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

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I. INTRODUCTION

My name is Dr. Joseph W. Mitchell. I live at 19412 Kimball Valley Road, Ramona, CA 92065. I am the principal of M-bar Technologies and Consulting, also in Ramona, CA. My qualifications are provided in Appendix L of this testimony. I am submitting this testimony on behalf of the Mussey Grade Road Alliance.

In the Amended Application A.09-08-020 of Pacific Gas & Electric Co (PG&E), Southern California Edison (SCE), San Diego Gas & Electric Company (SDG&E) and Southern California Gas Company (collectively referred to hereafter as the "Joint Utilities"), a balancing account is proposed that would protect utilities from uninsured wildland fire losses arising from potential liability including resulting legal costs, awards, and settlements.[1] The purpose of this testimony is to examine the factual basis of this revised application and to provide supplementary facts to aid the Commission in its evaluation of the Amended Application.

II. BACKGROUND

The December 21, 2009 ruling by the Commissioner and the Administrative Law Judge states: "Creating powerful financial and operational incentives for continuously reducing wildfire risk *must be the primary focus* of a wildfire risk management program. Identifying and mitigating wildfire risk requires immediate and serious utility management attention due not only to the potential financial imposition on the utility and ratepayers but also due to the human, economic, and environmental harm caused by

[1] A.09-08-020; JOINT AMENDED APPLICATION SOUTHERN CALIFORNIA EDISON COMPANY (U 338-E), PACIFIC GAS AND ELECTRIC COMPANY (U 39-M), SAN DIEGO GAS & ELECTRIC COMPANY (U 902-M), AND SOUTHERN CALIFORNIA GAS COMPANY (U 904-G); August 10, 2010; ("Amended Application")

wildfires. Utility management and employees must have demonstrable incentives to reduce the risk of wildfires."[2] (Emphasis added)

In response to this ruling and the subsequent August 6, 2010 ruling setting the procedural schedule,[3] the Joint Utilities filed an Amended Application on August 10, 2010. In the Amended Application and its supporting testimony, the Joint Utilities offer a plan that would allow a utility, in the event of a fire losses not due to fault of the utility (which would be completely recoverable) and not due to reckless or intentional misconduct by management (which would not be recoverable) to "recover its full Wildfire Costs up to $1.2 billion, except that for each wildfire incident, the Utility would absorb $5 million (up to a maximum of $10 million per year). For Wildfire Costs in excess of $1.2 billion, the Utility would recover 95% of the Wildfire Costs, with the Utility absorbing the remaining 5% up to a cap."[4] Utilities would also be allowed to recover $5 million per year from ratepayers as part a forecasting of costs within the General Rate Case, which would be kept as profit by the utilities if no fires occurred.

It is the assertion of the Joint Utilities that such an arrangement will "address the concerns raised in the ACR and by other parties".[5]

It follows that the amended application making such a request would have an accompanying estimate of the potential costs to ratepayers, utilities, insurers and California residents would accrue over time under the auspices of the WEBA proposal. No attempt at such an estimate is made in the Amended Application, however, with the justification that power line fires and the losses they cause are inherently unpredictable.[6]

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[2] A.09-08-021; RULING OF THE ASSIGNED COMMISSIONER AND ADMINISTRATIVE LAW JUDGE DIRECTING APPLICANTS TO AMEND APPLICATION AND ALL PARTIES TO MEET AND CONFER; December 21, 2009 (December 2009 Ruling).

[3] A.09-08-021; ADMINISTRATIVE LAW JUDGE'S RULING SETTING PROCEDURAL SCHEDULE FOR AMENDMENT TO APPLICATION; August 6, 2011.

[4] Amended Application, p. 9.

[5] Id.; p. 7.

[6] Id; pp. 3, 5.

The basic assumption underlying the WEBA Amended Application is that the utilities need to have a formal mechanism in place to prevent catastrophic economic losses that may accrue to them if they incur fire liabilities exceeding their available insurance. I believe that the factual record regarding wildland fire and power line fires does not support such an assumption. It is also our opinion that facts show that the safety incentive mechanisms proposed by the Joint Utilities will do little to enhance public safety from catastrophic wildland fires ignited by powerlines, and may cost more to ratepayers.

III. SUMMARY OF MGRA TESTIMONY

This testimony is intended to lay out the following facts:

- Power line fires under extreme weather conditions that cause massive damage have been infrequent in California. This assertion is supported by Cal Fire fire perimeter data.
- Wind conditions capable of causing multiple near-simultaneous fire ignitions are also expected to be fairly rare, based on historical wind data and extrapolations using standard statistical modeling techniques. This is supported by wind history testimony submitted by San Diego Gas & Electric Company.
- Total acres burned and economic damage over time from wildland fire has been demonstrated to be dominated by rare catastrophic events, as expected from a power-law statistical distribution.
- The WEBA proposal would not expose the utilities to any financial loss except in the case of the very largest potential fires, in fact only those causing more damage than the October 2007 fires.

- Compared to corporate profits, historical penalties assessed by the Commission for safety violations related to wildland fire have been minimal.
- Exposure to losses that the WEBA mechanism allows would be expected to occur on a time scale much longer than the planning time frame of the typical corporate officer, or of interest to the average utility shareholder.
- A basic result of sociological studies of penalties and deterrence indicates that a penalty that is very unlikely to be applied provides poor deterrent value. Penalties which are much more certain to be applied, even if less severe, have a higher deterrent value.
- It follows that the Joint Utilities' WEBA proposal provides little in the way of a deterrent value that would enhance safety.
- The Joint Utilities' WEBA proposal also proposes a mechanism that might be an additional income source to the utilities from ratepayers.
- No economic modeling has been done by the Joint Utilities or by the Division of Ratepayer Advocates that demonstrates the actual costs to ratepayers under WEBA.
- Actuarial methods to estimate risk and losses can be developed based upon known statistical distributions of fire losses and wind probabilities in conjunction with catastrophe modeling. Such a model is essential to reduce overall risks and costs to ratepayers if they are to be exposed to utility fire losses through *any* mechanism – WEBA, Z-factor, third-party insurance payments, or any new mechanism to be developed.

IV. FIRE HISTORY DATA AND POWER LINE FIRESTORMS

Review of fire history data in California reveals that "power line firestorms" – multiple near-simultaneous ignitions of fires under extreme weather conditions – have been infrequent. As noted by the Joint Utilities in their testimony, power line fires are

responsible for a small fraction of overall ignitions over time.[7] With more severe weather conditions, however, their contribution becomes more predominant. For conditions sufficiently extreme, a "power line firestorm" can result, which is most likely to result in significant losses.

A record of all wildland fires larger than 100 acres within certain jurisdictions in California is maintained by Cal Fire as part of its Fire and Resource Assessment Program (FRAP).[8] CAL FIRE tracks cause information for each of these fires and includes a category for ignitions related to power lines (category 11).[9] I analyzed this data in testimony for proceeding A.06-08-021, in which I showed that power line fires were typically larger than fires from other sources.[10]

Weather events with high winds and low humidity create conditions favorable to the rapid spread of fire. Known generically as "Foehn" winds, the local name for these wind events in California are "Santa Ana", "Diablo", and "Sundowner" winds.[11,12] While fire ignitions are a common occurrence in Southern California, fire agency response is highly effective, extinguishing 97% of fires before they reach 100 acres in size. During conditions of high winds and low humidity, however, this fraction drops to

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[7] A.09-08-020; Joint Utilities Amended Testimony; pp. 5, 12-13.
[8] CAL FIRE fire perimeter data is available on its website:
http://frap.fire.ca.gov/data/frapgisdata/download.asp?spatialdist=1&rec=fire
Version firep10_1 (data up to 2010) is available as of July 24, 2011.
[9] CAL FIRE FGDC Metadata file firep10_1, CAUSE Attribute domain values, downloaded July 24, 2011:
http://frap.cdf.ca.gov/data/frapgisdata/data%20dictionaries%5Cfire.xml
[10] A.06-08-021; MGRA Phase 1 Direct Testimony, Appendix D; May 31, 2007;
A.06-08-021; MGRA Phase 2 Direct Testimony, Appendix 2B; March 12, 2008.
[11] Schroeder, M, et. al. . 1964. Synoptic weather types associated with critical fire weather. Berkeley, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Forest and Range Experiment Station. 492 p; 1964.
[12] Moritz, et. al.; Spatial variation in extreme winds predicts large wildfire locations in chaparral ecosystems; Geophysical Research Letters; v. 37; L04801, doi:10.1029/2009GL041735, 2010.

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

Potrero (POTC1), and the peak values for Campo can be estimated from those at the Potrero station. This relationship is show below for several Santa Ana wind events:

Date	Potrero (POTC1) gust	Campo (KCZZ) avg	Ratio
1/9/2007	45	32	1.4
2/17/2007	44	34	1.3
3/3/2007	50	47	1.1
		AVG:	1.26
10/22/2007	68	X (54 mph)	

Table 3 – Comparison of Potrero gust and Campo average wind data for 2007 Santa Ana events. Calculation for Campo station is shown.

As can be seen, using the average value of 1.26 would lead to an average wind speed value of 54 mph at Campo. Comparing with the previous table that shows return intervals as calculated by the SDG&E consultants, this wind speed corresponds to a 50 year return interval. Uncertainties are large. If the true ratio were to be 1.1 it would correspond to a wind speed of 62 mph (over 200 year return interval) and if it were 1.4 this would correspond to a wind speed of 49 mph (approximately 20 year return interval assuming that a difference of a factor of 2 in return interval corresponds to a shift of 3.5 mph in the wind speed, as seen between the 50 year and 100 year return intervals in Table 2). This systematic uncertainty in the ratio of the weather station measurements results in a broad range in return intervals that could be found for the October 2007 wind event, but this method allows us to estimate the order-of-magnitude for how often we'd expect such an occurrence to happen.

The approach taken by the SDG&E consultants was conservative, as was appropriate to the application at hand (setting design requirements for transmission towers in a high fire risk area): "For each of eight regional meteorological monitoring stations, input to the program was a series of annual maximum hourly wind speeds.

From the Simiu program output, results for either a type 1 or a type 2 statistical distribution was selected, based on which produced the largest wind values."[23] In fact, a more recent paper by Simiu and Heckert[24] now notes that a "Type 3" statistical distribution ("reverse Weibull") may be more appropriate for extreme wind recurrence intervals.[25] The relevance to this discussion is that using this alternative distribution would push down the estimates of maximum wind speed for a given recurrence interval, and conversely increase the recurrence interval for a given wind speed. In other words, the recurrence interval for events such as the October 2007 wind storm may be longer than the approximately 50 years expected from the SDG&E consultant analysis.

