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STATE OF CALIFORNIA

Investigation on the Commission's Own Motion into the Operations and Practices of Southern California Edison Company (U338-E), Cellco Partnership LLC d/b/a Verizon Wireless, Sprint Communications Company LP, NextG Networks of California Inc. and Pacific Bell Telephone Company d/b/a AT&T California and AT&T Mobility LLC Regarding the Utility Facilities and the Canyon Fire in Malibu of October 2007.	I.09.01.018 (Filed January 29, 2009)

MOTION OF JOINT RESPONDENTS TO STRIKE CHAPTER 3 OF THE DIRECT TESTIMONY OF THE CONSUMER PROTECTION AND SAFETY DIVISION REGARDING THE MALIBU CANYON FIRE OF 2007

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MOTION OF JOINT RESPONDENTS TO STRIKE CHAPTER 3 OF THE DIRECT TESTIMONY OF THE CONSUMER PROTECTION AND SAFETY DIVISION REGARDING THE MALIBU CANYON FIRE OF 2007

Pursuant to Rule 11.1 of the Rules of Practice and Procedure of the California Public Utilities Commission ("CPUC" or "Commission"), Southern California Edison Company, on behalf of itself and NextG Networks, Inc., AT&T Mobility LLC, Verizon Wireless and Sprint Telephony PCS, L.P. (collectively, "Joint Respondents"), hereby moves to strike Chapter 3 of the Direct Testimony of the Consumer Protection and Safety Division Regarding the Malibu Canyon Fire of 2007 ("CPSD Direct Testimony") dated May 3, 2010. This testimony, as sponsored by CPSD witness Kan-Wai Tong, fails to meet the reliability standards the Commission requires for its adjudicatory proceedings. Mr. Tong purports to provide expert testimony on the subject of a "minimum design wind speed requirement" for wood utility poles. However, Mr. Tong has no training or experience in the field of civil engineering or the sub-discipline of structural engineering. These are prerequisites to being able to offer an expert opinion on issues involving structural design. In addition, Mr. Tong's opinion is based upon a methodology that he alone has devised and is unsupported by and in conflict with established scientific standards for structural engineering. Finally, to the extent Mr. Tong is proffering a new scientific theory regarding the computation of a minimum design wind speed for wood utility poles, his theory has not been accepted in the scientific community nor has he used recognized scientific procedures to support his approach. Commission standards for admissible evidence, as well as guidance from California courts on the admissibility of expert opinions, require that this testimony be stricken and Joint Respondents not be required to respond further to it.

I. STATEMENT OF FACTS

During a fierce Santa Ana wind storm in the early morning hours of October 21, 2007, three wood utility poles in Malibu Canyon broke near their groundlines,[1] causing SCE conductors to spark and ignite vegetation. CPSD began its investigation of the Malibu fire shortly thereafter and staff engineer Tong was assigned as the investigator. Despite many reports of the extraordinary strength of this wind storm, Mr. Tong decided as early as November 2007 to concentrate solely upon the hypothesis that these failures were due to one or more of the poles being overloaded, *i.e.,* the various attachments on these poles at the time they failed caused the loading to be in excess of that permitted by the CPUC's design standard, General Order (GO) 95.

Mr. Tong has never done a pole loading analysis and admits that he is not qualified to do one. Deposition of Kan-Wai Tong (August 3-4, 2010) ("Tong Dep.") at 95:11-96:4 (attached herein as Exhibit 1). So he devised a formula which he claims in his testimony provides the "minimum design wind speed requirement" that all in-service wood poles should be able to withstand if they are not loaded in excess of the limits allowed by GO 95. The wind speed produced by Mr. Tong's formula is the near-hurricane velocity of 92.4 mph. Mr. Tong opines that any pole failing at winds below 92.4 mph must have been overloaded.[2] Tong Dep. at 46:7-47:6. As this motion demonstrates, Mr. Tong's conclusion is "junk science," *i.e.,* testimony offered by a person unqualified in the relevant field, using a methodology that has never been

[1] The groundline of a utility pole is the point separating the buried and above ground portions of the pole.

[2] Mr. Tong in turn relies on the testimony of CPSD witnesses from Spatial Informatics Group (SIG) who conclude gusts at the failure location did not exceed 43 mph at the time of the fire. SCE and the other Respondents are filing a companion motion to strike the SIG testimony.

tested much less validated by the scientific community and is directly in conflict with the recognized design standard of GO 95.[3]

II. THE COMMISSION'S STANDARDS FOR ADMISSIBLE EXPERT TESTIMONY ARE CONSISTENT WITH GENERAL CALIFORNIA LAW

Although the Commission need not apply all of the technical rules of evidence to its proceedings, its evidentiary standards must preserve the substantial rights of the parties.[4] The Commission has observed that evidence introduced before it should be "at least the sort on which responsible persons are accustomed to rely in the conduct of serious affairs," and that "evidence [that] is not reliable either on its own merits or as corroborated by other evidence, … is of no use to either the propounding party or to the Commission." *Application of Pac. Gas & Elec. Co. For Authorization to Establish a Rate Adjustment Procedure for its Diablo Canyon Nuclear Power Plant,* 23 CPUC 2d 352, D.86-12-101 (CPUC Dec. 22, 1986) (citing Cal. Gov't Code § 11513(c); refusing to adopt a special evidentiary rule concerning hearsay); *see also Airporter, Inc. v. Sonoma County Airport Express, Inc.,* D.00-07-051 (CPUC July 20, 2000) (noting that hearsay evidence is "accepted in Commission proceedings when supported by other evidence or when a responsible person would rely on it in the conduct of serious affairs.").

The Commission repeatedly has stressed the value of reliable evidence. *See* CPUC Gen. Order 156 at Rule 7.3.9 ("all relevant and reliable evidence may be received in the discretion of

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[3] The only other evidence upon which CPSD relies to support its claim that one or more of the failed poles must have been overloaded is a 2003 computation by an SCE employee, Richard Cromer, concluding that Pole 1169252E would be overloaded if certain telecommunications cables were added to it. The Cromer computation is seriously flawed because Mr. Cromer used an erroneous (and more conservative) safety factor, as CPSD has acknowledged. CPSD Direct Testimony at 3-3, 4-5 and 5-6. In addition, Mr. Cromer did not use the precise cable specifications for the proposed installation which would also affect his wind loading conclusions. CPSD Direct Testimony at 4-10.

[4] Cal. Pub. Util. Code § 1701 provides that in all Commission hearings, investigations, and proceedings, the "technical rules of evidence need not be applied." Rule 13.6(a) of the Commission's Rules of Practice and Procedure similarly states that "[a]lthough technical rules of evidence ordinarily need not be applied in hearings before the Commission, substantial rights of the parties shall be preserved."

the Administrative Law Judge"); CPUC Gen. Order 167 at Rule 13.3.8.7 (same); *In the Matter of the OII re Operations and Practices of Fed'n Moving Servs., Inc.,* D.01-11-002 at 8-9, 16 (CPUC Nov. 8, 2001) (explaining ALJ's "discretion to exclude evidence which is more prejudicial than probative, even when relevant to a material issue" and stating that "due process requires that our decisions…be based on reliable evidence that pertains specially to the alleged violations of rules set forth in our order."); *Fisch v. Garrapata Water Co., Inc.,* D.01-04-013 at 9 (CPUC April 10, 2001) ("While it is true that evidence in administrative hearings generally is not subject to the restrictive rules which govern admission in trials, it must be both 'relevant and reliable'"); *In the Matter of the Application of So. Cal. Gas Co. for Authority to Review its Rates,* D.99-03-026 at 8-9 (CPUC March 4, 1999) (granting limited rehearing on evidentiary issues where "evidence was tainted and not reliable, and accordingly, not adequate").

