BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Implement Electric Utility Wildfire Mitigation Plans Pursuant to Senate Bill 901 (2018).	Rulemaking 18-10-007 (filed October 25, 2018)

LIBERTY UTILITIES (CALPECO ELECTRIC) LLC (U 933-E) NOVEMBER 1, 2021 WILDFIRE MITIGATION PLAN PROGRESS REPORT

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Pursuant to Resolution WSD-018, issued July 15, 2021, Liberty Utilities (CalPeco Electric) LLC ("Liberty") respectfully submits its November 1, 2021 Wildfire Mitigation Plan ("WMP") Progress Report ("Progress Report"). This Progress Report responds to the key areas for improvement and additional issues and required remedies issued by the Wildfire Safety Division ("WSD") through Resolution WSD-018 and associated WSD-018 Action Statement.

I. ISSUE LIBERTY-1: NO CLIMATE-DRIVEN RISK MAPPING

Issue description: Liberty does not have a program that addresses climate-driven risk mapping as required in the WMP guidelines.

Remedies required: Liberty must describe how it applies existing risk analysis models to consider future climate projections.

Progress Report Discussion:

Liberty utilized extensive detailed historical weather data in its risk modeling efforts with a focus on the worst fire weather days. This analysis reflects the climate change impacts of recent years. Liberty intends to improve its risk modeling each year by updating the data used for modeling and improving risk evaluation methodologies.

In its next iteration of modeling, Liberty intends to consider future climate projections. Mid-century (2050) projected meteorological inputs will be obtained from a recently published dataset in which Global Circulation Model (GCM) data from the Coupled Model Intercomparison Project (CMIP6) was downscaled to 3-km resolution using Weather Research and Forecasting[1] (WRF). CMIP6 includes variability in Representative Concentration Pathways (RCPs), allowing researchers to examine worst case (SSP5-8.5), middle of the road (SSP3-7.0) and more optimistic (SSP4-6.0) outcomes based on failure or success in enacting climate policies.[2] If the CMIP6 dataset is unable to capture Liberty's entire service territory, the 4-km resolution dataset covering much of North America from the National Center for Atmospheric Research Data Archive will be used instead.[3]

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1 "CMIP6 GCMs downscaled using WRF", https://registry.opendata.aws/wrf-cmip6/.

2 Department of Atmospheric Sciences University of California Los Angeles, "CMIP6 downscaling using WRF", https://dept.atmos.ucla.edu/alexhall/downscaling-cmip6.

3 "High Resolution WRF Simulations of the Current and Future Climate of North America", https://rda.ucar.edu/datasets/ds612.0/.

II. ISSUE LIBERTY-2: LACK OF CONSISTENCY IN APPROACH TO WILDFIRE RISK MODELING ACROSS UTILITIES

Issue description: The utilities do not have a consistent approach to wildfire risk modeling. For example, in their wildfire risk models, utilities use different types of data, use their individual data sets in different ways, and use different third-party vendors. The WSD recognizes that the utilities have differing service territory characteristics, differing data availability, and are at different stages in developing their wildfire risk models. However, the utilities face similar enough circumstances that there should be some level of consistency in their approaches to wildfire risk modeling statewide.

Remedies required: The utilities must collaborate through a working group facilitated by the WSD to develop a more consistent statewide approach to wildfire risk modeling. After Energy Safety 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.*

Progress Report Discussion:

Liberty participated in the Energy Safety WMP Risk Modeling Workshop on October 5 and 6, 2021. At the workshop Liberty presented information about its WMP Risk Model. Refer to the attachment: "Liberty Risk Modeling Program Presentation_October 2021."

In addition, Liberty submitted its WMP Risk Model Workplan to Energy Safety on October 13, 2021. Refer to Attachment: "Liberty WMP Risk Modeling Workplan_October 2021."

Liberty will be an active participant in the Energy Safety WMP Risk Modeling Working Group and looks forward to collaboration with other utilities and stakeholders and increased risk modeling process transparency.