There are a number of uncertainties and risks in extrapolating future events based on the past. For one, it is assumed that system behavior in the future will be the same as in the past. Climate change, for instance, could have a significant impact on the risk posed by severe weather events in California, and based on available research to date it is not certain as to what the effect will be. Also, a number of new safety measures are likely to be initiated as a result of rule changes being considered in proceeding R.08-11-005. We do not know how much impact these will have, but cumulatively one might expect that fire risk will have some reduction. There is also the basic assumption that the statistical distribution of extreme wind events follows standard statistical distributions used for other types of extreme events, and is not driven by some other physical process giving them a different distribution.[26] Furthermore, these conclusions are reached from a very limited number of weather stations, since good data is sparse in the affected areas.

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[23] DR 6 Response.

[24] Simiu, E. and Heckert, A. (1996). Extreme Wind Distribution Tails: A Peak Over Threshold Approach. J. Structural Engineering, ASCE, 122(5), 539-547.

[25] Id.: "It is a physical fact that extreme winds are bounded, and one would expect the probabilistic model to reflect this fact. Therefore, to the extent that an extreme value distribution would be a reasonable model of extreme wind behavior, one would expect the best-fitting distribution to have a finite tail, that is, to be a reverse Weibull distribution." Simiu and Heckert also note that Gumbel distributions (Type 2) have been known to overestimate failure rates.

[26] Coles, Stewart, "An introduction to statistical modeling of extreme values", Springer-Verlag, London 2001; p. 2.

The uncertainties in this estimate are large, and it might not be possible to give better than an order of magnitude estimate for return intervals of events like the October 2007 wind storm. However, such an estimate is still valuable to the extent that it suggests that recurrence of events of the October 2007 type should be expected at most every few decades, and not every few years. Given the results of the SDG&E consultants, and the uncertainties inherent in the calculations above, it is reasonable to conclude that no strong argument could be made that there is an urgent need to initiate a financial program (such as WEBA) to deal with frequent, significant catastrophic wildland fire losses. While extreme weather conditions will in the fullness of time recur, flexible contingency planning to prevent catastrophic losses from occurring in the first place should be given the highest priority.

VI. TOTAL FIRE LOSSES ARE DRIVEN BY RARE, CATASTROPHIC EVENTS

One well-known characteristic of wildland fire losses is that the total amount of losses will tend to be dominated by losses from the largest events, rather than the accumulation from a larger number of losses from smaller events. The distribution of fire sizes can be seen to follow power law distributions, which have been described by a number of theoretical models.[27,28,29,30] In previous work I have shown that the size distribution for power line fires is also a power law distribution, albeit a much steeper one

[27] Malamud, B. D., G. Morein, and D. L. Turcotte (1998), Forest fires: An example of self-organized critical behavior; Science 281:1840-1842.
[28] Moritz, Max A., et. al; Wildfires, complexity, and highly optimized tolerance; Proceedings of the National Academy of Sciences of the United States of America; December 13, 2005; 102: 17913.
[29] Carlson, J. M. and John Doyle; Complexity and robustness; *PNAS* (2002) 99: 2538-2545.
[30] Boer, Matthias M, et al.; Spatial scale invariance of southern Australian forest fires mirrors the scaling behaviour of fire-driving weather events; Landscape Ecol (2008) 23:899–913.

than that for other wildland fires.[31] In other words, power line fires are larger than fires caused by other sources.

Larger fires generally correlate to larger financial losses as well. Consequently, overall financial losses also tend to be dominated by larger catastrophic events. Testimony submitted into the proceeding A.06-08-010 (Sunrise Powerlink) included data from the Insurance Information Institute showing the largest wildland fire losses prior to 2005.[32] The predominant contribution from the largest, most destructive events can be seen in the graph below:

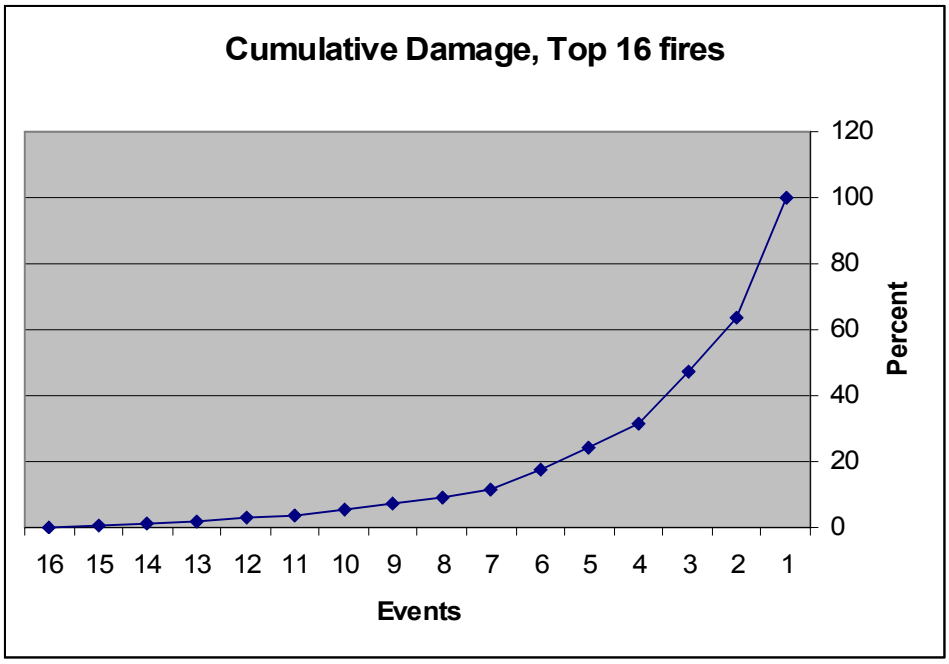

Figure 1 - Figure shows the top 16 US wildland fires prior to 2005 as measured by cost. The cumulative fraction that each fire and all smaller fires represent is plotted in this figure. It can be seen that over half of the damage was caused by the two largest fires. The total damage for all sixteen fires was roughly $7 billion in 2006 dollars. Data is from the Insurance Information Institute.

[31] Mitchell 2009.

[32] A.06-08-010; MGRA Phase 1 Direct Testimony, Appendix H; May 31, 2007; pp. 5-7. (Insurance Information Institute, downloaded from http://www.iii.org/media/facts/statsbyissue/wildfires/ also, quoted from Halsey: Halsey, Richard W; Fire, Chaparral, and Survival in Southern California; Sunbelt Publications; San Diego; 2005, p. 48)

These results imply that the sum of all losses expected from wildfires over time will be determined by a few of the very largest events. *The most extreme events drive overall losses.* Based upon the work shown in previous sections, we would expect these to be the power line firestorms. Hence, the proposed WEBA mechanism requiring co-payment of fire losses by the utilities would most likely be triggered by an extreme weather event such as October 2007, and not a single large power line fire.

Another implication of this result for purposes of trying to estimate future losses by utilities, residents and ratepayers is that any estimate of such losses must take into account this statistical effect and incorporate the appropriate power law distribution into the loss model.

VII. WEBA REMOVES UTILITY EXPOSURE TO LOSSES

A. Glossary of Terms

The Joint Utilities have in their data request responses objected to the use of various terms to discuss the financial arrangements that they have proposed as part of the WEBA application. In light of their objections, I state here how this testimony will be referring to various aspects of the WEBA proposal and how the Joint Utilities would prefer to have the same term referred to.[33] The terms used by MGRA throughout this testimony and in future filings are fully intended to be synonymous with the corresponding Joint Utilities' phrase, and are not intended to carry any functional meaning beyond that what the equivalent Joint Utilities' phrase would be. These terms are offered only for the sake of brevity and clarity.

[33] Responses of SDG&E, SCE, and PG&E to questions MGRA-1, MGRA-2, MGRA-3, MGRA-8, and MGRA-9.

JOINT UTILITIES / WEBA	MGRA TERM
"sharing of 5% of Tier 2 Wildfire Costs, up to a cap"	"effective co-payment"
"Wildfire Claims and Defense Costs up to $10 million which will be forecast in the Utilities' GRCs"	"effective deductible"
"revenue requirement"	"revenue requirement" (refers to annual charge to ratepayers to compensate utilities for assuming extra risk)

Table 4 - Definitions

B. Co-payments are Much Smaller than Profits

The Amended Application proposes that: "To compensate the Utility for the retained risk of self insurance, the Utilities would receive an annual revenue requirement based on their actual wildfire insurance premium rates."[34] The self-insurance that they refer to would be the incremental risk of loss they would assume due to the 5% co-payment that they propose for losses over $1 billion (Tier 2) up to a specified cap.

There is no justification given for the amount of the effective co-payment except that the Joint Utilities believe that it might satisfy the December 21, 2009 Ruling: "In the December Ruling, the parties were directed to develop proposals that 'provide utility management sufficient incentive to manage risk, but respect the shareholders' opportunity to earn a reasonable return on their investment.' (December Ruling, p. 9) The Joint Utilities developed this proposal to directly address this guidance in the

[34] Amended Application, p. 9.

December Ruling. The 5% figure was based on the Joint Utilities' judgment that this level of risk would meet the Ruling's directives."[35]

This effective co-payment is in place only up to a specified cap of $40 million for all wildfires in a 12-month period (for SCE and PG&E; $20 million for SDG&E). The amount for this cap was also arbitrarily chosen in an attempt to comply with the December 2009 Ruling: "The particular cap amounts were based on the Joint Utilities' judgment that this level of risk would meet the Ruling's directives."[36] This cap represents the maximum utility loss that could potentially occur in the most catastrophic conditions under the WEBA plan. Data provided by the Joint Utilities shows that this amount is a very small fraction of a utility's annual profit:[37]

Utility	WEBA Cap ($M)	Annual Profit ($M)	Percentage
SCE	40	839	4.8%
PG&E	40	1,064	3.8%
SDG&E	20	279	7%

Table 5 - WEBA cap value versus utility profits

It is evident that the potential exposure to economic effects by the utilities in this WEBA proposal is quite small compared to their normal profits.

