BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

In the matter of the Application of San Diego Gas & Electric Company (U 902-E) for a Certificate of Public Convenience and Necessity for the Sunrise Powerlink Transmission Project	Application No. 06-08-010 (Filed August 4, 2006)

PHASE 2 DIRECT TESTIMONY OF THE

MUSSEY GRADE ROAD ALLIANCE

FIRE ANALYSIS – SAFETY AND ENVIRONMENTAL

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1. INTRODUCTION AND TESTIMONY SUMMARY

Q. Please state your name, address, company and qualifications.

A. 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 J[1] of the MGRA Phase 1 testimony.

Q. On whose behalf are you submitting this testimony?

A. I am submitting this testimony on behalf of the Mussey Grade Road Alliance (MGRA).

Q. What is the purpose of your testimony?

A. The purpose of this Phase 2 testimony is to provide information on wildland fire and power lines that was not available during Phase 1 direct testimony with regard to cost/benefit analysis, to compare the fire risks of the proposed alternatives to SPL, and to discuss material factual inaccuracies and deficiencies in the Draft EIR/EIS.

Q. What new information exists regarding power lines and wildland fires that was not available during Phase 1 testimony?

A. Most notably, there was an extreme Santa Ana wind event during the week of October 21[st] that caused a number of power line ignitions throughout Southern California, and particularly in the SDG&E service area in San Diego County. This led to massive property loss, loss of life, and exposes SDG&E to potential liability. The impact on San Diego County was significantly worse than that experienced elsewhere in Southern California. This prompted an additional study to determine whether this pattern is true only of the October 2007 fires or

[1] MG-1; Phase 1 Testimony of the Mussey Grade Road Alliance; A.06-08-010; attached as MGRA_Mbar_SPL_AppJ_CV.pdf

whether it has been historically true. Our testimony then conducts a comparison of fire risks posed by the different alternative transmission routes in a manner that is suggested for the EIR/EIS. Additionally, SDG&E has collected another year of power line ignition data since the submission of the Phase 1 direct testimony analysis was performed, and this data changes and strengthens the conclusions that can be made regarding the potential risk from the proposed SPL project. MGRA will also address material factual inaccuracies and deficiencies in the EIR/EIS, and will include an analysis and critique of the SDG&E wind gust load analysis that should have been included in the Draft EIR/EIS.

2. THE OCTOBER 2007 FIRESTORM AND ITS IMPLICATIONS

Q. What occurred during the Santa Ana wind storm that took place the week of October 21st, 2007?

A. The Santa Ana event that hit Southern California during the week of October 21st was severe. According to Cal Fire[2], twenty significant fires started during this event. The October firestorm that resulted caused loss of life, massive destruction and dislocation in San Diego County and elsewhere in Southern California, and was reported widely in the press[3]. The locations of the October 2007 fires are shown in Figure 2A-1 of Appendix 2A[4].

Q. What are the implications of these fires for SPL and other power line projects?

A. Seven of the fires during the October, 2007 fire storm have been attributed to power lines. While investigations are still ongoing for most of these fires, Cal Fire issued a press release in November giving their preliminary conclusion that

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[2] MGRA Phase 2 Direct Testimony, Appendix 2A; data referenced in Section 2A-1.1 "Cal Fire October Fires Data Set"; p. 1.

[3] Appendix 2I, attached, contains a list of links to press reports regarding the October 2007 fires.

[4] Ibid; p. 9.

the Witch, Guejito, and Rice Fires were due to power lines[5]. Additional attributions came from press reports, including those in the Los Angeles Times and in regional papers local to the fires[6]. While not every one of these attributions is guaranteed to correspond to the results of the final investigation by authorities tasked with determining the fire origins, there was a widespread national recognition that power lines constitute an important fire source during Santa Ana wind events[7].

This vindicates the results put forward in the MGRA Phase 1 direct testimony, in which we raised the issue of the risk posed by siting power lines in heavily vegetated areas subject to Santa Ana wind conditions. It also supports our assertion that the economic impacts of power line fires need to be taken into account when addressing the cost/benefit analysis of transmission projects.

Q. Do SDG&E and other utilities recognize the importance of the issue of power line fires and the need to take action to address it?

A. Yes. In fact, in response to the October 2007 fires, SDG&E initiated a Petition to Initiate Rulemaking before the CPUC, requesting that the CPUC "issue a statewide OIR to consider whether to adopt additional or modified regulations and rules with respect to disaster preparedness and management to be implemented by public utilities beyond the current requirements of GO 95."[8] This petition received support from Southern California Edison[9] and Pacific Gas and

[5] Cal Fire; October Fire Causes; San Diego Unit; Cal Fire News Release; November 16, 2007; described in Appendix 2A, section 2A1-5.
[6] See Appendix 2A; section 2A-1.8; p. 5 for a list of reports.
[7] Vick, Karl; Probe of Calif. Fires Lays Most Blame on Power Lines; The Washington Post; Monday, December 24, 2007; Page A03.
[8] San Diego Gas & Electric Company; PETITION OF SAN DIEGO GAS & ELECTRIC COMPANY (U 902 E) TO ADOPT, AMEND, OR REPEAL A REGULATION PURSUANT TO PUBLIC UTILITIES CODE § 1708.5; November 6, 2007.
[9] Southern California Edison Company; Response of Southern California Edison Company (U338-E) to Petition of San Diego Gas & Electric Company to Adopt, Amend, or Repeal a Regulation Pursuant to Public Utilities Code §1708.5; CPUC Petition 07-11-007

Electric[10]. Additionally, it received the support of the Center for Biological Diversity and The Sierra Club[11], and the Mussey Grade Road Alliance[12], which maintained that an investigation into fire causes should precede any changes to regulations. Additionally, MGRA suggested an outline for addressing fire issues, dividing the problem into sections amenable to a cost-benefit analysis: 1) determining the probability of power line wildland fires 2) determining the costs of power line wildland fires and 3) determining the effectiveness and costs of minimization or mitigation procedures.

Q. How do the October 2007 power line fires compare to those started by other causes?

A. The list of all October 2007 fires is shown in Table 2A-1 of Appendix 2A[13] and is reprinted below for convenience:

[Remainder of page is left blank]

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[10] Pacific Gas and Electric Company's Response in Support of Petition of San Diego Gas and Electric Company; CPUC Petition 07-11-007.

[11] Response the Center for Biological Diversity and the Sierra Club to San Diego Gas & Electric Company's Petition to Adopt, Amend, or Repeal a Regulation Pursuant to Public Utilities Code Section 1708.5; CPUC Petition 07-11-007.

[12] Mussey Grade Road Alliance Response To San Diego Gas & Electric Petition To Adopt, Repeal Or Amend A Regulation Pursuant To Public Utilities Code § 1708.5; CPUC Petition 07-11-007.

[13] Appendix 2A; p. 9.

OCTOBER 2007 WILDLAND FIRES

FIRE_NAME	DATE_	SOURCE	COUNTY	ACRE
Non-power line fire				
Poomacha	11/1/2007	State agency	San Diego	49410.977
Buckweed	10/24/2007	Local agency	Los Angeles	38347.477
Cajon	10/26/2007	USFS	San Bernardino	104.45
Magic	10/26/2007	Local agency	Los Angeles	2728.853
Harris	10/28/2007	State agency	San Diego	90730.055
Santiago	11/1/2007	Local agency	Orange	28173.438
Coranado Hills		San Diego County	San Diego	58.795
Ammo		San Diego County	San Diego	21493.912
Rosa	10/22/2007	Riverside County	Riverside	409.625
Nightsky	10/26/2007	Local Agency	Ventura	53.116
Roca		State Agency	Riverside	0
October	10/23/2007	Local Agency	Los Angeles	0
Total				231,511
Power line fires				
Canyon	10/24/2007	Local agency	Los Angeles	4329.626
Ranch	10/27/2007	USFS	Los Angeles/ Ventura	58410.354
Rice	10/28/2007	State agency	San Diego	9471.855
Grass Valley	10/29/2007	USFS	San Bernardino	1242.371
Witch	10/31/2007	State agency	San Diego	163240.327
Slide	10/30/2007	USFS	San Bernardino	12769.254
Sedgewick	10/21/2007	USFS	Santa Barbara	808.812
Total				250,273

The above table shows the list of October 2007 fires provided by Cal Fire, divided into those attributed to a power line fire cause and fires due to other causes.

It is noteworthy that seven of the nineteen fires listed are attributed to power line ignitions. As noted in MGRA Phase 1 direct testimony[14], power line fires are historically responsible for only about 3% of ignitions state-wide, though only 1% or less in San Diego County[15], an observation that was confirmed for the numerous San Diego firesheds studied within the scope of the project EIR/EIS[16].

[14] MG-1; Phase 1 Testimony of the Mussey Grade Road Alliance; A.06-08-010; Appendix D., p. 4.
[15] Ibid; p. 9.
[16] California Public Utilities Commission and U.S. Department of Interior Bureau of Land Management; DRAFT Environmental Impact Report/Environmental Impact Statement and Proposed Land Use

Using the state-wide average and assuming that power line fires make up 3% of wildland fires, the probability that the observation of seven fires out of 20 as a statistical fluctuation is calculated to be roughly one in 400,000. Much more likely is the mechanism described in the MGRA Phase 1 testimony whereby power line fires are much more likely to occur and grow large during Santa Ana wind events.

It can also be seen that fires attributed to power lines were responsible for the majority of the area burned during the October fires (250,000 out of a total of 482,000 acres).

Q. How did the October 2007 fires affect different counties in Southern California?

A. The number of fires and the area burned are collected in Table 2A-2 of Appendix 2A[17]. This is reprinted below for convenience.

POWERLINE (PL) AND NON-POWER LINE FIRES (NPL) BY COUNTY

County	Non PL	NPL Area	NPL Avg	PL	PL Area	PL Avg
San Diego	4	161,694	40,423	2	172,712	86,356
Los Angeles	3	41,076	13,692	2	33,535	16,767
San Bernardino	1	104	104	2	14,012	7,006
Ventura	1	53	53	1	29,205	29,205
Riverside	2	410	205	0		
Orange	1	28,173	28,173	0		
Santa Barbara	0			1	809	809
TOTAL	12	231,511	19,293	8	250,273	31,284
TOTAL-SD	8	69,817	8,727	6	77,560	12,927

Amendment (EIR/EIS); San Diego Gas & Electric Company Application for the Sunrise Powerlink Project; SCH #2006091071; DOI Control No. DES-07-58; Prepared by Aspen Environmental Group January 2008; Section D.15 and also in most Sections E(x).15.

[17] Appendix 2A, p. 10.

As can be seen, San Diego County had the most fires overall (6 – actually 7 because the Guejito Fire merged with the Witch Fire and is not independently tallied). Los Angeles County is second with five fires.

When it comes to area burned, however, San Diego County overwhelms the statistics, with significantly more area burned by both power line fires and non-power line fires as the rest of Southern California combined.

The average area burned by a power line fire was 50-60% larger than that burned by an average fire started by other sources. Interestingly, this is true even if one excludes the data from San Diego (shown by the TOTAL-SD row), whose data overwhelms that of the other counties. One hypothesis that might explain this is that power line fire starts tend to come during periods when the Santa Ana wind conditions are at their most intense, since this is when the damage that causes arcing occurs in the electrical system. Other types of fire starts may come before or after maximum wind conditions, and therefore the wildfires they produce might not spread as quickly and therefore be more amenable to control measures.

Q. What were the property damage costs of the October 2007 fires?

A. According to the California State Insurance Commissioner[18], the total estimated claims to be filed for property damage as the result of the October 2007 fires is $1.6B. According to the press release issued by Cal Fire in November[19], "The Witch Fire burned 197,990 acres, destroyed 1,650 structures, valued at over $236 million, costing taxpayers $18 million in suppression costs. There were two civilian fatalities, 40 firefighters injured. The Rice Fire burned 9,472 acres, destroyed 248 structures, valued at over $30 million, costing taxpayers $6.5 million in suppression costs."

The bulk of property damage that occurred in the October 2007 fires occurred in San Diego County and was due to the Witch and Rice fires. According to Cal

[18] California Insurance Department; Insurance Commissioner Poizner Hosts Insurance Recovery Forum to Assist San Diego Wildfire Survivors with Recovery Efforts; Press Release; November 29, 2007. http://www.insurance.ca.gov/0400-news/0100-press-releases/0060-2007/release120-07.cfm

[19] Cal Fire; October Fire Causes; San Diego Unit; Cal Fire News Release; November 16, 2007.

Fire, the Witch Fire was the third largest fire in the history of California (by structures destroyed) while the Rice Fire was the nineteenth largest[20].

All October 2007 fires that were ranked in the top 20 list of "Structures Destroyed" are listed in the table below:

Rank	Name	County	Structures	Deaths
3	Witch	San Diego	1650	2
10	Harris	San Diego	548	6
18	Slide	San Bernardino	272	0
19	Rice	San Diego	248	0

Of these four, the Witch, Slide and Rice fires have been attributed to power lines.

Accordingly, the bulk of lost structures that contributed to the $1.6B costs of the October 2007 fires referred to by the insurance commissioner must necessarily arise from fires in San Diego County that were ignited by power lines. This implies that if SDG&E were found to be culpable for the start of the Witch and Rice fires, the company could be responsible for damages in excess of $1B. This is not consistent with the Cal Fire estimates and should be viewed as an upper limit on direct damages that could be recovered. However, additional damages could potentially be recovered under the theory of inverse condemnation or of trespass, as described in Appendix G of the MGRA Phase 1 direct testimony.[21] Potential application of these theories might allow as much as triple damages to be assessed.

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[20] Cal Fire; Fact Sheets; 20 Largest California Wildland Fires; (by Structures Destroyed); http://www.fire.ca.gov/communications/downloads/fact_sheets/20LSTRUCTURES.pdf

[21] MG-1; MGRA Phase 1 Direct Testimony; Sunrise Powerlink Transmission Line Project; Application No. 06-08-010; Appendix G.

Q. Were the MGRA Phase 1 cost estimates reasonably accurate in terms of estimating the liability costs accruing from property damage caused by a catastrophic power line fire?

A. Yes. The MGRA cost estimates used $1 B as a canonical estimate of property damage that typically accrued during a catastrophic wildland fire encroaching on an urban area.[22] This is within the range of damage estimates for the October 2007 San Diego County fires.

Q. Are there other monetary damages that could be leveled against SDG&E were it to be found culpable for the start of the Witch Fire?

A. Yes. The Witch Fire potentially caused significant environmental damage to habitat in San Diego County. This damage would be due to "type conversion", a term that describes the loss of habitat that occurs when areas burn too often for native vegetation to recover and when invasive grasses and weeds take its place. This process is described by Halsey, who also gives a good listing of the original literature on the topic.[23] It is also described thoroughly in the EIR/EIS.[24] The topic of type conversion as a potential source of liability was discussed in Appendix H of the MGRA testimony.[25]

Significant portions of San Diego County were burned in the October 2003 fires, and portions of these areas were re-burned in October 2007, making them prone to type conversion and loss of their native Californian vegetation. A large fraction of these lands are under the control of federal, state, and local agencies. Should these agencies decide to take measures to rehabilitate or replace the areas at-risk, they might potentially seek to recover the costs of this mitigation and additional damages from SDG&E if SDG&E is found culpable for the start of the Witch Fire.

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[22] MG-1; Appendix H; p. 9.
[23] Halsey, Richard W; Fire, Chaparral, and Survival in Southern California; Sunbelt Publications; San Diego; 2005; pp. 25-26.
[24] EIR/EIS; Section D2.5; p. D2-82.
[25] MG-1, Appendix H, pp. 9-12.

Q. Did the MGRA accurately estimate the potential costs of damages due to type conversion in its Phase 1 analysis?

A. No. MGRA significantly underestimated the potential damages that could accrue if SDG&E were held responsible for the power line fire start. For its estimate of area at-risk, MGRA chose a preserve of 2000 acres that had 50% of its area at risk for type conversion. The actual area subject to type conversion as a result of the October 2007 fires is much larger than this.

