

**MUSSEY GRADE ROAD ALLIANCE DATA REQUEST:
MGRA-SDGE-2023WMP-02**

**Date Received: April 17, 2023
Date Submitted: April 20, 2022**

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.

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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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QUESTION 1

Advanced Technologies:

Regarding the Advance Radio Frequency Sensors (ARFS) that “officially kicked off in 2022 after completing a 2 year demonstration” (p. 9):

- a. Provide technical documentation on the ARFS.
- b. Provide results of internal testing that led to the conclusion that the demonstration was successful and merits further development.
- c. Please provide best estimates as to the risk reduction that this technology provides for an instrumented circuit.
- d. Please provide 3 and 10 year estimations for deployment of this technology, including:
 - a) Percent of HFRA covered by the technology,
 - b) Percent of non-UG HFRA covered by the technology,
 - c) Estimates of total fraction of risk mitigated in the HFRA.

RESPONSE 1

SDG&E objects to the request on the grounds set forth in General Objections Nos. 2 and 8. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

- a. ARFS use radio frequency monitoring of partial discharge from primary conductors to find, replace, and/or repair damaged components before they ultimately fail. Sensors are installed for each phase at 4-km intervals along a circuit extending from just outside the substation to the end of its furthest branches. Data is collected every second and backhauled on commercial cell communication networks to web servers. Software analysis eliminates spurious signals and isolates signals which are generated by the electrical facilities. Comparing the timing of the arrival of the signals at two adjacent installations (nodes) allows the location of the equipment generating the signal to be determined within 10 meters on the path between the nodes. The developer analyzes the data and provides monthly reports showing low-medium-high risk ratings for each structure on the path, allowing targeted inspections of the facilities to find the damaged equipment generating the signal.

ARFS are a proprietary solution procured from IND.t, technical documentation for these sensors may be referenced on <https://ind-technology.com/>

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- b. The following items are examples of damage found as a result of Early Fault Detection (EFD) technology:
- i. Broken ceramic insulator found and replaced that was not identified during routine patrols.
 - ii. Burned insulator found and replaced.
 - iii. Multiple wire splices with internal partial discharge found and replaced.
 - iv. Damaged insulator leaking to crossarm found and replaced.
 - v. Bird nest on buck pole found and removed.
 - vi. Bird-caged jumper found and replaced.
 - vii. Damaged conductor, loose (not broken) strand, deemed no structural damage by QEW.
 - viii. Bird-caged conductor found that was not identified during routine patrols; deemed no structural damage by QEW.
 - ix. Animal damage to dead-end insulator found and replaced.
 - x. Multiple instances of cosmetic wire slap damage to conductor; deemed no structural damage by electric troubleshooter.
- c. Below is the risk reduction estimation for Early Fault Detection as presented in SDG&E's 2023-2025 WMP in Section 8.1.2.8.2 Early Fault Detection.

Calculation Component	Component Value
Risk Events Tier 3-5 yr avg (2017-2021)	104
Risk Events Tier 2-5 yr avg (2017-2021)	114.8
Risk Events 5 yr avg Ignition Tier 3	2.91%
Risk Events 5 yr avg Ignition Tier 2	2.55%
5 yr Avg Ignition Rate Tier 3	$104 \times 2.91\% = 3.02$
5 yr Avg Ignition Rate Tier 2	$114.8 \times 2.55\% = 2.93$
Ignition reduction estimate Tier 3	$3.02 \times 72\% = 2.1776$
Ignition reduction estimate Tier 2	$2.93 \times 72\% = 2.1082$
Mitigation Effectiveness	72%
Total units In The Network Tier 3	420
Total units In The Network Tier 2	810
Actuals to be repaired or replaced Tier 3	64
Actuals to be repaired or replaced Tier 2	116
Ignition Reduced Tier 3	$(64 , 420) \times 2.1776 = 0.3318$
Ignition Reduced Tier 2	$(116 , 810) \times 2.1082 = 0.3019$
Total Ignitions reduced	$0.3318 + 0.3019 = 0.6337$

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- d. 3- and 10-year estimations for deployment of this technology are as follows:
- a) For years 2023-2025, it is estimated that 17% of the HFTD will be enabled with EFD technology, and 36% enabled over the next ten years.
 - b) The EFD program primarily focuses on overhead conductors. If the circuit contains a mix of OH and UG conductors a small percentage of UG conductors may be enabled. For years 2023-2025 it is estimated 16% of EFD deployments will cover non-UG HFTD circuits. The ten-year estimated total percentage is approximately 34%.
 - c) Refer to table in response C above for estimate of the total fraction of risk mitigated in the HFTD.

