

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

Order Instituting Rulemaking to Revise and Clarify Commission Regulations Relating to the Safety of Electric Utility and Communications Infrastructure Provider Facilities.

R.08-11-005  
(Filed November 6, 2008)

**OPENING COMMENTS OF PACIFIC GAS AND ELECTRIC COMPANY (U 39-E)  
REGARDING PROPOSED DECISION ON PHASE 3, TRACK 1 AND 2 ISSUES**

**DECISION ADOPTING REGULATIONS TO REDUCE THE FIRE HAZARDS  
ASSOCIATED WITH OVERHEAD ELECTRIC UTILITY FACILITIES AND AERIAL  
COMMUNICATIONS FACILITIES**

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## SUBJECT INDEX – SUMMARY OF RECOMMENDED CHANGES TO PD

1. Regarding MAPs 5A/B, 6A/B, 7A/B, 8A/B or 9A/B, modify the PD to:
  - a. Defer to Track 3 consideration of the contested proposed changes in MAPs 5A/B, 6A/B, 7A/B, 8A/B or 9A/B (including the PD's interpretation of the Rule 48 "will not fail" performance standard and related application of safety factors);
  - b. Order the parties to address as part of Track 3: (i) the appropriate Rule 48 standard that with related safety factors accounts for variations in wind loading as well as material strength and other structural uncertainties; (ii) the appropriate heightened design and construction standards for identified high fire threat areas that account for variations in wind loading, material strength and other structural uncertainties; and (iii) the safety impacts and costs associated with such heightened standards as applied to high fire threat areas.
  - c. In the interim and until Track 3 is completed, maintain the status quo regarding Rule 48 and related rules by adopting the proposed Note on the definition of "Safety Factors" in Rule 44, incorporating the consensus language into the various proposed rules, and retaining the "in conjunction with" language suggested by SED.
2. Regarding retention of loading calculations, add language to the PD to clarify that the Rule 44.1 and 44.2 requirements to retain loading calculations for the service life of the pole is a new requirement and the requirement should be implemented prospectively.
3. Regarding the Fire Incident Data Collection Plan:
  - a. Correct a discrepancy in the PD on the minimum size of a reportable fire to conform to the requirement in the submitted plan in the Workshop Report ("square meter" corrected to "linear meter"); and
  - b. Change the word "implicates" to "involves" in the section of the PD that requires electric utilities to work with CIPs on fire incident reporting.

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**I. INTRODUCTION**

On November 19, 2013, Commissioner Florio issued his [Proposed] *Decision Adopting Regulations to Reduce the Fire Hazards Associated with Overhead Electric Utility Facilities and Aerial Communications Facilities* (PD). The PD revises General Order (GO) 95 to address proposals developed in workshops for Tracks 1 and 2 of Phase 3 of this proceeding and presented in the May 8, 2013 *Phase 3 Joint Parties' Workshop Report for Workshops held January – March 2013* (Workshop Report). Pacific Gas and Electric Company (PG&E) thanks all those involved in the Track 1 and 2 work for their efforts.

PG&E strongly supports the development of statewide fire-threat maps and heightened design and construction standards for electric utility and Communication Infrastructure Providers (CIP) overhead structures in high fire threat areas that experience dangerously high winds<sup>1</sup>. Given recent wildfire experiences in California, the nation and around the globe, a fresh look at how electric utilities should design and construct their facilities in high fire threat areas is appropriate. PG&E appreciates the PD's effort to clarify this important area.

However, as more fully discussed below, there are two significant errors in the PD. First, there is a fundamental flaw in the PD's interpretation of Rule 48 and its "will not fail"

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<sup>1</sup> The term "high fire threat areas" as used in these Comments means areas that experience high fire threat conditions coupled with dangerously high winds.

performance standard -- for which there is no easy fix. By applying the entire required safety factor solely to wind loading and leaving only a safety factor of 1.0 for material strength, the PD's interpretation fails to account for the variability in material strength and other design and construction uncertainties and provides no guidance on how utilities might approach a "will not fail" performance standard with no safety factor allowance left to account for this variability.

Second, the PD errs when it orders the parties to "henceforth" apply the PD's Rule 48 interpretation without any consideration of the safety and cost impacts associated with a blanket application of a standard that will result in the wasteful overbuilding of the overhead electric system in areas that are not high fire threat areas and do not require heightened standards.

The Commission should defer to Track 3 all discussion of the contested changes to the GO 95 Rule 48 (and related rules) and order the parties to address at that time: (a) the appropriate Rule 48 standard that with related safety factors accounts for variations in wind loading as well as material strength and other structural uncertainties; (b) the appropriate heightened design and construction standards for identified high fire threat areas that account for variations in wind loading, material strength and other structural uncertainties; and (c) the safety impacts and costs associated with such heightened standards as applied to high fire threat areas.

## **II. THE PD SHOULD DEFER TO TRACK 3 ANY CONSIDERATION OR IMPLEMENTATION OF RULE 48 AND RELATED RULES INVOLVING A "WILL NOT FAIL" PERFORMANCE STANDARD**

### **A. The PD Errs When It Dedicates the Entire Required Safety Factor To Wind Loading And Ignores Variations in Material Strength – Especially for Wood Poles**

#### **1. The PD Errs Because It Does Not Account for Variations in Material Strength**

The PD considers Rule 48 (and other related rules) to be a "will not fail" performance standard.<sup>2</sup> The PD explains that in situations where GO 95 provides a safety factor, the entire safety factor must be

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<sup>2</sup> Although the discussion here will be focused on Rule 48 and wood products and poles, the same principles apply to the application by the PD of the "will not fail" performance standard to the other related rules. (See, PD, Sections 6.6 through 6.9 at pp.54-82, covering Rules 48, 48.1, 48.2, 48.4 and 48.5.)

applied to the design loads and none of the safety factor can serve as a safety margin for uncertainties in material strengths, design performance, or minor construction deviations.<sup>3</sup> As interpreted by the PD in the example of newly installed Grade A wood poles in a Light Loading District, the Rule 43 wind load must be multiplied by the minimum required Rule 44 safety factor so that the installed structure (with allowed deterioration) will not fail at wind speeds of 92 mph.<sup>4</sup> On the basis of this interpretation, the PD draws the “inescapable conclusion” that Rule 48 is a mandatory “will-not-fail” performance standard.<sup>5</sup>

This interpretation changes in a very basic way the GO 95 core design methodology as currently understood and implemented by utilities. As has been explained in prior comments and briefing<sup>6</sup>, utilities have understood GO 95 to use a single factor of safety to account for both the inherent variation in the strength of materials behavior and the uncertainty in applied loading (as well as other structural uncertainties.<sup>7</sup> The Commission’s Safety and Enforcement Division (SED) also apparently understands that the GO 95 safety factors cover more than just wind loading because: 1) SED did not oppose the Note in Consensus Rule Change WR-PRC-5 for Rule 44 (which explains that “Safety factors are applied to account for factors such as uncertainties in strengths, loads, design performance, and minor construction deviations”)<sup>8</sup>; and 2) SED advocated for retention of the terminology “in conjunction with” for Rules 48.1, 48.2, 48.4 and 48.5 (explaining that replacing that phrase with the industry’s proposed “divided by” would be “overly prescriptive in specifying how a company must apply safety factors and does not allow an engineer to apply [the safety factor] on the load side if they so choose... [“In conjunction with”] allows the engineer a choice in how to apply the safety factor”).<sup>9</sup> Both the consensus Note to Rule 44 and SED’s “in

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<sup>3</sup> PD, at p.66

<sup>4</sup> PD, at p.63.

<sup>5</sup> PD, at p.66.

<sup>6</sup> PG&E will not repeat prior arguments here; those arguments are incorporated by reference simply to preserve the record. Specifically, some of the most recent industry arguments can be found at pp.9-13 in the May 22, 2013 *Opening Brief of Southern California Edison Company, Pacific Gas and Electric Company, PacifiCorp, San Diego Gas & Electric Company, Bear Valley Electric Service, and California Pacific Electric Company Regarding Phase 3 Joint Parties’ Workshop Report for Workshops Held January – March 2013* (Joint Utilities Opening Brief re Workshop Report); and in the rationales and pro/con comments submitted by the CIPS and IOUs for MAPs 6A/B, 7A/B, 8A/B, and 9A/B at pp. B-39 through B-119 in the Workshop Report.

<sup>7</sup> This design methodology is sometimes called “Allowable Stress Design” (ASD).

<sup>8</sup> Consensus Rule Change WR-PRC-5for Rule 44, Workshop Report, at p.A-16 to A-18.