Q. How much area is at risk of type conversion due to the October 2007 fires?

A. MGRA has analyzed the fire perimeters for the October 2003 and October 2007 fires in Appendix 2A[26], and has found that the total area that was burned in both sets of fires is almost 100,000 acres. According to sources on type conversion[27], one would expect that all of this area is at severe risk of permanently losing its native vegetation.

Q. What areas could SDG&E potentially be liable for restoring?

A. SDG&E could potentially be held liable for restoring public lands that were burned in the October 2003 and then subsequently re-burned in the Witch Fire. These are shown in the two figures below:

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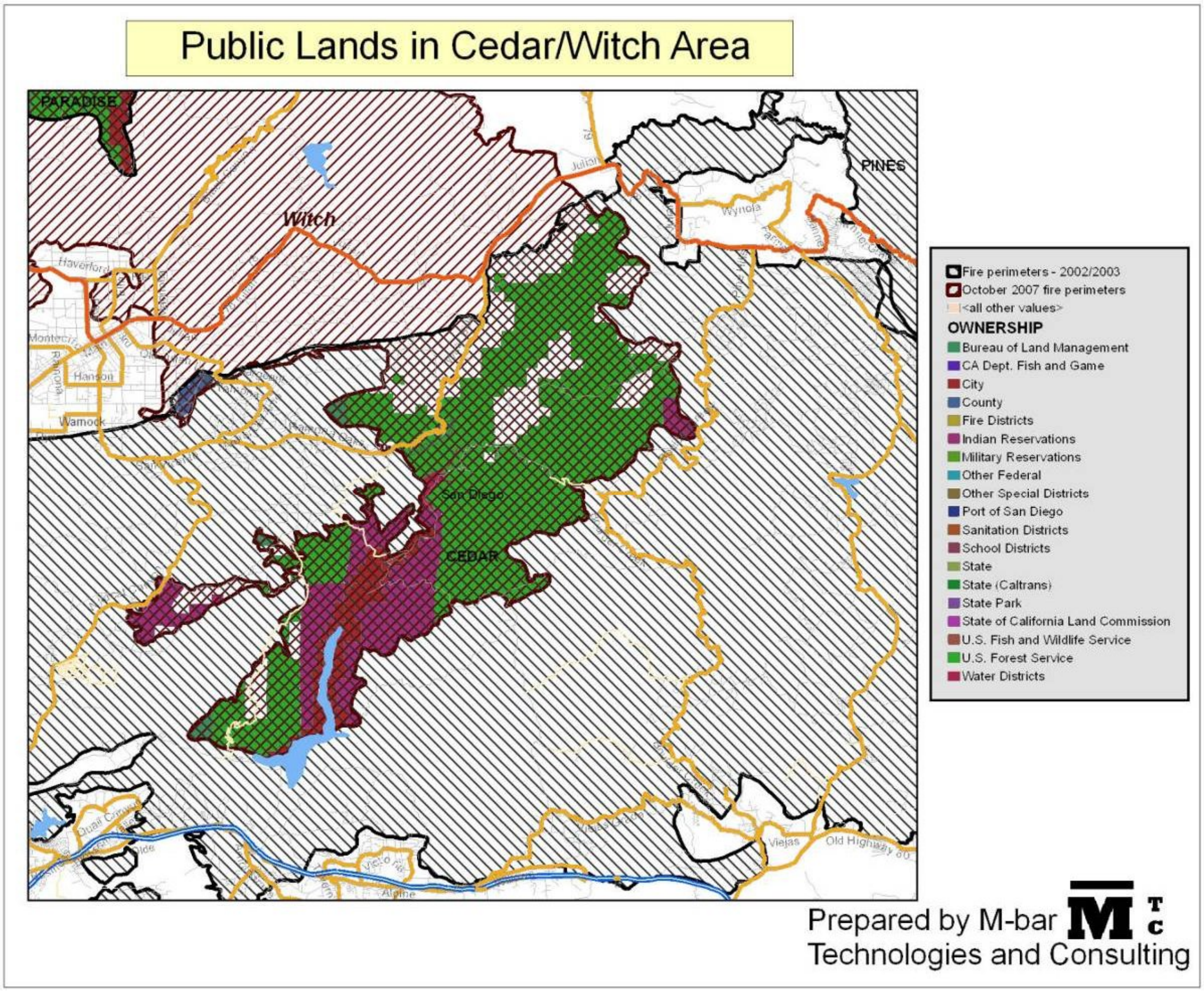
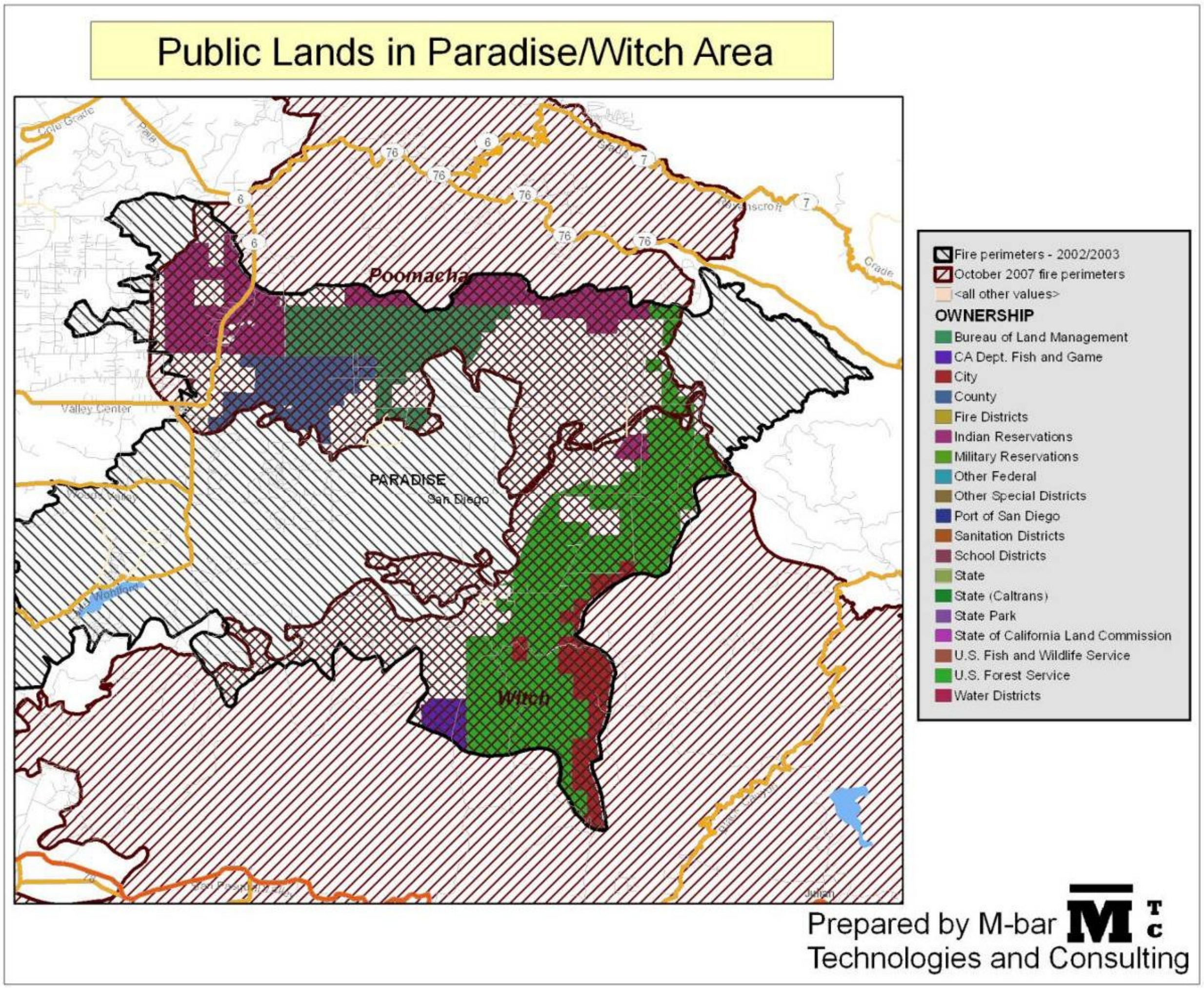
[26] Appendix 2A; pp. 13-17.
[27] Halsey.



The figure shows the area for which the Cedar Fire footprint (dark blue cross-hatch) overlaps the Witch Fire footprint. The vast majority of the holdings are public lands (and Indian reservations), with the U.S. Forest Service being the largest land holder, followed by reservation holdings and also city lands surrounding the El Capitan reservoir.

The area for which the Witch Fire footprint overlaps that for the 2003 Paradise fire is shown in the figure below:



This figure is included as Figure 2A-3 of Appendix 2A, and shows the areas burned in the Paradise Fire of 2003 (dark blue cross-hatch), Poomacha Fire of 2007 (maroon cross-hatch, northern area) and the Witch Fire of 2007 (maroon cross-hatch, southern area). The areas overlapped by both the Paradise and Witch Fires are at risk of type conversion.

Land ownership is shown by the colored areas. Once again, one can see that the majority of the area in which the Paradise Fire footprint overlaps the Witch Fire footprint is owned by public agencies, with the U.S. Forest Service being the largest land administrator.

The areas affected are tallied in Table 2A-3 in Appendix 2A[28], printed below for convenience:

OWNERSHIP OF LANDS AFFECTED BY THE 2003 AND 2007 FIRES

	Poomacha-Paradise	Witch-Paradise	Witch-Cedar	Harris-Otay	Total
TOTALS	15148	14370	40647	25801	95966
AGENCY					
U.S. Forest Service	375	7043	22232		29649
Bureau of Land Management	2660		472	7725	10857
Indian Reservations	3447	150	5690		9287
City		1334	2561	2170	6065
California Department of Fish and Game		371		3216	3587
State				2164	2164
County	1667		340	143	2149
U.S. Fish and Wildlife Service				632	632
Water Districts			197		197
School Districts	23				23
TOTAL	8171	8897	31492	16050	64610
Private Lands	6976	5472	9155	9751	31355

Q. What would the costs be for rehabilitation or replacement of damaged habitat?

A. The costs for land rehabilitation as determined by MGRA during Phase 1 direct testimony was determined to be between $5,000 and $50,000 per acre.[29] Costs for land replacement would vary from $4,000 to $6000 per acre at current prices.[30] Applying these to the cost of public lands re-burned in the October 2007 fires, we can determine the potential liability costs faced by SDG&E should they be found culpable for the Witch Creek Fire.

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[28] Appendix 2A; p. 17.
[29] MG-1; Phase 1 Testimony of the Mussey Grade Road Alliance; A.06-08-010; Appendix H; p. 16.
[30] Ibid; p. 19.

A total of 40,389 acres of the public land at risk is in the Witch Fire area. This means that SDG&E, if responsible for restoration or replacement, could be responsible for direct damages of between $162 M (for replacement alone) and $2.1 B (if intensive restoration was done over the entire area). Furthermore, applying triple damages according to the theory of inverse condemnation would increase this range to $480 M to $6 B.

Hence, potential liability for environmental restoration (if requested by the responsible agencies) could exceed that due to property damage.

Q. Are any efforts being undertaken to replace or restore the lands in danger of type conversion due to October 2007 fires?

A. MGRA currently knows of no agency that is trying to prevent loss of native habitat within its jurisdiction due to type conversion of lands following the successive fire storms in 2003 and 2007.

Q. How do these costs affect the Sunrise Powerlink?

A. In Appendix H of MGRA Phase 1 direct testimony, we presented an actuarial method by which the costs of fires generated by the SPL would be amortized over the 40 year projected lifetime of the line.[31] In this method we assumed a 10% chance of catastrophic fire over the lifetime of the line.

However the measurements of real data on catastrophic fires should be used instead of the very rough estimates put forward in the Phase 1 testimony. Using this as a baseline, the potential maximum costs amortized over 40 years of operational lifetime of the line would be:

$6 B * 10% / 40 years = $15 M/yr

A lower range, assuming replacement at current land values would be:

$480 M * 10% / 40 years = $1.2 M/yr

However, it would not be trivial to purchase 40,000 acres of mitigation land that could be reasonably said to mitigate for the damage caused. It is likely that

[31] Ibid; pp. 16-17.

the purchase of such a large quantity of mitigation land would drive up the costs of prime habitat to the point where restoration is the preferred mitigation method.

We argue that these costs should be applied to cost / benefit analysis for the proposed transmission line project.

Additionally, it was pointed out in the MGRA Phase 1 Opening Brief that catastrophic fires and the increased perception among insurers that power lines are a fire source could significantly raise the cost of insurance that SDG&E will need to pay[32]. This prospect was also identified in a motion by UCAN, in which it sought to compel additional testimony from SDG&E regarding the October 2007 fires.[33] The motion was granted, and so SDG&E will be providing insurance data in their Phase 2 testimony.

Q. Why did the SDG&E service area fare so much worse than other areas during the October 2007 fires?

A. Using existing data, a number of possibilities have been explored as to why the October 2007 power line fires were worse in San Diego County (the vast majority of SDG&E service territory) than elsewhere in Southern California. While no clear cause has been identified by MGRA, a number of hypotheses have been excluded, and a few viable hypotheses remain. Historical fire data up through 2006 were examined to determine whether the October 2007 fires were an anomaly or whether power line fires have been more frequent or severe in San Diego County than in other counties in Southern California.

Q. Were the October 2007 fires an anomaly, or have power line fires historically been more frequent or severe in the SDG&E service area?

A. Power line fires have been more frequent and severe in San Diego County than they have been elsewhere in Southern California. The analysis that led to this

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[32] OPENING BRIEF OF THE MUSSEY GRADE ROAD ALLIANCE ON PHASE I ISSUES OF THE SUNRISE POWERLINK TRANSMISSION PROJECT; November 9, 2007.

[33] UCAN MOTION TO COMPEL ADDITIONAL SDG&E TESTIMONY RELATING TO WILDFIRES IN PHASE II OF THE PROCEEDING; November 8, 2007.

conclusion can be found in Section 2B-2.1 of Appendix 2B.[34] To determine the number of power line fires throughout Southern California, Cal Fire fire perimeter data (valid through 2006) was analyzed for San Diego, Orange, Riverside, San Bernardino, Los Angeles, and Ventura counties. All fires since 1960 and larger than 100 acres were analyzed, with power line fires being analyzed in parallel. The results of the analysis described in the Appendix and its attached file are given in Table 2B-1[35], also shown below:

SO. CAL. FIRES LARGER THAN 100 ACRES, 1960-2006

County	Fires	Area (acres)	PL Fires	PL %	PL Area %	PL/All Ratio
Ventura	147	1,160,369	1	0.68	0.34	0.49
Los Angeles	496	1,035,183	3	0.60	0.25	0.41
San Bernardino	272	786,999	2	0.74	0.17	0.23
Orange	53	204,237	1	1.89	1.11	0.59
Riverside	635	1,082,772	1	0.16	2.26	14.33
San Diego	444	1,279,699	6	1.35	19.94	14.76

The above table shows the county, the total number of fires meeting acceptance criteria, the total area in acres burned between 1960 and 2006, the number of power line fires meeting acceptance criteria during that same period, the percentage of fires that were power line fires, the percentage of total burn area due to power line fires, and the ratio of the last two percentages, which gives the degree to which power line fires are more or less destructive than fires started by other sources.

Two remarkable observations can be made. First, San Diego county has the third largest number of large fires (after Riverside and Los Angeles), but has nearly double the number of power line fires (six) of the runner up (Los Angeles, which has three) and has almost the number of power line fires observed in the rest of Southern California put together (six for SD versus eight for the rest).

[34] Appendix 2B; p. 7.

[35] Appendix 2B; p. 9.

Secondly, the observation made during Phase 1 testimony that power line fires are much larger than fires started by other sources[36] seems to be borne out only for San Diego and Riverside counties, and is not observed in the data from other counties. In fact, data from other counties indicates that power line fires have been *smaller* than average fire starts from other types of fires. This result needs to be taken with some caution, since the statistical nature of fire data implies that over large averages, the statistics will be driven by the largest and most catastrophic events.[37] Because our data sample is so small, data from other counties did not (up to 2006) contain catastrophic events, while the much larger sample of all fires does. This makes the ratio of the two numbers smaller.