C. WEBA Shields Utilities from Significant Economic Impacts

WEBA also allows for an "effective deductible" of $5 million per fire and up to $10 million per year, which is the amount that the utility would have to pay above and

[35] SDG&E, SCE, and PG&E responses to data request MGRA-1.
[36] SDG&E, SCE, and PG&E responses to data request MGRA-2.
[37] Profit and cap information provided by SDG&E, SCE, and PG&E responses to data request MGRA-2. Profit represents a five year average of Net Income Available for Common Stock, from 2004 to 2009.

beyond the insured amount before the WEBA account could be accessed.[38] The utility shareholders, however, would not be exposed to this loss, because "The Utilities will forecast Claims and Defense costs for wildfires when the Claims and Defense costs total $10 million or less in their GRCs."[39] This is further explained by the Joint Utilities' response to the MGRA data request question MGRA-12: "Wildfire Costs arising from wildfires that involve $10 million or less in claims are not eligible to be recorded in the WEBA. Such costs will be subject to recovery to the extent they are within a forecast amount authorized for recovery in SCE's GRC."[40]

The ratepayers are therefore fully exposed to these losses. To gauge the impacts to insurers, ratepayers, and the utilities, we requested that the utilities model projected distributions of losses among these stakeholders for annual fire losses of given values. The results are plotted for SCE, PG&E, and SDG&E respectively.

[38] Amended Testimony; p. 9.
[39] Id.; p. 8.
[40] A.09-08-021; MGRA Data Request #2; Question MGRA-12. This response was from SCE. Identical responses were also obtained from PG&E and SDG&E.

Loss Amount	**Utility Assumed (SCE)**	**Insurer Assumed**	**Ratepayer Assumed (GRC + WEBA)**
$5 M	$0	$0	$ 5 M
$10 M	$0	$0	$ 10 M
$20 M	$0	$10 M	$10 M
$50 M	$0	$40 M	$10 M
$100 M	$0	$90 M	$10 M
$200 M	$0	$190 M	$10 M
$500 M	$0	$490 M	$10 M
$1 B	$ 5 M	$610 M	$385 M
$2 B	$45 M	$610 M	$1.345 B
$ 5 B	$45 M	$610 M	$4.345 B
$10 B	$45 M	$610 M	$9.345

Table 6 – SCE-assumed losses versus insurers and ratepayers[41]

[41] A.09-08-021; SCE response to MGRA Data Request #2; Question MGRA-11.

Loss Amount	Utility Assumed (PG&E)	Insurer Assumed	Ratepayer Assumed (GRC + WEBA)
$5 M	$0	$0	$ 5 M
$10 M	$0	$0	$ 10 M
$20 M	$0	$7.5 M	$12.5 M
$50 M	$0	$31.25 M	$18.75 M
$100 M	$0	$81.25 M	$18.75 M
$200 M	$0	$181.25 M	$18.75 M
$500 M	$0	$481.25 M	$18.75 M
$1 B	$ 5 M	$981.25 M	$18.75 M
$2 B	$45 M	$983.25 M	$971.75 M
$ 5 B	$45 M	$983.25 M	$3.97175 B
$10 B	$45 M	$983.25 M	$8.97175 B

Table 7 – PG&E-assumed losses versus insurers and ratepayers[42]

[42] A.09-08-021; PG&E response to MGRA Data Request #2; Question MGRA-11.

Loss Amount	Utility Assumed (SDG&E)	Insurer Assumed	Ratepayer Assumed (GRC + WEBA)
$5 M	$0	$0	$ 5 M
$10 M	$0	$0	$ 10 M
$20 M	$0	$8 M	$12 M
$50 M	$0	$23 M	$27 M
$100 M	$0	$66 M	$34 M
$200 M	$0	$166 M	$34 M
$500 M	$0	$466 M	$34 M
$1 B	$ 5 M	$966 M	$34 M
$2 B	$45 M	$966 M	$1.009 B
$ 5 B	$45 M	$966 M	$4.009 B
$10 B	$45 M	$966 M	$9.009 B

Table 8 – SDG&E-assumed losses versus insurers and ratepayers[43]

Historically, the only power line fire losses in one year exceeding the $1 billion threshold at which utilities would begin to contribute toward losses they incur under WEBA was due to the firestorm of 2007. As has also been shown, the maximum contribution would constitute only a small portion of annual profit. Therefore, based on these numbers, it is correct to conclude that the WEBA co-payment scheme, which is designed to "create additional incentives for the Utilities to mitigate their fire risk", will not achieve that goal because no incentives will result from a highly unlikely occurrence that has only a minor impact if it indeed does occur.

[43] A.09-08-021; SDG&E response to MGRA Data Request #2; Question MGRA-11.

VIII. WEBA CO-PAYMENTS ARE UNLIKELY TO ENHANCE SAFETY

Due to the low probability of actually being affected by the 5% co-payment provisions in WEBA, and the comparatively small impact (in terms of annual profit) should such a happenstance occur, it is unreasonable to assume that losses threatened under these co-payment provisions would substantially affect the decision-making and behavior of companies and their executives.

A. Executive Tenure

The interval between anticipated major fire losses can be expected to be significantly longer than the tenure of the executives themselves. This means that it is unlikely that any particular executive will have to deal with the crisis of a fire causing catastrophic losses while holding their position. This can be seen in the table below:

Company	CEO average tenure	President average tenure
PG&E[44]	4.2 years	3.5 years
SCE[45]	6.2 years	4.1 years
SDG&E[46]	3.7 years	5.5 years

If intervals between weather events capable of producing catastrophic power line fires are long, say, 20 to 200 years, the chance that any particular CEO or President will be in that position when such an event occurs will be small.

[44] A.09-08-021; MGRA Data Request 5, PG&E response to questions MGRA-19 and MGRA-20. "Please list the tenure (time spent in the position) for all Presidents in your company from 1980 to 2011. Please list month and year each President took office, and total time served in the position." Responses are in Appendix [].

[45] A.09-08-021; MGRA Data Request 5, SCE response to questions MGRA-19 and MGRA-20.

[46] A.09-08-021; MGRA Data Request 5, SDG&E response to questions MGRA-19 and MGRA-20. SDG&E only partially complied with this data request, listing executives only from 2000-2011. "SDG&E objects to this request because it is overbroad and seeks information not relevant to this proceeding." This leads to reduced statistical accuracy.

Utility executives have many responsibilities for the health of their companies and to their shareholders and customers. Safety is one of these concerns. However, they are primarily rewarded for the financial performance of their companies. While a catastrophic fire might potentially have an impact on financial performance (and WEBA as proposed would minimize this impact), it is difficult to see any compelling reason why it would be in the personal interest of a utility executive to divert resources that could be used productively elsewhere to a problem that is very unlikely to affect them or the company during their term of service.

Favoring financial performance over safety is not isolated to the problem of power line fires. The Independent Review Panel for the PG&E San Bruno pipeline explosion reached a similar conclusion:

"*Overemphasis on financial performance – While the company has multiple stated goals, top management may be overly focused on financial performance. Certainly the company must be financially healthy to fulfill its mission, but when top management focuses on financial performance and does not appear to be engaged in operational safety and performance, leadership may dampen the willingness of the organization to challenge the priorities or resources put in place by upper management.*"[47] (Emphasis added)

"*In this regard, PG&E sends mixed messages regarding system safety when it brings its own financial performance into the equation.*

In an interview with a top leader of PG&E, the question was asked as to what factor(s) would most positively affect safety in the future. The response given was the

[47] Report of the Independent Review Panel San Bruno Explosion; Prepared For California Public Utilities Commission; Revised Copy June 24, 2011; p. 17.

provision for the recovery of costs for safety improvements would be the most important factor."[48]

When an executive must make the decision whether to allocate a given set of resources to improving the financial outlook of the company or whether to allocate the same resources to enhance safety measures, he or she does so with the knowledge that they are likely to be rewarded for enhanced profits, and unlikely to face consequences for safety problems that might or might not show up some day. Regardless of their intent, or of public and company policies, this disincentive towards the priority of safety will more than likely remain as an inherent bias unless countermeasures are taken to compensate for it.

It should also be noted that corporate executives are primarily responsible to their own shareholders, and it is unreasonable to expect shareholders to have an investment timeline of many decades. This "investor myopia" can be illustrated by looking at the average time a typical utility stock is held: for both Sempra and PG&E the average stock is held approximately 200 days.[49] While this type of estimate over-emphasizes short-term trading (the same share can be traded many times over and be counted each time), it does indicate that most buyers and sellers of SDG&E and PG&E stock do not have an investment horizon that would be weighed on heavily by risks with a multi-decadal timeframe.

B. Certainty of Penalty is Considered Better than Penalty Size

When trying to create a situation in which a regulated entity complies with its governing rules, it is often necessary to apply penalties. In some cases, enforcement of

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[48] Id. p. 50.

[49] Calculations from 7/29/2011, using a 90-day volume average.
Sempra: 241,176,000 shares, 90d avg daily volume = 1241508.86, mean retention = 194 days
PG&E: 397,950,000 shares, 90d avg daily volume = 1984765.82, mean retention = 201 days

"good" behavior will also be applied by market forces. In fact, absent WEBA utility companies may face the risk of economic loss if their power lines start a fire. Therefore, WEBA could potentially remove this market force incentive, and for this reason the December 21, 2009 Ruling directed utilities to come up with a compensating mechanism.[50]

Sociological studies of the effect of punishment and deterrence[51,52] find that "the probability of being punished has a greater effect on compliance than does the amount of the punishment."[53] The Commission faces a challenge in this regard with respect to utility power line issues, because the probability that any specific non-compliance or violation will result in any negative impacts to the public are quite small, and largely depend on external circumstances that develop rarely.

The purpose of this section is not to imply that utility executives are not concerned with safety. Rather, it is to point out that as an executive prioritizes the importance of safety – and spending on safety – with regard to other matters critical to the health of the business, their judgment is likely to be affected by the fact that they are unlikely (personally) to be penalized for reducing the priority of safety – by the market, by regulators or by nature. That significant problems with power line fires can arise is a

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[50] December 21, 2009 Ruling; p. 9.

[51] "As punishment is always costly, both to the punisher and (obviously) to those punished, a well-designed enforcement system should combine high efficacy in discouraging exploitative behavior with low actual infliction of sanctions."; Mark Kleiman and Beau Kilmer; "The dynamics of deterrence"; Proceedings of the National Academy of Sciences; v. 106; pp. 14230-14235.

[52] "Classic deterrence theory holds that, to achieve maximum deterrence, an enforcement program must demonstrate three principles. First, detection and penalty must be *certain* if the illegal conduct is undertaken. Second, the *severity* of penalties must exceed the benefit resulting from the illegal conduct. Third, penalties must be swiftly applied, a factor termed '*celerity*.' The classical theory assumes that a would-be violator must perceive these risks associated with the illegal conduct and react in a rational manner."; State of Oregon, Department of Environmental Quality; "General Deterrence of Environmental Regulation – A Peek into the Mind of the Regulated Public"; prepared by Les Carlough; p. 6. Downloaded from http://www.deq.state.or.us/programs/enforcement/DeterrenceReport.pdf

[53] Scholz, John T. and Wayne B. Gray; OSHA Enforcement and Workplace Injuries: A Behavioral Approach to Risk Assessment; Journal of Risk and Uncertainty, 3:283-305 (1990)

given, however catastrophic powerline fire losses are unlikely to happen on any executive's particular watch.

