OFFICE OF ENERGY INFRASTRUCTURE SAFETY DATA REQUEST:
OEIS-SDGE-2023WMP-01
SDG&E RESPONSE

Date Received: April 07, 2023
Date Submitted: April 12, 2023

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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QUESTION 1

Regarding Appendix B Items That Are Currently Optional Or "By Request" Only
Provide the following, which are outlined in the 2023-2025 Wildfire Mitigation Plan Technical Guidelines, Appendix B. If the data is tabular (formulas, tables, graphs, charts) provide it in MS Excel. If the data is text-heavy, provide the information in MS Word.

a. Detailed Model Documentation for each model and sub-model discussed in SDG&E's response to Section 6.1.2 Summary of Risk Models (Technical documentation should be presented according to ASTM E 1472 – Standard Guide for Documenting Computer Software for Fire Models).

i. Include a list of assumptions and known model limitations according to ASTM E 1895 – Standard Guide for Determining Uses and Limitations of Deterministic Fire Models.

ii. Present verification and validation documentation according to the SFPE's Guidelines for Substantiating a Fire Model for a Given Application or ASTM E 1355 – Standard Guide for Evaluating the Predicting Capability of Deterministic Fire Models.

At a minimum, the documentation must include:[1]
(1) Purpose of the model/problem identification
(2) Model version
(3) Theoretical foundation
(4) Mathematical foundation
(5) External dependencies –
(6) Model substantiation -
(7) Sensitivity –

b. Model Substantiation:[2]
i. For each model, provide documentation of the following model substantiation studies:
(1) Validation data
(2) Model verification -
(3) Model validation
(4) Model calibration -

[1] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, pp. B-6 to B-7.
[2] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, pp. B-11 to B-12.

c. Additional Models Supporting Risk Calculation:[3]
i. For each additional model that supports the risk calculations, provide weather analysis and fuel conditions.

d. Calculation of Risk and Risk Components: Likelihood:[4]
i. More detailed information on:
(1) Ignition Likelihood
(2) Equipment Likelihood of Ignition
(3) Contact from Vegetation Likelihood of Ignition
(4) Contact from Object Likelihood of Ignition
(5) Burn Probability
(6) PSPS Likelihood

e. Calculation of Risk and Risk Components: Consequence[5]
i. More detailed information on: -
(1) Wildfire Consequence
(2) Wildfire Hazard Intensity
(3) Wildfire Exposure Potential
(4) Wildfire Vulnerability

f. Calculation of Risk and Risk Components: PSPS Consequence[6]
i. More detailed information on
(1) PSPS Exposure Potential
(2) Community Vulnerability to PSPS

g. Calculation of Risk and Risk Components: Risk[7]
i. More detailed information on: (1) Ignition Risk
(2) PSPS Risk
(3) Overall Utility Risk

RESPONSE 1

Link to the 2023 WMP: https://www.sdge.com/2023-wildfire-mitigation-plan
WMP technical documentation: Attached as

[3] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, pp. B-11 to B-12.
[4] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, pp. B-12 to B-16.
[5] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, pp. B-16 to B-17.
[6] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, p. B-18.
[7] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, pp. B-18 to B-20.

"Model Documentation_Wings Planning V1.pdf," and "Model Documentation_WiNGS-Ops V1.pdf."

WiNGS Planning:

i. Reference section 6.2.3 of WMP 2023, page 73.

ii. Reference section 2.6 of technical document for WiNGS Planning.

At a minimum, the documentation must include:[8]
(1) Purpose of the model/problem identification – reference section 1.1 - Technical document for Wings Planning
(2) Model version = reference section 1.2 - Technical document for Wings Planning
(3) Theoretical foundation – reference section 2.3 - Technical document for Wings Planning
(4) Mathematical foundation – reference section 2.4 - Technical document for Wings Planning
(5) External dependencies –reference section 2.5.1 - Technical document for Wings Planning
(6) Model substantiation - reference section 2.6 - Technical document for Wings Planning
(7) Sensitivity – reference section 2.6.2 - Technical document for Wings Planning

b. Model Substantiation:[9]
i. For each model, provide documentation of the following model substantiation studies:
(1) Validation data reference section 2.6.2 - Technical document for Wings Planning
(2) Model verification - reference section 2.6.1 - Technical document for Wings Planning
(3) Model validation - reference section 2.6.2 - Technical document for Wings Planning
(4) Model calibration - reference section 2.6.3 - Technical document for Wings Planning

c. Additional Models Supporting Risk Calculation:[10]
i. For each additional model that supports the risk calculations, provide weather analysis and fuel conditions. Reference section 2.5 - Technical document for Wings Planning

d. Calculation of Risk and Risk Components: Likelihood:[11]
i. More detailed information on: reference section 6.2.2.1, page 68 - Technical document for Wings Planning
(1) Ignition Likelihood
(2) Equipment Likelihood of Ignition
(3) Contact from Vegetation Likelihood of Ignition

[8] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, pp. B-6 to B-7.
[9] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, pp. B-11 to B-12.
[10] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, pp. B-11 to B-12.
[11] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, pp. B-12 to B-16.

