Case: A.20-09-019
ALJ: Nojan
Witness: PG&E - Cullings

TURN Cross Examination Exhibit

Exhibit Number: TURN-

PG&E Responses to Data Request

TURN 017, Questions 1 and Atch 01, 2, 3, 4 and 6

Regarding Overhead System Hardening

PACIFIC GAS AND ELECTRIC COMPANY
Wildfire Mitigation and Catastrophic Events
Application 20-09-019
Data Response

PG&E Data Request No.:	TURN_017-Q01		
PG&E File Name:	2020WMCE_DR_TURN_017-Q01		
Request Date:	May 5, 2021	Requester DR No.:	017
Date Sent:	May 19, 2021	Requesting Party:	The Utility Reform Network
PG&E Witness:	Sandra Cullings	Requester:	Marcel Hawiger

SUBJECT: PG&E REBUTTAL

QUESTION 01

Re. p. 2-18, lines 7-9:

a. Please provide all SOPs and applicable references to SOPs that discuss the different "accepted duration for a current degraded condition" between the routine historic GO 165 inspection and a WSIP enhanced inspection, respectively.

b. Please explain and provide all documentation, including but not limited to SOPs, that describe how PG&E evaluates whether an asset could degrade in five years.

ANSWER 01

a. Please see attachment 2020WMCE_DR_TURN_017-Q01Atch01, which contains an internal presentation outlining the changes to the GO 165/EC Program for WSIP. The first item in the table on slide 3 compares the previous guidance and new guidance for accepted duration for degraded conditions.

b. Please see attachment 2020WMCE_DR_TURN_017-Q01Atch02, which contains the revised Job Aid for Overhead Inspections, outlining the guidance for assessing compelling abnormal conditions of equipment risk may adversely impact public safety and/or service reliability in the next five years.

Wildfire Safety Inspections Program

Changes to the GO 165/EC Program

Together, Building a Better California

Some of the measures included in this document are contemplated as additional precautionary measures intended to further reduce the risk of future ignitions following the 2018 Camp wildfire

What's Different? Updated Procedures – EC notifications

Based upon the results of the FMEA "Failure Mode and Effects Analysis", **we have made significant changes to guidance on assessing field conditions via GO 165 or WSIP-specific inspections.**

- **Risk-based review approach** resulting in changes to how we identify and prioritize specific field scenarios - including leaning poles, suspect overloaded poles, splices, insulators, floaters, conductor, crossarms, and tree attachments. Additionally, scope of when an EC is written for OH is expanded to issues that needs to be addressed in the next 5 years, vs. 1 year, per previous guidance. *See appendix for detailed list of changes.*

- **Inventory of specific field conditions that exist in Tier 2 and 3 areas** to be analyzed and prioritized for future hardening or reliability projects.

- **Updated OH Inspector job aids** includes new and enhanced guidance for prioritizing specific fire-risk field conditions, including inventory items in Tier 2/3 areas.

- **Adjusted prioritization of specific FDAs (Facility/Damage/Action)** to align with risk-based approach, i.e. several work types moved from "regulatory" Priority F to maximum Priority E.

- **Additional Centralized Gatekeepers have been added** to account for increase in EC create rate to ensure timely/quality review of incoming non-emergency ECs.

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What's Different – Updated Procedures – GO 165 Program

GO 165 / EC Program Changes: Refer to revised OH Job Aid TD-2305M-JA02, Rev. 5.8, Mar. 2019