III. ISSUE LIBERTY-3: LIMITED EVIDENCE TO SUPPORT THE EFFECTIVENESS OF COVERED CONDUCTOR

Issue description: The rationale to support the selection of covered conductor as a preferred initiative to mitigate wildfire risk lacks consistency among the utilities, leading some utilities to potentially expedite covered conductor deployment without first demonstrating a full understanding of its long-term risk reduction and cost-effectiveness. The utilities' current covered conductor pilot efforts are limited in scope and therefore fail to provide a full basis for understanding how covered conductor will perform in the field. Additionally, utilities justify covered conductor installation by alluding to reduced PSPS risk but fail to provide adequate comparison to other initiatives' ability to reduce PSPS risk.

Remedies required: The utilities must coordinate to develop a consistent approach to 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.*

Progress Report Discussion:

Refer to the attachment: "Joint Utility Covered Conductor Working Group Report."

A. 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. This Progress Report also provides background information concerning covered conductor and discusses assumptions regarding what this workstream is intended and not intended to produce.

B. Background

Covered conductor is a widely accepted term to reference a conductor being "covered" with insulating materials 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 include:

- 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 brackets 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 covered conductor currently being installed in each of the utilities' service areas is a multi-layer design of insulating material. In this report, "covered conductor" refers generally to conductor encapsulated by multi-layer insulation installed on cross-arms or in a spacer cable configuration, or aerial bundled cable. 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	2,000	Wildfire Covered Conductor Program only
		Tree Wire	50	
		ABC	64	
PG&E	CC end of 2017, beginning TW installed historically	Covered Conductor	820	Primary distribution overhead only
		ABC	3	
SDG&E	2020	Covered Conductor	6	
		Tree Wire	2	
		Spacer Cable	6	
Liberty	2019	Covered Conductor	5	
		Spacer Cable	2	
Pacificorp	2007	Covered Conductor	50	
Bear Valley	2018	Covered Conductor	17	

C. 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 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.

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 judgment, 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 new information within the following sub-workstreams:

- Benchmarking
- Testing/Studies
- Estimated Effectiveness
- 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

D. Workstream Scope

The overall focus of the workstream is the long-term effectiveness of covered conductor. The purpose 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, 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, utilities can likely learn from one another construction methods, engineering/planning, execution tactics, etc. that can help improve each utility's deployment of covered conductor, but this is not the focus of this workstream. Additionally, as further described below, the costs of covered conductor deployment can differ based on numerous factors including the covered conductor system configuration, topography, scale of deployment, resource

availability, and other operational constraints. This effort is not intended to compare or contrast costs across all different variations and will focus on a high-level covered conductor cost analysis.

E. Framework / Approach

As noted above, the utilities propose 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 has been informed by benchmarking. Benchmarking is a useful process to obtain insights, lessons learned, and continually improve performance. SCE 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. These efforts helped inform SCE's Wildfire Covered Conductor Program (WCCP). The utilities have begun to conduct additional benchmarking. The utilities developed a survey to understand the current status of covered conductor, whether utilities have recorded data demonstrating effectiveness, and what alternatives to covered conductor utilities may have deployed or hope to deploy. The survey is being sent to approximately 150 to 200 utilities in the U.S. and abroad. The utilities anticipate results from this survey in Q4 2021. Based on the survey results, the utilities intend to engage other utility SMEs to learn more about their successes/failures, performance data, alternatives, etc. This may produce additional data sets to include in the effectiveness assessment, as well as potential data on alternatives to covered conductor. The utilities anticipate reaching out to other utilities before the end of 2021 and setting up working sessions in 2022. The results and/or status of this effort will be included in the utilities' 2022 WMPs along with future milestones to continuously improve 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. Prior to this working group, PG&E, SDG&E, and SCE collaborated on research and testing of covered conductor. This effort, now joined by PacifiCorp, 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 Phase 1 report is intended to lead to laboratory testing based on gaps identified. Phase 2, laboratory testing, anticipated to begin in late 2021 or 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 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. The utilities 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 areas. 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 for interoperability and ability to combine the data. The utilities 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:

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. The utilities intend to complete this initial assessment in November 2021. Once viable alternatives have been identified, the utilities intend to mutually assess the effectiveness of these alternatives against the same risk drivers that covered conductor is designed to mitigate. The utilities expect to complete an initial assessment and present the comparison effectiveness in the 2022 WMP. The utilities 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's potential to reduce the need for PSPS to that of other initiatives. In conjunction with 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. 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 that accounts for labor, material, contract, and various overhead charges. How each utility manages and accounts for its 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 their 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. The utilities 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 needed to validate aspects of this study, these would be planned for 2022.

