Proceeding: 2024 General Rate Case – Track 2
Application: A.22-05-015/-016 (cons.)
Exhibit: SDG&E-T2-ALJ-04

SUPPLEMENTAL EXHIBIT OF

SAN DIEGO GAS & ELECTRIC COMPANY

(San Diego Gas & Electric Company
2021 WMP Action Statement Supplemental)

March 2025

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

San Diego Gas & Electric
2021 WMP Action Statement Supplemental

November 1, 2021

Table of Contents

Action Items

Utility-#	*Issue title*	*Remedies required*
SDGE-21-01	Inadequate transparency in accounting for ignition sources in risk modeling and mitigation selection	SDG&E must fully explain: 1. How third-party ignition sources feed into SDG&E's risk models; 2. How ignition sources impact SDG&E's mitigation selection process, including: a. How SDG&E prioritizes ignition sources; b. If SDG&E treats third-party ignition sources that are not under SDG&E's direct control differently than other ignition sources, and if so, how; c. How SDG&E targets its mitigations efforts to reduce ignitions that are more likely to result in catastrophic wildfire conditions.
SDGE-21-02	Lack of consistency in approach to wildfire risk modeling across utilities	The utilities[1] must collaborate through a working group facilitated by Energy Safety[2] to develop a more consistent statewide approach to wildfire risk modeling. After the WSD completes its evaluation of all the utilities' 2021 WMP Updates, it will provide additional detail on the specifics of this working group. A working group to address wildfire risk modeling will allow for: 1. Collaboration among the utilities; 2. Stakeholder and academic expert input; and 3. Increased transparency.
SDGE-21-03	Limited evidence to support the effectiveness of covered conductor	The utilities[1] must coordinate to develop a consistent approach to evaluating the long-term risk reduction and cost-effectiveness of covered conductor deployment, including: 1. The effectiveness of covered conductor in the field in comparison to alternative initiatives. 2. How covered conductor installation compares to other initiatives in its potential to reduce PSPS risk.

[1] Here "utilities" refers to the California electrical corporations, specifically SDG&E, Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), PacifiCorp, Bear Valley Electric Service, Inc. (BVES), and Liberty Utilities.

[2] The WSD transitioned to the Office of Energy Infrastructure Safety (Energy Safety) on July 1, 2021.

Utility-#	*Issue title*	*Remedies required*
SDGE-21-04	Inadequate joint plan to study the effectiveness of enhanced clearances	SDG&E, PG&E, and SCE will participate in a multi-year vegetation clearance study. The WSD will confirm the details of this study in due course. The objectives of this study are to: 1. Establish uniform data collection standards. 2. Create a cross-utility database of tree-caused risk events (i.e., outages and ignitions caused by vegetation contact). 3. Incorporate biotic and abiotic factors[3] into the determination of outage and ignition risk caused by vegetation contact. 4. Assess the effectiveness of enhanced clearances. In preparation for this study and the eventual analysis, SDG&E must collect the relevant data; the required data are currently defined by the WSD Geographic Information System (GIS Data Reporting Standard for California Electrical Corporations - V2).
SDGE-21-05	Incomplete identification of vegetation species and record keeping	SDG&E must: 1. Use scientific names in its reporting (as opposed to common names). This change will be reflected in the upcoming updates to the WSD GIS Reporting Standard. 2. Add genus and species designation input capabilities into its systems which track vegetation (e.g., vegetation inventory system and vegetation-caused outage reports). 3. Identify the genus and species of a tree that has caused an outage[4] or ignition[5] in the Quarterly Data Reports (QDRs) (in these cases, an unknown "sp." designation is not acceptable). 4. If the tree's species designation is unknown (i.e., if the inspector knows the tree as "Quercus" but is unsure whether the tree is, for example, Quercus kelloggii, Quercus lobata, or Quercus agrifolia), it must be recorded as such. Instead of simply "Quercus," use "Quercus sp." If referencing multiple species within a genus use "spp." (e.g., Quercus spp.).[6] 5. Teach tree species identification skills in its VM personnel training programs, both in initial and continuing education. 6. Encourage all VM personnel identify trees to species in all VM activities and reporting, where possible.

[3] Biotic factors include all living things (e.g., an animal or plant) that influence or affect an ecosystem and the organisms in it; abiotic factors include all nonliving conditions or things (e.g., climate or habitat) that influence or affect an ecosystem and the organisms in it.
[4] WSD GIS Data Reporting Standard Version 2, Transmission Vegetation Caused Unplanned Outage (Feature Class), Section 3.4.5 & Distribution Vegetation Caused Unplanned Outage (Feature Class), Section 3.4.7.
[5] WSD GIS Data Reporting Standard Version 2, Ignition (Feature Class), Section 3.4.3.
[6] Jenks, Matthew A. (undated, from 2012 archived copy), "Plant Nomenclature," Department of Horticulture and Landscape Architecture, Purdue University, accessed May 18, 2021: https://archive.ph/20121211140110/http:/www.hort.purdue.edu/hort/courses/hort217/Nomenclature/description.htm.

Utility-#	*Issue title*	*Remedies required*
SDGE-21-06	Limited evidence of quantitative analysis to identify "at-risk" species	SDG&E must: 1. Describe its methodologies for determining what species it considers "at-risk." 2. Explain in complete detail why discrepancies exist between the genera with the highest number of outages per 1000 trees per year and SDG&E's "targeted species identified as a higher risk due to growth potential, failure characteristics and relative outage frequency."[7] 3. Define quantitative threshold values (whether a standard value, a range of values, or an example of a typical value) for the criteria used to define a tree as "at-risk."
SDGE-21-07	Need for quantified vegetation management (VM) compliance targets	SDG&E must define quantitative targets for all VM initiatives in Table 12. If quantitative targets are not applicable to an initiative, SDG&E must fully justify this, define goals within that initiative, and include a timeline in which it expects to achieve those goals.
SDGE-21-08	Non-communicative remote-controlled switches	SDG&E must: 1. Discuss its plans to take system level proactive steps to validate that existing SCADA switches remain fully functional. 2. Discuss its plans to ensure that newly installed SCADA switches are fully functional. 3. Describe the steps it is taking to increase and improve inspections and testing of SCADA switches.
SDGE-21-09	Inadequate transparency associated with SDG&E's decision-making process	SDG&E must: 1. Elaborate on its decision-making process to include a thorough overview of its initiative selection procedure. The overview must show the rankings of the relative decision-making factors (e.g., planning and execution lead times, resource constraints, etc.) and pinpoint where quantifiable risk reductions and RSE estimates are considered in the initiative selection process. The WSD recommends a cascading, dynamic "if-then" style flowchart to effectively demonstrate this prioritization process and satisfy this requirement. 2. Using the newly developed decision-making overview, demonstrate that its undergrounding projects are a reasonable and effective use of resources to achieve risk reduction compared to other mitigation alternatives

[7] SDG&E 2021 WMP Update, p. 278.