Facility Type	Previous Guidance	New Guidance
All Overhead	Write EC for Regulatory Issues (high signs, etc.) and compelling conditions that need to be addressed in the next 12 months	Write EC for Regulatory Issues (high signs, etc.) and compelling conditions that need to be addressed in the next 5 Years
Conductor	Visually check all primary, secondary, and service conductors for excessive sag, broken/damaged, frayed, cracked, strain/abrasion. Write EC if conductor issues needs to be addressed in the next 12 months. Refer to conductor clearance job aid for all clearance requirements. If Inspector suspects clearance issue, write EC if clearance standard is not met.	Write EC notification to replace ALL insulink and mini-wedges or any improperly used secondary connectors used in primary. Inspect all connections; write EC notification to replace all connectors with dissimilar metals that are incorrectly installed (copper over aluminum is incorrect). Visually check all auto-splices in a span. Write EC notification for automatic splices that appear to be damaged, corroded or tied in too close to the insulator, preventing free movement of the splice with the conductor Write EC notification for any spans with uneven conductor. Write EC notification to replace annealed copper conductor (6 or 4 solid). For all open wire secondary/rack construction, identify missing spreaders for >135 ft span; for spans that are longer, install spreader brackets every 135' when possible, otherwise, write EC notification to have spreader brackets installed where bucket truck accessible. If no access, write EC to have the vegetation cleared.
Crossarms	During detailed inspections, examine wood cross arms and assess their condition for all compelling abnormal conditions; write EC if crossarm needs to be addressed in the next 12 months.	During detailed inspections, examine wood cross arms and assess their condition for all compelling abnormal conditions; write EC if crossarm needs to be addressed in the next 5 years.
	No previous guidance to replace wood crossarm with composite.	Wood crossarms to be replaced with composite crossarm and associated hardware by construction crew completing the EC notification.
Floaters	Identify floaters; assess to determine priority (A, B, or E).	Floaters are ALWAYS emergency; stand-by required.
Insulators	Write EC to replace broken/damaged, chipped, cracked, flashed/burnt insulators that need to be addressed in the next 12 months.	ANY chipped, cracked, contaminated, broken, or damaged insulator to be replaced; cannot mix insulator types. Always replace full set of insulators AND replace crossarm w/composite crossarm. If gunshot - epoxy of polymer insulators. Write EC to replace **ALL** LAPP Insulators (based on guidance - specific installation year in the field). ANY chipped, cracked, contaminated, broken, or damaged insulator to be replaced; cannot mix insulator types. Always replace full set of insulators AND replace crossarm w/composite crossarm.
	Identify all primary squatters, at minimum priority F/5 years.	Primary squatter ECs now required to be max priority E, 12 month duration.

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What's Different – Updated Procedures (cont'd)

Facility Type	Previous Guidance	New Guidance
Poles	Write a Third Party notification for PG&E solely owned poles with third party attachments if the other utility's facilities are causing a safety issue.	Identify all solely owned pole with third-party attachments (based on how it is mapped). Write EC Notification for Pole / Overloaded / Test, for Estimating to confirm pole loading.
	General Guidance: Assess pole to determine if pole needs to be addressed (adjusted/replaced) in the next 12 months.	For ANY reduced circumference identified on a pole, at minimum, write EC for Pole / Overloaded / Test, for Estimating to confirm pole loading.
	Consider the following when evaluation a leaning pole: 1. Is the pole out of plumb by more than 10% of its height above the ground? 2. Is the leaning pole causing excessive conductor sag? 3. Does the lean appear as if it will become worse or affect safety or reliability in the next 12 months (considering environmental and configuration factors -soil, wind, pole attachments, equipment, guying)? If the answer is yes to any of these questions, *and in the inspector's judgment the pole is leaning excessively*, write an EC Form and fill out Pole Test Data Sheet.	Consider the following when evaluating a leaning pole: 1. Is the pole out of plumb by more than 10% of its height above the ground? 2. Is the leaning pole causing excessive conductor sag or reduced clearance issues that could result in contact, fire risk, or public safety? 3. Does the lean appear as if it will become worse or affect safety or reliability in the next 5 years (considering environmental and configuration factors -soil, wind, pole attachments, equipment, guying)? If the answer is yes to any of these questions write an EC Notification (Pole /Overloaded /Test) and fill out Pole Test Data Sheet. **All poles need to be load calculated prior to straightening.**
	IF the pole is excessively deformed (bowing, bending, improper guying, no guying); THEN create an EC Form. . IF the pole is excessively deformed (bowing, bending, overloaded) due to communications; THEN create a Third-Party Utility Form.	For deformed poles, write EC Notification for Pole / Overloaded / Test, for estimating to confirm pole loading. If the deformity appears as if it will become worse or affect safety or reliability in the next 5 years (considering environmental and configuration factors -soil, wind, pole attachments, equipment, guying) - write EC notice to replace pole. Common drivers for deformed poles: Improper/lack of guying, third party attachment Review clearances to verify no reduced clearance issues, all levels of clearance requirements that could result in contact, fire risk, or public safety.
Transformer	OH Transformer with signs of dried oil or stain only: Per oil spill matrix, no action required for this scenario in the field.	If an Inspector is writing an EC to address an issue at a pole location, and there is a transformer with oil stain ONLY (no action per oil spill matrix), add transformer to EC to be replaced.
Tree Attachment	Identify dead/dying trees.	If there are any questions about the integrity of tree, (causing damage to our facilities, dead or dying, causing conductor height issue, etc.), write vegetation EC to remove dead dying trees.

