

**BEFORE THE CALIFORNIA PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**



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Order Instituting Rulemaking to Implement Electric
utility Wildfire Mitigation Plans Pursuant to Senate
Bill 901 (2018)

R.18-10-007
(Issued October 25, 2018)

**BEAR VALLEY ELECTRIC SERVICE (U 913 E)
WILDFIRE MITIGATION PLAN**

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Date: February 6, 2019

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Pursuant to Senate Bill (SB) 901 and the Order Instituting Rulemaking to Implement Electric Utility Wildfire Mitigation Plans Pursuant to Senate Bill 901 (2018), Rulemaking (R.) 18-10-007 (OIR) of the California Public Utilities Commission (CPUC or Commission), Bear Valley Electric Service (BVES) submits its Wildfire Mitigation Plan (Plan). SB 901 requires all electric utilities to prepare plans on constructing, maintaining, and operating their electrical lines and equipment to minimize the risk of catastrophic wildfire. In the OIR, the CPUC established a schedule for submission and review of the initial wildfire mitigation plans, and a process for review and implementation of plans to be filed in future years.

BVES is providing this Plan for 2019, consistent with the statutory requirements and direction provided by the CPUC in the OIR and in the Administrative Law Judge's Ruling on Wildfire Mitigation Plan Template, and Adding Additional Parties as Respondents issued January 17, 2019. This Plan describes BVES's proposed programs and strategies

Respectfully submitted

By: /s/ *Nguyen Quan*

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Bear Valley Electric Service Wildfire Mitigation Plan



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DISCLAIMER

The State of California and the California Public Utilities Commission (CPUC) mandated in (R.)18-10-007 that the electric utilities develop "Wildfire Mitigation Plans". The CPUC provided a specific outline that the electric utilities were to follow in the development of their Wildfire Mitigation Plans. A utility's Wildfire Mitigation Plan (Plan) aims to reduce the utility's risk of starting a wildfire.

To support the development of its Wildfire Mitigation Plans, Bear Valley Electric Service (BVES) retained Navigant Consulting, Inc. (Navigant) to support the development of its Wildfire Mitigation Plan. Navigant's approach to support the development of BVES Mitigation Plan included:

- **Data Request:** Navigant requested data, reports and prior plans to be incorporated into their updated Wildfire Mitigation Plan.
- **Interviewed BVES Personnel:** A series of interviews were held with BVES personnel to determine what specific actions and plans they wanted included in their Wildfire Mitigation Plan.
- **Plan Development:** Navigant developed a Wildfire Mitigation Plan based on the direction and information provided to Navigant.
- **Review of the Plan:** BVES reviewed and approved its Wildfire Mitigation Plan.

Navigant Consulting, Inc. (Navigant) assisted BVES in preparing this report, based on the information and plan the utility provided. The information presented in this report represents Navigant's professional judgment based on the information available at the time this report was prepared. Navigant is not responsible for the reader's use of, or reliance upon, the report, nor any decisions based on the report. NAVIGANT MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESSED OR IMPLIED. Readers of the report are advised that they assume all liabilities incurred by them, or third parties, as a result of their reliance on the report, or the data, information, findings and opinions contained in the report.

1. OBJECTIVES OF THE PLAN

Given recent, catastrophic wildfires in California, the state passed Senate Bill (SB) 901 in late 2018. This bill requires utilities to adopt wildfire mitigation plans, the details of which are at the discretion of the California Public Utilities Commission (Commission or CPUC) for Investor-Owned Utilities (IOUs). In response, the Commission issued an Order Instituting Rulemaking to Implement Electric Utility Wildfire Mitigation Plans Pursuant to Senate Bill 901 (2018), (Rulemaking (R.) 18-10-007. The OIR provides guidance to the utilities governed by the CPUC about the framework and content of the Wildfire Mitigation Plan (Plan) and a timeline and process for review and implementation moving forward.¹ In this initial OIR, the Commission requires that utilities submit plans by February 6, 2019. The Commission will then review the plans and issue a decision in mid-2019. Due to the limited time in developing the document for filing, the Commission understands that the Plans may not be perfectly robust and envisions iterations of the Plan evolving over time.

Bear Valley Electric Service (BVES), a division of Golden State Water Company (GSWC), has applied a thoughtful approach in developing a holistic strategy to mitigate utility-posed wildfire risks pursuant to SB 901. The approach included a strategic, risk-based evaluation that resulted in efforts to improve operational practices, enhance existing mitigation measures, and monitor efforts over time.

1.1 Objectives by Timeframe

In compliance with SB 901 and the CPUC's related OIR, the following Wildfire Mitigation Plan aims to prevent the threat of utility-caused wildfires by identifying mitigation measures and in the event of a wildfire affecting the BVES Service Area, to provide emergency response and restoration actions regardless of cause.

Specifically, the report aims to fulfill the requirements detailed in Public Utilities Code (PUC) Section 8386, which has been modified by SB 901. The requirements are outlined in the OIR. The high-level requirements include an outline of wildfire risks within the service territory; overview of strategies, protocols, plans and programs to mitigate wildfires; metrics to monitor the plan's performance; and protocols for communicating with customers throughout any wildfire mitigation or emergency events.

This plan is effective upon CPUC approval for a period of 12 months. Based on the current schedule of OIR R. 18-10-007, it is anticipated that the plan will be effective from June 2019 to May 2020. However, BVES will commence executing the plan effective immediately where reasonable and prudent.

Since the Plan will evolve over time, BVES has defined objectives for the following timeframes: before the upcoming fire season, as defined by the CPUC and CAL FIRE, before the next Plan filing with the CPUC, and within the next five years. The objectives are as follows:

- Before the upcoming fire season
 - Identify "quick wins" or near-term, cost effective mitigation measures that can be implemented quickly
 - Explore new technologies and strategies to be established in the long-term and create plans for implementation

¹ The Commission oversees the following utilities, Pacific Gas & Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E), Liberty CalPeco, Bear Valley Electric Service (BVES), and Pacific Power.

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- Identify costs associated with both “quick-wins” and longer-term mitigation measures
 - Create metrics to begin monitoring Plan effectiveness
- Before the next Plan filing with the CPUC
 - Monitor implementation of approved near-term mitigation measures
 - Evaluate effectiveness of mitigation measures already implemented, using metrics identified in this Plan
 - Revisit long-term technologies and strategies to determine feasibility of implementation
 - Continue exploring new technologies and strategies to mitigate wildfire risks
- Within the next five years
 - Monitor implementation of approved long-term mitigation measures
 - Continue evaluating the effectiveness of mitigation measures already implemented, adjusting measures and metrics, as needed
 - Continue exploring new technologies and strategies to mitigate wildfire risks

To address the objectives detailed above, the report includes the following sections:

- **Section 2** provides an overview of BVES’ Service Territory, including at-risk areas.
- **Section 3** outlines system risks and risk drivers.
- **Section 4** details BVES’ system hardening, vegetation management, situational awareness, and public safety power shut-off plans to mitigate risks identified in Section 3.
- **Section 5** summarizes BVES’ emergency preparedness plans as they relate to wildfires.
- **Section 6** identifies metrics to monitor BVES’ fire mitigation tactics over time.

The Wildfire Mitigation Plan is intended to be iterative, promote continuous improvement year over year and implement industry best practices in a prudent and reasonable manner. Additionally, some of the projects and programs are part of a multi-year long range improvement plan. These will be indicated in the plan where applicable, so the overall vision and strategy are clear for both the short-term and long-term.

2. DESCRIPTION OF THE PREVENTATIVE STRATEGY & PROGRAMS

This section provides an overview of the preventative strategies and programs established in the plan. The information provided includes the overarching plan components, programs implemented or proposed, and the timing of proposed implementations. It should be noted that BVES did not split its preventative strategies into transmission and distribution categories, since BVES does not own and operate any transmission infrastructure. Although it has sub-transmission lines (34.4 kV), it considers the lines distribution assets, given the voltage.

2.1 Strategy & Program Overview

BVES' wildfire preventative strategy and programs encompass five main components and align with best practices. Together the five components create a comprehensive wildfire preparedness and response plan with an overarching focus on stringent construction standards, fire prevention through system design, proactive operations and maintenance programs, and well-socialized operating procedures and staff training. Figure 2-1 outlines the five main components.

Figure 2-1. Preventative Strategy & Program Overview



Source: BVES

- **Design & Construction:** These strategies consist of system, equipment, and structure design and technical upgrades. The practices in this category aim to improve system hardening to prevent contact between infrastructure and fuel sources, such as vegetation. For example, BVES plans to upgrade the Radford Line so it has a covered wire, mitigating the risk of bare line contact with vegetation or other fuel sources.
- **Inspection & Maintenance:** These strategies consist of assessment and diagnostic activities as well as associated corrective actions. The practices in this category aim to ensure all infrastructure is in working condition and vegetation adheres to defined minimum distance specifications.
- **Operational Practices:** These strategies consist of proactive, day-to-day actions taken to mitigate wildfire risks. The practices in this category aim to ensure BVES is prepared in high-risk situations, such as dry, windy environmental conditions. For example, should the weather forecast predict National Fire Danger Rating System (NFDRS) high-risk warning conditions, the

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Wildfire Information Protection Team (WIPT) will begin to prepare the system for a potential de-energization event, if needed.

- **Situational & Conditional Awareness:** These strategies consist of methods to improve system visualization and awareness of environmental conditions. The practices in this category aim to provide tools to improve the other components of the plan. For example, camera installation will improve system and vegetation inspection and maintenance practices.
- **Response & Recovery:** These strategies consist of procedures to react to de-energization, wildfire, or other related emergency conditions. The practices aim to formalize protocols for these situations, so BVES can provide an adequate response and recovery.

BVES has also outlined emergency preparedness plans, including customer support and communications protocols, as well as performance metrics to monitor its plan over time.

2.2 Detailed Strategy & Program Timing Overview

Each of the components outlined above have several sub-practices, many of which have already been implemented. Other practices are still in the pre-approval and proposal stages and will be implemented in the near future, upon approval by the CPUC. The sub-practices fall into four implementation timeframes: (A) already implemented; (B) implemented before the upcoming fire season, as defined by CAL FIRE and the California Department of Forestry; (C) implemented before the next plan filing with the CPUC; and (D) implemented within the next five years. Furthermore, the sub-practices align with the objectives outlined in Section 1.1. Table 2-1 below outlines the sub-practices and their implementation timelines.

Table 2-1. Prevention Strategy Program Descriptions & Timing

Mitigation Measure		Description	Timing
Design & Construction			
1	Pineknott Substation Upgrades	Technical and safety upgrades to prevent equipment exposure to the elements and human contact	C
2	Ute Undergrounding	Asset transfer from SCE; line undergrounding to mitigate proximity to forested areas	D ^A
3	Fuse Upgrades	Conventional fuse replacements with current limiting fuses and electronic programmable (vacuum switch) tripsaver technology to limit potential sparking when faults occur	D ^A
4	Tree Attachment Removal Project	Removal of tree attachments to avoid proximity of fuel and ignition sources	D ^B
5	Pole Loading Assessment & Remediation Program	Increase rate of pole assessments to identify pole issues, which can result in wildfires, sooner	D ^B
6	Covered Conductor Replacement Pilot Program	Pilot to determine the effectiveness of using covered tree wire conductor to test feasibility of a larger rollout	C
7	Covered Conductor Wrap Pilot Program	Pilot of a wire wrap for high-risk wires to test feasibility of a larger rollout	C

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8	Radford Line Covered Conductor Replacement Project	Radford Line replacement with a covered conductor to mitigate bare wire contact with fuel sources in High Fire-Threat District (HFTD) Tier 3 area	D ^A
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Inspection & Maintenance

9	First Annual On-Ground Inspection (GO 165)	One annual system patrol to inspect the condition of assets to avoid faults, which can result in fires	A
10	Second Annual On-Ground Inspection	One more system patrol in addition to the annual GO 165 patrol to ensure all assets are in good condition to avoid faults, which can result in fires	C
11	Predictive-Based Maintenance	System examination using infrared sensors and electromagnetic inference systems	A
12	Electrical Preventative Maintenance Program	System examination using additional diagnostics on assets to further inspect the condition of assets	C
13	LIDAR Inspection	Light Detection and Ranging (LIDAR) inspections of the overhead facilities in difficult-to-patrol areas to visualize vegetation growth proximity to the system for targeted maintenance	C
14	GIS Data Collection & Sharing	Geographic Information System (GIS) database on system infrastructure for asset management and planning with key stakeholders	A
15	Vegetation Management Plan	Vegetation maintenance program to avoid system proximity, which may cause wildfires	A

Operational Practices

16	Operational Considerations / Special Work Procedures	Protocols and procedures for staff during high-risk fire conditions	A
17	Automatic Recloser Upgrades	Recloser replacement to reduce electrical sparking, while also helping mitigate power outages and equipment damage	D ^A
18	Emergency Reporting	Protocols and procedures for staff when third-parties (e.g. customers) report potential fires, including "arcing, sparks, smoldering, smoke, or fire"	A
19	Wildfire Infrastructure Protection Teams	Roles and responsibilities for staff to respond to protect system infrastructure in case of emergencies	A

Situational & Conditional Awareness

20	SCADA Installations	Included in the Grid Automation project	D ^A
21	GIS-Based Applications (e.g. Outage Management System)	Implementation of GIS-based systems, such as outage management systems and interactive voice response systems, which allow BVES to locate outages and respond to customers more promptly in the case of a wildfire or related emergency	A
22	Web-Based Weather Resources	Monitoring of publicly available weather resources to evaluate forecasted weather and monitor for potential extreme fire conditions to prepare the system during high-risk events	A

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23	BVES-Owned Weather Stations	Monitoring of BVES-specific weather stations in strategic locations to evaluate forecasted weather and monitor potential extreme fire conditions	A, C ^C
24	Weather Forecasting	Analysis of weather feeds to predict and respond to extreme weather events, which may result in wildfires. BVES currently analyzes this in-house but proposes to contract out the services on a weekly basis for additional analysis	A, C ^D
25	Remote Monitoring	Monitoring of system and assets in remote areas using HD cameras to improve situational awareness and maintenance of key assets	D
26	Grid Automation	Grid automation to improve system responses to prevent wildfires and enhance safety	D ^A
Response & Recovery			
27	Public Safety Power Shut-Off (PSPS) Protocols	Protocols and procedures to respond to and recover from de-energization events, which proactively prevent wildfires	A
28	Post Incident Recovery, Restoration & Remediation	Protocols and procedures to respond to and recover from any wildfire or related emergency events	A

Source: BVES

^A Multi-year project/program that BVES proposes to start during the period of this plan.

^B Multi-year project/program that BVES has already started.

^C BVES already installed 10 weather stations and proposes to install an additional 10 weather stations.

^D BVES already analyzes weather data in-house but proposes to hire a part-time meteorologist to analyze data on a weekly basis.

3. RISK ANALYSIS AND RISK DRIVERS

As mentioned above, BVES understands that it operates within a high-risk wildfire environment. All decisions and plans made in this document used risk-based decision-making protocols. This provides an overview of this process as it relates to wildfire mitigation.

3.1 Description of Risk Methodology

On December 4, 2014, the Commission issued Decision 14-12-025 and directed BVES to transition to a risk-based decision-making framework in their General Rate Case (GRC) application filings beginning in December 2017. BVES adopted a risk-based decision-making framework ahead of the deadline and presented its framework to the CPUC in Volume 7, Direct Testimony Risk-Based Decision-Making Framework, of its 2018 GRC filing in May 2017. This framework is based upon the 10 steps of the ISO 31000 Cycle risk management process and includes six steps; the first three focus on understanding and evaluating risks and the last three, understanding and evaluating risk mitigation strategies. Since its development, BVES has developed additional mitigation measures for wildfire risks. Figure 3-1 provides an overview of the steps.

Figure 3-1. BVES Risk-Based Decision-Making Framework



Source: BVES

BVES' Risk-Based Decision-Making Framework is consistent with peer investor-owned utilities', including Southern California Edison (SCE).² For example, SCE's framework consists of six steps: (1) risk identification, (2) risk analysis, (3) risk evaluation, (4) risk mitigation identification, (5) decision-making and planning, and (6) monitoring and reporting. From a fundamental perspective, identifying threats, risk characterization, assigning appropriate measures, implementing remedies, and monitoring the results are components of the described assessment strategy above and other, similar utilities.

3.2 Risk Assessment Mitigation Prioritization

The CPUC has not required BVES to conduct a Risk Assessment and Mitigation Phase (RAMP), however, through its risk-based decision-making framework, BVES has created a list of risks and a prioritized list of mitigation measures. The following subsections outline these lists.

² Southern California Edison, Prepared Testimony in Support of Southern California Edison Company's Application for Approval of its Grid Safety and Resiliency Program Before the Public Utilities Commission of the State of California, September 10, 2018, . <https://www.edison.com/content/dam/eix/documents/investors/wildfires-document-library/201809-gsrp-filing.pdf>

3.2.1 Risk Understanding

According to the US Forest Service, there are three essential elements in the “fire triangle”: heat, fuel, and oxygen.³ The first, heat, provides the initial ignition of fire and helps it spread. The second, fuel, is any form of combustible material; combustibility is mainly defined by moisture content. Finally, the third, oxygen, is a chemical that supports the burning; most fires require roughly 16 percent oxygen content and the air contains roughly 21 percent. The conditions necessary for these elements to come together have created an increasing number of wildfires in recent years.⁴ For example, increasing complexity of implementing fire suppression and fuel treatment programs has resulted in accumulations of debris, such as leaves, branches, excessive overgrowth, and dead vegetation. Additionally, climate change patterns have exacerbated and continue to exacerbate these conditions.

Given the elements of the fire triangle, BVES’ electrical infrastructure poses several wildfire risks, including heat or an ignition source that can be caused by the electric grid and proximity to combustion materials, such as trees and dry vegetation. Once these materials come into contact, such as through weather, the risk for wildfire is extremely high.