Q. How statistically significant is the observation that San Diego has many more power line fires than other counties in Southern California?

A. Assuming that there is an equal probability of fires being started in any particular county, we can calculate what this average is, and then calculate the probability that the high number of power line fires in San Diego County is a statistical fluctuation.

There were eight power line fires, total, in the five counties other than San Diego, for an average of 1.6 fires per county. The statistical probability that the observed number of fires is consistent with the hypothesis of an equal number of fires per county is 0.9%.

Q. How does the Draft EIR/EIS address the comparative fire risk of power lines in San Diego versus other counties in Southern California?

A. The Draft EIR/EIS does not address the issues of comparative fire risk due to geographical location. This is a material factual deficiency of the EIR/EIS.

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[36] MG-1; MGRA Phase 1 Direct Testimony, Appendix D- Power Line Fires; pp. 9-10; Sunrise Powerlink Transmission Line Project Application No. 06-08-010

[37] 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; vol. 102; 17913.

Q. Is the assumption that there is an equal probability of a power line fire start in any given county reasonable?

A. No. The areas, vegetation, terrain and populations of the counties in southwest California are not equal and the assumption that there is an equal probability of a fire start in any given county is not reasonable.

Q. Could the number and destructiveness of power line fires in San Diego County compared to other counties be due to differences in the amount fire-prone vegetation?

A. An analysis, performed in section 2B-2.2[38], shows only a partial reduction in the significance of San Diego's excess of power line fires if they are assumed to be proportional to the amount of hazardous vegetation. San Diego remains higher than any other county, but the statistical significance is reduced.

This analysis was performed by tracing the general areas which had a Cal Fire Threat level of "High", "Very High", or "Extreme" for each county and assuming that the probability of a fire start was proportional to these areas.

These fire threat contours are shown in Figure 2B-1 of Appendix 2B, also shown below:

[Remainder of page is left blank]

[38] Appendix 2B, pp. 11-14.

The areas outlined in red in the figure were assumed to be proportional to the hazard and used to calculate the expected number of fire starts. These are compared to observed power line start rates in the table below:

CALCULATED POWER LINE FIRE THREAT (VEGETATION) BY COUNTY

Counties	PL Fires	Threat (acres)	PLF/ acre	Pred. (A-SD)	Prob.
Ventura	1	916,355	1.1E-06	1.7	
Los Angeles	3	1,179,430	2.5E-06	2.2	
San Bernardino	2	752,014	2.7E-06	1.4	
Orange	1	167,669	6.0E-06	0.3	
Riverside	1	1,286,175	7.8E-07	2.4	
San Diego	6	1,630,266	3.7E-06	3.0	19.8%

As can be seen, San Diego does in fact have a larger area of hazardous vegetation ("Threat area") than any other county in Southern California. If we calculate the number of historical power line fires per acre of threat area, we see that San Diego is still high, but not as high as Orange County.

. Calculation of the statistical significance shows that the excess of power line fires in San Diego County may be partially explained by the large amount of flammable vegetation in the County.

Q. Is the hypothesis that the number of power line fires will be proportional to the area of flammable vegetation a reasonable one?

A. Not really. It forces that the unreasonable assumption that the electrical infrastructure is uniformly distributed throughout the hazard zone. In fact, much of this hazard zone is hazardous because it is rural, remote, and undeveloped. Hence it is unlikely to have much transmission or distribution infrastructure in place in comparison to more highly urbanized areas of lower threat.

Q. Are we able to measure the exposure of hazardous vegetation to power lines?

A. No, not directly. SDG&E considers providing its line location information a security issue, and has refused to give it to MGRA.[39] Additionally, this would be a difficult task to perform for distribution lines, which make up the bulk of the data.

A possibly equivalent hypothesis is that there will be more power lines where there are more people. This will certainly be true for distribution lines, which are shorter and near homes and businesses. Since there is a much more extensive distribution network than there is a transmission network, a correlation between power lines and population probably exists. This can be combined with the vegetation threat regions defined above to estimate risks to individuals and households due to power line fires.

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[39] SDG&E'S 2/6/07 RESPONSE TO MGRA Data Request No. 2.

Q. Taking into account population density and vegetation, what is the significance of San Diego's excess of power line fires?

A. The analysis performed in section 2B-2.3 of Appendix 2B[40] shows that taking population into account does not reduce the significance of San Diego's excess of power line fires. It makes them far more significant than taking into account vegetation alone.

This analysis was performed by using census tract data provided by ESRI, valid as of 2007.[41] US census tracts were selected for Southern California, and only those falling within 300 meters of the "Fire Threat" zones shown within the previous figure were kept. This is shown in Figure 2B-2 of Appendix 2B. The number of housing units (as of 2000) was used as a proxy for the electrical network size, and this was summed per county. The result is shown in Table 2B-3 of Appendix 2B, and also shown below:

CALCULATED POWER LINE FIRE THREAT (POPULATION) BY COUNTY

County	PL Fires	Housing Units Tht.	PLF/ HUT	Pred. (A-SD)	Prob.
Ventura	1	101,654	9.84E-06	1.15	
Los Angeles	3	406,282	7.38E-06	4.61	
San Bernardino	2	211,755	9.44E-06	2.40	
Orange	1	109,326	9.15E-06	1.24	
Riverside	1	234,633	4.26E-06	2.66	
San Diego	6	170,028	3.53E-05	1.93	0.16%

The number of housing units in the threatened areas are listed in the third column. As is evident, while San Diego County might have the largest area enclosed in the "High" fire threat contours, the number of housing units enclosed is modest compared with some of the more densely populated areas of Southern California. Los Angeles, Riverside, and San Bernardino counties all have a larger

[40] Appendix 2B; pp. 14-17.

[41] ESRI; Tele Atlas North America, Inc.; 20070501; Redlands, California, USA; ESRI® Data & Maps; 2007 World, Europe, United States, Canada, and Mexico; *available with ArcGIS9.2 distribution*.

number of housing units within the tracts bordering or contained in the high fire risk contours. Remarkable uniformity is now seen in the fire rates between all counties in the power line fire rates – aside from San Diego County, which has a value 3.5 times larger than the average (and Riverside County, which with its one event is a factor of two low).

The probability that the large number of San Diego fires is due to a statistical fluctuation is estimated at 0.16%. These results imply that a home in the San Diego wildland urban interface is more than 3.5 times as likely to be exposed to a power line fire in San Diego County than it would be in other southwest California counties.

Q. Is the hypothesis that the exposure of powerlines to hazardous vegetation will be proportional to the number of housing units in the hazard area valid?

A. Possibly. It is likely that there will be a strong correlation between power line extent and number of housing units, though probably not a direct proportionality. More "rural" areas will tend to have longer runs of distribution line per structure, on the average, than more urbanized areas. Additionally, there has been a significant increase in building in rural areas since the 2000 census, though this would be expected to affect all Southern California counties and not just San Diego.

Also, power line fires require the correlation of power lines, flammable vegetation, and wind. This result does not take into account any localized wind effects.

Q. Could wind conditions be more severe in San Diego County than elsewhere in Southern California?

A. This is unlikely, though the data from the October 2007 Santa Ana event are ambiguous. An analysis performed in Section 2B-2.4 of Appendix B[42] compares the Santa Ana wind conditions in San Diego County in two different ways. It examines the data from six Santa Ana events both in terms of predictions from the National Weather Service and alternatively uses data from weather stations.

Q. What is the correct way to analyze Santa Ana wind conditions?

A. There is no mechanism as yet that allows accurate and fine-grained characterization of Santa Ana weather events. Computer models are in preparation that may allow this, but they are not available as of yet[43]. Nevertheless, analysis of wind conditions along the proposed and alternative SPL routes using currently available weather data and analysis should and can be performed. The MGRA Phase 1 Opening Brief requested that wind data be analyzed as part of the Draft EIR/EIS[44] in order to allow comparison of power line fire hazard along proposed and alternative routes. No analysis of this type was performed, which constitutes a material factual deficiency in the EIR/EIS.

Data from the National Climate Data Center's National Forecast Database can be used to construct typical examples of Santa Ana events. These tend to be coarse grained and do not take into account local topology, and are only predictions rather than actual measurements. Weather station data, on the other hand, while very accurate only represents one local area and it may not always be representative of the region surrounding it. Furthermore, publicly available digital data only exists for several years (nine years for RAWS weather station data, two years for NDFD predictions). Under these limitations, MGRA

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[42] Appendix 2B; pp. 17-25.
[43] Moritz, Max; private communication.
[44] MGRA Phase 1 Opening Brief; pp. 7-8.

undertakes to examine recent Santa Ana events in order to determine whether there San Diego County is especially prone to Santa Ana wind conditions.

Q. How does weather station data compare between Southern California counties during Santa Ana wind events?

A. Data from fourteen weather stations were analyzed for Santa Ana events occurring from 2006 to 2007. Four of these stations were in San Diego County: Potrero, Julian, Descanso, and Ammo Dump. Data was analyzed from the Mesowest weather data repository[45], and six Santa Ana events were selected. Maximum wind gust speed during the event and the number of hours that each station experienced gusts above 40 mph were recorded. The top three ranked stations (by wind gust speed) per event are shown in Table 2B-5[46], also shown below. The 'Values' column contains (wind gust speed in mph) / (number of hours gusts were over 40 mph).

TOP THREE GUSTS FOR SIX SANTA ANA EVENTS

Event	Station#1	Values	Station #2	Values	Station #3	Values
10/26/2006	WTP	55/5	FRC	53/13	BMT	47/8
11/29/2006	FRC	73/29	MBU	70/66	WTP	55/33
12/24/2006	MBU	65/17	WTP	55/14	FRC	52/8
1/6/2007	WTP	95/33	FRC	85/72	MBU	80/85
1/12/2007	MBU	65/81	FRC	65/47	WTP	55/30
10/21/2007	FRC	85/58	**POT**	70/54	BMT	65/60

The most noteworthy observation to be made here is that during only one event (10/21/2007 – the October 2007 event), does any station in San Diego County make it into the top three. This was Potrero (POT), with wind gust speeds measuring up to 70 mph. Other noteworthy stations are FRC, which is Fremont Canyon, in Orange County, which has consistently high readings, WTP,

[45] Mesowest; The University of Utah Department of Meteorology; *provides graphical interface to weather station data archives;* http://www.met.utah.edu/mesowest/

[46] Appendix B; p. 22.

Whittaker Peak in Los Angeles County, a mountain station, and MBU, Malibu Hills, quite close to the town of Malibu. It should be noted that a likely reason that the MBU station did not rank highly during the October 2007 event was that its data was incomplete so it was not included. Its location was very close to the Canyon Fire footprint, and it was likely damaged, disabled, or relocated as a result of the fire.

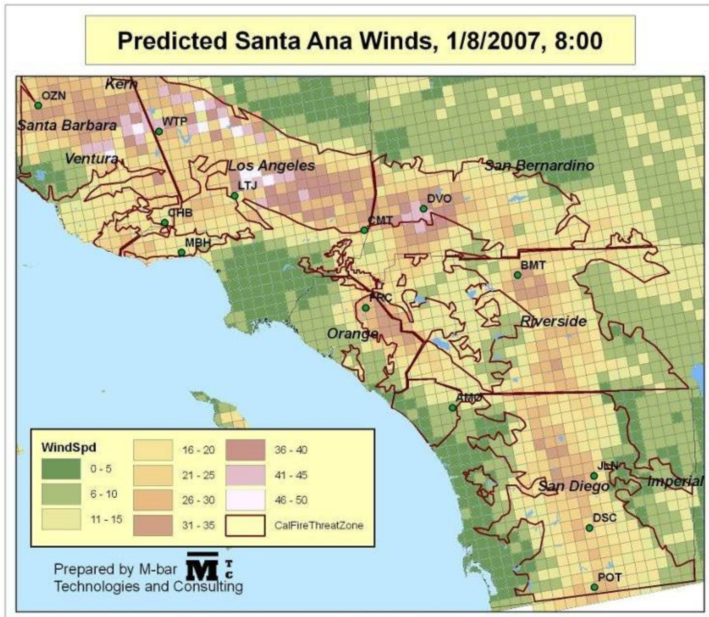
It should also be noted that according to the weather stations, the event that started 1/6/2007 was even more severe than the one that started 10/21/2007, as measured in all three ranks.

Taken as a whole, there is nothing in this data that would suggest that Santa Ana events are more severe in San Diego County than anywhere else. In fact, one could easily reach the opposite conclusion.

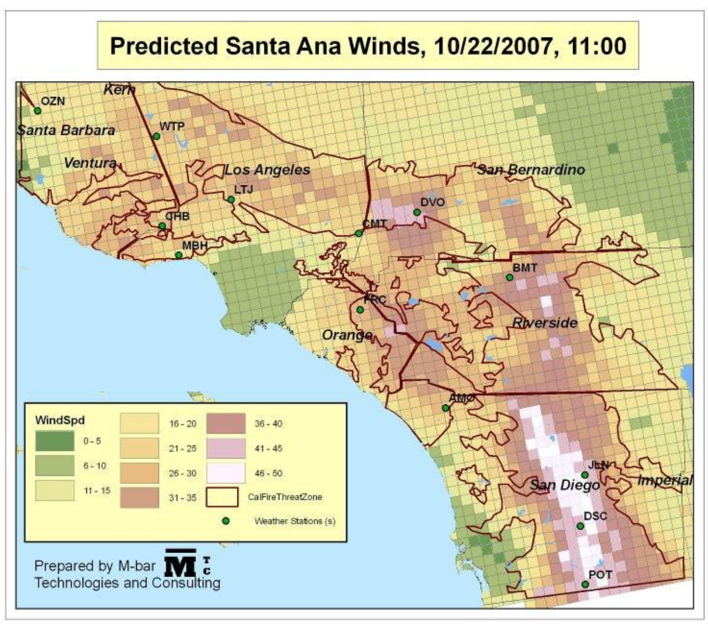
Q. How do National Climate Data Center wind gust predictions compare between counties in Southern California?

A. The results of the computer modeling vary greatly from event to event, and also vary with time as the high pressure system causing the event passes through the area. The most severely affected county is not necessarily the same for each event. NDFD data was collected for three hour intervals for five Santa Ana events between 2006 and 2007. Since there is currently no accepted way of turning these into hazard maps, we can compare examples against the results from weather station data. Data on the 1/6/2007 event, plotted in Figure 2B-5, also displayed below, confirms that the most active region during this event was in the northern regions of Southern California:

[Remainder of page is left blank]



However, the most intense wind prediction seen for any event was calculated to be in San Diego County during the October 21, 2007 event. This maximum wind event is displayed in Figure 2B-4, and is also shown below:



It is important to note that the prediction in the above figure is for two hours prior to the start of the Witch Fire, which occurred west of the Julian weather station (JLN) in the area of maximum predicted wind speeds.

Q. Could inadequate fire protection lead to the observed excess and destructiveness of power line fires in San Diego County?

