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Witness: Weim

PREPARED REBUTTAL TESTIMONY OF

DARREN WEIM

ON BEHALF OF

SAN DIEGO GAS & ELECTRIC COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

DECEMBER 16, 2016

#310780

TABLE OF CONTENTS

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ON BEHALF OF SAN DIEGO GAS & ELECTRIC COMPANY

I. INTRODUCTION

Q. Please state your name and position.

A. My name is Darren Weim. I am the Manager for the Northeast Construction and Operations District at San Diego Gas & Electric Company ("SDG&E").

Q. Have you previously submitted testimony in this proceeding?

A. Yes, I submitted Prepared Direct Testimony on September 25, 2015 ("Weim Testimony"). In that testimony, I described my experience and qualifications in Appendix 1.

Q. What is the purpose of your rebuttal testimony?

A. The purpose of my rebuttal testimony is to respond to:

(1) the October 3, 2016 testimony of Mr. Nils Stannik on behalf of the Office of Ratepayer Advocates ("ORA") ("Stannik Testimony") with respect to the Guejito Fire;[1] and

(2) the October 17, 2016 testimony of Dr. Joseph Mitchell on behalf of the Mussey Grade Road Alliance ("MGRA") ("Mitchell Testimony") and Dr. Matthew Rahn on behalf of Protect Our Communities Foundation ("Rahn Testimony"), both of which make a number of generalized assertions but do not really address the reasonableness of SDG&E's actions and decisions prior to the Witch, Guejito or Rice Fires.

Q. Did any of the intervenors who submitted testimony on October 17, 2016 discuss the reasonableness of SDG&E's actions and decisions leading up to the Guejito Fire?

A. Not to my knowledge.

[1] Stannik Testimony, pp. 17-21.

Q. How is your testimony organized?

A. In Section II, I respond to Mr. Stannik's arguments regarding the Guejito Fire. Mr. Stannik's main argument is that SDG&E was unreasonable for failing to maintain clearances required by General Order ("GO 95") because contact occurred between SDG&E's conductors and Cox facilities. This argument, however, completely sidesteps the facts as to how that contact occurred, even though those facts are critical with respect to the ignition of the fire. Although Mr. Stannik's testimony generally relies upon prior investigations from the California Department of Forestry and Fire Prevention ("Cal Fire") and the Consumer Protection and Safety Division ("CPSD"),[2] as well as CPSD's 2009 testimony in the I.08-11-007 ("Guejito OII"), he inexplicably ignores that those agencies concluded the contact resulted from a Cox lashing wire, that was broken before the fire, blowing into SDG&E's conductors in the Santa Ana wind event. The contact did not result from any actions or decisions by SDG&E.

I also respond to Mr. Stannik's testimony regarding SDG&E's inspections of the facilities linked the Guejito Fire ignition and demonstrate that Mr. Stannik has presented an incomplete and erroneous interpretation of the relevant GO requirements related to inspection of facilities. Cox installed its facilities last in time and thus established the clearance. Cox was also responsible for inspecting and maintaining its facilities, but Cox had never inspected the facilities at issue. In any case, there is no evidence that the clearance is what caused the Guejito Fire.

In Section III, I respond to the testimony of Dr. Mitchell and Dr. Rahn. First, I respond to Dr. Mitchell's various arguments regarding the wind loading criteria SDG&E used prior to the 2007 Wildfires. He claims that SDG&E misinterpreted GO 95, but that claim is entirely based

[2] Report of the Consumer Protection and Safety Division Regarding the Guejito, Witch and Rice Fires, P.07-11-007, p. 2. (September 2, 2008).

on a statement from a Commission decision in 2014, which the Commission later withdrew as an error. SDG&E appropriately engineered these facilities prior to the 2007 Wildfires.

Second, I explain that Dr. Mitchell's (and Mr. Stannik's) testimony regarding wind studies SDG&E commissioned for the Southwest Powerlink and Sunrise Powerlink do not show that SDG&E acted unreasonably prior to the 2007 wildfires. Dr. Mitchell makes no attempt to show that SDG&E would have avoided the Witch, Guejito and Rice Fires if it had used a higher wind loading standard.

Third, I explain that prior wildfires in Southern California that Dr. Mitchell and Dr. Rahn identify did not give SDG&E any specific notice that the Witch, Guejito and Rice Fires would ignite in October 2007 or provide information that could have been used to avoid those fires.

Finally, I demonstrate that Dr. Mitchell and Dr. Rahn cannot reasonably testify that SDG&E should have implemented, prior to 2007, the post-2007 measures it adopted to reduce fire risk because it did not have the necessary information to do so. That testimony is hindsight analysis.

II. RESPONSE TO MR. STANNIK'S TESTIMONY REGARDING THE GUEJITO FIRE

A. The Guejito Fire Ignition

Q. Please describe the SDG&E facilities alleged to have been involved in the ignition of the Guejito Fire.

A. As noted in my direct testimony, the SDG&E powerline, or circuit, consisted of three 12 kV conductors spanning between Poles P196387 and P196394.[3]

Q. When were the SDG&E facilities installed?

[3] Prepared Direct Testimony of Darren Weim, pp. 10-11.

A. As discussed by SDG&E witness Paul Alvarado in the Guejito OII, the circuit, including Poles 196394 and 196387, was originally installed in July 1927, with some modifications done at various times in the 1950s, 1960s, 1970s, and 1980s.[4]

Q. Please describe the Cox Communications ("Cox") facilities alleged to have been involved in the ignition of the Guejito Fire.

A. As noted in the CPSD Report, the Cox facilities consisted of a fiber optic cable and a messenger strand, both of which were bound using lashing wire. The lashing wire was made of steel and was 0.045 inches in diameter.[5]

Q. When were the Cox facilities installed?

A. In August 2001.[6]

Q. How were the Cox facilities installed in relation to the SDG&E facilities?

A. The Cox facilities were attached to SDG&E's poles and were underneath the SDG&E conductors.

Q. Have you reviewed the Cal Fire report into the Guejito Fire?

A. Yes, I have.

Q. What conclusion did Cal Fire reach regarding the ignition of the Guejito Fire?

A. The Cal Fire Investigator, Gary Eidsmoe, explained his conclusion as follows:

> With the witness statements from Suzanne Todd and Tyson Short and finding the lashing wire from the COX Cable fiber optics line fused to the south power line in several areas, and finding some of that wiring on the ground sooted and beaded, it is my opinion that sometime during the wind event the lashing wire securing the fiber

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[4] Direct Testimony of Paul Alvarado, p. 2. I.08-11-007 (May 18, 2009).

[5] CPSD Report, p. 4.

[6] Direct Testimony of Greg Walters, pp. 2-3. I.08-11-007 (May 18, 2009) ("Walters OII Direct Testimony").

> optics cable and the power line had come in contact with each other causing an arc and starting a fire.[7]

When filling out a section of his report entitled "What caused the fire?," Mr. Eidsmoe wrote: "According to witnesses and evidence at the origin area, the cause of the fire was wire used to attach fiber optics cable to a support cable [that] unwound and made contact with a powerline conductor, causing an arc."[8]

Q. Did Mr. Eidsmoe offer any opinions as to how the lashing wire and power line came into contact with one another during the wind event?