(4) Contact from Object Likelihood of Ignition
(5) Burn Probability
(6) PSPS Likelihood

e. Calculation of Risk and Risk Components: Consequence[12]
i. More detailed information on: - reference WMP 2023 section 6.2.2.2 page 70
(1) Wildfire Consequence
(2) Wildfire Hazard Intensity
(3) Wildfire Exposure Potential
(4) Wildfire Vulnerability

f. Calculation of Risk and Risk Components: PSPS Consequence[13]
i. More detailed information on: reference WMP 2023 section 6.2.2.2 page 70
(1) PSPS Exposure Potential
(2) Community Vulnerability to PSPS

g. Calculation of Risk and Risk Components: Risk[14]
i. More detailed information on: reference section 6.2.1 and 6.2.2 of WMP 2023, page 59 and 64
(1) Ignition Risk
(2) PSPS Risk
(3) Overall Utility Risk

WiNGS Ops:

i. Reference section 6.2.3 of WMP 2023, page 73

ii. Reference section 2.6 of technical document for WiNGS Ops

(1) Purpose of the model/problem identification – Section 1.1 - Technical documentation for WiNGS Ops
(2) Model version -
(3) Theoretical foundation – Section 2.2.1 – Technical documentation for WiNGS Ops
(4) Mathematical foundation Section 2.2.1 - Technical documentation for WiNGS Ops
(5) External dependencies –
(6) Model substantiation - Section 2.6 - Technical documentation for WiNGS Ops
(7) Sensitivity – Section 2.6.2 - Technical documentation for WiNGS Ops

[12] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, pp. B-16 to B-17.
[13] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, p. B-18.
[14] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, pp. B-18 to B-20.

b. Model Substantiation:[15] Section 2.6 - Technical documentation for WiNGS Ops
i. For each model, provide documentation of the following model substantiation studies:
(1) Validation data
(2) Model verification – Section 2.6.1 - Technical documentation for WiNGS Ops
(3) Model validation – Section 2.6.2 - Technical documentation for WiNGS Ops
(4) Model calibration – Section 2.2.3 - Technical documentation for WiNGS Ops

[15] As outlined in 2023-2025 WMP Technical Guidelines, Appendix B, pp. B-11 to B-12.

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QUESTION 2

Regarding Comprehensive System Diagram for All Risk Models Used

Provide comprehensive system diagrams in MS Visio or PPT for all risk models, including:

1. A comprehensive diagram for operational models
2. A comprehensive diagram for planning models

Section 6.1.2, Summary of Risk Models, asks for a summary of risk models in table form with specific fields. Section 6.2.1, Risk and Risk Component Identification, asks for a chart that demonstrates the components of overall utility risk.

This request is comprehensive of all models that work together in the Decision-Making Framework (DMF). The requested diagram should show:

a. Interaction between the models presented graphically (e.g., inputs and outputs coming to and going from models to other models)

b. Organization with the use of swimlanes where applicable

c. Starting and ending points

d. Decisions and process flows

e. Use of a legend and colors to classify inputs/output types and model-to-model interactions

f. The full cycle of models working together and creating feedback for model adjustments and fine-tuning