<sup>9</sup> Workshop Report, at pp.B-69 (emphasis added). At the same time, there was concern expressed that the SED option approach did not provide sufficient clarity. Workshop Report, at B-78 (“...experts are in agreement that the meaning of “in conjunction with” is unclear and provides no direction on how to derive allowable

conjunction with” terminology have been stricken from GO 95 by this PD.<sup>10</sup>

However, by interpreting Rule 48 to require that the entire safety factor be allocated solely for wind loading, the PD makes no allowance and provides no margin of safety for material strength variations or other structural uncertainties – a significant technical error.<sup>11</sup>

## **2. The Commission Should Provide Guidance on How Utilities Must Allow for Variations in Materials Strength and Other Uncertainties in Their Design and Construction of Facilities**

Given the PD’s interpretation of Rule 48’s “will not fail” performance standard and its directive that the entire safety factor must be dedicated to wind loading (leaving a safety factor of 1.0 for strength), utilities are provided with no guidance on how to address the risk posed by material strength variations and other uncertainties in the design and construction of their overhead structures.

Engineering texts and standards recognize that the mechanical property of materials (especially wood products) will vary and that a safety factor of 1.0 represents a mean or average strength.<sup>12</sup> Using wood poles as an example and applying a safety factor of 1.0, approximately one half of wood poles will exceed this mean strength and half will be less than the mean strength, with a theoretical probability of

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stresses...the lack of specificity regarding how safety factors are to be applied is inconsistent with the design method currently applied by electric and communication companies where the strengths of materials are divided by safety factors”).)

<sup>10</sup> PD, at pp.25 and 75 respectively.

<sup>11</sup> The PD’s interpretation adopts an approach similar to a Load and Resistance Factor Design (LFRD) methodology -- but erroneously applies only one half of that methodology. In LFRD, one factor is applied to the load and one factor is applied to the strength. As an example, the National Electrical Safety Code (NESC), which is used by most utilities in the nation and employs an LFRD approach, specifies separate load factors and strength factors (they are not called “safety factors”). (See, NESC, Sections 25 for loadings and Sections 26 for strength requirements. Per CPUC Rule 13.9, PG&E requests that official notice be taken of the NESC as a source of reasonably indisputable accuracy.)

Changing the design methodology in this way (as the PD has done) may well be outside the stated scope of the proceeding. The Scoping Memorandum for Phase 3 specifically excluded from Phase 3 any consideration of replacing GO 95’s design methodology in Section IV. (June 1, 2012 Scoping Memo, at p.4.) However, PG&E has no objection to expanding the scope of the proceeding with adequate time provided to better consider this basic change in design methodology.

<sup>12</sup> The strengths and modulus of rupture in bending in Rule 48.1 Table 5 correspond to the designated fiber stress for wood poles found in American National Standards Institute (ANSI) Standard O5.1. ANSI O5.1 makes clear that the designated fiber stress (the modulus of rupture in GO 95) are *mean/average* values of wood strength. (ANSI Standard O5.1.2008 [fiber strengths have a corresponding coefficient of variation equal to approximately 0.20]. Per CPUC Rule 13.9, PG&E requests that official notice be taken of the ANSI standard as a source of reasonably indisputable accuracy.)

<sup>13</sup> ANSI Standard O5.1.2008 (fiber strengths have a corresponding coefficient of variation equal to approximately



failure of 50% for a wood pole.<sup>13</sup> Because the actual strength of any given pole is unknown and one-half of wood poles are likely to be below the mean strength, the engineer must account for the variability of wood strength in any design.

The table below provides rough estimates of the various possible failure rates for fully loaded Grade A wood poles depending on what safety factors are applied to the material strength of the poles. Even a probability of failure of 5% involves a theoretical potential failure of 1 in 20 poles – a result that neither the Commission nor a utility would condone.

**Table 1: Estimate of Failure Rate for Wood Poles Based on Material Strength**

Safety Factor	% Failure Rate	Number of Failed Poles
1	50%	1 out of 2
1.75	5%	1 out of 20
4	.0088%	1 out of 10,000

Based on this information and with the caveat that it is not possible to provide a design standard that would ensure that no in-service wood pole would ever fail, to responsibly design overhead electric facilities that (when fully loaded) would come close to meeting the PD’s interpretation of the will-not-fail performance standard appears to require a safety factor of at least 4 for material strength.<sup>14</sup> This would result in a total safety factor of 16 (load SF 4 x material strength SF 4 = 16).<sup>15</sup> However, as the PD has stated, nothing in the GO either explicitly or implicitly requires a 4 x 4 squaring of safety factors.<sup>16</sup> This uncertainty needs to be addressed to avoid what will inevitably be inconsistent design and construction of overhead facilities as regards to material strength and other uncertainties. To ensure consistent statewide

0.20).

<sup>14</sup> As noted in the Table above, a safety factor of 4 for wood poles equate to an approximate failure rate of 1 in 10,000 fully loaded poles.

<sup>15</sup> See, June 5, 2013 *Reply Brief of Bear Valley Electric Service..., Pacific Gas and Electric Company, PacifiCorp, and Southern California Edison Company Regarding Phase 3 Joint Parties’ Workshop Report for Workshops held January-March 2013* (Joint Utilities Reply re Workshop Report), at p.9 (under a “will not fail” interpretation, “companies would have to install Grade A wood poles that are much stronger than the safety factor of 4 in order to ensure that wood poles never fail at a load equal to the safety factor of 4. SED’s interpretation of Rule 48 would necessitate safety factors on top of the safety factors specified in GO 95“.)

<sup>16</sup> PD, at pp. 66-67. The PD also states that there is no record that any utility ever in the past used a squaring of safety factors to design or construct overhead facilities. (PD, at p.67.) But there is a good reason for that. As explained above, California utilities (and the SED) all interpreted Rule 48 and the application of safety factors as covering both loading and material strength – so there has been no need (up until now) to apply a separate safety factor to material strength.

safety standards, GO 95 cannot be left silent on this issue.

The Commission identified one of the objectives of Phase 3 as follows:

Revising Section IV of GO 95 to incorporate standards for wood structures and materials that (i) provide electric utilities and CIPs with clear guidance for reliably obtaining prescribed safety factors when using wood products with *inherent variability*, and (ii) can be enforced by the Commission and CPSD.<sup>17</sup>

PG&E shares the goal of enhancing safety and also supports revising Section IV to provide clear guidance to utilities. However, the PD has not provided that guidance and has especially not adequately considered the “inherent variability” of the materials used in overhead construction. The Commission should defer this discussion to Track 3 to allow a full discussion of the ramifications associated with a scenario where the entire safety factor of 4.0 is allocated to wind loading.

**B. The PD Errs Because It Does Not Consider the Safety and Cost Impacts Associated with Its Interpretation and Its Order to “Henceforth” Implement the “Will Not Fail” Performance Standard throughout California**

**1. The Parties Expected that Public Policy Considerations and Cost/Benefit Arguments Would be Made in Track 3 During Discussions on the Appropriate Defining of Fire Threat Districts**

The PD’s interpretation of Rule 48 (and related rule changes), its addition of “will not fail” language to various other rules, and its directive to “henceforth” apply that interpretation to all overhead facilities in California<sup>18</sup> were imposed *sua sponte* by the PD. The PD’s interpretation that the safety factor be applied solely to wind loading is not represented in any of the proposed rules changes. It was not discussed in the workshops. No party proposed revisions to Rules 48.2, 48.4 and 48.5 in Contested Proposals 7 through 9 that included additions of the “will not fail” performance standard combined with the requirement to multiply the loads by the safety factors (as the PD has done). No party argued for or expected that interpretation -- or that it would be applied to all of California.<sup>19</sup>

<sup>17</sup> June 1, 2012 *Assigned Commissioner’s Ruling and Scoping Memo for Phase 3 of this Proceeding*. (Emphasis added).

<sup>18</sup> PD, OP 4 at p.102.

<sup>19</sup> Further, it was anticipated (at least by PG&E) that if Rule 48 MAPs 5 A or B were not adopted, SED’s MAP 5C would be adopted as a prudent compromise. In this proposal, SED proposed that the “multiplied by” language would be dropped upon the adoption of a statewide fire threat map and the implementation of special wind loading districts. This alternative essentially maintains the status quo – and continues the difference of opinion on interpretation until a California fire threat map is defined and fire threat districts are identified. (Workshop Report, at pp. B-56 to B61.)

Thus, it was PG&E's (and others) expectation was that *all the public policy arguments and cost/benefits discussions would take place in Track 3* when the parties would be discussing where to draw the lines for the fire threat districts.<sup>20</sup> As a result, no party submitted any specific safety impact information or cost/benefit analysis associated with limiting the application of the required safety factor solely to wind loading, nor has any party assessed the safety and costs impacts associated with immediately applying that interpretation to all overhead facilities in all areas of California.<sup>21</sup>

## **2. The PD's "Will Not Fail" Performance Standard Does not Adequately Consider Safety and Cost Impacts Associated with Its Implementation**

During past sessions of these proceedings, the utilities have argued generally that SED's recent interpretation of Rule 48 (that Rule 48 required utility facilities to withstand 112/92 mph winds) would result in an overbuilt system.<sup>22</sup> However, the PD's unexpected interpretation of Rule 48 that restricts the entire safety factor to wind loading and its order to "henceforth" implement that interpretation in all of California has been imposed in a factual vacuum. Without the benefit of information about either the safety impacts or the substantial costs associated with such a sweeping change, this interpretation may have significant unintended consequences that need to be fleshed out and discussed before any final implementation.