A. Yes. Mr. Eidsmoe indicated that the lashing wire "had come undone in several locations," and "that some of the lashing wire was dangling from the Cox cable line; the ends about 10 -12 feet from the ground."[9] He also indicated that SDG&E's power line was "damage[d]," and he "found three spots where the lashing wire from the fiber optics cable was fused to the power line."[10] As the CPSD later noted, Mr. Eidsmoe concluded that the Cox lashing wire was broken prior to the Guejito Fire and that this broken wire blew up into SDG&E's lines, starting the fire.[11]

Q. Have you reviewed the subsequent CPSD Report?

A. Yes, I have.

Q. What did the CPSD Report conclude about the ignition of the Guejito Fire?

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[7] Cal Fire Report CA-MVU-010484 (October 22, 2007) ("Cal Fire Report"), p. 17.

[8] Cal Fire Report, p. 21.

[9] *Id*., pp. 12-13.

[10] *Id*., p. 13.

[11] Supplemental Direct Testimony of the Consumer Protection and Safety Division Regarding the Formal Guejito Fire Investigation, I.08-11-007 (March 6, 2009) ("CPSD OII Supp. Direct Testimony"), pp. 1-4 to 1-5.

A. The CPSD also concluded that the Cox lashing wire was broken and made contact with SDG&E's conductor on October 22, 2007.[12] CPSD found that Cox failed to inspect and maintain the lashing wire in a manner consistent with GO 95.

Q. Did the CPSD Report make any findings regarding SDG&E's facilities and compliance with GO 95?

A. No.

Q. In the Guejito OII that followed the issuance of the CPSD Report, did CPSD ever take a position on SDG&E's compliance with GO 95?

A. Yes, its position on that issue evolved throughout its written testimony in the Guejito OII.

Q. How did CPSD's position evolve?

A. In CPSD's March 9, 2009 Supplemental Direct Testimony, CPSD continued to maintain that Cox violated GO 95. CPSD discussed at length Cal Fire's conclusion that the Cox lashing wire was broken prior to the ignition of the Guejito Fire, and that this broken lashing wire made contact with SDG&E's conductors, leading to the ignition of the Guejito Fire.[13] It referred to this scenario as the "Cal Fire/SDG&E theory."

Q. What support did CPSD provide for "Cal Fire/SDG&E theory"?

A. CPSD reviewed the evidence and found that since there was no damage to the Cox fiber optic cable, there was no support for a theory advanced by Cox that the lashing wire broke after making contact with SDG&E's facilities (referred to as the "Cox theory").[14] As CPSD explained:

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12 CPSD Report, p. 6.

13 CPSD OII Supp. Direct Testimony, pp. 1-4 to 1-5.

14 *Id.*, p. 1-5.

> If the lashing wire broke after the contact with SDG&E's facilities as Cox suggests, this implicates that the entire Cox facility (including the fiber optic cable, messenger strand, and lashing wire) would have made contact with the 12 kV conductor. Such an event would have caused significant damage to Cox fiber optic cable, as well as its other facilities. In other words, there would have been much more damage to Cox's facilities than was discovered. A scenario where the lashing wire and messenger strand are the main Cox facilities damaged by arcing is more consistent with a lashing wire contacting the 12 kV conductor after having been separated from the other Cox facilities before the contact was made.[15]

CPSD also indicated that there were several other reasons to believe that the Cox lashing wire was broken prior to the Guejito Fire and led to its ignition.

Q. What were those other reasons?

A. CPSD indicated that the multiple points of contact between the SDG&E conductor and Cox lashing wire, as reflected in records and photographs, were more likely to have resulted from a broken lashing wire than an intact lashing wire. CPSD also referred to eyewitness testimony of the lashing wire blowing into the SDG&E conductor in the wind, and that the lashing wire was hanging approximately 10-12 feet from the ground, which meant that it was long enough to contact the 12 kV conductor. Lastly, CPSD indicated that because Cox was not inspecting its facilities, it would not have uncovered a broken lashing wire.[16]

Q. In the Supplemental Direct Testimony, what did CPSD ultimately conclude about Cox's compliance with GO 95?

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[15] *Id*.

[16] *Id*., pp. 1-5 to 1-7.

A. CPSD took the position that regardless of whether the lashing wire was broken prior to the fire (per the "Cal Fire/SDG&E theory") or whether the entire, intact bundle of Cox facilities came into contact with SDG&E's conductors (per the "Cox theory"), Cox violated GO 95.[17]

Q. What position did the CPSD take in its Supplemental Direct Testimony with respect to SDG&E and GO 95?

A. It is not entirely clear. CPSD's witness Mr. Fadi Daye was asked "Do you believe SDG&E is in violation of any GO Rules?"[18] He responded "Under Cox's Theory, SDG&E could be found in violation of GO 95, Rule 38."[19] But Mr. Daye never indicated whether or not *he* believed or endorsed the "Cox theory." Based on my review of the Supplemental Direct Testimony, it certainly seemed that CPSD emphasized the "Cal Fire/SDG&E theory" that the lashing wire was broken prior to the fire.

Q. Did CPSD offer any other testimony?

A. Yes, on June 8, 2009, CPSD submitted its Rebuttal Testimony.

Q. What position did CPSD take with respect to alleged GO 95 violations in its rebuttal testimony?

A. In the rebuttal testimony, it presented a table to "clarify CPSD's position," indicating that both Cox and SDG&E violated GO 95, albeit under conflicting theories – the "Cal Fire/SDG&E theory" and the "Cox theory."[20] Once again, the vast majority[21] of the CPSD testimony was

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[17] *Id*., pp. 1-8 to 1-17.

[18] *Id*., p. 5-4.

[19] *Id*.

[20] Rebuttal Testimony of the Consumer Protection and Safety Division to the Direct Testimony of Cox Communications and the Direct Testimony of San Diego Gas & Electric Company Regarding the Formal Guejito Fire Investigation, I.08-11-007 (June 8, 2009), p. 1-2 ("CPSD OII Rebuttal Testimony").

[21] Chapter 1 of the CPSD OII Rebuttal Testimony, consisting of 26 pages, was directed at Cox, while Chapter 2 of that testimony, consisting of 11 pages, was directed at SDG&E.

directed at Cox, and CPSD continued to support its arguments regarding the "Cal Fire/SDG&E theory," and it advanced arguments rebutting the "Cox theory" and other Cox arguments. But CPSD also took the position that since there was contact between the Cox facilities, and SDG&E facilities, SDG&E should also be found in violation of GO 95.

Q. How were the CPSD's GO 95 allegations resolved?

A. Both Cox and SDG&E entered into settlement agreements with CPSD.

Q. Does Mr. Stannik discuss how the Cox facilities and SDG&E facilities came into contact with one another?

A. Not really. SDG&E asked Mr. Stannik in discovery to explain how he believes the SDG&E conductor and Cox lashing wire came into contact with one another. Instead of answering the question, he simply pointed to his testimony, which provides no such explanation.[22] While Mr. Stannik's testimony mentions the Cal Fire and CPSD findings regarding the broken lashing wire, he completely avoids the significance of those findings with respect to the ignition of the Guejito Fire.[23]

Q. How so?

A. Mr. Stannik repeatedly characterizes the ignition as resulting from physical contact between Cox facilities and SDG&E facilities, and he takes the position that "[p]hysical contact between communications and power lines constitutes a clearance violation under General Order 95."[24] But unlike Cal Fire and the CPSD, he does not try to understand what caused the physical contact (the broken lashing wire). He simply claims that a clearance violation occurred and since

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[22] See Appendix 1 (ORA's Response to SDG&E-ORA DR 02, Request 15).

