

**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA**

Office of Energy Infrastructure Safety  
Natural Resources Agency

**COMMENTS OF THE GREEN POWER INSTITUTE ON THE  
RESPONSE OF PG&E TO THE 2022 WMP REVISION NOTICE  
ISSUED BY OEIS ON MAY 26, 2022**

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The Green Power Institute (GPI), the renewable energy program of the Pacific Institute for Studies in Development, Environment, and Security, provides these *Comments of the Green Power Institute on the Response of PG&E to the 2022 WMP Revision Notice Issued by OEIS on May 26, 2022*.

GPI provides the following comments on PG&E responses to Critical Issues identified in the OEIS Revision Notice issues on May 26, 2022. Due to limited time our comments focus on a subset of the critical issues and instances where comments are not provided does not imply support.

**Risk Assessment and Mapping**

*RN-PG&E-22-01*: *PG&E has not adequately documented the causes of, or direct lessons learned from, PG&E-ignited catastrophic wildfires*

*For each PG&E-ignited catastrophic wildfire (greater than 500 acres) since 2017,<sup>11</sup> PG&E must:*

- 1. List the cause(s) of each catastrophic wildfire and any associated lessons learned, and*
- 2. Detail the specific measures PG&E is taking to i) directly mitigate the causes of past PG&E-ignited catastrophic wildfires, and ii) integrate lessons learned from past PG&E-ignited wildfires into its wildfire mitigation strategy.*

**Comments on PG&E Response:**

GPI has no comments at this time.

**Grid Design and System Hardening**

*RN-PG&E -22-02*: *PG&E did not report on the amount of work being completed in top-risk areas*

*PG&E must provide an update of Table 5.3- 1(A) with top-risk percentages based solely on risk model output.*

*The revised table must specifically provide the percentage of each type of work being completed in the top-risk circuits defined by risk model outputs. This must be done without conflating the percentages of top-risk circuits with other criteria, including PSPS-impacted locations, fire rebuild projects, and PSS-identified locations.*

*Separate from Table 5.3-1(A), PG&E must provide information to demonstrate that PSPS-impacted locations are correlated with the top risk.*

**Comments on PG&E Response:** PG&E does not provide Target % / Top Risk % for many of the mitigation activities listed in Table PG&E-5.3-1(A) that fall under: “(1) grid design and system hardening (7.3.3); (2) asset management and inspections (7.3.4); and (3) vegetation management and inspection (7.3.5)” correlating to PG&E activity/target IDs “C”, “D”, and “E”, respectively. Table PG&E – 5.3-1(A) provides 12 of 35 targets with Target % / Top Risk % metrics for activities classified as C (4 of 15), D (6 of 10), and E (2 of 10). PG&E explains that mitigation targets that are not based on wildfire risk models, for example, locations selected based on PSPS models are not subject to risk ranking-based percentages and are therefore listed as N/A. Other activities (e.g. E.06 Defensible Space Inspections – distribution substations) are not provided an explanation explaining the missing Target % / Top Risk % metrics.

PG&E has granular wildfire risk scores that are readily available and that allow for the quantification of Target % / Top Risk % for any mitigation or inspection conducted in a specified location or area. GPI asserts that there is value in understanding where mitigations and inspections are deployed on a wildfire risk ranked basis even if the decision-making process utilized a different quantitative model or qualitative justification.

Given PG&E’s Figure RN-PG&E-22-02-01 showing the overlay of PSPS frequency and Wildfire risk, PG&E should provide the Target % / Top Risk % on a co-located wildfire risk basis for program targets that are based on the PSPS frequency model. PG&E should also provide wildfire risk rank-based Target % / Top Risk % metrics for other mitigations and inspection activities informed by factors other than wildfire risk model and PSPS risk

model outputs. For example, activities C.04 Distribution motorized Switch Operator, C.05 SCADA Recloser Equipment Installations, and others. The fact that these mitigations might not be located in HFTD/HFRA circuits should not exempt PG&E from reporting a Target % / Top Risk % metric.

Instead of withholding Target % / Top Risk % metrics from Program Targets PG&E can provide an explanation of why planned work may take place outside of the top 20 % of riskiest circuits. For example, as mitigations with long lifetimes are deployed (e.g. new, replaced, or upgraded assets) the percent deployment in top 20 % riskiest circuits would be expected to decrease since these circuits were hardened in previous years – it would be reasonable to still provide the Target % / Top Risk % metric while also explaining in the notes column the total percent of top 20 % riskiest circuits already “treated.”

GPI is also concerned with the proposed deployment plan for C.01 Expulsion Fuse – Removal:

Engineering coordination studies are required for replacement of all fuses. To expeditiously progress on our plan to reduce risk by removing all known, non-exempt fuses on distribution poles in the HFTD or HFRA within the next five years, fuses requiring simpler engineering coordination studies were prioritized in 2022. Locations with more complex fuses in higher risk locations will be included in future years (Table PG&E-5.3-1(A)).