In addition to gaining a deeper understanding of its wildfire risks, BVES analyzed its reliability data to prioritize its risks. The analysis focused on recent outage data (2009-2018) and examined two events: vegetation contacting bare wire and wire down events, since these events may result in wildfires. Table 3-1 shows the results of the analysis. It is recognized that vegetation may have contacted a line without causing an outage and, therefore would not be reflected in the data in Table 3-1.

Table 3-1. BVES Analysis of Wildfire Risk Events (2009-2018)

Event	Count	Percent of Total
Vegetation-Bare Line Contact		
Caused by Vegetation Proximity	39	38%
Caused by Weather or 3 rd Party	49	48%
Wire Down Events		
Caused by Weather	11	10%
Caused by 3 rd Party	4	4%

Source: BVES

As illustrated by the table above, vegetation and bare line contact events pose the most frequent risk for wildfires in the BVES system. These events are mainly caused by weather and 3rd parties. This makes sense given the dense tree coverage found in the mountainous terrain and susceptibility of the area to winter snow storms. It should be noted that during winter snow storms, the moisture level in surrounding vegetation is typically high reducing the risk of wildfire. The second most frequent cause of these events is due to proximity to vegetation, which also makes sense given the tree density. The system has approximately 1,200 existing tree attachments, in compliance with previous system design standards and vegetation management protocols, which may also cause vegetation and bare line events. Also, the mountainous terrain and dry California climate may be contributing factors for these types of events.

³ US Forest Service Smokey Bear, “Elements of Fire”, 2018, <https://smokeybear.com/en/about-wildland-fire/fire-science/elements-of-fire>.

⁴ US Forest Service Smokey Bear, “Fire Science”, 2018, <https://smokeybear.com/en/about-wildland-fire/fire-science>.

Wire down events also pose a risk to the system, however, these events occur less frequently. Notably, the total number of these events accounts for less than 15 percent of the risk events studied. Of these events, weather was the greatest contributor to wire down events. However, it should be noted that wire down events among other hazards have the potential of triggering an underbrush fire which may lead to the source of a wildfire condition and are, perhaps, a more severe risk than vegetation and bare line contact. Of these wire down events, weather was the greatest contributor.

Another risk event that BVES considered is “blown conventional fuse” events. Conventional fuses expel hot particles and gases when blown, which can start fires. BVES reviewed data from 2009 to 2018 and found that 203 conventional blown fuse events occurred for a variety of reasons throughout the service area.

Based on this understanding, BVES identified applicable risks from its risk-based decision-making framework filing and added to the list, based on gaps identified through its Wildfire Mitigation Plan development. The risks identified as part of the BVES risk-based decision-making framework filing are scored according to frequency and impact. The latter includes the effect of events on reliability, compliance, quality of service, safety, and environmental quality. All other risks, identified outside of the formal filing, have not been formally scored. However, BVES qualitatively evaluated costs, technological effectiveness, and implementation feasibility when determining which mitigation measures should be implemented as part of its Wildfire Mitigation Plan. The list below organizes all the strategies included in the plan based on the categories identified in Section 2. It is shown below in Table 3-2.

Table 3-2. List of Wildfire Risks and Risk Score (Priority)

<i>Risk Event</i>	<i>Total Risk Score</i>
<i>Design & Construction</i>	
Line Attached to Fallen Tree	12,398.45
Sparking Caused by Equipment/Infrastructure Settings	NA
<i>Inspection & Maintenance</i>	
Pole Failures	15,687.00
Downed Wire	114,943.77
Aging Infrastructure	1,570.26
Vegetation in Proximity to Infrastructure	NA
Quickly Changing Conditions	NA
<i>Operational Practices</i>	
Unclear Protocols & Procedures During High-Risk Conditions	NA
<i>Situational & Conditional Awareness</i>	
Inability to Visualize Equipment in Hard-to-Patrol Areas	NA
Imprecise Weather Forecasting	NA
<i>Response & Recovery</i>	
Fatality caused by wildfire / emergency	28,109.65

Bear Valley Electric Service Wildfire Mitigation Plan

Sustained outages affecting health

5,283.35

Source: BVES

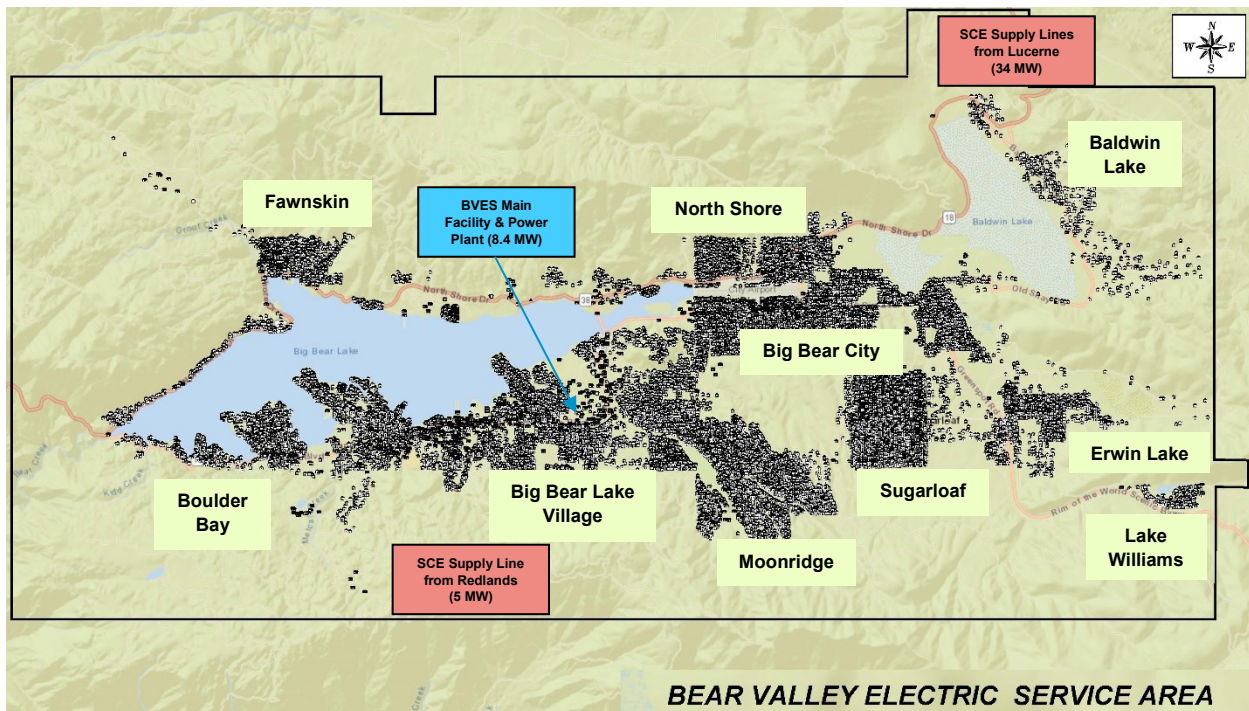
Note: Risks with “NA” represent risks identified after BVES’ formal risk-based decision-making process. Although these risks have not been formally scored, BVES has used qualitative information and evaluated cost-effectiveness and implementation-feasibility to prioritize these measures.

3.2.1.1 Service Territory Description & Risks

As part of its risk understanding, BVES examined its service territory to identify risks unique to its service territory. This section provides an overview of the service territory and details risks, which it factored into its mitigation strategy.

The BVES service territory is in the mountain resort community of Big Bear Lake, California, which provides service to approximately 24,300 customers in a 31-square mile service area. Located in the San Bernardino Mountains of Southern California, 80 miles east of Los Angeles, the area is rural and mountainous. Figure 3-2 below shows the service territory and key customer and system areas.

Figure 3-2. Map of BVES Service Territory and Key Areas



Source: BVES

Given its unique service territory, BVES must consider the following when making decisions and implementing plans related to wildfire mitigation: (1) electrical system design and assets, (2) complex jurisdictional structure, (3) local load profile, and (4) geographic location.

- **Electrical System Design & Assets:** BVES owns and operates 87.8 miles of overhead 34.5 kilovolt sub-transmission miles, 2.7 miles of 34.5 kilovolt underground sub-transmission miles, 488.6 miles of overhead distribution circuit miles, 89.1 miles of underground distribution circuit

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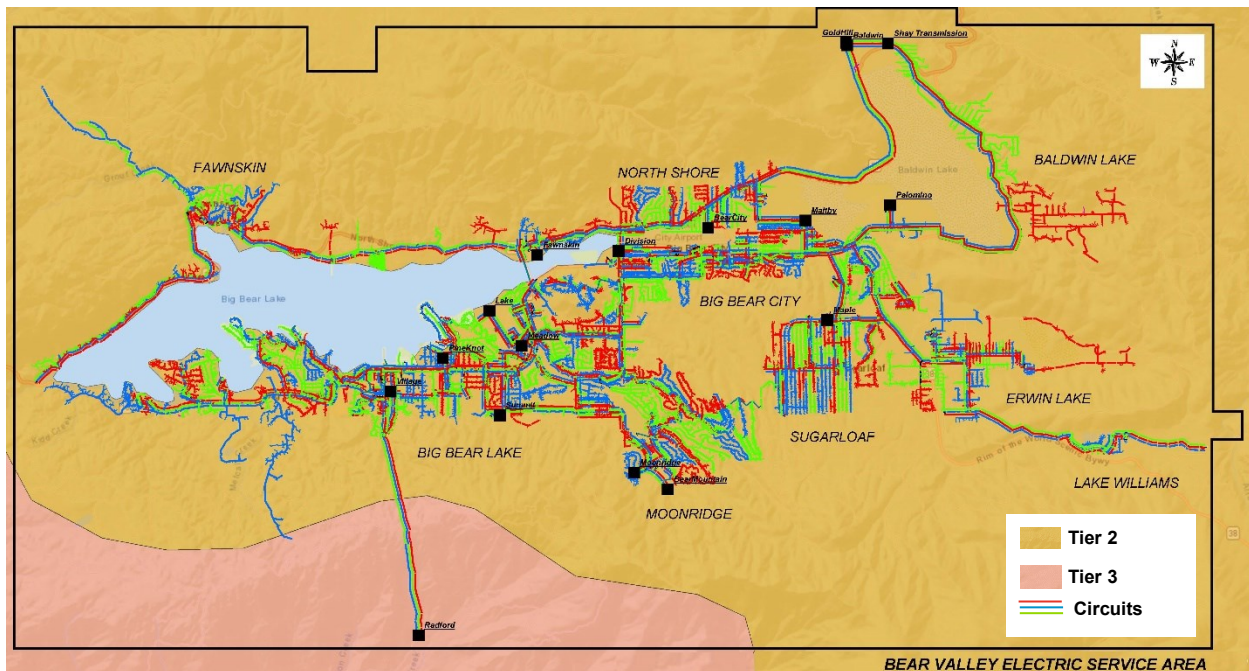
miles, 13 sub-stations and a natural gas-fueled 8.4 MW peaking generation facility. These assets will need to be considered when creating and implementing the Wildfire Mitigation Plan.

- **Jurisdictional Structure:** BVES' entire service area is under the jurisdictional responsibility of the City of Big Bear Lake and some areas (unincorporated) under the responsibility of the County of San Bernardino. The San Bernardino Mountains and forests are managed by the United States Forest Service, California Environmental Protection Agency, and the California Department of Fish and Wildlife. The complex jurisdictional structure is a key consideration when developing or implementing any strategic plan, including those related to wildfires.
- **Local Load Profile:** BVES mainly serves as a vacation destination during the winter months. This results in a winter peaking environment that occurs due to increased load from population increases and local snow-making activity in the late evening hours. Throughout the rest of the year, the load returns to normal. Understanding this local load profile will be a key element to implementing a successful Wildfire Mitigation Plan.
- **Geographic Location:** BVES' service area is entirely above the 3,000-foot elevation threshold (which requires heavy loading construction standards) and with a high density of trees in a mostly dry environment.

Identified Wildfire Risk Areas

There are several wildfire risk assessment designations from various organizations, including the CPUC, the California Department of Forestry and Fire Protection (CAL FIRE), and the US Department of Agriculture (USDA). Each designation provides a different perspective of potential fire danger. For example, the USDA's National Fire Danger Rating System (NFDRS) assesses fire threats at the county-level based on weather, while CAL FIRE includes four fire-hazard severity zones based on various factors. Figure 3-3 shows the CPUC designated fire hazard zone tiers.

Figure 3-3. BVES CPUC Designated Tier 2 and Tier 3 Fire Hazard Zones



Source: CPUC, Fire-Threat Map

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BVES monitors these assessment systems regularly and has created procedures and protocols accordingly. Figure 3-3 below outlines the various rating systems and BVES' rating in that system.

Table 3-3. Wildfire Risk Assessments in BVES Service Territory

Agency and Rating Name	Scope of Rating	BVES Rating
CPUC, Fire-Threat Map Adopted January 19, 2018 ⁵	Areas or zones where enhanced fire safety regulations in Decision 17-12-024 will apply ⁶	High Fire-Threat District; Mostly Tier 2 (elevated risk) with some Tier 3 (extreme risk) areas.
USDA Forest Service, National Fire Danger Rating System (NFDRS) ⁷	County-Level assessment of fire danger for that day or the next day based on fuels, weather, topography, and risks	80.5% of the time "Very Dry" or "Dry"
CAL FIRE, California Fire Hazard Severity Zone Map Update Project ⁸	City and County-level assessments of fire "hazard" zones	Very High Fire Hazard Severity Zone

Source: BVES

In addition to assessing its territory at a high-level, BVES conducted a detailed analysis based on the NFDRS evaluation. This analysis uses available weather data to determine the percentage of days for each rating. BVES found that on average its service area is "Very Dry" or "Dry" approximately 80.5% of the time, which significantly contributes to the high fire risk. Figure 3-4 below shows the full analysis.

⁵ CPUC, CPUC Fire Safety Rulemaking Background, 2018, <http://www.cpuc.ca.gov/firethreatmaps/>.

⁶ CPUC, CPUC Adopts New Fire-Safety Regulations, December 14, 2017, <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M201/K352/201352402.PDF>.

⁷ USDA Forest Service, National Fire Danger Rating System, <https://www.fs.usda.gov/detail/invo/home/?cid=stelprdb5173311>; BVES Analysis

⁸ CAL FIRE, Wildland Hazard & Building Codes Cities for which CAL FIRE has made recommendations on Very High Fire Hazard Severity Zones (VHFHSZ), http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_zones_maps_citylist.

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Table 3-4. BVES NFDRS Rating Analysis (% Days per Rating)

NFDRS Rating	Dryness	Fire Risk	2014	2015	2016	2017	2018	Avg
Green	Moist	Little or No	14.3%	27.4%	26.4%	19.9%	9.8%	19.5%
Yellow	Dry	Low	52.7%	47.6%	38.4%	63.9%	37.3%	48.0%
Brown	Very Dry	Moderate	33.1%	24.9%	35.3%	16.2%	53.0%	32.5%
Orange (Wind)	Very Dry	High	1.3%	2.3%	1.1%	0.0%	0.1%	1.0%
Red (Lightning)	Very Dry	High	0.0%	0.0%	0.3%	0.2%	0.0%	0.1%

Note: 2014 data begins at 5/14/2014; 2018 data ends at 11/20/2018

Source: BVES NFDRS Analysis

There are also specific areas that are considered high risks and would be more adversely affected in a wildfire or emergency. These areas consist of dense vegetation coverage, populations, and or critical infrastructure. The areas identified, and their risks are listed below. This section details the wildfire prevention activities for these locales.

- **Radford Area:** The area is remote, mountainous, heavily forested and mostly only accessible by foot. Additionally, BVES has critical infrastructure running through this area, creating challenges in upgrading the infrastructure and maintaining visibility on the lines. Specifically, infrastructure changes require the use of helicopters and specially trained linemen to work in the challenging environment. Currently, BVES de-energizes the infrastructure in this area in the summer due to the high fire risk.
- **Boulder Area:** BVES has identified this area as high-risk due to the number of customers in the area (~1,000), the dense tree coverage, the adverse terrain, abundant available fuel, and the high number of tree attachments. This area includes the Boulder and Lagonita distribution circuits.
- **North Shore Area:** Like the Boulder Area, this area is susceptible to fires due to its tree density, available fuel, the high number of tree attachments, and difficult terrain, which makes operations and maintenance and access to facilities difficult. Additionally, certain areas have a high density of customers.
- **Moonridge Area:** Like the Boulder Area, BVES has identified this area as high-risk due to the number of customers in the area (~1,000), the dense tree coverage, the adverse terrain, and abundant available fuel. This area includes the Goldmine and Club View distribution circuits.
- **Erwin Lake Area:** Like the Boulder Area, BVES has identified this area as high-risk due to the number of customers in the area (~1,000), the dense tree coverage, the adverse terrain, and abundant available fuel.

As described above, the service territory's high elevation means the area consists of a heavily treed, alpine, mountainous environment, which is highly vulnerable to wildfires. BVES understands this risk and has prepared its fire mitigation plans accordingly. Furthermore, it has complied with all fire-safety regulations adopted to date, including those set out in GO 95, 165, and 166.

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Evaluation of Higher Fire Threat Areas

As it evaluated fire risks, BVES noted particularly high fire threat areas for additional monitoring and assessment. These areas include those that are more prone to fires than others due to increased vegetation or exposed lines or areas that would be particularly destructive in a wildfire, such as those with high customer densities. By prioritizing these higher fire threat areas, BVES can further mitigate wildfires. Table 3-5. Evaluation of Higher Fire Threat Areas below outlines the parameters of the analysis.