Given the *reliability* standard for evidence presented to the Commission, it is appropriate for the Commission also to consider the California rules and gatekeeping standards for the admissibility of expert testimony in trial courts because they are similarly based on the need for *reliability.* As set forth below, expert testimony that is not reasonably relied upon by other experts or new scientific techniques that are not generally accepted may be stricken at the outset of a proceeding to avoid wasting the time and resources of the courts and of the parties forced to defend against such "junk science." For the same reasons, the Administrative Law Judge (ALJ) should exercise his/her discretion, strike testimony determined to be scientifically unreliable and allow only relevant and reliable evidence to become a part of the record. It is costly and a waste of time to admit unreliable evidence and require testimony in response

Under California law, expert testimony must be based on "special knowledge, skill, experience, training, or education." *People v. Chapple,* 138 Cal. App. 4th 540, 546 (2006)

(citing Cal. Evid. Code § 801(b)); *see also* Cal. Evid. Code § 720 (defining qualified expert witness). Further, an expert's opinion is admissible only if based on a matter "that is of a type that reasonably may be relied upon by an expert in forming an opinion upon the subject to which his testimony relates…" Cal. Evid. Code § 801(b); *see also* Cal. Evid. Code § 803 (court shall exclude opinion testimony "based in whole or in significant part on matter that is not a proper basis for such an opinion"). By contrast, an expert's opinion has "no evidentiary value" if it rests upon assumptions that are not supported by the record or factors that are "speculative, remote or conjectural." *Geffcken v. D'Andrea,* 137 Cal. App. 4th 1298, 1311 (2006); *Pac. Gas & Elec. Co. v. Zuckerman,* 189 Cal. App. 3d 1113, 1134-35 (1987); *see also Hyatt v. Sierra Boat Co.,* 79 Cal. App. 3d 325, 337-39 (1978). California courts also evaluate the methodology employed by an expert in forming his opinion and will exclude opinion testimony that is based on an unreliable methodology. *See Geffcken,* 137 Cal. App. 4th at 1311 ("[t]he value of opinion evidence rests not in the conclusion reached but in the factors considered and the reasoning employed."); *Zuckerman,* 189 Cal. App. 3d at 1135-36 (similar).

The factors that a California court can consider under Evidence Code section 801(b) are similar to the factors that the federal courts consider under Federal Rule of Evidence 702 and *Daubert v. Merrell Dow Pharms.,* 509 U.S. 579 (1993). *People v. Leahy,* 8 Cal. 4th 587, 597, 600 (1994) (suggesting that California Evidence Code Section 801 is "functional equivalent" of Fed. R. Evid. 702). The United States Supreme Court held in *Daubert* that the trial judge must "determine *at the outset*, pursuant to Rule 104(a), whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact at issue." 509 U.S. at 592 (citations omitted; emphasis added). The Supreme Court identified four nonexclusive factors that should be considered when determining whether a theory or technique

is "scientific knowledge" that will assist the trier of fact: (1) whether the theory or technique has been tested; (2) whether the theory or technique has been subjected to peer review and publication; (3) the known or potential rate of error; and (4) whether the theory or technique is generally accepted in the relevant scientific community. *Id.* at 593-94. As shown below, Mr. Tong's Chapter 3 testimony does not survive scrutiny under any of these factors.

Federal courts applying *Daubert* have also considered other factors in addition to the four identified by the Supreme Court. For example, after remand from the Supreme Court, the Ninth Circuit in *Daubert II* considered whether the expert's opinions were developed for litigation. *See Daubert v. Merrell Dow Pharms., Inc.,* 43 F.3d 1311, 1317 (9th Cir. 1995). Courts also consider whether an expert employed the same level of intellectual rigor in the courtroom that someone in the expert's field would employ outside the courtroom. *See, e.g., Kumho Tire Co. v. Carmichael,* 526 U.S. 137, 152 (1999). Finally, as explained by the Supreme Court in *General Electric Co. v. Joiner,* 522 U.S. 136 (1997), courts should also examine whether an expert's opinions are properly derived from the data upon which they purport to be based:

> [C]onclusions and methodology are not entirely distinct from one another. Trained experts commonly extrapolate from existing data. But nothing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert. A court may conclude that there is simply too great an analytical gap between the data and the opinion proffered.

Id. at 146.

In addition to meeting the standard of Evidence Code section 801, evidence based on any new scientific technique must also meet the three-pronged *Kelly* test in California. *See People v. Kelly,* 17 Cal. 3d 24 (1976). The *Kelly* test requires that evidence obtained through a new scientific technique can be admitted only if (1) the technique is generally accepted as reliable in the relevant scientific community, (2) the witness testifying about the technique and its application is a properly qualified expert on the subject, and (3) the person performing the test in

the particular case used correct scientific procedures. *Id.; Roberti v. Andy's Termite & Pest Control, Inc.,* 113 Cal. App. 4th 893, 899-900 (2003).

As explained in detail in the remainder of this brief, Mr. Tong's opinions regarding minimum design wind speed are unreliable by any standard and would be clearly inadmissible under California Evidence Code Section 801 and the *Kelly* test. For all the same reasons, these opinions do not meet the Commission's own reliability standards and should be disregarded. Joint Respondents should not be required to file testimony in response to such flawed opinions.[5]

III. MR. TONG IS NOT QUALIFIED TO RENDER AN EXPERT OPINION ON MINIMAL WIND SPEED DESIGN FOR WOOD UTILITY POLES

The subject matter of the testimony in question is the strength properties and loading of wood utility poles used to carry electrical power conductors and telecommunications cables. Mr. Tong attempts to offer an opinion as to the "minimum" wind speed the poles should have been able to withstand, unless they were overloaded. Mr. Tong lacks the expertise, background and training to offer such an opinion.

Civil engineering is the discipline that deals with the construction and maintenance of all physical and natural environments. Structural engineering is a subset of civil engineering that concentrates on the design and performance of structures, including the analysis of the strength of materials and the loads (or stresses) to which those materials may be exposed. Structural engineers typically specialize in particular types of infrastructure such as power facilities.

Mr. Tong is not a civil engineer. Moreover, and as he admitted in his deposition, he is not a structural engineer and has no special training or experience in the design or structural

[5] Rule 9.1 of the Commission's Rules of Practice and Procedure provide that the ALJ may receive evidence and rule upon all objections or motions which do not involve final determination of proceedings. Alternatively, Rule 13.6(c) authorizes the ALJ to refer evidentiary rulings to the Commission for determination in extraordinary circumstances, where prompt decision by the Commission is necessary to promote substantial justice.

analysis of wood poles.[6] Tong. Dep. at 59:13-18; 288:9-19. In contrast, Mr. Andrew Stewart, who has prepared a declaration in support of this motion, is a trained civil engineer. Stewart Decl. ¶ 3 (attached hereto as Exhibit 2). He is also a specialist in structural engineering and within that field, has focused on the loading and strength of wood poles for power and telecommunications purposes for over 25 years. *Id.*

There is nothing in Mr. Tong's education, training or experience that qualifies him to offer expert opinions on the subject of the design and loading of wood utility poles and on this basis alone, his testimony should be stricken.

IV. MR. TONG EMPLOYS A METHODOLOGY THAT IS UNSUPPORTED BY AND IN CONFLICT WITH THE WELL ESTABLISHED SCIENCE OF STRUCTURAL ENGINEERING

A. The Tong Formula Misapplies GO 95's Concept Of The Safety Factor In Wood Pole Design

Mr. Tong testified that within the first month of his investigation, he decided not to attempt an actual pole loading analysis but rather chose an admittedly simpler route of attempting to calculate a "minimum design wind speed," *i.e.*, a wind speed below which the Commission could assume that any pole failure must have been due to overloading. Tong Dep. at 66:13-22. Or, stated another way, he claims to have calculated the wind speed below which no properly loaded pole will fail. While there are a number of fatal flaws in this approach, the most critical is the way in which Mr. Tong's formula misapplies GO 95's concept of the *safety factor* in pole design.