This problem is particularly exacerbated by the proposal in WEBA requiring co-payments on the part of utilities only in the case where a very high threshold is reached. From a deterrence standpoint, this is the opposite weighting of what would be expected to affect behavior. As pointed out in MGRA Comments,[54] utilities have control over the frequency, not the severity, of fires they cause. Shielding them from the cost and impacts of much more frequent smaller fires may reduce incentives for them to reduce the fire frequency – and thereby increase the longer term chances of a catastrophic fire.

C. Commission-Imposed Penalties

Commission-imposed penalties occur rarely and are small compared to utility profits.

One argument made by the Joint Utilities is that the proper mechanism for regulating utility behavior is through fines and penalties assessed by the Commission in the event of utility non-compliance.[55] However, review of the record of enforcement proceedings over the past decade leads to the conclusion that Commission action usually occurs only in the case of egregious infractions that cause public harm. Therefore, the random and rare nature of negative consequences lessens the regulatory efficacy of the enforcement program.

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[54] A.09-08-021; MUSSEY GRADE ROAD ALLIANCE PROTEST; September 30, 2009; pp. 5-6.

[55] A.09-98-021; Joint Utilities; AMENDED AND RESTATED TESTIMONY IN SUPPORT OF JOINT AMENDED APPLICATION FOR AUTHORITY TO ESTABLISH A WILDFIRE EXPENSE BALANCING ACCOUNT TO RECORD FOR FUTURE RECOVERY WILDFIRE-RELATED COSTS; August 10, 2010; "Cost recovery and penalties serve different purposes. The purpose of ratemaking is to give utilities the opportunity to recover costs that are necessarily incurred in the provision of service to customers. The purpose of penalties, by contrast, is to punish past violations that were within the utility's control to prevent and deter future noncompliant behavior."; p. 25. (Amended Joint Utility Testimony)

Settlements since 1999 reached between utilities and the Commission due to wildland fire related issues are listed below:[56]

Year	Utility	Decision	Background	Settlement	Other utility costs	Incident	Incident cost
1999	PG&E	99-07-029	Vegetation Management	$ 29 M	Enhanced Veg. Mgt. ($1.9 M)	Tauner/ Rough and Ready	$10 M
2010	SDG&E	10-04-047	Witch, Rice and Guejito Fires	$14.3 M	CPSD data ($ .4 M), Z-factor ($ 7M reduction)	Witch, Rice and Guejito Fires	>$1.6 B

Commission enforcement actions against electrical utilities regarding wildland fire safety issues have been relatively rare and have resulted where there has been substantial public harm. Our research has revealed only two specific incidents that are directly related to wildland fire in the last twelve years.

Decision 99-07-029 resulted in a settlement in which PG&E agreed to pay $28 M for enhanced vegetation management and to the general fund of California.[57] This settlement was a result of investigation I.98-09-007, in which CSD (precursor to CPSD) alleged violations of tree-line and pole clearance provisions.[58] Prior to the CPUC investigation, PG&E had been convicted of 739 counts relating to its vegetation management practices by Nevada County relating to the 1994 Tauner fire,[59] which caused roughly $10 million in damages.[60]

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[56] CPUC website listing of CPUC imposed fines and settlements: http://www.cpuc.ca.gov/NR/rdonlyres/A50FD526-F085-4181-978B-6DB66AD26439/0/CPUCFinesRestitution102010.pdf

[57] D. 99-07-029; p. 1.

[58] Id. p. 2.

[59] Nadeau, Tom; Showdown at the Bouzy Rouge – People vs. PG&E; Comstock Bonanza Press; 1998; p. 97.

[60] Jim Doyle; PG&E Faces Charges Over Fire Safety / Nevada County files criminal complaint; San Francisco Chronicle; August 5, 1995.

Decision 10-04-074 resulted in a settlement in which SDG&E agreed to pay $14.3 million, plus $400,000 to CPSD for the development of a data collection program. This settlement grew out of investigations I.08-11-006 and I.08-11-007 into the Witch, Rice, and Guejito fires, which were estimated to cost over of $1 billion. In addition, SDG&E agreed to forego its request to collect $6.8 M in O&M costs as part of its Z-factor application related to these fires.[61]

The clear pattern here is that penalties for wildland fire related issues have been requested by the Commission after significant fires have already occurred. Compared with average profits for SDG&E of $279 million and for PG&E of $1,064 million,[62] these penalties correspond to 7.6% of annual profit for SDG&E and 2.8% of annual profit for PG&E. These were one-time penalties, and their impact on utility profitability over time if annualized would be very small.

Regarding the appropriate level of penalties, the Commission in D.04-04-065 states: "***Need for Deterrence***

Fines should be set at a level that deters future violations. Effective deterrence requires that the Commission recognize the financial resources of the utility in setting a fine."[63]

In historical context, it would be difficult to support an assertion that settlements in the wildland fire safety area meet the Commission standard of fines being at a level that affect deterrence.

[61] D.10-10-004; October 14, 2010; p. 6.
[62] See section **Error! Reference source not found.**.
[63] D.04-04-065; p. 42.

IX. WEBA MIGHT BE PROFITABLE FOR UTILITIES

The WEBA proposal takes the position that there is no inherent liability assumed by the utilities for wildland fires.[64] They therefore argue that if they accept a marginal risk of losses above a specified threshold, then in return they would like a "revenue requirement" be assessed to ratepayers to "compensate them for this retained risk".[65]

Even if one accepts the premise of "no inherent liability", matching the annual revenue requirement to the actual risk would require a dedicated modeling effort to determine the "premium" that would balance the assumed risk. This would require modeling of future fire losses using actuarial techniques. This type of study has not been performed in the Application. Instead,

"*The Utilities propose that they be compensated for the financial risk they would bear by receiving an annual revenue requirement based on the actual cost of each Utility's liability insurance and the amount of liability insurance each Utility purchased. Each year following the Utility's liability insurance renewal a Premium Rate will be calculated as follows: the premiums for each Utility's liability insurance divided by the amount of liability insurance each Utility purchased. For example, if the premium for a given Utility's liability insurance was $10 million and the amount of liability insurance that Utility purchased was $500 million, the Premium Rate for that Utility would be 2%.*

*The Utilities propose that the Commission authorize an annual revenue requirement equal to the Premium Rate times the cap on the amount the Utility may be required to absorb in Tier 1 and Tier 2 costs. For example, if SCE's or PG&E's Premium Rate is 2%, it would receive an annual revenue requirement of $1 million ($10 million Tier 1 plus $40 million Tier 2 * 2%)*."[66]

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[64] Other than in the case of "the result of intentional or reckless misconduct by Utility management"; Revised WEBA Application; p. 10.

[65] A.09-08-021; Amended WEBA Application; p. 3.

[66] A.09-08-021; Amended Joint Utility Testimony; p. 33.

So effectively, the Joint Utilities are assuming the role of insurer for the proposed 5% co-payment of uninsured losses. What this proposal ignores is that the fact that insurance companies are themselves businesses, and incorporated into the "premium rate" is a component of risk and a component of profit. Assuming that the insurer has correctly assessed risk and wishes to make a profit on the exchange, the price charged to the customer will be larger than the price justified by compensation for risk alone. So when the Joint Utilities propose using the same fractional premium that they (more specifically the ratepayers) are charged for insurance, then they themselves are taking for themselves any additional potential profit in the transaction.[67]

The Joint Utilities themselves acknowledge that there is the possibility that the revenue requirement would generate net income: "The revenue requirement proposed would produce net income to the extent it exceeds the amount the utility records in a given year as its retained liability in respect of uninsured wildfire costs."[68] They also maintain that this is not expected to be a source of income, but rather just to compensate them for assumed risk. However, the fact that the amount is derived from insurance premium costs, which contain both risk compensation *and* profit, is not considered in the Joint Utility analysis.

In order to demonstrate that any potential "revenue requirement" is not an additional revenue stream for the utilities requires modeling of the risk. Neither the Joint Utilities nor the Division of Ratepayer Advocates[69] have to date done any such modeling.

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[67] Kunreuther, Howard and Erwann O. Michel-Kerjan with Neil A. Doherty ... [et al.];
At war with the weather: managing large-scale risks in a new era of catastrophe; 2009; pp. 136-7. See discussion of "fair rate of return on capital".

[68] A.09-08-021; Responses of SCE, PG&E, SDG&E to MGRA DR-1, Question 4.

[69] A.09-08-021; MGRA Data Request #5 to DRA; Question MGRA-16; August 4, 2011.

X. THE CURRENT INSURANCE MODEL CREATES LITTLE SAFETY INCENTIVE

It is important to point out that whether or not the WEBA plan is allowed by the Commission in either its present form or an altered form, the current way insurance costs are passed onto ratepayers also reduces safety incentives for utilities. Under the current scheme, utilities are allowed to pass on insurance premiums to their ratepayers under their GRCs.[70] The recent application A.09-08-019 ("Z-Factor") decision extended the reach of the utilities to collect insurance premiums even when they far exceed the projection in the GRC due to a sudden rise in premium.[71]

Ordinarily, if an insurer learns that the risk that they had assumed for an insured is larger than they had originally anticipated, they will increase the premium to compensate for the increased risk, impose restrictions such as higher attachment points, or cancel the policy. This explains the behavior of the Joint Utilities' insurers in the 2007-2010 time frame discussed in their application, as described in the Joint Utility testimony.[72] In the case where a business or person is responsible for paying insurance costs – premiums, co-payments, and deductibles - reducing these costs is a strong incentive for behavior that reduces the risk of losses. However, as can be seen, the *existing* mechanisms that allow utilities to recover insurance costs from ratepayers eliminate most of these incentives. WEBA, of course, would eliminate the remaining ones, except for a relatively small penalty in the very rare event of truly catastrophic losses.

Effectively, the Commission has created an "assurance program" that shifts the costs of insuring risk from utilities to ratepayers. A recent paper by Yin, Kunreuther, and

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[70] Amended Joint Utility Testimony; p. 7.
[71] D.10-12-053; (A.0-08-019) DECISION GRANTING REQUEST, WITH EXCEPTIONS, OF SAN DIEGO GAS & ELECTRIC COMPANY FOR "Z-FACTOR" TREATMENT FOR LIABILITY INSURANCE PREMIUM AND DEDUCTIBLE EXPENSE INCREASES; December 16, 2010.
[72] Amended Joint Utility Testimony; pp. 47-51, 82.

