MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

I. GENERAL OBJECTIONS

1. SDG&E objects generally to each request to the extent that it seeks information protected by the attorney-client privilege, the attorney work product doctrine, or any other applicable privilege or evidentiary doctrine. No information protected by such privileges will be knowingly disclosed.

2. SDG&E objects generally to each request that is overly broad and unduly burdensome. As part of this objection, SDG&E objects to discovery requests that seek "all documents" or "each and every document" and similarly worded requests on the grounds that such requests are unreasonably cumulative and duplicative, fail to identify with specificity the information or material sought, and create an unreasonable burden compared to the likelihood of such requests leading to the discovery of admissible evidence. Notwithstanding this objection, SDG&E will produce all relevant, non-privileged information not otherwise objected to that it is able to locate after reasonable inquiry.

3. SDG&E objects generally to each request to the extent that the request is vague, unintelligible, or fails to identify with sufficient particularity the information or documents requested and, thus, is not susceptible to response at this time.

4. SDG&E objects generally to each request that: (1) asks for a legal conclusion to be drawn or legal research to be conducted on the grounds that such requests are not designed to elicit facts and, thus, violate the principles underlying discovery; (2) requires SDG&E to do legal research or perform additional analyses to respond to the request; or (3) seeks access to counsel's legal research, analyses or theories.

5. SDG&E objects generally to each request to the extent it seeks information or documents that are not reasonably calculated to lead to the discovery of admissible evidence.

6. SDG&E objects generally to each request to the extent that it is unreasonably duplicative or cumulative of other requests.

7. SDG&E objects generally to each request to the extent that it would require SDG&E to search its files for matters of public record such as filings, testimony, transcripts, decisions, orders, reports or other information, whether available in the public domain or through FERC or CPUC sources.

8. SDG&E objects generally to each request to the extent that it seeks information or documents that are not in the possession, custody or control of SDG&E.

9. SDG&E objects generally to each request to the extent that the request would impose an undue burden on SDG&E by requiring it to perform studies, analyses or calculations or to create documents that do not currently exist.

10. SDG&E objects generally to each request that calls for information that contains trade

secrets, is privileged or otherwise entitled to confidential protection by reference to statutory protection. SDG&E objects to providing such information absent an appropriate protective order.

II. EXPRESS RESERVATIONS

1. No response, objection, limitation or lack thereof, set forth in these responses and objections shall be deemed an admission or representation by SDG&E as to the existence or nonexistence of the requested information or that any such information is relevant or admissible.

2. SDG&E reserves the right to modify or supplement its responses and objections to each request, and the provision of any information pursuant to any request is not a waiver of that right.

3. SDG&E reserves the right to rely, at any time, upon subsequently discovered information.

4. These responses are made solely for the purpose of this proceeding and for no other purpose.

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III. RESPONSES

QUESTION 1

With regard to SDG&E Data Request Response MGRA-2026-8-03-2:

"For example, if 5 animal-contact caused ignitions occurred at locations where the 99th wind gust falls between 25th to 50th percentiles of the overall 99th wind gust (WRwind = 21) and where the 50th consequence is above the overall 50th percentile threshold, the Rfreq is calculated as follow:"[sic]

a. Does SDG&E use a wind-gust adjustment for animal contact?

b. If the answer to a is yes, what is the justification for adjusting the frequency of animal contact ignitions as a function of wind gust speed?

c. Does SDG&E apply the same wind gust weight adjustment to all ignition drivers?

d. If the answer to c is no, which ignition drivers have a wind gust adjustment applied, and what is the basis for the application of the weighting and its magnitude?

RESPONSE 1

a. Yes. SDG&E applied a wind gust weight factor (WR_{wind}) to ignition events, including those caused by animal contact when calculating the R_{freq}

b. By applying a wind-based weighting, SDG&E accounts for the elevated wildfire risk associated with ignition events occurring in locations prone to high wind gusts. This approach enables a location-specific quantification of risk, even for ignition causes not directly influenced by wind, such as animal contact.

c. Yes

d. N/A

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QUESTION 2

With regard to SDG&E Data Request Response MGRA-2026-8-03-3:

a. For risk factors such as wind gust, humidity, and temperature, were these sampled at the time of the risk event or does the analysis use aggregated data (i.e. averages, peaks, etc.)?

b. If sampled at the time of the was this based on climatology models or weather station data?

c. If aggregated describe the source of the data, aggregation period method.