A safety factor is a minimum acceptable ratio, *i.e.,* the numerical extent to which the expected ultimate strength of the material must exceed the maximum computed working stresses

[6] As of January 2010, Mr. Tong became a registered *mechanical* engineer in the State of California – an engineering discipline wholly unrelated to the subject matter of his testimony.

in that material. Stewart Decl. ¶ 7. For example, a safety factor of 4.0 means that total design loading cannot exceed 25% of the ultimate strength value for that structure. Table 4 of Rule 44.1 of GO 95 specifies a variety of safety factors ranging from 1.0 to 4.0. For wood poles of the type at issue here (Grade A construction), the safety factor at the time of initial installation is 4.0. Once in service, Rule 44.3 provides that the original safety factor may be reduced by one third resulting in a safety factor of 2.67 (4.0 x 2/3). As Mr. Stewart explains in his declaration, the purpose of a safety factor in structural design is to take into account all uncertainties that can affect a structure's performance. One of these factors is wind loading but there are many others including the inherent variability in the strength of the material. Other uncertainties accounted for by a safety factor include variation in installation and inevitable deterioration once the structure is placed in service. Stewart Decl. ¶ 6.

What Mr. Tong's formula does mathematically is to apply *the entirety* of the relevant safety factor to wind loading, something which no experienced structural engineer would ever do. *Id.* Not surprisingly, the result is an enormously high "minimum design wind speed" of 92.4 mph which is in direct conflict with the true wind loading design requirements of GO 95.

Mr. Tong's formula is quite simple: SFmin = P1/P2. SFmin is what Mr. Tong calls the "minimum safety factor for poles." P1 he calls the "ultimate strength" of poles and P2 is the maximum assumed wind pressure. Mr. Tong derives his "Minimum Design Wind Speed" by creating a ratio between what he calls the "Ultimate Strength" and the "Maximum Assumed Wind Pressure." He assumes this ratio must equal the relevant safety factor in GO 95 and then solves algebraically the resulting equation for the wind speed that he believes represents the maximum pressure (in psf) the pole can be exposed to without exceeding the safety factor. CPSD Direct Testimony at 3-4.

The actual effect of Mr. Tong's algebra is to *multiply* the design wind loading specification of GO 95 (8 psf in light loading areas) by the applicable safety factor for in-service wood poles.[7] This is how Mr. Tong achieves such a high "minimum design wind speed" but in the process, his formula allocates the *entirety* of the 2.67 in-service safety factor to wind loading – even though wind loading is just one of the conditions that the safety factor is intended to cover. The next subsections discuss why Mr. Tong's misuse of the safety factor puts his "minimum design wind speed" at odds with the scientific community and GO 95.

B. Mr. Tong Ignores The Natural Variability In The Strength Of Wood Poles

By applying the safety factor entirely to wind loading, Mr. Tong concedes that his formula does not take into account the fundamental fact that wood poles vary in their ultimate strength.[8] Tong Dep. at 81:8-18. The range of that variability has been computed based on actual failures induced by tests on hundreds of wood specimens. While the resulting *average ultimate strength* has been computed and is used by structural engineers in making design decisions (and is recognized in GO 95), it remains only an *average*. It is this unavoidable uncertainty in material performance that an engineering safety factor is designed in part to take into account. Stewart Decl. ¶ 7.

If every single wood pole had an identical ultimate strength (which obviously is not the case and Mr. Tong has conceded as much), and if the other variables that a safety factor is designed to cover are ignored, then it would theoretically be possible to apply a specified safety

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[7] The actual computation is 8 psf x 2.67 = 21.36 psf. Mr. Tong then uses a standard engineering formula for converting wind pressure to wind velocity (psf = .0025 x velocity^2) to reach 92.4 mph.

[8] An entirely separate problem with Mr. Tong's reliance on his formula is that it does not account in any way for the possibility that poles may fail because of physical deterioration of the wood. While Mr. Tong acknowledged this in his deposition, he also admitted that he lacked the expertise to identify and measure wood deterioration. Tong Dep. at 157:21-23.

factor *entirely* to the wind loading value as Mr. Tong has done.[9] *See* Tong Dep. at 81:8-18. Again theoretically, that would yield a wind speed below which *no* properly loaded structure would fail and above which *all* such structures would fail. But no competent structural engineer ever makes such an assumption because of the inherent, unavoidable, and to some extent unpredictable nature of all structures, the materials from which they are made, and the loads to which they are exposed. Stewart Decl. ¶ 6. While this is true even for engineered materials such as steel, it is even more important for natural materials such as wood which is one reason why the safety factor for wood is so much higher than for steel. As noted earlier, structural engineers use numerical safety factors such as those in GO 95 to account for a whole range of conditions affecting structural performance. *Id.* In the case of wood poles, these conditions certainly include occasions of wind speeds in excess of the equivalent of the 8 psf (56.6 mph) specified in GO 95 but they also include natural variations in the poles themselves. Furthermore, installation and in-service conditions cannot be ignored such as the depth of burial and the pace of wood deterioration between inspection cycles. *Id.* It contradicts all established engineering science to allocate the applicable safety factor entirely to any one condition such as windloading. Yet that is what Mr. Tong's formula does and that is why it cannot be found in any scientific literature, nor does that literature provide any support for such a formula or its purported result. Stewart Decl. ¶ 5.

C. The Unreliability of Mr. Tong's Formula Is Clearly Demonstrated By Comparing How It Would Apply To Steel And Wood Poles

The scientific unreliability of Mr. Tong's formula yields obviously illogical results when applied to other materials. Assume that there are two poles adjacent to each other and that one is

[9] Under these assumptions, the safety factor for wood poles would be much lower and Mr. Tong's formula, the results of which depend entirely on the safety factor, would produce a "minimum design wind speed" well below 92.4 mph.

steel and one is wood. Using Mr. Tong's formula to determine the "minimum design wind speed" for the steel pole, the result is 56.6 mph – only 60% of his purported "minimum design wind speed" for wood poles. Stewart Decl. ¶ 11. Obviously, this is not an accurate reflection of the different strength of steel compared to wood. *Id.* It is simply the arithmetic result of the fact that GO 95 sets a lower safety factor for steel poles than for wood poles. *Id.* If both poles were exposed to a 70 mph wind and if both failed, using Mr. Tong's logic, one would assume that the wood pole failed because it was overloaded while the steel pole failed because the wind velocity exceeded its minimum design speed. The wood pole failure would be a GO 95 violation while the steel pole failure would not – a result that clearly makes no sense.

D. Mr. Tong's Formula Is In Direct Conflict With The Established Engineering Science Of Materials Strength And Wind Loading

1. GO 95 Uses An *Average* Value For The Ultimate Strength Of Wood Poles Which Is Inconsistent With Mr. Tong's Concept Of A "Minimum Design Wind Speed"

GO 95 defines safety factors as "the minimum allowable ratios of ultimate strengths of materials to the maximum working stresses..." Gen. Order 95, Rule 44. Rule 44 goes on to state that "[t]he maximum working stresses used with these safety factors shall be the maximum stresses which would be developed in the materials under the construction arrangement with temperature and loadings as specified in Rule 43." In GO 95, the ultimate strength value for wood poles is provided in Table 5 of Rule 48. Stewart Decl. ¶ 7. For the poles at issue here (Douglas fir dense round poles), that value is 6,800 pounds per square inch (psi) which can be increased to 8,000 psi for poles that meet American National Standards Institute (ANSI) specification O5.1-1992.[10] *Id.* The "wood strength" values in Table 5 are described as the

[10] SCE, as is the case with most electric utilities, has long specified that all its wood poles must meet ANSI specifications.