White explains programs that assure the coverage of losses without risk-based pricing can create moral hazard:

"*A salient feature of many government assurance programs is the absence of risk-based pricing: they protect beneficiaries from adverse events for a price that does not vary with the insured's likelihood of loss. A common concern is that this practice may exacerbate moral hazard, raising the frequency of adverse events by lessening incentives for risk-reducing effort (Kareken and Wallace, 1978; Cooper and Ross, 1998; Brown, 2008).*

In contrast, risk-based pricing is widely employed in private insurance contracts. This can attenuate moral hazard problems by rewarding firms with premium discounts for risk-reducing activities (Freeman and Kunreuther, 1997; Boyd, 1997)."[73]

In this same paper, Yin, Kunreuther and White demonstrate the beneficial effect of risk-based pricing by analyzing its effect on underground fuel tank leaks by comparing equivalent regulatory environments in Illinois and Michigan, one of which (Michigan) switched to a risk-based pricing scheme in the mid-90s and the other of which (Illinois) maintained a state-backed assurance fund. They conclude:

"*The data indicate that eliminating a state-level government assurance program and switching to private insurance markets to finance cleanups reduced the frequency of costly underground fuel tank leaks by more than 20 percent. This corresponds to more than 3,000 avoided fuel-tank release accidents over eight years in one state alone, a benefit in avoided cleanup costs and environmental harm exceeding $400 million*."[74]

In their testimony, the utilities assert no instance in which a utility has been refused compensation for insurance costs, which they assert is a normal cost of doing

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[73] Haitao Yin, Howard Kunreuther, Matthew White; 2010, Risk-Based Pricing and Risk-Reducing Effort: Does The Private Insurance Market Reduce Environmental Accidents? Journal of Law & Economics (To be published); p. 1.
http://opim.wharton.upenn.edu/risk/library/WP20100426_HY,HK,MW.pdf

[74] Id.; *abstract*.

business and thus eligible for compensation under the GRC. While still utilizing private insurance, the utilities pass on all costs to the ratepayers. Only potential losses (which would be passed on to ratepayers under WEBA) and CPUC penalties (historically small compared to overall revenues) provide any real financial safety incentive. Consequently, changes to the current framework of utility liability need to be fully analyzed with regard to risks, costs, and benefits to verify that the cost to ratepayers is minimized and, specifically, that moral hazard is avoided. There is a lack of such an analysis in the Amended Application.

XI. ACTUARIAL METHODS TO MINIMIZE RATEPAYER COSTS

It is not the purpose of this testimony to argue for any particular position with regard to the extent to which utilities need to be or should be shielded from wildfire costs, which include insurance, damages, and liability. However, an optimal strategy for minimizing ratepayer costs can be derived given the chosen strategy. This will require an actuarial calculation and catastrophe modeling, which should be based upon the best available methods and data.

Significant work has been devoted to actuarial calculation and risk estimation for disasters, and there are a number of companies that provide such calculations.[75] However, work to date has focused on catastrophes such as hurricanes, floods, and earthquakes rather than wildland fire or more particularly the very specific case of power line fire. This is because, as noted wildfire researcher Stephen Pyne observed, "even the largest fire outbreak is small compared with hurricanes, floods, and catastrophes located in densely inhabited areas. Windy and dry is less damaging than windy and wet."[76]

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[75] Patricia Grossi, Howard Kunreuther, managing editors ; assisted by Chandu C. Patel; Catastrophe modeling : a new approach to managing risk; Springer; 2005
Participating authors include staff from AIR Worldwide, EQECAT, and Risk Management Solutions (RMS). p. xiii.

[76] Stephen J. Pyne; Tending Fire - Coping with America's Wildland Fires; Island Press; Washington; 2004; p. 159.

It is quite possible that using catastrophe modeling techniques to address power line fire risks will not only pay for itself but reduce overall insurance premiums, resulting in significant savings for ratepayers. Kunreuther and Michel-Kerian note that academic work supports the assertion that: "Insurers are likely to charge higher premiums if there is ambiguity associated with estimating the likelihood and consequences of a risk. A recent survey of actuaries and underwriters undertaken by the Wharton Risk Management Center as part of this project revealed that the premiums for ambiguous risks are 25 percent higher than when risks are unambiguous."[77] A similar study in France found a premium reduction between 32 and 40 percent when risks were known.[78] This result makes intuitive sense as well. An insurer who wants to limit potential losses below a given level must take into account not only the overall size of expected losses, but also the *variance* in their estimate of the expected losses. Both of these terms must be reflected in the price and terms of the policy. Therefore, if power line fire risks can be better quantified, and the variance reduced, this reduction in risk to the insurer is likely to be reflected in a reduced premium cost.

The essential ingredients for successful simulations exist in this case – specifically, collections of statistical data regarding fires, winds and power lines as well as analytical techniques that can be applied. Specifically:

- Ignition probabilities for wildland fires from power lines can be expected to be dependent on the maximum wind speed. Wind speed return intervals can be calculated from historical weather station data, in the same manner as demonstrated by SDG&E in A.06-08-010,[79] or using similar methods.

[77] Kunreuther, Howard and Erwann O. Michel-Kerjan with Neil A. Doherty ... [et al.]; At war with the weather: managing large-scale risks in a new era of catastrophe; 2009; p. 129.
[78] Id.; p. 133.
[79] A.06-08-010; Sunrise Powerlink Project SDG&E's 3/3/08 Responses to MGRA Data Request No. 6; p. 3.

- Ignition probabilities might also be anticipated to be dependent on overall fault rate. Distributions of fault rate as a function of wind speed were recently released by SDG&E as part of another proceeding.[80] These data may be extremely useful in estimating ignition rates at high wind speeds.
- Fire sizes in California as a function of wind speed.[81]
- Property loss distributions might simply be held to be proportional to fire size (which is only generally true –counterexamples exist of large fires of moderate cost and small fires that are very costly). It would be more accurate to do fire modeling on landscapes that includes potential property losses. Fire modeling was accepted as a method of estimating potential fire sizes in A.06-08-010.[82] Such a technique could be applied to calculating losses as well.
- Once all historical distributions are obtained, it should be possible to create probability distributions to be used in a Monte Carlo method. This type of method is used in catastrophe modeling,[83] as well as physics, economics, and numerous other fields. A Monte Carlo technique forecasts thousands (or more) of randomly selected "alternative futures" based on input probability distributions. Such a technique would allow cost probability distributions to be estimated for ratepayers, utilities, and insurers. A simulation of this type would allow the optimal strategy for sharing wildfire costs between utilities, ratepayers, and insurers to be identified.

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[80] A.08-12-021; OPENING COMMENTS OF SAN DIEGO GAS & ELECTRIC COMPANY (U-902-E) IN RESPONSE TO DIRECTION OF ADMINISTRATIVE LAW JUDGE'S RULING DENYING MOTION TO STRIKE, PROHIBITING EX PARTE COMMUNICATIONS, AND DIRECTING PARTIES TO FILE COMMENTS; July 25, 2011; pp. 4-88.

[81] Mitchell, 2009.

[82] Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement; San Diego Gas & Electric Company's Sunrise Powerlink Project (Applications A.05-12-014 and A.06-08-010); *Prepared for:* California Public Utilities Commission and Bureau of Land Management; *Prepared by:*Aspen Environmental Group, San Francisco, California; July 2008; Sections D.15 and Sections E.X.15.

[83] Grossi and Kunreuther et. al.; pp. 74-78.

This list demonstrates that sufficient information is currently available to estimate future fire losses at the level of a statistical distribution.[84] The above list should not be considered exhaustive – other data might be applied that is relevant to such a calculation. It must also be acknowledged that such estimates would be approximate, because historical data regarding catastrophic power line fires is sparse and statistical uncertainties regarding the probability distributions can be large. There are also various systematic uncertainties involved in such a calculation. Among these are the potential effects of climate change on the likelihood of Santa Ana weather conditions or the length of fire season, and the effect of system improvements such as those being considered as part of Rulemaking R.08-11-005.

[84] This claim is not intended to imply that such calculations would be appropriate for GRC estimations. Dramatic year-to-year variations can be expected. Instead, calculations should be used to choose appropriate strategies and balance risk and costs between ratepayers and the utilities.

APPENDICES

Appendix A - SCE Response to MGRA DR-1

A0908020-MGRA-SCE-01.pdf

Mussey Grade Road Alliance Data Request No. 1
Workpaper for Questions 2 and 3

Net Income Available for Common Stock ($millions)

2004	915
2005	725
2006	776
2007	707
2008	683
2009	1226

6-year average	839	
Ratio, $40 million to 6 year average		4.8%
Ratio, $10 million to 6 year average		1.2%

Sources:
EIX Financial and Statistical Report, 2006, p. 15
EIX Financial and Statistical Report, 2009, p. 18
Reports available at: www.edison.com/investors/financial_stat_rpts.asp

Appendix B – SDG&E Response to MGRA DR-1


SDGE MGRA DR-01 .docx


Q2b_3b MGRA DR1.xls

Appendix C – PG&E Response to MGRA DR-1

PG&E Data Request No.:	MusseyGradeRd_001-01		
PG&E File Name:	WildfireExpense BalancingAcct_DR_MusseyGradeRd_001-Q01		
Request Date:	November 21, 2010	Requester DR No.:	001
Date Sent:	December 9, 2010	Requesting Party:	Mussey Grade Rd
PG&E Witness:		Requester:	Diane Conklin

QUESTION 1

On p. 9 of the Amended Application it is stated that: "For Wildfire Costs in excess of $1.2 billion, the Utility would recover 95% of the Wildfire Costs, with the Utility absorbing the remaining 5% up to a cap." What is the origin of this 5% coinsurance payment and how was this particular number chosen?

ANSWER 1

PG&E objects to this request to the extent it characterizes the Amended Application as proposing a "coinsurance payment." Subject to and without waiving its objection, PG&E responds as follows:
The 5% figure was developed by the Joint Utilities in response to the December 21, 2009 Assigned Commissioner's Administrative Law Judge's Ruling issued in this proceeding (December Ruling). In the December Ruling, the parties were directed to develop proposals that "provide utility management sufficient incentive to manage risk, but respect the shareholders' opportunity to earn a reasonable return on their investment." (December Ruling, p. 9) The Joint Utilities developed this proposal to directly address this guidance in the December Ruling. The 5% figure was based on the Joint Utilities' judgment that this level of risk would meet the Ruling's directives.