Table 3-5. Evaluation of Higher Fire Threat Areas

Circuit	Voltage (kV)	Fire Threat Tier	Customers	# of Poles	# of Tree Attachments	OH Circuit Miles	UG Circuit Miles
Radford	34.5	3	0	89	0	2.82	0.02
Shay	34.5	2	9,627	610	0	17.17	0.39
Baldwin	34.5	2	11,305	256	0	8.94	0.5
Boulder	4.16	2	2,046	917	299	17.68	1.8
North Shore (Fawnskin)	4.16	2	1,523	745	269	15.83	8.09
Erwin Lake	4.16	2	2,533	1,042	30	21.83	7.41
Pioneer (Palomino)	4.16	2	537	599	0	16.39	2.95
Clubview	4.16	2	1,984	504	88	10.18	0.27
Goldmine	4.16	2	1,698	550	92	13.2	5.26
Paradise	4.16	2	1,895	549	69	9.85	2
Sunset	4.16	2	1,918	505	53	10.67	0.5
Sunrise (Maple)	4.16	2	1,506	347	36	7.79	3.86
Holcomb (Bear City)	4.16	2	1,587	614	33	13.25	0.85
Georgia	4.16	2	1,023	345	64	5.91	3.95
Eagle	4.16	2	959	322	16	7.38	1.53
Harnish (Village)	4.16	2	254	82	13	1.34	1.21
Garstin	4.16	2	1,055	276	15	5.91	3
Lagonita	4.16	2	1,103	451	60	7.46	1.43
Interlaken	4.16	2	880	280	27	6.45	3.55
Castle Glen (Division)	4.16	2	1,188	343	45	6.93	3.68
Country Club	4.16	2	605	177	10	3.18	0.94
Fox Farm	4.16	2	35	4	0	0	0.84
Pump House (Lake)	4.16	2	4	22	0	0.64	0.02
Lift (Summit TOU)	4.16	2	1	1	0	0.1	0
Skyline (Summit Res)	4.16	2	0	0	0	0	0
Geronimo (Bear Mtn.)	4.16	2	1	0	0	0	0.03

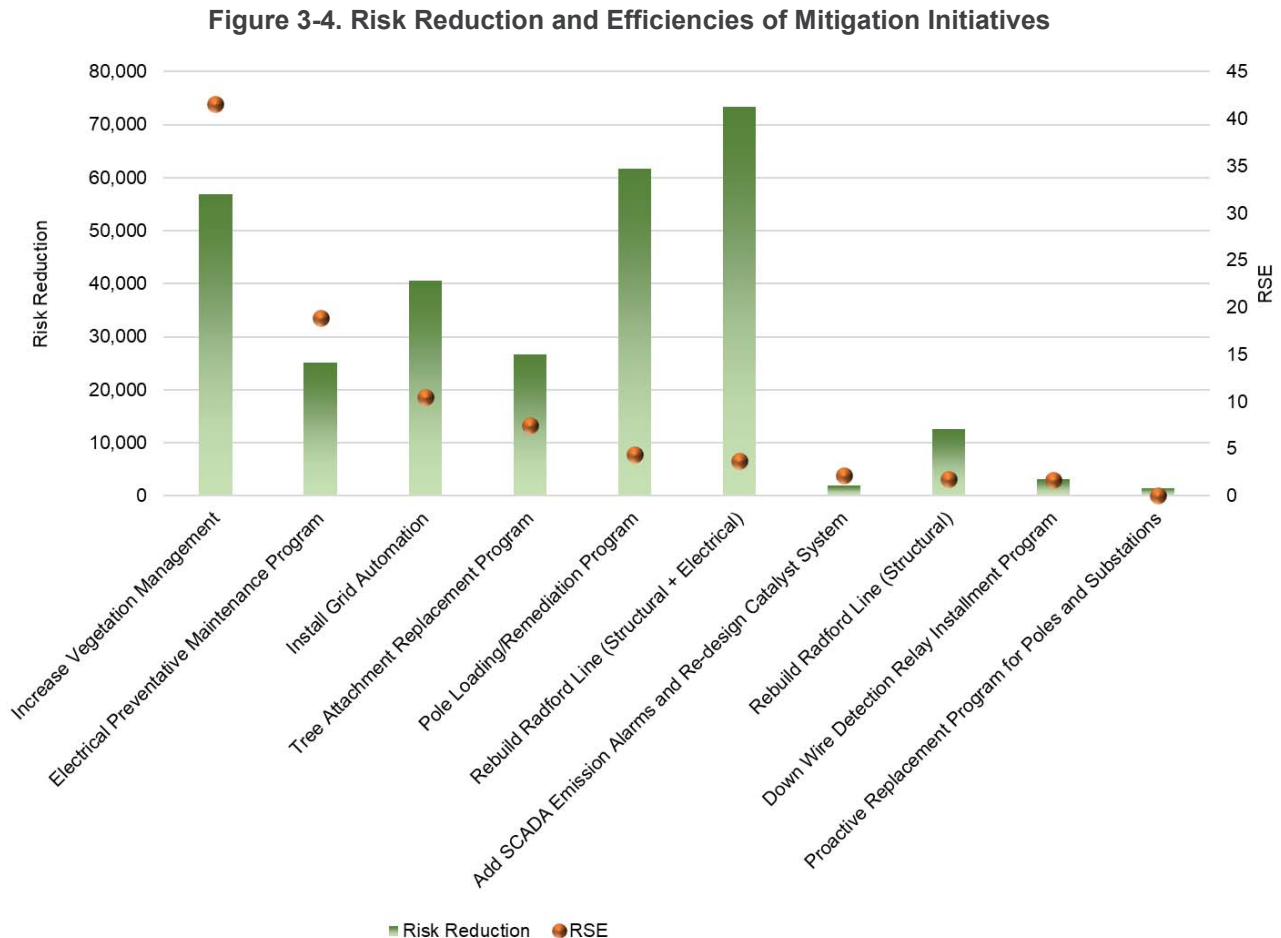
Source: BVES

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According to the analysis, BVES identified the higher fire threat areas outlined above to include the following circuits: (1) Radford, (2) Boulder, (3) Northshore, (4) Moonridge (Goldmine and Clubview), and (5) Erwin. BVES has paid special attention and in many cases prioritized mitigation strategies in these areas. At this time, BVES believes that the Tier 2 and Tier 3 HFTD used by the CPUC adequately accounts for these higher fire threat areas.

3.2.2 Risk Mitigation Strategy (Prioritization)

Using its risk understanding, BVES developed a risk mitigation strategy, prioritizing the most cost- and operationally-effective strategies for its risk-based decision-making framework filing. This prioritization included evaluating the risk reduction relative to the cost of the mitigation using a Risk Spend Efficiency (RSE) analysis. This analysis resulted in the figure below. Many of these strategies are being implemented or have been implemented previously. All of the mitigation strategies included here have been included in BVES' most recent GRC, which is pending approval. Note that this prioritization does not include any additional mitigation measures identified outside of the formal process. Figure 3-4 below charts the prioritization of the measures analyzed.



Source: BVES

As mentioned previously, BVES also conducted an additional risk assessment for the purposes of this Plan. This has resulted in the mitigation practices proposed in Table 2-1 above that are not included in

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the graphic above. These measures include installing covered wire in place of bare conductor lines, replacing conventional fuses with current limiting (non-expulsion) fuses and electronic programmable (vacuum switch) fuses savers, LIDAR inspection, weather forecasting, a second annual on-ground inspection, and remote monitoring capabilities. BVES has prioritized these additional measures based on their cost effectiveness, relative mitigation effectiveness (e.g. targeting of high-risk areas), ability to build upon existing infrastructure, and state-wide trends. For example, BVES proposes to conduct a wire wrap pilot project, targeting high-risk lines, because the wire wrap technology has not yet been implemented widely. Therefore, the utility believes it is prudent from a cost and mitigation effectiveness perspective to test the technology before implementing it more broadly.

3.3 Description of How the Plan Accounts for Identified Risks

Since BVES identified risk mitigation strategies based on its list of potential risk events, the Plan aligns closely with its risk-based decision-making framework. Table 3-6 below details how the Plan accounts for identified risks. It should be noted that mitigation measures may span several different categories and help mitigate multiple risks.

Table 3-6. Risk & Risk Mitigation Mapping

<i>Risk Event</i>	<i>Proposed Mitigation Measures</i>
<i>Design & Construction</i>	
Line Attached to Fallen Tree	<ul style="list-style-type: none"> • Implement Tree Attachment Replacement Program
Ignition Caused by Equipment/Infrastructure Settings	<ul style="list-style-type: none"> • Implement Fusing Upgrades (install current limiting fuses & electronic fuses) • Cover bare lines, prioritizing high-risk areas (e.g. the Radford Line) to prevent ignition • Underground high-risk overhead lines, where possible (e.g. Ute Lines) • Enclose substations and related infrastructure
<i>Inspection & Maintenance</i>	
Pole Failures	<ul style="list-style-type: none"> • Increase Vegetation Management Program • Implement Pole Loading Assessment & Remediation
Downed Wire	<ul style="list-style-type: none"> • Increase Vegetation Management Program • Implement Pole Loading Assessment & Remediation • Implement Predictive Based Maintenance of Overhead Lines • Install grid automation equipment • Implement Tree Attachment Replacement Program • Implement Down Wire Detection Relay Installment Program • Increase on-ground inspections

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Aging Infrastructure	<ul style="list-style-type: none"> • Implement Pole Loading Assessment & Remediation Program • Implement Electrical Preventative Maintenance Program • Implement Proactive Replacement Program for Poles & Substations • Increase on-ground inspections • Implement LIDAR inspections
Vegetation in Proximity to Infrastructure	<ul style="list-style-type: none"> • Increase on-ground inspections • Implement LIDAR inspections • Increase Vegetation Management Program • Implement covered wire program
Quickly Changing Environmental Conditions Due to Climate Change	<ul style="list-style-type: none"> • Increase on-ground inspections • Install cameras to monitor remote areas
Operational Practices	
Unclear Protocols & Procedures During High-Risk Conditions	<ul style="list-style-type: none"> • Update protocols and procedures on an as-needed basis
Situational & Conditional Awareness	
Inability to Visualize Equipment in Hard-to-Patrol Areas	<ul style="list-style-type: none"> • Increase on-ground inspections • Install cameras to monitor remote areas • Implement LIDAR inspections • Install grid automation equipment
Imprecise Weather Forecasting	<ul style="list-style-type: none"> • Hire a part-time meteorologist to analyze weather data • Monitor publicly available weather data in the area • Install and monitor BVES-owned weather stations
Response & Recovery	
Fatality caused by wildfire / emergency	<ul style="list-style-type: none"> • Increase vegetation management program • Implement Pole Loading Assessment & Remediation • Implement fusing program (install current limiting fuses and electronic fuses) • Implement covered wire program • Implement Predictive Based Maintenance of Overhead Lines • Implement Tree Attachment Replacement Program • Rebuild Radford Line (Structural + Electrical)
Sustained outages affecting health	<ul style="list-style-type: none"> • Increase Vegetation Management Program • Implement Pole Loading Assessment & remediation • Implement Predictive Based Maintenance of Overhead Lines • Implement Electrical Preventative Maintenance Program • Install grid automation equipment • Implement covered wire program

Source: BVES

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Based on the items identified, BVES evaluated the impact for risk mitigation, feasibility, and cost-effectiveness of each item. The items that passed the evaluation are included in BVES' wildfire mitigation portfolio and described in the next section. BVES will continue to monitor all items not currently planned for inclusion and continue to explore new technologies as they arise.

4. WILDFIRE PREVENTION STRATEGY & PROGRAMS

Leveraging the risk-based decision-making framework, BVES has enhanced its existing wildfire mitigation practices. The updated programs and practices are categorized into 5 key areas, including: (1) design and construction, (2) inspection and maintenance, (3) operational practices, (4) situational/conditional awareness, and (5) response and recovery. These areas align with those identified in the risk-based decision-making framework. Each subsection is further divided into plan, execution, and cost components, providing details about how the practices mitigate fires, the financial impact of each practice, the time required to establish each practice and any applicable regulatory requirements. All mitigation practices in this section will be reviewed annually to evaluate progress and determine if modification to the plan is appropriate.

4.1 Design and Construction

The first category, design and construction, encompasses practices that relate to system infrastructure or design, such as design and technical upgrades to substations, poles, wires, and other utility structures. Notably, BVES has traditionally designed its system to provide safe, reliable power to customers in alignment with best practices from other utilities. However, some of these practices, such as the use of bare wire, have been reexamined in the context of wildfire risks. This section details the updated practices.

4.1.1 System Design

4.1.1.1 Safety and Technical Upgrades of Pineknott Substation

Plan: BVES plans to convert the existing Pineknott Substation from an overhead-type to an underground and pad-mounted design. This will improve the safety, reliability and efficiency of the substation by eliminating a wiring configuration that poses a safety and fire risk due to its exposure to the elements, such as vegetation contact. Additionally, the utility will replace all substation equipment with enclosed pad mount transformers, voltage regulators, re-closers, and bus work, further enhancing wildfire mitigation and reliability.

Execution: BVES will complete all Pineknott upgrades in 2019. The utility has already issued bids at the time of the report submission and will begin to make upgrades shortly after awarding the contract(s).

Expense: The cost of the changes to the Pineknott Substation are being addressed in the BVES' General Rate Case A.17-05-004 submitted on May 1, 2017, which is pending decision. No additional expense is anticipated.

4.1.1.2 Undergrounding the Ute Lines

Plan: The undergrounding of the Ute Lines is a proposed project, which would involve Southern California Edison (SCE) transferring its Ute Lines (34.5 kV) assets to BVES. This asset consists of approximately 1.5 miles of overhead sub-transmission bare lines (34.5 kV) that connect the BVES system at two points with the SCE Goldhill Switch Station. These lines provide approximately 72% of supply capacity and under normal conditions 100% of BVES' supply loads. If the transfer is approved, BVES would convert the assets from an overhead system located in the forestry area to underground facilities alongside a county road.

BVES proposes taking control of these lines due to complications with the June 2016 Holcomb Fire. The fire severely damaged the assets and resulted in a single point of failure of supplies to the BVES service area. By taking control of these lines and converting them to underground facilities along the side of the existing road, BVES will remove overhead facilities from forested areas. This removal will result in enhanced system safety, wildfire risk mitigation, and reliability.

Execution: Once approved, BVES expects the project to take 2 years to complete (timeline includes planning, permitting, civil construction, and electrical installation). The project would officially kick-off in August 2019 and be completed in July 2021.

Expense: The cost of undergrounding the Ute Lines is not addressed in BVES' General Rate Case A.17-05-004 submitted on May 1, 2017, which is pending decision. BVES estimates the total cost of this underground project to be \$3.5 million. Therefore, BVES requests by approval of this Wildfire Mitigation Plan, that the Commission authorize BVES to establish a memorandum account to track and recover the expenses related to the above proposed undergrounding project not included in base rate revenue requirement (BRRR).

4.1.2 Equipment Design / Application Focus Areas

4.1.2.1 Fusing

Plan: Fuses refer to devices that protect the distribution system from faulted or damaged lines and equipment. Historically, BVES, in addition to other CA and nationwide utilities, have used conventional fuses to protect lines; however, many utilities are beginning to replace their conventional fuses with current limiting fuses (non-expulsion, ELF) on branch line fusing opportunities system wide.⁹ BVES proposes to follow this trend as well as install electronic programmable fused trip savers (vacuum style) system-wide such as the S&C TripSaver II. Conventional fuses expel hot particles and gases when activated which can start fires. In contrast, current limiting fuses and electronic fuses expel no materials, limit the available fault current, and may even reduce the duration of faults. BVES plans on replacing approximately 457 conventional fuses with electronic fuses and approximately 2,327 conventional fuses with ELF.

Execution: BVES plans to continue this rollout over time, beginning in June 2019, until all conventional fuses have been replaced with either current limiting fuses or electronic fuses. BVES proposes to complete this project in 24 months performing the fuse replacements in the higher risk areas first. Table 4-1 shows the approximate number of fuses that will be replaced by year.

Table 4-1. Planned Fuse Replacements

Year	Electronic Fuses	Current Limiting ELF
June 2019 to May 2020	230	1,163
June 2020 to May 2021	227	1,164

Source: BVES

⁹ The ELF fuse is made by Eaton Cooper Power. It is designed to help protect electric infrastructure.

Expense: The cost of implementing this fusing plan is not addressed in BVES' General Rate Case A.17-05-004 submitted on May 1, 2017, which is pending decision. BVES estimates the total cost of this fusing project to be \$5.2 million (or \$2.6 million for the period of this plan). Therefore, BVES requests by approval of this Wildfire Mitigation Plan, that the Commission authorize BVES to establish a memorandum account to track and recover the expenses related to the above proposed fusing project not included in BRRR.

4.1.3 Structure Design

4.1.3.1 Tree Attachment Removal

Plan: Tree attachments are pieces of electrical infrastructure fastened to trees for infrastructural support. Due to its original system design, BVES had over 1,200 existing tree attachments on 16 distribution circuits. Given that tree attachments introduce significant risk of heat and fuel source contact, BVES has been removing them.

Execution: As noted above, BVES has begun removing its tree attachments and plans to continue removals at a rate of approximately 240 attachments each year. The utility estimates that all attachments will be removed by 2022.

Expense: The cost of the Tree Attachment Removal project is being addressed in the BVES' General Rate Case A.17-05-004 submitted on May 1, 2017, which is pending decision. No additional expense is anticipated.

4.1.4 Pole Loading Assessment and Remediation Program

Plan: BVES currently has a program to assess and remediate noncompliant distribution poles that pose a fire risk in compliance with GO 95. The utility proposes a program to significantly accelerate this program by increasing its annual pole evaluation to 2,000 poles per year. Since the entire BVES service area is in the High Fire Threat District (Tier 2 and 3), any pole failure is considered a high fire risk. By assessing poles and remedying failures at a faster rate, BVES can significantly reduce its fire risk.

Execution: BVES plans to evaluate approximately 8,000 wood poles in the BVES service area over the next four years (approximately 2,000 per year) and replace or remediate poles as applicable for those poles that fail the inspection criteria.

Expense: The cost of Pole Loading Assessment and Remediation Program is being addressed in the BVES' General Rate Case A.17-05-004 submitted on May 1, 2017, which is pending decision. No additional expense is anticipated.