F. 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 their respective 2022 WMPs. The utilities 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.

IV. ISSUE LIBERTY-4: LACK OF CURRENT INSPECTION QA/QC PROGRAM

Issue description: While some Quality Assurance/Quality Control (QA/QC) measures are conducted by Liberty personnel, Liberty does not currently have a formal QA/QC program in place for its asset inspections, with one currently in development for completion by January 2022.

Remedies required: Liberty must:

1) *In its Progress Report, explain how it currently conducts quality checks of its asset inspections;*
2) *Develop an interim QA/QC procedure for asset inspections between now and the establishment of its new QA/QC program by January 2022 in order to ensure that work is being completed accurately and effectively;*
3) *Provide updates on the development of its QA/QC program in its Progress Report, including:*
    a. *The scope of the QA/QC program;*
    b. *Procedures of the QA/QC program that Liberty and/or its contractor have developed; and*
    c. *The implementation status of the QA/QC program.*

Progress Report Discussion:

A. Quality checks of asset inspections

Although Liberty does not have a formal QA/QC program for its asset inspections, Liberty conducts annual inspections of its overhead distribution assets in accordance with construction design standards set forth in G.O. 95 and timelines in G.O. 165 to ensure reliable, high-quality, and safe operation of the utility.[4] Liberty submits an annual G.O. 165 report documenting the number of assets patrolled (rural versus urban), the number of detailed asset inspections performed, and the number of intrusive pole inspections performed for the previous year under penalty of perjury.[5] Liberty maintains records of each asset inspected under G.O. 165 patrols and detailed inspections by circuit for each reporting year. Similarly, records of intrusive pole testing conducted each year is maintained separately by circuit and pole number to track remediation efforts appropriately.

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4 https://docs.cpuc.ca.gov/PUBLISHED/GENERAL_ORDER/159182.htm and https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M146/K646/146646565.pdf.

5 Distribution asset inspections are performed every five years and intrusive pole inspections are conducted every ten years.

As explained thoroughly in Liberty's 2021 WMP update, in 2020, Liberty surveyed and inspected all overhead distribution assets that normally would have been completed under G.O. 165 reporting timelines, in one year.[6] The results of the detailed asset survey provided documentation of geospatial asset location, verification of asset identifiers, level findings and associated level code descriptions listed for remediation. Liberty has developed an operational approach to remediate and prioritize all asset repair and replacements by type of fire risk and HFTD location. In 2021, Liberty resumed G.O. 165 inspection cycle and will develop an appropriate QA/QC evaluation later this year.

Liberty conducts visual inspections for GO 95 compliance upon completion of asset installations which includes new facilities and replacements. New asset inspection documentation is contained in the job folders. Existing facility inspection documentation has historically been collected and stored on paper, but recent third-party inspection work has been collected and stored in a GIS application called Fulcrum.

B. Interim Procedure for 2021 Asset Inspection QA/QC

In 2021, Liberty improved documentation of asset inspections. Inspection practices for asset installations now include inspection notice forms (notice of correction or deficient work), daily Job Hazard Analysis (JHA) forms, GO 95 checklists, pole by pole inspection forms and logging of key data in our Fulcrum GIS database. Refer to attachment: "Liberty Inspection Forms." In addition, Liberty is piloting a third-party QA/QC program on select projects to gather lessons learned for implementation in the QA/QC program that is under development. It should also be noted that earlier in 2021 Liberty developed a Post Work Verification Procedure for its vegetation management program to provide reasonable assurance that Liberty is meeting the applicable requirements pertaining to vegetation management.

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[6] Liberty inspected all assets and not just one-fifth of the assets in 2020.