RESPONSE 2

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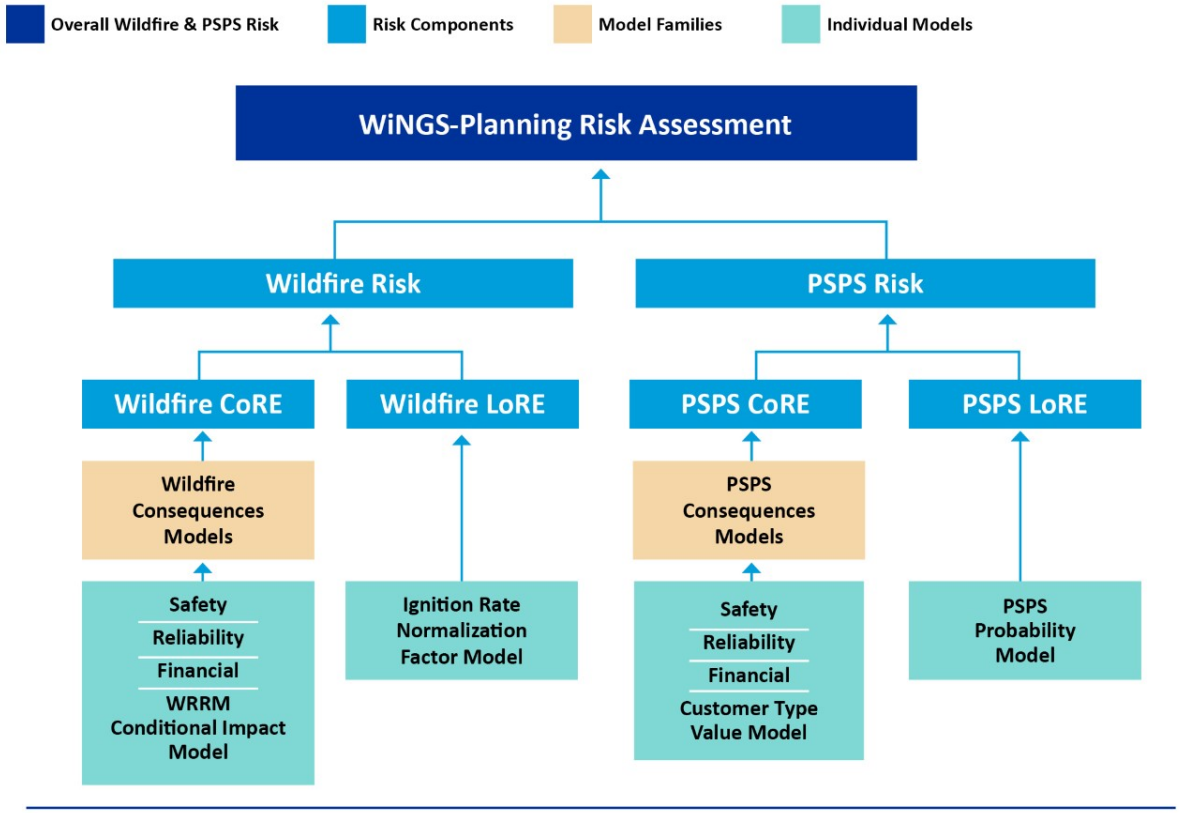
a.
WiNGS Planning Risk Calculation Process Flow Diagram (Figure 6-4 – WMP 2023)



WiNGS Planning (Figure 6-7 – WMP 2023)

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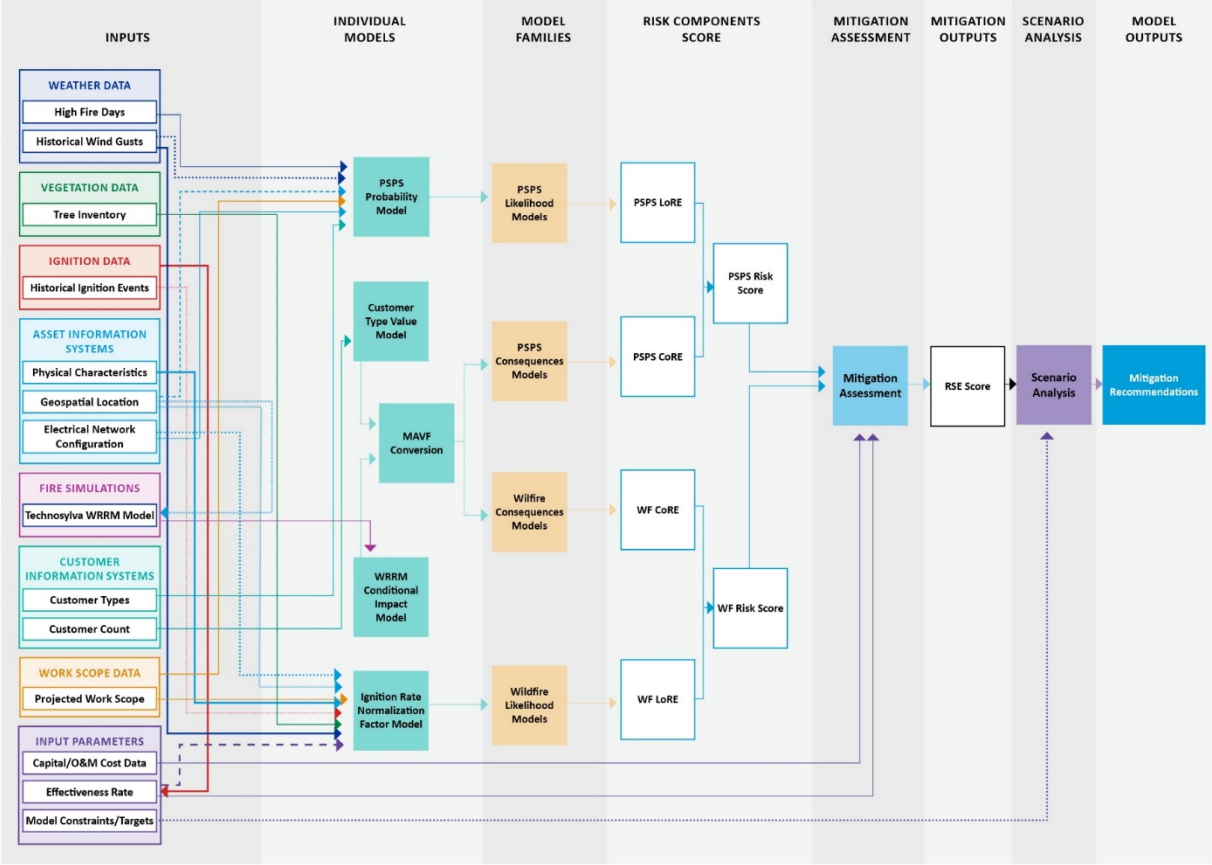