A. According to the analysis performed in Appendix 2B, section 2B-2.5, there is no evidence that fires since 1990 in San Diego County have been any more frequent or larger (with the exception of the Cedar Fire) than fires in other counties in southwest California. A recent report[47] has chided San Diego County for lack of fire protection funding, and press accounts[48] following up on this report have pointed out that San Diego County spends only $8M on fire protection, whereas Los Angeles County spends $860M and Orange County spends $260M. These numbers on their own are deceptive, because very little of San Diego County's fire protection activities are carried out by the County of San Diego. Instead, San Diego County is Balkanized into numerous city and rural fire protection agencies that are independently funded. A study of the unincorporated areas that is laying the ground for the creation of a county-wide fire service calculates that the funding of the unincorporated areas alone in 2003 totaled $47M.[49]

Regardless of funding or structural characteristics of San Diego's fire protection infrastructure, if it were to be deeply problematic this would be indicated by a greater frequency of large fires and a larger fire size in San Diego County than elsewhere. Using the Cal Fire historical fire data again, Appendix 2B

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[47] San Diego Regional Fire Safety Forum; http://www.sdfiresafety.org/

[48] Welch, William M.; Report: San Diego failing at fire safety; USA Today; February 19, 2008; http://www.usatoday.com/weather/wildfires/2008-02-19-sandiego-fire_N.htm?csp=34

[49] San Diego Local Agency Formation Commission (LAFCO); MACRO REPORT; Options for Providing Structural Fire Protection and Emergency Medical Services in Unincorporated San Diego County; December 5, 2005; p. 9. http://www.sdlafco.org/document/MACRO%20REPORT_wo_maps.pdf

looks at the total number of fires after 1990 in each of the counties studied. Results are summarized in Table 2B-7, also reprinted below:

ALL FIRES >100 ACRES, BY COUNTY

County	Fires >1990	Area (acres)	Average	Median
Ventura	57	604,260	10601	820
Los Angeles	156	298,048	1911	321
San Bernardino	94	441,943	4702	555
Orange	20	62,589	3129	696
Riverside	188	384,812	2047	421
San Diego	131	692,482	5286	501

As can be seen, the number of fires greater than 100 acres in San Diego is no larger than that observed in other Southern California Counties. Its average fire size is somewhat large, at 5,286 acres, but most of this can be accounted for by the Cedar Fire, which added 270,000 acres to the total area burned in San Diego County. Minus this event, total area burned would be typical of other comparable counties. Likewise, the median fire size in San Diego (a better representation of a "typical" fire than the average due to the size distribution statistics for wildland fires) is within the typical range of the other counties.

We can conclude that whatever funding or organizational irregularities may exist in San Diego County, these do not lead to a measurable reduction in the quality of fire protection in comparison to other Southern California counties.

Q. What are the implications the large number of power line fires in San Diego County for Sunrise Powerlink?

A. The analysis described above was to attempt to identify possible causal mechanisms that could explain the excess fires, so that we can then determine whether these mechanisms would have implications for Sunrise Powerlink. Correlations with areas of flammable vegetation were observed, but not enough to explain the entire effect. A considerable portion of MGRA Phase 1 testimony was devoted to the high exposure of the proposed SPL route to flammable vegetation[50], as is a considerable portion of the Draft EIR/EIS treatment of fire issues.[51] The observed correlation, if correct, would add further weight to the argument that we are increasing the risk of significant power line fires by routing the SPL through areas of hazardous vegetation.

However, attributing the enhanced fire rate to the exposure of power lines to hazardous vegetation areas due to encroachment of people and structures into these areas seems to be ruled out by census data. Other counties have more of this encroachment than San Diego.

Attributing the excess to wind meets with ambiguous results. According to weather station data, weather stations in San Diego County do not experience Santa Ana weather conditions that are worse than those recorded elsewhere. This leaves the question of the excess fires unresolved.

The National Digital Forecast Database (NDFD) predictions, however, show an anomalously strong event over San Diego County during the week of October 21, 2007. It might be hypothesized that the "worst of the worst" Santa Ana events occur in San Diego County. If this were to be true, it would mean that the SPL (and alternative routes that go through the wind hazard area, as most of them do), might be exposed to abnormally high winds. According to SDG&E's Phase 1 Reply Brief, the expected wind conditions for SPL were calculated based upon the results of nearby weather stations.[52] If the NDFD data for the October 2007 Santa Ana event is more accurate than that from the weather stations nearby (which could be true if the weather stations were not properly positioned to experience the full strength of Santa Ana events), this would imply that the SPL engineering calculations might not be rigorous enough in the maximum wind area. If, on the other hand, the NDFD predictions were incorrect and the weather

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[50] MG-1; MGRA Phase 1 Direct Testimony; pp. 20-26.
[51] Draft EIR/EIS; Section D.15 and also in most Sections E(x).15.
[52] San Diego Gas and Electric Company; PHASE 1 REPLY BRIEF OF SAN DIEGO GAS & ELECTRIC COMPANY; November 30, 2007; p. 155-156.

station data more representative, then there is still no explanation for the excess of power line fires in San Diego County or their destructiveness.

Q. What other possibilities might explain the excess of power line fires and their destructiveness?

A. One other possibility is that maintenance of lines and equipment by SDG&E is worse than that practiced in other utility service areas, leading to greater fault rates and fire starts. With this possibility in mind, MGRA requested maintenance records for SDG&E's 230 kV and 500 kV network.[53] These were provided as confidential information to MGRA. These are of limited value, however, because in order to determine how SDG&E's practices compare to that of other utilities would require that the maintenance records be compared with other companies, which is not possible under the scope of this proceeding. MGRA has, nevertheless, reviewed the data and as of yet has discovered no patterns suggestive of a maintenance problem. If insufficient maintenance were to be at the root of the excess of power line fires in San Diego County, the implications for the SPL would be that safeguards would need to be put in place to ensure proper maintenance of the proposed project takes place, and these would need to be specified in the EIR/EIS. Additionally, the added costs for implementing these safeguards would need to be added to the cost of the project.

In fact, regardless of the source of the excess of power line fires in San Diego County, it is clear that SDG&E could be taking more aggressive measures to address this risk. Even if there is full compliance with GO 95 and other best practices, if the conditions in San Diego are somehow more hazardous than those found elsewhere in Southern California, it would be incumbent upon SDG&E to mitigate for these conditions if it wishes to do business in this area. Such mitigation measures should be included in the cost of the SPL project and included in the scope of the Phase 2 testimony.

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[53] MGRA Data request #5 to SDG&E.

Q. Does the analysis above give an exhaustive list of possible causes for the excess of power line fires observed historically in San Diego County?

A. No. There could be other possible causes as yet not suggested by MGRA. The purpose of the analyses in Appendix 2B was to address a number of reasonable hypotheses. None of those addressed give an unambiguous explanation of the excess.

3. COMPARISON OF THE PROPOSED AND ALTERNATIVE ROUTES

Q. Does the Draft EIR/EIS[54] for the Sunrise Powerlink project analyze fire risk as a means of comparing alternatives to the project?

A. Yes. The Draft EIR/EIS devotes over 300 pages of analysis to fire issues related to the Sunrise Powerlink project. It applies three general analysis methods that are used for route comparison:

1) A general survey of vegetation and other fire-relevant conditions was done along the main route and a hazard metric was developed and applied to each route.

2) Fire modeling was done in which ignition points were placed along the route and the fire allowed to propagate under mild and extreme Santa Ana conditions. Burn areas and structures at risk were determined in this fashion.

3) Factors affecting the difficulty of firefighting along the route were done on a per-segment basis, taking into account overhead lines, remoteness, ruggedness of terrain and other factors relevant to wildland firefighting.

Based upon these analyses, a comparison of routes was done in Section H of the Draft EIR/EIS, and the routes were ranked in order of preference due to fire hazard.

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[54] California Public Utilities Commission and U.S. Department of Interior Bureau of Land Management; DRAFT Environmental Impact Report/Environmental Impact Statement and Proposed Land Use Amendment (Draft EIR/EIS); San Diego Gas & Electric Company Application for the Sunrise Powerlink Project; SCH #2006091071; DOI Control No. DES-07-58; Prepared by Aspen Environmental Group January 2008.

Q. Is the Draft EIR/EIS route analysis based upon fire hazard complete and correct?

A. The fire analysis done in the Draft EIR/EIS is a superbly detailed and very thorough treatment of fire issues affecting the routes. In its Phase 1 brief[55] requested that as part of the CEQA review: "All alternative routes need to be fully analyzed with respect to wildland exposure and fire hazards in a way that compares hazard combinations on a mile-by-mile basis." The route analyses performed in the Draft EIR/EIS[56] form a foundation for performing such an analysis.

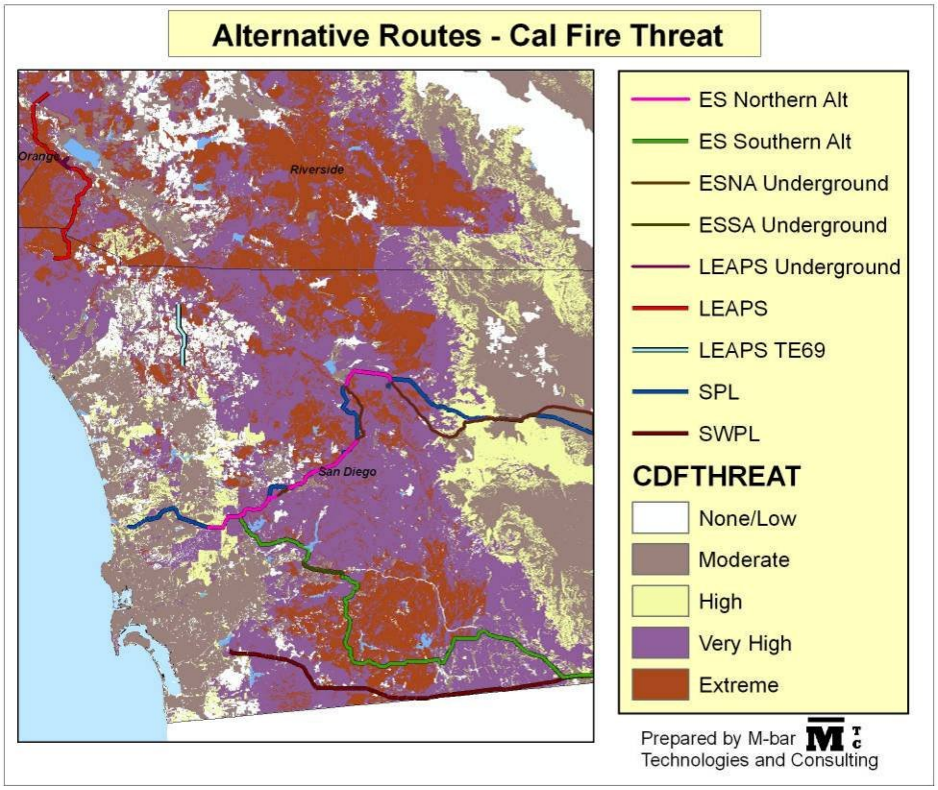
However, the Draft EIR/EIS has a number of substantive shortcomings and material factual deficiencies that need to be corrected. Many of these will be addressed more fully in a subsequent section. Presently, we note that the analysis in Section H of the Draft EIR/EIS lacks a fully quantitative comparison between routes. The methodology used for the burn probability model and the wildfire containment conflict model would lend itself very well to a quantitative summary of route segments, but such a quantitative comparison has not been done.

Q. Has the MGRA performed a quantitative comparison of the routes based upon fire hazard?

A. Yes, following the methodologies laid out in Appendix D of the MGRA Phase 1 Direct Testimony, a comparative analysis has been done between routes based upon Cal Fire fire metrics and vegetation type maps. This is presented in Appendix 2C. As in the Phase 1 analysis, the routes are broken into one kilometer segments, and the conditions along each segment are collected for a number of different types of GIS data. These are gathered into the Excel spreadsheet file RouteAnalysis_SPLAlt.xls, which is submitted with this testimony. The routes

[55] MGRA; Phase 1 Opening Brief; p. 44.
[56] Draft EIR/EIS; Section D.15.4.

studied by this analysis, superimposed on a Cal Fire Threat[57] map, are shown in Figure 2C-1, which is also displayed below:



This figure shows the proposed SPL route along with the "Environmentally Superior" Northern and Southern routes, as well as LEAPS and the Southwest Powerlink (SWPL – for reference only). The additional 69 kV segment along the Talega-Escondido route, which would be required in conjunction with LEAPS, is also shown. Differently colored areas represent different levels of fire threat as calculated by Cal Fire.

Q. What conclusions can be reached regarding the SPL route and all alternative routes?

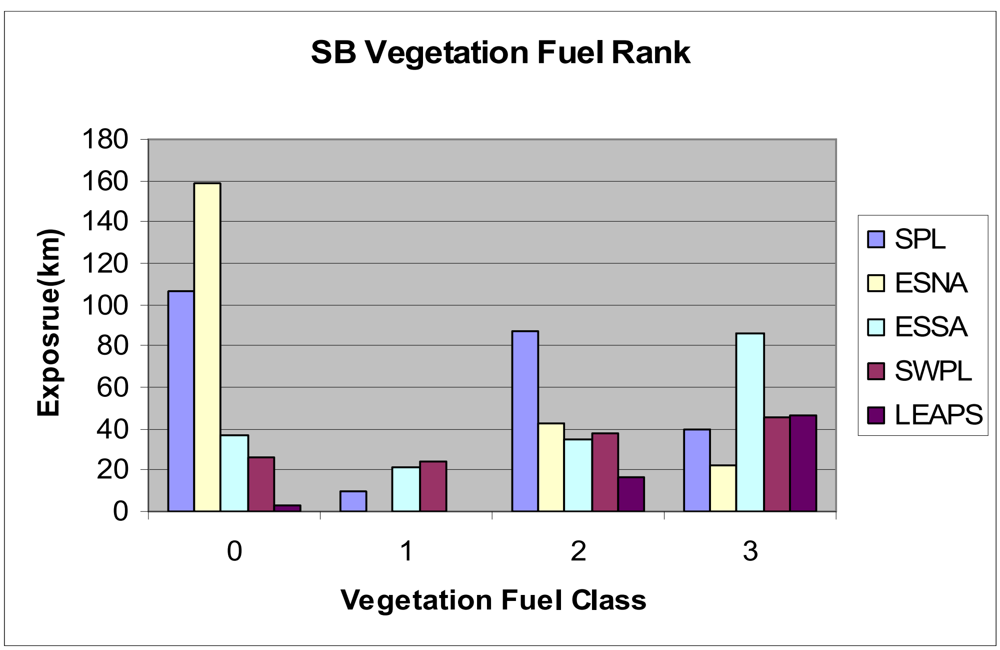
A. As the map above makes clear, all the alternative transmission routes have significant exposure to hazardous vegetation and conditions that create a significant fire threat. This coincides with the results of the Draft EIR/EIS, which

[57] Appendix 2C; 2C-1.3; p. 3.

concludes that all transmission routes have a Class I impact[58], listed as impact F-2: "Presence of the overhead transmission line would increase the probability of a wildfire."[59] These impacts affect all non-desert firesheds of the proposed and alternative routes, including many communities such as Poway, Ramona, Santa Ysabel, Campo and Potrero.

Q. What advantages are there to the approach taken in this testimony over that taken in the Draft EIR/EIS?

A. While all routes have Class I impacts, some routes have significantly more exposure to hazardous conditions than other routes. This can be quantified. The approach taken by in the analysis performed in Appendix 2C and the attached spreadsheet makes this straightforward. We show a comparison of vegetation along the proposed and alternative routes classified as to potential flame lengths according to Scott-Burgan vegetation classifications[60] in Figure 2C-4, reprinted below:



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[58] Draft EIR/EIS; Appendix H, multiple locations.
[59] Draft EIR/EIS; pp. D.15-70 – D.15-71 and multiple locations.
[60] Appendix 2C, Section 2C-1.2; p.2.

This figure shows the exposure of the line segments to vegetation of various hazard classes, with 1 representing flame lengths of 5 feet or less in a 10 mph wind, class 2 representing flame lengths from 5 to 15 feet, and class 3 representing flame lengths over 15 feet. Five routes are analyzed, indicated by the bar graphs of different color. In this manner, the hazard present along each route can be quantitatively compared. The results from the analysis performed in Appendix 2C are summarized in the table 2C-1, reprinted below:

COMPARISON OF FIRE METRICS FOR ALL ROUTES

Route	**CF Fuel > 1**	**CF Threat >1**	**SB Vegetation >1**
SPL	106	104	127
ESSA	129	131	121
SWPL	95	95	83
ESNA	48	49	65
LEAPS	56	54	62

A table of this type allows direct comparison of routes to be quantified. From this table we can glean that the greatest fire threat would be created by the proposed SPL route and by the Environmentally Superior Southern Alternative. A lesser exposure to flammable vegetation and conditions would occur if either the Environmentally Superior Northern Alternative or LEAPS were to be constructed.