C. Development of 2022 Asset Inspection QA/QC Program

As of January 2022, Liberty will be rolling out a well-documented QA/QC Program to cover both inspections of new assets and inspections of existing assets. This program will specify requirements for inspections, methods for documentation and control checks to verify that inspections and the documentation of the inspections are accurate and complete. The program will be implemented in Q1 2022 starting with all new large capital projects.

V. ISSUE LIBERTY-5: LACK OF IMPROVEMENT TO VISUAL AND DETAILED ASSET INSPECTIONS THAT SPECIFICALLY TARGET ASSETS AND ASSET COMPONENTS WITH HIGH IGNITION RISK AND AREAS OF HIGHEST WILDFIRE RISK

Issue description: Liberty makes minimal improvements to enhance asset inspections outside of meeting GO 165 requirements, with little focus specifically on wildfire risk. Given Liberty's high instance of ignitions due to equipment failures, as well as large number of Level 3 findings in 2020, Liberty must work to improve upon its current inspection practices.

Remedies required: Liberty must enhance its current asset inspection process and maintenance programs in order to specifically target:

1) *Assets and asset components with higher ignition risk; and*
2) *Areas of highest wildfire risk.*

Progress Report Discussion:

A. Assets and asset components with higher ignition risk

In 2020, Liberty went above and beyond normal G.O. 165 requirements for its asset inspections and conducted detailed inspections on all overhead distribution assets and not just one-fifth of the service territory required by G.O.165. Liberty remediated all level one findings last year, regardless of fire risk, and developed an operational plan for prioritizing level two findings by HFTD tier and fire risk. Liberty used the detailed inspection results from the system survey to identify high ignition risk assets based on subject matter expert input that was incorporated in the overall evaluation of fire risk by circuit. In the future, Liberty's operations will use the fire risk identifiers to develop a comprehensive inspection program of existing assets. In addition, Liberty plans to assign resources to manage the asset maintenance and inspection program and to schedule and prioritize repairs documented in asset inspection compliance reports. The development of an improved maintenance and repair plan is in process and will be completed by end of 2021. While maintenance and repair work are in progress, the improved plan is intended to better manage and document the work. Documentation of repair work is being logged and tracked in the Fulcrum GIS database.

B. Areas of highest wildfire risk

During the latest wildfire risk modelling efforts, Liberty gained a better understanding of wildfire risk areas in its service territory. Because the service territory consists of a relatively small area designated as HFTD 3 and the remainder of the territory designated as HFTD 2, Liberty utilized the Reax fire threat zones to designate additional fire threat areas of concern to expand the fire threat prioritization of asset inspection areas within its service territory. Inspections and remediation work will be prioritized based on the (1) HFTD Tier 3, then on (2) Reax Very High and High zones, and followed by (3) Reax Moderate and Low zones for the remainder of the HFTD Tier 2 locations going forward. Liberty has an RFP under development with a project scope to perform a tree attachment survey in HFTD Tier 3 to help prioritize the remediation work based on tree attachment documentation including arborist field study and tree health. This is an example of how the high fire threat zones are being prioritize work that includes the recent Reax fire propagation study.

VI. ISSUE LIBERTY-6: INADEQUATE JUSTIFICATION OF VEGETATION MANAGEMENT INSPECTION FREQUENCY

Issue description: Quarterly Report Action LIB-9 (Class B) requires Liberty to "provide a justification with supporting data of its three-year vegetation inspection cycle outside of Tier 3 HFTD areas. Liberty has not provided such justification.

Additionally, Liberty does not provide a clear or consistent explanation of its VM inspection frequency. Liberty states that it performs detailed inspections of entire once every three years per circuit. In its 2020 WMP, Liberty stated that it "plans to inspect its overhead system within Tier 3 of the High Fire-Threat District on an annual basis." It is unclear whether Liberty implemented this plan to inspect its overhead system in HFTD Tier 3 for VM compliance annually as it is not mentioned in its 2021 WMP Update. Liberty does state that is "conducts annual inspections of its facilities in order to identify needed vegetation management work" but does not specify any HFTD Tier.