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<sup>20</sup> The Scoping Memo for Phase 3 directed that Section IV of GO 95 be revised to "incorporate... (iii) fire safe standards for the design and construction of electric utility and CIP structures in the High Fire-Threat District". (Scoping Memo, at p.2.)

<sup>21</sup> As further evidence that no party anticipated a cost discussion at this time, the ratepayer parties The Utility Reform Network (TURN) and the Division of Ratepayer Advocates (DRA) were not actively participating in the workshops and were generally "not present" for votes on any of the proposed rules or rules changes. See, various confirmation voting records in Workshop Report.

<sup>22</sup> See, e.g., Joint Utilities Opening Brief re Workshop Report, p. 11 (result of "will not fail" standard would be for a utility "to inappropriately overbuild its system – an impractical and costly alternative"); November 6, 2012 *Joint Reply Comments of Bear Valley Electric Service, California Pacific Electric Company, Pacific Gas and Electric Company, PacifiCorp, and Southern California Edison Company to Opening Comments on Panel 1 and 2 Reports* (Joint Utilities Reply Comments to Panel Reports), p. 6 (in part referring to SDG&E's LFRD proposal, "costs associated with a revised Section IV would be significant...").

There has been insufficient time since the PD was issued to perform a thorough analysis of the safety and cost implications of the PD's interpretation. However, as a place to start, it is possible to provide a list of the possible impacts. PG&E would want to review current engineering and estimating models to determine what type of changes would be needed in its design standards to restrict the safety factor of 4.0 solely to wind loading while also accounting for the variability in the material strength of wood poles. PG&E anticipates that these changes will require larger poles and shorter spans (which will require more poles). The increase in the number of poles and the larger size of poles in the system will pose public safety issues (the most obvious being the increased likelihood of car pole accidents and increased severity of possible injuries due to more and larger poles). There will also be additional costs associated with the need for extra and larger poles as well as more cross arms, insulators, hardware and other elements of lines, materials supply constraints (lack of availability of larger wood poles or manufactured concrete or steel poles and the elements), and organizational costs required to revise and train on new PG&E design and construction standards. There will be additional land/easement acquisition costs, additional time and costs associated with environmental and permitting issues, increased opposition from customers due to the added negative visual and environmental impacts of shorter spans and more poles. These are just a few of the considerations that should be discussed.<sup>23</sup>

By way of example, PG&E has over 2 million just distribution poles in its service

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<sup>23</sup> Southern California Edison will be filing a Motion to Supplement the Record and submitting cost testimony initially prepared for the Malibu Canyon Fire OII (I.09-01-018). SCE estimates that the design criteria would be doubled, that twice as many poles would be needed due to reduced span lengths, and that costs of installation would be doubled. PG&E supports SCE's Motion to Supplement the Record with that testimony, as it believes that information is very important to provide some context to the ramifications of the PD's unexpectedly restricted interpretation. Although PG&E has not had a chance to do a thorough analysis, PG&E expects that its incremental increased costs are not inconsistent with those of SCE.

territory (of which 99% are wood)<sup>24</sup> and spends hundreds of millions of dollars each year on overhead facilities construction. The additional safety and cost impacts of these changes will be substantial. Given the fact that important safety and cost information has not been developed, the PD should defer to Track 3 further discussion about changes to Rule 48 and related rules, when the Commission can consider the safety and cost impacts associated with those changes.<sup>25</sup>

**C. To Ensure More Effective Implementation of Rule 48 Changes, It would Be Prudent to Wait Until the Track 3 Fire Threat Mapping and High Fire Threat Districts are Identified – Especially for Northern California**

**1. The Risk of Catastrophic Fires Associated with Power Lines in Northern California is Very Different From Southern California; Northern California has Many Areas with Low Fire Risk**

There are a number of indicators already available to the Commission that support the fact that it would be wasteful to immediately apply a heightened fire threat design and construction standard to all of Northern California. The Commission itself has recognized that “there is no history of catastrophic power-line fires in Northern California, ... Northern California does not experience Santa Ana windstorms that contribute significantly to the risk of catastrophic power-line fire in Southern California”, and the “risk of power-line fires is lower in Northern California...”<sup>26</sup>

Northern California's climate varies widely, depending on latitude, elevation, and proximity to the coast. Coastal and Southern parts of the PG&E service territory have a Mediterranean climate, with somewhat rainy winters and dry summers. Although there are portions of hot, dry areas, the influence of the ocean generally moderates temperature extremes in many locales, creating warmer winters and substantially cooler summers, especially along the coastal areas. The cool California Current offshore often creates summer fog near the coast, creating a moderate oceanic climate on the northern coast and a moderate Mediterranean climate from about Cape Mendocino southward. Generally, the strongest

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<sup>24</sup> 2013 PG&E GRC Testimony PG&E-4: Chapter 7 [Pole Replacement], Section B, at p.7-2 (“PG&E has full or joint ownership of 2.2 million distribution poles, more than 99% of them wood...”).

<sup>25</sup> In the alternative, the Commission should put this PD on hold and order that workshops and evidentiary hearings be held on these issues as soon as possible.

<sup>26</sup> D.12-01-032, Finding of Fact 8 at p.166.

winds occur during the winter months – a time when there is no or very low fire threat.

The *CIP Threat Class 3 and 4 Map* adopted in Phase 2 of this proceeding (which PG&E understands builds on the CalFire Fire Threat Maps) provides a graphic visual demonstration that the majority of Northern California does not fall into high fire threat areas.<sup>27</sup> Further, SED has acknowledged that different wind speed standards may be appropriate for different areas in California. “SED believes that it is likely that some areas of the State may need a higher standard, and in other areas a lower standard may be appropriate.”<sup>28</sup> Finally, in preparing its Fire Prevention Plan, PG&E collected wind behavior information for its service territory. Out of 209,911 Red Flag Warning records collected from 2001 through 2011, PG&E found only 33 hourly records where wind gusts exceeded 56 mph in light loading districts or 68.9 mph in heavy loading areas<sup>29</sup>. Of those 33 records, nearly half (16) were located on the top of Mount Diablo and only seven other stations account for the remaining 17 records.<sup>30</sup> None of the identified wind gusts exceeded 92 mph.

This wind and weather data simply does not support a ***blanket application*** of heightened wind loading standards to all of California and especially to PG&E’s entire service territory.

**2. It is Premature to Order the Utilities to “Henceforth”  
Design and Construct Facilities to a “Will Not  
Fail” Performance Standards – Especially in  
Northern California (which has Many Areas  
with Low Fire Risk)**

PG&E agrees that heightened standards are appropriate for high fire threat areas that concurrently experience high winds. However, at this point it has not been established scientifically that designing to 112/92 mph winds is necessary or cost effective in the entire

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<sup>27</sup> D.12-01-032, Appendix C.

<sup>28</sup> PD, at p.71.

<sup>29</sup> PG&E December 12, 2012 Advice Letter 4167-E, Attachment B at p.1, filed in compliance with D.12-01-032. Heavy loading areas are areas above 3,000 feet in elevation. Utility facilities are built stronger in heavy loading areas to be able to withstand winter winds, ice loading and temperatures. (GO 95, Rule 43.1.) 68.9 mph is the median wind speed across various conductor types used in PG&E’s Heavy Loading areas. 68.9 mph is based on an analysis done to convert a 6 lb. wind and ½” radial ice (GO 95 Heavy loading areas Rule 43.1) to an equivalent summer wind speed with no ice. When doing this conversion, the equivalent summer wind speed will vary as a function of the wire size and the diameter of the conductor. Many of these heavy loading areas (where facilities are already built with more strength) overlap the potential areas of high fire threat. Deferring this discussion to Track 3 will allow the loading requirements for heavy loading areas to be reconciled with possible heightened standards for high fire threat areas.

<sup>30</sup> Id.

PG&E service territory or (if heightened standards are appropriate) just where in the PG&E service territory such heightened standards should be applied.

Given the facts that: 1) California has a wide range of geographic diversity; 2) so much of PG&E’s service territory is located in coastal and other mild weather areas; and 3) the Track 3 fire threat mapping has not yet been performed, PG&E suggests that it would be prudent to wait to determine whether and where to implement the PD’s interpretation of Rule 48 until the critical high fire threat areas are identified. It makes little sense to require the immediate start of construction of overhead electric facilities built to a heightened standard (which not only will cost more but will also create additional negative visual, environmental and public/worker safety impacts) when there is no evidence yet that such construction is required or prudent for PG&E’s service territory.