This type of analysis is lacking in the Draft Environmental Impact Report / Environmental Impact Statement (Draft EIR/EIS), and both the burn probability model and the wildfire containment conflict model could be adapted to this approach in a straightforward manner. This is a significant shortcoming in the current version that should be addressed in the final Draft EIR/EIS.

Q. Are there flaws in the data used in either the Draft EIR/EIS or in the data used in the analysis in Appendix 2C?

A. Yes, there is a significant shortcoming in both data sets. The data used for both the Cal Fire fuel load and fire threat metrics was based upon a 2004 survey that occurred in the aftermath of the Cedar fire. This fire temporarily reduced the fuel hazard ranking over a wide area, much of which is traversed by the proposed route for SPL. Fuel load can be expected to return to much higher levels than those measured during the lifetime of the project. This was confirmed by SDG&E's witness Hal Mortier during cross-examination.[61] This bias is also present for the Scott-Burgan vegetation analysis, but the effect is less evident.

All analyses performed within the EIR/EIS – the burn probability model, fire behavior modeling, and the wildfire containment conflict model are subject to the same bias encountered in the MGRA analysis. Analyses were based upon field studies conducted in 2006 or 2007, when the fuel load in the Cedar Fire footprint has still not approached the value expected to be typical over the lifetime of the proposed project. This will cause these models to significantly under-predict the future fire risk within the Cedar Fire perimeter. This preferentially would affect the proposed SPL route and the Environmentally Superior Northern Alternative, since these routes have the longest traversal through the Cedar Fire footprint, with the net result that these routes would be shown to have a lower comparative fire risk than would be expected to be present during most of the lifetime of the proposed project.

This effect is not mentioned in the Draft EIR/EIS. No mention is made of measures that might have been taken to compensate for this bias, or the effect of the bias. This is a significant shortcoming, and needs to be addressed in the final

[61] Cross Examination of witness Mortier; Public Utilities Commission, State of California; A0608010; July 17, 2007; p.1007.
Exhibit MG – 10; CDF Fire Threat - Pre-Cedar (2003)/Pines(2002) Fires;
Exhibit MG – 11; CDF Fire Threat - Post Cedar (2003)/Pines (2002) Fires;
Exhibit MG – 12; CDF Fire 2003 - Pre-Cedar/Pines Enlarged "Sunrise" Northern Loop

EIR/EIS. Preferably, a method should be found to correct for the bias. If this is not possible to do in a correct and rigorous way, the bias introduced by the Cedar Fire footprint needs to be fully disclosed and its effect on the conclusions of the EIR/EIS discussed.

4. SDG&E OUTAGE AND FIRE DATA FOR 2007

Q. What new information is available regarding fires and powerlines that was not available during the Phase 1 testimony?

A. Fire rates for transmission lines in the SDG&E network based on SDG&E fire history data were calculated as part of the MGRA Phase 1 testimony.[62] This showed that power line fires – even those from 230 kV lines – did not have a negligible rate of occurrence and could well be an issue for the SPL project. This assertion was challenged by SDG&E in its rebuttal testimony.[63] The Draft EIR/EIS also gives the impression that fires from larger transmission lines are unlikely: "There is a public perception that all power lines can be a direct cause of wildfire ignitions, but power line-caused fires are much more prevalent for distribution and lower-voltage transmission lines compared with higher-voltage transmission lines such as the Proposed Project."[64] This must be considered a shortcoming in the Draft EIR/EIS.

Two things have happened since the Phase 1 testimony was submitted that confirm and solidify our original conclusions:

- The October 2007 fire storms demonstrated clearly the link between power lines, vegetation, and Santa Ana winds that was put forward in the MGRA testimony.

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[62] MG-1; MGRA Phase 1 Direct Testimony, Appendix B – SDG&E Power Line Fires; pp. 5-9; Sunrise Powerlink Transmission Line Project Application No. 06-08-010.

[63] SD-32; PREPARED REBUTTAL TESTIMONY OF HAL MORTIER ON BEHALF OF SAN DIEGO GAS & ELECTRIC COMPANY; July 15, 2007; Sunrise Powerlink Transmission Line Project Application No. 06-08-010; pp. 6-7.

[64] Draft EIR/EIS; Section D-15 – Fire and Fuels Management; pp. D.15-2 – D.15-4.

- Yet another significant fire occurred due to a 230 kV line in the SDG&E service area, when according to SDG&E records, a 230 kV started a fire under windy conditions on Stuart Mesa in June of 2007. This is very important, in that it means that the Camp Pendleton event in 2006 is not a singular event. This allows us to make more accurate predictions of the actual fire rates expected for 230 kV lines.

Q. What is the relevance of this testimony for Phase 2?

A. These new data allow recalculation of predicted fire rates for SPL, and hence allow reformulation of project cost that incorporates wildland fire liability, as described in Appendix H of the MGRA Phase 1 testimony. Furthermore, as will be shown, 2007 fire data belies the assertion that lower voltage transmission lines have a higher fire ignition rate than higher voltage lines "such as the Proposed Project", thus revealing an erroneous assertion in the Draft EIR/EIS. Finally, the MGRA analysis put forward in Appendix 2D calculates predicted fire rates for proposed transmission alternatives to the SPL project. We also carry out fire rate analysis assuming several planned expansions of the project that are mentioned in the EIR/EIS but not analyzed by the EIR/EIS (constituting a material factual deficiency in the Draft EIR/EIS).

Q. How are the power line fire rates determined?

A. Predicted rates for power lines are derived using a method identical to that which we applied in Appendix B of the Phase 1 MGRA Direct Testimony.[65] We take the SDG&E fire history from March 2004 to November 2007 and have separated out events caused by human or animal activity (vehicle collisions, construction, gun shots, plane crashes, kites, balloons, birds) from those due to mechanical failure, wind damage, trees, or other that might be relevant during a Santa Ana event.

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[65] MG-1; MGRA Phase 1 Direct Testimony; Appendix B; pp. 5-9.

SDG&E has specified which fires were caused by transmission lines and which were caused by distribution lines. Unfortunately they did not specify the voltage of the transmission lines. This was easily remedied in this analysis by cross-referencing the fire record to the outage history supplied by SDG&E[66].

The categories of were further broken down into distribution, 69/138 kV, and 230 kV initiated fires. Once again, there were no 500 kV fires in 2007. This is shown in the fire history file as modified by the MGRA[67] to highlight these separate categories. These are summarized in Table 2D-1 in Appendix D, also shown below:

Dist - Failure/Wind/Tree	75
Dist - Human/Bird	33
69/138 kV - Human/Bird	6
69/138 kV - Failure/Wind	4
230 kV - Failure/Wind	2

It is evident that there were two 230 kV power line failures that caused fires in the 2004-2007 time frame. At the time that the MGRA Phase 1 testimony was written, there was only one, opening up the possibility that this one event was some sort of anomaly. This is now much less likely. We can say definitively that "the big lines cause fires". This is of course relevant to SPL because significant portions of the proposed SPL and some alternatives will consist of 230 kV lines.

All transmission line fires listed in the SDG&E data between 2004 and 2007 are listed in Table 2D-2, also listed below. New data not presented during Phase 1 is indicated by violet highlighting.

[66] Appendix 2D; File 2D-1; SDGE_Outages_2007.xls; attached.

[67] Appendix 2D; File 2D-2; MGRA DR5-41 SDGE Fire Cause Data 2004; attached.

Date	Incident	Location	Voltage[68] (kV)	Acres	Cause
3/15/2005	Otay Substation	Metro	69	0.1	Mylar balloon into 69 kV, 10 x 60 spot
7/3/2005	Miller Valley	Mountain Empire	69	19	Mid-line slap, static line (Contractor)
7/12/2005	Eastlake	Metro	69	0.1	Dust, dirt on insulator/relay, sm. Spot
7/28/2005	San Clemente	Orange County	69	1	Corrosion/wire down, 1 acre brush fire
8/5/2005	Corte Chrisalida	Northeast	69	0.1	Mylar balloon into conductor, sm.spot
2/7/2006	Hidden Valley	North Coast	69	0.1	Kite tail into insulators
9/9/2006	Grapevine	Ramona	69	5	Wire down, gun shot, 5 acre fire
10/27/2006	Boulder Creek	Mountain Empire	69	2	Hvy. wind, wire down, 2 acre fire
12/27/2006	Cmp. Pendleton	North Coast	230	3	Hvy. wind, wire down, 3 acre fire
6/14/2007	Sweetwater	Eastern	?	0.1	Mylar Balloon
6/25/2007	Ladera Ranch	Orange County	138?	0.1	Mylar Balloon suspected
6/30/2007	Stuart Mesa	North Coast	230	5	Static line failed in wind
7/6/2007	Carlsbad Plane Crash	North Coast	138	0.1	Plane crashed into tower & ignited fire
9/7/2007	Clairemont	Beach Cities	69	0.1	Bird contact
10/21/2007	Witch	Ramona	69	163,240	Under investigation.

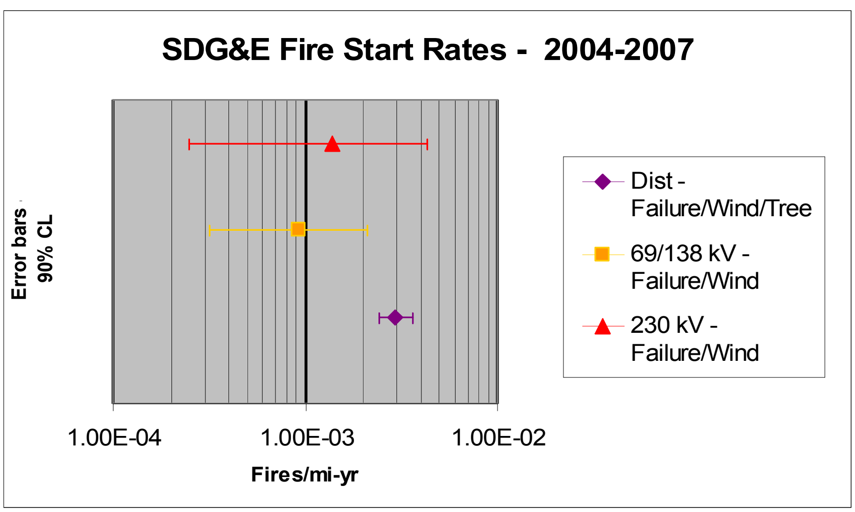
As described in Appendix 2D of this Phase 2 testimony, SDG&E supplied the MGRA with data that allowed us to obtain the total length of their existing distribution and transmission networks. The measured ignition rate, in ignitions

[68] Obtained by cross-referencing to the SDG&E Outage History.

per year per mile, can then be obtained by dividing the number of ignitions for a given line type with the length of line of that type within the SDG&E network. This has been done for SDG&E's data and is tabulated in Table 2D-3, also shown below:

Line Type	**Length (mi)**	**Rate ($yr^{-1}mi^{-1}$)**	**Low 90%CL**	**High 90%CL**
Distribution	6757	2.96E-03	2.42E-03	3.59E-03
69 kV + 138 kV	1155	9.24E-04	3.16E-04	6.27E-03
230 kV	387	1.38E-03	2.48E-04	2.01E-02

Once the rate was determined, a 90% confidence interval was obtained using the Poisson.rb calculator. The 90% confidence interval is defined as the region bounded on the low side by the rate that would have a 5% probability of producing the observed number of events or more, and on the high side by the rate that would have a 5% probability of producing the observed number of events or fewer. These results are shown graphically in figure 2D-1, shown below for convenience:



The figure displays the historical ignition rate for distribution lines (purple diamond), 69 and 138 kV lines (yellow square), and 230 kV lines (red triangle). It also shows the 90% confidence intervals as error bars. The most remarkable thing about this plot is that it indicates that there is no statistical difference between ignition rates for 69 kV lines and for 230 kV lines. In fact, the 230 kV lines have had a greater ignition rate than 69 kV lines. While this excess is not statistically significant, it certainly belies the claims made consistently by SDG&E that their 230 kV lines should not be expected to be a significant fire risk under high-wind conditions.

The Draft EIR/EIS states that the engineering of 230 kV lines makes them less subject to the types of faults that often cause fires on 69 kV lines.[69] It argues that the primary ignition danger arising from the SPL will be due to human activity and construction. The fire data analyzed by MGRA, on the other hand, *excludes* human activity as a fire cause, with the reason being that the primary risk to life and property posed by power lines is due to lines initiating fires during Santa Ana wind conditions. Regardless of the supposed engineering superiority of 230 kV transmission lines, they are still subject to design flaws, defects in construction materials or workmanship, or insufficient or improper maintenance. While fire rates from 230 kV lines *might* be less than those of other transmission lines based on engineering considerations alone, this is not what the SDG&E fire data shows. The final EIR/EIS needs to address this point and note that 230 kV lines have caused ignitions in the SDG&E service area under windy conditions.

Q. What conclusions can be reached from the SDG&E fire history data regarding ignitions from 500 kV lines?

A. Interestingly, the lack of initiated fires along the 500 kV SWPL route in the 2004-2007 period does not put a significant constraint on the fire rate for 500 kV lines. SWPL has roughly 60 miles of exposure to flammable vegetation.[70] One observed fire would suggest a rate of 1 / 3.75yr * 60mi = 4.4E-03 $yr^{-1}mi^{-1}$. The 90% confidence limit on a null observation is 2.3 times larger than this, or

[69] Draft EIR/EIS; pp. D.15-2 – D.15-4.
[70] Appendix 2C, Section 2C-2.1, attached file RouteAnalysis_SPLAlt.xls; tab SWPL_Hazard.

1.02E-02 (.0102). This does not rule out a base fire rate that is equal to or even exceeds the rate of other transmission lines. Even if SWPL were to have caused no fires in its 20 year history, the 90% confidence level limit for fire rate would still be 1.9E-03 (.0019), which still does not exclude the best estimates for 69 kV and 230 kV fire rates. Hence there is no basis to conclude from the SDG&E fire history data or historical data on SWPL that 500 kV transmission lines are any more or less likely to ignite wildland fires than any other transmission line type.

Q. Based upon SDG&E's historical fire rates, what is the predicted fire recurrence time for the SPL route compared with alternative routes?

A. Fire rate calculations based upon fire history for the proposed and alternative routes is given in Table 2D-4, copied below. We use two hypotheses for 500 kV lines 1) that they are 'fire safe' and do not contribute to fire risk (listed in the table as '230 only'), and 2) that they have the same failure rate as the 69 kV network (listed in the table as '230+500'). We include only the segment of the 500 kV path for each alternative that traverses flammable vegetation. In the case of LEAPS, there are no 230 kV lines, however there are several miles of relocated 69 kV line that will have additional vegetation exposure. We treat this segment as 230 kV line in order to calculate the recurrence rate.

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FIRE RECURRENCE PERIOD FOR ROUTES USING SDG&E HISTORY

Route	**230 kV length (miles)**	**500 kV length (miles)**	**Recurs 230 only (yrs)**	**Recurs[71] 230 + 500 (yrs)**	**Low 230 (yrs)**	**High 230 (yrs)**	**Low 230 +500 (yrs)**	**High 230 +500 (yrs)**
SPL Proposed	50	20	14.5	11.4	80.6	4.6	53.4	3.9
Environmentally Superior North	32	20	22.7	16.0	125.9	7.2	70.1	5.5
Environmentally Superior South	20	62	36.3	11.8	201.5	11.5	40.7	4.6
SWPL	0	80	NA	13.5	NA	NA	39.5	5.9
LEAPS (230 kV really 69kV)	9	30	80.6	24.9	447.8	85.3	25.6	9.8

Under the hypothesis that 500 kV lines are substantially safer than 230 kV lines and produce fewer ignitions, the SPL and the ESNA would be expected to have the shortest recursion time (most frequent ignition). This is because the Southern Alternative (ESSA) consists of a 500 kV line for most of its traversal through the backcountry and only has a 230 kV segment for the last 20 miles of its length. LEAPS would be expected to have the longest recursion time (least frequent ignition) because the main route is all 500 kV, with only a short 69 kV segment being added along the Talega-Escondido line.