[23] Stannik Testimony, p. 18.

[24] *Id.*

SDG&E's facility was involved, SDG&E must be found in violation of GO 95.[25] Mr. Stannik is simply concerned with the effect but ignores the cause.

Q. In your opinion, how did physical contact between Cox's facilities and SDG&E's facilities occur, and what impact does that have on the reasonableness of SDG&E's conduct?

A. First of all, the weight of the facts support the "Cal Fire/SDG&E theory" discussed above, and that a broken Cox lashing wire blew up into SDG&E's conductors in the Santa Ana wind event. Those facts show that SDG&E did not imprudently design, engineer or maintain its facilities. Cox's broken lashing wire blew into SDG&E's conductors and caused the ignition. The breaking of Cox's lashing wire was not within SDG&E's control.

Q. In addition to claiming that the physical contact between the SDG&E facilities and Cox facilities constituted a GO 95 violation, Mr. Stannik also argues that the 3.3 foot clearance between those respective facilities, as documented in the post-fire Nolte Survey, constitutes a GO 95 violation.[26] How do you respond to that argument?

A. Mr. Stannik does not even attempt to connect the clearance recorded by the Nolte Survey to the ignition of the Guejito Fire. There is no evidence that the Guejito Fire occurred because of a 3.3 foot clearance; rather, as discussed above, it occurred because the Cox lashing wire broke and blew up into SDG&E's conductors. Whether or not the clearance constituted a violation of GO 95 is irrelevant to the issue here.

B. SDG&E'S Inspections

Q. Did SDG&E inspect the distribution facilities linked the Guejito Fire?

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[25] Stannik Testimony, pp. 18-19.

[26] *Id.*, p. 19.

A. Yes. As I discussed in my direct testimony in this proceeding,[27] the most recent SDG&E patrol inspection of the facilities between Poles P196394 and P196387 prior to the fire took place on August 20, 2007, and no areas of follow-up or hazards were identified. The most recent SDG&E detailed overhead inspection of those facilities prior to the fire took place on June 22, 2007 (for Pole P196394) and April 8, 2005 (for Pole P196387). Other than missing or damaged high voltage or warning signs (which were repaired), no conditions were noted in those inspections.

Q. In your opinion, what is the significance of those inspections?

A. They show that, prior to the Guejito Fire, SDG&E was complying with applicable guidelines regarding inspections, including GO 165.

Q. Can you explain Mr. Stannik's criticisms of SDG&E's inspections?

A. Yes. First, I do not believe Mr. Stannik has criticized SDG&E's Corrective Maintenance Program in general, which is the program pursuant to which inspections are conducted. I described that Corrective Maintenance Program in my direct testimony.[28] Rather, I understand his criticisms to be that the actual inspections did not discover either (1) the 3.3 foot clearance (which was less than the 6 foot clearance required by GO 95) prior to the Guejito Fire; or (2) "lashing break" endpoints, indicating locations where the lashing wire was severed, as well as locations on the SDG&E conductor where parts of the lashing wire presumably fused to the conductor.[29]

Q. How do you respond to Mr. Stannik's first criticism regarding the 3.3 foot clearance and SDG&E's inspections?

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[27] Weim Testimony, pp. 10-11.

[28] *Id*., pp. 3-10.

[29] Stannik Testimony, p. 20.

A. There is no evidence that the 3.3 foot clearance had anything to do with the ignition of the ignition of the fire. As I said above (and as Cal Fire concluded), the cause of the fire was the broken Cox lashing wire blowing up into SDG&E's conductors. Prior to the Guejito Fire, SDG&E inspectors checked for and noted obvious problems with Communications Infrastructure Provider ("CIP") facilities when such problems impacted SDG&E facilities or presented safety concerns, along with over 60 additional overhead condition codes – ranging from missing/damaged high voltage signs or damaged ground moldings to damaged equipment.

As a general matter, detailed overhead inspections start at the physical pole location and the pole and associated hardware and equipment on the pole is inspected. The electric conductors attached to the pole are then visually inspected to identify suspected issues. If an issue is suspected, the inspector will use binoculars or a spotting scope to take a closer look. If no suspected infractions are identified, the additional tools will not be utilized and no conditions will be noted by the line checker.

With respect to this particular span, which I have visited, the clearances at the poles were likely observed to be compliant with GO 95 (and this compliance was confirmed by the post-fire survey), so that likely would not have raised any concerns regarding mid-span clearance. I believe that if the inspections of this span had discovered a clearance violation, SDG&E would have notified Cox of the issue, using the process that Mr. Walters described in his direct testimony.[30]

[30] Prepared Direct Testimony of Greg Walters on Behalf of San Diego Gas & Electric Company (September 25, 2015) ("Walters Testimony"), pp. 10-13.

Q. Mr. Stannik refers to statements you made in your Guejito OII testimony regarding the allocation of responsibility for checking CIP facilities as between SDG&E and Cox. [31] What is your position on that allocation?

A. At the time of the 2007 Wildfires, there were no regulatory requirements that a utility conduct inspections of CIP facilities. While not required to do so, SDG&E did track GO infractions caused by or related to CIPS prior to the 2007 Wildfires, as Mr. Walters explained in his direct testimony.[32] Mr. Walters also explained that SDG&E had been notifying CIPs of such infractions, despite the time and expense this entailed, and that CIPs were not very responsive to these concerns.[33] In addition, as Mr. Walters explained, SDG&E had been notifying the Commission of this problem in several GO 165 annual reports, but the Commission had not taken any action.[34]

While SDG&E was tracking GO infractions it discovered relating to CIP facilities, it is important to remember that the proper inspection and maintenance of these facilities is the responsibility of those CIPs, such as Cox. In the Guejito OII, the CPSD specifically faulted Cox for not conducting inspections: "In particular, if Cox had a compliant inspection program it could have been able to detect a failed lashing wire, and/or any clearance issues, and make necessary repairs in a timely manner."[35] The CPSD also found that Cox had not inspected the facilities at issue since their installation in August 2001.[36] A major problem with respect to CIP infractions was that CIPS were not required to comply with GO 165 prior to the 2007 Wildfires (GO 165

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31 Stannik Testimony, p. 20.

32 Walters Testimony, pp. 10-12.

33 *Id*., pp. 10-12.

34 *Id*., pp. 10-12.

35 CPSD OII Supp. Direct Testimony, p. 1-8; *see also*, pp. 1-9 to 1-14.

36 *Id*., p. 1-12.

was imposed on CIPS in the Fire Safety OIR in R.08-11-005, after the 2007 Wildfires). I do not believe it is appropriate to blame this gap in regulatory compliance or oversight on SDG&E.

Q. Are there any GO 95 rules that discuss the allocation of responsibility for establishing a clearance as between a utility and a CIP?