It not clear whether more timely and rapid removal of expulsion fuses on lower risk circuits, versus fewer and slower removal on the highest risk circuits will result in more rapid risk buydown. GPI is concerned that the proposed prioritization plan leaves “more complex fuses in higher risk locations” for longer. This would appear to result in expulsion fuses with known wildfire risk left in place in high-risk locations for longer periods of time (i.e. years), while relatively more expulsion fuses are removed from lower risk areas first. That is, PG&E appears to be prioritizing volume over risk.

*RN-PG&E-22-03: PG&E is not adequately focusing grid hardening work, particularly undergrounding, on highest-risk areas based on risk model output.*

*PG&E must revise its system hardening plan to adequately demonstrate prioritization based on highest-risk areas. PG&E must provide details of, and commit to, a more*

*aggressive 2022–2024 goal of locating undergrounding in its top 20 percent risk-ranked circuits, on par with its peers. The undergrounding goal must not include any undergrounding associated with fire rebuild miles.*

*If PG&E takes any additional risks into account when developing this more aggressive undergrounding goal, aside from those already considered as part of the risk model output, PG&E must:*

- *Identify the percentage of undergrounding work that will be driven by these additional risk categories (i.e., PSPS, open work tags, Public Safety Specialist selected, etc.)*
- *Explain why PG&E’s existing risk model output does not sufficiently cover these additional risks.*

**Comments on PG&E Response:** PG&E cites The Reburn Project in their response regarding Fire Rebuild Miles.<sup>1</sup> This study states that while the impact of burn and burn severity is complex, incidences of reburn are generally lower intensity and, “within 5 years, most had low amounts of reburn. Area reburned generally increases over time.” The region burned in the 2018 Camp Fire is approaching 4-years. While we understand PG&E’s argument that installing undergrounding in recent burn areas within years after a wildfire may be more efficient, GPI also agrees with WSD concerns and queries whether the proposed fire rebuild is a basic service provision and delays mitigation in locations that may be even more susceptible to high wildfire risk, including high intensity fires, where existing ageing equipment is known to increase risk, especially in the near- to mid-term planning horizon (1-5 years).

This issue is also a broad matter relevant to future wildfire mitigation planning. It is likely that wildfires across California from a variety of ignition drivers will require fire rebuild projects in the coming years. Whether this work should supplant forward progress on risk buydown across the rest of a utility’s territory or occur in addition to regularly planned risk

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<sup>1</sup> Stevens-Rumann, C.S., Prichard, S.J., Strand, E.K., Morgan, P. 2016. Prior wildfires influence burn severity of subsequent large fires. *Canadian Journal of Forest Research* 46 (11): 1375-1385. DOI: 10.1139/cjfr-2016-0185. <https://depts.washington.edu/nwfire/reburn/> Accessed on August 4, 2022.

mitigation efforts or some combination thereof, is a precedence that is important to establish for all Utilities.

PG&E's undergrounding plan has committed the utility to perhaps the most time-consuming and expensive wildfire risk mitigation strategy to implement, such that the pace of risk mitigation is generally slower despite the effectiveness of undergrounding for wildfire risk reduction. GPI proposes adding Fire Rebuild Plans as a subsection of each WMP, including how the burned area is updated in risk maps including risk projections, a utilities' standard for fire rebuild projects, the timeline over which they will complete a rebuild project, the percent to total mitigation work and investments for the plan years, and how they will moderate the impacts of fire rebuild projects on territory-wide wildfire risk buydown activities.

The second general issue the PG&E fire rebuild project raises is the concurrent filing of Wildfire Mitigation Plans with plan implementation. PG&E's response notes that the proposed work is already in progress, with nearly all 2022 work completed and the workplan for 2023 is underway. We propose that New Fire Rebuild Plans in the WMP Update the year after a wildfire would provide additional lead-time for external review and risk mitigation impact assessments.

*RN-PG&E-22-04: PG&E does not provide planned undergrounding locations beyond 2023, nor adequately demonstrate that it is currently prepared to meet its ambitious undergrounding goals*

- 1. PG&E must provide an update of its planned undergrounding projects in 2024, following a similar format as PG&E-21-14 from the 2021 WMP Final Action Statement. This should be in the form of a spreadsheet with the following information: Location; Status of the project (scoping, design permitting, etc.); Relevant Circuit Protection Zones (CPZs)/Risk Score; Circuit ranking based on 2021, 2022, and 2023 risk model output; Measured effectiveness of ignition risk reduction projected to result from undergrounding at that circuit segment; Planned length; Risk-type identified for prioritization of the project (top 20 percent of risk buydown curve, fire rebuild, PSPS mitigation, public safety specialist identified, or non-risk related, or combination of the proceeding).*
- 2. PG&E must include a timeline for the frequency with which it will determine undergrounding mileage and locations based on updated risk model output,*

*factoring in RSE comparison with other initiatives. The timeline must continue past 2024. If the above information for the targeted 400 miles in 2023 and 800 miles in 2024 is not available, PG&E must provide justification as to why it is unable to provide any of the missing information and provide a timeline for when the information will be available.*

**Comments on PG&E Response:**

We reviewed PG&E's Excel table<sup>2</sup> detailing planned miles for undergrounding in 2023 and 2024-2026. We provide the following observations and recommendations.