"modulus of rupture in bending." However, as Mr. Stewart's declaration explains, the ultimate strengths of the wood structures in Table 5 are based upon the *average* modulus of rupture values for poles of a given species as determined in various controlled failure tests overseen by ANSI and other industry organizations. *Id.* In other words, assuming a normal statistical distribution of strength values, approximately one-half of all Douglas fir poles will fail *before* the 8,000 psi bending stress is reached and the other half will fail at values *in excess of* 8,000 psi. *Id.*

Mr. Tong testified that he did not know if the Table 5 values were averages or not, but he agreed that the ANSI specification O5.1 *are* averages. Tong Dep. at 58:15-59:8; 107:16-108:1. The fact that the ANSI specification O5.1 values are averages guarantees that his formula will not produce the information he thinks it does or support the conclusions that he derived from it. Unlike Mr. Tong's formula, GO 95 specifies a wind loading value to be used in the design process. For the Malibu Canyon area, that value is 8 psf or 56.6 mph. As Mr. Stewart explains, at winds in excess of that value, some number of wood poles that are fully loaded up to the allowed safety factor will fail because their *actual* ultimate strength was less than the *average* strength of 8000 psi. Stewart Decl. ¶ 10. As wind speed increases, the number of such failures of fully loaded poles will increase yet *none of these poles will have failed because they were overloaded in violation of GO 95.*

2. The Formula Is Contrary To GO 95's Instructions On How Wind Is To Be Considered In A Pole Loading Analysis

Unlike the ultimate strength of materials which is readily found in Table 5 of Rule 48, there is no single table where the various stresses impacting wooden poles are identified and analyzed in terms of their impact on ultimate strength. Stewart Decl. ¶ 8. The reason is that such stresses will vary with each particular construction situation the engineer and designer face, *e.g.,* how many conductors will the pole carry and at what height; how many telecommunications

cables and at what height and size; what is the planned or actual length of the forward and backward span? Because of these endless variations, GO 95 provides only certain key values and assumptions to be used in calculating stresses. *Id.* These include temperature, wind and ice loading found in Rule 43. As noted earlier, the Malibu Canyon poles were in a light loading area where Rule 43.2 dictates the use of a horizontal wind pressure of 8 psf. Stewart Decl. ¶ 10. Beyond the loadings provided in Rule 43, the engineer and designer are expected to rely on their professional and job training in computing all other loadings for any particular pole.

No specific rule can take into account the wide variety of construction scenarios that may exist. As a result, GO 95 provides in Appendix F a number of specific design situations and shows how the total working stresses are calculated and the resulting ratio compared to the applicable safety factor to determine if the stresses are acceptable or not. Stewart Decl. ¶ 8. Again, it is telling that Mr. Tong never read any part of Appendix F in deriving his formula or determining whether it was consistent with accepted structural engineering practices and GO 95. Tong Dep. at 82. As Mr. Stewart explains, in none of the pole loading analyses illustrated in GO 95's Appendix F is there any instruction to compute a "minimum design wind speed" or to use any wind loading other than that specified in Rule 43.2 in order to determine if a particular structure's safety factor will be exceeded. Stewart Decl. ¶ 8.

V. MR. TONG'S FORMULA AND THE CONCEPT OF A "MINIMUM DESIGN WIND SPEED REQUIREMENT" ARE UNKNOWN IN THE SCIENCE OF STRUCTURAL ENGINEERING

Mr. Tong developed his formula on his own and there is no scientific publication that mentions such a formula as a way to derive what he calls the "Minimum Design Wind Speed Requirement." Mr. Stewart's declaration indicates that he is familiar with the applicable scientific literature dealing with structural design issues for wood poles and that it contains nothing at all comparable to Mr. Tong's formula or its result. Stewart Decl. ¶ 5. The CPSD

offers no evidence that its "new formula" has been accepted by scientists within the community or is otherwise acknowledged as reliable.

While it may be true that each of the singular input values Mr. Tong uses for his formula are recognized in engineering literature, they have *never* been amalgamated in the form used by Mr. Tong to solve for a minimum design wind speed for wood poles or any other structure. One input in particular, what Mr. Tong calls P1 or the "ultimate strength of the poles" in pounds per square foot, merits discussion here because Mr. Tong uses a recognized engineering concept but in a novel and inappropriate way. Since he is searching for a "minimum design wind speed," he uses a standard formula for converting wind loading (expressed in psf) to wind velocity: $P = 0.0025V^2$. Stewart Decl. ¶ 9. The *Standard Handbook for Electrical Engineers* does indeed contain this equation which is known as "Buck's formula." *Id.* However, this formula does not bear the title that Mr. Tong gives it ("Ultimate Strength of the Poles") and is *never* used by engineers to calculate the "ultimate strength" of any category of poles. *Id.* The equation appears in the handbook under the heading "wind pressure" and is applicable to all "cylindrical surfaces." *Id.* Buck's equation is used by engineers who have wind data (expressed in mph) to convert that to wind pressure (expressed in psf). It is not a shortcut for determining the minimum design wind speed for a particular type of "cylindrical surface" such as a Douglas fir pole – although that is exactly how Mr. Tong has used it. *Id.*

Because he is not a civil engineer or a structural engineer, *i.e.*, because he is fundamentally unqualified to give the testimony put forth in Chapter 3, Mr. Tong was unable to recognize the basic error in his novel – and completely unsupported – use of Buck's formula. This error is egregious and is yet another reason why his testimony is unreliable. Mr. Tong's attempt to use that formula as he has in Chapter 3 of CPSD's testimony does not pass muster

under any of the factors identified in *Daubert* or *Kelly*. CPSD offers no showing, no literature and no peer review – *nor can it* – to satisfy the factors set forth in these decisions. Accordingly, Mr. Tong's Chapter 3 testimony must be ruled inadmissible.

VI. CONCLUSION

Neither fundamental fairness, efficiency nor accuracy is served by permitting Mr. Tong's testimony in Chapter 3 to become a part of the record in this proceeding. As a result of his lack of qualifications, his purported expert testimony is based on a formula that truly meets the definition of "junk science." While the Commission has admissibility standards that are more expansive than the California Evidence Code, there is a reliability threshold to which all testimony should be subject. For all of the reasons discussed above, Mr. Tong's testimony comes nowhere close to that threshold and should be stricken.

Dated: October 29, 2010

Respectfully submitted,

/s/ Charles C. Read

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Attorneys for
SOUTHERN CALIFORNIA EDISON COMPANY

EXHIBIT 1

1 BEFORE THE PUBLIC UTILITIES COMMISSION OF THE
2 STATE OF CALIFORNIA
3
4 INVESTIGATION ON THE COMMISSION'S)
OWN MOTION INTO THE OPERATIONS AND)
5 PRACTICES OF SOUTHERN CALIFORNIA)
EDISON COMPANY (U338-E); CELLCO)
6 PARTNERSHIP LLC, D/B/A VERIZON) I.09.018
NETWORKS OF CALIFORNIA, INC.; AND) Filed Jan. 29, 2009
7 PACIFIC BELL TELEPHONE COMPANY,)
D/B/A AT&T MOBILITY LLC, REGARDING)
8 THE UTILITY FACILITIES AND THE)
CANYON FIRE IN MALIBU OF OCTOBER)
9 2007.)
_____)
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15 VIDEOTAPED DEPOSITION OF KAN-WAI TONG, VOL. I
16 LOS ANGELES, CALIFORNIA
17 TUESDAY, AUGUST 3, 2010
18
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23
REPORTED BY:
24 Alejandria E. Kate
RPR, CLR, CSR NO. 11897, HAWAII 448
25 JOB NO.: 32111

AUGUST 3, 2010

10:17 A.M.