Utility-#	*Issue title*	*Remedies required*
SDGE-21-10	Insufficient detail regarding prioritization of HFTD in undergrounding and covered conductor mitigation efforts	SDG&E must fully demonstrate that its undergrounding and covered conductor mitigation efforts are focused on efficiently reducing wildfire risk and PSPS events, including a description of how SDG&E determines the order in which circuit segments are scheduled for mitigation.
SDGE-21-11	RSE values vary across utilities	The utilities[8] must collaborate through a working group facilitated by Energy Safety[9] to develop a more standardized approach to the inputs and assumptions used for RSE calculations. After the WSD completes its evaluation of the 2021 WMP Updates, it will provide additional detail on the specifics of this working group. This working group will focus on addressing the inconsistencies between the inputs and assumptions used by the utilities for their RSE calculations, which will allow for: 1. Collaboration among utilities; 2. Stakeholder and academic expert input; and 3. Increased transparency.

[8] Here "utilities" refers to SDG&E, Pacific Gas and Electric Company (PG&E), and Southern California Edison Company (SCE).
[9] The WSD is transitioning to the Office of Energy Infrastructure Safety (Energy Safety) on July 1, 2021.

Project Status

Utility #	Status
SDGE-21- 01	1. In Progress 2.a. In Progress 2.b. In Progress 2.c. In Progress
SDGE-21- 02	1. In Progress 2. In Progress 3. In Progress
SDGE-21- 03	1. In Progress 2. In Progress
SDGE-21- 04	1. In Progress 2. In Progress 3. In Progress 4. In Progress
SDGE-21- 05	1. In Progress 2. In Progress 3. In Progress 4. In Progress 5. In Progress
SDGE-21- 06	1. Complete 2. Complete 3. Complete
SDGE-21- 07	In Progress
SDGE-21- 08	1. Complete 2. Complete 3. Complete
SDGE-21- 09	1. In Progress 2. In Progress
SDGE-21- 10	In Progress
SDGE-21- 11	1. Not Started 2. Not Started 3. Not Started

SDGE-21- 01 Ignition Sources in Risk Modeling and Mitigation

SDGE-21- 01	Inadequate transparency in accounting for ignition sources in risk modeling and mitigation selection	SDG&E must fully explain: 1. How third-party ignition sources feed into SDG&E's risk models; 2. How ignition sources impact SDG&E's mitigation selection process, including: a. How SDG&E prioritizes ignition sources; b. If SDG&E treats third-party ignition sources that are not under SDG&E's direct control differently than other ignition sources, and if so, how; c. How SDG&E targets its mitigations efforts to reduce ignitions that are more likely to result in catastrophic wildfire conditions.

SDG&E has been working to develop Probability of Failure (PoF) and Probability of Ignition (PoI) models with more granularity at the asset and ignition source level. SDG&E has a roadmap for the development of those models and has prioritized them based on evaluating the most recurring types of ignitions including those that are wind-driven to support risk mitigation efforts. To date, SDG&E has developed a model to predict conductor-related failures and ignitions and is working on developing models designed to predict ignitions from third party sources such as vegetation contacts, vehicle contacts, balloon contacts, and animal contacts. Updates on the remedies identified for this area of improvement are further outlined below:

1. SDG&E continues to refine its modeling documentation to provide more clarity about how various ignition sources (including third-party sources) feed into SDG&E's risk models and will provide those details in the upcoming 2022 WMP Update.
2. SDG&E's modeling and decision-making documentation that is currently under development will further explain how ignition sources impact SDG&E's mitigation selection in the 2022 WMP Update. SDG&E primarily focuses its mitigation efforts on targeting ignitions that are within its control; but as a result of those mitigations, third-party ignition sources may also be further mitigated. For example, SDG&E's traditional hardening program has focused on the mitigation of conductor failures by replacing small copper wire with larger aluminum wire and additional spacing along with the replacement of wood poles to steel poles to further reduce equipment-related failures. While focusing on those 'controllable' ignition sources, traditional hardening efforts can also provide benefits for reducing third-party ignitions such as vehicle contacts due to increased resiliency of steel poles relative to wood poles.

SDGE-21- 02 Wildfire Risk Modeling

SDGE-21- 02	Lack of consistency in approach to wildfire risk modeling across utilities	The utilities must collaborate through a working group facilitated by Energy Safety to develop a more consistent statewide approach to wildfire risk modeling. After the WSD completes its evaluation of all the utilities' 2021 WMP Updates, it will provide additional detail on the specifics of this working group. A working group to address wildfire risk modeling will allow for: 1. Collaboration among the utilities; 2. Stakeholder and academic expert input; and 3. Increased transparency.

The utilities have prepared a joint response to this Issue/Remedy.

On October 5-6, 2021, Energy Safety hosted a two-day workshop on risk modeling. Each of the utilities made presentations on their risk modeling approaches and participated in the Q&A section of workshop, as did other intervenors, stakeholders and interested parties including members of the public. At the conclusion of the workshop, Energy Safety requested that the utilities submit reports providing "detailed descriptions" on more than 30 risk-modeling related issues. These reports were submitted on October 13, 2021.

Energy Safety also requested that stakeholders interested in participating in the risk modeling working group submit application materials by October 14, 2021, and that stakeholders selected for the working group participation would be notified by October 18, 2021. Energy Safety may reach out to academic experts to participate in the working group or provide input on the utilities' risk modeling.

Energy Safety established a schedule of bi-weekly working group meetings, starting October 20, 2021 and running through January 19, 2022, on various risk-modeling related topics such as modeling components, algorithms, data and impacts of other issues on modeling such as climate change and ingress/egress. Energy Safety initially scheduled the following meetings and topics:

- October 20, 2021 Modeling baselines, alignment and past collaboration
- November 3, 2021 Modeling components, linkages, and interdependencies
- November 17, 2021 Modeling algorithms
- December 1, 2021 Fault, outage, and ignition data
- December 15, 2021 Asset and vegetation data
- January 5, 2022 Initiative implementation impact, and PSPS risk impact
- January 19, 2022 Climate change impacts, suppression and ingress/egress

The utilities are collaborating through the working group with Energy Safety and stakeholders and have already dedicated and will continue to dedicate substantial time and resources to the working group. The utilities believe that there will be increased transparency for Energy Safety and stakeholders through the working group process.

SDGE-21- 03 Effectiveness of Covered Conductor

SDGE-21- 03	Limited evidence to support the effectiveness of covered conductor	The utilities[10] must coordinate to develop a consistent approach to evaluating the long-term risk reduction and cost-effectiveness of covered conductor deployment, including: 1. The effectiveness of covered conductor in the field in comparison to alternative initiatives. 2. How covered conductor installation compares to other initiatives in its potential to reduce PSPS risk.

The utilities have prepared a joint response to this Issue/Remedy.