In their 60d Revision Notice Responses PG&E notes that not all miles in the worksheet listed for 2023 or 2024-2026 undergrounding will be built and that the excess miles allow for implementation flexibility (PG&E 60 d Revision Notice Responses, p. 3, 4). UG plans for 2023 include 400 of 598 scoped miles. While not in and of itself an unreasonable plan, the 30+ percent of miles that are not selected for undergrounding in 2023 could substantially change the risk mitigation buydown rate if top risk ranked miles are delayed. PG&E also does not detail the total miles planned for 2024-2026 build of 3,075 miles listed in the Excel table. GPI recommends requiring PG&E to minimally report summary tables (e.g. Tables 1-3) in each WMP and WMP Update, on their UG work plan as it continues to develop over 2022 and through the 2023-2026 planning horizon.

Based on PG&E's table of planned undergrounding locations, only a small proportion (3.8 percent) of planned miles are in the Permitting/Dependency phase (Table 1).

Approximately 72 percent are in the Scoping/Scoped phase, with no miles listed as Ready for Construction. This reinforces concerns regarding whether PG&E can implement their undergrounding project mileage goals as planned and on-time. PG&E should provide updates on undergrounding mileage status.

The relatively long lead-times for ensuring undergrounding projects are on-track also reinforces the need for year-ahead, 3-year WMPs in addition to WMP annual updates,

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lsx

versus the current filing system that only provides updates after much of the work has started and plans are being acted upon late in the year.

**Table 1.** Miles of planned undergrounding by project status for 2023 and 2024-2026

<b>Status</b>	<b>2024-26 UG</b>	
	<b>2023 UG (mi)</b>	<b>(mi)</b>
Pre-Scoping	0.0	3010.6
Scoping/Scoped	428.7	21.6
Estimating	144.4	42.3
Permitting/Dependency	23.2	0.0
Ready for Construction	0.0	0.0
In-Construction	0.8	0.0
Post-Construction	0.0	0.0
Closed	1.2	0.0
<b>Total</b>	<b>598.2</b>	<b>3074.5</b>

Over 80 percent of PG&E’s planned 2023 undergrounding miles are located in HFTD Tier 2 areas, while only approximately 8 percent are located in Tier 3 (Table 2). The percent of Tier 3 planned miles increases to 70 percent in the 2024-2026 undergrounding plan. However, since only a subset of line-miles listed for 2023 are expected to be built, and line miles listed for 2024-2026 are in the pre-scoping phase. The final distribution of built undergrounding across Tier 2 and Tier 3 is unknown. GPI raises concerns about the following aspects:

- (1) Terrain and terrain features that present undergrounding challenges listed by PG&E, including rock/rock hardness, water crossings, and gradient, may hinder grid hardening in high wildfire risk locations when following an undergrounding focused grid hardening strategy. Notably HFTD Tier 3 zones are often located in mountainous regions. This implementation bias may slow risk reduction in Tier 3 locations.



The aggressive undergrounding goals and terrain constraints listed in 1 above may also incentivize PG&E to prioritize undergrounding in easier to implement locations in order to achieve their high mileage targets. This could slow risk buy down.

PG&E should explain how their grid hardening plan prevents these possible biases and should provide updates on the distribution of planned and completed undergrounding work in Tier 2 versus 3 locations.

- (2) Utilities perform work on bundled circuit segments for efficiency, versus pin pointing work at just the highest risk segments. While this strategy appears reasonable, the method used to determine the extent of local circuit bundling is not provided. PG&E references a “Wildfire Feasibility Efficiency” (WFE) calculation for 3010 miles selected in 2024-2026 (i.e. ProjectType = V3 Tranche 1 or Targeted UG) in the Excel workbook attachment<sup>2</sup>. PG&E should provide details on this calculation.

**Table 2.** Miles of potential undergrounding by implementation years 2023 and 2024-2026.

HFTD/HFRA	2023 UG	2023 UG	2024-26 UG	2024-26 UG
	(mi)	(%)	(mi)	(%)
Tier 2	476.3	80%	853.1	28%
Tier 3	50.2	8%	2156.7	70%
Tier 2 & 3	69.6	12%	6.0	0%
Non Tier, Tier	0.0	0%	20.2	1%
HFRA	2.1	0%	38.4	1%
<b>Total</b>	<b>598.3</b>	<b>100%</b>	<b>3074.5</b>	<b>100%</b>

Mean risk and risk rankings change drastically from WDRM V2 to V3. A mileage-weighted mean risk score for the 2023 and 2024-2026 undergrounding plan shows substantial differences in PG&Es WDRM V2 and V3 mean risk values as well as average

per mile risk buydown between the 2023 and 2024-2026 undergrounding miles (Table 4). While there are far fewer “Fire Rebuild” miles compared to “Base SH” type miles (Table 3), the different models show inverse average per mile mean risk relationships between these two mileage types based on WDRM V2 and V3. Per-mile “mean risk” for Fire Rebuild miles is 0.083 and 0.0091 for WDRM V2 and V3, while miles classified as Base SH had per-mile “mean risk” score of 0.188 and 0.0062 based on WDRM V2 and V3 (not shown).