The PD should be modified to order that discussion and implementation of the Rule 48 “will not fail” performance standards be deferred to Track 3.

### III. SPECIFIC CHANGES TO PROPOSED DECISION AND RULES

#### A. Table of PG&E’s Proposed Specific Changes

PG&E supports the various Consensus Proposals as presented in the Workshop Report (see page 7 of the Workshop Report for a list of the Consensus Proposals) and urges they be adopted in whole and without exception. Pursuant to CPUC Rules of Practice and Procedure Rule 14.3 (which allows proposals for specific changes to the PD), below is a table that summarizes PG&E’s proposed specific changes to the PD (with supporting rationale).<sup>31</sup>

Language or Rule Changed	Proposed Change/Correction and Rationale
<p><b>PD Rule 48 “will not fail” and safety factor issues:</b></p> <p><b>GO 95, Rule 44: <i>Safety Factors</i></b>            Note            PD, Section 5.3 Discussion at pp. 25-26; Section 6.6.3 Discussion at p.65.</p>	<ul style="list-style-type: none"> <li>• Defer consideration or implementation of a Rule 48 “will not fail” performance standard at 92 mph to Track 3 fire threat mapping.</li> <li>• Order the parties to address in Track 3:               <ul style="list-style-type: none"> <li>o The appropriate Rule 48 standard that with related safety factors accounts for variations in wind loading as well as material strength and other structural uncertainties;</li> </ul> </li> </ul>

<sup>31</sup> PG&E will not discuss each and every proposed rule or rule change, and reserves the right to raise concerns about any rules not discussed here in its Reply Comments as necessary.

<p>PD, Adopted Rule at p.B-4.</p> <p><b>GO 95, Rules 48, 48.1, 48.2, 48.4 and 48.5</b> <i>Strength of Materials: Wood, Steel, Fiber-Reinforced Polymer, and Other Engineered Materials</i>  PD, Sections 6.6 - 6.9, at pp.54-82  PD, FOF 10 at p.97.  PD, COL 5 at p.98.  PD, COL 6 at p.98.  PD, COL 7 at p.99.  PD, OP 4 at p.102.  PD, OP 5 at p.102.  PD, Rule 48.1 at p.B-10 to B-11.  PD, Rule 48.2 at p.B-12.  PD, Rule 48.4 at p.B-14.  PD, Rule 58.5 at p.B-14.</p>	<p>The appropriate heightened design and construction standards for identified high fire threat areas that accounts for variations in wind loading as well as material strength and other structural uncertainties; and</p> <ul style="list-style-type: none"> <li>o The safety impacts and costs associated with such heightened standards as applied to high fire threat areas.</li> </ul> <ul style="list-style-type: none"> <li>• In the interim and until Track 3 is completed, maintain the status quo by: <ul style="list-style-type: none"> <li>o Adopting the Consensus Note on the definition of “Safety Factors” to Rule 44.</li> <li>o Modifying Sections 6.6 through 6.9 in the PD to adopt the uncontested portions in MAPs 5A/B, 6A/B, 7A/B, 8A/B or 9A/B.</li> <li>o Deferring discussion of the contested portions in MAPs 5A/B, 6A/B, 7A/B, 8A/B or 9A/B regarding the “will not fail” performance standard and application of the safety factors.</li> </ul> </li> </ul> <p><u>Rationale:</u></p> <ul style="list-style-type: none"> <li>• GO 95 is based on the engineering principle of Allowable Stress Design (ASD), which (unlike the National Electrical Safety Code) has only <u>one</u> safety factor, and does not provide a separate safety factor for load and a separate safety factor for strength.</li> <li>• Because GO 95 specifies only one safety factor, that factor must account for <u>all</u> uncertainties and variations, including material strengths and wind loading.</li> <li>• The PD’s interpretation that the <u>entire</u> safety factor should be allocated solely to wind loading does not account for variations in material strength or other uncertainties.</li> <li>• Track 3 will provide a forum to consider new heightened fire safety standards and how they should apply to existing and new facilities in the high fire threat districts.</li> <li>• Track 3 will generate authoritative fire threat mapping data.</li> <li>• Track 3 will provide a forum to discuss safety impacts and costs associated with the implementation of heightened standards in high fire threat districts.</li> </ul>
<p><b>GO 95, Rules 44.1</b> <i>Installation and Reconstruction, and 44.2</i> <i>Additional Construction</i>  PD, Section 6.4.3.2. at pp.48-51</p>	<p>Add language to PD at page 50 to clarify that the revised retention period for loading calculations for the life of the pole is prospective.</p> <p><u>Rationale:</u></p> <ul style="list-style-type: none"> <li>• The proposed added language is consistent with language used in the Phase 2 Decision when a retention period for these records was first introduced. The Commission clearly included “henceforth” in its</li> </ul>



	directive and stated that the new retention requirement applies to “records currently in an entity’s possession and records created on or after the date of today’s decision.” (D.12-01-032, at p.26.)
<b>Fire Incident Data Collection Plan</b> PD, Section 7.3 at p.85. PD, Adopted Plan at p.C-3	Correct the discrepancy in discussion on the minimum size of a reportable fire to conform to the requirement in the submitted plan in the Workshop Report (should be “linear”, not “square” meter in size. <u>Rationale:</u> <ul style="list-style-type: none"> <li>• This appears to be a simple typographical error.</li> </ul>
<b>Page 103. [Fire Incident Reporting to CIPs].</b> PD, Ordering Paragraph at p.103.	Change the word “implicates” to “involves” when talking about CIP facilities. <u>Rationale:</u> <ul style="list-style-type: none"> <li>• The term “implicates” could be interpreted to imply some degree of culpability. The parties agreed during the workshop on the Fire Incident Data Collection Plan to use objective descriptive terminology that did not carry any culpability connotations.</li> <li>• The term “involved” or “involves” is used consistently throughout the Plan, and should be used here instead.</li> </ul>

#### IV. COST RECOVERY AND IMPLEMENTATION

The PD appropriately allows the IOUs to recover their reasonable costs prudently incurred to comply with the PD.<sup>32</sup> PG&E will be using its Fire Hazard Memorandum Account set up following Phase 1 of this proceeding to track any incremental costs and will be prepared to provide cost data associated with Phase 2-related work as directed in the PD.

The PD also acknowledges the fact that implementation of the PD “may require the affected entities to develop, implement, and maintain new procedures, documentation, and databases, and to train and possibly add personnel.”<sup>33</sup> With the exception of the directive to “henceforth” design and construct overhead facilities to conform to the PD’s interpretation of the “will not fail” performance standard,<sup>34</sup> the PD sets reasonable expectations for the implementation of its orders and directives.<sup>35</sup> This approach is consistent with the approach

<sup>32</sup> PD, at pp.89-90.

<sup>33</sup> PD, at pp.92-93.

<sup>34</sup> PD, OP 4 at p.102.

<sup>35</sup> PD, at p.93. (PD orders implementation “as soon as possible” but states: “We do not adopt any deadlines except those specified in various rules, regulations, or ordering paragraphs themselves.”.)

taken in the Phase 1 and 2 Decisions, which also did not set deadlines or require compliance plans and provided each entity some flexibility to take reasonable measures to begin to implement the directives to fit its particular circumstances.<sup>36</sup>

## V. CONCLUSION

As GO 95 is currently written, applying safety factors is a zero sum game. Any part of the safety factor that is reserved solely for loading (as proposed in the PD) takes away from the margin of safety for materials strength and other structural uncertainties. In addition to adopting the Consensus Rules and considering PG&E's other recommendations, the PG&E strongly urges that the PD be modified to defer any discussion of the contested portions of Rule 48 and related rules to Track 3 -- when any changes in Rule 48 standards can be based on authoritative and scientific data informed by appropriate safety and cost-benefit analysis.

Respectfully Submitted,

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By:

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Dated: December 23, 2011

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<sup>36</sup> D.09-08-029 at p.44 (“We do not require compliance plans but, instead, expect each entity to establish a reasonable implementation plan to fit its particular circumstances”) and D.12-01-032 at p.156 (no deadlines adopted unless specified, and “[a]ll entities...shall implement these directives as soon as possible”).

**APPENDIX**

**PG&E'S SPECIFIC RECOMMENDED CHANGES**

APPENDIX

PG&E'S SPECIFIC RECOMMENDED CHANGES

A. CHANGES TO PROPOSED DECISION

Pages 24-26.

**PD, Section 5.3. GO 95, Rule 44 [Note to Safety Factors].** Modify the PD to adopt the clarifying note in Consensus Proposal 5 to Rule 44, which note explains the fundamental purpose of safety factors as used in GO 95 is “to account for factors such as uncertainties in strengths, loads, design performance, and minor construction deviation”.

Version showing proposed specific changes:

With one exception identified below, [W]we find that every Consensus Proposal is consistent with our objective of modernizing GO 95 in a way that improves fire safety.