Introduction:

This Progress Report outlines the utilities' approach, assumptions, and preliminary milestones that will enable the utilities' to better discern the long-term risk reduction effectiveness of covered conductor to reduce the probability of ignition, assess its effectiveness compared to alternative initiatives, and assess its potential to reduce PSPS risk in comparison to other initiatives. We also provide background information concerning covered conductor and discuss assumptions regarding what this workstream is intended to produce and what it is not intended to produce.

Background:

Covered conductor is a widely accepted term to distinguish from bare conductor. The term indicates that the installed system utilizes conductor manufactured with an internal semiconducting layer and external insulating UV resistant layers to provide incidental contact protection. Covered conductor is used in the U.S. in lieu of "insulated conductor," which is reserved for grounded overhead cable. Other utilities in the world use the terms "covered conductor," "insulated conductor," or "coated conductor" interchangeably. Covered conductor is a generic name for many sub-categories of conductor design and field construction arrangement. In the U.S., a few types of covered conductor are as follows:

- Tree wire
  - Term was widely used in the U.S. in 1970s
  - Associated with a simple one-layer insulated design
  - Used to indicate cross-arm construction
- Spacer cable
  - Associated with construction using trapezoidal insulated spacers and a high strength messenger line for suspending covered conductor
- Aerial bundled cable (ABC)
  - Tightly bundled insulated conductor, usually with a bare neutral conductor

The current type of covered conductor being installed in each of the utilities' service areas is an extruded multi-layer design of protective high density or cross-linked polyethylene material. In this

[10] Here "utilities" refers to SDG&E and PG&E, SCE, PacifiCorp, BVES, and Liberty Utilities; although this may not be the case every time "utilities" is used throughout this progress report.

report, “covered conductor” refers generally to a system installed on cross-arms, in a spacer cable configuration, or as aerial bundled cable (ABC). The table below provides a snapshot of the approximate amount and types of covered conductor installed in the utilities’ service areas.

Covered Conductor Type and Miles Deployed by Utility

Utility	First covered conductor installation (year)	Type of covered conductor installed	Approx. miles of covered conductor deployed through Sept. 2021	Notes
SCE	2018	Covered Conductor	2,500	Includes WCCP and Non-WCCP
	Installed Historically	Tree Wire	50	
	Installed Historically	ABC	64	
PG&E	CC end of 2017, beginning of 2018	Covered Conductor	820	Primary distribution overhead only
	TW installed historically	ABC	3	
SDG&E	2020	Covered Conductor	6	
		Tree Wire	2	
		Spacer Cable	6	
Liberty	2019	Covered Conductor	5	
		Spacer Cable	2	
Pacificorp	2007	Spacer Cable	50	
Bear Valley	2018	Covered Conductor	17	

Overview / Summary of Approach:

The utilities initiated the Covered Conductor Effectiveness Workstream in August 2021 and have held meetings every two weeks since. The initial meetings have focused on identifying the purpose/objective of the workstream, organization and administration of the workstream, sharing of covered conductor practices and updates that are ongoing and planned covered conductor effectiveness efforts, developing an overall approach to meet the remedies, and discussing project timelines. These efforts have led to identification of project management, workstream lead, and subject matter expert (SME) roles, establishing meeting cadence, obtaining utility commitment and resources to contribute, establishing an online workspace to share and collaborate on documents, and building out an initial framework and high-level timelines to assemble and assess the information.

The utilities believe that long-term effectiveness of covered conductor and its ability to reduce wildfire risk and PSPS impacts (and, in comparison to alternatives) requires multiple sets of information that need to be compiled, assessed, discerned, and updated over time. To date, all the utilities have estimated the effectiveness percentages in developing the risk reduction of covered conductor. These estimates have been informed by SME judgement, engineering analyses, testing, benchmarking/research, and/or historical recorded results. To improve and obtain better consistency on the estimated effectiveness of covered conductor, the utilities will be compiling and analyzing existing data sets and capturing additional information within the following sub-workstreams:

- Benchmarking
- Testing / Studies
- Estimated Effectiveness

- Additional Recorded Effectiveness

Each of these sub-workstreams will seek to obtain existing and new information to help refine our understanding of the effectiveness of covered conductor. Additionally, the utilities have identified the following additional sub-workstreams to meet the remedy requirements:

- Alternative comparison
- Potential to Reduce PSPS risk
- Costs

Workstream Scope:

The overall focus is on the long-term effectiveness of covered conductor. The outcome of this workstream is not to determine the scope of covered conductor nor is this effort intended to compare system hardening decisions that utilities have made and will make. Instead, the outcome of this effort is intended to produce (and update over time) a consistent effectiveness value for covered conductor that utilities can use in their decision making. As part of this effort, the utilities anticipate there will likely be lessons the utilities can learn from one another such as construction methods, engineering/planning, execution tactics, etc. that can help improve each utilities' deployment of covered conductor but this is not the focus of this workstream. Additionally, and as further described below, the costs of covered conductor deployment can differ based on numerous factors including, for example, the covered conductor system configuration, topography, scale of deployment, resource availability and other operational constraints. This effort is not intended to compare nor contrast costs across all different variations and instead will focus on a high-level covered conductor cost analysis that can show higher or lower costs based on several factors.

Framework / Approach:

As noted above, the utilities are proposing a holistic framework with multiple sub-workstreams to better understand the long-term effectiveness of covered conductor. These sub-workstreams are further described below.

Benchmarking:

Each of the utilities' covered conductor programs have been informed by benchmarking. Benchmarking is a useful process to obtain insights, lessons learned, and continually improve performance. SCE, for example, previously researched covered conductor use in the U.S., Europe, Asia, and Australia. SCE benchmarked directly with 13 utilities abroad and in the U.S. and surveyed 36 utilities on covered conductor usage.[11] These efforts helped inform SCE's Wildfire Covered Conductor Program (WCCP). The utilities have begun to conduct additional benchmarking. We have developed a survey to understand the current status of covered conductor, if utilities have recorded data demonstrating effectiveness, and what alternatives to covered conductor they may have deployed or are looking to deploy. The survey is being sent to approximately 150 to 200 utilities in the U.S. and abroad. We anticipate receiving the results of this survey in Q4 2021. Based on the survey results, we intend to engage other utility SMEs to learn more about their successes/failures, performance data, alternatives, etc. This may produce additional data sets we can include in our effectiveness assessment as well as potentially data on alternatives to covered conductor. We anticipate reaching out to other

[11] *See* Covered Conductor Compendium.

utilities prior to the end of 2021 and setting up working sessions in 2022. The results and/or status of this effort will be included in our 2022 WMPs along with future milestones to continuously improve our knowledge of covered conductor effectiveness through benchmarking.