DIRECT TESTIMONY OF THE
MUSSEY GRADE ROAD ALLIANCE
WEBA IMPACTS ON FIRE RISK AND COSTS

PG&E Data Request No.:	MusseyGradeRd_001-02		
PG&E File Name:	WildfireExpense BalancingAcct_DR_MusseyGradeRd_001-Q02		
Request Date:	November 21, 2010	Requester DR No.:	001
Date Sent:	December 9, 2010	Requesting Party:	Mussey Grade Rd
PG&E Witness:		Requester:	Diane Conklin

QUESTION 2

On p. 32 of the Supporting Testimony it is stated that: "For SCE and PG&E, the cap on Tier 2 costs absorbed by the Utility should be $40 million for all wildfires within any 12-month period. For SDG&E and SoCalGas, the cap on Tier 2 costs absorbed by the Utility should be $20 million for all wildfires within any 12-month period."

How were these particular cap amounts chosen for each company? What is the basis for these amounts?

What fraction of annual profit (averaged over the period from 2004-2009) would these amounts correspond to?

ANSWER 2

a. This cap was developed by the Joint Utilities in response to the December 21, 2009 Assigned Commissioner's Administrative Law Judge's Ruling issued in this proceeding (December Ruling). In the December Ruling, the parties were directed to develop proposals that "provide utility management sufficient incentive to manage risk, but respect the shareholders' opportunity to earn a reasonable return on their investment." (December Ruling, p. 9) The Joint Utilities developed this proposal to directly address this guidance in the December Ruling. The particular cap amounts were based on the Joint Utilities' judgment that this level of risk would meet the Ruling's directives.

b. PG&E objects to the request on the ground that the term "annual profit" is vague and ambiguous. Subject to and without waiving its objection, PG&E responds as follows:

For PG&E, the cap on Tier 2 costs of $40 million is approximately 3.8% of average Net Income Available for Common Stock for the years 2005-2009. Note that the financial results for 2004 include one-time effects of PG&E's emergence from bankruptcy. See Attachment MGRA-001-02-1.

PG&E Data Request No.:	MusseyGradeRd_001-03		
PG&E File Name:	WildfireExpense BalancingAcct_DR_MusseyGradeRd_001-Q03		
Request Date:	November 21, 2010	Requester DR No.:	001
Date Sent:	December 9, 2010	Requesting Party:	Mussey Grade Rd
PG&E Witness:		Requester:	Diane Conklin

QUESTION 3

On p. 16 of the Supporting Testimony it is stated that: "Wildfire Claims and Defense Costs up to $10 million, which will be forecast in GRCs, are not eligible for recovery through WEBA in the Amended Proposal."

a. How was the $10 M amount of this effective deductible chosen? What is the basis for this amount?

b. What fraction of annual profit (averaged over the period from 2004-2009) would these amounts correspond to?

ANSWER 3

a. PG&E objects to the request to the extent it characterizes the $10 million as an "effective deductible." Subject to and without waiving its objection, PG&E responds as follows:
This amount was selected as this is the current deductible amount for two of the Joint Utilities (PG&E and SCE), and also because this represents an amount that may reasonably be forecasted and included in the Joint Utilities' GRCs. Because catastrophic wildfire events with damages in excess of $10 million cannot be accurately forecast, depend upon circumstances beyond the control of the Joint Utilities, and occur with far less frequency than smaller wildfires, the Joint Utilities believe it would not be appropriate to attempt to forecast and recover the costs of catastrophic wildfire costs through the GRC process.

b. PG&E objects to the request on the ground that the term "annual profit" is vague and ambiguous. Subject to and without waiving its objection, PG&E responds as follows:
For PG&E, $10 million is approximately 0.9% of average Net Income Available for Common Stock for the years 2005-2009. Note that the financial results for 2004 include one-time effects of PG&E's emergence from bankruptcy. See Attachment MGRA-001-02-1. Note that the Joint Utilities propose that costs associated with Wildfire Claims and Defense Costs up to $10 million be forecast and recovered in rates through each utility's GRC. (See Amended Testimony pp. 9-10, 16, 23, and 27-28.

PG&E Data Request No.:	MusseyGradeRd_001-04		
PG&E File Name:	WildfireExpense BalancingAcct_DR_MusseyGradeRd_001-Q04		
Request Date:	November 21, 2010	Requester DR No.:	001
Date Sent:	December 9, 2010	Requesting Party:	Mussey Grade Rd
PG&E Witness:		Requester:	Diane Conklin

QUESTION 4

On p. 33 of the Supporting Testimony it is stated that: "The Utilities propose that they be compensated for the financial risk they would bear by receiving an annual revenue requirement based on the actual cost of each Utility's liability insurance and the amount of liability insurance each Utility purchased. Each year following the Utility's liability insurance renewal a Premium Rate will be calculated as follows: the premiums for each Utility's liability insurance divided by the amount of liability insurance each Utility purchased. For example, if the premium for a given Utility's liability insurance was $10 million and the amount of liability insurance that Utility purchased was $500 million, the Premium Rate for that Utility would be 2%.
The Utilities propose that the Commission authorize an annual revenue requirement equal to the Premium Rate times the cap on the amount the Utility may be required to absorb in Tier 1 and Tier 2 costs. For example, if SCE's or PG&E's Premium Rate is 2%, it would receive an annual revenue requirement of $1 million ($10 million Tier 1 plus $40 million Tier 2 * 2%)."

a. How was the proposed rule for determining annual revenue requirement determined? What is the logical basis for proposed rule?

b. Under what conditions would this proposed rule lead to an increase in annual profits for the utilities?

ANSWER 4

a. This concept was developed by the Joint Utilities in response to the December 21, 2009 Assigned Commissioner's Administrative Law Judge's Ruling issued in this proceeding (December Ruling). In the December Ruling, the parties were directed to develop proposals that "provide utility management sufficient incentive to manage risk, but respect the shareholders' opportunity to earn a reasonable return on their investment." (December Ruling, p. 9) The Joint Utilities developed this proposal to directly address this guidance in the December Ruling.
   The proposal is based on the logic of compensating the utilities as the same level insurance companies are compensated for assuming the risk. PG&E believes the compensation formula is reasonable as the amount is approximately the average rate PG&E is paying for its insurance.
b. PG&E objects to the request on the ground that the term "annual profit" is vague and ambiguous. Subject to and without waiving its objection, PG&E responds as follows:

The revenue requirement proposed would produce net income to the extent it exceeds the amount the utility records in a given year as its retained liability in respect of uninsured wildfire costs. However, such net income in one year could be more than offset by the utility's responsibility for payment of uninsured wildfire costs in another year. Because the methodology for developing the Premium Rate is designed to compensate the utility for its retained risk, the expected value of the revenue requirement is not greater than zero.

PG&E Data Request No.:	MusseyGradeRd_001-05		
PG&E File Name:	WildfireExpense BalancingAcct_DR_MusseyGradeRd_001-Q05		
Request Date:	November 21, 2010	Requester DR No.:	001
Date Sent:	December 9, 2010	Requesting Party:	Mussey Grade Rd
PG&E Witness:		Requester:	Diane Conklin

QUESTION 5

What average yearly loss due to wildfires was assumed by the utilities in their application?

ANSWER 5

The Joint Utilities did not assume a specific yearly loss amount due to the Wildfires in excess of $10 million because such wildfire events cannot be accurately forecast, depend upon circumstances beyond the control of the Joint Utilities, and occur with far less frequency than smaller wildfires. Indeed, the intent of the Joint Application is to present a mechanism for addressing the costs of these unpredictable wildfire occurrences. See testimony, pp. 34-36.

PG&E Data Request No.:	MusseyGradeRd_001-06		
PG&E File Name:	WildfireExpense BalancingAcct_DR_MusseyGradeRd_001-Q06		
Request Date:	November 21, 2010	Requester DR No.:	001
Date Sent:	December 9, 2010	Requesting Party:	Mussey Grade Rd
PG&E Witness:		Requester:	Diane Conklin

QUESTION 6

On p. 2 of the Supporting Testimony it states that "Large uninsured wildfire costs could threaten the Utilities' financial integrity, contrary to the public interest."

a. What level of loss would "threaten the utilities' financial integrity"?

ANSWER 6

The level of loss that would threaten the utilities' financial integrity depends on the utility's specific financial circumstances, its regulatory environment, the risk of future losses, and general economic conditions, among other factors. Thus the impact of any loss cannot be quantified in isolation.

Note that as a result of the San Bruno gas pipeline explosion Standard and Poor's has placed PG&E on CreditWatch with negative implications for PG&E's credit ratings.

PG&E Data Request No.:	MusseyGradeRd_001-07		
PG&E File Name:	WildfireExpense BalancingAcct_DR_MusseyGradeRd_001-Q07		
Request Date:	November 21, 2010	Requester DR No.:	001
Date Sent:	December 9, 2010	Requesting Party:	Mussey Grade Rd
PG&E Witness:		Requester:	Diane Conklin

QUESTION 7

What is the sum total of penalties paid as a result of alleged safety violations (whether acknowledged or not), on a per-year basis, between 2000 and 2010?

ANSWER 7

The CPUC has prepared a list of all penalties assessed during this time period, which is published at:
http://www.cpuc.ca.gov/NR/rdonlyres/87394981-CE5B-4701-A5B1-6F69DE627D2F/0/FinesandRestitution.pdf

Attachment MGRA-001-02-1

PACIFIC GAS AND ELECTRIC COMPANY
Wildfire Expense Application

PG&E (Utility) Income available for Common Stock

Line	Year	Amount
1	2005	$918
2	2006	971
3	2007	1,010
4	2008	1,185
2	2009	1,236
6	Total 2005 - 2009	$5,320
7	Average 2005 - 2009	$1,064
8	$40 million as percentage of line 7	3.8%
9	$10 million as percentage of line 7	0.9%

Appendix D – SCE Response to MGRA DR-2

A0908020-MGRA-SC
E-02-1.pdf

A0908020-MGRA-SC
E-02 Q.11b Supplem

Appendix E – SDG&E Response to MGRA DR-2

SDGE_MGRA
DR-02-1.docx

Revised Response
MGRA 02 9a-1.docx

Appendix F – PG&E Response to MGRA DR-2

PG&E Data Request No.:	MusseyGradeRd_002-08		
PG&E File Name:	WildfireExpenseBalancingAcct_DR_MusseyGradeRd_002-Q08		
Request Date:	December 20, 2010	Requester DR No.:	002
Date Sent:	January 6, 2011	Requesting Party:	Mussey Grade Rd
PG&E Witness:		Requester:	Diane Conklin

QUESTION 8

In reference to the answers received by the Alliance to question MGRA-1: SDG&E, SCE, and PG&E all objected to the characterization of the proposed 5% co-payment that each utility would make for damages resulting from their infrastructure as a "coinsurance payment". Please clarify by providing:

The utility-preferred term for the 5% co-payment specified in the Application.