A. Yes.

Q. Please describe that rule.

A. As Mr. Walters mentioned in his direct testimony in this proceeding, GO 95, Rule 32.1 ("Two or More Systems") deals directly with clearances between utility conductors and facilities owned by another party.[37] Rule 32.1 requires that the utility last in point of time to construct its facilities to establish the clearance required by Rule 38. More specifically, Rule 32.1 states (now, as it did in 2007):

> Where two or more systems are concerned in any clearance, that owner or operator who last in time constructs or erects facilities, shall establish the clearance required in these rules from other facilities which have been erected previously.[38]

Q. In this situation, which party constructed its facilities last in time?

A. Cox.

Q. If Cox installed its facilities last in time, what does that suggest about the 3.3 foot clearance documented by the Nolte Survey?

A. If the 3.3 foot clearance existed prior to the extreme wind event in October 2007, it indicates that the insufficient clearance was caused by Cox installing their facilities too close to SDG&E's conductors.

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[37] Walters Testimony, p. 11.

[38] *Id.*

Q. You noted that Mr. Walters previously mentioned Rule 32.1 in his direct testimony. Is that the first time he has pointed to Rule 32.1?

A. No, he made the same reference to Rule 32.1 in his Guejito OII direct testimony.[39]

Q. Did CPSD respond to Mr. Walters' assertion regarding Rule 32.1 in its rebuttal testimony in the Guejito OII?

A. No, it did not. CPSD only responded to Mr. Walters' testimony regarding a different issue (the SDG&E and Cox Joint Pole Agreement).[40]

Q. In this proceeding, did Mr. Stannik respond to Mr. Walters' direct testimony regarding Rule 32.1?

A. No. Mr. Stannik never refers to Mr. Walters' testimony, nor does he mention or acknowledge the existence of Rule 32.1.

Q. How do you respond to Mr. Stannik's second criticism of SDG&E's inspections, with respect to the post-fire lashing break endpoints and the lashing wire fused to SDG&E's conductors?

A. As I mentioned earlier, Mr. Stannik cites to the fact that the post-fire Nolte Survey found Cox lashing break endpoints, and locations on the SDG&E conductor where he presumed lashing wire fused with the conductor.[41] What Mr. Stannik fails to explain, however, is his basis for assuming that the lashing breaks occurred prior to the most recent inspections, and so could have been caught during those inspections. Nor does he explain his basis for assuming that the lashing wire fused to the conductor in several places prior to the most recent inspections. It is far

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[39] Walters OII Direct Testimony, p. 3.

[40] CSPD OII Rebuttal Testimony, pp. 2-9 to 2-10.

[41] Stannik Testimony, p. 20.

more likely, and consistent with the Cal Fire report, that such fusing took place in the Santa Ana wind event in late October 2007. So I think that criticism is misguided.

III. RESPONSE TO THE TESTIMONY OF DR. MITCHELL AND DR. RAHN

A. Wind Loading

Q. Do you agree with Dr. Mitchell that SDG&E designed the facilities linked to the Witch Fire to withstand a wind speed of 56 mph?

A. Yes. Those facilities were designed using the wind loads in GO 95, Rule 43, the safety factors in Rule 44, and the strength of materials specified in Rule 48. The methodology for pole loading is shown in an example in Appendix F of GO 95.

Q. Do you agree with Dr. Mitchell that SDG&E incorrectly interpreted GO 95 in designing the facilities involved in the Witch Fire to withstand winds of 56 mph?

A. No.

Q. Why not?

A. Dr. Mitchell says that "the Safety Enforcement Division of the CPUC and Decision D.14-02-015 currently maintains that the correct interpretation of GO 95 Rule 48 requires new construction to be built to a wind loading of 112 mph and for that existing construction withstand wind gusts of 92 mph."[42] As I understand it, Phase 1 of this proceeding concerns the reasonableness of SDG&E's conduct *prior to* the 2007 Wildfires. However, Dr. Mitchell is saying that an interpretation that the Safety and Enforcement Division has advanced in a rulemaking proceeding *subsequent to* the 2007 Wildfires,[43] an interpretation which has not even been adopted by the Commission, somehow shows that we incorrectly interpreted GO 95 in

[42] *Id.*

[43] Order Instituting Rulemaking to Revise and Clarify Commission Regulations Relating to Safety of Electric Utility and Communications Infrastructure Provider Facilities, R.08-11-005.

designing our facilities prior to the 2007 Wildfires. In addition, the 112 mph and 92 mph wind speeds are based on a flawed interpretation of what wood poles can withstand, and we did not have any pole failures during the period of the 2007 Wildfires.

Q. How do you know that the Safety Enforcement Division's interpretation has not even been adopted by the Commission?

A. Because in the very decision Dr. Mitchell cites, the Commission deferred consideration of revisions to GO 95, Rule 48 to Phase 3, Track 3 of the OIR.[44]

Q. But how do you explain the following sentence from D.14-02-015 that Dr. Mitchell emphasizes in support of his position: "Currently, Rule 48 establishes a single wind-load standard of 112/92 mph for Grade A wood poles in the Light Loading District."[45]

A. SDG&E sought rehearing of that statement[46] and explained that the 112/92 mph standard represented a major departure from the status quo that, if allowed to stand, would cause SDG&E to have to immediately upgrade its entire existing overhead electric system at a cost of between $4-12 billion.[47]

In response, the Commission issued its "Order Modifying D.14-02-015" in which it acknowledged "that statements in the Decision may have caused confusion about whether the IOUs and CIPs are now expected to replace, redesign, or reconstruct their facilities based on a standard of 112/92 mph while Phase 3, Track 3 of this proceeding is pending, and therefore modify the decision to provide clarification."[48] The Commission went on to explain that it had

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[44] D.14-02-015 at 68-70; Findings of Facts 9-10; Conclusions of Law 6-7.

[45] Mitchell Testimony, p. 10.

[46] "Application for Rehearing of Decision 14-02-015 and Oral Argument by San Diego Gas & Electric Company (U-902-E)" (March 12, 2014).

[47] *See* D.14-12-089 at 2-4.

[48] *Id*. at 4.

"deleted" references to the 112/92 mph standard from the Proposed Decision, but that "it appears modifications were not consistently made throughout the PD" and thus clarified that "all consideration of issues regarding Rule 48" would be deferred to Track 3, Phase 3 of the proceeding.[49] In other words, the reference to "the 112/92 mph standard" was an error. Thus, in Ordering Paragraph 1.d of the "Order Modifying D.14-02-015," the Commission explicitly eliminated the sentence Dr. Mitchell emphasized.[50] The point is that the precise wind loading standard remains unresolved, and the Commission has never articulated that a 112/92 mph standard applied prior to 2007.

Q. Later in his testimony, Dr. Mitchell asserts that SDG&E "aggressively fought against the interpretation of GO 95 Rule 48 as requiring a 92 mph wind loading standard, putting forth its own proposal that would have weakened the provisions of Rule 48."[51] How do you respond to that testimony?

A. To say that the SDG&E proposal would have weakened the provisions of Rule 48 is a misleading statement. The proposals sought to strengthen the provisions by eliminating confusing and inconsistent requirements in Section IV. Even the Energy Division of the CPUC took issue with Rule 48, as evidenced in a letter written to the GO 95/128 Rules Committee on December 14, 2009. In the letter, the Deputy Director of the Energy Division said the following:

> In its technical advisory role at the CPUC the Energy Division has encountered what we believe to be deficiencies in the Commission's General Order 95. Accordingly we have drafted two rule changes for review and consideration by the GO 95/128 Rules Committee. Should the Committee find these changes have merit, Energy Division asks it to recommend the Commission adopt them at the next convenient procedural opportunity.