RESPONSE 2

a. For this analysis, the risk factors other than Fire Potential Index (FPI) such as wind gust, humidity, and temperature, were aggregated for a given location.

b. N/A

c. Historical wind gust, humidity and temperature were aggregated at the weather station level. For each station, wind gust was aggregated using the 99^{th} percentile, and both temperature and humidity were aggregated using minimum, median and maximum values. All risk events (outages and ignitions) were then spatially tied to their associated weather station to incorporate these localized climatological factors into the risk driver prioritization analysis.

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QUESTION 3

With regard to SDG&E Data Request Response MGRA-2026-8-03-4:

In SDG&E's most extreme wildfire scenario, the total risk with SDG&E's risk aversion applied is 16 times larger than without risk aversion. In Section 5.2.2.3 of its WMP SDG&E explains this adjustment comes from applying a power law with an exponent of 1.47.

a. Provide the basis for choosing a power law for the risk aversion function.

b. Provide the method by which the exponent of 1.47 was determined.

c. Does SDG&E agree that wildfire loss statistics, in particular wildfire size, generally follow a power law distribution?

d. If the answer to c is yes, then please provide an explanation of why it is appropriate to adjust a power law distribution by multiplying by another power law distribution.

RESPONSE 3

SDG&E objects to the request to the extent it seeks information that is otherwise publicly available in SDG&E's existing filings and regulatory submissions. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

a. Refer to "Risk-Averse Scaling Function" detailed discussion in SDG&E's recent RAMP submission at "SCG/SDG&E RAMP-3 Risk Quantification Framework-24"
   https://www.sdge.com/sites/default/files/regulatory/Vol1_Ch3_Joint_ERM_Risk_Quantification.pdf

b. Refer to the answer given in 3a.

c. Yes, SDG&E agrees with this statement. Refer to "Consequence of a Risk Event" discussion in SDG&E's recent RAMP submission, starting in "SDGE-Risk-4 Wildfire and PSPS-25"
   https://www.sdge.com/sites/default/files/regulatory/SDG%26E%20-Risk-4%20Wildfire%20%26%20PSPS_0.pdf

d. SDG&E's wildfire risk modeling framework demonstrates that wildfire consequences within its service territory exhibit a heavy-tailed loss distribution, underscoring the significant role that infrequent yet high-impact events play in overall risk assessment. By modeling tail events, this approach ensures that rare but severe losses are appropriately accounted for in decision-making, leading to a more precise risk characterization and the development of more effective mitigation strategies.

To further refine its wildfire consequence modeling, SDG&E has transitioned its wildfire consequence model to Technosylva's 24-hour unsuppressed simulations.[1] These simulations validate the previously observed heavy-tailed behavior while offering a site-specific, asset / span, level analysis of wildfire impact across varying observed weather conditions within SDG&E's service territory. While statistical models such as power-law distributions and/or Technosylva simulations effectively describe the potential scale of wildfire-related losses, they do not inherently account for any risk attitude, whether risk-seeking or risk-averse. These models provide a robust quantitative foundation for understanding wildfire impacts but lack the dimension necessary to capture SDG&E's reasonable approach to wildfire risk management.

Risk aversion plays a critical role in regulatory and operational decision-making, shaping how SDG&E evaluates, plans for, and responds to wildfire threats. It influences mitigation strategies, infrastructure investments, emergency response protocols, and stakeholder engagement.

To ensure wildfire risk is managed in accordance with regulatory requirements and community safety priorities, additional modeling techniques, such as incorporating a risk-aversion scaling function, are essential. These adjustments help integrate both statistical projections and the practical, economic sensitivities of utilities, regulators, and communities, ensuring that extreme loss scenarios receive appropriate consideration in planning and risk mitigation efforts.