The highest WDRM V2 risk-ranked miles planned for 2023 undergrounding fall between 2 and 11,157 rankings in WDRM V3, with only one location showing an increase in risk rank. To our knowledge WDRM V3 does not take into account risk reduction from planned 2023 undergrounding. Inversely, very low risk-ranked locations in WDRM V2 increase in rank in WDRM V3 outputs (Table 3, bottom). GPI interprets PG&E’s WDRM risk rankings to imply that their WDRM model and the model output are still undergoing substantial material changes and their risk rankings remain relatively unstable. GPI is concerned as to whether such a volatile model is capable of informing granular risk spend efficiency for the 10,000-mile undergrounding program. That is, given that undergrounding is perhaps the most expensive wildfire mitigation approach, while possibly also one of the most effective risk-reduction tools, the drastic changes in model risk ranking and mean risk scores bring into question whether the WDRM is stable or matured enough to inform risk spend efficient undergrounding deployment on such a large scale.

**Table 3.** Miles planned per application category by year.

Category	2023 UG (mi)	2023 UG (%)	2024-26 UG (mi)	2024-26 UG (%)	UG (Total, mi)	Total UG (%)	Overhead Hardening (mi)	Removed (mi)	Total (mi = UG Total +OH +Removed)
Targeted UG	0.0	0%	3010.6	98%	3010.6	82%	0.0	0.0	3010.6
Fire Rebuild	30.1	5%	0.0	0%	30.1	1%	0.0	0.0	30.1
Community Rebuild	82.8	14%	43.2	1%	125.9	3%	0.0	0.0	125.9
Other	6.1	1%	0.4	0%	7.5	0%	0.1	0.0	7.6
Base SH	479.3	80%	20.4	1%	469.1	14%	19.7	10.8	499.7
<b>Total</b>	<b>598.3</b>		<b>3074.5</b>		<b>3643.2</b>		<b>19.9</b>	<b>10.8</b>	<b>3673.9</b>

**Table 3.** Mileage weighted mean risk (sum(mean risk x miles planned) for each location based on project type) based on the 2021 WDRM (V2) and 2022 WDRM (V3) versions for undergrounding miles planned for 2023 and 2024-2026. Total mean risk per mile is a relative metric of undergrounding risk buydown for 2023 versus 2024-2026 planned/possible work. PG&E reports a risk reduction estimate of 99 percent for undergrounding.

Category	2023 (V2) MEAN RISK WEIGHTED	2023 (V3) MEAN RISK WEIGHTED	2024-2026 (V2) MEAN RISK WEIGHTED	2024-2026 (V3) MEAN RISK WEIGHTED
Targeted UG	0.0	0.0	220.9	43.8
Fire Rebuild Community Rebuild	2.5	0.3	0.0	0.0
Other	1.6	0.4	0.2	0.3
Base SH	0.4	0.0	0.0	0.0
<b>Total</b>	<b>94.8</b>	<b>3.7</b>	<b>221.3</b>	<b>44.4</b>
Total miles	598.3	598.3	3074.5	3074.5
<b>Total per mile</b>	<b>0.158</b>	<b>0.006</b>	<b>0.072</b>	<b>0.014</b>

**Table 4.** Top 10 planned undergrounding locations based on WDRM V2 (top) and WDRM V3 (bottom) Risk Rank.

Category	Status (see 2nd tab)	Planned UG Miles	2023 Forecast Miles	2024-2026 Forecast Miles	2021-2023 Risk Rank (V2)	v2 Mean Risk	2024-2026 Risk Rank (V3)	v3 Mean Risk	Project Type	HFTD Tier
Targeted UG	Pre-Scoping	0.02	0	0.018	2	1.8786	11159	-	V3 Tranche 1	Tier 3
Targeted UG	Pre-Scoping	1.36	0	1.36	6	1.2559	588	0.00452	V3 Tranche 1	Tier 2
Base SH	Permitting/D&E	1.320	1.320	0	8	0.9163	392	0.00709	Top 50 Miles	Tier 2
Targeted UG	Pre-Scoping	0.14	0	0.14	10	0.7725	515	0.00526	V3 Tranche 1	Tier 2
Targeted UG	Pre-Scoping	6.02	0	6.02	11	0.7350	21	0.02900	V3 Tranche 1	Tier 2 & 3
Base SH	Permitting/D&E	1.540	1.540	0	14	0.7162	443	0.00630	Top 50 Miles	Tier 2 & 3
Base SH	Permitting/D&E	1.930	1.930	0	14	0.7162	443	0.00630	Top 50 Miles	Tier 2 & 3
Base SH	Estimating	1.490	1.490	0	14	0.7162	443	0.00630	Top 50 Miles	Tier 2 & 3
Targeted UG	Pre-Scoping	0.30	0	0.30	16	0.6866	12	0.03864	V3 Tranche 1	Tier 2
Base SH	Permitting/D&E	2.678	2.678	0	27	0.5487	29	0.02613	Top 250 Miles	Tier 2 & 3