Videotaped deposition of KAN-WAI TONG, held at the offices of JONES DAY, 555 South Flower Street, 50th Floor, Los Angeles, California, pursuant to agreement before Alejandria E. Kate, a Registered Professional Reporter and Notary Public of the State of California.

1 BEFORE THE PUBLIC UTILITIES COMMISSION OF THE
2 STATE OF CALIFORNIA
3
4 INVESTIGATION ON THE COMMISSION'S)
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16 LOS ANGELES, CALIFORNIA
17 WEDNESDAY, AUGUST 4, 2010
18
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23
REPORTED BY:
24 Alejandria E. Kate
RPR, CLR, CSR NO. 11897, HAWAII 448
25 JOB NO.: 32112

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5 AUGUST 4, 2010
6 9:42 A.M.
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13 Professional Reporter and Notary Public of the
14 State of California.
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1 means the evidence was altered. And also I -- I took an
2 approach that, you know, if I could get a wind speed or
3 calculate a minimum wind speed -- or the minimum wind
4 speed requirement for the facility to withstand at the
5 time of the incident -- I mean, I have to revisit the
6 site again -- I mean the evidence again.
7 Q. Okay. Let me move on to that issue that you
8 mentioned in your last answer that -- your calculation.
9 And I think you'll probably want to look at Page 3-4,
10 primarily, in your testimony.
11 Is it correct, Mr. Tong, that you contend that
12 the poles that failed should have been able to withstand
13 winds of up to 92.4 miles per hour if they had been
14 loaded in accordance with the safety factors in
15 Rule 44.1 and 44.3?
16 A. Correct.
17 Q. Okay. And is it correct that you rely on the
18 SIG study -- S-I-G -- to conclude that the maximum wind
19 in Malibu Canyon on the day of the fire did not exceed
20 approximately 70 miles per hour; is that right?
21 A. Correct.
22 Q. Okay. And, therefore, you conclude that since
23 the poles failed, or at least one or more of them
24 failed, one or more of them must have been overloaded;
25 is that right?

1 A. Yes.
2 Q. Okay. And since you did not do a pole loading
3 calculation for any of the three failed poles, you can't
4 tell which one or perhaps more than one, in your
5 opinion, was actually overloaded; is that right, too?
6 A. Yes.
7 Q. Okay. Your -- you have a value, which you
8 call P-1, at line 8 --
9 MR. MOLDAVSKY: Which page are we at,
10 Counsel?
11 MR. READ: I'm on Page 3-4.
12 Q. -- that is .0025 pounds per square foot. And
13 you take that from Table 5 of Rule 48 for Douglas fir;
14 am I correct?
15 A. No, it's not.
16 Q. Okay. Where do you take that or do you derive
17 that P-1 value?
18 A. I only use the formula. I didn't use the
19 Rule 48 in that regards.
20 Q. Okay. Do you -- you do have your copy of
21 General Order 95 with you?
22 A. Yes, sir.
23 Q. Good.
24 MR. READ: Let's go off the record for a
25 moment.

1 rupture and bending to be for a round pole?
2 A. In order to get the value of modulus of
3 rupture, you have to know the shape of the object and
4 the strength of the object as well.
5 Q. Okay. And what -- what I'm getting at is what
6 is the modulus of rupture? When they say that for a
7 Douglas fir, the modulus of rupture for a round pole,
8 Douglas fir is 6800 pounds per square inch, what does
9 that mean, Mr. Tong?
10 A. It's a pressure that the Douglas fir pole will
11 break.
12 Q. Okay. If you apply that pressure, a Douglas
13 fir pole will break. That's your understanding?
14 A. Yes, sir.
15 Q. Okay. Now, is it your -- do you have an
16 understanding of -- of how this value, 6800 pounds per
17 square inch, in Table 5, what -- what are -- what are
18 the data points -- what is the source of information
19 that backs up that 6800-pounds-per-square-inch number?
20 Where does that come from?
21 A. I don't know.
22 Q. You've never looked into that?
23 A. No.
24 Q. Do you know whether this number is a result of
25 actual tests of Douglas fir poles to see at what, you

1 know, pressure pounds per square inch they will fail?
2 MR. MOLDAVSKY: Objection. That
3 question was asked and answered.
4 Go ahead.
5 A. No.
6 Q. So you don't know whether the
7 6800-pounds-per-square-inch number is the result or is
8 the average pressure placed upon a series of Douglas fir
9 poles or any other result of experiments?
10 MR. MOLDAVSKY: Objection. Compound.
11 Vague and ambiguous as to "average."
12 A. I don't know.
13 Q. Okay. I take it that you don't consider
14 yourself to be an expert on the determination of the
15 ultimate strength of a wood pole?
16 MR. MOLDAVSKY: Objection. Misstates
17 testimony.
18 A. You can say that.
19 Q. Do you know how, if in any way, the number
20 shown for 6800 pounds per square inch for Douglas fir as
21 its modulus of rupture relates to the value you show at
22 line 8 of Page 3.4, which you call the ultimate strength
23 of the poles in pounds per square foot?
24 A. No. I didn't relay that 6800 pounds per
25 square foot into my calculation.

1 notes.
2 I'll represent to you that this collection of
3 documents was provided to respondents by CPSD as -- in
4 the form you see here.
5 I just wondered if you could identify the
6 three pages of notations, diagrams, as -- are those the
7 notations that you made on your trip to Westminster?
8 A. They appear to be.
9 Q. And do you recall any other notations or --
10 or -- or notes that you made beyond the three pages seen
11 here?
12 A. That's pretty much it.
13 Q. Okay. I believe you said, before lunch, that
14 not long after you made your visit to Westminster, which
15 was November of '08, I believe, that you decided that
16 you would pursue your analysis in the form of the
17 equation that we have been talking about on Page 3-4 and
18 calculating what you call a minimum design wind speed
19 requirement, rather than trying to replicate the
20 conditions on the poles.
21 Is that right?
22 A. That's correct.
23 Q. And in making that decision, did you consult
24 with anybody else at CPSD as to whether that was the
25 right course of action?

1 Go ahead.
2 A. I did take into consideration the wind
3 strength, the strength -- or the stress caused by the
4 wind.
5 Q. Yeah, I understand. That's the -- that's the
6 stress -- that's a loading, right, in engineering terms?
7 A. Yes.
8 Q. But the other part of the consideration of how
9 well a structure will withstand the loading is what is
10 the material strength of the structure; isn't that
11 right?
12 A. Correct. Yes.
13 Q. And the material strength of wood poles, that
14 element is not considered in your equation on Page 3-4?
15 MR. MOLDAVSKY: Objection. Misstates
16 testimony.
17 Go ahead.
18 A. I guess, yeah.
19 Q. And -- but the paragraph you pointed out in
20 Rule 48, the opening paragraph says that the -- you are
21 to determine the values of the ultimate strength of the
22 material in compliance with the safety factors in
23 Rule 44; correct?
24 A. Yes.
25 Q. Okay. Now -- and sticking for a moment with

1 new construction, just because the arithmetic is a
2 little easier, which is a 4-to-1 ratio.
3 Isn't it correct that in actually following
4 GO-95 and its design requirements, that the engineers
5 are instructed to divide the material strength factor in
6 Table 5 by four? Isn't that the instruction in GO-95
7 about how to apply the safety factor?
8 MR. MOLDAVSKY: Objection. Vague.
9 Go ahead.
10 A. I don't know.
11 Q. And --
12 MR. HANSCHEN: I'm sorry. I didn't hear
13 that answer.
14 (The record was read.)
15 Q. Take a look at Appendix F, which is at the end
16 of your collection of the general order excerpts.
17 Just have a -- are you familiar with -- have
18 you studied Appendix F, the typical problems and how
19 they are to be solved?
20 A. I remember reading it. I remember reading.
21 Q. Did you examine it in preparation for your --
22 of your testimony?
23 A. No.
24 Q. Is it your understanding that Appendix F is
25 used to instruct engineers as to how, among other

1 MR. MOLDAVSKY: Are you talking about a
2 range of calculations?
3 MR. READ: Yes.
4 MR. MOLDAVSKY: Like every calculation
5 in a possible range?
6 MR. READ: A series of pole loading
7 calculations using a variety of data points
8 provided by respondents.
9 Q. Nobody has done that at CPSD, have they?
10 A. Not that I'm aware of.
11 Q. I may have asked this, but let me just clear
12 it up.
13 In the data request answer to 2.7, you stated
14 that Mr. Tong did not perform pole loading calculations
15 prior to this incident. And you've referred to your --
16 your calculation on Page 3-4.
17 But with respect to the kind of pole loading
18 calculation I'm asking about, where you take span
19 lengths, you take pole size, diameters, you take
20 measures, appurtenances, attachments, and run a
21 calculation, that kind of pole loading, you've never
22 done that kind of pole loading calculation, have you?
23 A. I have not.
24 Q. Do you consider yourself qualified to do a
25 pole loading calculation of that type?