Testing:

Testing has shown that covered conductor will prevent incidental contacts that cause phase-to-phase and phase-to-ground faults caused by vegetation, conductor slapping, wildlife, and metallic balloons.[12] Prior to the initiation of this working group, PG&E, SDG&E, and SCE collaborated on conducting additional research and testing of covered conductor. This effort, now joined by Pacific Corp, Bear Valley and Liberty, has two phases. The first phase is to conduct a literature and prior work review to determine if various failure modes by bare wire can be mitigated with covered conductor and if any gaps exist for covered conductor installation. As part of this effort, PG&E previously contracted with Exponent to develop a report for Phase 1, anticipated to be completed in November 2021. The outcome of the Phase 1 report is intended to lead to laboratory testing based on the gaps identified in phase 1. Phase 2, laboratory testing, anticipated to begin in late 2021 / early 2022, will help quantify the behavior of covered conductors in simulated real-world scenarios (e.g., third-party contact, conductor slapping, downed conductor, etc.) to better understand the risk of arcing, electric shock, and wildfire ignition relative to traditional bare conductor. These results will help inform the effectiveness of covered conductor, potential shortcomings, and whether additional testing is needed.

Estimated Effectiveness:

Each utility has estimated the effectiveness of covered conductor to mitigate the drivers, such as contact-from-object (CFO) and equipment and facility failure (EFF), of wildfire risk. The utilities plan to organize and assess the different estimated effectiveness values of covered conductor to mitigate wildfire risk drivers. SMEs from the utilities will then work together to discern a common estimated effectiveness value, that will be informed by existing and future date sets such as the additional benchmarking and testing described above, and the recorded results described below. We expect to complete the initial common estimated effectiveness value prior to the submission of the 2022 WMP. Ultimately, the by-product of the sub-workstreams described above and below will result in an estimated covered conductor effectiveness value that can be updated over time.

Recorded Effectiveness:

The utilities plan to collect recorded faults, ignitions and wire downs on overhead circuits involving utility facilities that have been covered in each of the utilities' service area. Similar historical data on circuits that have not been covered will also be collected to form a baseline. The data sets will need to be analyzed to ensure interoperability and our ability to combine the data. We anticipate completing this initial assessment by the 2022 WMP submission date. Given that the utilities only recently began to deploy covered conductor, the utilities also plan to develop longer-term milestones to continuously update the recorded results over time.

Alternative Comparison:

[12] *See* Covered Conductor Compendium.

The utilities plan to determine which mitigations and/or groups of mitigations are viable alternatives to covered conductor. A viable alternative is a mitigation or group of mitigations that would address, to a similar or greater degree, the risk drivers that covered conductor is designed to mitigate. We intend to complete this initial assessment in November 2021. Once we have identified viable alternatives, we intend to mutually assess the effectiveness of these alternatives against the same risk drivers that covered conductor is designed to mitigate. We expect to complete an initial assessment and present the comparison effectiveness in the 2022 WMP. We will also include subsequent milestones to continuously update this effectiveness comparison.

Potential to Reduce the Need for PSPS:

The purpose of this sub-workstream is to compare covered conductor installation to other initiatives in its potential to reduce the need for PSPS. Building off the Alternative Comparison sub-workstream, the utilities intend to identify the viable alternatives and/or groups of mitigations that have potential to reduce the need for PSPS, and will derive a common risk reduction factor, subject to weather conditions, for purposes of this effort. The utilities plan to present the results of this initial assessment in the 2022 WMP. Subsequent milestones to update and and/or improve this analysis will also be presented.

Costs:

Covered conductor installation is managed in a project-oriented manner. Like traditional or underground construction, each overhead span is custom-designed and the total spans for each project are also unique. Additionally, covered conductor is also installed with other equipment and materials and can be combined with other system hardening mitigations and/or reliability efforts. These project costs are typically collected in a work order which accounts for labor, material, contract, and various overhead charges. How each utility manages and accounts for their projects can vary based on numerous factors such as system configuration, resource availability, accounting system, CPUC and FERC rate case decisions, and other operational constraints/efficiencies. These differences can make it difficult to compare the cost of covered conductor deployment across utilities. For this sub-workstream, the utilities intend to engage its cost analysts and other SMEs to develop a simplified approach to compare the costs of covered conductor installation across utilities. This assessment will begin with collecting existing recorded unit cost details and documenting project differences in addition to material, labor, and other cost grouping differences. This effort is not intended to pinpoint all cost changes and instead will be a high-level assessment of the major drivers of cost differences. We intend to complete the initial assessment by the 2022 WMP and will inform on future milestones to update the study. If any field studies are determined to be needed to validate aspects of this study, these would be planned for 2022.

Next Steps

As explained above, the utilities plan to make progress on each of the sub-workstreams described above prior to the 2022 WMP. While this effort is in its early stages, the utilities expect to provide an initial common effectiveness value for covered conductor and a long-term plan to continually update the data sets that inform this value in our respective 2022 WMPs. We also expect to make progress on comparing covered conductor to alternatives, covered conductor's ability to reduce the need for PSPS (in comparison to alternatives), and to have an initial assessment of the differences in costs.

SDGE-21- 04 Effectiveness of Enhanced Clearances

SDGE-21- 04	Inadequate joint plan to study the effectiveness of enhanced clearances	SDG&E, PG&E, and SCE will participate in a multi-year vegetation clearance study. The WSD will confirm the details of this study in due course. The objectives of this study are to: 1. Establish uniform data collection standards. 2. Create a cross-utility database of tree-caused risk events (i.e., outages and ignitions caused by vegetation contact). 3. Incorporate biotic and abiotic factors[13] into the determination of outage and ignition risk caused by vegetation contact. 4. Assess the effectiveness of enhanced clearances. In preparation for this study and the eventual analysis, SDG&E must collect the relevant data; the required data are currently defined by the WSD Geographic Information System (GIS Data Reporting Standard for California Electrical Corporations - V2).

The utilities have prepared a joint response to this Issue/Remedy.[14]

SDG&E, PG&E, and SCE (jointly investor-owned utilities or IOUs) have begun collaboration on a vegetation clearance study. In benchmarking vegetation management practices and data collection methodologies across IOUs, it has been determined to be a multi-year effort concurrent with the terms of the study and are expecting the development of uniform standards following the timeline of the study. Bi-weekly meetings began on September 9th and three meetings were held with attendance by IOUs and Energy Safety at each meeting. Early meetings have focused on addressing the first two items listed in the remedies required for this issue:

1. Establish uniform data collection standards
2. Create a cross-utility database of tree-caused risk events (i.e., outages and ignitions caused by vegetation contact)

Meeting topics have consisted of the IOUs discussing their current data collection standards including:

- The amount (years) of historical data each IOU has collected
- Outage cause codes employed for tree-caused risk events
- Tree-caused risk event data collection across the primary and secondary voltages
- Definition of an inventory tree

[13] Biotic factors include all living things (e.g., an animal or plant) that influence or affect an ecosystem and the organisms in it; abiotic factors include all nonliving conditions or things (e.g., climate or habitat) that influence or affect an ecosystem and the organisms in it.
[14] Op Cit Pg 6.