Category	Status (see 2nd tab)	Planned UG Miles	2023 Forecast Miles	2024-2026 Forecast Miles	2021-2023 Risk Rank (V2)	v2 Mean Risk	2024-2026 Risk Rank (V3)	v3 Mean Risk	Project Type	HFTD Tier
Targeted UG	Pre-Scoping	0.07	0	0.066	1168	0.0509	1	0.10471	V3 Tranche 1	Tier 3
Targeted UG	Pre-Scoping	0.08	0	0.08	644	0.1201	2	0.09012	V3 Tranche 1	Tier 2
Targeted UG	Pre-Scoping	0.06	0	0.058	2308	0.0034	3	0.06844	V3 Tranche 1	Tier 3
Targeted UG	Pre-Scoping	0.02	0	0.018	3054	0.0000	4	0.06608	V3 Tranche 1	Tier 3
Targeted UG	Pre-Scoping	5.34	0	5.34	2334	0.0032	6	0.04726	V3 Tranche 1	Tier 2
Targeted UG	Pre-Scoping	0.32	0	0.32	1744	0.0168	8	0.04094	V3 Tranche 1	Tier 3
Targeted UG	Pre-Scoping	19.89	0	19.89	555	0.1435	10	0.03930	V3 Tranche 1	Tier 2
Targeted UG	Pre-Scoping	11.07	0	11.07	2361	0.0029	11	0.03874	V3 Tranche 1	Tier 2
Targeted UG	Pre-Scoping	0.30	0	0.30	16	0.6866	12	0.03864	V3 Tranche 1	Tier 2
Base SH	Permitting/D&E	1.550	1.550	0	468	0.1603	13	0.03518	ICOP - Top 20%	Tier 3

## Asset Management and Inspections

*RN-PG&E-22-05: PG&E has a significant backlog of repairs and needs a more aggressive plan to address the poor health of its infrastructure*

- 1. PG&E must create a plan that demonstrates consistent progress on reducing the number of open tags and improve the health of its infrastructure.<sup>54</sup> To ensure that PG&E is reducing its backlog of work orders, PG&E must have a plan to complete more remediations than findings found.*
- 2. PG&E must provide a resource plan, including timeline and quantitative targets for either a number or percentage of tags PG&E plans to resolve per quarter for the remainder of 2022 as well as 2023. The plan must include a description of how PG&E prioritizes completion based on risk analysis and modeling and where resources are being diverted from other efforts, if applicable.*
- 3. PG&E must also provide a spreadsheet of all open work orders as of the date of its response to this Revision Notice that were generated in HFTD as well as all remediations in HFTD that have been completed in 2021.*

**Comments on PG&E Response:** PG&E’s Work Order Tag backlog is a critical issue that is leading to unaddressed and increased wildfire risk. In our comments on the 2021 WMP GPI pointed out this issue stating:

PG&E performs Field Safety Reassessments on some inspection findings in the event that they are unable to address them in the required timeframe based on the finding “priority” ranking or Level.

This comment and practice appear to suggest that PG&E is currently unable to repair or remedy all findings according to the assigned level of urgency. It further suggests that PG&E may be spending substantial time reassessing existing findings and down- or upgrading them based on these reassessments. PG&E should clarify how many reassessments it is performing each quarter and year, how this is affecting its ability to perform new annual inspections on as yet uninspected HFTD circuit-miles, and its plan for eliminating the need to reinspect assets as soon as possible. If re-inspections are substantially affecting the initial, annual inspection process, a “long-term” plan as proposed is inadequate. PG&E should also detail how they will efficiently remedy what seems to be a backlog of findings and prevent backlogs in the future (GPI Comments on the 2021 WMP Annual Updates, pp 17-18).

Now in 2022, PG&E’s response to critical issue RN-PG&E-22-05 requirement 1 largely pushes the launch of a healthy infrastructure plan to 2024 within their Integrated Grid

Planning strategy – a full 5+ years after the issue was created by the WSIP; 3 years after the issue was identified in 2021; and 2 years after issuance of the 2022 Revision Notice. This delay is unacceptable and would not pass muster for quality of services provided in an open market subject to penalties. PG&E should be required to accelerate their holistic infrastructure plan, especially for HFTD, and especially in the context that the IOUs are transitioning to a distribution systems operator role as their energy customer base migrates to CCAs and ESPs in the open energy market.

PG&E summarizes the Field Safety Re-assessment (FSR) program that revisited work tags to monitor condition and degradation. PG&E's "ongoing effort to address and mitigate the tag backlog" includes many of the same inefficiencies identified in 2021 comments as well as RN-PG&E-22-05. This plan includes re-evaluating tags to determine if they were properly identified and classified, and align them with their "long-term capital investment strategy." GPI is concerned that this iterative and tag-wide QA/QC effort, including current and past tag-reclassification efforts, implies that there are critical issues with PG&E's work tag assignment method and therefore with the efficiency and efficacy of the inspection program and the resultant repair efforts. While the described QA/QC approach is important, it should only need to constitute a sampling (e.g. percentage) of total work tags generated.

Lessons learned from PG&E's QA/QC review, such as incorrectly classified work orders, should lead to changes in the inspection program such as classification instructions and training that ultimately reduce the number of mis-classified workorder tags at the time when they are generated. QA/QC checks should ultimately become a work order tag *quality monitoring tool* to ensure the program is accurate and efficient. That is, QA/QC checks should not be a crutch applied to all work order tags used to re-evaluate classifications for the purpose of reducing near-term remediation workload and/or eliminating work orders that were improperly categorized in the first place. PG&E should be required to develop a proper work order tag QA/QC effort that reduces re-assignments and monitors program accuracy in order to eliminate their inefficiencies.