....

For the preceding reasons, we find all but one of the Consensus Proposals are reasonable in light of the record, consistent with the law, and in the public interest. We therefore adopt the proposals, with one exception.

We decline to adopt Consensus Proposal 5’s recommendation to add a “note” to Rule 44 that states the purpose of safety factors is to account for uncertainties in material strengths, loads, design performance, and minor construction deviations.<sup>17</sup> We are concerned that the proposed “note” would be detrimental to public safety in situations where GO 95 allows a safety factor of 1.0.<sup>18</sup> In these situations, the design strength of the structure is exactly equal to the design loads for the structure. The entire safety factor of 1.0 must be available to support the design load; none of the safety factor of 1.0 can be taken up by uncertainties in material strengths, loads, design performance, or minor construction deviations as would be allowed by the proposed “note.” Otherwise, the structure may fail and thereby ignite a fire, damage or destroy property, and kill or injure people.

<sup>17</sup> Rule 44, as revised by this decision in conformance with Consensus Proposal 5, defines “safety factors” as “the minimum allowable ratios of material and/or line element strengths to the effect of design loads as specified in Rule 43.”

<sup>18</sup> See, for example, GO 95, Rules 44.3, 47.4, 47.5, 49.2(c)(1)(a), 49.2(c)(1)(b), and 49.3(c)(1)(a).

Final version incorporating proposed specific changes:

We find that every Consensus Proposal is consistent with our objective of modernizing GO 95 in a way that improves fire safety.

....

For the preceding reasons, we find all of the Consensus Proposals are reasonable in light of the record, consistent with the law, and in the public interest. We therefore adopt the proposals.

**Pages 48-51.**

**PD, Section 6.4.3.2. GO 95, Rules 44.1 *Installation and Reconstruction*, and 44.2 *Additional Construction*.** Add language to PD at pages 50 and 51 to clarify that the revised retention period for loading calculations for the life of the pole is a new requirement and is prospective.

Version showing proposed specific changes:

At page 50: So that the record retention requirement is clear, we will revise Rule 44.2 to require loading calculations to henceforth be retained for the service life of the pole for which the pole loading calculations were made. This new record-retention requirement applies to records currently in an entity's possession and records created on or after the date of today's decision.

...

At page 51: Therefore, we will revise Rule 44.1 to incorporate a record-retention requirement for loading calculations that mirrors our revisions to Rule 44.2 and require loading calculations to henceforth be retained for the service life of the pole. This new record-retention requirement also applies to records currently in an entity's possession and records created on or after the date of today's decision.

Final version incorporating proposed specific changes:

At page 50: So that the record retention requirement is clear, we will revise Rule 44.2 to require loading calculations to henceforth be retained for the service life of the pole for which the pole loading calculations were made. This new record-retention requirement applies to records currently in an entity's possession and records created on or after the date of today's decision.

...

At page 51: Therefore, we will revise Rule 44.1 to incorporate a record-retention requirement for loading calculations that mirrors our revisions to Rule 44.2 and require loading calculations to henceforth be retained for the service life of the pole. This new record-retention requirement also applies to records currently in an entity's possession and records created on or after the date of today's decision.

**Pages 60-69.**

**PD, Section 6.6.3. GO 95, Rule 48 [MAPs 5A and B].** Modify the discussion to defer to Track 3 all discussion concerning Rule 48 and the "will not fail"/safety factor standard.

Version showing proposed specific changes:

**Delete** all of existing text for Section 6.6.3 and replace with version below.  
(Deletion not shown due to large number of pages involved.)

Proposed replacement version incorporating proposed specific changes:

### **6.6.3. Discussion**

There exists a fundamental disagreement among the parties about the appropriate interpretation of Rule 48 and its progeny when applying safety factors to loading and material strength requirements for overhead utility structures for design and construction purposes. The CIPs, IOUs and MOUs state that they have long designed their facilities using a wind load of 8 psf/56 mph in accordance with Rule 43 (which accounts for variations in both load and material strength) and that designing to 56 mph is obviated by Rule 31.1 of GO 95 (which requires facilities to be designed with “known local conditions” in mind). Thus, if local winds are known to exceed 56 mph, then facilities in that area must be designed to take such winds into account pursuant to Rule 31.1. Finally, they argue that the “will not fail” standard is an engineering impossibility that does not recognize the fundamental engineering principle that every material used in utility overhead poles and lines will have some probability of failure (especially for wood poles).

SED, LA County Fire Dept., MGRA and others interpret Rule 48 as requiring newly installed and reconstructed Grade A wood poles in the Light Loading District to be designed and constructed so they will not fail at wind loads of 32 psf/112 mph, which may degrade over the service life of the poles to 21.4 psf/92 mph. They are concerned that Contested Proposals 5A and 5B would lower the standard to 56 mph wind loads, which is too low and thus unsafe for many parts of the State – and especially areas subject to the Santa Ana winds.

While we believe that utilities should design and construct overhead facilities to a higher standard in areas where high fire threat is accompanied by high winds, we also recognize that a blanket requirement that all facilities must be designed and constructed to 112/92 mph wind loading (or any other heightened standard) may not be appropriate for all areas of the state. Therefore, we **will defer** to Phase 3 Track 3 of this proceeding any consideration and implementation of the contested portions of MAPs 5A/B, 6A/B, 7A/B, 8A/B and 9A/B, as they pertain to Rules 48, 48.1, 48.2, 48.4 and 48.5 (along with the “will not fail” requirement and appropriate application of related safety factors) so that those contested proposed rules changes can be appropriately considered in conjunction with the Track 3 fire threat mapping effort.

In Phase 3, Track 3 of this proceeding, we intend to develop, adopt, and implement statewide fire-threat maps. The function of these maps is to accurately designate geographic areas where fires associated the presence of power lines are more likely to ignite and rapidly spread, thereby posing an increased risk of dangerous wildfires. To function properly, these maps will have to reflect local wind conditions, vegetation fuel

loads, terrain, and other factors that bear on the risk of fires associated with power lines igniting and spreading rapidly.

As set forth in our Phase 2 Decision, we intended to use these fire-threat maps for several purposes, including:

- i. Revising Section IV of GO 95 to incorporate (a) a new High Fire-Threat District, (b) one or more maps of the High Fire-Threat District, and (c) fire-safety standards for the design and construction electric utility and CIP structures in the High Fire-Threat District.
- ii. Assessing whether any of the new fire-safety standards developed pursuant to the previous Item i.c should apply to existing facilities in the High Fire-Threat District in light of cost-benefit considerations and Rule 12 of GO 95 and, if so, developing a plan, timeline, and cost estimate for upgrading existing facilities in the High Fire-Threat District to meet the new standards. (D.12-01-032, Ordering Paragraphs 8.iii and 8.iv.)

The following principles will guide the parties as they consider both Items (i)c and (ii) above. Any proposed rules or revisions to rules in Section IV of GO 95 must:

- Be consistent with the primary purpose of this proceeding, which is to enhance fire safety and consider/adopt measures to reduce the fire hazards associated with overhead facilities;
- Define standards that will ensure the utility facilities will withstand predicted wind loads based on scientific data in certain defined high fire threat areas of California;
- Provide clear direction on the appropriate application of safety factors that accounts for variations in both wind loading and material strength (as well as other structural and design uncertainties);
- Ensure that Rule 48 and related rules are consistently applied so that the same wind loading is addressed for various elements of an overhead structure or when using different types of material for the same use (e.g., wood poles or metal poles should be able to withstand the same wind loading);
- Weigh the safety impacts and incremental costs incurred associated with heightened design and construction standards in high fire threat areas against the fire mitigation benefits associated with those heightened standards;
- Consider whether, and to what extent, existing overhead structures throughout the State that do not meet any heightened standards may need to be reinforced or replaced based on the high fire threat/high winds mapping that will be adopted in Track 3 and appropriate safety/cost/benefit assessments.

The assigned Commissioner may determine the exact scope, procedures and

timeframe for addressing these issues.

**Pages 74-76.**

**PD, Section 6.8.3 re GO 95, Rule 48.1 (MAPs 6A and B).** Retain the uncontested portions of the MAPs as indicated below. Defer to Track 3 discussion of the contested portions of text concerning the appropriate use of “divided by”/“in conjunction” and the PD’s proposed interpretation of the “will not fail”/“multiplied by” performance standard and application of related safety factors.

Version showing proposed specific changes:

**6.8.3. Discussion**

We will adopt the unopposed elements of Contested Proposals 6A and 6B by revising Rule 48.1 to (1) incorporate references to ANSI wood-related standards ANSI O5.1 (for round wood poles), ANSI O5.2 (for laminated wood members), and ANSI O5.3 (for solid sawn crossarms and braces); and (2) revise Table 5 to list selected wood fiber strengths from ANSI 05.1. As noted by the parties, these standards are written specifically for the design and construction of utility structures and are widely used by electric utilities and CIPs. The adopted revisions to Rule 48.1 are consistent with our objective of revising GO 95 to reflect modern materials and practices, with the goal of improving fire safety.