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49 *Id*. at 5.

50 *Id*. at 9.

51 Mitchell Testimony, p. 22.

> The first proposed rule change would delete the first two paragraphs of Rule 48. These paragraphs impose a design standard that we believe violates standard practice and, if literally interpreted, would result in unnecessarily expensive transmission and distribution lines.[52].

SDG&E has shared the same view as that expressed in the letter referenced above. From SDG&E's perspective, there were multiple concerns with how Rule 48 was written. The first issue is that one could read the combination of Rules 44 and 48 to require a double application of safety factors during design, which is neither appropriate nor necessary. Another issue is that Rule 48 says "[s]tructural members and their connection shall be designed and constructed so that the structures and parts thereof will not fail or be seriously distorted at any load less than their maximum working loads (developed under the current construction arrangements with loadings as specified in Rule 43) multiplied by the safety factors in Rule 44." This requirement is inconsistent with the guidance provided by Rule 48.1, which points to ANSI 05.1 2008 for wood pole fiber strengths. ANSI 05.1 2008 lists average wood pole strengths (for use in design, per the example in Appendix F of GO 95). An average value implies that 50% of poles could have a lower fiber strength and 50% of poles could have a higher fiber strength. SDG&E's intent in changing Rule 48, in addition to other rules in Section IV, was to align Section IV with modern structural design codes and requirements and eliminate inconsistencies.

Q. To your knowledge, have the wind loading issues deferred in D.14-02-015 been resolved?

A. No, they have not.

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[52] See Appendix 2.

Q. Dr. Mitchell testifies that SDG&E did "no probabilistic failure analysis of its infrastructure at potential wind speeds above 56 mph."[53] How do you respond to that contention?

A. I am not sure I understand the point he is trying to make. SDG&E designed its facilities in compliance with GO 95. There is no requirement to do probabilistic failure analyses, so he seems to be suggesting we did not meet a requirement that did not exist at the time of the 2007 Wildfires (and does not exist today).

B. SDG&E Meteorological Studies for 500 kV Transmission Projects

Q. Both Dr. Mitchell and Mr. Stannik testify that SDG&E knew prior to October 2007 that wind gusts could exceed 56 mph in its service territory on the basis of two studies it had commissioned for 500 kV transmission projects.[54] What is your response to that testimony?

A. The facilities linked to the ignition of the Witch, Rice and Guejito Fires were all constructed prior to the earlier of the two studies, the 1981 Southwest Powerlink study. GO 95 specified the state standard for wind loading, and SDG&E designed its facilities to that standard. Rule 12.3 of GO 95 specifies that the design requirements in effect at the time an overhead powerline is built continue to apply:

> The requirements of this Order, other than the safety factor requirements specified in Rule 12.2, do not apply to lines or portions of lines constructed or reconstructed prior to the effective date of this Order. *In all other particulars, such lines or portions of lines shall conform to the requirements of the rules in effect at the time of their construction or reconstruction.*[55]

Thus, I believe that SDG&E was in compliance with applicable rules at the time of the October 2007 Wildfires.

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[53] Mitchell Testimony, pp. 9-10.

[54] Mitchell Testimony, pp. 11-18; Stannik Testimony, pp. 35-36.

[55] GO 95, Rule 12.3 (August 2007 version).

Q. Did the other utilities in California design their facilities in accordance with the wind load of 56 mph, as specified in GO 95?

A. Yes.

Q. How do you know that?

A. From my first-hand experience working in both transmission and distribution engineering functions at SDG&E, during which time I communicated with other California utilities. The Commission also recognized that fact in D.14-02-015, in which it stated: "The CIP Coalition and the IOUs assert that they have long designed their facilities using a wind load of 8 psf/56 mph in accordance with Rule 43."[56]

Q. But what about Dr. Mitchell's allegation that SDG&E violated GO 95, Rule 31.1, which requires utilities to design their facilities with regard to known local conditions?

A. Both Dr. Mitchell and Mr. Stannik make that argument.[57] Similar to Rule 12.3, however, Rule 31.1 links the knowledge of local conditions to the time at which the facilities were designed:

> For all particulars not specified in these rules, design, construction, and maintenance should be done in accordance with accepted good practice for the given local conditions *known at the time* by those responsible for the design, construction, or maintenance of [the] communication or supply lines and equipment.[58]

As I mentioned earlier, the SDG&E facilities linked to the Witch, Rice and Guejito Fires were all designed in accordance with the standard at the time, and were designed well before the 1981 Southwest Powerlink study.

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[56] D.14-02-015 at 61.

[57] Mitchell Testimony, pp. 11, 23; Stannik Testimony, pp. 35-36.

[58] GO 95, Rule 31.1 (August 2007 version).

Q. Why did SDG&E do wind studies for the Southwest Powerlink and Sunrise Powerlink 500 kV transmission projects but not for the circuits linked to the Witch, Rice and Guejito Fires?

A. It is industry standard to do wind studies for large, 500 kV transmission projects. Those facilities are the backbone of our electric grid.

That was not the standard for distribution circuits (or low voltage transmission circuits such as TL 637). SDG&E had not experienced an event comparable to the 2007 Wildfires prior to October 2007. Thus, we had no reason to believe that designing our facilities in accordance with the standards of GO 95 might not be enough. After we learned that lesson, we redesigned our systems and changed standards accordingly, as discussed in Mr. Geier's direct testimony.

Q. Why didn't SDG&E apply the knowledge regarding wind speeds from the Southwest Powerlink and Sunrise Powerlink studies to its other facilities, including the circuits linked to the Witch, Rice and Guejito Fires?

A. As I said in my previous answer, SDG&E believed that complying with GO 95 was sufficient for those facilities. It is always tempting to review a situation, with hindsight information, and claim that something could have been done differently, as Dr. Mitchell and Mr. Stannik do when they point to those studies. But in any case, I do not believe that the information from those studies would have led to the avoidance of the Witch, Rice or Guejito Fires.

Q. Why not?

A. While extreme Santa Ana winds certainly played a role in the ignitions and spread of the Rice and Guejito Fires, Cal Fire and CPSD concluded that those fires started when another object (a tree limb in the case of the Rice Fire, and a broken lashing wire in the case of the Guejito Fire)

made contact with SDG&E's facilities. So increasing the strength of the poles or conductors on those circuits to withstand wind pressure would not have avoided the fires.

With respect to the Witch Fire, it is not known what exactly caused SDG&E's conductors to come into contact with one another in the wind event, since there were no eyewitnesses. But if SDG&E had used the wind speed information from the vicinity of the Witch Fire ignition point that is included in the Sunrise Powerlink study (68 mph), that still would not have solved the problem since SDG&E's meteorology department has concluded that the wind gusts were far stronger (92 mph).[59]

Q. Do Dr. Mitchell or Mr. Stannik offer opinions and analysis as to how designing the facilities implicated in the Witch, Guejito and Rice Fires to a higher wind loading standard would have avoided those fires?

A. No. There is simply no evidence that designing any of these facilities to a higher wind loading standard would have avoided the fires. Dr. Mitchell and Mr. Stannik are simply implying that we failed to do something, but they never even attempt to prove that the supposed failure contributed to the Witch, Guejito and Rice Fires.