PG&E does provide a workorder tag-backlog remediation plan. Table RN-PG&E-22-05-02 (not shown) reports 150,635 open distribution E tags as of Q1 2022, while Figure RN-PG&E-22-05-11 reports 190,239 E-tags in their distribution work plan. PG&E should clarify what the correct value is, or if they are defined differently. PG&E also states that the 2021 WDRM was used to determine E- tag wildfire risk scores and the total risk reduction associated with their 2022 distribution E-tag workplan. They will use the 2022 WDRM v3 to guide the 2023 work plan. However, the relative proportion of annual work in the highest risk-ranked workorders is not transparent. Workorder tags constitute asset and other wildfire risk drivers for which mitigations should be conducted in the highest risk locations, and not only on volume-based, workorder buy down. PG&E should report the annual Target % / Top Risk % of remaining E-tags for their E-tag work plan.

GPI is also concerned that the proposed plan will require 10+ years to remedy all HFTD/HFRA ignition risk tags. While PG&E further prioritizes non-pole (3-year backlog closure plan) over pole-tag remediations (7-year backlog closure plan), and non-ignition risk work plan (10-year with 2030-2032 focus), even this risk-based timeline suggests wildfire risk associated with known asset issues in backlogged workorder tags may persist for years in high-risk-ranked circuits before the issue is remedied.

GPI questions whether PG&E's method of non-ignition risk workorder tags (i.e. F tags) is an appropriate, efficient, and optimized way to close out backlogged lower priority non-ignition risk work tags. Remediating approximately 50,000 low-priority F Tags annually as a focused initiative in 2030-2032, as the PG&E plan implies, will likely require substantial time and human resources, even if this work is layered on top of planned inspections and other site visits for an attempt at efficiency. PG&E also did not provide anticipated future work tags in Figure RN-PG&E-22-05-09 regarding the non-ignition risk tag workplan. The volume of new non-ignition work tags generated over the next decade, combined with the back-burned remediation of these backlogged tags to 2030-2032, should not interfere with the timely remediation of new workorder tags with ignition risk that arise over the remainder of the 2020s and beyond 2030. PG&E should provide an explanation regarding how they will implement large volumes of F tag corrections planned

for 2030 – 2032 without affecting other wildfire risk reduction WMP mitigation efforts including ignition risk work tag corrections. They should also explain how F tags are being corrected as efficiently as possible. For example, does PG&E have a data governance approach that allows low-priority F Tags to be efficiently identified, planned for, and addressed during other utility activities such as site visits or inspections to an asset with outstanding F Tags? An F tag that constitutes replacing missing signage could be identified for correction when work is ordered at that particular asset for another utility purpose (e.g. inspection, VM work, other tag corrections, asset repairs etc.).

*RN-PG&E-22-06: PG&E does not sufficiently explain its increase in distribution-level ignitions from equipment failure, nor provide a remediation plan*

- 1. PG&E must provide a plan to address increases in ignitions from equipment failures categorized by equipment type, which must include the following: a. Conductors; b. Switches; c. Crossarms; d. Reclosers; e. Connection devices*
- 2. The plan must include any additional efforts, if any, PG&E will undertake that are informed by a root cause analysis outside those efforts PG&E completes as part of its routine maintenance program or as part of program-level WMP initiatives.*
- 3. PG&E must explain why it does not predict decreases in ignitions for equipment failures from 2022 to 2023, broken down by equipment type.*
- 4. PG&E must also explain how mitigations it is implementing for all equipment types affect predicted ignition rates.*

### **Comments on PG&E Response:**

In response to Remedy 4, PG&E provides a generalized qualitative summary of how they calculate the projected ignition reduction rate due to planned and implemented mitigations. PG&E does not provide sufficient information to determine the ignition reduction values associated with each mitigation, or how they value the risk reduction (e.g. ignition reduction) associated with overlapping mitigations. In terms of overlapping mitigations, they simply state that interaction effects are taken into account. In general, the specific quantification approaches including inputs and algorithms used to project ignition reduction and to quantify Risk Spend Efficiency for each mitigation and risk sub-driver remains relatively opaque across the utilities. GPI supports the call for additional

transparency into how risk events and ignitions are projected as well as RSE quantification.

We also note that short-term “snapshots” from PG&E’s HFTD ignition data present challenges in terms of robust statistical evaluation. Equipment failure related ignitions occurred less than or equal to 10 times per year for a given equipment risk driver (e.g. conductor related ignitions  $n(2021) = 9$ ). The equipment is subject to many failure modes, influences from stochastic events (e.g. weather), and failure probability (e.g. asset type, condition). The counting statistics, especially for annual equipment-specific ignition events are limited by the occurrence of a relatively small number of rare events. A difference of  $\pm 1$  to 2 events in a given year suggests a 10 to 20 percent “improvement” or risk “increase” relative to the previous year. However, this 1-2 event per year change may reflect stochastic behavior versus systematic improvements or deterioration, especially if considered over only a couple year period. We do not pose these statistical limitations as excuses for poor WMP outcomes, but rather as a caution. For example, PG&E references a 12.9 percent reduction in equipment failure ignitions from 31 in 2020 to 27 in 2021, a reduction of just 4 ignitions that is well within one standard deviation of equipment-caused ignitions since 2015. Reviewing their 2022 WMP table 7.2, PG&E equipment-related distribution system ignitions in HFTD Tier 2, Tier 3 and Zone 1 for years 2015-2020 (Table 5) averaged  $31 \pm 10$  (1 standard deviation) ignitions per year. Long-term monitoring that reflects sustained decreases in ignition events will be required to ensure that mitigations and maintenance are reducing wildfire risk.