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QUESTION 2

Risk Analysis:

In OEIS Table 601: Summary of Risk Models, what are:

- a. Maximum buildings destroyed,
- b. Maximum acres affected per segment,
- c. Max wind gust (specifically over which period(s)),
- d. Wildfire adjustment factor, including algorithm/code to compute it.

RESPONSE 2

- a. For WiNGS Planning, max ignition simulation 100th percentile buildings destroyed tied to a segment. This comes as an input from the Technosyla WRRM model
- b. For WiNGS Planning, max ignition simulation 100th percentile acres burned tied to a segment. This comes as an input from the Technosyla WRRM model
- c. For WiNGS Planning, maximum wind gust recorded gust at weather station associated to segment. Period is over entire weather history for the given segment's associated weather station.
- d. Ignition adjustment factor that converts the circuit-segment ignition rate to wildfire rate.

$$\textit{Wildfire adjustment factor} = \frac{1}{\textit{Wildfire Frequency} * \textit{Annual HFTD Ignitions}}$$

Where *Wildfire Frequency* is the frequency in years of expected wildfires occurring.

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QUESTION 3

Risk Analysis:

Regarding the Wind Gust Annual ignition rate (p. 68),

- a. Over what period of time is the wind gust annual rate recorded?
- b. Are wind gusts in this model restricted to those occurring during fire weather events (Santa Ana), or year round?
- c. What facts, analysis, data, or references does SDG&E use to assume a baseline of “one catastrophic event every 15 years”? (p. 80)

RESPONSE 3

- a. Period is over entire weather history for the given segment’s associated weather station
- b. Year round.
- c. The analysis behind the assumption are detailed and can be referenced in SDGE’s 2019 Risk Assessment Mitigation Phase (Chapter SDG&E-1), Wildfires Involving SDG&E Equipment, Section IV ‘Risk Quantification’, Sub-section B ‘Source of Input’.

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QUESTION 4

Risk Analysis:

For SDG&E's calculation of Number of Serious Injuries and Fatalities (SIFs) per structure destroyed (p. 73), what data set does SDG&E use to arrive at this number, and does it include territories outside of SDG&E's service area?

RESPONSE 4

SDG&E estimates the Number of Serious Injuries and Fatalities (SIFs) per structure destroyed based on CALFIRE dataset (2010-2020) for all of California including fires outside of SDG&E's service territory.

Reference:

<https://www.fire.ca.gov/incidents/>

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QUESTION 5

Risk Analysis:

In its climate change modeling, SDG&E uses a “Wildfire frequency adjustment to ignition rate based on the effect that climate change has on wildfire frequency,” and that this is: “Based on Monte Carlo analysis, not standard climate change scenarios.” Please provide a description, the documentation and workpapers leading to SDG&E’s Monte-Carlo based climate change scenarios.

RESPONSE 5

SDG&E objects to the request on the grounds set forth in General Objections Nos. 2, 3, and 9. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

As part of the calibration process for the ignition rate, the WiNGS-Planning model is adjusted to account for future climate change scenarios. SDG&E's "Top-down" Enterprise Risk model incorporates Climate Change impacts by simulating numerous scenarios of the potential effect of extreme weather conditions. SDG&E currently assumes a triangular distribution to increase the likelihood of ignitions in its service territory, where distribution parameters are Subject Matter Estimates based on the references listed below.

SDG&E is currently working with industry experts, academia, government agencies, and other stakeholders to better understand and quantify the impact of Climate Change in its Wildfire and PSPS risk models. SDG&E will update its modeling assumptions based on the knowledge gained and feedback received during these collaborations.

References:

- https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf
- https://www.energy.ca.gov/sites/default/files/2019-11/Projections_CCCA4-CEC-2018-014_ADA.pdf
- <https://iopscience.iop.org/article/10.1088/1748-9326/ab83a7#erlab83a7s3>
- https://amir.eng.uci.edu/publications/20_ERL_SoCal_Fire.pdf

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QUESTION 6

Risk Analysis:

Please provide the GIS data set used showing categorized circuit risk in Figure 6- 12, p. 83.

If this has already been provided in another form by SDG&E please direct us to the correct source.

RESPONSE 6

SDG&E objects to the request on the grounds set forth in General Objections Nos. 9. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

The GIS data displayed in Figure 6-12 is in flux and from an application that is in development using non-production GIS data. A production application is expected within the year with solidified data pipelines. Geospatial data of the WiNGS Planning risk scores is available upon request.

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QUESTION 7

Risk Analysis:

For the table OEIS Table 6-5, the summary of Top-Risk Circuits, Segments, or Spans, please provide a full table containing all circuits in the HFRA in Excel spreadsheet format and showing risk ranking, segment ID, Overall Wildfire and PSPS Risk Score, Wildfire Risk Score, and PSPS Risk Score.

RESPONSE 7

See attachment named “table_6_5_full_table_Question 7”

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END OF REQUEST