In 2020, Liberty engaged a third-party to "provide a comprehensive assessment of the vegetation management program," but does not detail in its WMP any finding regarding the effectiveness of its VM inspection frequency.

Remedies required: Liberty must:

1) *Clearly detail its VM inspection frequency by inspection type and HFTD Tier;*
2) *Fully and completely justify its 3-year detailed inspection cycle for all circuits;*
3) *Describe the implementation of any findings from the third-party evaluation; and*
4) *Provide the third-party's evaluation of Liberty's VM program as an appendix.*

Progress Report Discussion:

A. Clearly detail its VM inspection frequency by inspection type and HFTD Tier

Liberty's Vegetation Management Plan states that Liberty will:

- Inspect vegetation conditions annually or more frequently, as needed; and
- Complete the annual work needed to prevent encroachments into the clearance distances described in the applicable regulations.

There are seven separate types of vegetation related inspections employed by Liberty:

- Light Detection and Ranging ("LiDAR") Inspections – Scheduled
- LiDAR Supplemented Ground Inspections – Unscheduled
- Detailed Ground Inspections – Scheduled
- Supplemental Inspections – Scheduled
- Catastrophic Event Memorandum Account ("CEMA") Patrol Inspections – Scheduled
- Post Work Verification Procedure Inspections (Quality Assurance/Quality Control) – Scheduled
- Post Storm Hazard Tree Inspections – Unscheduled

LiDAR

LiDAR is the principal inspection tool Liberty uses to comply with the applicable clearance regulations. LiDAR inspections are completed annually on Liberty's entire system, which includes both distribution and transmission facilities in the Tier 3 and Tier 2 High Fire-Threat Districts ("HFTD"), and all non-HFTD areas. LiDAR inspections can result in work being performed on a routine basis, on an emergency basis, or part of CEMA activities.

Liberty defines LiDAR inspections methods in its Vegetation Management Plan and other related documents. System-wide LiDAR inspections are completed on an annual basis to comply with applicable clearance regulations and identify any vegetation concerns.

The example of LiDAR results below depicts vegetation that has encroached into a predetermined clearance zone or Maintenance Action Threshold ("MAT") zone. The predetermined clearance zone is a distance greater than the applicable regulations (see Clearance Tables, Appendix 'A'). The polygon highlighted in blue (Figure 1) shows the vegetation distance to wire as flown (D2W AF), at its nearest point, is 5.75 ft.

Figure 1: LiDAR example of vegetation detected within MAT

LiDAR Supplemented Ground Inspections

Vegetation concerns identified from the evaluation of LiDAR data will be followed by LiDAR Supplemented Ground Inspections. Once an encroachment into the predetermined clearance zone, or MAT, has been identified, a qualified pre-inspector will verify the LiDAR results in the field and prescribe any needed mitigation work.

Detailed Ground Inspections

Detailed inspections are completed of entire circuits to prescribe pruning and removal of vegetation as a safeguard against grow-ins or fall-ins and to conform to laws and regulations. Liberty will perform such inspections and work once every three years per circuit. Detailed inspection cycles

may vary in order to account for vegetation growth rates, site characteristics, environmental conditions, or other factors that can affect the timing of corrective actions.

Detailed ground inspections are conducted on a three-year cycle and are primarily used to identify hazard trees but are also used to determine if applicable clearances are being met. The inspection cycle can be shortened based on various factors but would not be lengthened beyond three years.

Detailed ground inspections are also an integral part of the Hazard Tree Mitigation Plan, which defines the various assessment levels to be conducted. The assessment levels are determined by the hazard tree attributes and, if applicable, the site attributes.

The 2020 Novembri Consulting Liberty Vegetation Management Program Efficacy Report indicated that a three-year cycle is not adequate to comply with mandated clearance regulations. Accordingly, in 2021, Liberty moved to an annual LiDAR inspection cycle for its entire system (Tier 3 and Tier 2 HFTDs, and non-HFTD). LiDAR is the principal inspection method used to comply with applicable clearance regulations.

Supplemental Inspections

Supplemental inspections are performed by qualified line operations personnel throughout the year. Conditions that are identified that require vegetation-related work are documented and reported to the vegetation management personnel and scheduled for remediation.