C. Prior Wildfires in SDG&E's Service Territory

Q. Dr. Mitchell testifies that SDG&E should have been aware of the potential for catastrophic wildfires resulting from extreme weather in its service territory.[60] Dr. Rahn makes similar statements.[61] How do you respond to that testimony?

A. As a general matter, SDG&E has been aware of the potential for wildfires in its service territory. In his direct testimony, Mr. Geier explained that the 2003 Wildfires caused tremendous

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[59] Prepared Direct Testimony of Steve Vanderburg on Behalf of San Diego Gas & Electric Company (September 25, 2015), p. 13.

[60] Mitchell Testimony, pp. 24 and 25.

[61] Rahn Testimony, pp. 4-19.

damage in our service territory and to SDG&E's facilities, and SDG&E initiated measures in the wake of those fires to reduce the risk of wildfires.[62] But the 2003 Wildfires were not linked to utility facilities, and while there had been fires linked to utility facilities prior to 2007, none of those fires were anywhere near comparable to the 2007 Wildfires in terms of scope and magnitudes of the resulting damage. Notably, the Commission itself did not recognize the risk of a potential fire event such as this prior to 2007.

Dr. Mitchell indicates that these fires were unprecedented when testifies "[i]n my study of power line fire history in California I have not seen any other similar incident where a weather incident was associated with multiple power line fires."[63] Dr. Mitchell made a nearly identical statement in his 2011 direct testimony opposing SDG&E's Wildfire Expense Balancing Account ("WEBA") Application, where he then went on to say: "This is doubtless one reason that the California Public Utilities Commission and utilities were taken by surprise by the October 2007 fires – there was not sufficient historical precedent to warn that planning to prevent multiple fire ignitions was necessary."[64] Now he seems to take a contrary view.

It is also important to recognize the reason that these fires were so unprecedented was because of the weather and wind conditions that occurred at the time, not because powerlines were associated with the ignition of three of the many fires that broke out in late October 2007. Dr. Mitchell recognized this fact in his 2011 WEBA direct testimony: "The October 2007 windstorm in eastern San Diego County was the most intense on record, and created the

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[62] Prepared Direct Testimony of David L. Geier on Behalf of San Diego Gas & Electric Company (September 25, 2015), pp. 15-19.

[63] Mitchell Testimony, p. 9.

[64] See Appendix 3. Direct Testimony of The Mussey Grade Road Alliance WEBA Impacts on Fire Risk and Costs (Dr. Mitchell), A.09-08-020 (September 11, 2011) ("Mitchell WEBA Direct Testimony"), p. 6.

conditions under which power line fires occurred in the SDG&E area."[65] Dr. Mitchell also acknowledged that "[d]uring conditions of high winds and low humidity… firefighting resources can be overwhelmed by ignitions they would be able to handle under normal conditions."[66] Unfortunately, SDG&E has no control over the sufficiency or effectiveness of such firefighting resources.

Q. Dr. Mitchell and Dr. Rahn point to three prior fires in SDG&E's service territory: (1) the 1970 Laguna Fire; (2) the 2002 Pines Fire; and (3) the 2006 Open Fire.[67] Did those fires provide SDG&E with notice that the Witch, Guejito and Rice Fires would occur?

A. None of the fires Dr. Mitchell and Dr. Rahn point to could have been used to predict that the Witch, Rice and Guejito Fires would ignite where, when, and under the circumstances they did.

In direct testimony, Mr. Geier, Mr. Walters, Mr. Akau, and I testified as to the specific steps SDG&E was taking prior to the 2007 Wildfires to design, inspect and maintain its facilities, and appropriately manage vegetation, in accordance with applicable guidelines – all of which were intended to promote safety.

For instance, Mr. Akau discussed SDG&E's Vegetation Management Program, which is intended to avoid the type of vegetation-conductor contact that Dr. Mitchell claims led to the 1970 Laguna Fire.[68] Mr. Akau also presented a chart that shows how successful SDG&E has been in reducing tree-caused outages.[69] Nevertheless, when there are natural objects like trees in

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65 See Appendix 3. Mitchell WEBA Direct Testimony, p. 10.

66 Mitchell Testimony, p. 4.

67 Mitchell Testimony, pp. 24-25; Rahn Testimony, p. 8-9.

68 Mitchell Testimony, p. 24.

69 Prepared Direct Testimony of Don Akau on Behalf of San Diego Gas & Electric Company (September 25, 2015), p. 14.

the vicinity of powerlines, SDG&E can only mitigate the risk of contact between vegetation and powerlines and not eliminate it entirely. SDG&E wants to avoid every such vegetation-related outage – as well as outages from other causes.

With respect to the 2002 Pines Fire, I do not believe that a fire that was allegedly started by helicopter to conductor contact is relevant in any way to the 2007 Wildfires or this case more generally because it provides no information that could have been used to avoid the 2007 Wildfires.

Dr. Mitchell claims that "[t]he most prescient example" that should have informed SDG&E about the 2007 Wildfires to come was the 2006 Open Fire.[70] Dr. Mitchell, however, says this fire involved a transmission line, when it in fact involved a distribution circuit. And Dr. Mitchell also insinuates that this fire took place on the same transmission circuit (TL 637) as the Witch Fire, which is not true. In any case, the damage that resulted from the Open Fire (300 acres) was nowhere near the damage that resulted from the Witch Fire (~300,000 acres), which once again goes to show just how unpredictable wildfires can be, and how the difference between a 300 acre fire and a 300,000 acre fire is determined by wind, weather, geographic location, and other factors that SDG&E could not predict or control.

Q. Do Dr. Mitchell or Dr. Rahn offer any specific proposals for actions SDG&E should have taken prior to October 2007?

A. They do not offer any meaningful proposals. As noted above, Dr. Mitchell that if SDG&E had built to a higher wind loading standard, "the Witch Fire would likely not have occurred."[71] He offers no evidence or engineering analysis to support that conclusion with any degree of certainty. Dr. Mitchell also suggests that, after the Open Fire, SDG&E "might have

[70] Mitchell Testimony, p. 24.

[71] *Id.*, p. 25.

turned off reclosing on [TL 637] without manual inspection,"[72] but he presents no evidence that reclosing had anything to do with either the Open Fire or any other prior fire.

Dr. Rahn is also fairly vague with respect to specific actions SDG&E might have taken prior to the 2007 wildfires. The only recommendation that he appears to make is that "SDG&E could have and should have run catastrophe modeling and cost-benefit analysis.[73] But Dr. Rahn never even attempts to demonstrate that a catastrophe modeling and cost-benefit analysis would have avoided the Witch, Guejito and Rice Fires from occurring when, where and under the circumstances that they did.

D. SDG&E's Post 2007 Efforts to Reduce Wildfire Risk

Q. Dr. Mitchell identifies a few of the steps SDG&E has taken since the 2007 Wildfires to reduce wildfire risk – including changing its design criteria for wind loading – and states that "[t]his indicates a tacit recognition that the 56 mph standard it was using prior to 2007 is not appropriate for its service territory."[74] Dr. Rahn makes similar claims.[75] How do you respond to that testimony?