4.1.5 Covered Conductor

Plan: Covered conductors are any conductors (wires) protected or "covered" by layers of insulation. Vendors have designed these wires so they can withstand contact with vegetation and/or other debris. Bare wires have been used because they provide a reliable, cost-effective solution for delivering energy to customers. Additionally, many California utilities have historically used bare wires as a best practice for reliability purposes. However, BVES has recently reevaluated its structure design in the context of wildfire risk and decided to replace bare conductors with covered conductors first on high-risk wires to mitigate risks as much as possible. The list below provides the planned bare wire enhancements.

- **Covered Conductor Replacement Pilot Program:** The utility plans to conduct a pilot program to determine the effectiveness of using covered tree wire conductor by replacing approximately 3 circuit miles of overhead bare conductor in a high fire threat area. Based on the results of the pilot, BVES will consider implementing the covered tree wire on the remainder of bare primary lines in the system.
- **Covered Conductor Wrap Pilot Program:** The utility plans to conduct a pilot program to determine the effectiveness of using a “wire wrap” to cover existing wire in other high threat areas. The wire wraps will snap onto existing wire, so BVES does not have to replace the entire wire. Based on the results of the pilot, BVES will consider implementing the wrap on the remainder of bare primary lines in the system. BVES plans to wrap approximately 3 miles of overhead distribution lines for this pilot project.
- **Radford Line Covered Conductor Replacement Project:** BVES plans to replace bare wire with a high-performance covered conductor on the Radford 34.5 kV line. BVES has chosen to cover this line, which is located in the HFTD Tier area, specifically, since it has the highest risk of wildfires out of all of BVES’ overhead facilities. The line is located in a densely vegetated area that is difficult to patrol, so BVES believes that replacing the line completely will provide the greatest protection.

Execution: Both of the covered conductor pilot programs and the Radford covered conductor replacement project are proposed mitigation strategies that the utility intends to execute during the period of this plan. There is risk that the Radford covered conductor program may have to be deferred until 2020. This is due to the fact that work on the Radford Line is generally not feasible from the end of October to April due to weather, adverse terrain, and load demand. BVES has begun planning the Radford Line and sourcing the high-performance covered conductor. If BVES is able to start work in June 2019, then the project will likely proceed as planned. If delays are encountered, BVES will replace as much of the Radford Line as feasible during this Plan period and finish the replacement work next Plan period.

Expense: The cost of both of the covered conductor pilot programs and the Radford covered conductor replacement project are not addressed in BVES’ General Rate Case A.17-05-004 submitted on May 1, 2017, which is pending decision. BVES estimates the costs of these projects to be:

- Covered Conductor Replacement Pilot Program: \$458,000
- Covered Conductor Wrap Pilot Program: \$292,000
- Radford Line Covered Conductor Replacement Project: \$2.5 million

Therefore, BVES requests by approval of this Wildfire Mitigation Plan, that the Commission authorize BVES to establish a memorandum account to track and recover the expenses related to the above proposed covered wire projects not included in BRRR.

4.1.6 Alternative Technologies

BVES will consider the feasibility of implementing alternative technologies, such as wire-break sensing technology, as they become available and cost-effective. Based on its current risk-based decision-making framework, the utility believes that the technologies chosen to mitigate fire risks are appropriate from both a cost and operational perspective. BVES will plan to explore its options in future iterations of its wildfire mitigation plan.

4.2 Inspection & Maintenance

The second wildfire prevention category, inspection and maintenance, consists of monitoring and maintaining the system. This includes conducting system patrols, leveraging technological inspections tools, and managing maintenance.

4.2.1 System Inspection and Maintenance Plan

Plan: Inspection plays an important role in wildfire prevention. BVES currently patrols its system regularly and plans to increase inspections. The BVES inspection plan includes several components: ground inspections, predictive maintenance, electrical preventative maintenance, LIDAR inspection, and GIS data collection and sharing. The list below outlines the plans for each of these inspections.

- **On-Ground Inspection:** In compliance with GO 165, BVES has established an Inspection Program that requires overhead facilities to undergo an on-ground patrol inspection each year. BVES proposes an additional, independent patrol of the entire overhead system, so that two visual patrols of the entire overhead system are conducted annually. BVES believes this additional patrol is warranted due to the local climate; likelihood of icing conditions; tree limbs and branches being subject to weakening due to repeated high winds, snow, and ice weight (which may cause fatigue failure); high elevation; other local conditions; difficulty accessing vegetation for trimming near bare conductors; species growth rates and characteristics; and the fact that the service area is designated “very dry” or “dry” over 80 percent of the time in the NFDRS. This environment coupled with the fact that the fire season is now all year round creates a high risk condition that can be mitigated by increasing patrols. In addition to patrolling, BVES conducts a detailed on-ground inspection at least every five years. The list below defines the difference between these two types of inspections.
 - A “patrol inspection” is a simple visual inspection designed to identify obvious structural problems and hazards. These patrols are designed to identify gross defects. Gross defects may include, but are not limited to: damaged poles, broken cross-arms, damaged insulators, sagging wires, leaking transformers, vegetation encroachment inside of minimum clearance standards, etc.
 - A “detailed inspection” is a careful visual and routine diagnostic exam of individual pieces of equipment. The inspector will record the results of the diagnostic and visual examinations and rate the condition of each piece of equipment. These inspections are designed to identify any existing defects, including minor ones. These may include, but are not limited to: open wire secondary clearance, corona effect on cross-arms, warning signage issues, visibility strips and pole-tag issues, rotten poles, vegetation encroachment inside of minimum clearance standards or encroachment that will lead to violation of minimum clearance standards before the next scheduled vegetation clearance crew visit, etc.

BVES conducts these inspections in compliance with GO 95 Rule 18. If any defects outlined by that rule are identified, BVES prioritizes the defect based on risk and resolves the issues in compliance with GO 95 Rule 18 timeframes.¹⁰

¹⁰ BVES uses the examples of defects and issues that are safety hazards, risks of at least moderate potential impact to safety or reliability, and/or risks of low potential impact to safety or reliability that are provided in GO-95 Appendices I and J. These appendices also provide examples of repair/resolution priorities and timeframes.

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- **Predictive Maintenance of Overhead Lines Program:** This program is dedicated to identifying locations in the overhead system that are at-risk of failure through infrared sensors, a radio frequency technology that captures partial discharge and electromagnetic interference emissions, and ultrasonic acoustic technology to identify the location of specific structures where problematic conditions are present. Most importantly, the program mitigates the risk of catastrophic failures of overhead power lines and equipment, which could result in fire, public and worker safety hazards, environmental damage, prolonged unplanned outages, and costly emergent repairs and/or replacement of overhead lines. BVES recently implemented this program, engaging a contractor to perform Exacter surveys on approximately one third of its overhead facilities in 2018. In 2019, BVES will have the contractor perform inspection on an additional third of its overhead facilities.
- **Electrical Preventative Maintenance Program:** This program assesses major equipment assets located in BVES substations and in the field at various locations in the BVES sub-transmission (34.5 kV) and distribution (up to 4.160 kV) system. The results of the program are designed to evaluate the condition of key distribution equipment assets, identify equipment at-risk of failure, improve performance, reduce costs, and extend equipment life. Most importantly, the program will mitigate the risk of catastrophic failure of equipment, which could result in fire, public and worker safety hazards, environmental damage, prolonged unplanned outages, and costly emergent repairs and/or replacement of equipment.
- **LIDAR Inspection:** BVES proposes to conduct LIDAR (Light Detection and Ranging) inspections and analysis, which use a system of lasers and software to develop surveys of the overhead sub-transmission and distribution systems, to accurately determine vegetation clearances to conductors. While most often acquired via helicopter or fixed wing flights, LIDAR can also be captured via a truck mounted mobile system. Given the proximity of the majority of BVES's electrical system to the road network, truck mounts mobile LIDAR will most likely be utilized. This relatively quick and accurate inspection will allow BVES to resolve vegetation issues before they make contact with bare conductors. BVES proposes to conduct two LIDAR sweeps for the first year of the plan; one at the beginning of the plan and one toward the end of the plan to evaluate the effectiveness of clearance efforts. In future plans, BVES proposes to perform one LIDAR sweep well before the fire season.
- **GIS Data Collection & Sharing:** BVES currently creates and collects Geographic Information System (GIS) data about its infrastructure. The data includes system infrastructure locations and related information for mapping and cataloging purposes. The Engineering & Planning Supervisor regularly oversees updates to the database to ensure accuracy. While it currently does not share data, BVES understands the importance of collaborating with key stakeholder agencies, such as the CPUC and CAL FIRE, and plans to provide its data in accordance with CPUC proceeding I17-06-027, Pole Oil Phase I, which relates to sharing pole databases. Additionally, the utility will provide information to stakeholder agencies on a case-by-case basis at the discretion of the Engineering & Planning Supervisor, Operations & Planning Manager, and Director.

Execution: BVES currently conducts on-ground patrols and detailed maintenance inspections, predictive-based maintenance, and GIS data collection. The utility proposes to implement an additional on-ground patrol, LIDAR aerial inspection, electrical preventative maintenance program, and data sharing with relevant agencies by request, upon approval by the CPUC.

Expense: The cost of several of the system inspection and maintenance programs is partially included in the BRRR proposed in the BVES' General Rate Case A.17-05-004 submitted on May 1, 2017, which is pending decision. Specifically, the BRRR includes:

- The annual inspection patrol in compliance with GO 165
- The 5-year detailed inspections in compliance with GO 165

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- Electrical Preventative Maintenance Program
- Predictive Based Maintenance of Overhead Lines Program (Exacter)

BVES requests that the following practices not currently included in the BRRR be approved along with a memorandum account to track and recover related expenses:

- The second annual patrol to be performed by a third party, which is estimated to cost \$90,000.
- LIDAR Inspection, which is estimated to cost \$110,000 per sweep. Therefore, for the period of this plan LIDAR inspection costs would be \$220,000.

4.2.2 Vegetation Inspection and Management Plan

Plan: BVES has a vegetation management plan in place. Mowbray's Tree Service Inc., a third-party contractor, executes the vegetation clearing efforts under the direction of BVES. The contractor's work is subject to frequent BVES Quality Control checks. The goal of this plan is to proactively maintain vegetation, so it does not come into contact with electrical infrastructure, therefore preventing wildfires. The utility created the vegetation management plan with wildfire prevention in mind, collaborating with the City of Big Bear Lake, local Fire Departments, and the US Forest Service on an as-needed basis.¹¹ The plan will be reviewed and updated on an as-needed basis or every three-years, depending on changing conditions. The program includes three components: preventative vegetation management, corrective vegetation clearance, and emergency vegetation clearance. Each of these components need to adhere to specific specifications, detailed below.

- **Preventative Vegetation Management:** This scope of work encompasses ensuring vegetation on BVES overhead sub-transmission and distribution lines adhere to clearance specifications identified.
- **Corrective Vegetation Clearance:** This scope of work consists of completing corrective and emergent vegetation orders to fix clearance discrepancies that the contractor or BVES discovers. If an order is designated as High Priority, the contractor must prioritize that work and make the correction immediately.
- **Emergency Vegetation Clearance:** This scope of work includes completing maintenance on an as-needed basis for any major disaster or emergency events. For example, if a storm results in fallen trees and branches, the contractor must mobilize as soon as possible to clear the vegetation.

As mentioned above, all vegetation management work must adhere to certain specifications, as outlined by BVES. The utility-defined specifications comply with and exceed those outlined in Public Utilities Code, GO 95, Rules for Overhead Electric Line Construction, Rule 35 Vegetation management, and Appendix E Guidelines to Rule 35, and Commission decisions, such as D.17-12-024. As previously described, BVES has unique local conditions that require it to go beyond the regulated vegetation clearance standards. These specifications include:

- A minimum radial clearance of 72 inches between bare conductors and vegetation. (BVES' bare conductors operate between 2,400 or more volts, but less than 72,000 volts, which means it must have a minimum radial clearance of 48 inches.)
- No vertical coverage be allowed above BVES sub-transmission lines (34,500 V).

¹¹ BVES has met with these stakeholders in the previous year to gather feedback and input on its vegetation maintenance program, emergency planning, and wildfire mitigation strategy.

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- All vegetation within the drip line of primary conductors that has the potential of growing into the secondary system or within 12 feet of the energized primary conductors within the 3-year vegetation management program cycle will be removed.
- Dead, rotten or diseased trees or dead, rotten or diseased portions of otherwise healthy trees – also known as “hazard trees” – that overhang or lean toward and may fall into a span of power lines will be removed. Note that this may apply to trees outside the clearance zone.
- Exceptions for tree trunks or major limbs that meet the following criteria: at the primary conductor level, mature tree trunks that are greater than 18 inches in diameter and major limbs that are greater than 10 inches in diameter with sufficient strength and rigidity may encroach within the minimum safe distance (72-inches) but not within 18 inches of the bare line conductors. The rigidity of the tree trunk or major limb must be such that it would be impossible for it to encroach within 12 inches of the bare conductor at any time during high wind, heavy icing and snow, or other conditions.

BVES will also consider the removal of any fast-growing trees, such as Poplars, Aspens, or Cottonwood, rotten or diseased trees, and healthy trees hanging over or leaning towards bare lines. All such trees will be trimmed to 12 feet minimum and removal will be evaluated in each case.

Execution: BVES’ contractor currently conducts vegetation maintenance on the system. To ensure quality, BVES conducts frequent Quality Control (QC) checks of the contractor’s work through detailed, routine inspections and patrols of its overhead circuits. Any discrepancies discovered are categorized by priority level (e.g. emergency, urgent, or routine) and subsequently corrected by the contractor. The contractor also provides weekly updates, which include the status of work completed and upcoming work, such as tree removals, special support requests, corrective and emergent vegetation order status, and other items pertinent to progress of the work.

When executing tree removals, BVES and its contractor comply with permitting requirements mandated by the US Forest Service. BVES currently does not remove trees on hillsides or on a large-scale, addressing any risks, such as erosion, wind shear, and flooding, that may arise from trimming and removing trees. It will consider these risks moving forward should tree removal plans change.

Expense: The cost of the Vegetation Management program is included in the BRRR proposed in the BVES’ General Rate Case A.17-05-004 submitted on May 1, 2017, which is pending decision, and through BVES’ Fire Hazard Prevention Memorandum Account (FHPMA) per Commission Decision D.17-12-024, Decision Adopting Regulations to Enhance Fire Safety in the High Fire-Threat District. No additional expense is anticipated.

4.3 Operational Practices

The third wildfire prevention category, operational practices, encompasses standard company procedures that relate to wildfires, special work procedures, and wildfire infrastructure protection team definition. These practices help the utility manage risk on a day-to-day basis through its operations.

4.3.1 Operational Considerations and Special Work Procedures

Plan: Understanding system demand allows BVES to create a hybrid operating system that can be optimized for two types of operations: (1) safety and reliability and (2) wildfire prevention, depending on

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the weather and system demand. However, it should be noted that wildfire prevention measures during high fire risk weather conditions always override reliability optimization regardless of season or system demand. Generally, since the winter months bring the heaviest demand on the BVES distribution system, BVES optimizes the system for safety and reliability. These months are often wet and do not pose significant wildfire risks. Following the winter season, the operational focus becomes more defensive and optimized for wildfire prevention, given the warmer, dry climate. Specifically, the system uses the following dates and protocols:

- From November 1 through March 31, the system is focused on safety and reliability with higher load settings to accommodate higher demand due to colder temperatures and reclosers set to automatic.
- From April 1 through October 31, BVES adopts a more defensive operational scheme during the non-winter months. To accomplish this, the utility enacts certain operational settings:
 - All Fuse TripSavers set to not reclose.
 - Auto-Recloser field trip settings adjusted for summer load.
 - Radford 34kV line de-energized.

Although BVES generally follows a strict schedule, BVES monitors conditions, using the NFDRS, to determine if additional precautions should be taken.¹² The predictive service provides a forecast on fuel dryness and high-risk days as indicated in Table 4-2 below.

Table 4-2. Operational Direction Based on NFDRS Forecast

Fuel Dryness & High Risk Days	Rating	Description
Green	Moist	Little to no risk of fires.
Yellow	Dry	Low risk of large fires in the absence of a “High Risk” event.
Brown	Very Dry	Low/moderate risk of large fires in the absence of a “High Risk” event.
Orange	High-Risk Day	At least a 20% chance of a “Large Fire” due to a combination of either “Dry” or “Very Dry” fuel dryness and a critical burn environment (e.g., Santa Ana winds).
Red	High-Risk Day	At least a 20% chance of a “Large Fire” due to a combination of either “Dry” or “Very Dry” fuel dryness and an ignition trigger (lightening).

¹² The National Fire Danger Rating System (NFDRS) can be found at <https://gacc.nifc.gov/oscc/predictive/weather/index.htm#>. The entire BVES system is in Predictive Service Area SC10.

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Furthermore, BVES reviews the NFDRS on a weekly basis to make advanced preparations and on a daily basis to determine if additional steps should be taken. An example of the seven-day forecast is provided in Table 4-3 below.

Table 4-3. Example NFDRS Weekly Forecast

System	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
SC09-Western Mountains							
SC10-Eastern Mountains							
SC11-Southern Mountains							

Source: BVES, based on actual weekly forecasts

In short, overall system configuration is optimized for fire prevention from April 1 to October 31, using the seasonal characteristics of BVES' climate and load profile. The system is then further optimized based on the seven-day NFDRS forecast as well as other operational and weather information available to BVES.

Execution: As stated previously, BVES monitors the NFDRS fire danger forecast each day and then determines the proper operational focus from reliability to fire prevention. Exact steps depend on the level of fire threat. As indicated in Table 4-4 below, "Brown", "Red", and "Orange" are considered elevated fire threat conditions that require the BVES system to be configured for fire prevention over reliability concerns.