Under the assumption that 500 kV lines are no more or less likely to start fires than other transmission lines, the results are somewhat different. Under this assumption, the proposed SPL route and the ESSA are approximately the same, with an expected recurrence rate of 12 years. LEAPS once again has the longest recurrence period with 25 years.

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[71] Under the hypothesis that the fire rate for 500 kV is the same as the rate for 69 kV.

These predicted fire start rates are for ignition only. The probability that a fire will escape initial suppression efforts by fire fighters and become a significant fire under Santa Ana conditions was calculated in Appendix F of the MGRA Phase 1 Direct Testimony to be approximately 36%.[72] The predicted mean interval between major fires can then be obtained by taking the values in the table above and multiplying them by 1/.36 = 2.8. Hence the predicted recurrence period for large fires for SPL under the "safe 500 kV" hypothesis would be 40 years, and 32 years under the "same as other" hypothesis, which remains consistent with our Phase 1 results. The statistical uncertainty is still quite large, though smaller than it was during Phase 1 due to the increased statistics.

Q. What are the impacts of potential system upgrades or expansions on the number of fires expected during the project lifetime?

A. A number of proposed system upgrades are discussed in the EIR/EIS, with the proposed and most alternative routes being slotted for some type of upgrade. The proposed SPL route for instance may require an upgrade in less than a decade after its original construction: "At least four additional 230 kV future circuits may be required after the two 230 kV circuits proposed as part of the SRPL[SPL]. Although this expansion may not be needed for decades, it is expected that two additional 230 kV circuits are possible within the first decade following completion of the Sunrise Powerlink. The most likely substation end points for the additional 230 kV circuits are Sycamore Canyon, Penasquitos, Escondido, Mission and Los Coches Substations."[73]

The route of these extra circuits would most likely be along the SPL (or alternative) route: "From a planning perspective, SDG&E would, to the extent possible, site additional lines in already disturbed corridors using existing ROWs. As a result, at least one or two additional circuits could follow segments of the

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[72] MG-1; MGRA Phase 1 Direct Testimony; Appendix F; pp. 14-17.
[73] Draft EIR/EIS; Section B.2; p. B-5.

proposed Sunrise Powerlink 230 kV transmission corridor, as described in Section B.2."[74]

As likely expansions of the project, which could be considered "full build-out" of the project, these impacts should be fully addressed in the EIR/EIS. While they are discussed briefly throughout the Draft EIR/EIS, nowhere do potential expansions encounter the same level of scrutiny as the main project or its alternatives. This is a material factual deficiency in the Draft EIR/EIS, and should be corrected in the final version.

In Appendix 2D, Section 2D-2.2[75], we address what the impact of system expansion would have on the number of expected fires for the SPL project and alternatives. To calculate the effect of expansion, we examine the total number of expected fires over a forty year lifetime assuming 1) no expansion 2) construction of two additional circuits after 10 years. These calculations are shown on the sheet "Expansion" in File 2D-2 and the results are given in Table 2D-5, printed below:

NUMBER OF IGNITIONS EXPECTED IN 40 YEARS

No expansion	**230 Fires**	**230+500 Fires**	**230 Low**	**230/500 Low**	**230 High**	**230/500 High**
SPL	2.8	3.5	0.5	0.7	8.7	10.4
ESNA	1.8	2.5	0.3	0.6	5.6	7.2
ESSA	1.1	3.4	0.2	1.0	3.5	8.7
SWPL	0.0	3.0	0.0	1.0	0.0	6.7
LEAPS	0.5	1.6	0.1	0.5	1.6	4.1
10 yr Expansion						
SPL	4.8	5.6	0.9	1.1	15.2	16.9
ESNA	3.1	3.8	0.6	0.8	9.7	11.4
ESSA	1.9	4.2	0.3	1.1	6.1	11.3
SWPL	0.0	3.0	0.0	1.0	0.0	6.7
LEAPS	0.5	1.6	0.1	0.5	1.6	4.1

Several conclusions can be reached from the above data. One is that the probable system expansions that would occur over the lifetime of the proposed

[74] Ibid.; Section B2.7; p. B-24.
[75] Appendix 2D, pp. 11-16.

project increase the fire risk (shown above as number of fires expected to be originated by the project over its lifetime). The fractional increase generally depends on the length of the 230 kV segment. This is quite long for the proposed SPL, and so an expansion to four circuits over 20 years would be expected to almost *double* the number of expected fires. The Environmentally Superior Southern Alternative (ESSA), on the other hand, has a much larger fraction of 500 kV transmission line along its path, and so the expansion impacts would be somewhat less.

Accordingly, the ESSA route demonstrates the sensitivity of rate calculations to assumptions made about the safety of 500 kV lines. The predicted number of fires along ESSA varies by a factor between two and five based upon the assumptions made regarding the safety of 500 kV lines.

Finally, it is clear that the statistical uncertainties involved make it difficult to say with what the exact level of risk is. However, the observation of a second fire in 2007 along the 230 kV transmission network has raised the predicted fire rate for SPL, and additionally the likelihood of expansion would significantly increase the level of risk. Between these two effects, the 90% confidence level lower limit for the predicted number of fires along the proposed SPL route is approaching 1.0. ***Consequently, it is possible to say that based upon extrapolation from SDG&E fire history, and assuming future 230 kV system expansion, there is roughly a 90% probability that the SPL would cause at least one fire during the course of its projected 40 year lifetime.***

5. MATERIAL FACTUAL DEFICIENCIES AND INACCURACIES IN THE DRAFT EIR/EIS

Q. Does the Draft EIR/EIS make a reasonable attempt to address the safety and environmental issues associated with wildland fire?

A. The Draft EIR/EIS for the Sunrise Powerlink Proposal is a 7,000 page document representing a tremendous expenditure of high quality talent and effort.

Its thoroughness, which we understand is unprecedented for projects of this type, should set a new, and we think appropriate, standard by which future projects should be analyzed. Furthermore, the draft EIR/EIS contains more than 300 pages of analysis related to wildland fire and power lines, and conducts a fire and fuels analysis for every alternative to the project. This is highly commendable work. However, the fire issues associated with the SPL are numerous, and the Draft EIR/EIS does not adequately address all of them. Material factual deficiencies and inaccuracies in the Draft EIR/EIS are addressed in detail in Appendix 2E, submitted with this testimony.

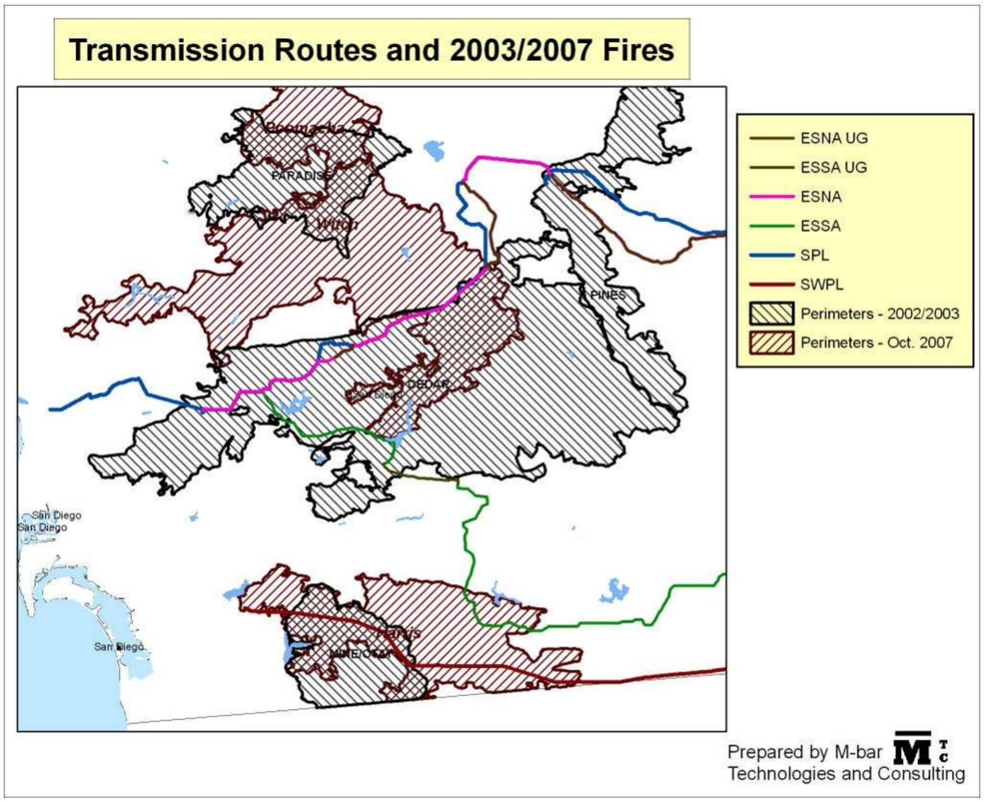
Q. What does the Draft EIR/EIS do well?

A. As discussed in Appendix 2E, the following things were noted as particular strengths of the Draft EIR/EIS: that every route and alternative was analyzed with respect to wildland fire, that field data were collected to perform DEIR analyses, that worst-case fire modeling was used to examine the impacts of fire spread, and that an impact of the chosen routes on the effectiveness of firefighting was performed. ***We note that all transmission alternatives resulted in Class I, immitigable impacts due to potential fire dangers, which is consistent with MGRA Phase 1 and Phase 2 testimony, and that these impacts were used in the determination of the environmentally superior alternatives. The Draft EIR/EIS finds non-transmission alternatives preferable overall from an environmental standpoint.***

Q. What is the most serious material factual deficiency of the Draft EIR/EIS?

A. The treatment of the impact of the October 2007 fires, particularly with respect to biology, is cursory. This is treated in section 2E-2.4 of Appendix 2E. A related topic is the lack of a detailed route-specific treatment of “type conversion” (the permanent loss of native habitat after extreme disturbance such as fires that occur too frequently). This material factual deficiency is called out as a separate issue in section 2E-2.3 of Appendix 2E.

This deficiency is particularly disturbing in the biological sections of the DEIR, since impacts of major wildland fires in the past seven years have had a tremendous impact on the vegetation and wildlife of the affected lands that many of the alternate routes pass through. This is shown clearly in the figure below:



This figure shows the fires of 2002 and 2003 in dark blue cross-hatching, and the fires of October 2007 in brown cross-hatching, superimposed on the proposed and alternative routes. Areas affected by multiple fires are indicated by the overlap of these two patterns, which creates diamond cross-hatching. The areas that were burned once are highly sensitive to type conversion. It was for this reason that MGRA argued in its Phase 1 Opening Brief that an exhaustive study of type conversion and the sensitivity of lands be performed for and applied to areas along the proposed route and any alternatives.[76] This was not done, and is a major material factual deficiency in the DEIR.

Areas burned twice are at extreme risk, if they are in fact not already doomed. As can be seen, both the northern and southern routes pass through such areas. What is remarkable is that biological surveys have been performed the DEIR that may have little relevance to the current status of the environment along the proposed routes. There is no mention whatsoever in the Draft EIR of either the Harris or Witch Creek fires in the biological sections of either the SPL route analysis or of any of the alternative routes. Yet, for significant portions of the line, the October 2007 fires may be the determining factor of the ecology of the areas along the route for the coming years – and perhaps permanently.

This situation can only be addressed properly by resurveying these areas in the aftermath of the October 2007 fires to determine the risk posed to these lands and their ecology by future power line fires and other impacts associated with the lines.

Q. Are all routes adequately addressed in the Draft EIR/EIS?

A. While the proposed and alternative routes get similar scrutiny in the Draft EIR/EIS, the effect of route expansions is not given the same weight or level of analysis, though they are disclosed and discussed. This constitutes a material factual deficiency in the Draft EIR.

The topic of expansion of the proposed project has been addressed at the direction of the July 24, 2007 ruling by Commissioner Grueneich, in which she stated that "the Commission must thoughtfully consider how this potential future expansion should be analyzed in the EIR/EIS"[77], and cites and quotes from the case *Laurel Heights Improvement Ass'n v. Regents of Univ. of Cal.* (1998): "All

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[76] MGRA; Phase 1 Opening Brief; A.06-08-010; p. 8.

[77] California Public Utilities Commission; Assigned Commissioner's Ruling Addressing Newly Disclosed Environmental Information; A.06-08-010; July 24, 2007; p. 6.

phases of a project must be considered when evaluating its impact on the environment."[78]

The lack of full scrutiny of the expansion routes for the proposed and alternative routes in the Draft EIR/EIS is excused because "approval of the SRPL would not result in automatic approval of the potential future expansions to the SRPL and all future 230 or 500 kV lines would require new applications by SDG&E, followed by preparation of project-level environment documents and separate approvals from the CPUC prior to permitting and construction."[79] However, this reasoning leads to insufficient scrutiny of all phases of the project and would be true for expansions which could not be considered a phase of the project.

Yet for the 230 kV expansions in particular, there is a very strong case to be made that these expansions should be considered "full build-out" of the project and therefore need to be fully analyzed within the scope of the EIR/EIS. The 500 kV transmission line that would form the backbone of the SPL transmission infrastructure has twice the capacity of the transmission line that would feed from it at the proposed Central Substation.[80] The DEIR notes that adding additional circuits might be possible within 10 years after completion of the primary route. The routes for these additional circuits, if approved, would most likely follow the ROW already disturbed by construction of the SPL or other routes: "From a planning perspective, SDG&E would, to the extent possible, site additional lines in already disturbed corridors using existing ROWs. As a result, at least one or two additional circuits could follow segments of the proposed Sunrise Powerlink 230 kV transmission corridor..."[81]

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[78] *Laurel Heights Improvement Ass'n v. Regents of Univ. of Cal.* (1988) 47 Cal.3d at 396; 14 Cal. Code Regs. Sec. 15126

[79] Draft EIR/EIS; Section B.2; p. B-5.

[80] Ibid. The 500 kV line can feed up to four 230 kV circuits. Only two are proposed for the SPL and for alternative routes.

[81] Ibid; Sec. B.2.7.1; p. B-24.

Fire would not be the only consideration. Visual impacts would be greater with 230 kV build-out, as would other potential impacts under CEQA/NEPA. These must be fully addressed in order to remedy this material factual deficiency in the Draft EIR/EIS. The impacts of these expansions on fire risks are addressed elsewhere in this testimony, and derive from Appendix 2D.[82]

The 230 kV expansions are easily foreseeable expansions to the project or its alternatives, and would never themselves occur without the project being in place. Hence, they should be viewed as part of the project and fully analyzed as part of the final EIR/EIS.

Q. Are there methodological material factual inaccuracies and deficiencies in the Draft EIR/EIS?

A. Yes, and we discuss two in particular. One easily remediable deficiency is to adopt a more quantitative approach for the results of burn probability modeling and wildfire containment conflict modeling, so that the results can be easily compared for different routes in a quantitative way. This is discussed in Section 2E-2.2 of Appendix E.

More significant is the bias expected to be present in vegetation surveys conducted shortly after a fire, which is addressed in Section 2E-3.2 of Appendix E. This was a major issue raised in the MGRA Phase 1 direct testimony – that the areas burned in the 2002 and 2003 fires if measured now would show fuel loads that were significantly less than the typical load that would be expected during the SPL lifetime.[83] This was confirmed by SDG&E's witness Hal Mortier during cross-examination[84] and constitutes a material factual inaccuracy.

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[82] Appendix 2D, p. 14.
[83] MG-1; Appendix D; Section 2.1.5; p. 10.
[84] Cross Examination of witness Mortier; Public Utilities Commission, State of California; A0608010; July 17, 2007; p.1007.
Exhibit MG – 10; CDF Fire Threat - Pre-Cedar (2003)/Pines(2002) Fires;
Exhibit MG – 11; CDF Fire Threat - Post Cedar (2003)/Pines (2002) Fires;
Exhibit MG – 12; CDF Fire 2003 - Pre-Cedar/Pines Enlarged "Sunrise" Northern Loop

This same bias would be expected to appear in the site surveys performed by the Draft EIR/EIS.[85] This should be adjusted for, and maps regenerated for areas of the route affected by recent fires. If this has already been taken into account in the "burn probability maps", then the exact method used to adjust for the bias should be stated in the final Draft EIR/EIS.