A. The testimony on post-2007 changes[76] is pure hindsight analysis.

Q. How so?

A. Because all of the many steps we have taken since the 2007 Wildfires to reduce the risk of wildfire were undertaken based on SDG&E's changed state of knowledge resulting from those fires. SDG&E learned a lot from the fires, as did the Commission, and many of the changes SDG&E has undertaken have been in conjunction with the Fire Safety OIR (R.08-11-005), in

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72 *Id.*

73 Rahn Testimony, p. 12.

74 Mitchell Testimony, p. 22; *see also*, p. 4.

75 Rahn Testimony, p. 13.

76 Mitchell Testimony, pp. 19-23.

which the Commission has changed the GO requirements to take account of environmental conditions like extreme wind loading and fire threat zones that weren't even mentioned or addressed in the GO rules, as they existed prior to the 2007 Wildfires. This includes the creation of a transmission and distribution wind loading design map based on current knowledge about extreme winds in the SDG&E service territory.

Q. Have you participated on behalf of SDG&E in the Fire Safety OIR and in post-2007 measures to reduce wildfire risk?

A. Yes, I have.

Q. Dr. Mitchell criticizes SDG&E for being too slow to implement "more stringent engineering requirements" after the 2007 Wildfires.[77] How do you respond to that testimony?

A. Based on my experience, I believe that Dr. Mitchell is wrong. Immediately after the 2007 Wildfires, in November 2007, SDG&E petitioned the Commission to undertake a rulemaking to determine the extent to which additional measures might be necessary for disaster preparedness related to the operation of its electric system. SDG&E also revised a number of its operating protocols and programs as part of its 2008 Fire Preparedness Plan, including a wood-to-steel pole replacement program and modification of its recloser policy to limit or eliminate line re-energization after an outage, depending on fire weather conditions. SDG&E also expanded ground and aerial inspection of powerlines and poles, and deployed advanced technologies (e.g., advanced reclosing devices, advanced digital relays, wireless fault indicators, weather stations) to give us enhanced situational awareness and operational capabilities. SDG&E has actively participated in the Fire Safety OIR since 2008, which has resulted in dozens of changes to how SDG&E operates. Under the Commission's direction, those

[77] Mitchell Testimony, pp. 22-23.

proceedings remain ongoing, and currently, the parties are working on a fire mapping effort. The fact that those proceedings have been ongoing for the last 8 years shows that there has been a massive change in how the Commission and stakeholders understand the risk of wildfires, and that there are not quick and easy fixes to reduce that risk. That process shows just how off-base Dr. Mitchell is when he points to events like the 2006 Open Fire, or the 2006-08 Sunrise Powerlink study I discussed earlier.

IV. CONCLUSION

Q. Does this conclude your prepared rebuttal testimony?

A. Yes it does.

Appendix 1

ORA
Office of Ratepayer Advocates
California Public Utilities Commission
505 Van Ness Avenue
San Francisco, California 94102
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http://ora.ca.gov

Request 15. Please provide Mr. Stannik's explanation for how the SDG&E conductor and Cox's lashing wire came into contact with one another in connection with the ignition of the Guejito Fire. Please provide all documents that support your answer.

Objection: Incorporating the General Objections indicated in Sections I-III, and specifically objecting to this data request on the grounds that it seeks information under SDG&E's custody and control, and seeks to shift the burden of proving whether SDG&E acted reasonably or not to ORA, ORA provides the following response.

Response 15.

Mr. Stannik's testimony regarding the ignition of the Guejito Fire is provided in ORA-01, pages 17-21, as well as various supporting attachments in ORA exhibits ORA-04, ORA-05, and ORA-06.

Appendix 2

STATE OF CALIFORNIA
Governor

ARNOLD SCHWARZENEGGER,

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

December 14, 2009

Executive Board, GO 95/128 Rules Committee
C/o Mr. Jerome Candelaria
California Cable & Telecommunications Association
1001 K Street 2nd Floor
Sacramento, CA 95814

Subject: California Public Utilities Commission General Order 95 *Rules for Overhead Line Construction*

Gentlemen:

In its technical advisory role at the CPUC the Energy Division has encountered what we believe to be deficiencies in the Commission's General Order 95. Accordingly we have drafted two rule changes for review and consideration by the GO 95/128 Rules Committee. Should the Committee find these changes have merit, Energy Division asks it to recommend that the Commission adopt them at the next convenient procedural opportunity.

The first proposed rule change would delete the first two paragraphs of Rule 48. These paragraphs impose a design standard that we believe violates standard practice and, if literally interpreted, would result in unnecessarily expensive transmission and distribution lines.

The second proposed rule change would add a third section to Rule 43 to provide a third loading area to complement the Heavy Loading and Light Loading areas. This third area would specify design and construction criteria expressly applicable to fire prone areas.

Thank you for taking up these proposals; should you have any questions regarding the

need for and justification of these proposed rule changes, please feel free to contact Brian Schumacher, a supervisor on my staff, who is conversant with this issue.

Sincerely yours,

/S/

Ken Lewis
Deputy Director, Energy Division

Cc: Julie Fitch, Director
Julie Halligan, CPSD
OIR 08-11-005 Service List

Attachments

Appendix 3

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Application of San Diego Gas & Electric Company (U 902-M), Southern California Edison Company (U 338-E), Southern California Gas Company (U 904-G) and Pacific Gas and Electric Company (U 39-M) for Authority to Establish a Wildfire Expense Balancing Account to Record for Future Recovery Wildfire-Related Costs

Application No. 09-08-020
(Filed August 31, 2009)

DIRECT TESTIMONY OF THE

MUSSEY GRADE ROAD ALLIANCE

WEBA IMPACTS ON FIRE RISK AND COSTS

Diane Conklin, Spokesperson
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Dated: September 11, 2011

80%, and firefighting resources can be overwhelmed by ignitions they would be able to handle under normal conditions.[13]

This situation is further complicated in the case of power line fires because the very conditions that lead to ignition (through clashing of lines, tree contact with lines or infrastructure failure), also favor the rapid spread of fires that ignite wildland fuels.[14,15] Under sufficiently extreme conditions this leads to a "power line firestorm", since wind conditions that are extreme enough can lead to multiple failures of electrical infrastructure or downed trees or branches throughout a utility's system. This phenomenon has been observed several times in Australia – in 1977, 1983, and most recently in the catastrophic "Black Saturday" fires of 2009.[16]

The only major incident of this type in California consisting of multiple near-simultaneous ignitions of major wildland fires by electrical equipment and recorded in the CAL FIRE record is the October 2007 firestorm, which has been described in much detail in other proceedings.[17] This is doubtless one reason that the California Public Utilities Commission and utilities were taken by surprise by the October 2007 fires – there was not sufficient historical precedent to warn that planning to prevent multiple fire ignitions was necessary.

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[13] R.08-11-005; MUSSEY GRADE ROAD ALLIANCE PRE-HEARING CONFERENCE STATEMENT; Appendix A (Mitchell, Joseph W.; Power Lines and Catastrophic Wildland Fires in Southern California; Fire & Materials 2009;San Francisco, CA; January 26-28, 2009), February 2, 2009. (Mitchell, 2009)

[14] Id.

[15] OSFM, CDF, USFS, PG&E, SC Edison, SDG&E; Power Line Fire Prevention Field Guide; Mar 27, 2001.