[1] SDGE-Risk-4 Wildfire and PSPS-25 https://www.sdge.com/sites/default/files/regulatory/SDG%26E%20-Risk-4%20Wildfire%20%26%20PSPS_0.pdf

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QUESTION 4

With regard to SDG&E Data Request Response MGRA-2026-8-03-5:

Please provide a version of the table MGRA-2026-8-03_Q06-OEIS-Table-4-3.xlsx with three additional columns listing the total number of customers current as of 2025 on each listed circuit for each of the customer classes:

a. Large/Medium commercial

b. Small commercial

c. Residential

RESPONSE 4

SDG&E objects to the request to the extent it is unduly burdensome and calls on SDG&E to perform studies or analysis that do not currently exist. Subject to and without waving the foregoing objections, SDG&E responds as follows:

Commercial and Industrial customers are split based on their kW demand. SDG&E does not have C&I broken down by small, medium or large. The documentation provided includes customers broken out into total, residential and C&I based on current circuit customer counts.

Please see the attached spreadsheet titled "SDGE Response MGRA-2026-8-04_Q04-OEIS-Table-4-3.xlsx."

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QUESTION 5

With regard to SDG&E Data Request Response MGRA-2026-8-03-7:

SDG&E states that it "*does not default to undergrounding as the preferred mitigation strategy. For each feeder segment, SDG&E evaluates risk reduction and cost-benefit ratios for both Combined Covered Conductor and Strategic Undergrounding mitigation options*."

In SDG&E's last GRC, the WiNGS Planning suite used a decision tree (see GRC DR request responses SDG&E DR Response MGRA-3-13, SDG&E DR Response MGRA-4-1, and SDG&E DR Response TURN-SEU-056-1).

a. Please confirm whether the methodology used during the GRC has been replaced and whether a decision tree is still used at any point in the mitigation decision process.

b. Since SDG&E evaluates both risk reduction and cost-benefit ratios to evaluate mitigation options, please provide the quantitative and qualitative process by which both risk reduction and CBR go into the mitigation decision.

RESPONSE 5

a. The current mitigation decision process has evolved from the methodology used in previous WiNGS-Planning versions. While a structured framework still guides mitigation selection, the process now incorporates a more dynamic, data-driven approach. After the Risk Analytics team reviews and approves the feeder-segment outputs from WiNGS-Planning, a multidisciplinary group of subject matter experts, including Electric System Hardening engineers, fire coordination staff, meteorologists, risk data scientists, and construction engineers, conducts a comprehensive evaluation.

This team assesses the WiNGS-Planning model results and associated cost-benefit ratios, considering feasibility, expected risk reduction, and residual risks for each mitigation option, such as Combined Covered Conductor or Strategic Undergrounding. They also factor in both upfront installation and lifecycle costs, which are modeled over a 55-year lifespan, to ensure long-term cost-effectiveness.

Additionally, the team evaluates opportunities to "bundle" upstream feeder segment hardening projects to enhance PSPS risk reduction and achieve cost efficiencies through reduced permitting and mobilization efforts.

This integrated, expert-driven process reflects a refinement of earlier methodologies, allowing for more nuanced and context-sensitive mitigation decisions. For further details, please refer to

Figure 6.1.3.2.6, *Mitigation Initiative Prioritization to Reduce Wildfire and PSPS Risk in the 2026–2028 WMP*.

b. SDG&E performs a cost-benefit analysis to compare the expected risk reduction and lifecycle costs of Strategic Undergrounding and Combined Covered Conductor. This analysis informs the prioritization of grid hardening mitigations. The WiNGS-Planning model estimates reductions in wildfire, PSPS, and PEDS risks for each feeder segment located in Tier 2 and Tier 3 of the High Fire-Threat District (HFTD). Based on these risk reduction estimates, SDG&E recommends a mitigation strategy for each feeder segment. These recommendations are then reviewed by the Electric System Hardening team for further evaluation. As part of the scoping process, a desktop feasibility study is conducted to assess the practicality of the proposed mitigation. Adjacent upstream and downstream segments are also evaluated to determine whether Strategic Undergrounding or Combined Covered Conductor is the more effective solution (see Section 6.1.2, *Risk-Informed Prioritization*). Where appropriate, consecutive segments may be bundled to maximize PSPS risk reduction and realize economies of scale.

   Additionally, Electric Distribution Planning engineers review wildfire mitigation projects for any capacity-related grid needs identified on the associated circuits. These needs, along with any required upgrades, are identified through the annual Distribution Planning Process. As part of their review, engineers verify the results of the Distribution Planning Process and assess whether any changes in scope have occurred since its completion. If necessary, upgrades or reconfigurations are incorporated into the wildfire mitigation project scope. For further details, please refer to Figure 6.1.3.2.6, *Mitigation Initiative Prioritization to Reduce Wildfire and PSPS Risk in the 2026–2028 WMP*.