Q. Are there material factual inaccuracies or deficiencies in mitigation measures proposed by the Draft EIR/EIS?

A. As discussed in Section 2E-2.5 of Appendix 2E, the proposal for a vegetation management fund, while innovative, suffers from two shortcomings. The first is that vegetation management is not an adequate measure for protecting structures (a fact acknowledged in the Draft EIR/EIS). While it is one component of structure protection, vegetation management does little to protect against secondary fires started by wind-driven embers and firebrands, which have been shown in several studies to be the primary means by which structures are ignited and destroyed fires.[86,87,88] Only measures that prevent ember (or firebrand) ignitions are effective in protecting homes.[89,90]

The second problem with this approach is the tremendous size of catastrophic wildland fires. In the Witch Fire, for instance, the distance from the origin of the fire east of Ramona to its western terminus near Del Mar is roughly 29 miles. Along its north/south axis, its maximum extent is 23 miles. This perimeter is much larger than those considered in the Draft EIR/EIS, and contains a substantial

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[85] Draft EIR/EIS, Appendix 3, Sections 3A, 3B.
[86] Ramsay, G.C., McArthur, N.A. & Dowling, V.P.; Preliminary results from an examination of house survival in the 16 February 1983 bushfires in Australia; Fire and Materials, 11 (1987) 49.
[87] FOOTE, E.I.D.; 1994; Structure survival on the 1990 Santa Barbara "Paint" fire: A retrospective study of urban-wildland interface fire hazard mitigation factors. MS thesis, University of California at Berkeley.
[88] Cohen, Jack D. 2000. Preventing disaster: home ignitability in the wildland-urban interface. Journal of Forestry 98(3): 15-21.
[89] Mitchell, Joseph W.; Wind-enabled ember dousing; Fire Safety Journal; Volume 41, Issue 6, September 2006, Pages 444-458.
[90] 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, Jan. 2007. Available at: http://www.mbartek.com/FM07_FirebrandsWildfires_1.1F.pdf

number of homes that would not be considered for mitigation under the proposed plan. Clearly, it is not possible to protect all homeowners in the areas potentially affected by power line fires. Hence, even if the utility were to make payments to a mitigation fund that ended up saving more homes overall than were lost in the fire, it could still be liable for property damage due to the fire. This proposal is deficient as mitigation. These shortcomings need to be alleviated or disclosed in the final EIR/EIS.

Q. Were any incorrect conclusions reached in the Draft EIR/EIS?

A. Yes. The overview of power line fires given in the draft EIR/EIS comes to one conclusion that is not supported by data, and which is contradicted by information presented in this testimony, thereby constituting a material factual inaccuracy. We address this in section 2E-3.1 in Appendix 2E of this testimony. The Draft EIR/EIS states that: "There is a public perception that all power lines can be a direct cause of wildfire ignitions, but power line-caused fires are much more prevalent for distribution and lower-voltage transmission lines compared with higher-voltage transmission lines such as the Proposed Project."[91] The Draft EIR/EIS also states that "The primary ignition threats associated with higher-voltage transmission lines like the Proposed Project are indirect, consisting of human-caused accidents during construction and maintenance activities and as a result of increased access to wildlands."[92]

The testimony given in Appendix 2D of this testimony contradicts this claim, which is based upon the supposedly superior engineering characteristics of high voltage transmission lines, rather than in any quantitative study of fire rates. The problem with the approach taken by the Draft EIR/EIS (and by SDG&E in equivalent statements regarding the line) is that this analysis ignores the fact the defects in design, engineering, manufacturing, construction, or due to improper or inadequate maintenance <u>can cause failures</u>. The SDG&E network is tremendously

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[91] Draft EIR/EIS; Section D.15; p. 15-3.
[92] Ibid.; p. 15-4.

large and complex, and consists of a huge number of individual components, many of which could be the cause of a fire were they to fail mechanically or electrically.

Protective measures such as automatic fault detection and shut-off requires that the fault occur before the shut-off can take place, which can take between 1/60 and 3/60 of a second. However, a serious failure on a 230 kV or 500 kV line can release significant heat energy and create hot fragments capable of igniting vegetation in the time it takes to de-energize the line, a fact not contested by SDG&E: "SDG&E makes no assertion that a circuit breaker which de-energizes in 0.1 second will prevent arcing in the event of a short circuit or other line fault in 230 kV or 500 kV lines".[93]

Engineering considerations aside, the fact that 230 kV lines have started two fires due to component failure and wind problems during the last two years is conclusive proof that this type of event *can and does* happen. Furthermore, the calculations put forward in Appendix 2D demonstrate that there is no measurably significant difference between the fire rates for 69 kV and 230 kV transmission lines.

It would be proper to either mention this fact in the Draft EIR/EIS, or to remove the assertion that the primary expected cause of fires due to the lines are expected to be due to construction and human access, which implies that transmission lines left to themselves are relatively safe. This is an extremely important point, because fires due to line faults in high winds are over ten times[94] more likely to develop into large fires than fires started by construction (which can be curtailed during red-flag warning days) and access by people along service roads. MGRA's extreme concern regarding power line fires is focused on the issue of catastrophic fires and wind-initiated faults or failures because these fires are the most devastating to people, property and the environment.

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[93] SDG&E'S 1/12/07 RESPONSE TO MGRA Data Request No. 1; MGRA-9.

[94] This can be derived from MG-1; MGRA Phase 1 Direct Testimony; Appendix F. The success of firefighting initial attack is generally 98%. This drops to 64% when there are severe winds near the fire's point of origin. The ratio of failed initial attack is 36% / 2% is 18 times.

Q. Were all topics raised by the MGRA and requested for inclusion dealt with in the Draft EIR/EIS?

A. No. In the MGRA's Phase 1 Opening Brief, recommendations 11 to 13 deal with the necessity of handling wind and its relation to wildland fire.[95] In particular, it requested that Santa Ana conditions be analyzed for the area under study using both best-available weather modeling and also the data from local weather stations.

None of this analysis was performed. Only SDG&E, in its response to MGRA data request number six[96], provides any weather analysis data at all. This has effectively gone unchallenged and unexamined by the Commission, but it is of critical importance for the safety of the public. ***The omission of wind analysis is a material factual deficiency in the Draft EIR/EIS, which unless addressed will result in an incomplete and flawed report, as the MGRA critique of the SDG&E analysis in Appendix G shows.***

6. CRITIQUE OF SDG&E WIND DATA AND ANALYSIS

Q. Is the SDG&E study of wind, conducted for purposes of engineering the line, adequate to protect against wildland fire?

A. No. This study does not appear be targeted at the effects of Santa Ana winds, which are the most serious and fire-prone weather conditions expected for the area affected by the proposed SPL. The analysis that supports this conclusion can be found in Appendix 2G of this testimony.

Q. What data and analysis lead to the conclusion that the SDG&E study does not adequately address Santa Ana winds?

A. SDG&E cites and notes meteorological sources which describe the conditions that are associated with extreme wind events. Among the conditions

[95] MGRA Phase 1 Opening Brief; pp. 7-8.
[96] SDG&E; Response to MGRA Data Request #6. http://www.sdge.com/sunrisepowerlink/discovery.shtml

that are explicitly mentioned as being associated with high winds are canyons or valleys that are aligned along the direction of prevailing winds and additionally downhill wind flow forced by strong atmospheric pressure gradients. In the SDG&E study, these criteria are deemed to be relevant to Grapevine Canyon, which contains a segment of the proposed SPL route. Grapevine Canyon trends east-southeast downhill from the coastal range, making it nearly perpendicular to prevailing Santa Ana winds. Additionally, the slope is uphill to the west, opposite to that associated with strong Santa Ana wind conditions. Nevertheless, SDG&E has designed this segment of line with very conservative wind gust design criteria, requiring that the line endure wind gusts up to 146 mph. This would only be appropriate for winds coming in from the west. While such winds could potentially occur, and the design requirements are probably appropriate, the "wet storm" that they would be associated with would not likely be the start of a catastrophic power line fire if a component failure occurred.

Q. What design criteria has SDG&E applied in areas of Santa Ana wind hazard?

A. Areas from the western terminus of the line to east of Ramona are assumed not to have wind gusts any stronger than 56 mph. From the area east of Ramona east to Grapevine Canyon the maximum wind gust speed to be designed for would be 68 mph.

Q. What does SDG&E base these design criteria on?

A. The criteria are based upon weather station data. The majority of the 56 mph segment is based on historical wind data from Lindbergh Field. The remainder of the 56 mph segment is based on wind data from Ramona Airport. For the 68 mph segment, the wind gust design criterion was determined by data from the Campo weather station. The application of these criteria to the route is displayed in the map provided by SDG&E along with its data request, attached as File 2G-2[97].

Q. Why are these choices of weather station inappropriate for Santa Ana conditions?

A. Use of a coastal weather station, such as Lindbergh Field, for determining Santa Ana gust criteria is inappropriate. The distribution of Santa Ana winds is determined as a result of a struggle between the Santa Ana winds and the daily on-shore flow of marine air, coupled with interactions with the local topography[98,99,100]. This interaction, along with a graphic depicting the segments of the proposed SPL with different design criteria (as per the delineations provided in File 2G-2), is shown in Figure 2G-1, reproduced below:

[Remainder of page left blank]

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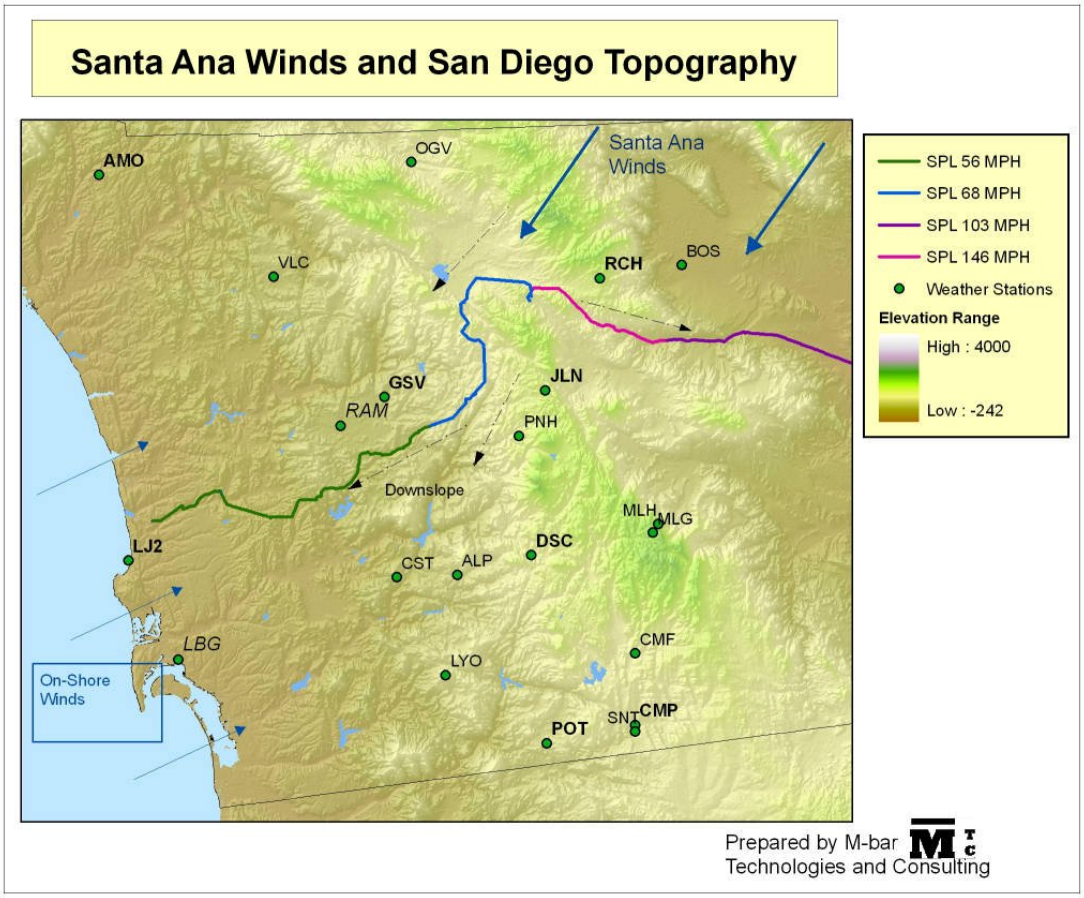
[97] Appendix 2G; p. 3; SDGE_MGRA49_map.pdf

[98] Fosberg, Michael A., O'Dell, Clyde A., and Schroeder, Mark J. 1966. Some characteristics of the three-dimensional structure of Santa Ana winds. Berkeley, Calif., Pacific SW. Forest & Range Exp. Sta. 35 pp., illus. (U. S. Forest Serv. Res. Paper PSW-30)

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

[100] Sommers, William T.; LFM Forecast Variables Related to Santa Ana Wind Occurrences; Monthly Weather Review; September, 1978; v. 106, pp. 1307-1316.



The strength of on-shore (thin blue arrows) winds versus the Santa Ana pressure gradient (thick blue arrows) determines how far from the mountains that Santa Ana conditions can extend. Where the winds line up with downslope topographical features such as valleys they can be significantly accelerated. These downhill gradients are depicted by the dashed black arrows in the figure. The green circles represent weather stations. Those used in MGRA analysis are in bold-face, while those used only by SDG&E such as Lindbergh Field (LBG) and Ramona Airport (RAM) are in italics. Note that many of the downslope areas are oriented in a roughly parallel direction to the Santa Ana winds. This conforms to SDG&E's expectation for high-wind areas: "*Winds can be strong and gusty near the mouths of canyons oriented parallel to the direction of airflow. Funneling of airflow through mountain passes and along deeper valleys can cause unusually high wind speeds… valleys with persistent down slope winds* *associated with strong pressure gradients.*"[101] However, contrary to this assessment, the western regions were not treated as high wind areas. In the region with hazardous vegetation, only the Grapevine Canyon segment was designed for high winds.

Q. Does the Grapevine Canyon segment, designed for 146 mph winds, experience strong Santa Ana events?

A. No, not compared to nearby weather stations on western slopes. Wind gust data taken from the Ranchita weather station shows that during Santa Ana events the winds actually can be calmer than they were prior to or after the event. This is shown in Figure 2G-3, which shows ten days of data from the Ranchita (RCH) RAWS weather station.[102] This can be compared with Figure 2G-4, which depicts the same data collection period from a nearby weather station in Julian (JLN), and which shows strong, gusting Santa Ana winds.[103]

Q. What criteria were used for determining the design criteria for the Grapevine Canyon segment?

A. SDG&E used weather data from the Beaumont Canyon weather station in Riverside County. This is used as a "worst case" weather station, being situated in the San Gorgonio Pass and being known for very strong wind conditions. This was deemed appropriate because Grapevine Canyon is a steeply sloping mountain canyon, and if its direction was aligned with a strong wind – particularly one from the west-northwest so that the flow was downhill – the wind could experience strong acceleration and reach extreme wind speeds.

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[101] SDG&E; Response to MGRA Data Request #6. http://www.sdge.com/sunrisepowerlink/discovery.shtml
[102] Appendix 2G; p. 11.
[103] Appendix 2G; p. 10.

Q. Would these design criteria be appropriate elsewhere along the route?

A. It follows that if the SPL segment on the eastern slopes is designed for "canyon effects" using data from a worst-case weather station, then the SPL route for the western slopes should be similarly designed, since these areas are not prone only to high winds, but also to explosive fire growth due to the presence of heavy vegetation in conjunction with high winds should a failure in any line component occur.