WiNGS Ops Risk Calculation Process Flow Diagram (Figure 6-5 – WMP 2023)

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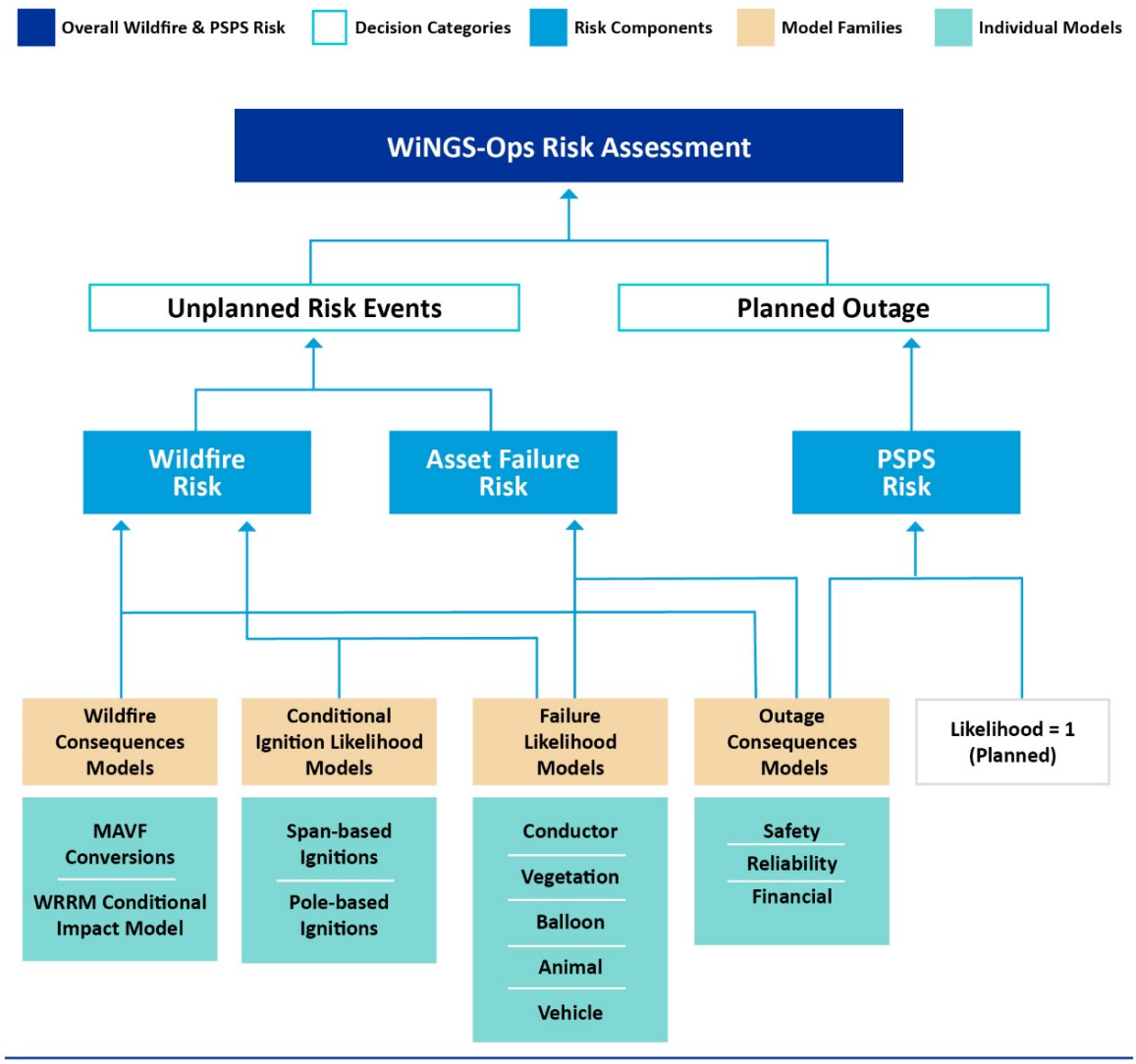
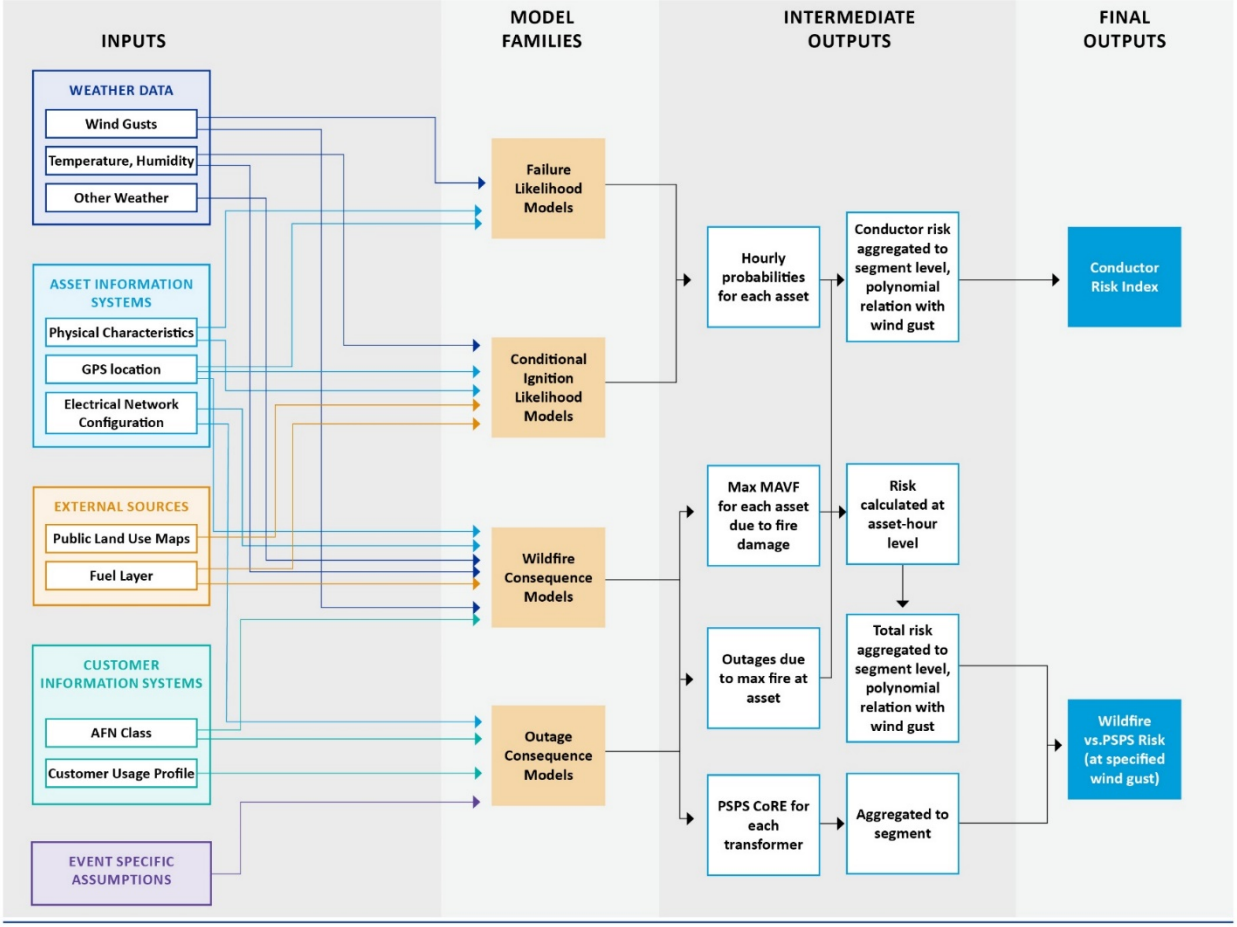