We defer to Track 3 of Phase 3 of this proceeding the discussion of the “divide by”/“in conjunction with” method for applying safety factors that is part of Contested Proposals 6A and 6B because this issue is included in the larger discussion concerning the heightened fire safety standards for the high fire threat districts. (See Section 6.6.3 above).

We decline to adopt the “divide by” method for applying safety factors that is part of Contested Proposal 6A because this method is intended, in part, to establish a wind-load design standard of 56 mph for much of the State. Our reasons for rejecting the 56 mph standard are explained previously in this decision as part of our discussion on Contested Proposals 5A and 5B.

We also decline to adopt SED’s recommendation in Contested Proposal 6B to retain in Rule 48.1 the current “in conjunction with” method for applying safety factors. We agree with the opponents of Contested Proposal 6B that the “in conjunction with” method does not provide sufficient guidance for applying safety factors. The goal of public safety is better served when the rules regarding the application of safety factors are clear.

In order to provide clear and consistent direction regarding the application of safety factors, we will revise Rule 48.1 to conform to the will-not-fail performance standard for safety factors in Rule 48 that was described previously in our discussion of Contested Proposals 5A and 5B. For example, Rule 48.1-A shall state as follows with respect to wood poles:



**Poles**

Wood poles shall be designed and constructed so that poles will not fail or be seriously distorted at any load less than the maximum working loads (developed with the loadings specified in Rule 43) multiplied by the safety factors specified in Rule 44. The required strength of natural wood poles that comply with ANSI O5.1-2008 shall be derived by using the designated fiber strength specified in ANSI O5.1-2008. Table 5 lists some of the values of fiber strength specified in ANSI O5.1-2008.

The text of Rule 48.1, as revised by this decision, is contained in Appendix B of this decision.

Proposed version incorporating proposed specific changes:

**6.8.3. Discussion**

We will adopt the unopposed elements of Contested Proposals 6A and 6B by revising Rule 48.1 to (1) incorporate references to ANSI wood-related standards ANSI O5.1 (for round wood poles), ANSI O5.2 (for laminated wood members), and ANSI O5.3 (for solid sawn crossarms and braces); and (2) revise Table 5 to list selected wood fiber strengths from ANSI O5.1. As noted by the parties, these standards are written specifically for the design and construction of utility structures and are widely used by electric utilities and CIPs. The adopted revisions to Rule 48.1 are consistent with our objective of revising GO 95 to reflect modern materials and practices, with the goal of improving fire safety.

We defer to Track 3 of Phase 3 of this proceeding the discussion of the “divide by”/”in conjunction with” method for applying safety factors that is part of Contested Proposals 6A and 6B because this issue is included in the larger discussion concerning the heightened fire safety standards for the high fire threat districts. (See Section 6.6.3 above).

The text of Rule 48.1, as revised by this decision, is contained in Appendix B of this decision.

**Pages 79-82.**

**PD, Section 6.9.3. GO 95, Rules 48.2, 48.4 and 48.5 [MAPs 7A/B, 8A/B, and 9A/B].** Retain PD discussion of uncontested changes to Contested Proposals 7A/B, 8A/B, and 9A/B regarding updating the rules to conform to certain ASCE provisions as indicated below. Defer to Track 3 the contested portions of text concerning the appropriate use of “divided by”/”in conjunction” and the PD’s proposed interpretation of the “will not fail”/”multiplied by” performance standard and application of related safety factors.

Version showing proposed specific changes (text on uncontested and unchanged portion of Discussion truncated due to length):

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### 6.9.3. Discussion

The issue before us is whether to...

...

...Therefore, consistent with our goals for this phase of the proceeding, we will adopt the elements that are common to each pair of Contested Proposals.

The only substantive difference between each pair of Contested Proposals concerns the application of safety factors. Contested Proposals 7A, 8A, and 9A use the “divide by” method for applying safety factors, while Contested Proposals 7B, 8B, and 9B use the “in conjunction with” method. We defer to Track 3 of Phase 3 of this proceeding the discussion of the “divide by”/“in conjunction with” method for applying safety factors that is part of Contested Proposals 7A/B, 8A/B, and 9A/B because this issue is included in the larger discussion concerning the heightened fire safety standards in the high fire threat districts. (See Section 6.6.3 above).

We decline to adopt either method for the reasons stated previously in this decision. Instead, we will revise Rules 48.2, 48.4, and 48.5 to conform to our policy that the required strength of overhead line structures and parts thereof shall be determined in accordance with the will-not-fail performance standard in Rule 48. The adopted texts on this matter shall state as follows:

**Rule 48.2:** Overhead line structures and subcomponents made from steel shall be designed and constructed so they will not fail or be seriously distorted at any load less than the maximum working loads (developed with the loadings specified in Rule 43) multiplied by the safety factors specified in Rule 44. The required strength of steel structures and components shall be derived using ASCE 10-97 for latticed steel structures and ASCE 48-11 for tubular steel pole structures, as applicable.

**Rule 48.4:** Overhead line structures and subcomponents made with fiber-reinforced polymer material shall be designed and constructed so they will not fail or be seriously distorted at any load less than the maximum working loads (developed with the loadings specified in Rule 43) multiplied by the safety factors specified in Rule 44. This requirement applies to tension and bending, compression and bending, and shear.

**Rule 48.5:** Overhead line structures and subcomponents made with other engineered materials shall be designed and constructed so they will not fail or be seriously distorted at any load less than the maximum working loads (developed with the loadings specified in Rule 43) multiplied by the safety factors specified in Rule 44. This requirement applies to tension, compression, and shear.

The complete texts of Rules 48.2, 48.4, and 48.5, as revised by this decision, are contained in Appendix B of this decision.

Proposed version incorporating proposed specific changes:

### 6.9.3. Discussion

The issue before us is whether to...

...

...Therefore, consistent with our goals for this phase of the proceeding, we will adopt the elements that are common to each pair of Contested Proposals.

The only substantive difference between each pair of Contested Proposals concerns the application of safety factors. Contested Proposals 7A, 8A, and 9A use the “divide by” method for applying safety factors, while Contested Proposals 7B, 8B, and 9B use the “in conjunction with” method. We defer to Track 3 of Phase 3 of this proceeding the discussion of the “divide by”/“in conjunction with” method for applying safety factors that is part of Contested Proposals 7A/B, 8A/B, and 9A/B because this issue is included in the larger discussion concerning the heightened fire safety standards in the high fire threat districts. (See Section 6.6.3 above).

The complete texts of Rules 48.2, 48.4, and 48.5, as revised by this decision, are contained in Appendix B of this decision.

#### Page 85.

**PD, Section 7.3. Fire Incident Data Collection Plan [dimension of fire].** Correct the discrepancy on the minimum size of a reportable fire to conform to the submitted plan in the Workshop Report at page C-10 (“square meter” changed to “linear meter”).

Version showing proposed specific changes:

...to collect specified information regarding every known fire associated with their overhead power-line facilities down to one linear square meter in size,...

Final version incorporating proposed specific changes:

...to collect specified information regarding every known fire associated with their overhead power-line facilities down to one linear meter in size,...

#### Page 96.

**PD, Finding of Fact 3.** Add one additional issue to the paragraph discussing proposed rules.

Version showing proposed specific changes:

3. The proposed regulations that are not adopted by this decision have one or more of the following defects: (i) the proposed regulation provides less public safety relative to

existing regulations; (ii) the proposed regulation is not within the scope of this proceeding; (iii) the proposed regulation is contrary to the fire-safety goals of this proceeding; (iv) there is no demonstrated need for the proposed regulation; (v) the proposed regulation is not necessary in light of existing regulations or the regulations adopted by this decision; (vi) the proposed regulation is not technically sound; and/or (vii) the costs and burdens of the proposed regulation outweigh its benefits; and/or (viii) consideration of the proposed regulation requires additional information concerning the appropriate application of safety factors that account for both loading and variations of materials strength as they would be applied in high fire threat areas as well as the safety and cost impacts of applying the heightened standards (which information will be developed in Track 3 of this proceeding).

Final version incorporating proposed specific changes:

3. The proposed regulations that are not adopted by this decision have one or more of the following defects: (i) the proposed regulation provides less public safety relative to existing regulations; (ii) the proposed regulation is not within the scope of this proceeding; (iii) the proposed regulation is contrary to the fire-safety goals of this proceeding; (iv) there is no demonstrated need for the proposed regulation; (v) the proposed regulation is not necessary in light of existing regulations or the regulations adopted by this decision; (vi) the proposed regulation is not technically sound; (vii) the costs and burdens of the proposed regulation outweigh its benefits; and/or (viii) consideration of the proposed regulation requires additional information concerning the appropriate application of safety factors that account for both loading and variations of materials strength as they would be applied in high fire threat areas as well as the safety and cost impacts of applying the heightened standards (which information will be developed in Track 3 of this proceeding).