1 A. I can try.
2 Q. Well, that's not quite an answer to my
3 question. I could try it.
4 A. No.
5 Q. No. Thank you.
6 You rely on the conclusions of the SIG wind
7 study in -- at least in part, in reaching your
8 conclusion that one or more of the poles was overloaded;
9 correct?
10 A. Yes.
11 Q. And do you consider that the conclusions and
12 the methodology employed by the SIG study to be based on
13 sound scientific standards and methods?
14 MR. MOLDAVSKY: I'm going to object to
15 this question. Because questions as to the
16 expertise and qualifications of the SIG
17 witnesses are properly directed to the SIG
18 witnesses.
19 MR. READ: Well, not entirely. I mean,
20 the -- this witness has clearly indicated
21 that he is relying on the SIG study, in part,
22 to reach his conclusion of overloading.
23 So I'm entitled to ask -- and this is
24 not a long line of questions, but I'm
25 certainly entitled, I think, to ask if he

1 MR. MOLDAVSKY: Point of clarification.
2 In the rule it references the 1992 document.
3 And then you represent the 2002 is the latest
4 update. That's not cross-referenced in the
5 GO Rule --
6 MR. READ: I believe I said that. It's
7 on the record. That's correct. So what
8 we've got here is an update with the very
9 same values, 8,000 for Douglas fir, with a
10 footnote that I've asked the witness about
11 that has been added, that is not in the '92
12 version. That's correct.
13 MR. MOLDAVSKY: Which was what was
14 referenced in the rule. Okay.
15 BY MR. READ:
16 Q. My question is: Isn't it correct that at
17 least as to the 2002 Table 1, that ANSI is telling us
18 that its value of 8,000 for Douglas fir is the result
19 of -- is a mean or an average of actual values? Isn't
20 that the way you'd read that footnote?
21 MR. MOLDAVSKY: Objection. The
22 document, to the extent that you've provided
23 it, speaks for itself.
24 MR. READ: Well, I'm interested in the
25 witness's understanding of it.

1 A. That's how I understand.
2 Q. Okay. Does that -- and the fact that GO-95,
3 48.1, references the -- that very same ANSI standard --
4 MR. MOLDAVSKY: I, again, object because
5 it references the 19 --
6 MR. READ: Excuse me. Let me finish my
7 question.
8 MR. MOLDAVSKY: Please.
9 Q. It references the very same ANSI standard from
10 a -- from an earlier year, but with the same fiber
11 stress value, 8,000.
12 Does that give you some indication that the
13 values shown in Table 5 are also the result of an
14 average or a mean?
15 MR. MOLDAVSKY: Objection. Calls for
16 speculation.
17 Go ahead.
18 A. I don't know.
19 Q. Do you have an opinion one way or the other?
20 MR. MOLDAVSKY: Asked and answered.
21 A. No, I don't.
22 Q. Well, let's ask you to assume that it's an
23 average, that these are the results of a series of
24 failure tests, and the average failure for Douglas fir
25 occurs at 6800 pounds per square inch.

1 Q. Okay. So you looked at two things: Strong
2 wind and perhaps overloading.
3 Is that -- is that basically it?
4 A. And also it could be third-party damage.
5 Q. Okay. Did you look at deterioration of the
6 poles?
7 A. Deterioration as well, too.
8 Q. Okay. Now, your analysis at -- you just told
9 me at Westminster is you were only able to arrive at a
10 conclusion with respect to the stub pole, is that right,
11 with respect to deterioration?
12 MR. MOLDAVSKY: Objection. Vague.
13 Misstates testimony.
14 Go ahead.
15 A. That may not be the only good pole, but I
16 didn't -- the other two poles may have been the same
17 condition as well.
18 Q. But you aren't sure because you weren't able
19 to check them; that's what you told me; is that right?
20 A. Yes.
21 Q. Okay. So did you -- you're not an expert on
22 wood deterioration yourself, are you?
23 A. No, I'm not.
24 Q. Okay. What -- what additional steps did you
25 take with respect to deterioration to determine if the

A. I do.

Q. So, for example, electrical engineers, civil engineers, chemical engineers, mechanical engineers; you understand that?

A. Yes, sir.

Q. And those are all different kinds of disciplines, are they not?

A. They are.

Q. Okay. Now, you are a mechanical engineer; correct?

A. That's what my -- I took my exam and licensed in.

Q. Okay. And just for my understanding, mechanical engineer deals with what?

A. Mechanical engineers deal with a lot of mechanical parts.

Q. Okay. Now, you are not a structural engineer; is that correct?

A. Correct.

Q. Okay. Have you ever received any professional training in the disciplines of a structural engineer?

A. I have taken some courses related to structural engineering.

Q. And what would those have been?

A. From my recollection, I have taken strength of

EXHIBIT 2

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE

STATE OF CALIFORNIA

Investigation on the Commission's Own Motion into the Operations and Practices of Southern California Edison Company (U338-E), Cellco Partnership LLC d/b/a Verizon Wireless, Sprint Communications Company LP, NextG Networks of California Inc. and Pacific Bell Telephone Company d/b/a AT&T California and AT&T Mobility LLC Regarding the Utility Facilities and the Canyon Fire in Malibu of October 2007.	I.09.01.018 (Filed January 29, 2009)

DECLARATION OF ANDREW H. STEWART

I, Andrew H. Stewart, hereby declare and state as follows:

1. I make this declaration in support of the Motion of Joint Respondents to Strike Chapter 3 of the Direct Testimony of the Consumer Protection and Safety Division Regarding the Malibu Canyon Fire of 2007. If called upon to testify, I could and would do so consistently with the facts stated in this declaration.

2. I am President of EDM International, Inc. (EDM). My business address is 4001 Automation Way, Fort Collins, Colorado 80525. EDM is a leader in the electric utility and telecommunications industries. It conducts inspection and assessment, engineering, product testing, line rating and research and development for electric transmission and distribution systems. For timber structures, including utility poles, EDM provides inspection and assessment, forensic engineering and product testing.

3. I have a B.S. in Civil Engineering from the University of Rhode Island and an M.S. in Civil/Structural Engineering from Colorado State University. I have authored more than 50 publications in structural engineering and infrastructure management. I joined EDM in 1983. I have served as the project manager for an initiative sponsored by the Electric Power Research Institute (EPRI) to improve the state of the art of inspection and assessment methods for overhead power lines. I have performed and managed projects involving the inspection, maintenance and structural analysis of tens of thousands of miles of utility lines. Many of my assignments have involved overhead lines in California, and as a result, I am very familiar with the provisions of General Order (GO) 95 and how to conduct pole loading analyses. I currently serve as the Chairman of the International Electrical and Electronics Engineers (IEEE) Working Group on the Management of Existing Overhead Lines. I am also a member of the American Society of Civil Engineers.