- Post trim clearance data

The IOUs discussed definitions being used and began to standardize definitions including “enhanced clearance,” “inventory tree,” “tree-caused risk event,” and “post-trim clearance.” The different types and methods of creating a cross-utility database of tree-caused risk events was reviewed, including recommendation from Energy Safety that a database can be as simple as a spreadsheet. There are pros and cons to the various methods discussed, with more work to be completed in the future on the format and location of this database.

At the most recent meetings, the IOUs demonstrated their current analysis around the effectiveness of enhanced clearances. SDG&E and SCE presented their analysis with PG&E expected to present at the next meeting. SDGE’s initial analysis of expanded clearances demonstrates a reduction in vegetation related risk events as clearances are increased. SCE’s initial analysis demonstrates reduced tree-caused circuit interruptions since implementation of enhanced clearances in 2018-2019. The IOUs used the existing analyses to discuss the various methods of analyses that can be performed to assess the effectiveness of enhanced clearance. Over the course of this extended study the IOUs will work towards a more uniform standard for measuring the efficacy of expanded clearances. Part of these discussions included the types of biotic and abiotic factors that can affect the risk of vegetation contact including tree genus/species, tree health, soil composition, storm conditions, Santa Ana winds, etc. IOUs believe that biotic and abiotic factors can be extracted from existing data sets.

Each IOU will collect the relevant data identified by Energy Safety for the purposes of this study.

SDGE-21- 05 Vegetation Species and Record Keeping

SDGE-21- 05	Incomplete identification of vegetation species and record keeping	SDG&E must: 1. Use scientific names in its reporting (as opposed to common names). This change will be reflected in the upcoming updates to the WSD GIS Reporting Standard. 2. Add genus and species designation input capabilities into its systems which track vegetation (e.g., vegetation inventory system and vegetation-caused outage reports). 3. Identify the genus and species of a tree that has caused an outage[15] or ignition[16] in the Quarterly Data Reports (QDRs) (in these cases, an unknown "sp." designation is not acceptable). 4. If the tree's species designation is unknown (i.e., if the inspector knows the tree as "Quercus" but is unsure whether the tree is, for example, Quercus kelloggii, Quercus lobata, or Quercus agrifolia), it must be recorded as such. Instead of simply "Quercus," use "Quercus sp." If referencing multiple species within a genus use "spp." (e.g., Quercus spp.).[17] 5. Teach tree species identification skills in its VM personnel training programs, both in initial and continuing education. 6. Encourage all VM personnel identify trees to species in all VM activities and reporting, where possible.

SDG&E has begun implementing remedies to address incomplete identification of vegetation species and record keeping. Progress on the six required remedies is provided below:

1. SDG&E is in the process of working with its IT Designer to create a specific data field within the tree record of the inventory database to record Genus and species which will provide additional reporting capability. SDG&E expects this to be complete by Quarter 1, 2022.
2. Genus and species designation is in-progress for the vegetation inventory database as described in item 1 above. As an interim step, SDG&E has begun recording the genus and species of each tree associated with an outage within a miscellaneous comments field with the tree record and separately on a tracking spreadsheet.

[15] WSD GIS Data Reporting Standard Version 2, Transmission Vegetation Caused Unplanned Outage (Feature Class), Section 3.4.5 & Distribution Vegetation Caused Unplanned Outage (Feature Class), Section 3.4.7.
[16] WSD GIS Data Reporting Standard Version 2, Ignition (Feature Class), Section 3.4.3.
[17] Jenks, Matthew A. (undated, from 2012 archived copy), "Plant Nomenclature," Department of Horticulture and Landscape Architecture, Purdue University, accessed May 18, 2021: https://archive.ph/20121211140110/http:/www.hort.purdue.edu/hort/courses/hort217/Nomenclature/description.htm.

3. SDG&E has begun recording the genus and species of each tree associated with an outage on a tracking spreadsheet. This information will be used to populate these fields in future Quarterly Data Reports.
4. SDG&E will follow this requirement as an element to item 3 above.
5. All vegetation management tree inspectors are required to have education and/or experience in a field related to vegetation management, tree biology, natural resources, etc. Once employed, inspectors receive on-the-job species identification training related to utility arboriculture.
6. SDG&E will determine the applicability of species identification in conjunction with its other vegetation activities and encourage personnel to identify genus/species. Third-party pre-inspection auditing scope will be expanded to include validation of genus/species.

SDGE-21- 06 Quantitative Analysis to Identify "at-risk" Species

SDGE-21- 06	Limited evidence of quantitative analysis to identify "at-risk" species	SDG&E must: 1. Describe its methodologies for determining what species it considers "at-risk." 2. Explain in complete detail why discrepancies exist between the genera with the highest number of outages per 1000 trees per year and SDG&E's "targeted species identified as a higher risk due to growth potential, failure characteristics and relative outage frequency."[18] 3. Define quantitative threshold values (whether a standard value, a range of values, or an example of a typical value) for the criteria used to define a tree as "at-risk."

1. **Methodologies for determining what species SDG&E considers "at-risk".**

SDG&E has identified five primary "at-risk" species, including palm, eucalyptus, sycamore, pine and oak, because they may exhibit one or more of the following criteria:

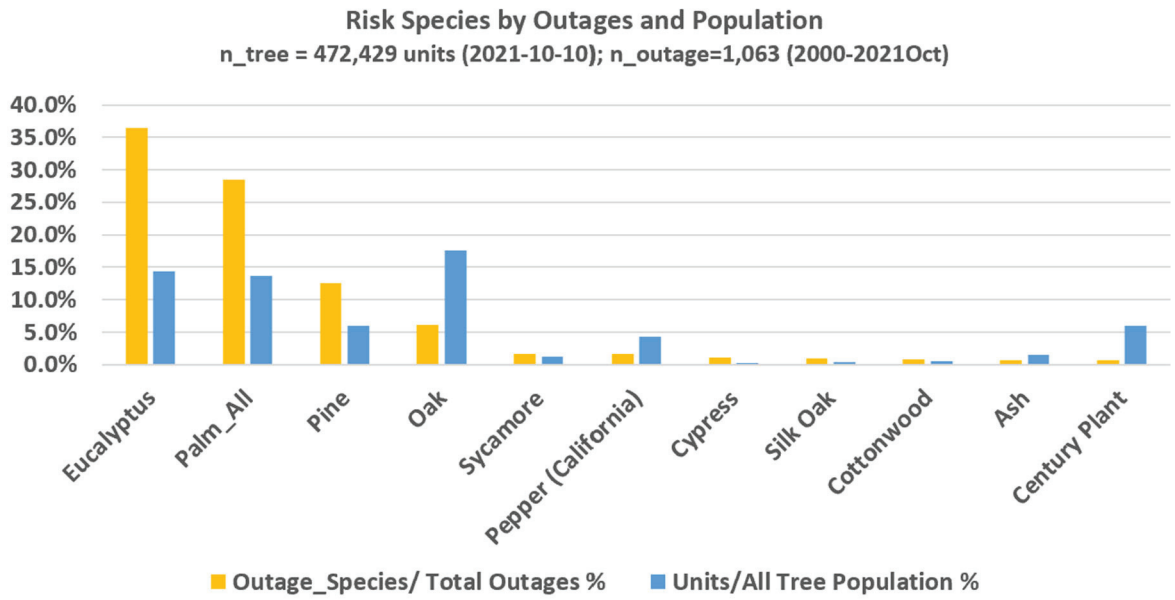
- Fast-growing species
- Species with known characteristics or propensity for branch failure
- Species that represent a high outage frequency per year and species that have a high outage rate relative to the total inventory tree population