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QUESTION 6

With regard to SDG&E Data Request Response MGRA-2026-8-03-11:

Please provide:

a. An Excel spreadsheet listing all FPI daily records going back to April 2013, listing FPI value, date, and operational district.

b. A shapefile or geodatabase representing SDG&E's operational districts.

RESPONSE 6

SDG&E objects to the request to the extent it is overly broad and unduly burdensome, particularly in that it seeks information dating back more than 10 years. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

a. See attached spreadsheet titled "SDGE Response MGRA-2026-8-04_Q6_Operational FPI - 2012-Current.xlsx."

b. See attached zipped folder titled "SDGE Response MGRA-2026-8-04_Q6_District Shapefiles.zip."

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QUESTION 7

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

Define "Combined Covered Conductor" and why this is different from the traditional term "Covered Conductor.

RESPONSE 7

The term "Covered Conductor" previously referred solely to replacing bare conductor with covered conductor manufactured with an internal semiconducting layer and external insulating ultraviolet-resistant layers to provide incidental contact protection. The "Combined Covered Conductor" Program (WMP.455) refers to the replacement of bare conductors with covered conductors in the HFTD and, as needed, combining additional equipment replacements and installations such as structures, lighting arrestors, fuses, connectors, and avian protection. Furthermore, advanced protection solutions like Early Fault Detection (EFD) and Falling Conductor Protection (FCP) are assessed and implemented to enhance the system's effectiveness against various risk drivers.

A revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan.

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QUESTION 8

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

Does the "CCC_RA_RAMP" tab calculate the effectiveness of covered conductor alone or does it include EFD and FCD?

RESPONSE 8

All calculations related to Combined Covered Conductor include effectiveness of EFD and FCP.

A revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan..

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<u>QUESTION 9</u>

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

Why is Expected Risk Reduction dramatically less than Activity Effectiveness for combined covered conductor? Section 6.2.1.2 does not clarify why this would be the case.

<u>RESPONSE 9</u>

The expected risk reduction for combined covered conductor may appear lower than the stated activity effectiveness due to two key factors: baseline asset condition and the probabilistic nature of risk reduction modeling.

First, the effectiveness of any mitigation activity is calculated relative to the baseline condition of the asset. Assets that have already received traditional hardening measures will experience less additional benefit from the application of covered conductor compared to assets that are currently unhardened. In SDG&E's modeling framework, this means that the marginal risk reduction is lower where the baseline already includes some degree of risk mitigation.

Second, expected risk reduction is derived through stochastic simulation in which ignition events are probabilistically sampled out based on the modeled efficacy of the mitigation. For example, a mitigation effectiveness of 0.58 implies that, on average, 58 out of 100 ignition events are prevented on an unhardened asset. However, because wildfire risk is highly skewed (tail risk, where a small number of events can drive a large share of total expected dollar impact) the removal of events does not necessarily translate to a proportional reduction in overall risk. The events that are sampled out may be lower impact on average, and therefore the total expected risk (in dollar terms) may be reduced by less than the raw event count suggests.

This distinction between activity effectiveness and expected risk reduction is an intentional aspect of the model design, ensuring that mitigation impacts are realistically scaled to both the existing system state and the asymmetric nature of wildfire consequences.

A revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan.

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QUESTION 10

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

While the Excel file is interactive and relatively transparent, changing the Mitigation Effectiveness value in cell K10 on the CCC_RA_RAMP page has no effect on the calculated mitigation values.

a. Why is this the case?

b. Is there a way to adjust the table in order to insert user-defined efficiencies?

c. If not, please provide an alternative version of SDG&E_2026-2028_Base-WMP_Appendix G Supporting Data_R0.xlsx with the CCC efficiency set to 85%.

RESPONSE 10

SDG&E objects to the request on the grounds it calls for SDG&E to conduct studies or analysis that do not currently exist and are inconsistent with SDG&E's existing risk models. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

a. Modifying the effectiveness does not affect risk reduction because SDG&E incorporates mitigation effectiveness into its risk reduction calculations within the WiNGS-Planning tool, where millions of stochastic simulations are performed to ensure accurate risk reduction assessments at the feeder-segment level. WiNGS-Planning outputs can be reviewed in tab "raw_WiNGS_Planning".
b. User-defined mitigation efficiencies can be modified in all tabs except CCC and SUG, where this functionality is not available due to risk reductions being calculated within the WiNGS-Planning tool.
c. See attached file titled "SDGE Response MGRA-2026-8-04_Q10c.xlsx" with 85% CC efficacy rate.

A revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan

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QUESTION 11

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

Do the cost benefit calculations derived from the file incorporate SDG&E's risk attitude function?

RESPONSE 11

Yes, the cost benefit calculations derived from the file incorporate SDG&E's risk attitude function.

A revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan

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<u>QUESTION 12</u>

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

SDG&E states that "*Currently, SDG&E does not calculate a Mitigation Effectiveness metric for PSPS and PEDS risk reductions*." Does SDG&E calculate a wildfire risk reduction metric for PSPS and PEDS?

<u>RESPONSE 12</u>

SDG&E does not establish a wildfire risk reduction metric for PSPS and PEDS, as its approach to risk assessment focuses on analyzing the likelihood and potential consequences of risk events both before and after mitigation. For each mitigation effort, risk reduction is determined by calculating the difference between the total baseline risk and the total post-mitigation risk.

Since both PSPS and PEDS events are highly dependent on weather conditions, SDG&E cannot precisely identify the locations where these protocols will be activated within a three-year period. As a result, SDG&E is unable to calculate risk reduction specific to the WMP years for PEDS and PSPS.

A revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan

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<u>QUESTION 13</u>

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

Figure 6.5 shows that the residual risk after SDG&E hardening programs, PSPS and PEDS is 1.5%.

a. What is the estimated combined net estimated residual risk from the portfolio CCC+FCD+ESD+PEDS+PSPS

b. Please provide a version of SDG&E_2026-2028_Base-WMP_Appendix G Supporting Data_R0.xlsx with a tab representing this portfolio risk if it is not already incorporated into the CCC tab.

c. If the tab in b) is onerous to produce, provide a date by which such a portfolio could be generated.

<u>RESPONSE 13</u>

a. "Figure 6-5: Estimated Wildfire Risk Reduction 2007–2037" is derived from current grid hardening initiatives and the projected mileage outlined in "Figure 6-4: Wildfire Hardening Targets". In developing these estimates, an average risk reduction factor is applied to both SUG and CC scenarios, regardless of the specific location of the feeder segment.

   Currently, SDG&E has not scoped the exact feeder segments beyond 2027. Consequently, the risk reduction estimates provided are indicative and reflect preliminary risk reduction estimates. These high-level risk reduction estimates serve as an initial assessment to support wildfire and PSPS risk strategy efforts, and they are expected to be refined and updated as more detailed feeder segmentation data becomes available.

   Modeling only CCC (CC+ Inspections + EFD + FCP+PSPS) the resulting residual risk is 2.22% with a 38.89% risk reduction provided by PSPS de-energizations.

b. Refer to tab "CCC" where risk reduction for 139 miles are presented for the given portfolio. Note that a revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan

c. N/A

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QUESTION 14

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

Are advanced protections planned for circuits that may be in SDG&E's long term undergrounding plans?

RESPONSE 14

The current method for scoping advanced protection projects includes analysis based on SDG&E's strategy and cost consideration in selecting circuits for strategic undergrounding of electric lines and aims to provide protection on circuits where no other mitigation exists before implementing a combined mitigation of Falling Conductor Protection (FCP) and long term undergrounding scope. The goal is to gain immediate risk reduction on circuits expected to remain overhead before installing additional mitigation measures on circuits which already have had risk reduced via undergrounding.

Some circuits may not be completely undergrounded due to construction complexity or lower calculated risk on those segments. In this case, advanced protection deployments may be scoped to provide additional risk reduction by installing advanced protection downstream of where the underground segment ends and returns to the overhead plant.

A revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan.

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<u>QUESTION 15</u>

Consequence Modeling:

With regard to SDG&E Data Request Response OEIS-P-WMP_2025-SDGE-02-Q7 and Q9:

Provide available technical details of the structure loss model including citations to supporting literature.