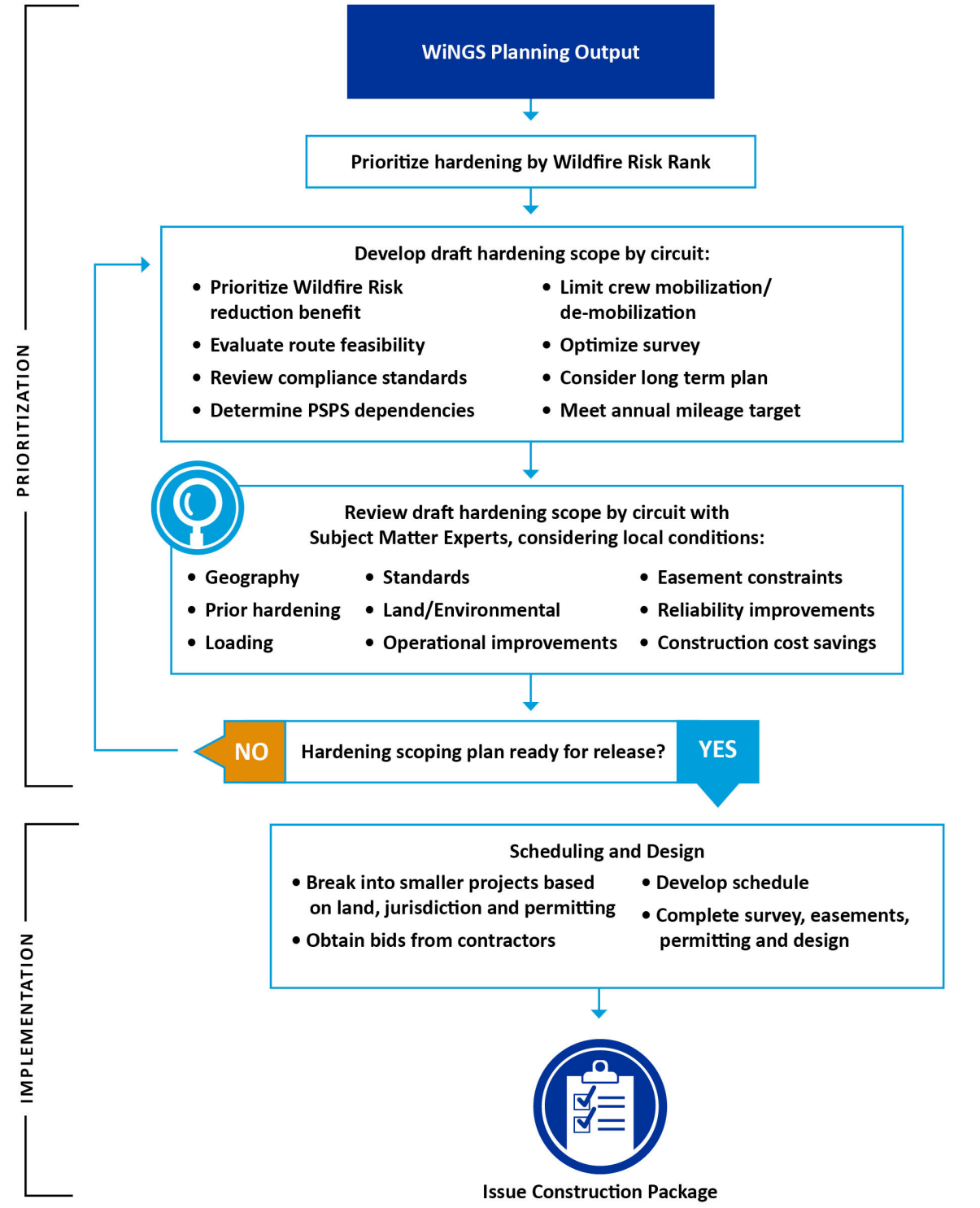
WiNGS-Ops (Figure 6-8 – WMP 2023)



b. Please see response/figures in part a.

c. Please see response/figures in part a.

d. WiNGS Planning – Mitigation initiative prioritization (Figure 7-4 – WMP 2023)