**Page 97.**

**PD, Finding of Facts.** Add reason for deferring discussion and implementation for the PD's interpretation of Rule 48 and related safety factors.

Version showing proposed specific changes:

10. The "divide by" method for applying safety factors in several GO 95 rules could be misinterpreted as a manifestation of a wind-load standard of 8 psf/56 mph for utility poles in the Light Loading District. However, if the "multiplied by" method is used and the entire safety factor is applied solely to loading to ensure that facilities can withstand a wind-load of 8 psf/92 mph for utility poles in the Light Loading District, this leaves a safety factor of 1.0 to account for the variability in material strength and other uncertainties -- with a potential 50% failure rate for wood poles.

Final version incorporating proposed specific changes:

10. The "divide by" method for applying safety factors in several GO 95 rules could be

misinterpreted as a manifestation of a wind-load standard of 8 psf/56 mph for utility poles in the Light Loading District. However, if the “multiplied by” method is used and the entire safety factor is applied solely to loading to ensure that facilities can withstand a wind-load of 8 psf/92 mph for utility poles in the Light Loading District, this leaves a safety factor of 1.0 to account for the variability in material strength and other uncertainties -- with a potential 50% failure rate for wood poles.

**Page 98.**

**PD, Conclusion of Law 5.** Add reason for deferring discussion and implementation for the PD’s interpretation of Rule 48 and related safety factors.

Version showing proposed specific changes:

5. Rule 48 of GO 95 establishes a mandatory performance standard that structures and parts thereof will not fail at the loads specified in Rule 43 multiplied by the safety factors in Rule 44. Electric utilities and CIPs must design and construct their overhead facilities to comply with the “will not fail” performance standard in Rule 48. As written, this rule requires the entire required safety factor to be available to support design loads. It provides no guidance to utilities on how to design and construct overhead facilities in a way that will account for uncertainties in material strength, design performance, or construction deviations. Further, applying this rule as written may result in the construction of upgraded facilities in areas that do not require upgraded facilities.

Final version incorporating proposed specific changes:

5. Rule 48 of GO 95 establishes a mandatory performance standard that structures and parts thereof will not fail at the loads specified in Rule 43 multiplied by the safety factors in Rule 44. As written, this rule requires the entire required safety factor to be available to support design loads. It provides no guidance to utilities on how to design and construct overhead facilities in a way that will account for uncertainties in material strength, design performance, or construction deviations. Further, applying this rule as written may result in the construction of upgraded facilities in areas that do not require upgraded facilities.

**Page 98.**

**PD, Conclusion of Law 6.** Provide direction for Track 3 scope.

Version showing proposed specific changes:

6. The scope of Phase 3, Track 3 of this proceeding should include the topics of: (i) the appropriate design methodology for Rule 48 and related safety factors for overhead facilities that will account for both loading as well as variations in material strength and other structural uncertainties; (ii) where heightened design standards for overhead facilities should be applied; and (iii) whether, and to what extent, heightened design

standards for overhead facilities that do not meet the will-not-fail standard in Rule 48 need to be reinforced or replaced based on the fire-threat map(s) that will be adopted in Track 3, local wind conditions, and public-safety considerations. Also included in the scope should be consideration of the costs and benefits of applying heightened design standards to identified high fire threat areas and the appropriate implementation schedule of the heightened design standards.

Final version incorporating proposed specific changes:

6. The scope of Phase 3, Track 3 of this proceeding should include the topics of: (i) the appropriate design methodology for Rule 48 and related safety factors for overhead facilities that will account for both loading as well as variations in material strength and other structural uncertainties; (ii) where heightened design standards for overhead facilities should be applied; and (iii) whether, and to what extent, heightened design standards for overhead facilities need to be reinforced or replaced based on the fire-threat map(s) that will be adopted in Track 3, local wind conditions, and public-safety considerations. Also included in the scope should be consideration of the costs and benefits of applying heightened design standards to identified high fire threat areas and the appropriate implementation schedule of the heightened design standards.

**Page 99.**

**PD, Conclusion of Law 7.** Provide explanation for current changes in rules and direction for Track 3 scope.

Version showing proposed specific changes:

7. Those GO 95 rules that are adopted or revised by this decision (or later in Track 3) which use either the “in conjunction with” method or the “divide by” method for applying safety factors should be modified to reflect the “will not fail” performance standard the same standard and approach for applying safety factors in Rule 48 in all the rules. This modification will provide consistency among the GO 95 rules and a high level of public safety.

Final version incorporating proposed specific changes:

7. Those GO 95 rules that are adopted or revised by this decision (or later in Track 3) should be modified to reflect the same standard and approach for applying safety factors in Rule 48 in all the rules. This modification will provide consistency among the GO 95 rules and a high level of public safety.

**Page 102.**

**PD, Ordering Paragraph 4.**<sup>37</sup> Defer to Track 3 Rule 48 discussion and implementation of “will not fail” requirement and related safety factors.

Version showing proposed specific changes:

4. Electric utilities and communications infrastructure providers shall henceforth design and construct overhead facilities subject to General Order (GO) 95 to comply with the performance standard in Rule 48 of GO 95 that such facilities will not fail or be seriously distorted at any loads less than those specified in Rule 43 of GO 95 multiplied by the safety factors specified in Rule 44. This decision defers to Track 3 consideration or implementation of a Rule 48 “will not fail” performance standard and related safety factor issues.

Final version incorporating proposed specific changes:

4. This decision defers to Track 3 consideration or implementation of a Rule 48 “will not fail” performance standard and related safety factor issues.

**Page 102.**

**PD, Ordering Paragraph 5.** Provide direction for Track 3 scope.

Version showing proposed specific changes:

5. The scope for Phase 3, Track 3 of this proceeding shall include:
- i. The appropriate application of a Rule 48 “will not fail” performance standard and related safety factors that accounts for variations in wind loading, materials strength and other structural uncertainties;
  - ii. The appropriate heightened design and construction standards for identified high fire threat areas that account for variations in both wind loading, materials strength and other structural uncertainties);
  - iii. The issue of whether, and to what extent, existing overhead power-line facilities and aerial communications facilities in California that do not meet the will-not-fail standard in Rule 48 General Order 95 heightened fire safety standards need to be reinforced or replaced based on the fire threat map(s) that will be adopted in Track 3, local wind conditions, and public safety considerations;
  - iv. The safety and costs impacts associated with applying heightened standards in high fire threat areas either prospectively or to existing facilities; and
  - v. An appropriate implementation framework for applying heightened design and construction standards for identified high fire threat areas.

The assigned Commissioner may determine the exact scope of this issue and the

<sup>37</sup> PG&E offers some suggested language on the various Ordering Paragraphs as a courtesy and convenience for ALJ Kenney and Commissioner Florio.

procedures and timeframe for addressing this issue.

Final version incorporating proposed specific changes:

5. The scope for Phase 3, Track 3 of this proceeding shall include:

- i. The appropriate application of a Rule 48 “will not fail” performance standard and related safety factors that accounts for variations in wind loading, materials strength and other structural uncertainties;
- ii. The appropriate heightened design and construction standards for identified high fire threat areas that account for variations in both wind loading, materials strength and other structural uncertainties);
- iii. The issue of whether, and to what extent, existing overhead power-line facilities and aerial communications facilities in California that do not meet the will-not-fail standard in Rule 48 General Order 95 heightened fire safety standards need to be reinforced or replaced based on the fire threat map(s) that will be adopted in Track 3, local wind conditions, and public safety considerations;
- iv. The safety and costs impacts associated with applying heightened standards in high fire threat areas either prospectively or to existing facilities; and
- v. An appropriate implementation framework for applying heightened design and construction standards for identified high fire threat areas.

The assigned Commissioner may determine the exact scope of this issue and the procedures and timeframe for addressing this issue.

**Page 103.**

**PD, Ordering Paragraph. [Fire Incident Reporting to CIPs].** Change the word “implicates” to “involves”.

Version showing proposed specific changes:

...establish a mutually satisfactory process for notifying CIPs when an IOU reports a fire incident...that implicates involves CIP facilities.

Final version incorporating proposed specific changes:

...establish a mutually satisfactory process for notifying CIPs when an IOU reports a fire incident...that involves CIP facilities.



**B. CHANGES TO PROPOSED RULES [Appendix B]**

Page B-4.

**PD, GO 95, Rule 44, Safety Factors.** Adopt note from Consensus Proposal 5 to preserve the status quo pending discussion deferred to Track 3 of Rule 48 “will not fail” requirement and related safety factors (retaining the consensus language).

Version showing proposed specific changes:

**44 Safety Factors**

The safety factors specified in these rules are the minimum allowable ratios of material and/or line element strengths to the effect of design loads as specified in Rule 43.