<u>RESPONSE 15</u>

SDG&E objects to the request to the extent it seeks information that contains confidential trade secret or proprietary information. SDG&E objects to providing such information absent an appropriate protective order. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

SDG&E utilizes Technosylva's proprietary software to estimate potential wildfire impacts, including acres burned and structures destroyed. To ensure clarity and transparency on the methodology used, SDG&E has formally requested Technosylva's latest documentation detailing the methodology used to determine structures destroyed based on those located within the fire footprint in their simulations.

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QUESTION 16

Consequence Modeling:

With regard to SDG&E Data Request Response OEIS-P-WMP_2025-SDGE-02-Q7 and Q9:

What assumptions do the structure loss model make regarding the fractions of structures burned within the fire perimeter?

RESPONSE 16

See response to Question 15.

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QUESTION 17

Consequence Modeling:

With regard to SDG&E Data Request Response OEIS-P-WMP_2025-SDGE-02-Q7 and Q9:

Does the structure loss model use Technosylva's TDI calculation to estimate home losses? If so what is the relationship between TDI and fraction of structures burned?

RESPONSE 17

See response to Question 15.

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QUESTION 18

Consequence Modeling:

With regard to SDG&E Data Request Response OEIS-P-WMP_2025-SDGE-02-Q7 and Q9:

Provide additional technical detail regarding SDG&E's egress model.

RESPONSE 18

The wildfire egress modeling framework developed by SDG&E is a simulation system designed to evaluate evacuation feasibility and understand potential egress strategies in the event of a wildfire. The model integrates multi-source geospatial and temporal data to simulate fire progression, population movement, and traffic dynamics. It leverages a combination of deterministic fire spread modeling, graph-based network optimization, and behavioral simulation to identify evacuation bottlenecks and high-risk communities.

At its core, the model treats each utility pole as a potential ignition point, associating it with the nearest weather station and Technosylva fire simulation data to parameterize fire behavior. Fire spread is modeled as an elliptical function, where the major and minor axes are dynamically determined by wind gust magnitude and direction. This allows the model to simulate the temporal evolution of fire perimeters across a heterogeneous landscape. The fire footprint is discretized into five concentric zones, each representing a different level of threat, and road segments are dynamically assigned to these zones as the fire advances.

Population data is spatially resolved using smart meter locations, with each meter's population assigned to the nearest road segment. This enables fine-grained estimation of evacuee density and supports the identification of critical evacuation corridors. The road network is derived from OpenStreetMap (OSM) via OSMNx python library, incorporating attributes such as speed limits and lane capacities. These are used to construct a weighted graph for network flow analysis, where evacuation routes are identified using shortest-path algorithms that account for dynamic fire encroachment and traffic congestion.

The simulation pipeline consists of several stages: ignition point initialization, fire spread simulation, safe zone identification, egress route computation, and behavioral modeling. Safe zones are predefined based on geographic and infrastructural criteria, and the model computes optimal paths from each populated node to the nearest safe zone, updating routes in response to fire progression. Human behavior is modeled probabilistically, incorporating compliance rates with evacuation orders and potential deviations from optimal routes. The model also supports dynamic rerouting and capacity adjustments, such as contraflow lane usage, to reflect real-world emergency response strategies.

To manage computational complexity, the model employs spatial clustering using hexagonal binning. This reduces the number of required simulations by aggregating ignition points with similar fire spread characteristics. For instance, out of over 216,000 potential ignition points, only 30,283 simulations are necessary after filtering out those locations with simulated zero rate of spread and applying hexagonal aggregation. This optimization significantly reduces runtime while preserving spatial resolution and ensuring the predictions remain relevant and accurate.

Egress modeling is a complex and technically challenging process, and its accuracy depends on a several factors and necessary assumptions that are intrinsically extremely difficult to model. SDG&E is constantly working on model enhancements and more effective incorporation of modeling inputs into its larger risk assessment framework to help support a more accurate predictive and prescriptive modeling output, with the intent to more effectively support wildfire mitigation efforts and situational awareness to benefit the community at large.

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SDG&E RESPONSE

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QUESTION 19

GIS Data:

Please provide GIS data in the form of geodatabase used in Figure 5-12.

RESPONSE 19

Please see attached zip file titled “base_risk_data_GDB.zip” containing the base_risk_geodatabase.gdb file. The .gdb file includes all 3 geospatial layers visualized in Figure 5-12, namely circuit-segment overall risk hexagons, San Diego County line boundaries, and High Fire Threat District (HFTD) line boundaries.

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END OF REQUEST