These are routine annual line inspections that are conducted to identify any electrical line or equipment issues. As part of the inspection, vegetation management issues are documented, reported to vegetation management personnel, and mitigated.

CEMA Patrol Inspections

Annually, Liberty performs inspections of vegetation along utility rights-of-way to identify obvious hazards. These inspections focus on the removal of dead and dying trees within and adjacent to the right-of-way.

Patrol inspections of vegetation around electric lines and equipment identify dead and dying trees with the potential to strike electric facilities. During patrol inspections, trees are also evaluated for compliance with regulated clearance distances from vegetation to conductors per General Order 95 Rule 35 and Public Resources Code 4293.

To complement CEMA-related work, Liberty developed a Hazard Tree Management Plan to identify, document, and mitigate trees that are located within the Utility Strike Zone and are expected to pose a risk to electric facilities based on the tree's observed structural condition and site considerations. The plan includes an overview of tree risk associated with electric lines and equipment, inspection types, risk assessment levels, work priority levels, and mitigation actions.

Post-Work Verification Procedure Inspections

Liberty maintains and implements a robust scheduling process in order to meet mandated compliance inspection requirements. Maintenance work (pre-inspection, pruning, and removal) is performed by non-Liberty resources (contractors). The oversight contained in the Post-Work Verification Procedure is intended to provide several levels of defense-in-depth strategies in order to provide reasonable assurance that inspection and maintenance work is being performed effectively.

This procedure includes sampling methodology, sample size for each work type (completed tree work, detailed pre-inspections, hazard tree work, and pole brushing), acceptable quality level and conformance rates, desktop reviews, and field reviews.

Post-Storm Hazard Tree Inspections

Liberty may perform specific hazard tree inspections, as needed, after major storms, high wind events, and fires. The need for these inspections is determined based on the severity of the event and resulting possibility of damaged trees.

B. Fully and completely justify its three-year detailed inspection cycle for all circuits.

As previously stated, detailed ground inspections are conducted on a three-year cycle and are primarily used to identify hazard trees but are also used to determine if applicable clearances are being met. Detailed ground inspections are an integral part of the Hazard Tree Mitigation Plan, which defines the various assessment levels to be conducted. The assessment levels are determined by the hazard tree attributes and, if applicable, the site attributes.

The 2020 Novembri Consulting Liberty Vegetation Management Program Efficacy Report indicated that a three-year cycle is not adequate to comply with mandated clearance regulations. As a result, in 2021, Liberty moved to an annual LiDAR inspection cycle for its entire system (Tier 3 and Tier 2 HFTDs, and non-HFTD). LiDAR is the principal inspection method used to comply with applicable clearance regulations.

C. Describe the implementation of any findings from the third-party evaluation.

This section identifies the six findings from the 2020 Novembri Consulting Liberty Vegetation Management Program Efficacy Report and describes Liberty's actions based on these findings.

1. Finding #1 - Lack of Complete Tree Inventory

The third-party evaluation found that a lack of a complete tree inventory is likely contributing to missed trees and recommended that Liberty continue to update and refine the tree inventory database during each inspection. This, along with the full implementation of LiDAR inspections, will result in fewer missed trees.

a. Liberty's Action to Address Finding

Liberty moved to an annual LiDAR inspection cycle for its entire system and is in the process of updating its tree inventory database.

2. Finding #2 - Inadequacy of a Three-Year Cycle

Based on the data gathered during the field assessment and information provided by Liberty in response to data requests, it appears that the current three-year cycle is not adequate to comply with mandated clearances and should be modified.

a. Liberty's Action

Liberty moved to an annual LiDAR inspection cycle for its entire system to meet mandated clearances.

3. Finding #3 – Pole Clearing Issues

The large number of poles that were not adequately cleared to meet the mandated clearance requirements, found in PRC 4292, appear to be due to a quality control issue. The contractor responsible for pole brushing should be made aware of the issues identified and implement the necessary changes to meet Liberty's pole brushing requirements throughout the fire season. Liberty indicated that its quality assurance/quality control (QA/QC) program is still under development. As part of that development, Liberty may need to implement a more structured audit of the pole brushing contractor's work.

a. Liberty's Action

Liberty developed a Post-Work Verification Procedure and implemented a QA/QC program for completing post-work audits of contractors' work.