The full definition of the utility-preferred term, and

The general and particular characteristics that would differentiate the utility-preferred term from the term "coinsurance payment".

ANSWER 8

a. The Utilities object to calling this aspect of our proposed cost recovery mechanism either a "co-payment" or "coinsurance payment" because both those terms have specific meanings in an insurance-related context, and neither term accurately describes our proposal. (Note: capitalized terms used and not defined herein shall have the meanings set forth in the Amended and Restated Testimony in Support of Joint Amended Application.) In our amended application and supporting testimony, the Utilities proposed a sharing mechanism that would have the Utilities absorb 5% of Tier 2 Wildfire Costs, up to a cap. The Utilities do not have a preferred term for this aspect of our proposed sharing mechanism, but if MGRA says "sharing of 5% of Tier 2 Wildfire Costs, up to a cap" or something similar, it will likely be clear what MGRA is referring to.

b. See response to subpart a. above. The relevant section of the Utilities' proposal is explained at page 32 of the utilities' joint testimony.

c. See response to subparts a. and b. above.

PG&E Data Request No.:	MusseyGradeRd_002-09		
PG&E File Name:	WildfireExpenseBalancingAcct_DR_MusseyGradeRd_002-Q09		
Request Date:	December 20, 2010	Requester DR No.:	002
Date Sent:	January 6, 2011	Requesting Party:	Mussey Grade Rd
PG&E Witness:		Requester:	Diane Conklin

QUESTION 9

In reference to the answers received by the Alliance to question MGRA-3: SDG&E, SCE, and PG&E all objected to the characterization of the proposed $10 M threshold that utilities would pay prior to having access to the WEBA account as an "effective deductible." Please clarify by providing:

The utility-preferred term for the $10 M threshold specified in the Application.

The full definition of the utility-preferred term, and

The general and particular characteristics that would differentiate the utility-preferred term from the term "effective deductible".

ANSWER 9

a. The Utilities object to calling this aspect of our proposed cost recovery mechanism an "effective deductible" because the term "effective" is somewhat unclear, and because the term "deductible" has a specific meaning in an insurance-related context, and does not accurately describe our proposal. In our amended application and supporting testimony, the Utilities proposed to exclude from the WEBA Wildfire Claims and Defense Costs up to $10 million and instead to include such costs in their GRC forecasts. The Utilities do not have a preferred term for this aspect of our proposal, but if MGRA says "Wildfire Claims and Defense Costs up to $10 million which will be forecast in the Utilities' GRCs" or something similar, it will likely be clear enough what MGRA is referring to.

b. See response to subpart a. above. The relevant portion of the Utilities' proposal is explained at pages 27-28 and 88-90 of the Utilities' joint testimony.

c. See response to subparts a. and b. above.

PG&E Data Request No.:	MusseyGradeRd_002-10		
PG&E File Name:	WildfireExpenseBalancingAcct_DR_MusseyGradeRd_002-Q10		
Request Date:	December 20, 2010	Requester DR No.:	002
Date Sent:	January 6, 2011	Requesting Party:	Mussey Grade Rd
PG&E Witness:		Requester:	Diane Conklin

QUESTION 10

In reference to the answers received by the Alliance to question MGRA-6: "The level of loss that would threaten the utilities' financial integrity depends on the utility's specific financial circumstances, its regulatory environment, the risk of future losses, and general economic conditions, among other factors. Thus the impact of any loss cannot be quantified in isolation."

Using present circumstances as a model; i.e. assuming that current financial circumstances, regulatory environment, risk of future losses, and general economic conditions remain similar to what they are currently, what level of loss would "threaten the utilities' financial integrity"?

Please relate any anticipated changes (one that the utility is already planning for) in regard to current financial circumstances, regulatory environment, risk of future losses, and general economic conditions, and how each of these changes would potentially affect your utility's sensitivity to large unanticipated losses due to wildland fire liabilities.

ANSWER 10

a. PG&E objects to this request on the grounds that it calls for speculation and is unduly burdensome. The utilities cannot simply assume "current financial circumstances" and determine loss levels that would threaten their financial integrity due to the substantial uncertainty in their current circumstances. At present, the specific regulatory circumstances under which a wildfire loss could occur are a matter of speculation.

California regulation is a critical element in the credit rating agencies' and investors' assessments of the utilities' credit quality. Thus, the impact of any loss would depend not only on the Commission's actions, but how investors interpret those actions with respect to the utilities' current and future financial risk.

PG&E has not developed any scenarios that attempt to assess the financial impact of specific levels of wildfire losses and will not speculate as to investors' response to such loss levels.

b. PG&E objects to this request on the grounds that it calls for speculation and is unduly burdensome. For a discussion of potential changes in PG&E's financial circumstances please see "Key Factors Affecting Results of Operations and Financial Condition" and "Cautionary Language Regarding Forward-Looking Statements" at pages 40 through 42 of the Company's most recent 10Q, filed with the U.S. Securities and Exchange Commission on November 4, 2010, available at the following website: http://www.sec.gov/Archives/edgar/data/1004980/000119312510247854/d10q.htm#tx103042_18

PG&E has not developed scenarios attempting to assess the impact of any anticipated changes in financial circumstances on its sensitivity to wildfire losses and will not speculate as to the impact of such changes.

PG&E Data Request No.:	MusseyGradeRd_002-11		
PG&E File Name:	WildfireExpenseBalancingAcct_DR_MusseyGradeRd_002-Q11		
Request Date:	December 20, 2010	Requester DR No.:	002
Date Sent:	January 6, 2011	Requesting Party:	Mussey Grade Rd
PG&E Witness:		Requester:	Diane Conklin

QUESTION 11

Please calculate the amounts that your utility would expect to pay, those that your insurer would expect to pay, and those that would be reimbursed from the WEBA account for potential wildfires with the specified level of loss.

Present the results of the calculations, preferably in tabular form, similar to the template below. Calculate for all Loss Amounts specified in the table below. Assume that the WEBA application is accepted in current form and that current levels of insurance are maintained.

Loss Amount	Utility Assumed	Insurer Assumed	WEBA Assumed
$ 5 M			
$10 M			
$20 M			
$50 M			
$100 M			
$200 M			
$500 M			
$ 1 B			
$ 2 B			
$ 5 B			
$ 10 B			

Provide detail and relevant calculations showing how the numbers were obtained for the table.

ANSWER 11

a. PG&E's response assumes that loss amounts in the chart below represent Wildfire Costs arising from a single wildfire and that such costs are deemed to fall within Category B as described at page 29 of the Utilities' joint testimony. We also assume no Third Party Recoveries and wildfire insurance as described in PG&E's Insurance Testimony of Hudson Martin.

Loss Amount	Utility Assumed	Insurer Assumed	WEBA Assumed
$ 5 M	Included in rates to the extent claims are within a forecast amount approved for inclusion in rates in PG&E's GRC	$0	$0
$10 M	Included in rates to the extent claims are within a forecast amount approved for inclusion in rates in PG&E's GRC	$0	$0
$20 M	$0	$7.5 M	$12.5 M
$50 M	$0	$31.25 M	$18.75 M
$100 M	$0	$81.25 M	$18.75 M
$200 M	$0 M	$181.25 M	$18.75 M
$500 M	$0 M	$481.25 M	$18.75 M
$ 1 B	$0 M	$981.25 M	$18.75 M
$ 2 B	$45 M	$983.25 M	$.97175 B
$ 5 B	$45 M	$983.25 M	$3.97175 B
$ 10 B	$45 M	$983.25 M	$8.97175 B

b. As explained in the Utilities' joint testimony, Wildfire Costs arising from wildfires that involve $10 million or less in claims are not eligible to be recorded in the WEBA. Such costs will be subject to recovery to the extent they are within a forecast amount authorized for recovery in PG&E's GRC. For wildfires exceeding $10 million in claims, the first $10 million in claims would not be covered by insurance and would be recorded in the WEBA. $26.25 of the next $35 million of claims would be covered by insurance and $8.75 would not be covered by insurance and would be recorded in WEBA. The next $957 million in claims would be covered by insurance. For fires involving claims exceeding $1.002 billion but less than or equal to $1.2 billion, the utility would absorb $5 million and any balance would be recorded in the WEBA. Where wildfires result in claims exceeding $1.2 billion, 5% of any amounts in excess of $1.2 billion, up to an annual cap of $40 million, would be paid by the PG&E and any balance would be recorded in the WEBA. *See* Utilities' Joint Testimony, pages 27-32.

Appendix G – DRA Response to MGRA DR-4

DRA Response
A0908020_MGRA_Da

Appendix H – SCE Response to MGRA DR-5

A0908020-MGRA-SC
E-03 Responses.pdf

Appendix I – SDG&E Response to MGRA DR-5

MGRA DR-05 SDG&E FINAL.doc

Appendix J – PG&E Response to MGRA DR-5

PG&E Data Request No.:	MusseyGradeRd_005-01		
PG&E File Name:	WildfireExpense BalancingAcct_DR_MusseyGradeRd_005-Q01		
Request Date:	August 5, 2011	Requester DR No.:	005
Date Sent:	August 18, 2011	Requesting Party:	Mussey Grade Rd
PG&E Witness:		Requester:	Diane Conklin

QUESTION 1

Please list the tenure for all Chief Executive Officers (CEOs) from 1980 to 2011. Please list month and year each CEO took office, and total time served in the position.

ANSWER 1

Name and Title	Elected Date	Resignation Date
Frederick W. Mielke *(Chairman & CEO)*	6/1/1979	5/1/1986
Richard A. Clarke *(Chairman & CEO)*	5/1/1986	6/30/1994
Stanley T. Skinner *(President & CEO)*	7/1/1994	5/31/1995
Stanley T. Skinner *(Chairman & CEO)*	6/1/1995	6/1/1997
Gordon R. Smith *(President & CEO)*	6/1/1997	12/31/2005
Thomas B. King *(CEO)*	1/1/2006	5/31/2007
Thomas B. King *(Chairman & CEO)*	6/1/2007	6/30/2007
William T. Morrow *(President & CEO)*	7/1/2007	8/31/2008
Peter A. Darbee *(President & CEO)*	9/5/2008	7/31/2009
No officer has held the CEO title since 7/31/2009		

PG&E Data Request No.:	MusseyGradeRd_005-02		
PG&E File Name:	WildfireExpense BalancingAcct_DR_MusseyGradeRd_005-Q02		
Request Date:	August 5, 2011	Requester DR No.:	005
Date Sent:	August 18, 2011	Requesting Party:	Mussey Grade Rd
PG&E Witness:		Requester:	Diane Conklin

QUESTION 2

Please list the tenure (time spent in the position) for all Presidents in your company from 1980 to 2011. Please list month and year each President took office, and total time served in the position.