Q. How far to the west should conservative design criteria be extended?

A. In order to answer this question, MGRA has analyzed data from a number of weather stations during six Santa Ana wind events that occurred between 2006 and 2007, including the October 2007 event which led to the Witch, Rice, and Guejito power line fires. This data is presented in Table 2G-1, reprinted below for convenience:

MAXIMUM GUST SPEEDS (MPH) DURING SANTA ANA EVENTS

Abrev.	Station	10/26/06	11/29/06	12/24/06	1/6/07	1/12/07	10/21/07
POT	Potrero	32	46	20	47	35	70
GOS	Goose Valley	28	36	19	41	18	54
CMP	Campo	39	47	37	45	45	60
RCH	Ranchita	25	21	14	23	19	35
JLN	Julian	35	47	30	45	40	58
DSC	Descanso	35	35	17	40	34	60
AMO	Ammo Dump	35	15	25	40	25	47
LJ2	La Jolla	17	17	15	32	15	23
BMT	Beaumont	47	55	27	50	42	65

Two of the stations used by SDG&E – Lindbergh Field (LBG) and Ramona Airport (RAM) were not included because they do not include the "wind gust" data in their histories, which has been used by MGRA in all weather analyses to date. We substitute La Jolla (LJ2), another coastal station for Lindbergh Field and Goose Valley (GOS) as being more appropriate for the SPL route through

Ramona. The Ramona Airport lies near the western end of the broad Santa Maria Valley, and is a poor representative of the steep canyon lands that the SPL route traverses through the area. The "worst-case" Beaumont station is included for comparison.

We note that the "coastal effect" is very strong. Data from the La Jolla (LJ2) station indicate a strong suppression of Santa Ana conditions. We can deduce that the Lindbergh Field (LBG) station would be experiencing similar conditions. Hence, it is inappropriate to use it as a design reference for any portion of the line when designing for Santa Ana wind events.

Another thing to be noted is the strong consistency between the Potrero (POT), Descanso (DSC), Julian (JLN), and Campo (CMP) stations. While these vary from event to event as far as which encountered the strongest gust, the maximum gust speeds for these stations are usually quite close together, and this should be taken to mean that they are good representatives of the regions high on the western slopes of the coastal range, and also that Santa Ana winds effect the entire region and are not an entirely local phenomenon.

The weakening of the Santa Ana event as it approaches the coast can be seen first at Goose Valley (GOS), which has slightly lower values than the maximum stations, and then at Ammo Dump (AMO), which is in northeast San Diego County and still closer to the coast.

It would therefore be appropriate to extend conservative design criteria into any region where the Campo (CMP) weather station data would be considered appropriate, assuming that there are valleys tending downslope to the west in the area being reviewed.

Q. Have the wind gust limits proposed by SDG&E for maximum expected 50-year wind load on the SPL been approached or exceeded by Santa Ana Winds?

A. Yes. The wind gust speed at Goose Valley (GOS) in October 2007 was 54 mph, only two mph short of the maximum gust design criteria. The SPL route to the east would have been expected to encounter even stronger winds, and there is a good chance that the design criteria would have been exceeded. Likewise, the Potrero (POT) station recorded a maximum gust speed of 70 mph, and this would also have exceeded the 68 mph wind gust criterion put in place for Campo.

However, the Ranchita (RCH) station, near the SPL segment designed for 146 mph gusts, encountered winds that were similar to the coastal winds measured in La Jolla (LJ2).

Q. Was the Beaumont station a plausible "worst-case" weather station?

A. Yes, the Beaumont (BMT) station is a plausible "worst-case" weather station, having recorded the maximum wind gust value measured in three (but only three) of the six events. Notably, though, it did *not* exceed the wind speed measured at the Potrero station during the October 2007 Santa Ana event, and both Descanso and Campo stations clocked speeds of only 5 mph less than Beaumont. This suggests that it may even be appropriate to use the Beaumont weather station data for line segments for which the Campo weather station is now being used. Beaumont is also preferable from an analysis standpoint because it has a much longer data history than the other stations, as can be seen in the logs attached to this testimony[104].

Q. Exactly how are the maximum wind gust speed design values shown in the SDG&E map derived from the weather data?

A. This is not clear, because the approach taken by SDG&E is inconsistent. According to an example calculation provided by SDG&E[105], the maximum design wind gust load is determined by estimating the 100 year maximum wind speed using statistical tools, and then multiplying it by a factor of 1.6 "gust factor". However, this approach has not been consistently applied. This can be

[104] Appendix 2G; File 2G-1; WindHistory.xls; p. 3.
[105] SDG&E Response; MGRA-48.

seen by examining the correlation of the map and the calculations provided in the MGRA Data Request #6 and shown in the table below:

COMPARISON OF SDG&E WIND GUST MAP AND ANALYSIS

Segment West	**Segment East**	**Max Gust mph**	**Station**	**50 y Wind mph**	**50 y Gust mph**	**100 y Wind mph**	**100 y Gust mph**
Del Mar	Ramona	56	LBG	50.0	80.0	55.3	88.4
Ramona	E. Ramona	56	RAM	42.8	68.5	45.3	72.5
E. Ramona	Grapevine	68	CMP	54.3	86.9	57.7	92.3
Grapevine	Desert	146	BMT	75.6	121.0	91.4	146.2
Desert	Desert	103	El Centro	60.5	96.8	64.6	103.4

One of the most notable problems in the analysis shown in the table above is that the method detailed by SDG&E indicates that five different segments of the line were independently treated between the desert and the western end of the line, whereas the map provided to illustrate this shows only four segments. It appears that the 56 mph segment represents a merger of the first two segments (LBG and RAM) in the SDG&E analysis description.

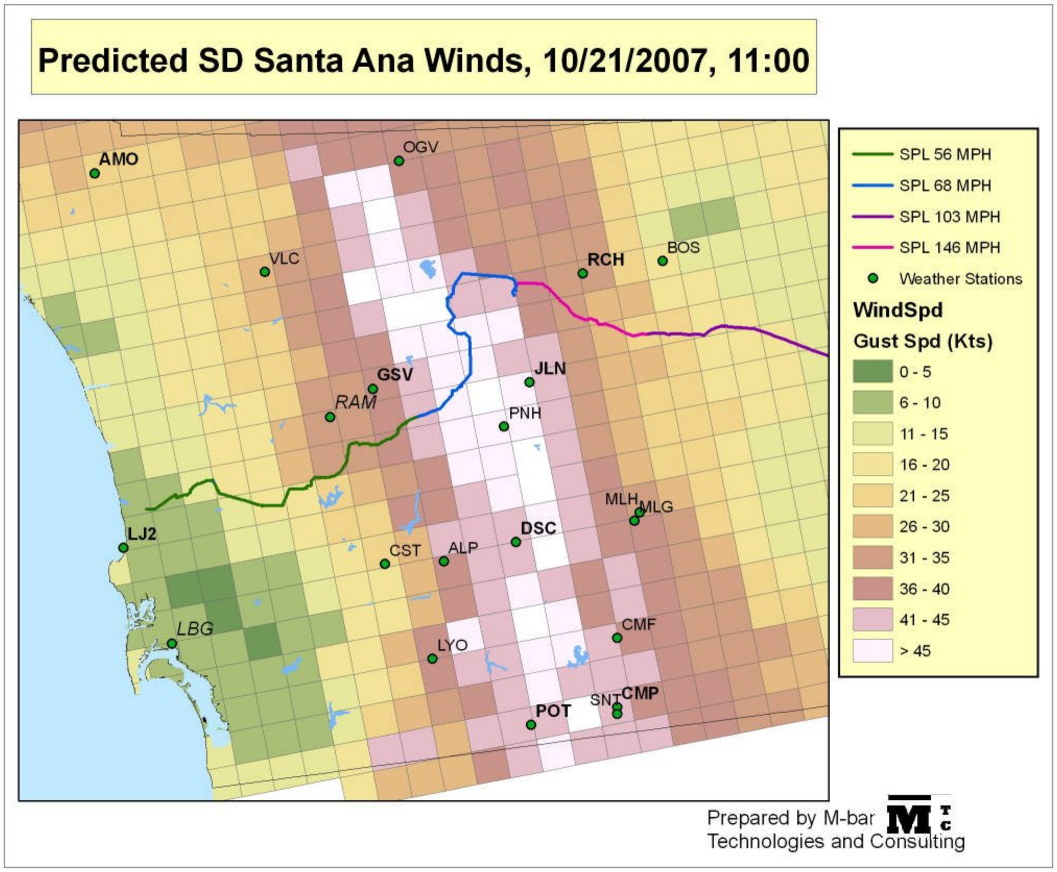
In the data request, the design gust factor was defined as being obtained by taking the 100 year wind speed and multiplying it by a "gust factor" of 1.6. As can be seen in the table, this was applied correctly for the Desert and Grapevine Canyon segments of the line. However, it is not at all clear how the 56 mph and 68 mph gust values were obtained. It would appear that for the western segment it is possible that the 100 year wind speed and not 100 year gust speed was used. For the sections from Ramona to Grapevine canyon, there is no plausible explanation of how the value of 68 mph listed on the map was obtained.

If the map provided by SDG&E is simply inaccurate, it should be corrected and the correct values for wind gusts applied, and the map re-issued to the MGRA and the Commission***. If, however, the SDG&E map accurately represents the planned engineering design limits for the SPL, this represents a major and potentially catastrophic under-engineering of the project.*** New construction costs would need to be developed by SDG&E and provided for inclusion in Phase 2 cost/benefit analysis.

Q. Do any other data support the assertion that the western segment of the line requires a more conservative design?

A. Yes, data from the National Digital Forecast Database (NDFD) can be used to support the assertion that Santa Ana wind intensities are much greater on the western portion of the line. These are recorded forecasts that show predicted wind gust intensities for a coarse grid of geographic cells. While they are not fine-grained enough to handle the effects of small-scale topography, they show general trends. A plot from the October 2007 Santa Ana event, representing the forecast for a period two hours prior to the start of the Witch Fire, is shown in Figure 2G-4, shown again below:

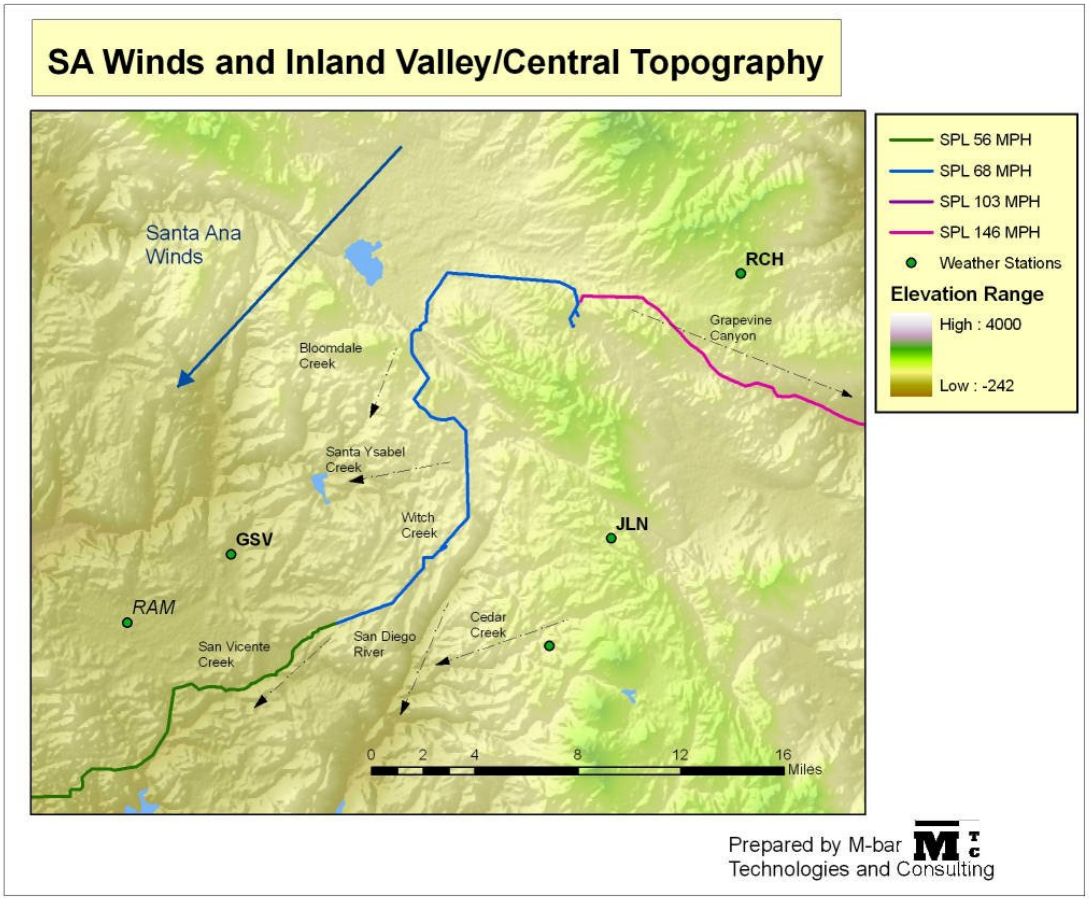
[Remainder of page is left blank]



As is quite clear, the most intense winds would have affected only those portions of the line designed for 56 mph and 68 mph wind gusts.

Q. Do conditions exist on the western slopes of the mountains that would merit the application of conservative design standards?

A. Yes. There are a number of valleys and canyons along or near the proposed SPL route that trend downhill from the northeast to the southwest which could align with Santa Ana winds and cause “funneling” and acceleration of the wind speeds. These are shown in Figure 2G-5, also attached below:



Some of the canyons that could potentially align with Santa Ana winds from the northeast quadrant are indicated by dashed arrows. Among the valleys and canyons that the SPL route crosses, approaches or follows are Bloomdale Creek, Santa Ysabel Creek, the San Diego River, Kimball Valley, and San Vicente Creek.

Also indicated on the map are Cedar Creek, starting point of the Cedar Fire, which is California's largest historical fire, and Witch Creek, starting point of the Witch Fire, which is California's fourth largest historical fire. That these are only about five miles apart is not fully coincidental – this area is well known by locals and firefighters to be subject to some of San Diego's worst Santa Ana wind conditions. The Witch Fire started in or near the ROW of the 69 kV transmission line that is planned for consolidation with the ROW of the Sunrise Powerlink project and follows the same path through the area[106].

Q. What return time for catastrophic wind events should be chosen to protect the public?

A. SDG&E studied 50 and 100 year return times as part of its standard analysis. However, as shown in Table 2G-2, reproduced below, these are not fully adequate.

Return Period (years)	**Expected Occurrences**	**Probability ≥ 1 event**
50	0.8	55%
100	0.4	33%
200	0.2	18%
300	0.13	12%

The probability column shows the calculated probability that the wind gusts will exceed the design criteria during the forty year lifetime proposed for the project. Given that component failures in the wind may lead to ignition and rapid fire growth, with massive loss of property, life, and environment (as recently occurred in the Witch Fire) it is critical that the line be designed in such a way that recurrence of a wind event that approaches the designed maximum is very small. This criterion would only be achieved by accepting design criteria that assume at least 200 and preferably 300 year recurrence times.

[106] San Diego Gas and Electric Company; Sunrise Powerlink Transmission Project; Application for Certificate of Public Convenience and Necessity; Proponent's Environmental Assessment; August 6, 2006; Figure 2.3-1E, Figure 2.3-1E, Table 3.4-2.

Q. What impacts would these mitigation measures have on the proposed SPL project?

A. We would recommend applying the more stringent "Beaumont" design criteria to SPL route areas on the western slopes of the coastal range. We would also recommend application of 300 year recurrence times due to the potentially catastrophic consequences of line failures under high wind conditions. A number of measures that can be taken to comply with GO 95 are listed in the response to MGRA Data Request #6[107]. The extra cost of adding these engineering enhancements to the line in areas at-risk should be included as potential mitigation in Phase 2 testimony and added to the total cost of the project as part of the overall cost/benefit analysis. Additionally, these engineering enhancements might have significant visual impacts, and these would need to be fully disclosed and analyzed as part of the Final EIR/EIS.

Q. Does this conclude your testimony for MGRA?

A. Yes, this concludes my portion of the MGRA testimony.

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[107] Sunrise Powerlink Project; SDG&E's 3/3/08 Responses to MGRA Data Request No. 6; MGRA-51.