Table 4-4. Operational Direction Based on NFDRS Forecast

Operational Action	Green	Yellow	Brown	Orange	Red
Circuit Recloser Settings	Automatic Reclosing	Automatic Reclosing	Non-Automatic Reclosing	Non-Automatic Reclosing	Non-Automatic Reclosing
Patrol following circuit outage	No ¹	No ¹	Yes	Yes	Yes
TripSavers	Automatic	Automatic	Non-Automatic	Non-Automatic	Non-Automatic
Proactive De-energization (PDE)	No	No	No	Yes – "at risk" lines when wind gusts greater than 55 mph	

¹No patrol is required. Re-test allowed following check of fault indicators, SCADA, other system indicators, and reports from the field. If the re-test fails, a patrol is mandatory.

When a "Red Flag" condition is declared, Field Operations will closely monitor the NFDRS Forecast and other local forecasts to determine the appropriate operational conditions to be implemented. It should be noted that generally "Red Flag" conditions are assigned to areas much larger than the BVES service area, such as the County of San Bernardino. Therefore, BVES factors in the localized conditions for its service area.

Expense: The cost of System Operations is included in the BRRR proposed in the BVES' General Rate Case A.17-05-004 submitted on May 1, 2017, which is pending decision. No additional expense is anticipated.

4.3.1.1 High-Speed Clearing (Automatic Reclosers (AR) and Fast-Curve Sensitive Relay Settings)

Plan: High speed clearing refers to the ability to clear faults using automatic reclosers and fast-curve sensitive relay settings. Traditionally, electrical circuits were designed to automatically open and close to detect and isolate faults. In many cases the relays make three attempts to isolate a fault condition and each potential attempt could cause an electrical spark, which could be a source of ignition. Today, many utilities are implementing modern controls that allow them to designate a normal setting and a wildfire setting. The latter allows utilities to reduce the number of correction attempts to prevent ignition. This can be coupled with Supervisory Control and Data Acquisition (SCADA) technology for remote control of the equipment. The list below details BVES plans in regard to these technologies.

- **Supervisory Control and Data Acquisition (SCADA) Installations:** BVES plans to install SCADA system-wide, which will allow for remote monitoring, operation, and control of its system. Currently, BVES has SCADA installed on a small part of its system but will expand its rollout. Once implemented, SCADA can help control the automatic reclosers, fast-curve settings, and Intellirupters remotely.
- **Automatic Recloser Upgrades:** BVES plans to install S&C's IntelliRupters Pulse Closer Fault Interrupter across its system. This technology provides the settings necessary to reduce electrical ignition, while also helping mitigate power outages and equipment damage by using low energy pulses to test for faults.

Execution: BVES is developing plans to install SCADA system-wide. As for the automatic reclosers, BVES plans to begin the rollout in 2019 and finish by 2022.

Expense: The cost of implementation of these technologies is being addressed in the BVES' General Rate Case A.17-05-004 submitted on May 1, 2017, which is pending decision. No additional expense is anticipated.

4.3.1.2 Emergency Reports from Third-Parties

Plan: The Operations & Planning Manager has issued operational guidelines in the event BVES receives a report of potential fire such as "arcing, sparks, smoldering, smoke, and/or fire" or other emergency reports involving the overhead distribution system. Examples of reports include customer or 3rd party reported arcing, sparking, smoke, or fire sightings.

Execution: These procedures will be at the discretion of the Operations & Planning Manager, given the event, and will require prompt and decisive action to place the system in a safe condition.

Expense: These costs are recovered as part of BVES' normal operations and therefore, are covered through the GRC. No additional funding is needed at this time.

4.3.2 Wildfire Infrastructure Protection Teams

Plan: BVES has a dedicated Wildfire Infrastructure Protection Team (WIPT). Given the need for similar capabilities during wildfire incidences and other emergencies, the WIPT aligns with BVES' Emergency

Response Team (ERT). Both teams consist of the Operations & Planning Manager, Field Operations Supervisor, Service Crew, and Customer Service staff.

Execution: The roles of each of the team members will also align with ERT roles and responsibilities. Specifically, the Operations and Planning Manager will oversee the WIPT. The Field Operations Supervisor will direct field activities and operations. The Service Crew (or Dutyman outside normal working hours) will provide initial field response. Additional linemen will be called out as needed. Furthermore, Customer Service staff and/or additional staff may be called out to assist with notification procedures as needed. Other staff may be called out at the direction of the Operations and Planning Manager to assist, as needed. For example, Engineering staff may be called out to assist linemen in monitoring local wind speeds.

Expense: These costs are covered as part of BVES' normal operations and therefore, are covered through the GRC. No additional funding is required.

4.4 Situational & Conditional Awareness

The fourth category, situational and conditional awareness, consists of practices that enhance system and environmental visibility and monitoring.

Plan: The overall goal of situational awareness is to facilitate collaborative planning, assist in achieving shared situational awareness, and improve decision-making in particular for wildfire mitigation. As discussed earlier, BVES is a small electric utility with limited staff resources. During normal operations, BVES staff is optimized to work during normal working hours and it has limited resources dedicated to afterhours. Therefore, BVES outlined several critical operations, listed below.

- **Information Requirements & Methods:** Critical information to BVES' wildfire mitigation decision making is weather (forecasted and actual), system line-up, and available resources. This information is best gathered from devices and sensors in the field and on equipment. Additionally, online feeds and websites, such as the NFRDS rating system information and weather feeds, provide another highly useful information resource to BVES situational awareness enhancements.
- **Roles & Responsibilities:** Key Field Operations staff must have real time access to this information. These staff include the Operations & Planning Manager, Field Operations Supervisor, Engineering Planning Supervisor, and Service Crew/Dutyman. Additionally, the Customer Care and Operations Support Superintendent must also be included to ensure customers and key stakeholders are informed as applicable.
- **Methods of Sharing Information:** The information is optimally shared through network connected devices such as operations displays at BVES, desktop computers, laptops, and other mobile devices out in the field.
- **Implementation of Technologies to Communicate and Manage Information:** Technologies that will aid in communicating situational awareness information is SCADA, internet, intranet, social media and other networked solutions.

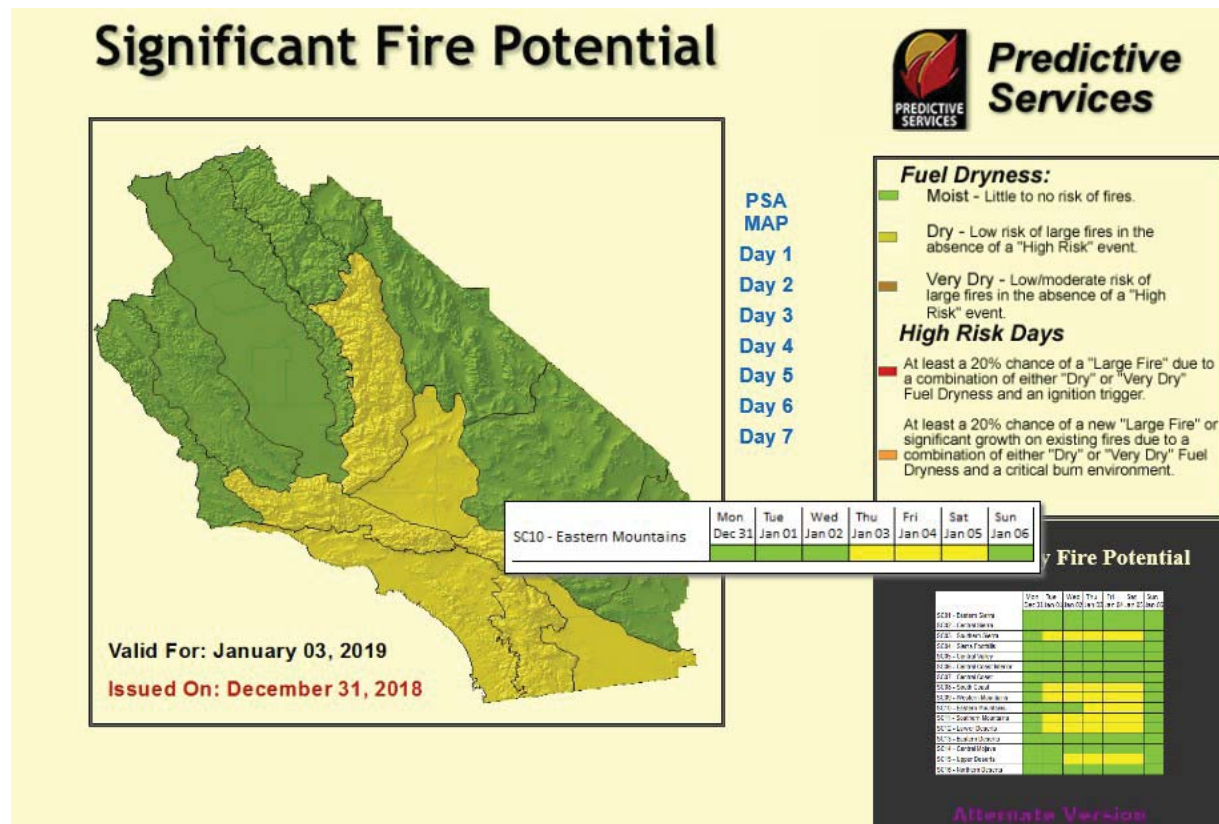
To further enhance its situational monitoring, BVES has outlined a number of resources, which contribute to its information base and facilitate sharing. These resources include web-based weather resources, BVES-owned weather stations, weather forecasting, distribution system SCADA, and GIS based

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applications, such as its Outage Management System (OMS). BVES is also considering remote monitoring via cameras.

- **Supervisory Control and Data Acquisition (SCADA):** BVES has a very basic SCADA system with few controls for the distribution system and very limited monitoring capability. Through its Grid Automation Project, BVES intends to establish a service area network, build out its SCADA software and historian capabilities, connect substations and field switches, and install circuit metering and monitoring devices.
- **GIS Based Applications:** BVES has implemented an ESRI-based GIS system and runs several applications to improve situational awareness. Recently BVES installed an Outage Management System (OMS) and an Interactive Voice Response (IVR) system. BVES intends to continue to build upon this capability by implementing mobile workforce and dispatching applications.
- **Web Based Weather Resources:** BVES monitors several web-based weather resources to evaluate forecasted weather and monitor for potential extreme fire conditions. The weather resources monitored by BVES are products produced by the National Weather Service, local weather forecasts from local media, and the National Fire Danger Rating System (NFDRS) 7-day significant fire potential product. The NFDRS is monitored at least daily by Field Operations. Figure 4-1 provides an example of real-time NFDRS rating system information monitored. The utility also monitors the likelihood of dry lightning occurrence as it is the type most likely to cause wildfires. This section details how BVES monitors conditions and how it will enhance this monitoring.

Figure 4-1. NFDRS California South Observed Fire Danger Class Example



Currently, BVES monitors weather conditions using local weather services and ten weather stations recently installed. It also conducts regular patrols of its system to monitor conditions in real-time. More specific information about actions taken during certain conditions is included in Section 4.3.1.

- **BVES-Owned Weather Stations:** Since weather stations have been identified as wildfire risk-mitigation strategies, BVES has implemented 10 Orion Weather Stations and plans on installing an additional 10 stations to further enhance actual weather monitoring at its facilities. These stations include temperature sensors, relative humidity sensors, digital barometers, ultrasonic wind direction and speed sensors, and impact rain sensors. These sensors communicate with the BVES system over wireless cell communications to help BVES obtain service territory-specific data and information at one-minute interval recordings. In addition to adding 10 weather stations to the system, BVES intends to integrate the output of these weather stations to SCADA to concentrate critical information in one primary display and to provide alarm and notification capability.
- **Weather Forecasting:** BVES does not have a dedicated meteorologist on staff. Therefore, BVES relies on its Field Operations staff to interpret web-based weather feeds along with the raw data from its weather stations. Given BVES' small size, BVES does not consider it practical to hire fulltime meteorology staff. BVES believes it would be very beneficial to contract out for weekly part-time forecasting services tailored to BVES' service area and to have the ability to obtain analysis of weather data during, before, and after certain extreme weather events. BVES believes this would be achieved by sending the weather data to a local university or consulting meteorologist for detailed analyses on a weekly basis.
- **Remote Monitoring (via Camera):** BVES would also like to install cameras to monitor its system in remote areas that are difficult to patrol on foot, such as the Radford Area. BVES plans to issue a Request for Proposals (RFP) for cost and equipment-specification information to further analyze the feasibility and cost-effectiveness of installing HD cameras. BVES does not have the staffing resources to monitor such cameras continuously. Therefore, BVES will explore other monitoring options, such as partnering with San Bernardino County Office of Emergency Services (OES) before implementing this program.
- **Grid Automation:** In the coming years, BVES plans to continue to implement grid automation into its system. Grid automation would enhance operational efficiency, safety, and wildfire prevention tactics by allowing remote monitoring and fault detection in real-time.

Execution: BVES has already established some of these techniques, including implementing web-based weather monitoring and BVES-owned weather stations. It currently monitors these systems on a weekly and daily basis to determine how best to optimize its systems. Execution of weather forecasting, remote monitoring, and grid automation are longer duration plans beginning in 2019 and continuing through 2022.

Expenses: BVES has already implemented several of these situational awareness techniques, so costs have already been approved through previous rate cases. Other projects, such as Grid Automation are being addressed in BVES' General Rate Case A.17-05-004 submitted on May 1, 2017, which is pending decision. The cost of procuring and installing 10 additional weather stations (estimated at \$9,500), integrating the weather stations (total of 20 weather stations, which includes the 10 already installed and the 10 planned) into SCADA (estimated at \$27,000), and weather consulting services (estimated at \$900/week) are not currently included in the BRRR; Therefore, BVES requests by approval of this Wildfire

Mitigation Plan, that the Commission authorize BVES to establish a memorandum account to track and recover the expenses related to the above proposed weather stations, SCADA integration and weather consulting services not included in BRRR. Expenses for cameras for remote monitoring will be determined at a later date following issuance of an RFP to procure, install and connect the cameras and development of a process to monitor the cameras.

4.5 Response & Recovery

The fifth category, response and recovery, consists of practices to react in high-risk conditions, including de-energization events and restoration activities.

4.5.1 Public Safety Power Shut-Off (PSPS) or De-Energization

Plan: PSPS refers to the proactive de-energization of the grid in high-fire danger conditions. This is a preventative measure to help keep customers, employees, and the public safe. As explained in Section 3, a combination of ignition (heat) from electrical infrastructure and fuel from nearby materials, such as vegetation, can result in a wildfire. While BVES will attempt to control the latter through its vegetation management program, it will control the former with PSPS in certain high-risk fire danger conditions, as described in this section.

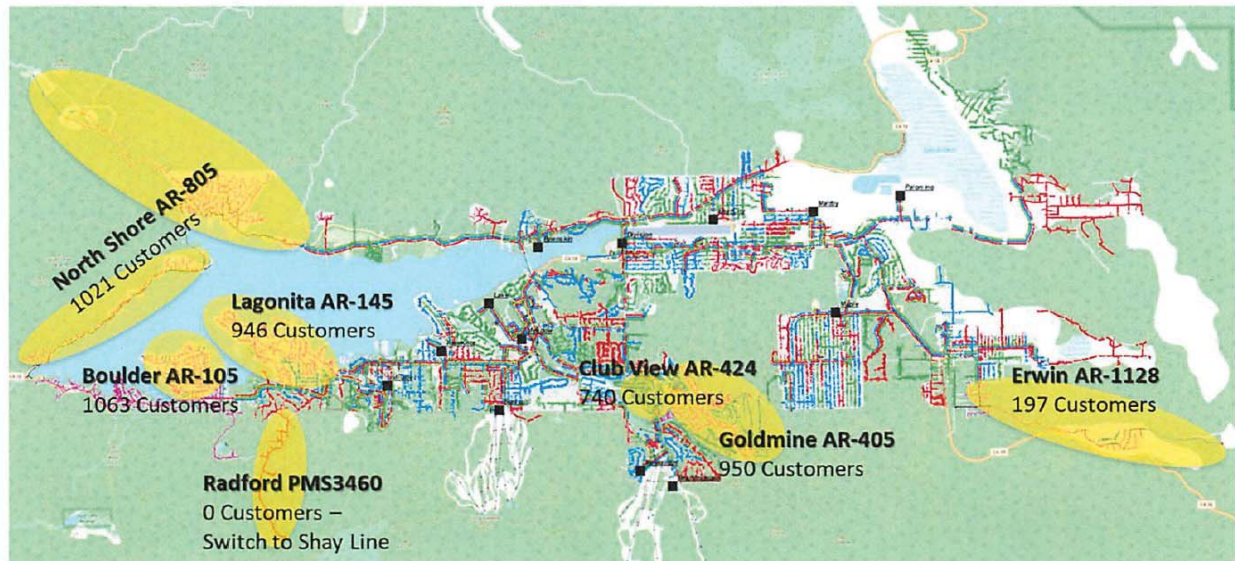
It should be noted, however, that BVES is not able to determine the strength or health of vegetation surrounding bare conductors outside of the required vegetation clearance zones as well as other structures that may come loose and impact BVES distribution facilities.¹³ Therefore, BVES proactively de-energizes facilities during any high fire threat and high wind conditions in close consult and coordination with government(s) and agencies.

As described in Section 4, BVES faces substantial wildfire risk due to its climatic, weather, and topographical conditions, and therefore, monitors the NFDRS and wind speeds regularly. These two components comprise extreme fire danger conditions. If the NFDRS is “red” or “orange,” signals for high fire danger, BVES will actively monitor forecasted wind speeds, using weather monitoring equipment and local forecasts.

BVES has identified seven sections of “at-risk” areas based on type of distribution facilities (overhead bare conductions, high voltage, etc.), tree and vegetation density, available dry fuel, and other factors that make certain locations vulnerable to wildfire risk. The “at-risk” line sections are identified shown in the map in Figure 4-2 and further outlined in Table 4-5 below. These line sections may be de-energized by “opening” the Auto-Reclosers (AR); each circuit affects a varying number of customers, as outlined in the table below.