[16] 2009 Victorian Bushfires Royal Commission; Final Report; Volume II; Chapter 4; (Victorian Bushfires Report) p. 148.
http://royalcommission.vic.gov.au/finaldocuments/volume-2/PF/VBRC_Vol2_Chapter04_PF.pdf

[17] Significant testimony and discussion regarding the 2007 fires occurred in A.06-08-010 (Sunrise Powerlink), A.08-12-021 (SDG&E Shut-off plan), R.08-11-005 (Fire safety rulemaking), and investigations I.08-11-005, I.08-11-006, and I. 09-01-018.

It is important to stress that there are two classes of power line fire ignitions and one of these is more likely to cause catastrophic losses than the other. In the first type, which is described by the narrative in the application testimony, power line fire ignitions can occur from a variety of sources (the causation of which may or may not be under the control of the utility) and under a variety of conditions. In the event that one of these ignitions occurs in the appropriate fuels and during "fire weather" conditions, there is the possibility that this fire will grow rapidly and cause harm. While large losses might be caused in such a scenario, we should not expect this to be the largest expected source of loss.

A much more likely cause of catastrophic events is the fact that power line components and vegetation (trees) near power lines must be expected to become much more likely to fail as wind speeds increase, increasing the probability of an ignition under circumstances where fire control will be difficult or impossible. For wind speeds that are great enough, multiple ignitions should even be anticipated, as occurred in October 2007. Hence, the technical problem that needs to be solved in order to understand the likelihood of catastrophic losses can be reduced to a *weather problem*. What are the greatest Santa Ana wind speeds we can anticipate, and how often? Fortunately, designing for wind loads is a common problem in engineering, and there are a variety of standard techniques that are used by practitioners to solve this type of problem.

Power line fires have historically been shown to be much larger and more damaging than fires from other causes, due to the correlation between ignition and high winds.[18] Extreme Santa Ana weather events, when they occur, have the potential to lead to widespread devastation if they affect areas with live power lines. Hence, contingency planning is necessary, regardless of the fact that the year-to-year probability of a major power line firestorm is small, because the human and financial impacts on California if

[18] Mitchell, 2009.

one does occur would be extreme. As will be shown, over a long period of time, overall losses will be determined by the most extreme events.

V. WIND HISTORY DATA FOR EXTREME SANTA ANA EVENTS

While power line fires are relatively common occurrences, near-simultaneous ignitions of multiple power line fires occurs only under severe weather conditions of wind and low humidity. With rare exceptions, weather data that accurately describes such extreme events is fairly recent. Many sites where we have a long history of weather data, such as at airports or sites near the coast, typically do not exist in places where fire weather is at its most frequent or extreme. The fact that historical data is limited means that using this data to extrapolate to the future will lead to large uncertainties in the results. With this kept in mind it is still possible to see trends and to compare them against the basic assumptions made in a loss or insurance model.

A. SDG&E Weather History Testimony

Testimony presented by SDG&E does not support the premise of frequent extreme Santa Ana windstorms.

SDG&E presented testimony in 2008 regarding the wind conditions expected along the route of the "Sunrise Powerlink" transmission line. SDG&E provided the basis for these wind calculations to the Alliance as the result of data requests.[19] The SDG&E consultants obtained historical weather data from a number of weather stations in Southern California: El Centro, Campo, San Diego Gillespie, Ramona, Carlsbad Palomar Airport, March Air Force Base (AFB), Beaumont, and San Diego Lindbergh Field. They then calculated the intensity of extreme winds expected for certain return intervals. Of the sites chosen, most do not meet the criterion of being subject to the most extreme

[19] A.06-08-010; Sunrise Powerlink Project SDG&E's 3/3/08 Responses to MGRA Data Request No. 6; p. 3. The data were provided by the SDG&E consultant for one-hour estimated wind speeds. (DR 6 response)

Santa Ana wind conditions because they are at low elevation and coastal, and therefore subject to the moderating effect of offshore winds.[20]

To validate this assertion, the historical wind data between 2002 and 2010 for five of these stations in San Diego County were examined: Lindbergh field, Ramona Airport, Campo, Gillespie Field, and Carlsbad. It was noted whether the "extreme" wind value for each year occurred during a dry "Santa Ana" type storm or during a "wet" winter storm, which is information not available in the data used by the SDG&E consultants. The total number of years out of the nine examined in which "Santa Ana" wind storms produced the highest wind speeds recorded for the year are as follows:

Lindbergh Field	0.5[21]
Carlsbad	1
Gillespie Field	2
Ramona Airport	6
Campo	8

Table 1 – Number of years that most extreme wind was from Santa Ana storm during period 2002-2010

It is therefore reasonable to suggest that only Ramona Airport (KNRM) and Campo (KCZZ) data should be used as the basis for predicting extreme Santa Ana wind storms capable of causing power line fire storms. Most of the extreme events at the Lindbergh Field, Carlsbad, and Gillespie Field stations (KSAN, Carlsbad NWS, and

[20] Raphael, M. N.; The Santa Ana Winds of California; Earth Interactions; Volume 7 (2003) p. 1-13.

[21] Data were obtained from http://mesowest.utah.edu/ROMAN Data graphs between 2002 and 2010 were manually scanned for the most intense wind gust speeds within a given year. Humidity conditions ("wet" or "Santa Ana", depending on humidity being less than 30% for Santa Ana events) and wind speed were recorded, and the maximum wind speed was selected for each year. These maxima were compared against those provided by the SDG&E consultants in footnote 19 for years in which the data overlapped and found to be in good agreement with them. Where the maximum speed for a given year was reached on two occasions, one during a "wet" storm and the other during a "Santa Ana" windstorm, a value of 0.5 was added to the total.

KSEE, respectively) occurred during "wet" winter storms, and shouldn't be used to extrapolate to Santa Ana conditions (though they might be able to be used to set an upper limit on such conditions). Additionally, one must be careful when reaching conclusions with the data from Ramona Airport, which is located in the middle of a flat valley several miles wide. This condition significantly moderates wind intensities as can be seen in the table below.[22] Calculations for return intervals for these stations are provided by the SDG&E consultants, and reprinted below, along with equivalent wind gust speeds using the gust factor of 1.6 suggested by the consultants:

Return interval (years)	Campo		Ramona Airport	
	Avg. (mph)	Gust (mph)	Avg. (mph)	Gust (mph)
50	54.30	86.6	42.81	68.5
100	57.72	92.3	45.27	72.4
200	61.13	97.8	47.73	76.4
300	63.12	101.0	49.16	78.7

Table 2 - Extreme winds predicted for specified return intervals[19]

The October 2007 windstorm in eastern San Diego County was the most intense on record, and created the conditions under which power line fires occurred in the SDG&E area. We might wish to compare what return interval it might be equivalent to on the above chart. As noted above, the Ramona Airport is sheltered, and seems to have been spared the most intense gusts in 2007, when the wind speed reached 36 mph. The data provided by the SDG&E consultants and also obtainable from Mesowest also shows a Santa Ana wind event of 36 mph in 2002, which was not a notable year for Santa Ana events as measured at other stations. Unfortunately, the Campo station was disabled during the peak of the 2007 storm. However, it is closely tracked by a nearby station at

[22] To illustrate the sheltered nature of the Ramona Airport, we suggest comparison of its recorded wind speeds to those of the nearby Goose Valley (GOSV) RAWS weather station. http://mesowest.utah.edu/ROMAN