PRIORITIZATION
WiNGS Planning Output
Prioritize hardening by Wildfire Risk Rank
Develop draft hardening scope by circuit:
• Prioritize Wildfire Risk reduction benefit
• Evaluate route feasibility
• Review compliance standards
• Determine PSPS dependencies
• Limit crew mobilization/ de-mobilization
• Optimize survey
• Consider long term plan
• Meet annual mileage target
Review draft hardening scope by circuit with Subject Matter Experts, considering local conditions:
• Geography
• Prior hardening
• Loading
• Standards
• Land/Environmental
• Operational improvements
• Easement constraints
• Reliability improvements
• Construction cost savings
NO
Hardening scoping plan ready for release?
YES
IMPLEMENTATION
Scheduling and Design
• Break into smaller projects based on land, jurisdiction and permitting
• Obtain bids from contractors
• Develop schedule
• Complete survey, easements, permitting and design
Issue Construction Package

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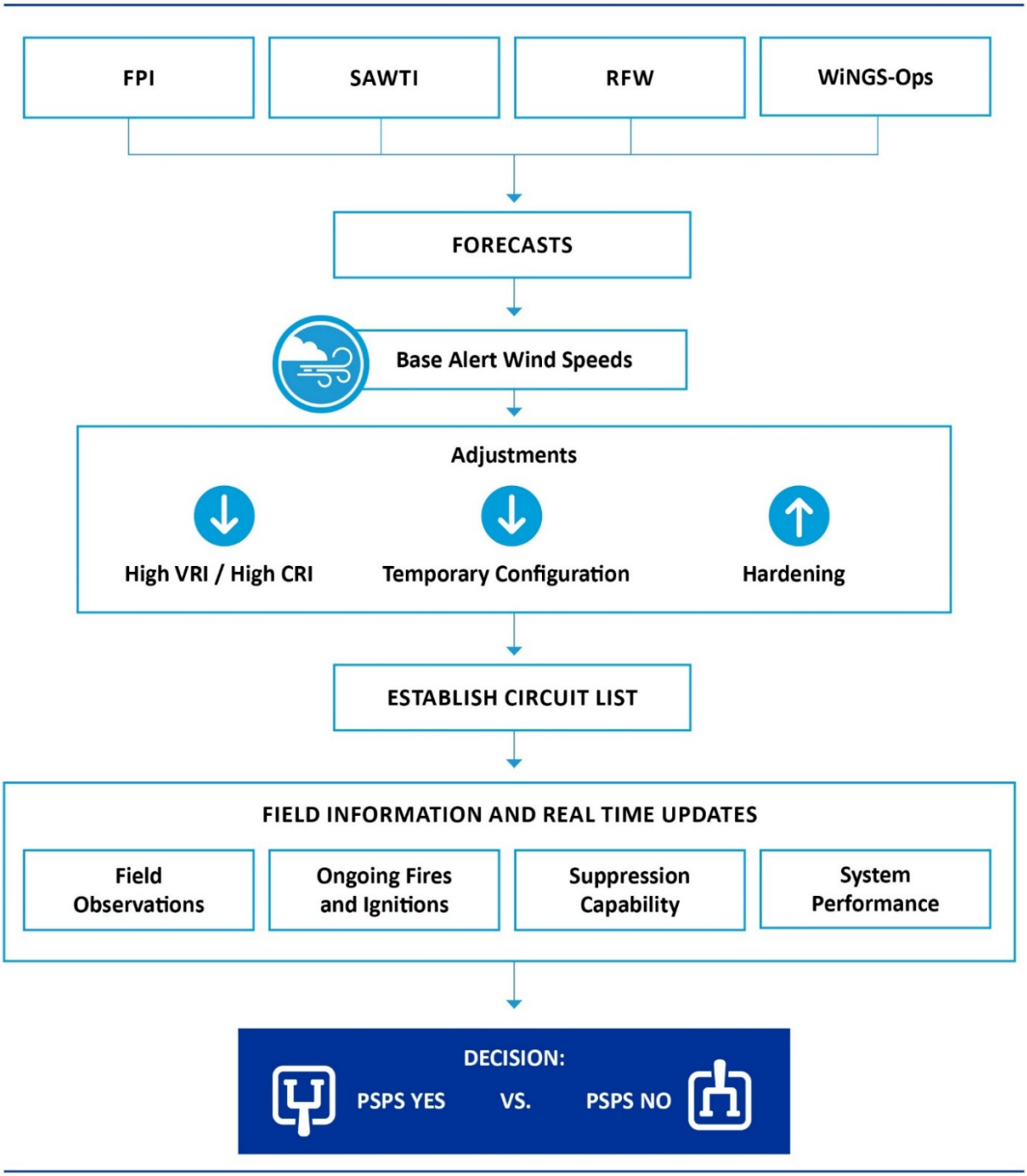
WiNGS Ops – PSPS Decision Making Framework



e. Please see response/figures in part a.

f. Please see "Model Documentation_Wings Planning V1.pdf," section 2.6.2 Validation and 2.6.3 Calibration. Additionally see the "Model Documentation_WiNGS-Ops V1.pdf" section 2.6.2 Validation and 2.6.3 Calibration.