¹³ Note that health impacts the moisture content of plants. Drier or “less healthy” vegetation is more prone to cause fires.

Figure 4-2. “At-Risk” Line Sections



Source: BVES

Table 4-5. Circuits Identified for De-Energization & Customers Affected

Circuit (AR To Be Opened)	Number of Customers
Radford 34kV	0 ¹⁴
North Shore 4kV (Open AR)	1,021
Erwin 4 kV (Open AR 1128)	197
Boulder 4kV (Open AR 105)	1,063
Lagonita 4kV (Open AR 145)	946
Club View 4kV (Open AR 424)	740
Goldmine 4kV (Open AR 405)	950

Source: BVES

Execution: BVES' procedures include two aspects: (1) field operations and (2) communications. The first includes the planned actions of service crews and BVES staff and the second, notifications to stakeholders. Table 4-6below outlines these procedures.

¹⁴ When this line is de-energized, the load is shifted to the Shay 34kV line.

Table 4-6. PSPS Procedures

Fire Conditions	Planned Actions	Planned Notifications
Forecasted Extreme Fire Weather Conditions	<ul style="list-style-type: none"> • Monitor existing wind speed in “at risk” locations • Determine if conditions warrant specific actions • Communicate with Customer Service to ensure accurate communications with stakeholders 	<ul style="list-style-type: none"> • Notify local government and agencies • Post notification of potential power outages on website and social media • Issue press release to local media
Imminent Extreme Fire Weather Conditions (Wind Speeds measured at 50 mph for > 3 seconds)	<ul style="list-style-type: none"> • Dispatch crews to monitor field conditions for dangerous conditions throughout service area and “at risk” locations • De-energize any power line that may pose a hazard 	<ul style="list-style-type: none"> • Continue to coordinate with local government and agencies • Update notifications on website and social media to warn of potential for power shutoff • Issue updated press release to local media
Validated Extreme Fire Weather Conditions (Wind Speeds measured at 55 mph or greater for > 3 seconds)	<ul style="list-style-type: none"> • Monitor local wind gusts and de-energize circuits in “at risk” areas as gusts reach 55mph for 3 or more seconds • Patrol service area and “at risk” areas to monitor actual conditions • De-energize additional power lines as needed 	<ul style="list-style-type: none"> • Continue to coordinate with local government and agencies • Update notifications on website and social media • Send notification via Interactive Voice Response (IVR) • Issue updated press release to local media • Notify CPUC and Warning Center at the Office of Emergency Services per protocols, listed in Section 5

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Weather Subsides to Safe Levels	• Validate that extreme fire weather conditions have subsided to safe levels ¹⁵	• Continue to coordinate with local government and agencies
	• Conduct field inspections and patrols of de-energized facilities	• Update notifications on website, social media and IVR
	• Restore power once field inspections and patrols are completed	• Issue updated press release to local media

Source: BVES

For the purpose of the procedure discussed in Table 4-1, the Operations and Planning Manager will be in charge of the execution. The Field Operations Supervisor will direct field activities and operations. The Service Crew (or Dutyman outside normal working hours) will provide initial field response. Additional linemen will be called out as needed. Furthermore, Customer Service staff and/or additional staff may be called out to assist with notification procedures as needed. Other staff may be called out at the direction of the Operations and Planning Manager to assist, as needed. For example, Engineering staff may be called out to assist linemen in monitoring local wind speeds. Collectively, these staff described above are referred to as the ERT.

When de-energization is deemed necessary, BVES crews will manually shut off at risk circuits, lines, and other infrastructure. In the future, as it implements SCADA and other technologies, BVES will consider remote shut-off implementation, where cost-effective. The utility has worked closely and will continue to work closely with local stakeholders that own or operate critical facilities, including hospitals and police and fire departments, to ensure their facilities remain operational and/or they have back-up plans in PSPS situations. Additionally, BVES will plan to update these plans in accordance with changes to the CPUC proceeding 18-12-005, Order Instituting Rulemaking to Examine Electric Utility De-Energization of Power Lines in Dangerous Conditions.

Expense: The cost of Public Safety Power Shut-off (PSPS) Protocols is partially included in the base rate revenue requirement (BRRR) proposed in the BVES' General Rate Case A.17-05-004 submitted on May 1, 2017, which is pending decision. Based on past weather (2014-2018), BVES anticipates the ERT could be called out approximately 9 times per year for an average of 12 hours. Expense for regular (straight time) work hours are covered in BRRR; however, the overtime (double time) is not. Given that only 23.8% of time is regular work hours, BVES anticipates approximately \$42,000 per year in overtime expense not covered in the BRRR. Therefore, BVES requests by approval of this Wildfire Mitigation Plan, that the Commission authorize BVES to establish a memorandum account to track and recover these plan related expenses.

4.5.2 Post Incident Recovery, Restoration and Remediation Activities

Plan: Outage events and emergencies are rarely similar in all respects; therefore, this general restoration strategy is constructed to provide BVES Emergency Operations Center (EOC) management with a

¹⁵Safe levels are defined as wind speeds in the affected area calming below 50 mph for a minimum period of 20 minutes. Crews may extend the calm period beyond 20 minutes, if they assess that further wind gusts greater than 50 mph are likely.

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restoration strategy that can be employed as required to deal with the unique aspects of each major outage and emergency event.

The restoration strategies and guidance assume that the BVES system is in its normal winter line-up as follows:

- Bear Valley Power Plant (BVPP) is available for normal full power operations (8.4 MW).
- Goldhill SCE sub-transmission power lines and facilities from Cottonwood (Doble, Cushenberry, Goldhill Switch Station, and Ute 1 & 2) are fully operational and connected to the BVES system at the Shay and Baldwin Auto-Re-closers (34 MW).
- Radford SCE sub-transmission power lines and facilities from Zanja (Radford) are fully operational and connected to the BVES system at the Radford Auto-Re-closer (5 MW).
- BVES T&D systems are in the normal line-up.

Therefore, staff must ensure that when implementing guidance provided in the Emergency Response Plan (ERP) that they fully understand the current line-up of the BVES system and, if there are deviations to the normal winter line-up, that they properly account for these deviations in their restoration actions. It should be noted that under normal conditions the Field Operations Supervisor controls the system line-up and during EOC activation the system line-up is controlled by the Storm Operations Supervisor (SOS).

Execution: The Operations & Planning Manager will direct the specific restoration priorities keeping safety (public and worker) as the top priority. In most cases, based on best available information regarding the situation and available restoration resources, resources will be dispatched to restore systems to achieve the following restoration priorities:

- **Public safety** in the affected areas;
- **Worker safety** in performing the restoration work;
- **Critical infrastructure** (Sheriff's Department, hospital, Fire Department, key City & County facilities, other utility facilities (e.g., water, sewage, gas, communications), Airport, Traffic Control, Incident Commander Site, Incident Base Camp, Incident Evacuation Centers, Radio Stations, etc.);
- Major commercial activities critical to **continuity of community services** (e.g., gas stations, food stores, supply stores, repair shops, eateries and lodging facilities to support outside first responders (e.g., CAL FIRE), financial institutions, etc.);
- **Life-support customers**;
- Reduce the **Number of customers** affected; and
- Reduce the **Length of time** customers have been without power;

In directing restoration efforts to achieve the above priorities, the Operations Group will generally find it most efficient to dedicate restoration resources to restoring the following types of facilities in the following order of priority to optimally restore electric service:

- Energy supply sources (Southern California Edison (SCE) supply lines, Bear Valley Power Plant (BVPP), etc.)
- Sub-transmission circuits (34.5 kV)
- Substations
- Distribution circuits (4 kV)
- Feeders
- Distribution transformers
- Service Lines

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Table 4-7 below provides guidance on the restoration priorities for sub-transmission circuits, substations, and distribution circuits. This guidance must be tempered by many factors including the actual cause of the outage(s), available resources, time to conduct repairs, access to repair sites, etc. Therefore, the Operations & Planning Manager must have wide discretion when developing the specific restoration priorities and may choose to deviate from the general guidance.

Table 4-7. Restoration Priorities for Sub-Transmission Circuits, Substations, and Distribution Circuits

Priority	Sub Transmission Circuit	Substation	Distribution Circuit		Comments
1	Baldwin	Meadow	Garstin		<ul style="list-style-type: none"> • Key critical infrastructure. Connects BVPP.
2	Shay	Pineknot Village Malby Division	Interlaken Boulder Harnish Country Club	Georgia Paradise Erwin Lake Castle Glen	<ul style="list-style-type: none"> • Additional critical infrastructure. • Major commercial activities & airport. • Large number of residential customers.
3	Radford	Moonridge Maple Bear City Fawnskin Palomino	Eagle Lagonita Fox Farm Clubview Sunset	Goldmine Holcomb Pioneer Sunrise	<ul style="list-style-type: none"> • Mostly residential customers.
4	NA	Bear Mountain Summit Lake	Geronimo Skyline	Lift Pump House	<ul style="list-style-type: none"> • Mostly interruptible customers.

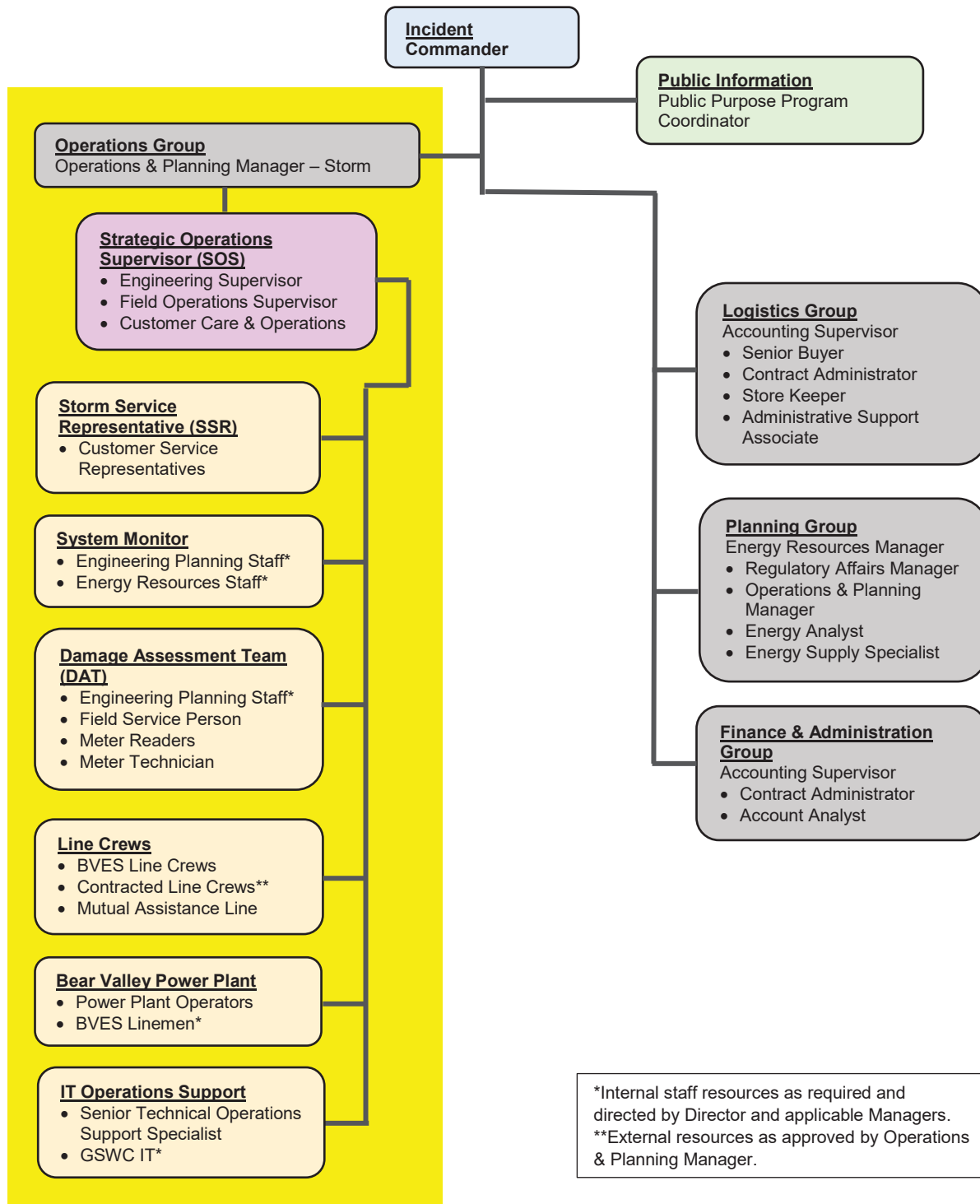
Source: BVES

Expense: These expenses are included as part of BVES' normal operations and therefore, are covered by its GRC. If applicable, BVES would also recover expenses through a Catastrophic Event Memorandum Account (CEMA) pursuant to Public Utilities Code Section 454.9. No further expense is needed at this time.

5. EMERGENCY PREPAREDNESS AND RESPONSE

BVES responds to emergencies in accordance with its Emergency Preparedness and Response Plan, which is compliant with General Order 166 (GO-166), Standards for Operation, Reliability, and Safety During Emergencies and Disasters. A copy of the Emergency Preparedness and Response Plan is forwarded to the Commission annually per GO-166. In responding to emergencies, the Company's staff shall be organized largely based on the Standardized Emergency Management System (SEMS) as interpreted by the Company and outlined in the Emergency Preparedness and Response Plan. Figure 5-1 illustrates how the BVES staff aligns with the SEMS organizational structure during an emergency.

Figure 5-1. BVES Emergency Organization



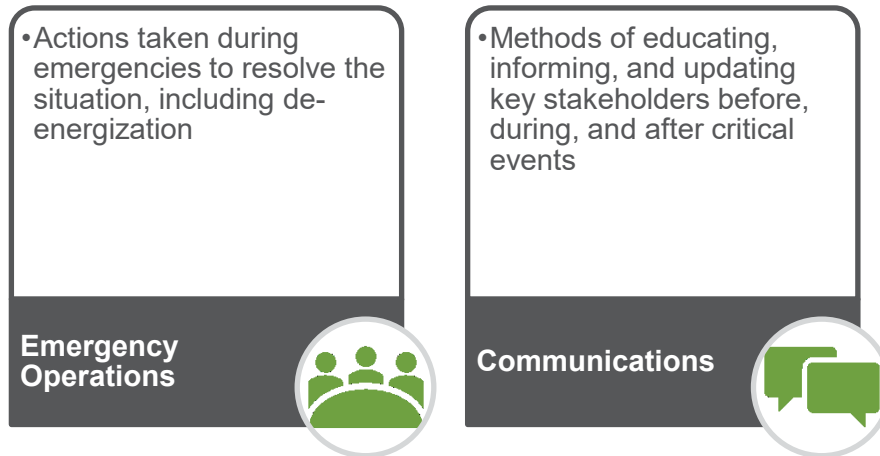
Source: BVES

Additional guidance is provided in this section. These procedures apply to both situations that may affect the electrical system (e.g. proactive de-energization) and/or the area at-large (e.g. wildfire erupts). This section details these plans, including compliance, and roles and responsibilities for executing the plan.

5.1 Plan Overview

BVES believes it is vitally important to have proactive planning and close coordination with local governments, agencies, other stakeholders, and customers. The emergency preparedness and response plan reflects those philosophies. Specifically, the emergency preparedness and response plan includes two main components: (1) an emergency protocol plan and (2) a communications plan, similar to the PSPS steps. Figure 5-2 below describes these two complementary components.

Figure 5-2. Emergency Preparedness and Response Components



Due to BVES' unique service territory, there are several key stakeholders that will be involved in emergency preparedness and response. These stakeholders include local governments and agencies as well as location-specific organizations, including resorts and business groups. With this understanding, BVES has outlined all key stakeholders. Table 5-1 provides the stakeholder list. BVES will review the list annually and update it, as needed.

Table 5-1. BVES Emergency Preparedness and Response Stakeholder List

Stakeholder Group	Description
Customers	<ul style="list-style-type: none"> Any person or organization who receives electricity from BVES
Local Government / Agencies	<ul style="list-style-type: none"> Big Bear Area Regional Wastewater Agency (BBARWA) Bear Valley Community Hospital Bear Valley Unified School District Big Bear Chamber of Commerce Big Bear Airport District Big Bear City Community Services District (CSD) Big Bear Fire Department Big Bear Lake Water Department (DWP) Big Bear Mountain Resort Big Bear Municipal Water District (MWD) San Bernardino County Sheriff's Department CAL FIRE California Highway Patrol Arrowhead Area California Department of Transportation City of Big Bear Lake San Bernardino Fire Department and Office of Emergency Services Southwest Gas Corporation US Forest Service
Mountain Mutual Aid Association	<ul style="list-style-type: none"> Organization with 31 members, including utilities, business groups, and non-government organizations committed to the community
State	<ul style="list-style-type: none"> Warning center at the Office of Emergency Services San Bernardino Director of Safety Enforcement Division Others, as requested

Source: BVES

5.2 Emergency Operations

The first part of emergency preparedness is the operational protocols. This portion of the plan focuses on the specific steps BVES will take to deescalate emergency situations. These steps will include:

- Conducting and coordinating emergency response drills and exercises with emergency responders, regulatory agencies, and stakeholders from Table 5-1.
- Operating according to the PSPS guidelines, including de-energization, outlined in Section 4.3.1 above.
- Following procedures for operating distribution lines in affected areas.

BVES will continue to refine these operations in future iterations of the plan.

5.3 Emergency Communications

As stated above, the second part of the emergency preparedness and response protocols focuses on educating, informing, and updating key stakeholders. Reporting varies based on outage type, as outlined in the list below.