**Table 5.** Equipment related distribution system ignitions in HFTD Tier 2, Tier 3 and Zone 1. Values vary from PG&Es Revision notice report due to including “equipment – other” caused ignitions.

<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
35	25	48	30	18	31	27



RN-PG&E-22-07: *PG&E's ignition projections do not account for its ignition mitigation measures*

1. *PG&E must revise and resubmit Table 7.2 from PG&E's 2022 Update to project 2022 and 2023 ignitions factoring in risk reduction benefits of mitigation measures, including (but not limited to) EPSS, undergrounding, and covered conductor.*
2. *PG&E must also provide a narrative description for what factors are considered when calculating ignition projections, inclusive of WMP mitigation measure implementation, the weights of such factors and effects on projected ignitions.*

### **Comments on PG&E Response:**

In line with our comments on RN-PG&E-22-06, ongoing and long-term monitoring will be required to show statistically-significant decreases in ignition risk from wildfire mitigation activities. PG&E suggests a 3 percent and additional 7.4 percent decrease in ignitions in 2022 and 2023 from wildfire mitigations not including their Enhanced Powerline Safety Settings (EPSS) program. These percentages and resultant ignition decreases are within the 2 standard deviations reported for the 6-year, 2015-2020 annual distribution ignition average of  $143 \pm 33$  ignitions. PG&E anticipates the largest ignition reductions from EPSS. Including EPSS and other mitigations PG&E projects 76 ignitions in 2022, which they then adjusted to  $97 \pm 18$  ( $2\sigma$ ) to account for above average January – May ignitions. They later state that they anticipate the remainder of the year to adhere closer to historical averages.

Statistical challenges apply as discussed in RN-PG&E-22-06 above; and as noted by PG&E, ignitions “adhering to historical averages” includes a probable range of  $143 \pm 33$  ( $2\sigma$ ) ignitions, or 23 percent. However, the exercise of comparing historic, current, and projected future ignition rates is valuable and will provide important metrics over time as mitigations continue to be implemented. Future ignition reduction projections may also be refined based on long-term trends. GPI is most concerned with the lack of transparency regarding how they arrived at the wildfire mitigation adjusted ignition rate (-3 and -7.4 percent) prior to EPSS-related ignition reductions, as well as the quality of pilot study findings used as the basis for assumed EPSS related ignition reduction rates. As discussed in RN-PG&E-22-06, there is still little insight into how utilities are estimating wildfire risk

reduction associated with many mitigations. Additional transparency is needed in future MWPs.

GPI also recommends that PG&E and other utilities use standard formatting to report 1 or 2 sigma standard deviation for all historic averages and for values with a calculated confidence interval or error using standard formatting such as:  $143 \pm 33$  ( $2\sigma$ ) or  $143 \pm 17$  ( $1\sigma$ ). Including the standard deviation in tables for averages is best practice and will allow reviewers to more readily consider annual variability and the implications of that variability in regards to current and projected ignition and other risk metrics.

***RN-PG&E-22-08: PG&E has high find and failure rates in its quality assurance and quality control of asset inspections***

- 1. For all listed actions to increase the quality of its asset inspections, provide an update on progress and timeline for implementation.*
- 2. Provide quarterly quantitative asset management QA/QC goals for both findings and reducing failure rates for the remainder of 2022 and 2023.*
- 3. Explain whether there is a failure rate threshold at which PG&E will take remedial or disciplinary action on an inspector. If so, provide that threshold and describe the action that PG&E takes to address inspectors with high failure rates.*
- 4. Provide a detailed description of how PG&E escalates non-adherence to asset inspections processes and procedures.*
- 5. Provide actions to improve training for both internal inspectors and contractors in PG&E's asset inspection and management program based on repeat QA/QC findings.*
- 6. Provide an update on PG&E's QA/QC findings and failure rates for asset inspections completed since the 2022 WMP Update filing.*

#### **Comments on PG&E Response:**

Based on Table RN-PG&E-22-08-04 (QC Find Rates for 3/1/2022 – 6/14/2022) PG&E is not meeting their Q2 target of 95.5 and 90.0 percent pass rate for Transmission and Distribution QC, respectively. Rather they report QC failure rates ranging from 34 to 64 percent. PG&E should be required to report on their QC and QA pass/fail rates quarterly. Failure to meet their internal targets in Q3 and Q4 should trigger additional asset

inspection requirements for their 2023 WMP including benchmarking hiring and training methods with other utilities. Similar to RN-PG&E-22-10, PG&E should ultimately be held to a minimum acceptable quality level (AQL) of 95 percent.