It is important to note that SDG&E designates these species as "at risk" to facilitate targeted inspections of these species to better identify if they require enhanced clearances and/or removal. The need for an enhanced clearance is determined at the time of trim and is based on several tree characteristics, including species, location, tree health, and other issues identified by the tree inspector. Thus simply because a tree has been identified as "at risk" does not mean that it will be trimmed to an enhanced clearance.

SDG&E's methodology is based on the goal of reducing the total number of risk events (vegetation caused outages) to mitigate wildfire risk. As shown in Chart 6.1 below, the top five tree species—which SDG&E has identified as "at risk"—are associated with 85.1% of all vegetation caused outages, while the total amount of species units represents 52.9% of SDG&E's entire inventory tree population. SDG&E has teamed with scientists from San Diego Supercomputer Center (SDSC) to further refine its vegetation data to focus on reducing outages caused by these species, which should mitigate overall vegetation outages and the risk of potential associated vegetation-related ignitions.

Chart 6.1: Risk Species by Percentage of Outages (Top 10) and Its Population

[18] SDG&E 2021 WMP Update, p. 278.



Note: the total inventory unit count is based on SDG&E's inventory tree database and reflects current tree inventory.

In the graph above, an orange bar taller than the blue bar represents an instance where there is a disproportionate number of outages relative to the species' total population. These instances also represent the species that have higher outage risk per unit or per 1000 units. The associative annualized data points can be found in Chart 6.2 below under the column titled, "Average Outage Rate Per 1000 Inventory Units." However, when the total species population (the denominator of the equation) is very small this metric yields a very high outage rate per 1000 units. Focusing on preventing outages for these species—such as century plant or cypress—will have less impact on reducing the overall number of outages. Therefore, the metric, Average Outage Rate Per 1000 Inventory Units, should be utilized collaboratively with "Average Outage Per Year" when determining outage risk.

As seen in Chart 6.1, Oak and Sycamore can be categorized as species where the average number of outages per 1,000 inventory trees are not as high compared to other tree types. SDG&E Vegetation Management also considers qualitative measures including anecdotal evidence, industry knowledge, and known species characteristics in its consideration of "at risk" species. For instance, oak and sycamore trees have a known propensity for branch failure, which could lead to increased chance of vegetation/line contact. Certified Arborists and line-clearance-qualified-tree-trimmers apply this knowledge when determining which species should be targeted for enhanced clearances and removal to prevent outages. As previously stated, however, while inspectors use this knowledge when assessing a tree for removal or trim, the ultimate determination regarding the need for enhanced clearance and/or removal is made at the time of trim, based on a wholistic review of the tree.

2. **Explain in complete details why discrepancies exist between the genera with the highest number of outages per 1000 trees per year and SDG&E's "targeted species identified as a higher risk due to growth potential, failure characteristics and relative outage frequency".**

As explained above, SDG&E uses various criteria to determine its targeted at-risk species. Correlation with higher outage frequency is a good indication that a tree poses a higher risk to electrical infrastructure, however SDG&E uses qualitative characteristics to identify high-risk trees as well. This

qualitative assessment, based on the expertise of SDG&E's certified arborists and line-clearance-qualified-tree-trimmers, explains some of the discrepancies between the genera with the highest number of outages per 1000 trees per year and SDG&E's list of five targeted "at risk" species.

Since submitting the 2021 WMP update, SDG&E has continued to refine its study of enhanced tree clearances and tree-related outages with updated data to better understand its assessment of targeted species. SDG&E has collaborated with the San Diego Supercomputing Team in this initiative. Chart 6.2 was created using updated data points to compare with the excerpted table previously prepared by Mussey Grade Road Alliance (MGRA) (see Chart 6.3 below).[19] In Chart 6.2, SDG&E calculated the "Average Inventory Per Year" based on the number of inventory tree units[20] in each year from 2000 to 2020. Queries for trees trimmed in Chart 6.2 were also refined to remove unrelated work orders. Chart 6.2 thus updates certain incomplete data points previously used by MGRA. In MGRA's analysis, tree units trimmed represent only a portion of the total inventory units of the species. This explains the discrepancies between the two studies. The revised, corrected "Average Inventory Per Year" in Chart 6.2 compared to the "Average Inventory" in MGRA Chart 6.3 explains differences in the relative average outages per 1000 inventory trees.

Chart 6.2: 2000-2020 Risk Species Statistics and Threshold[21]

No.	Name	Average Inventory Per Year (Unit)	Average Trees Trimmed Per Year (Unit)	Average Outages Per Year	Total Outages	% of Total Outages	Avg. Outages Per 1000 Inventory Units Per Year
1	Eucalyptus	80,636	44,193	18.10	380	36.2%	0.22
2	Palm	33,592	17,206	14.29	300	28.6%	0.43
3	Pine	30,697	10,407	6.29	132	12.6%	0.20
4	Oak	69,290	17,704	3.10	65	6.2%	0.04
5	Sycamore	5,904	2,815	0.76	17	1.6%	0.13
6	Pepper (California)	16,996	7,491	0.81	16	1.5%	0.05
7	Cypress	1,476	425	0.52	11	1.0%	0.35
8	Silk Oak	2,351	1,450	0.43	9	0.9%	0.18
9	Cottonwood	3,913	1,792	0.43	9	0.9%	0.11
10	Century Plant	11,002	317	0.33	7	0.7%	0.03
11	Ash	7,562	4,309	0.33	7	0.7%	0.04
12	Avocado	24,238	10,947	0.29	6	0.6%	0.01
13	Tamarisk/Salt Cedar	2,059	1,244	0.29	6	0.6%	0.14
14	Willow	13,937	8,128	0.29	6	0.6%	0.02
23	Ficus	3,605	1,395	0.14	3	0.3%	0.04

[19] Comments of Mussey Grade Road Alliance on SDG&E's Wildfire Mitigation Plan at 40.

[20] Inventory units by species: each inventory tree is inspected at least once every year, the number of units that were inspected in each year represents the inventory units of each species, which was determined in the previous year. During the cycle of on-going inspection in the current year, some of the inventory trees could be removed and new trees were added to the inventory database. The overall total tree inventory has been consistent.