- **Major Outage:** Consistent with Public Utilities Code Section 364, a major outage occurs when 10 percent of the electric utility's serviceable customers experience a simultaneous, non-momentary interruption of service. For utilities with less than 150,000 customers within California, a major outage occurs when 50 percent of the electric utility's serviceable customers experience a simultaneous, non-momentary interruption of service.
- **Standard 6:** BVES will provide an initial notification within one hour of the identification of a major outage or other newsworthy event. The utility shall also notify the Commission and Warning Center at the Office of Emergency Services of the location, possible cause and expected duration of the outage. The Warning Center at the OES is expected to notify other state and local agencies of the outage. Subsequent contacts between state and local agencies and the utility shall be conducted between personnel identified in advance, as set forth in Standard 4.B. From time to time the Commission staff may issue instructions or guidelines regarding reporting.

Major Outages are to be reported using the CPUC Online Reporting System at <http://www.cpuc.ca.gov/emrep/>. Reports of major outages may also be made to the CPUC by calling 1-800-235-1076.

5.3.1 Communications Plans by Stakeholder

The Customer Care & Operations Support Superintendent shall make (or cause to be made) all outage reports to local government, key stakeholders and customers per the BVES communications plan based on information provided by the Operations Group. The communications protocols vary slightly by stakeholder. For this reason, BVES has divided its communication plan into key stakeholder groups. Communications will involve two types of communications: (1) proactive preparation before emergencies occur and (2) reactive notifications during and after emergency events. The list below describes the exact goals and methods of informing each of these groups.

- **Customer Outreach and Notifications:** The goal of customer outreach is to educate and prepare customers for fire prevention and emergency management activities.
 - **Before Emergencies:** Proactive outreach will include regular messages related to fire prevention, such as vegetation management, distribution inspection de-energization policies, and operational initiatives. This engagement will occur through public workshops, BVES newsletters, social media, website posts, and other forms of media.
 - **During / After Emergencies:** Reactive notifications will include pre-planned statements in the case of de-energization activities and emergencies, including information about the timing and location of such events. These notifications will occur through news outlets, including print, digital, and radio forums, website updates, social media updates, local government and agency media (e.g. City of Big Bear Lake's email blasts), and interactive voice response (IVR). Additional forms of communication may be leveraged as new technologies and software become available.

In addition to providing communications, BVES will also provide billing and repair support for affected customers. Billing support may include billing adjustments, deposit waivers, suspension of disconnection, and extended payment plans for standard and low-income customers. Repair support may include regular communications about repair processing and timing and individualized support from a utility representative.

- **Local Government and Agency Engagement and Notification:** This engagement aims to inform and prepare relevant agencies, before, during, and after fire prevention or emergency activities. BVES envisions this engagement being a two-way communication channel to help facilitate communications with customers and manage the potential impacts of events.
 - **Before Emergencies:** The proactive briefings will center on how the plan impacts the distribution system as a whole. These briefings will occur through emails, trainings, and in-person meetings. In addition to briefings, BVES will solicit feedback from local government and agencies on its emergency preparedness communication plans and overall protocols.
 - **During / After Emergencies:** When an emergency occurs, BVES will notify all relevant local government and agencies immediately to ensure proper coordination of response. BVES will also provide its pre-prepared customer statements for staff to disseminate information to customers. Once notified, BVES will continue to provide timely communications until the situation has been resolved. These notifications will happen through phone and email.
- **Mountain Mutual Aid Association (MMAA) Participation:** The outreach and engagement with the MMAA will be similar to that of the local government and agency communications. Specifically, the goal of this engagement will be to inform, prepare, and coordinate closely with the group.
 - **Before Emergencies:** The proactive briefings will center on how the plan impacts the distribution system and members. These briefings will occur through emails, trainings, and in-person meetings. In addition to briefings, BVES will solicit feedback from MMAA on its emergency preparedness communication plans and overall protocols.
 - **During / After Emergencies:** When an emergency occurs, BVES will notify MMAA members immediately to ensure proper coordination of response. BVES will also provide its pre-prepared customer statements for staff to disseminate information to customers. Once notified, BVES will continue to provide timely communications until the situation has been resolved. These notifications will happen through phone and email.
- **CPUC Reporting:** CPUC communications will align with mandated standards.
 - **Before Emergencies:** The utility will notify the Director of Safety Enforcement Division (SED) within 12 hours of the power being shut off per ESRB-8. BVES will also notify the CPUC and Warning Center at the Office of Emergency Services San Bernardino within one hour of shutting off the power if the outage meets the major outage criteria of GO-166.
 - **During / After Emergencies:** BVES will provide a written report to the Director of SED no later than 10 business days after the shut-off event ends per ESRB-8. The utility will also comply with all future analysis and report requests during and after any emergencies.

Outage data shall also be included in BVES' annual reliability indices report to the CPUC.

5.3.2 Plans to Prepare for and Restore Service

In the event of a wildfire or other emergency event, BVES will invoke its Emergency Preparedness and Response Plan and staff up its Emergency Operations Center to coordinate activities to restore service. The BVES restoration strategy and priorities was detailed in its Emergency Preparedness and Response Plan.

5.3.3 Restoration Resource Adequacy

BVES WIPT will oversee restoration and response activities. In the event that additional staff is needed, BVES will leverage mutual aid agencies, including the City of Big Bear Lake staff and local aid organizations. The utility will also engage contractors on an as-needed basis.

5.4 Plan Compliance

The emergency preparedness and response plans described in this section comply with Public Utilities Code Section 768.6 and 8386^{16,17}. Specifically, the plan complies with the following mandates:

- Sharing of plan with relevant cities and counties to provide input and feedback.
- Plans to update and improve the plan at least every two years.
- Accounting of responsibilities of persons responsible for executing the plan.
- Appropriate and feasible procedures for notifying customers who may be impacted.
- Plans to prepare for and restore service, including workforce mobilization.
- Plans for community outreach and public awareness before, during, and after a wildfire.
- Emergency communications that includes plans to translate messages into the top three languages in CA based on census data.
- Protocols for compliance with CPUC reporting guidelines.

As the CPUC develops new mandates, BVES will update its plan accordingly.

5.5 Customer Support in Emergencies

In the event the Governor of California declares a state of emergency because a disaster has either resulted in the loss or disruption of the delivery or receipt of utility service and/or resulted in the degradation of the quality of utility service, BVES shall implement certain customer service actions as described below. This section provides an overview of the protocols for compliance with requirements adopted by the CPUC regarding activities to support customers. The protocols span outage reporting, customer billing, support for low income customers, and other forms of customer support.

¹⁶ FindLaw, California Code, Public Utilities Code – PUC 768.6, <https://codes.findlaw.com/ca/public-utilities-code/puc-sect-768-6.html>

¹⁷ FindLaw, California Code, Public Utilities Code – PUC 8386, <https://codes.findlaw.com/ca/public-utilities-code/puc-sect-8386.html>.

5.5.1 Support for Low Income Customers

The Customer Care team will freeze low income customers' accounts and stop all California Alternative Rates for Energy (CARE) High-Usage tracking. The Superintendent will work with implementation contractors and emergency assistance programs to update affected customers on eligibility requirements and enroll them in assistance programs.

5.5.2 Billing Adjustments

The Customer Care team will freeze accounts and stop billing during the wildfire event to ensure bills are not estimated or generated for affected customers. Billing will resume once the case is closed by the Customer Care & Billing (CC&B) technical team, upon notice from the Superintendent.

5.5.3 Deposit Waivers

The Customer Care team will add a designated customer contact for all affected customers. The contact will reside within CC&B for up to one year from the date the emergency ends. This will allow BVES to easily track the customer's account, so when service is re-established, the utility will know to waive any associated fees and to expedite customer re-connection.

5.5.4 Extended Payment Plans

The Customer Care team will freeze all payments on affected customers' account to avoid affecting their credit. All affected customers will be notified that an extended payment plan option is available for any past due payments.

5.5.5 Suspension of Disconnection and Nonpayment Fees

The Customer Care team will freeze affected customer accounts, so disconnections and nonpayment fees are not generated during the wildfire event. Once the emergency ends, the Superintendent and/or Specialist will contact the CC&B team to "close" all affected customer cases. This will automatically transition the customer's account back to the normal state. BVES will simultaneously begin assisting with service restoration and deposit waivers.

5.5.6 Repair Processing and Time

During emergencies, BVES will set up specialized repair teams to expedite repair processing. If additional support is needed, BVES will leverage mutual aid programs with other emergency response resources and will work with electrical contractors to ensure timely service restoration. Exact timing will be dependent on the nature of the situation.

5.5.7 Access to Utility Representatives

The BVES Engineering Inspector will arrange for connections and facilitate expedited services. Leveraging its IVR system, BVES will be able to handle thousands of phone calls simultaneously and divert customers to the appropriate utility representative.

6. PERFORMANCE METRICS AND MONITORING

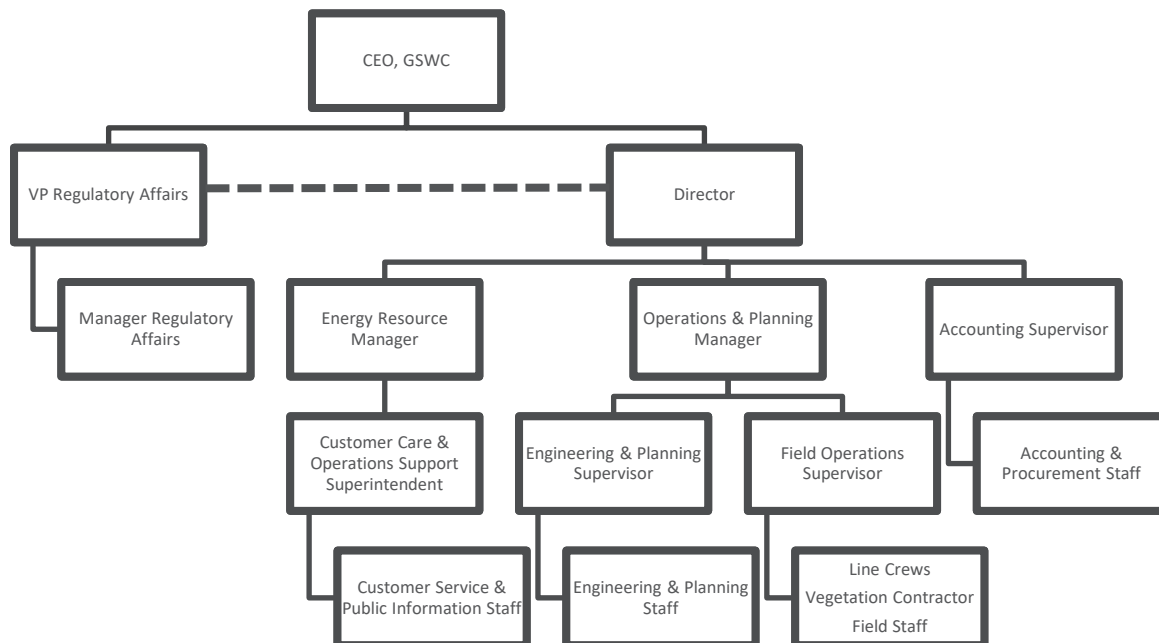
In addition to a robust mitigation strategy, BVES developed performance metrics to monitor their efforts over time. The goal of these metrics is to provide a data-driven evaluation of performance to help BVES determine the effectiveness of the wildfire plan and identify areas of improvement. The performance plan is comprised of: Roles and Responsibilities, Metrics Reporting, Application of Metrics, Planning Processes and Procedures.

6.1 Roles and Responsibilities for Plan Execution

The overall roles and responsibilities for the performance metrics align closely to those outlined in the broader plan. The Director will oversee implementation, ensuring staff follow procedures and protocols. The Operations and Planning Manager will manage the execution of the performance monitoring. This includes providing guidance to staff and leading the development of reports. The staff responsible for each metric area will aggregate relevant metrics at the direction of the Operations and Planning Manager. For example, the Customer Care and Operations Support Superintendent will assume responsibility for tracking customer-related metrics.

Figure 6-1 below outlines the BVES Wildfire Mitigation Plan organization. Further descriptions of the roles and responsibilities are provided in Sections 6.1.1 for Executive Level and 6.1.2 for Program Owners.

Figure 6-1. BVES Wildfire Mitigation Plan Organization



Source: BVES

6.1.1 Executive Level Responsibilities

The following Executives are responsible for:

- **Chief Executive Officer (CEO), Golden State Water Company** is responsible for the overall management of BVES.
- **Vice President, Regulatory Affairs** is responsible for ensuring regulatory compliance on all matters concerning BVES.

The Director and Manager, Regulatory Affairs have the following responsibilities:

- **Director, BVES** is responsible for the overall execution of the Wildfire Mitigation Plan and ensuring all of the plan elements are executed as intended. The Director shall report directly to the CEO on all matters regarding the plan and be fully accountable for its proper execution. He shall provide the CEO periodic updates on plan execution; identify any problems, delays in schedule, and resource shortfalls; and propose solutions to issues and problems. He shall also keep the Vice President, Regulatory Affairs informed of all compliance and regulatory affairs issues regarding the plan. He shall communicate the plan to BVES staff and hold them fully accountable for executing their portions of the plan. He shall ensure the applicable portions of the plan are communicated to local government and agencies, key stakeholders, customers and the general public. He will also ensure lessons learned and metrics from the current plan are incorporated into future plans as appropriate.
- **Manager, Regulatory Affairs** is directly responsible to the Vice President, Regulatory Affairs for ensuring regulatory compliance on all matters concerning the plan. He shall work closely with BVES' Director and Managers to ensure regulatory compliance issues are promptly resolved and will be directly responsible for any communications between BVES and the Commission on any matter regarding the plan including required reports.

6.1.2 Program Owners

Execution will be implemented by key utility staff, working closely with the stakeholders listed in Section 5.1, as applicable. The staff providing oversight of the program elements to the plan include the Operations & Planning Manager, Energy Resource Manager, Field Operations Supervisor, Engineering & Planning Supervisor, Customer Care & Operations Support Superintendent, and Accounting Supervisor. All implementation staff are highly qualified and will ensure prompt communications and restoration of service. These members will be critical to maintaining customer and system safety. Figure 6-1 below outlines each staff member's role in implementation of the plan and their relevant qualifications.

Table 6-1. Plan Implementation Roles and Responsibilities

Staff Member	Role
Operations & Planning Manager	<ul style="list-style-type: none"> Responsible for overall execution of wildfire prevention strategy and programs (Section 4 to the Plan) and emergency operations Ensures timely and accurate communications with other BVES staff performing Plan functions Collaborates with counterparts at local governments and agencies during proactive de-energization procedures and emergency events Ensures Field Operations Supervisor is adequately resourced to execute field operation activities per the plan Ensures Engineering & Planning Supervisor is adequately resourced to execute engineering and planning activities per the plan Manages all wildfire recovery activities Reports on events and statuses as required by GO 166 and ESRB-8 Provides periodic updates to the Director on the status of plan initiatives Identifies to the Director plan problems, delays in schedule, and resource shortfalls Proposes solutions to issues and problems Fully supports internal and external audits of the plan including the annual independent third-party audit required by SB-901 Evaluates plan annually and proposes plan updates Responsible for first draft of annual plan
Energy Resources Manager	<ul style="list-style-type: none"> Responsible for overall Customer and Stakeholder engagement and programs Ensures Customer Care & Operations Support Superintendent is adequately resourced to execute Customer and Stakeholder engagement per the plan Ensures all customer support and communications during wildfire recovery are conducted per the plan Provides periodic updates to the Director on the status plan initiatives Fully supports internal and external audits of the plan including the annual independent third-party audit required by SB-901 Evaluates plan annually and submits recommendations to Operations and Planning Manager

	<ul style="list-style-type: none">• Responsible for directing operations in the field• Monitors weather advisories and manages operational system line-ups based on weather advisories• Ensures timely and accurate communications with other BVES staff performing plan functions• Schedules and controls construction work on the distribution system by BVES and contracted crews in support of plan initiatives• Manages GO 165 inspections and patrols and other field inspection programs, document results, and follows-up as needed for corrective action
Field Operations Supervisor	<ul style="list-style-type: none">• Manages Vegetation Management program execution to ensure contractor maintains program clearances• Provides periodic updates to the Operations & Planning Manager on the status of plan initiatives• Directs all field operations (BVES crews, contracted crews, and mutual aid crews) during wildfire recovering efforts• Identifies to the Operations & Planning Manager plan problems, delays in schedule, and resource shortfalls• Proposes solutions to issues and problems• Collects relevant data and documentation• Evaluates plan annually and submits recommendations to Operations and Planning Manager
Engineering & Planning Supervisor	<ul style="list-style-type: none">• Responsible for wildfire mitigation planning and engineering design• Issues and manages Work Orders to support plan initiatives• Reviews and approves as applicable engineering design work performed by contractors in support of plan initiatives• Supports Field Operations and broader Emergency Response Team (ER) as directed• Manages proactive system-related elements of plan, including implementing design standards, policies and procedures to mitigate fires• Directs all engineering and planning activities during wildfire recovery• Provides periodic updates to the Operations & Planning Manager on the status of plan initiatives• Identifies to the Operations & Planning Manager plan problems, delays in schedule, and resource shortfalls• Proposes solutions to issues and problems• Collects relevant data and documentation• Evaluates plan annually and submits recommendations to Operations and Planning Manager

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Customer Care & Operations Support Superintendent

- Responsible for implementing communications plan and customer service programs (Section 5)
- Notifies stakeholders, including local governments, agencies, and customers
- Creates pre-planned statements to support proactive de-energization
- Establishes and maintains customer communication methods, systems, and equipment to support the policies and procedures laid out in the plan
- Trains staff to perform customer and public information functions
- Develops and maintains contact list of local governments and agencies
- Directs customer education strategy to inform customers about BVES' fire mitigation and emergency plans
- Directs all customer support and communications during wildfire recovery per the plan
- Evaluates plan annually and submits recommendations to Operations and Planning Manager
- Provides periodic updates to the Energy Resource Manager on the status of plan initiatives
- Identifies to the Energy Resource Manager plan problems, delays in schedule, and resource shortfalls
- Proposes solutions to issues and problems
- Collects relevant data and documentation
- Evaluates plan annually and submits recommendations to Energy Resource Manager

Accounting Supervisor

- Responsible for ensuring budget(s) developed to support Plan expenses (O&M) and capital investments
- Processes Work Orders in support of Plan in accordance with Company procedures
- Ensures procurement of material, equipment, and services in support of the Plan comply with Company policies
- Orders material and equipment to support the Plan and alerts applicable Supervisor when received
- Issues contracts to support Plan initiatives as requested by Managers
- Documents expenses in support of the Plan in accordance with Company procedures
- Provides Director and Managers reports of the status of execution of expense and capital project budgets in support of the Plan
- Identifies to the Director and Managers any resource shortfalls

6.2 Description of Metrics

As described above, metrics will play a critical role in the overall wildfire mitigation plan. BVES intends for the metrics to inform them about their progress on wildfire mitigation and determine potential gaps that may arise over time as conditions change. That said, the metrics proposed in this plan reflect current plans and circumstantial conditions. Upon plan approval, BVES will create targets for each of the metrics. The utility will also plan to revisit the metrics annually and update them as needed. Table 6-1 below details BVES' proposed metrics.