### **Vegetation Management and Inspections**

*RN-PG&E-22-09: PG&E has failed to provide plans to mature in certain vegetation management capabilities*

- 1. PG&E must benchmark its use of predictive and risk modeling in VM with SCE and SDG&E. PG&E should also consider benchmarking with at least one electric utility outside California.*
- 2. PG&E must report on practices learned from benchmarking regarding the use of predictive and risk modeling in VM and discuss the initial steps that it will take to incorporate those practices into its VM programs.*

### **Comments on PG&E Response:**

In response to action item (2) PG&E proposes identifying 1-2 high risk regions and implementing a pilot process for inspections and updated clearance guidance. They propose to implement this pilot in Q2 2023. One of the major issues with WMP pilot studies to date includes adequately defining the extent of implementation, including area and duration, such that the proposed pilot provides actionable outputs and anticipated outcomes in a timely fashion. PG&E should provide a better justification for the proposed pilot including how their pilot study area and duration (e.g. project timeline) will yield actionable outputs and outcomes that advance territory wide VM maturation in the areas identified by the Revision Notice.

PG&E summarizes SCE's VM Tree Risk Index as including tree species data as well as other factors, and informing inspections as well as clearances in the near future. SCE's TRI and VM maturation plan appears to expand on the existing TRI to increase its functionality beyond informing inspections to also informing VM clearance. PG&E describes their Tree Assessment Tool (TAT) which documents species and is used exclusively for strike tree and tree removal evaluation. PG&E's proposed pilot would use their existing Targeted Tree Species Study to identify where additional clearances are

required and develop a tree inventory. GPI is concerned that the pilot proposal appears to apply to existing study data, the Targeted Tree Species Study, that should already inform inspection and VM clearance decision making. We are also concerned that PG&E does not mention leveraging their existing TAT database as a foundation upon which to expand functionality without requiring an entirely new tree inventory or new tool. PG&E should provide better justification for developing a new “inventory of tree by species” and other risk factors and if or how they can build on the existing TAT to expand its functionality and increase VM efficiency across related activities (e.g. tree removal, trimming, inspections).

The proposed pilot also appears to overlap with PG&E’s second proposed action to “Develop a collaborative, cross functional team similar to SCE in creating Areas of Concern ...” that includes developing guidelines that may include increased clearances. PG&E should explain if or how the pilot study will inform whether and where increased clearances are recommended by the proposed cross-functional team, the development of “areas of concern” and/or clearances based on “species and region.” Overall, PG&E’s proposal is very generalized and requires additional detail on elements such as timelines, outputs, and anticipated outcomes in order to ensure progress is being made and is on-track.

*RN-PG&E-22-10: PG&E does not report targets for its vegetation management quality assurance and quality verification program or for poles brushed*

1. *PG&E must provide targets in accordance with PG&E-21-24 and the 2022 WMP Guidelines for its QA/QV program and number of poles brushed per PRC 4292. For the QA/QV targets, PG&E may provide either the percentage of vegetation inspections audited (as prescribed by the Guidelines) or the number of audits/reviews it plans to perform (as described in Data Request OEIS-PG&E-22-005, Answer 6, and reiterated in Table 8).*
2. *PG&E must establish an Acceptable Quality Level (AQL) for performance for each QA/QV program listed in Table 8. The AQL for each program may be no lower than 95 percent.*
3. *Targets and associated AQLs must be presented in a revised WMP Table 5.3-1.*

**Comments on PG&E Response:**

GPI has no comments at this time.

*RN-PG&E-22-11: PG&E has failed to implement the vegetation management refresher curriculum it committed to implement in its 2021 WMP Update*

- 1. PG&E must provide a progress update, a summary of the curriculum, and a timeline to complete the implementation of its VM refresher training in 2022.*

**Comments on PG&E Response:**

GPI has no comments at this time.

**Grid Operations and Protocols, Including PSPS**

*RN-PG&E-22-12: PG&E has failed to provide sufficient evidence to support its extensive use of Enhanced Powerline Safety Settings and instead relies on the findings of a time-limited pilot deployed in 2021*

**Comments on PG&E Response:**

GPI has no comments at this time.

**Resource Allocation Methodology**

*RN-PG&E-22-13: PG&E does not provide sufficiently disaggregated data on its system hardening initiatives*

- 1. PG&E must separately provide detailed costs, miles previously treated, a range for miles planned to be treated, and RSE estimates for covered conductor installation, undergrounding, line removal, and any other system hardening initiatives currently presented together as one value in PG&E's 2022 Update.*
- 2. Table 12 must be revised to provide the required information for each initiative listed in Energy Safety's 2022 WMP Guidelines.*

**Comments on PG&E Response:**

GPI has no comments at this time.

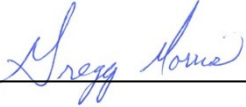
## Conclusions

GPI urges the OEIS to adopt these recommendations and considerations as WMPs and the associated guidelines continue to mature in the next 3-year WMP cycle.

We urge the OEIS to adopt our recommendations herein.

Dated August 10, 2022.

Respectfully Submitted,



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