4. I have read Mr. Tong's testimony in Chapter 3 of the CPSD's May 3, 2010 testimony in this proceeding. I also attended the two days of Mr. Tong's deposition.

5. I am unaware of any recognized textbook, treatise, handbook or published article in the field of civil engineering which references the formula Mr. Tong uses to compute what he calls a "Minimum Design Wind Speed." This is to be expected because his formula is at odds with a fundamental principle of structural engineering in that it completely ignores the natural range of actual maximum strength (or capacity) of wood poles.

6. Mr. Tong's formula applies the totality of the safety factor specified in GO 95 for in-service wood poles to wind loading. This is contrary to the pole loading examples set forth in Appendix F of GO 95 and in conflict with the way safety factors are used in designing structures including wood poles. Structural engineers use numerical safety factors such as those found in GO 95 to account for a whole range of uncertainties affecting structural performance. One of these factors is wind loading, but there are many others not the least of which is the variability of the material's strength. Other uncertainties accounted for by a safety factor include variation in installation and inevitable deterioration once the structure is placed in service. No structural engineer or designer would apply the entirety of a safety factor to the single condition of wind loading, as Mr. Tong does.

7. The safety factors in GO 95 are minimum acceptable ratios, *i.e.,* the numerical extent to which the expected ultimate strength of the material must exceed the maximum computed working stresses in that material. For wood poles, GO 95 provides the expected ultimate strength values in Table 5 of Rule 48. For Douglas fir (and certain other species), Table 5 permits the use of a higher strength value (up to 8,000 psi) if the poles meet the specifications of American National Standards Institute, Inc. (ANSI) O5.1-1992 (Table 1). It is my understanding that Southern California Edison (SCE), as is true of most electric utilities, has long specified that all of its wood poles must meet ANSI O5.1. As confirmed in ANSI O5.1-2002 (Table 1) (attached as Exhibit A to my declaration), the specified strength value of 8,000 psi for Douglas fir (called the "modulus of rupture" in GO 95 and the "fiber stress" in ANSI O5.1) is a mean or average derived from the results of controlled tests where gradually increased loads are applied to Douglas fir poles up to the point of failure for each pole. My firm, EDM, has conducted some of these tests and I have observed them. The fact that ANSI O5.1 uses average strength values means that there were approximately as many tested failures of Douglas fir poles at values less than 8,000 psi as there were at values in excess of 8,000 psi.

8. There is no single table in GO 95 where a single set of design stresses (or loading) can be found for wood poles. This is because such stresses will vary with the particular configuration of each pole including the number of conductors, cross arms, and communication cables; span lengths and angle; and size of pole. No rule can govern all possible permutations. For this reason, GO 95 provides a number of design examples in Appendix F to illustrate how particular pole loads are calculated and then compared to the ultimate strength value to see if the applicable safety factor is exceeded or not. Nowhere in the Appendix F examples is there any reference to a "minimum design wind speed" or an instruction to use a wind loading value other than those specified in Rule 43.

9. One component of Mr. Tong's formula is the equation $P = 0.0025V^2$. Mr. Tong calls this value "the ultimate strength of the poles" but that is not correct. I located the page of the Standard Handbook for Electrical Engineers (11th Ed.) from which Mr. Tong took this formula. It is attached as Exhibit B to my declaration. This formula, known as Buck's formula, is simply the way to convert a particular wind velocity (in mph) into wind pressure (in psf). As the Handbook notes, Buck's formula is applicable to cylindrical surfaces. It has nothing to do with the "ultimate strength" of poles or any other material.

10. GO 95 does provide a specific wind pressure which is to be used in determining whether any particular pole configuration exceeds the allowable safety factor. For the poles at issue in this proceeding, that value is 8 psf which can be converted to a design wind velocity of 56.6 mph (using the same Buck's formula described in the preceding paragraph). This is the only wind loading value specified in GO 95 for poles in light loading areas. At winds in excess of 56.6 mph, some number of wood poles will fail even though they have not been overloaded simply because the actual ultimate strength of those poles turned out to be less than the average strength of 8000 psi.

11. Because his formula applies the GO 95 safety factor solely to wind, it yields illogical results. If it is applied to steel poles, Mr. Tong's formula results in a "minimum design wind speed requirement" of 56.6 MPH – approximately 60% of his purported "minimum design wind speed" for wood poles.[1] Obviously this is not reflective of the different strength of steel compared to wood. Rather, it is simply the arithmetic result of the fact that GO 95 has a lower safety factor for steel poles than for wood poles. The difference in safety factors for wood compared to steel is due in part to the much greater variation in strength for a natural material such as wood compared to an engineered material such as steel.

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

Dated: October 29, 2010

Andrew H. Stewart

[1] According to Rule 43.2 A, the designer is to employ an assumed horizontal wind pressure of 8 pounds per square foot. Using Mr. Tong's formula and applying a 2/3 multiplier to the safety factors set forth in Table 4, "V_{min}" for the steel pole is 56.6 mph, *i.e.,* 8 x 1.5 x 2/3 = 8 psf = 56.56 mph.

EXHIBIT A

Exhibit A

ANSI O5.1-2002 (Table 1)

Table 1 - Designated Fiber Stress for Wood Utility Poles[1)]

Treatment Group	Genus and Species	Fiber Stress (psi)	Fiber Stress (kPa)
Group A (air seasoning)			
Cedar, northern white (eastern)	*Thuja occidentalis*	4000	27600
Cedar, western red[2)]	*Thuja plicata*	6000	41400
Pine, ponderosa	*Pinus ponderosa*	6000	41400
Pine, jack	*Pinus banksiana*	6600	45500
Pine, lodgepole	*Pinus contorta*	6600	45500
Pine, red (Norway)	*Pinus resinosa*	6600	45500
Pine, Scots	*Pinus sylvestris*	7800	53800
Cedar, Alaska yellow	*Chamaecyparis nootkatensis*	7400	51000
Douglas-fir, interior north[2)]	*Pseudotsuga menziesii*	8000	55200
Group B (Boulton drying)			
Douglas-fir, coast [2)]	*Pseudotsuga menziesii*	8000	55200
Larch, western	*Larix occidentalis*	8400	57900
Group C (steam conditioning)			
Pine, southern[2)]		8000	55200
Loblolly	*Pinus taeda*		
Longleaf	*Pinus palustris*		
Shortleaf	*Pinus echinata*		
Slash	*Pinus elliottii*		
Group D (kiln drying)			
Cedar, western red[2)]	*Thuja plicata*	6000	41400
Douglas-fir, interior north[2)]	*Pseudotsuga menziesii*	8000	55200
Douglas-fir, coastal [2)]	*Pseudotsuga menziesii*	8000	55200
Larch, western	*Larix occidentalis*	8400	57900
Pine, jack	*Pinus banksiana*	6600	45500
Pine, lodgepole	*Pinus contorta*	6600	45500
Pine, ponderosa	*Pinus ponderosa*	6000	41400
Pine, red	*Pinus resinosa*	6600	45500
Pine, Scots	*Pinus sylvestris*	7800	53800
Pine, southern[2)]		8000	55200
Loblolly	*Pinus taeda*		
Longleaf	*Pinus palustris*		
Shortleaf	*Pinus echinata*		
Slash	*Pinus elliottii*		