4. Finding #4 – Clearance Regiment

Liberty should transition to a modified clearance regimen over the next two years based on the following recommended clearances:

Vegetation Clearances Phase I – Implementation 2021

Regulations – PRC 4293; GO 95, Rule 35, Extreme and Very High Fire Areas (Case 14)

Voltage	Regulation Clearance Distance **RCD**	Trigger Clearance Distance **TCD**	Maintenance Clearance Distance - Minimum **MCD**
14.4kV	4’	6’	12’ – 15’
60kV	4’	6’	12’ – 15’
120kV	10’	15’	30’

- RCD: Clearance distance between conductors and vegetation that is mandated by regulations.
- TCD: Clearance distance that triggers the work scheduling process. The TCD is based on the regulation clearance with a safety margin multiplier of 1.5. This identified work generally needs to be completed within the next year.
- MCD: Clearance distance to be achieved at time of work. Minimum clearances based on Rule 35, Appendix E. Clearance to be increased, as needed, based on vegetation growth rates.

Vegetation Clearances Phase II – Implementation 2022-2023

Regulations – PRC 4293; GO 95, Rule 35, Extreme and Very High Fire Areas (Case 14)

Voltage	Regulation Clearance Distance **RCD**	Compliance Clearance Distance **CCD**	Trigger Clearance Distance **TCD**	Maintenance Clearance Distance - Minimum **MCD**
14.4kV	4’	6’	9’	12’ – 15’
60kV	4’	6’	9’	12’ – 15’
120kV	10’	15’	18’	30’

- RCD: Clearance distance between conductors and vegetation that is mandated by regulations.
- CCD: Clearance distance to maintain regulatory compliance for a one-year period. The CCD is based on the regulation clearance with a safety margin multiplier of 1.5. This identified work generally needs to be completed within the next year.
- TCD: Clearance distance that triggers the work scheduling process. The TCD adds three feet to the CCD. The logic for adding three feet to the CCD to determine the TCD was to enable the clearance to be easily observed by field personnel and to provide a buffer should a tree be missed during an inspection. Because growth rates vary significantly by species, three feet is the appropriate distance to prevent compromising the CCD.
- MCD: Clearance distance to be achieved at time of work. Minimum clearances based on Rule 35, Appendix E. Clearance to be increased, as needed, based on vegetation growth rates.

a. Liberty's Action

Phase 1 – 2021 recommended clearances have been implemented.

5. Finding #5 – Annual Inspections

Other California utilities have moved to = inspection-driven programs in which more frequent inspections are performed and VM work is limited to what is necessary between scheduled inspections periods.

Consideration should be given to implementing annual inspections for all distribution lines. This could be accomplished using LiDAR (see "LiDAR Inspections" below) in conjunction with ground inspections.

a. Liberty's Action

Liberty moved to an annual LiDAR inspection cycle for its entire system. Annual inspections will likely result in an increased workload, which will require an adjustment in field resources.

6. Finding #6 – Use of LiDAR

Liberty's use of LiDAR for distribution VM is an advanced aspect of the program. To date, Liberty is not aware of any other utilities in the state that have completed LiDAR scans of 50% of their distribution lines. LiDAR is very effective and is an ongoing tool in Liberty's VM program.

a. Liberty's Action

Liberty moved to an annual LiDAR inspection cycle for its entire system.

D. Provide the third-party's evaluation of Liberty's VM program as an appendix.

Refer to attachment: "Vegetation Management Program Efficacy Report_December 2020."

VII. ISSUE LIBERTY-7: EQUIVOCATING LANGUAGE USED TO DESCRIBE RISK-BASED DECISION-MAKING IMPROVEMENTS

Issue description: Liberty uses noncommittal and equivocating language to describe improvements to its risk-based decision-making process in section 7.3.7.1.