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What's Different – Updated Procedures (cont'd)

GO 165, Tier 2/3 Inventory Items		
Animal Activity	**No previous guidance or requirement to inventory any condition during GO 165 inspect or patrol.**	Record locations with any evidence of animal activity, nesting, damage or debris associated with the pole
Animal Guards		Record all locations with missing animal guards on all overhead transformers. Document locations that do not have bushing covers and insulated jumpers.
Bridging		Record all locations where bridging is absent.
Chance Clamps		Record improperly installed Chance Clamps associated with the pole. (Guidance: Identify improperly installed chance clamps (no armor rod under chance clamp for conductor smaller than 1/0 or installed incorrectly on tap line supporting more than 2 TXs or used on any other type of equipment
Conductor		1. Record all open wire locations 2. Record number of auto splices in a span 3. Record all Kierneys and PGs
Cutouts		Record all locations with bushing-mounted cutouts.
Flying Bells		Record all locations with flying bells installed on primary.
Insulators		Record every location where flying bells are installed. Identify type of insulator, ceramic or non-ceramic.
Non-Exempt Equipment		Record any Non-Exempt Fuse Cutouts and/or Switches associated with the pole. (Guidance: Look for equipment without snuffing capabilities; expulsion type of fuse; Lightning Arrestors, Switches with no LB's - KPF's, Grasshopper, Porcelain In-line Disconnects; Non-exempt cutouts may eject material.)
Oil-Filled Equipment		Record all locations with oil filled equipment on pole.
Tree Attachment		Record All tree connects - secondary, service, guying.

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PACIFIC GAS AND ELECTRIC COMPANY
Wildfire Mitigation and Catastrophic Events
Application 20-09-019
Data Response

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PG&E Witness:	Sandra Cullings	Requester:	Marcel Hawiger

SUBJECT: PG&E REBUTTAL

QUESTION 02

Re pp. 2-26-2-27, please provide the following for PG&E's HFTD, including all supporting workpapers, assumptions, and calculations in Excel, as well as an explanation of how each statistic was calculated:

a. The likelihood of ignition of a transformer containing mineral oil vs. FR3 fluid, separately;

b. The likelihood of ignition of a wooden pole vs. composite or wrapped pole, separately;

c. The likelihood of ignition of a non-exempt switches vs. exempt switches, separately.

ANSWER 02

a. FR3 fluid has a higher flash point and (compared to mineral oil) is less likely to ignite from a fire on the transformer. For more detail, please see the attached U.S. Department of Interior study (attachment 2020WMCE_DR_TURN_017-Q02Atch01), which compares the advantages of mineral oil-based fluids as compared to ester-based fluids (i.e., FR3). PG&E does not calculate individual component ignition probabilities.

b. PG&E's pole material choice is based on fire resiliency from PG&E's internal testing, not ignition risk. Therefore, the pole materials do not have a specific ignition probably associated with them.

c. PG&E has not conducted our own analysis but follows the recommendations of CAL FIRE. Non-exempt switches are known to have the likelihood of causing ignition under normal operation. Therefore, PG&E has adopted the CAL FIRE standard of replacing them with exempt switches to mitigate the likelihood of causing ignition under normal conditions.

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PG&E Witness:	Sandra Cullings	Requester:	Marcel Hawiger

SUBJECT: PG&E REBUTTAL

QUESTION 03

PG&E states on page 2-19, lines 17-19, that it

> "removed idle facilities because we have identified at least two ignitions in the immediate proximity…of idle facilities in recent years."

a. Please confirm and explain whether the two ignitions referenced by PG&E is derived from an analysis PG&E conducted in this proceeding pursuant to discovery by TURN (TURN-010, Question 2).

b. If the answer to part (a) is that PG&E accomplished this analysis prior to TURN's discovery, please provide all documentation supporting this assertion, including but not limited to email communications (with time stamps) and any other supporting documentation.

ANSWER 03

a. Yes, the ignitions referenced by PG&E are derived from the analysis PG&E conducted pursuant to discovery by TURN in TURN-010, Question 2.

b. Please see response to 3.a. above.

PACIFIC GAS AND ELECTRIC COMPANY
Wildfire Mitigation and Catastrophic Events
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PG&E Data Request No.:	TURN_017-Q04		
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PG&E Witness:	Sandra Cullings	Requester:	Marcel Hawiger

SUBJECT: PG&E REBUTTAL

QUESTION 04

PG&E states at pp. 2-23-24, lines 30-4,

> "many of the 31 miles of system hardening that TURN objects to were identified as deteriorated conductor requiring immediate replacement. These projects were initially part of another program and identified for construction in 2019. Thus, the planning and permitting processes were at or near completion, allowing these projects to be more quickly completed in 2019."

a. Please indicate which and how many of the 31 miles referenced had planning and permitting processes "at or near completion." Please include as an attachment PG&E Excel workpaper 2B.2-2 and indicate which miles PG&E refers to by highlighting the applicable row in yellow or adding a column that indicates which projects PG&E is referring to.

b. Please provide all supporting documentation that supports PG&E's assertion.

c. Please explain why it is relevant whether a project is at or near permitting completion to whether it should be subject to the system hardening program.

d. Please provide the expected cost per mile of replacing the deteriorated bare conductor with new bare conductor for the miles indicated in part (a) and on average, if different.

e. Please explain which "(an)other program" these projects were initially part of, and please provide the GRC authorized cost and the actual amount spent on that program for 2019.