Note: Safety factors are applied to account for factors such as uncertainties in strengths, loads, design performance, and minor construction deviations.

Final version incorporating proposed specific changes:

**44 Safety Factors**

The safety factors specified in these rules are the minimum allowable ratios of material and/or line element strengths to the effect of design loads as specified in Rule 43.

Note: Safety factors are applied to account for factors such as uncertainties in strengths, loads, design performance, and minor construction deviations.

Page B-10 to B-11.

**PD, GO 95, Rule 48.1 Wood.** Preserve the status quo pending discussion deferred to Track 3 of Rule 48 “will not fail” requirement and related safety factors (retaining the consensus language in the various rule proposals and the “in conjunction with” language suggested by SED).

Version showing proposed specific changes:

**48.1 Wood**

**A. Natural Wood (Non Laminate)**

**1. Poles**

Allowable stresses for natural wood poles of various species meeting the requirements of ANSI O5.1-2008 shall be derived in conjunction with the safety factors given in Rule 44 and the designated fiber strength in that standard. Wood poles shall be designed and constructed so that poles will not fail or be seriously distorted at any load less than the maximum working loads (developed with the loadings specified in Rule 43) multiplied by the safety factors specified in Rule 44. The required strength of natural wood poles that comply with ANSI O5.1-2008 shall be derived by using the designated fiber strength specified in ANSI 05.1-2008.

Table 5 lists some of the values of fiber strength specified in ANSI O5.1-2008.

## **2. Sawn Wood Structural Members**

Allowable stresses for sawn wood structural members, such as cross arms and braces, meeting the requirements of ANSI O5.3-2008 shall be derived in conjunction with the safety factors given in Rule 44 and the designated fiber strength in that standard. Sawn wood structural members, such as crossarms and braces, shall be designed and constructed so they will not fail or be seriously distorted at any load less than the maximum working loads (developed with the loadings specified in Rule 43) multiplied by the safety factors specified in Rule 44. The required strength of sawn wood structural members that comply with ANSI O5.3-2008 shall (a) be derived by using the designated fiber strength specified in ANSI O5.3-2008, and (b) take into account whether the sawn wood structural member(s) will be used for short-term loading (continuous load for less than one year) or long-term loading (continuous load for one year or more).

Multiply the given allowable stress values by 0.55 for sawn wood where the loading being considered is a long time loading (continuous load for one year or more).

## **B. Laminated Wood**

Allowable stresses for laminated wood poles and other structural members, such as cross arms, meeting the requirements of ANSI O5.2-2006 shall be derived in conjunction with the safety factors given in Rule 44 and the designated fiber strength in that standard. Laminated wood poles and other structural members, such as crossarms, shall be designed and constructed so they will not fail or be seriously distorted at any load less than the maximum working loads (developed with the loadings specified in Rule 43) multiplied by the safety factors specified in Rule 44. The required strength of laminated wood poles and other structural members that comply with ANSI O5.2-2006 shall be derived by using the designated strength specified in that standard.

[No changes to Table 5.]

Final version incorporating proposed specific changes:

## **48.1 Wood**

### **A. Natural Wood (Non Laminate)**

#### **1. Poles**

Allowable stresses for natural wood poles of various species meeting the requirements of ANSI O5.1-2008 shall be derived in conjunction with the safety factors given in Rule 44 and the designated fiber strength in that standard. Table 5 lists some of the values of fiber strength specified in ANSI O5.1-2008.

#### **2. Sawn Wood Structural Members**

Allowable stresses for sawn wood structural members, such as cross arms and braces, meeting the requirements of ANSI O5.3-2008 shall be derived in conjunction with the safety factors given in Rule 44 and the designated fiber strength in that standard.

Multiply the given allowable stress values by 0.55 for sawn wood where the loading being considered is a long time loading (continuous load for one year or more).

**B. Laminated Wood**

Allowable stresses for laminated wood poles and other structural members, such as cross arms, meeting the requirements of ANSI O5.2-2006 shall be derived in conjunction with the safety factors given in Rule 44 and the designated fiber strength in that standard.

[No changes to Table 5.]

**Page B-12.**

**PD, GO 95, Rule 48.2 Steel.** Preserve the status quo pending discussion deferred to Track 3 of Rule 48 “will not fail” requirement and related safety factors (retaining the consensus language in the various rule proposals and the “in conjunction with” language suggested by SED).

Version showing proposed specific changes:

**48.2 Steel**

Overhead line structures and subcomponents made from steel shall be designed and constructed so they will not fail or be seriously distorted at any load less than the maximum working loads (developed with the loadings specified in Rule 43) multiplied by the safety factors specified in Rule 44.

The required strength of steel structures and components shall be derived designed using ASCE 10-97 for latticed steel structures and ASCE 48-11 for tubular steel pole structures, as applicable.

Allowable stresses for steel members and their connections shall be derived in conjunction with the safety factors given in Rule 44 and the permitted stresses specified in the applicable standard.

[No changes to the rest of the rule.]

Final version incorporating proposed specific changes:

**48.2 Steel**

The required strength of steel structures and components shall be derived designed using

ASCE 10-97 for latticed steel structures and ASCE 48-11 for tubular steel pole structures, as applicable.

Allowable stresses for steel members and their connections shall be derived in conjunction with the safety factors given in Rule 44 and the permitted stresses specified in the applicable standard.

[No changes to the rest of the rule.]

**Page B-14.**

**PD, GO 95, New Rule 48.4 Fiber-Reinforced Polymer.** Preserve the status quo pending discussion deferred to Track 3 of Rule 48 “will not fail” requirement and related safety factors (retaining the consensus language in the various rule proposals and the “in conjunction with” language suggested by SED).

Version showing proposed specific changes:

**48.4 Fiber-Reinforced Polymer**

Allowable stresses for fiber-reinforced polymer Overhead line structures and subcomponents made with fiber-reinforced polymer material shall be derived in conjunction with the safety factors given in Rule 44 and other permitted stresses specified in the applicable standard designed and constructed so they will not fail or be seriously distorted at any load less than the maximum working loads (developed with the loadings specified in Rule 43) multiplied by the safety factors specified in Rule 44. This requirement applies to tension and bending, compression and bending, and shear.

[No changes to the rest of the rule.]

Final version incorporating proposed specific changes:

**48.4 Fiber-Reinforced Polymer**

Allowable stresses for fiber-reinforced polymer overhead line structures and subcomponents shall be derived in conjunction with the safety factors given in Rule 44 and other permitted stresses specified in the applicable standard. This requirement applies to tension and bending, compression and bending, and shear.

[No changes to the rest of the rule.]

**Page B-14.**

**PD, GO 95, Renumbered Rule 48.5 Other Engineered Materials.** Preserve the status quo pending discussion deferred to Track 3 of Rule 48 “will not fail” requirement and related safety factors (retaining the consensus language in the various rule proposals and the “in conjunction with” language suggested by SED).

Version showing proposed specific changes:

**Rule 48.5 Other Engineered Materials**

The allowable strength of Overhead line structures and subcomponents made with other engineered materials shall be derived in conjunction with the designed and constructed so they will not fail or be seriously distorted at any load less than the maximum working loads (developed with the loadings specified in Rule 43) multiplied by the safety factors specified given in Rule 44 to determine the maximum allowable working stress. This requirement applies to tension, compression, and shear.

[No change in the rest of the rule.]

Final version incorporating proposed specific changes:

**Rule 48.5 Other Engineered Materials**

The allowable strength of overhead line structures and subcomponents made with other engineered materials shall be derived in conjunction with the safety factors given in Rule 44 to determine the maximum allowable working stress. This requirement applies to tension, compression, and shear.

[No change in the rest of the rule.]

(END OF APPENDIX)

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**CERTIFICATE OF SERVICE BY ELECTRONIC MAIL**

I, the undersigned, state that I am a citizen of the United States and am employed in the City and County of San Francisco; that I am over the age of eighteen (18) years and not a party to the party to the within cause; and that my business address is 77 Beale Street, B30A, San Francisco, California 94105. I hereby certify that I have this day electronically served the foregoing document(s) upon each member of the official service list of **R.08-11-005** pursuant to Rules 1.9 and 1.10 of the California Public Utilities Commission's Rules of Practice and Procedure:

**OPENING COMMENTS OF PACIFIC GAS AND ELECTRIC COMPANY (U 39-E) ON PROPOSED DECISION ON PHASE 3, TRACK 1 AND 2 ISSUES: DECISION ADOPTING REGULATIONS TO REDUCE THE FIRE HAZARDS ASSOCIATED WITH OVERHEAD ELECTRIC UTILITY FACILITIES AND AERIAL COMMUNICATIONS FACILITIES**

to the attached e-mail service list, and if no e-mail address was available, the party was served by U.S. Mail.

I certify and declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on December , 2011 at San Francisco, California.

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ELISA MARTY  
PACIFIC GAS AND ELECTRIC COMPANY  
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