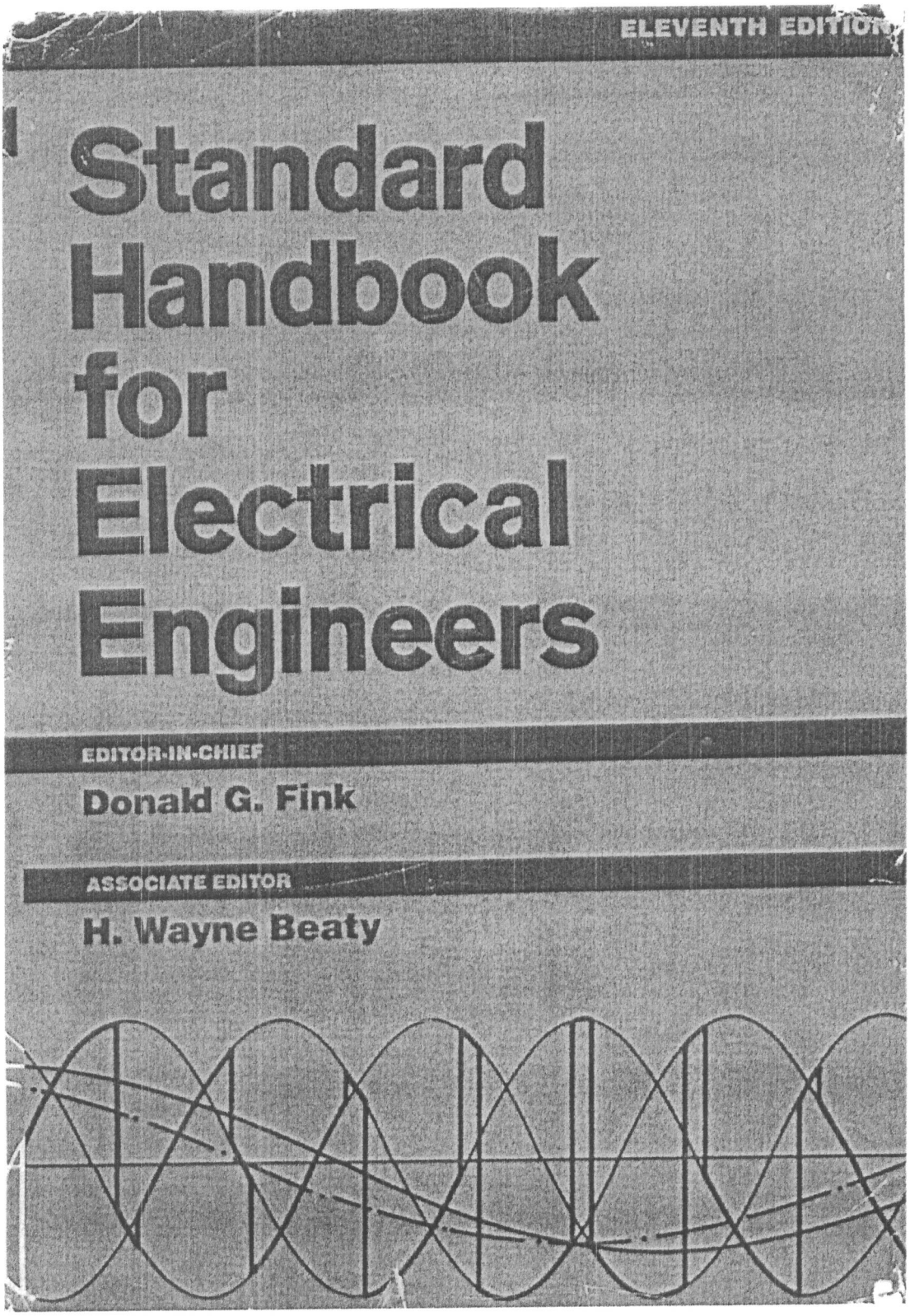
NOTES:

1) The effects of conditioning on fiber stress have been accounted for in the Table 1 values.

2) This designated fiber stress represents a mean, groundline, fiber stress value with a corresponding coefficient of variation equal to .20.

EXHIBIT B

Exhibit B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ended and sagged to the same stringing tension as the rest of the line, compared with the maximum tension for normal span lengths, is a good indication of the necessity for dead-end construction.

In case a number of long spans are encountered in a line or section of line, it may prove more economical to reduce the tension in the entire section to the long-span values and accept an increase in sag and corresponding reduction in span length in order to avoid dead ends.

MECHANICAL DESIGN OF OVERHEAD SPANS

64. Conductor Loads. The span design consists in determining the sag at which the conductor shall be erected so that heavy winds, accumulations of ice or snow, and low temperatures, even if sustained for several days, will not stress the conductor beyond the elastic limit, cause a serious permanent stretch, or result in fatigue failures from continued vibrations.

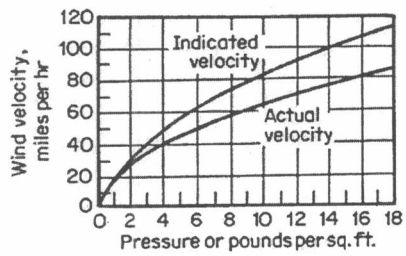

Fig. 14-36. Wind velocity and pressure.

The dead weight of the conductor and the weight of accumulated ice or snow act vertically; the wind load is assumed to act horizontally and at right angles to the span; the resultant is the vectorial sum. Under combined vertical and horizontal loading the conductor swings out into an inclined plane whose angle with the vertical is the angle between the direction of the vertical force and the resultant force. The resulting deflection is measured in this inclined plane.

Wind pressure in pounds per square foot, p, as a function of the actual wind velocity in miles per hour, V, is given by Buck's formula[1] for cylindrical surfaces,

$$p = 0.0025V^2 \tag{14-66}$$

which is generally accepted in span computations. The pressure on flat surfaces is generally taken as

$$p = 0.004V^2 \tag{14-67}$$

The relation between actual wind velocity and indicated wind velocity is shown in Fig. 14-36. However, this relation is not entirely definite, and with any wind-velocity data, correction factors should be obtained from the U.S. Weather Bureau.

65. Assumed Simultaneous Weather Conditions in the United States. See Table 14-12.

66. Safety Code loadings have generally been accepted as a guide in determining the thickness of ice, wind velocity, and temperature which may be expected in any section of the country (see Fig. 14-37). These loading assumptions are convenient as a basis of design, in that the loads caused by ice, wind, and low temperatures are assumed to occur simultaneously; however, consideration should be given to past experience and local conditions. For instance, accumulation of ice and snow on the conductors is rare in Minnesota, but extremely low temperatures are common; ice loads considerably greater than heavy loading but without extreme winds have occurred on several occasions from Maryland to New England, as well as in many other locations.

Unit wind and ice loadings for conductors are found by the following formulas,

$$\text{Wind load (lb/ft)} = \frac{p}{12} D \tag{14-68}$$

$$\text{Ice load (lb/ft)} = 0.311\,[(D + 2r)^2 - D^2] \tag{14-69}$$

in which p = wind pressure in pounds per square foot, D = diameter of conductor in inches, r = radial thickness of ice. Ice is taken at 57 lb/ft^3.

[1]Frank F. Fowle, A Study of Sleet Loads and Wind Velocities; *Electr. World*, 1910, vol. 56, p. 995.
E. H. Lamb, Behavior of Overhead Transmission Lines in High Winds; *J. IEE*, 1928, vol. 66, p. 1079.

CERTIFICATE OF SERVICE

I hereby certify that, pursuant to the Commission's Rules of Practice and Procedure, I have this day served a true copy of the **MOTION OF JOINT RESPONDENTS TO STRIKE CHAPTER 3 OF THE DIRECT TESTIMONY OF THE CONSUMER PROTECTION AND SAFETY DIVISION REGARDING THE MALIBU CANYON FIRE OF 2007** on all parties identified on the attached service list(s). Service was effected by one or more means indicated below:

Transmitting the copies via e-mail to all parties who have provided an e-mail address. First class mail will be used if electronic service cannot be effectuated. Executed this **29 Day of October, 2010** at Rosemead, California.

/s/ Andrea Moreno

Andrea Moreno, Case Analyst
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