ANSWER 04

a. Please see attachment 2020WMCE_DR_TURN_017-Q04Atch01, which highlights the projects that were identified as deteriorated conductor needing immediate replacement.

b. Please see attachments 2020WMCE_DR_TURN_017-Q04Atch02CONF and 2020WMCE_DR_TURN_017-Q04Atch03CONF, which includes the business cases

for each of the deteriorated conductor projects identified in attachment 2020WMCE_DR_TURN_017-Q04Atch01. This information is provided to you pursuant to the confidentiality terms agreed upon in the NDA.

c. The deteriorated conductor projects discussed on pp. 2-23-24, lines 30-4, had bare conductor that was in need of immediate replacement. As part of the System Hardening program, any deteriorated conductor in HFTD that required replacement was included in the scope to be hardened. In addition, as permitting was at or near completion for deteriorated conductor replacement, it was prudent from a cost and efficiency standpoint to harden these miles with covered conductor.

d. As described in response 4.c. above, as part of the System Hardening program any deteriorated conductor in Tier 2 and Tier 3 areas that required replacement was included in the scope to be hardened. For Tier 1 areas, the average cost of replacing deteriorated conductor with new bare conductor (as part of the Deteriorated Conductor Replacement Program) is $0.53 million per mile.

e. These projects were initially part of the Deteriorated Conductor Replacement program (MAT 08J). The 2019 actual expenditures for this program was $9.7 million, and the GRC authorized amount was $32.2 million. This program falls under MWC 08. Overall, we overspent for distribution capital by $1.1 billion and for MWC 08 by $253.8 million.

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PG&E Data Request No.:	TURN_017-Q06		
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PG&E Witness:	Sandra Cullings	Requester:	Marcel Hawiger

SUBJECT: PG&E REBUTTAL

QUESTION 06

PG&E states on p. 2-28, lines 5-12,

> "For example, PG&E's terrain has substantially more trees compared to SCE's, and thus PG&E must use larger poles and higher standards than SCE to protect against tree strikes. In addition, the density of trees in PG&E's terrain makes gaining access to certain overhead lines a significant challenge and resulted in additional costs to the significant hardening program of up to $300,000/mile.

a. Please provide all supporting calculations, workpapers, analyses, and documentation regarding the $300,000/mile figure. Please explain how this was derived.

b. In Excel, please provide a comparison of pole sizes installed due to covered conductor for PG&E vs. SCE, respectively.

c. Please provide the number of trees in "PG&E's terrain" versus SCE's terrain in HFTDs, respectively.

d. Please explain and quantify why access to overhead lines due to trees increases the cost of PG&E's covered conductor program so dramatically.

ANSWER 06

a. Please see attachment 2020WMCE_DR_TURN_017-Q06Atch01, which contains the vegetation management costs associated with each 2019 overhead system hardening project. The $300,000/mile figure is derived from summing the net PO value amounts in column H and dividing by the number of overhead system hardening miles in 2019 (110.8 miles).

b. Please see response 5.a. above. PG&E cannot speak to what SCE does as part of their covered conductor program.

c. In 2019, PG&E trimmed 1,895,852 trees across our distribution service territory. Per SCE's 2021 GRC Track 2, Volume 1 (A.19-08-013), in 2019 SCE trimmed 726,597 across their service territory.

d. When PG&E hardens a circuit, we create a wider footprint associated with the assets on that circuit because we are installing covered conductor that requires larger equipment and increased spacing between equipment. For system hardening projects, the wider footprint falls within many of PG&E's heavily forested areas. Due to the increased size of the assets, additional clearance activities are needed to widen the area to accommodate the increased footprint and mitigate the risk of wildfire. The additional vegetation costs associated with overhead system hardening increase the cost due to several key factors, which are organized into the two categories below:

Activities that Change the Landscape

- The installation of a crossarm widens the overhead clearance requirements resulting in additional tree trimming and often times removal.
- Access to the poles in the rural forested/brush environment for estimators to take measurements and/or for construction vehicles/equipment access may be required.
- Any relocation of poles, conductor, or tree connect removal may require additional vegetation clearing.

Activities that Require Access and Compliance

- If taller poles are installed, additional clearing would be required to maintain current compliance requirements.
- The additional sag of covered conductor may require additional clearing below the line.