Table 6-1. Proposed Wildfire Prevention Plan Metrics

Metric Category	Metric	Rationale
Overall Plan	Number of utility caused fires	Assess overall electiveness of the plan
Infrastructure	Number of bare line contact with vegetation	Assess if plan has reduced risk events
	Number of live wire down events	Assess if plan has reduced risk events
	Number of conventional blown fuse events	Assess if plan has reduced risk events
	Number of poles failing assessment replaced or remediated	Determine if plan is on schedule
	Number of Tree Attachments Removed Annually	Determine if plan is on schedule
	Length of Bare Wire Covered Annually	Determine if plan is on schedule
	Number of conventional fuses replaced by current limiting fuses	Determine if plan is on schedule
	Number of conventional fuses replaced by fused trip savers (vacuum style)	Determine if plan is on schedule
Operations	Average Time for Clearance Permissions from Local Agencies	Assess mitigation plan constraints and timelines
Customer Service	Number of Customer Service Calls about Tree Trimming	Assess if communications plan has reduced customer concerns and risk events
	SAIDI due to PSPS	Assess outage impact on customers as a result of PSPS
Weather Conditions	Number of NFDRS "Very Dry" and "Dry" Days	Monitor changing climatic and weather patterns

PSPS	Number of PSPS Events	Monitor the need for PSPS events over time as an indicator of changing climatic and weather patterns
	Maximum recorded sustained winds and wind gusts	Monitor the need for PSPS events over time as an indicator of changing climatic and weather patterns
	Frequency of high sustained high winds and wind gusts	Monitor the need for PSPS events over time as an indicator of changing climatic and weather patterns

Source: BVES

BVES will prepare formal reports, aggregating the monthly metrics, for review by the Director and other executives on an annual schedule. The reports will evaluate whether the metrics are below, meeting, or exceeding their targets. The reports will also include brief updates and correction plans for metrics below target. The Director will provide feedback and additional guidance as necessary.

6.3 Application of Previous Metrics to Previous Plan Performance

This is the first annual Wildfire Mitigation Plan submitted by BVES to the Commission for approval. Therefore, past plan metrics are not available to evaluate past plan performance. However, in developing this plan, BVES examined past data, such as Wildfire Risk Events as presented in Table 3-1 and the number of NFDRS High-Fire Risk Days to inform the plan.

6.4 Description of Processes and Procedures

6.4.1 Monitoring and Auditing the Plan

The Operations & Planning Manager and Energy Resource Manager will update the Director on the status of the Wildfire Mitigation Plan at regularly scheduled Management Meetings. Additionally, the Wildfire Mitigation Plan will be included as a discussion item on the agenda at regularly scheduled Manager and Supervisor Meetings.

As mentioned above, the Operations & Planning Manager will collect and submit a report of the plan metrics each month to the Director as well as BVES Managers and Supervisors. Based on the results, the Operations & Planning Manager will make recommendations to the Director on action to be implemented, if warranted. Additionally, work orders, contracts, purchase orders and other expense mechanisms will be subject to the Company's internal and external audit procedures.

Annually, BVES shall engage one of the CPUC approved listed evaluators to review and assess BVES' compliance with its plan. It is expected that the evaluator will:

- Consult with, and operate under direction of, Safety and Enforcement Division.
- Issue a report by July 1 of each year commencing 2020.

- Determine whether the utility failed to fund any activities included in its plan.

6.4.2 Identifying and Correcting Deficiencies in the Plan

BVES staff and qualified external stakeholders are encouraged to identify plan deficiencies or potential deficiencies to the Operations & Planning Manager as soon as possible when observed. The Operations & Planning Manager shall evaluate each reported deficiency and, if the deficiency is determined to be a valid plan deficiency, he shall enter the deficiency into a log with the following information:

- Date the deficiency was discovered
- Description of the deficiency
- Source identifying the deficiency (e.g., Internal Audit)
- Priority based on deficiency severity
- Assigned corrective action including the date when it must be completed by
- Assigned staff responsible for completing the corrective action
- Date corrective action completed

The Operations & Planning Manager will go over the log at regularly scheduled Manager and Supervisor Meetings. It should also be noted that the log is not a substitute for tracking specific program deficiencies (e.g., vegetation management discrepancies are tracked via the vegetation management QC program not in the wildfire mitigation plan deficiency log).

6.4.3 Monitoring and Auditing the Effectiveness of Equipment and Line Inspections

The Operations & Planning Manager will assign qualified internal staff or engage a third party to review and audit the equipment and line inspection programs called out in the Wildfire Mitigation Plan after the completion of the first six months of the plan. Ideally, the audit is to be conducted between the 6-month and 8-month point of the plan period. The assigned auditor will:

- Review records for the inspection programs,
- Interview staff performing inspections to assess their knowledge of the inspection programs,
- Monitor staff performing inspection activities,
- Review deficiencies noted in the programs,
- Identify systemic issues or problems,
- Note the timeliness of corrective actions,
- Pick a random sample of some completed corrective actions and verify the effectiveness of the corrective actions, and
- Issue a written report of findings.

The Operations & Planning Manager will review the audit findings and assign corrective action as applicable. A copy of the audit report will be routed to the Director.

7. ADDITIONAL INFORMATION

This section captures the additional information required by the CPUC. As of January 2019, the CPUC has only requested cost information, including the potential cost implications of the proposed measures.

7.1 Cost Information

BVES has incorporated some costs of planned measures into previous GRCs. However, due to recent regulation updates, BVES has updated its plan and some proposed measures have not been previously captured. Table 7-1 below outlines the proposed costs and cost recovery of the measures included in this plan.

Table 7-1. Mitigation Measures Cost Information

Mitigation Measure		Cost Covered Previously	Cost Recovery
<i>Design & Construction</i>			
1	Pineknott Substation Upgrades	Y	GRC ^A
2	Ute Undergrounding	N	Memorandum Account ^B \$3.2 million
3	Fuse Upgrades	N	Memorandum Account ^B \$5.2 million total (\$2.6 million/year)
4	Tree Attachment Removal Project	Y	GRC ^A
5	Pole Loading Assessment & Remediation Program	Y	GRC ^A
6	Covered Conductor Replacement Pilot Program	N	Memorandum Account ^B \$458,000
7	Covered Conductor Wrap Pilot Program	N	Memorandum Account ^B \$292,000
8	Radford Line Covered Conductor Replacement Project	N	Memorandum Account ^B \$2.5 million
<i>Inspection & Maintenance</i>			
9	First Annual On-Ground Inspection	Y	GRC ^A
10	Second Annual On-Ground Inspection	N	Memorandum Account ^B \$90,000
11	Predictive-Based Maintenance	Y	GRC ^A

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12	Electrical Preventative Maintenance Program	Y	GRC ^A
13	LIDAR Inspection	N	Memorandum Account ^B \$220,000
14	GIS Data Collection & Sharing	Y	GRC ^A
15	Vegetation Management Plan	Y	GRC ^A and FHPMA ^C
Operational Practices			
16	Operational Considerations / Special Work Procedures	Y	GRC ^A
17	Automatic Recloser Upgrades	Y	GRC ^A
18	Emergency Reporting	Y	GRC ^A
19	Wildfire Infrastructure Protection Teams	Y	GRC ^A
Situational & Conditional Awareness			
20	SCADA Installations	Y	GRC ^A
21	GIS-Based Applications (e.g. Outage Management System)	Y	GRC ^A
22	Web-Based Weather Resources	Y	GRC ^A
23	BVES-Owned Weather Stations (Install 10 additional stations and integrate all 20 stations with SCADA)	Partial	GRC ^A and Memorandum Account ^B \$122,000 not authorized yet
24	Weather Forecasting (Consulting services)	N	Memorandum Account ^B \$46,800
25	Remote Monitoring (Cameras)	N	No cost recovery intended this plan period (Cost TBD)
26	Grid Automation	Y	GRC ^A
Response & Recovery			
27	PSPS Protocols	Partial	GRC ^A and Memorandum Account ^D \$42,000 not authorized yet
28	Post Incident Recovery, Restoration & Remediation	Y	GRC ^A plus CEMA if applicable

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^A Expense is being addressed in the BVES' General Rate Case A.17-05-004 submitted on May 1, 2017, which is pending decision.

^B New expense. BVES requests by approval of this Wildfire Mitigation Plan, that the CPUC authorize BVES to establish a memorandum account to track and recover the expenses related to this project/program that are not included in BVES' BRRR.

^C BVES' Fire Hazard Prevention Memorandum Account (FHPMA).

^D Expense for regular work hours are covered in BRRR; however, the overtime is not. BVES requests by approval of this Wildfire Mitigation Plan, that the Commission authorize BVES to establish a memorandum account to track and recover these plan related expenses.

Source: BVES

Bear Valley Electric Service Wildfire Mitigation Plan

APPENDIX A. ATTACHMENT A SPREADSHEET

§8386 (c) (3)(4)(8)(9): Wildfire Mitigation Strategies and Programs

Program/Strategy (§ 8386(c)(3))	Asset Addressed (Ex: line, poles, etc. (§ 8386(c)(3))	Annual Cost (Capital v. Expense) (Scoping Memo at 4: "In evaluating the proposed plans the Commission may weigh the potential cost implications of measures proposed in the plans")	Costs Currently Reflected in Revenue Requirement? (Provide Decision Reference) If for Only Part of Budget, Identify the \$ for that Part and Explain Part Not Previously Authorized (§ 8386(j))	Compliance Requirement? (Provide Code/GO Reference) If for Only Part of Budget, Identify the \$ for that Part and Explain Part that is Not Compliance	Identify any Aspects of Plan/Strategy and Associated Funding That is or Will Be Addressed in Another Case (Identify the Case (§ 8386(j))	Identify Memorandum Accounts Where Costs of Program/Strategy Are Being Tracked and Explain How Double Tracking is	Previously Included in RAMP? (Provide Reference) (§ 8386 (c)(11))	Evaluation Metric(s) (§ 8386 (c)(4))	Assumptions Underlying Metric (§ 8386 (c)(4))
OPERATIONAL PRACTICES									
Blocking Reclosers	All Reclosers	Expense ¹	Yes ¹	No	NA	NA	Y	NA	NA
Fast-Curve Settings	All Circuit Breakers	Expense ¹	Yes ¹	No	NA	NA	Y	NA	NA
Sensitive Relay Settings	All Circuit Breakers	Expense ¹	Yes ¹	No	NA	NA	Y	NA	NA
Red Flag Warning Period / Special Work Conditions	All Circuit Recloser Settings; Trip Savers;	Expense ¹	Yes ¹	PU Code Sections 451 and 399.2(a)	Proceeding 18-12-005	NA	N	NA	NA
Wildfire Infrastructure Protection Teams	All Assets	Expense ¹	Yes ¹	PU Code Sections 451 and 399.2(a); GO 166	Proceeding 18-12-005	NA	N	NA	NA
PLANS FOR INSPECTION									
1st Annual On-Ground Inspection	All Assets	Expense ¹	Yes ¹	GO 165	BVES GRC A.17-05-	NA	Y	NA	NA
2nd Annual On-Ground Inspection	All Assets	\$90,000 Expense ²	No ²	No	NA	WMP Memorandum	Y	NA	NA
Preventative Maintenance of Overhead Lines Program	All Overhead Lines (Over a 3 year period)	Expense ¹	Yes ¹	No	BVES GRC A.17-05-004	NA	Y	NA	NA
Electrical Preventative Maintenance Program	All Substations; All Distribution	Expense ¹	Yes ¹	GO-174	BVES GRC A.17-05-004	NA	Y	NA	NA
LIDAR Inspection	Radford 34kV Line	\$220,000 Expense ²	No ²	No	NA	WMP Memorandum	N	NA	NA
GIS Data Collection & Sharing	All Assets	Expense ¹	Yes ¹	No	NA	NA	NA	NA	NA
VEGETATION MANAGEMENT									
Compliance Related Work (list each separately) (1) 72 in Minimum Radial Clearance; (2) No vertical coverage be allowed above BVES sub-transmission lines (34,500 V); (3) All vegetation within the drip	All Assets	Expense ^{1,3}	Yes ^{1,3}	GO 95; D.17-12-024 (Decision Adopting Regulations to Enhance Fire Safety in the High Fire Threat District)	BVES GRC A.17-05-004	Fire Hazard Prevention Memorandum Account (FHPMA); Costs with contractor	Y	Average time for clearance permissions from local agencies; number of	NA

Bear Valley Electric Service Wildfire Mitigation Plan

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SYSTEM HARDENING									
Pole Loading	All Distribution Poles (8,000 total; 2,000 per year)	Capital & O&M Expense ¹	Yes ¹	GO-95	BVES GRC A.17-05-004	NA	Y	Number of Poles Failing Assessment Replaced / Remediated	Ends once all 8,000 poles have been assessed (in 4 years)
Covered Conductor Replacement Pilot Program	Overhead distribution in high risk areas (3)	\$458,000 Capital ²	No ²	No	NA	WMP Memorandum Account	Y	Length of bare wired covered	Funding for pilot is approved; ends
Covered Conductor Wrap Pilot Program	Overhead distribution in high risk areas (3)	\$292,000 Capital ²	No ²	No	NA	WMP Memorandum Account	Y	Length of bare wired covered	Funding for pilot is approved; ends
Radford Line Covered Conductor Replacement Project	Radford 34kV Line HFTD Tier 3 line	\$2.5 million Capital ²	No ²	No	NA	WMP Memorandum Account	Y	Length of bare wired covered	Funding for Radford line is approved; ends once
Undergrounding	Ute Line; Big Bear Lake Village Circuit	\$3.2 million Capital ²	No ²	No	NA	WMP Memorandum Account	N	NA	NA
Substation Upgrades	Pineknott	Capital ¹	Yes ¹	GO-174	BVES GRC A.17-05-004	NA	Y	NA	NA
Fuse Upgrades (Replace fuses with current limiting (non-expulsion) and electronic fuses)	All Fuses	\$2.6 million Capital ²	No ²	No	NA	WMP Memorandum Account	Y	Number of fuses replaced by fused trip savers and	Funding for fuse upgrades is approved; ends
Tree Attachment Removals	All Tree Attachments (1,200 total; 300 per year)	Capital ¹	Yes ¹	GO-95	BVES GRC A.17-05-004	NA	Y	Number of Tree Attachments Removed	Target removal of 300 attachments per year; end
SITUATIONAL AWARENESS									
SCADA Installations	All Assets	Capital ¹	Yes ¹	No	BVES GRC A.17-05-004	NA	Y	NA	NA
GIS Based-Applications - Outage Management System (OMS)	All Circuits	Expense ¹	Yes ¹	No	BVES GRC A.17-05-004	NA	N	NA	NA
GIS Based-Applications - Interactive Voice Response (IVR)	All Circuits	Expense ¹	Yes ¹	No	BVES GRC A.17-05-004	NA	N	NA	NA
Web-Based Weather Resources	All Assets	Expense ¹	Yes ¹	No	Proceeding 18-12-005	NA	N	NA	NA
BVES-Owned Weather Stations (pole top mounted)	Overhead Distribution System	\$122,000 Capital ² (\$95,000 to install 10 additional weather stations and \$27,000 to	No ²	ESRB-8	Proceeding 18-12-005	WMP Memorandum Account	N	Max recorded sustained winds and wind gusts; frequency of high	NA

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SITUATIONAL AWARENESS CONTINUED									
Weather Forecasting (Consulting Services)	All Assets	\$46,800 Expense ²	No ²	ESRB-8	Proceeding 18-12-005	WMP Memorandum Account	N	Number of NFDRS "Very Dry" and "Dry" days	NA
Remote Monitoring (Cameras) to be planned this period	Radford 34 kV Line; Other High-Risk	No expense this plan period.	No	ESRB-8	Proceeding 18-12-005	NA	N	NA	NA
Grid Automation (Historian & Software Capabilities)	All Circuits	Capital ¹	Yes ¹	No	BVES GRC A.17-05-004	NA	Y	NA	NA
RESPONSE & RECOVERY									
Public Safety Power Shut-Off / De-Energization	All Assets	\$42,000 Expense ² for overtime only.	No ²	PU Code Sections 451 and 399.2(a)	Proceeding 18-12-005	WMP Memorandum Account	N	Number of PSPS Events	NA
Post Incident Recovery, Restoration & Remediation	All Assets	Incident specific	Yes ¹ plus CEMA if applicable	GO 166	NA	CEMA if applicable	NA	NA	NA
Notes:									
¹ Expense is being addressed in the BVES' General Rate Case A.17-05-004 submitted on May 1, 2017, which is pending decision.									
² New expense. BVES requests by approval of this Wildfire Mitigation Plan, that the CPUC authorize BVES to establish a memorandum account to track and recover the expenses related to this project/program that are not included in BVES' BRRR.									
³ BVES' Fire Hazard Prevention Memorandum Account (FHPMA).									