[21] All calculations in this table are based on historical data from Year 2000 to 2020.

Chart 6.3: MGRA Species and Outage Frequency

Species	Average Inventory	Average Outages per year	Total Outages	% of total outages	Outages per 1000 trees per year
Eucalyptus	48116	25.50	459	41.90%	0.53
Palm	11223	12.50	225	20.50%	1.11
Pine	11509	8.11	146	13.30%	0.70
Oak	19510	3.72	67	6.10%	0.19
Sycamore	3118	1.11	20	1.80%	0.36
Pepper (California)	8462	0.94	17	1.60%	0.11
Cottonwood	1931	0.72	13	1.20%	0.37
Avocado	11838	0.72	13	1.20%	0.06
Cypress	473	0.67	12	1.10%	1.42
Ash	4706	0.61	11	1.00%	0.13
Century Plant	401	0.50	9	0.80%	1.25
Ficus	1587	0.50	9	0.80%	0.32
Willow	9099	0.50	9	0.80%	0.05
Silk Oak	1578	0.44	8	0.70%	0.28
Tamarisk/Salt Cedar	1310	0.39	7	0.60%	0.30

Table 9 - Copied from MGRA Q3 Comments (Footnote 56). Recalculation of SDG&E Table 24. Columns have been added for total number of outages and for outages per 1000 trees per year. Only plants causing more than 6 outages in the 18 year study period are included. Color coding is based upon number of outages per year per 1,000 trees: Red: >1.00, Yellow: 0.5 to 1.0, No color, 0.3 to 0.5, and Green, < 0.3.

As shown in Chart 6.2, Palm has the highest average outage rate, 0.43 per 1,000 inventory units; Cypress (highlighted in yellow in Chart 6.2) has the second highest annualized average outage rate, 0.35 per 1,000 inventory units. This is because the inventory unit of Cypress only represents 0.3% of total tree inventory, which is much smaller than the other five risk species. For Century Plant, about 317 units were trimmed annually, which represents 2.9% of its average annual inventory; Century Plant's average outage rate per 1,000 inventory units is 0.03 (compared to a much higher rate of 1.25 in MGRA's initial analysis).

3. **Define quantitative threshold values (whether a standard value, a range of values, or an example of a typical value) for the criteria used to define a tree as "at-risk".**

To quantify the threshold, two main metrics can be used to define "at-risk" species based on historical outage data (2000-2020): Average Outages Per Year (AOPY) and Average Outage Rate Per 1000 Inventory Units (AORPI). When using AORPI to assess the risk, AOPY should be utilized collaboratively. Hence, "At risk" is defined as AOPY >=1; or AORPI > 0.1 and AOPY >=0.7. SDG&E will continue to monitor the changes over time.

SDGE-21- 07 Quantified Vegetation Management Compliance Targets

SDGE-21- 07	Need for quantified vegetation management (VM) compliance targets	SDG&E must define quantitative targets for all VM initiatives in Table 12. If quantitative targets are not applicable to an initiative, SDG&E must fully justify this, define goals within that initiative, and include a timeline in which it expects to achieve those goals.

Ten (10) of the 20 VM initiatives in Table 12 are related to and covered under one or more of the other 10 VM initiatives. Therefore, they are not individually and separately quantified or qualified. Of the remaining 10 VM initiatives, 4 can be quantified and 6 can be qualified.

The 6 initiatives that are not quantifiable include:

7.3.5.1 - Throughout the year Vegetation Management (VM) participates in multiple community and outreach events including fire preparedness webinars, wildfire safety fairs, presentations, tree plantings, customer engagements, etc. Many of these events are ad hoc and typically not pre-planned or scheduled by Vegetation Management nor tracked by metrics such as number of participants. Vegetation Management's goal is to continue to participate in all related applicable and related outreach events to message its tree operations with customers and stakeholders, and support safety and reliability goals. SDG&E expects to complete these goals annually as they occur.

7.3.5.7 - VM does not currently have quantifiable goals for the use of technologies such as LiDAR. SDG&E continues to research the potential integration of LiDAR into its tree operations through use cases. In Q3, 2021 the SDG&E Innovation Team completed the Final Readout on the LiDAR Proof of Concept (PoC) for developing an enterprise-wide solution in its use of LiDAR and AI. This readout summarized analysis outcomes for vegetation clearance. Following the readout, the team collaborated with others to plan and frame the scaling of a solution to support storage, analysis and visualization of critical LiDAR data. For Q1 2022, SDG&E aims to capture the new LiDAR flight data for the HFTD and begin analyzing the relative data.

7.3.5.13 - VM performs QA/QC on a sample of all its completed work activities. Audits are ongoing throughout the year. SDG&E continues its routine QA/QC program by performing random sampling audits on a sample population of all completed VM activities including pre-inspection, tree trimming, and pole brushing. Audit consists of a 15% sample of each completed activity. Vegetation Management additionally audits 100% of all completed hazard-tree trimming in the HFTD and 100% of all completed tree removals in the HFTD to ensure full compliance with the scope of work. As part of the company's "doubling-down" initiative for fire preparedness in advance of fire season, VM also performed a QA/QC audit on a sample of all FiRM (Fire Risk Mitigation) project work completed in 2021. SDG&E did not identify any non-compliant tree/line clearance findings as a result of this audit. SDG&E will begin to quantify completed audits using its Master Schedule of activities beginning in Q4 2021

7.3.5.14 - Contractor training is the responsibility of the contractor company. SDG&E requires its contractors to complete annual training including hazard tree assessment, customer service, and

environmental. The inaugural line-clearance tree trimming training class sponsored by SDG&E and the Utility Arborist Association was completed in Q3 2021. Ten individuals currently employed with the California Conservation Corps successfully completed the course. The success of this program has spurred the planning of additional local tree trimming training classes that will take place in the future. This program will also be expanded in Q1 2022 to develop a similar training course for Pre-inspection.

7.3.5.16 - Vegetation Management considers trees for remediation (expanded clearance or removal) throughout the service territory, and targets species in the HFTD with known fast-growing and/or hazard characteristics. The volume of work and number of trees subject to trimming or removal can only definitively be known upon completion of the pre-inspection activities as each tree changes year to year based on tree growth, environmental conditions, etc.

SDG&E has fully integrated its team of internal company Patrollers to perform the specialized hazard tree inspections within the HFTD. Currently, this second, annual hazard tree patrol in the HFTD is scheduled to occur 6 months ("mid-cycle") following the routine tree inspection activity. SDG&E has begun to refine the schedule of the annual HFTD patrol activity such that they occur within the quarter (June-Aug) preceding September, the month the Santa Ana wind season typically begins. This schedule adjustment will begin in 2022. Until that time the current off-cycle HFTD patrol schedule will continue. During routine inspection and special patrols within the HFTD, the team of Pre-inspectors and Patrollers continue to assess all trees within the strike zone for hazard characteristics that require trimming or removal to avoid conflict with the power lines.

