international media coverage.
	Consequences					