ANSWER 2

Name and Title	Elected Date	Resignation Date
Barton W. Shackelford *(President & COO)*	6/1/1979	4/28/1983
Barton W. Shackelford *(President)*	4/29/1983	4/30/1986
George A. Maneatis *(President)*	5/1/1986	10/31/1991
Stanley T. Skinner *(President & COO)*	11/1/1991	6/30/1994
Stanley T. Skinner *(President & CEO)*	7/1/1994	5/31/1995
Robert D. Glynn, Jr. *(President & COO)*	6/1/1995	5/31/1997
Gordon R. Smith *(President & CEO)*	6/1/1997	12/31/2005
Thomas B. King *(President & CEO)*	1/1/2006	7/31/2006
William T. Morrow *(President & COO)*	8/1/2006	6/30/2007
William T. Morrow *(President & CEO)*	7/1/2007	8/31/2008
Peter A. Darbee *(President & CEO)*	9/5/2008	7/31/2009
Christopher P. Johns *(President)*	8/1/2009	Present

Appendix K – A.06-08-010 – SDG&E Response to MGRA DR-6

MGRA DR6
3-3-08.pdf

Appendix L – Joseph W. Mitchell Vitae

JOSEPH W. MITCHELL, PH.D.

Vitae

2011 – Presented on the power line fire threat and California's regulatory response at the annual Wildland Fire Litigation Conference. Participated in rulemaking at the California Public Utilities Commission (CPUC) as the fire expert for the Mussey Grade Road Alliance (MGRA). Four rule changes I proposed on behalf of MGRA (or jointly proposed with the Consumer Protection and Safety Division) were fully or partially accepted by a proposed decision of the California Public Utilities Commission. Continued to provide technical input into other active CPUC proceedings for MGRA.
2010 – Continued participation in ongoing CPUC proceedings on behalf of MGRA, including joint utility proposal to pass on liability costs to ratepayers. Jointly sponsored proposed rules with the Consumer Protection and Safety Division and facilitated participation of CAL FIRE.
2009 – Presented paper and presentation at *Fire and Materials 2009* on catastrophic power line fires, which was the first paper to demonstrate the relationship between wind, fire suppression efficiency, and power line failure rates. Served on a California State Fire Marshal Task Force, establishing a framework for testing ignition-resistant construction proposed for the 2010 update to the California Building Code. Successfully opposed an application by San Diego Gas & Electric Company to shut off power under regularly occurring wind conditions, arguing instead for a cost/benefit analysis – a recommendation that was adopted by the CPUC. WEEDS water spray system was featured in a news segment by San Diego television station KGTV.
2008 – Submission of expert witness testimony on behalf of MGRA in the CPUC Phase 1 and Phase 2 hearings for the proposed SDG&E "*Sunrise Powerlink*" transmission line on the subject of power lines and wildland fire, which included cross-examination and contribution to briefs. Demonstrated potential fire risks from transmission lines, and also found a significantly larger number of power line fires in San Diego County.
2007 – Presented work with Oren Patashnik at *Fire & Materials 2007* conference in San Francisco, whose Scripps Ranch data demonstrated potential ember vulnerability of curved-tile roofing (confirmed in 2009 by NIST research). Provided comment on and criticism of San Diego County's 'shelter-in-place' guidelines. Wrote an op-ed piece published in the San Diego Union Tribune and provided commentary for News 8 KFMB piece on shelter-in-place. Submitted expert testimony for CPUC on *Sunrise Powerlink* project.
2006 – Publication of peer-reviewed paper on the WEEDS water-spray wildland fire protection system in the *Fire Safety Journal*. Presentation of results at the *Third International Fire Ecology and Management Congress*, San Diego, CA.

2005 – Assimilation of all relevant academic literature regarding structure ignition in wildland fires and the dominance of wind-driven catastrophic events. Published articles in *Home&fire* and *Wildfire* trade magazines. Computer modeling validates WEEDS principles.
2004 – Founded M-Bar Technologies and Consulting to promulgate knowledge regarding WEEDS and the importance of designing for firebrand protection under high-wind conditions. Poster session at *Wildfire 2004* conference, Reno, NV. Article published in *San Diego Reader* magazine.
2001-2003 – Developed the WEEDS method for structure defense during wildland fires. Completed in time for the October 26, 2003 Cedar fire, when it was tested under wildland fire conditions. It worked.
1999 – Returned to the United States from Europe, settling in San Diego, CA.
1996-present – Work in software engineering and management for major multinational corporations.
1989-1998 – Lived and worked in Europe first as a postdoctoral physicist and then in software engineering for a multinational corporation. Resided in Switzerland, Germany, France, and Belgium.
1993-1996 – Postdoctoral work for University of California at Davis in heavy ion physics, performed at CERN. Continuing with work in lasers, optical systems and computer modeling.
1989-1993 – Postdoctoral work for McGill University in high energy physics at CERN (Center for European Nuclear Research, Geneva, Switzerland) and DESY (Deutsches Electron-Synchrotron, Hamburg, Germany). Developed expertise in energy measurement, computer modeling, lasers and optical systems.
1989 – Ph. D. in Physics received from Ohio State University, Columbus, Ohio
1981-1989 – Graduate research in elementary particle (neutrino) physics, Columbus and Los Alamos National Laboratory, NM. Trained in electronics, mechanical engineering, computing, energy measurement and statistics.
1981-1983 – Graduate teaching assistant, OSU physics department.
1981 – Bachelor of Science in Physics received from Ohio State University, Columbus, Ohio

Expert Testimony

California Public Utilities Commission (CPUC); Application Proceeding A.06-08-010; Mussey Grade Road Alliance (MGRA); MG-1; MGRA Phase 1 Direct Testimony; Sunrise Powerlink Transmission Line Project; Application No. 06-08-010; March 12, 2008
http://www.mbartek.com/cpucspl/cpuc_index.html
California Public Utilities Commission; Application Proceeding A.06-08-010; Mussey Grade Road Alliance (MGRA); MG-20; MGRA Phase 2 Direct Testimony; Sunrise Powerlink Transmission Line Project; Application No. 06-08-010; May 31, 2007
http://www.mbartek.com/cpucspl/Phase2/phase2_index.html
Provided all technical input on wildland fire for the following CPUC Proceedings for the Mussey Grade Road (MGRA):
P.07-11-007 - Petition of San Diego Gas & Electric Company (U 902-E) to Adopt, Amend, or Repeal a Regulation Pursuant to Pub. Util. Code Section 1708.5.

DIRECT TESTIMONY OF THE
MUSSEY GRADE ROAD ALLIANCE
WEBA IMPACTS ON FIRE RISK AND COSTS

R.08-11-005 - Order Instituting Rulemaking To Revise and Clarify Commission Regulations Relating to the Safety of Electric Utility and Communications Infrastructure Provider Facilities.
A.08-12-021 - Application of SAN DIEGO GAS & ELECTRIC COMPANY for Review of its Proactive De-Energization Measures and Approval of Proposed Tariff Revisions (includes J. W. Mitchell report "*When to Turn Off the Power? Cost/Benefit Outline for Proactive De-energization*", March 27, 2009)
A.09-08-021 - 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

Publications

Fire Publications & Presentations - Academic

Mitchell, Joseph W.; "Power Lines and Catastrophic Wildland Fire in Southern California"; Presentation to the Fire & Materials 2009 Conference, San Francisco CA, Jan 26, 2009.
http://www.mbartek.com/FM09_JWM_PLFires_1.0fc.pdf

Mitchell, Joseph W. and Oren Patashnik**;** Firebrand Protection as the Key Design Element for Structure Survival during Catastrophic Wildland Fires; Fire and Materials 2007, San Francisco, CA; Jan 29-31, 2007.
http://www.mbartek.com/FM07_FirebrandsWildfires_1.1F.pdf

Mitchell, Joseph W.; REDUCING URBAN INTERFACE ECOLOGICAL IMPACTS AND FIRE LOSSES THROUGH STRUCTURAL FIREBRAND PROTECTION; Third International Fire Ecology and Management Conference; San Diego, CA; Nov13-17, 2006.
Mitchell, Joseph W.; Wind-enabled ember dousing; Fire Safety Journal; v. 41 (2006); pp 444-458.
WEEDS poster session; Wildfire 2004 conference, Reno, NV; Mar. 2004.

Fire Publications & Presentations – Trade and General Public

Mitchell, Joseph W.; **Goaded into Action: California's Regulatory Response to the Power Line Fire Threat**
Presented at the 5th Annual Wildland Fire Litigation Conference, April 16, 2011

Conklin, Diane and Joseph W. Mitchell; The PUC should deny this plan outright; The San Diego Union Tribune; May 10, 2009.
http://www3.signonsandiego.com/stories/2009/may/10/puc-should-deny-plan-outright/?uniontrib

Mitchell, Joseph W; Wind-Enabled Ember Dousing - A comparison of wildland fire protection strategies; Prepared for the Ramona Fire Recovery Center, 8/12/2008.

http://www.mbartek.com/Mbar_WEEDS_Comparison_web.pdf
Mitchell, Joseph W.; Playing with fire: The county's 'Shelter in Place' gamble; The San Diego Union-Tribune; May 2, 2007, p. B7.
http://www.signonsandiego.com/uniontrib/20070502/news_lz1e2mitchell.html
Mitchell, Joseph W.; Brand Dilution (Cover article); Wildfire Magazine; Mar. 2005
http://wildfiremag.com/wui/brand_dilution/
Mitchell, Joseph W.; WEEDS: Wind Enabled Ember Dousing System; Home&fire Magazine; Spring, 2005; p. 32
Mitchell, Joseph; Engineering a Miracle; San Diego Weekly Reader Magazine; April 29, 2004

Physics: List of neutrino, high-energy, and heavy ion physics publications is available upon request.

Other Experience

International:
Spoken & written German; some French. Extended business trips to Japan.

Technical & Managerial:
Five years of managerial experience in a software development organization. Twelve years of experience in corporate software development environments in the financial application and consumer electronics industries.

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