Remedies required: Liberty must report on its risk-based decision-making in measurable, quantifiable, and verifiable language and discuss its progress and future improvements to the risk-based decision-making process.

Progress Report Discussion:

Liberty reports on its WMP risk-based decision making in measurable, quantifiable, and verifiable language in its WMP Risk Model Workplan, submitted to Energy Safety on October 13, 2021. Refer to Attachment: "Liberty WMP Risk Model Workplan_October 2021." Liberty is currently conducting its second iteration of wildfire risk modeling. As the modeling methodology is refined, and as the models are updated with more current data, the confidence level of modeling results will increase. With this increased confidence, Liberty intends to share in a more quantifiable way how its risk modeling assists in making wildfire mitigation decisions.

VIII. ISSUE LIBERTY-8: LIMITED DISCUSSION ON REDUCTION OF SIZE, SCALE, AND FREQUENCY OF PSPS

Issue description: Liberty has limited discussion on its progress for reduction in size, scope, and frequency of PSPS. Liberty stated that due to its minimal use of PSPS in the past, it is unnecessary or impossible to further reduce PSPS. Nevertheless, Liberty must still report its plans to minimize PSPS scope, scale, and frequency normalized for weather events and climatic conditions.

Remedies required: Liberty must report on its plan to minimize the size, scope, and frequency of PSPS events normalized for weather events and climatic conditions, and fully describe how its planned initiatives minimize PSPS impact.

Progress Report Discussion:

A. Use of microgrids and backup batteries to reduce the scope of potential PSPS events

One of the most effective ways to eliminate line exposure and reduce scope of possible PSPS events is to de-energize lines for the entire fire season. For example, by utilizing the Sagehen Microgrid on the UC Berkeley campus north of Truckee, CA, Liberty was able to power down the four miles of distribution line that normally feeds the campus; and this would have resulted in no interruption to customers if Liberty had initiated the potential September 19, 2021 PSPS event that ultimately did not occur. This model is also being replicated in the South Lake Tahoe area for another load pocket in 2022.

Liberty further plans to reduce scope by deploying backup battery systems for MBL, critical, and large customers. These battery systems will prevent outages for customers during PSPS events and winter storm events and will ultimately act as a virtual power plant.

B. Evaluating use of new PSPS decision tree

In January 2021, Liberty's Fire and Weather Scientific consultant, Reax Engineering, formulated an enhanced version of its fire weather forecasting tool to include an additional parameter known as Burning Index, or BI. BI adds an increased layer of information regarding fire potential to its already robust predictive formula. It accounts for predominant fuel type, live and dead fuel moisture, and short-term fluctuations in fire weather conditions. Use of this new formula with increased information from newly installed additional weather stations will enable further granularity in the area of alternative

responses to initiating a PSPS, such as managing recloser technology, de-energizing specific circuits, and/or increasing patrols in specific geographic areas of concern.

C. Liberty is evaluating the use of fast trips with fault indicators as a tool to lower ignition possibility, mitigate PSPS impacts, and restore service faster

Liberty is currently evaluating the use of fast trips with fault indicators as a tool to lower ignition possibility, mitigate PSPS impacts, and restore service faster. When fire threat is high, this fast tripping construct offers an additional option instead of a PSPS. Utilizing fast trips can significantly reduce ignition probability. However, outages can be larger because fault clearing can happen before fuses and other protective devices have time to operate. Therefore, Liberty is considering deploying a network of fault indicators that will allow fast isolation of the problem area and quick restoration of the rest of the circuit. Liberty is considering proposing a pilot program in its 2022 WMP Update.

D. Grid hardening efforts such as covered conductor will minimize PSPS impact when complete

Grid hardening efforts, such as covered conductor and microgrids, will help reduce the number of customers affected by PSPS. Some portions of Liberty's service territory are served via an underground distribution system. Liberty is evaluating creating additional resiliency corridors in these areas that may include portable generator units.

IX. CONCLUSION

As directed by WSD-018, Liberty has addressed the key areas of improvement and implemented the required remedies associated with Liberty's 2021 WMP Update.

Respectfully submitted,

/s/ Jordan Parrillo

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