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QUESTION 3

Regarding Portfolio Level Risk Analysis and Risk Spend Efficiency

a. Provide an example of how risks are aggregated to a portfolio, and if and how interdependencies between the risks are explicitly captured in the portfolio. Response should be provided in Excel. Also include the level of organization for the portfolio (e.g., asset, geographical or business unit).

b. Are tail-risks calculated on a portfolio of risks? If so, provide an example.

c. Are probability distributions and interdependencies used as inputs to outputs for the bowties used in SDG&E's WMP submission (see examples present in Appendix B)? If so, provide an example using the bowtie charts presented in SDG&E's Appendix B submission. As appropriate, the response should be provided in Excel.

d. Provide an example of how risk spend efficiency (RSE) deals with interdependent risks, and mutually exclusive risks. As appropriate, the response should be provided in Excel.

e. Is RSE calculated for both average and tail? If so, provide an example. The response should be provided in Excel.

RESPONSE 3

a. Per the WiNGS-Planning model risk inputs, inputs are assessed and treated as independent risk drivers and metrics that support the calculation of the risk scores, per the weighted sum framework of the model. The WiNGS-Planning model granularity is at the circuit-segment level. For the portfolio level reporting of the risk scores from the model, the risk scores are subsequently sum aggregated from the circuit-segment level to the portfolio level granularity.

See attached .csv file "Question 3a - WF and PSPS risk scores - 2023 wmp output.csv" for the output of circuit-segment risk scores prior to sum aggregation to the portfolio level granularity, indicating how risk scores are aggregated.

b. The top 5%, top 20%, and bottom 80% are calculated on the WiNGS Planning output. Please see SDG&E WMP 2023 - table 6.5 for a reference of the top 5% wildfire risk circuit segments.

c. Assuming the bowties referred to are the flow diagrams (Figures 1 & 2) present in 2023 WMP Appendix B, two probability distributions are used as inputs to the model: FIRE SIMULATIONS (WRRM metrics) (percentiles) (Figure 2) and WEATHER DATA (percentiles) (Figure 2). No interdependencies are used as inputs.

d. Per the WiNGS-Planning model risk inputs, inputs are assessed and treated as independent risk drivers and metrics that support the calculation of the risk scores. As such, RSE does not need to deal with interdependent or mutually exclusive risks as they are not present as inputs to the model.

e. Within WiNGS-Planning, an RSE value is calculated for each circuit-segment mitigation combination. The RSE value is neither an average nor a tail value, but a single RSE value calculated from the risk reduction and cost assessed associated to the selected circuit-segment mitigation combination.

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QUESTION 4

Regarding Cost-Benefit Within and Overall Decision-Making Framework

a. If projects are justified based on a multi-attribute value functions/cost basis, what threshold or hurdle is used?

b. How is the chance that a project exceeds the threshold computed?

c. If projects are justified based on a multi-attribute value functions/cost basis, what threshold or hurdle is used?

RESPONSE 4

a. A financial analysis was conducted analyzing different portfolios ultimately identified the risk mitigation and hardening strategy that reflected the inflection point between risk and cost. The RSE threshold is set to meet targeted risk reduction percentages over time, while also meeting construction mileage targets. To achieve the desired risk reduction, the RSE threshold based on the model that forms the basis of SDG&E's 2023 Wildfire Mitigation Plan was 29.

The WiNGS model employs a decision tree to select mitigations. The decision tree does not compare covered conductor RSE to underground RSE. The first branch on the decision tree is to measure the validity of undergrounding per segment. Each segment is qualified as whether it meets the RSE for undergrounding. If the segment meets or exceeds the undergrounding RSE, the model recommends undergrounding as the proposed mitigation. Segments that do not meet the undergrounding RSE, are then evaluated for covered conductor mitigations. If the RSE for covered conductor is met or exceeded, the proposed mitigation is covered conductor. When neither condition is met, no mitigation is recommended.

b. For every mitigation project informed by the WiNGS-Planning model, the project is required to have met the threshold framework described above and have had an optimal recommended mitigation assigned to it. Therefore, every project will have met the threshold prior to implementation.

c. Please see response a.

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END OF REQUEST