As part of its tree removal/replacement program and it's "Right Tree, Right Place" initiative, SDG&E continues to offer customers trees that are compatible to plant near power lines. As part of the company sustainability initiative, SDG&E set a goal of planting 10K trees in 2021. By the end of Q3, 2021 approximately 9500 trees had been given away and planted in collaboration with a multitude of stakeholders including customers, HOAs, cities, tribal lands, and state and federal agencies.

7.3.5.19 - SDG&E integrated the Vegetation Risk Index (VRI) GIS layer into the mobile application (Epoch) of its work management system in Q3 2021. This will bring added risk ignition visibility to VM contractors in the field. The components of the VRI include the Vegetation Management inventory tree data, outage frequency history, and meteorology. Veg Management can utilize this information in its decision-making for all HFTD inspections as well as any specialized VRI or PSPS patrols. With the new Epoch system, Vegetation Management now also has the ability to capture the accurate GPS (latitude/longitude) location of its inventory trees. Vegetation Management has also begun to track and record the Genus/species in its database for each tree associated with an outage. Updates to the VM inventory database will be ongoing as refinements are identified for business and regulatory requirements, and as technology and updates to the system become available.

SDGE-21- 08 Non-Communicative Remote-Controlled Switches

SDGE-21- 08	Non-communicative remote-controlled switches	SDG&E must: 1. Discuss its plans to take system level proactive steps to validate that existing SCADA switches remain fully functional. 2. Discuss its plans to ensure that newly installed SCADA switches are fully functional. 3. Describe the steps it is taking to increase and improve inspections and testing of SCADA switches.

The issue description for SDGE-8 utilizes a line from a SDG&E PSPS post-event report that broadly states that missed PSPS-related notifications "may be attributed to non-communicative SCADA switches." However, this is not the only reason why PSPS-related notifications can be missed. Due to the quick turnaround of the PSPS post event report, full audits and research of these items had not yet completed at the time of SDG&E's initial analysis as cited by the Action Statement. After review of these PSPS events, only three items were related to an inoperable SCADA switch and the rest were related to unexpected impacts from weather. Overall, SDG&E has maintained a very reliable 98% communication rate in its fleet of SCADA enabled devices.

SDG&E takes system-level proactive steps to validate that existing SCADA switches remain fully functional. SDG&E has internal operating procedures that call for testing SCADA switches in the fire area annually. SDG&E's maintenance procedure provides the guidelines for uniform inspection and maintenance performed at least every six years, and battery replacements every three years on all line SCADA devices.

SDG&E has similar procedures to confirm that newly installed SCADA switches are fully functional. Newly installed SCADA equipment requires a standardized operational test procedure involving tests of local and remote operations, fault indications, and alarm systems to ensure full functionality before it is placed into service.

SDG&E has taken additional steps to improve the inspections and testing of SCADA switches to minimize customer impacts of devices being inoperable during PSPS events. SDG&E instituted new processes during the 2020 PSPS season that included identifying bypassed devices and devices out of communication within the HFTD. In 2021 SDG&E has identified 33 such devices and has repaired 30 to date, restoring their remote functionality. Any device that cannot be repaired and is forecasted to be impacted by a PSPS event will have mitigation measures applied. These measures include stationing a qualified electrical worker at the device to perform manual switching or adjusting the forecasted customer notification list.

These responses demonstrate that SDG&E has existing procedures and has developed enhancements to these procedures to ensure that SCADA devices remain fully functional throughout the year. SDG&E has completed the remedies required and considers issue SDGE-21-08 completed.

SDGE-21- 09 SDG&E's Decision-Making Process

SDGE-21- 09	Inadequate transparency associated with SDG&E's decision-making process	SDG&E must: 1. Elaborate on its decision-making process to include a thorough overview of its initiative selection procedure. The overview must show the rankings of the relative decision-making factors (e.g., planning and execution lead times, resource constraints, etc.) and pinpoint where quantifiable risk reductions and RSE estimates are considered in the initiative selection process. The WSD recommends a cascading, dynamic "if-then" style flowchart to effectively demonstrate this prioritization process and satisfy this requirement. 2. Using the newly developed decision-making overview, demonstrate that its undergrounding projects are a reasonable and effective use of resources to achieve risk reduction compared to other mitigation alternatives

To address the improvement opportunity identified in this area, SDG&E is currently developing its decision-making flow. Such process flow charts are intended to cover the key remedies identified and will be presented in the 2022 WMP update to provide greater clarity around how risk factors are considered in decision-making.

SDGE-21- 10 Prioritization of HFTD in Undergrounding and Covered Conductor Mitigation Efforts

SDGE-21- 10	Insufficient detail regarding prioritization of HFTD in undergrounding and covered conductor mitigation efforts	SDG&E must fully demonstrate that its undergrounding and covered conductor mitigation efforts are focused on efficiently reducing wildfire risk and PSPS events, including a description of how SDG&E determines the order in which circuit segments are scheduled for mitigation.

SDG&E first installed covered conductor in 2020 on spans that qualified for overhead hardening based on the FiRM and PRiME risk models. This prioritization targeted small copper conductor, with locations ranked by running SDG&E's Wildfire Risk Reduction Model (WRRM). Within this scope the first covered conductor locations accounted for accessibility to SDG&E work sites to gain experience. Covered Conductor work in the 2021-2022 construction years marked a transition in prioritization where projects that met the FiRM and/or PRiME prioritization through WRRM, were also supported by the risk spend efficiency calculations developed in the WiNGS model.

SDG&E's 2020-2021 undergrounding work focused on allowing community-critical facilities to remain powered during PSPS events. This was accomplished through an infrastructure assessment feasibility of PSPS impacted communities. Like overhead, in 2022 SDG&E will begin to see the influence of the WiNGS model applied to projects in construction. Legacy projects were validated against the WiNGS model, and this is the year SDG&E will first see the full segment approach for wildfire mitigation through WiNGS, in construction. These WiNGS-identified locations were both highly ranked for wildfire risk and assessed to have minimal constraints to project timelines.

SDGE-21- 11 RSE Values Vary Across Utilities

SDGE-21- 11	RSE values vary across utilities	The utilities must collaborate through a working group facilitated by Energy Safety to develop a more standardized approach to the inputs and assumptions used for RSE calculations. After the WSD completes its evaluation of the 2021 WMP Updates, it will provide additional detail on the specifics of this working group. This working group will focus on addressing the inconsistencies between the inputs and assumptions used by the utilities for their RSE calculations, which will allow for: 1. Collaboration among utilities; 2. Stakeholder and academic expert input; and 3. Increased transparency.

The utilities have prepared a joint response to this Issue/Remedy.

Energy Safety has not yet initiated the Risk Spend Efficiency (RSE) working group. The utilities look forward to working with Energy Safety and other stakeholders on RSE approaches and issues.