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Subject: Independent Evaluator's Report of the Northern California Power Agency 2023 Wildfire Mitigation Plan

1 Introduction

The Northern California Power Agency (NCPA) contracted with Dudek to engage in an independent evaluation of its 2023 Wildfire Mitigation Plan (WMP). This independent evaluation report describes the technical review and evaluation of the WMP prepared by the NCPA. The WMP requirements are codified in California Public Utilities Code (PUC) Section 8387(b)(2) for local publicly owned electric utilities (POUs). PUC Section 8387(c) requires that an independent evaluator review and assess the comprehensiveness of a POU's WMP and issue a summary report. The year 2023 is important for POUs because they are required by PUC Section 8387(b)(1) to comprehensively revise their WMPs "at least once every three years."

Dudek conducted a review of NCPA 's 2023 WMP from February 27 to May 5, 2023. The focus of the evaluation was to determine the comprehensiveness of WMP and ensure it included all elements required under PUC Section 8387(b)(2) (listed in Attachment A).

In addition to evaluating the elements required by the PUC, Dudek reviewed the Wildfire Safety Advisory Board's (WSAB's) specific guidance for the NCPA published in their Guidance Advisory Opinion for the 2023 Wildfire Mitigation Plans of Electric Publicly Owned Utilities and Rural Electrical Cooperatives (WSAB 2022).

This Independent Evaluator's report contains the following elements: (1) an overview of the NCPA , (2) A review of the statutory requirements in PUC Section 8387(b)(2) for local POUs, (3) A review of the specific recommendations published by the WSAB for the NCPA 2022 WMP, (4) 2022 wildfire mitigation and prevention accomplishments of the NCPA , (5) an overview of the metrics used the NCPA 's WMP, and (6) a comparison of wildfire risk reduction strategies used by the NCPA with those used by similar utilities and municipal utility industry standards.

2 An Overview of the Northern California Power Agency

The NCPA's service territory consists of several geothermal and hydroelectric generating stations plus the tie-in lines that connect the NCPA facilities to their customers. NCPA's geothermal generating facilities are in the Coastal

Ranges, specifically the Mayacamas Mountains in Lake County, California. There are four facilities plus two 230 kV tie-in lines; one that is operated by the NCPA and that connects the NCPA's geothermal generating facilities to PG&E lines to the west, and a second that is not operated by the NCPA and connects to the CALPINE facilities and extends PG&E substations to the east. The lands surrounding the geothermal facilities are undeveloped except for access roads and are covered with continuous areas of forest, brush, and mixed forest-shrubland cover. It is worth noting that CALPINE's facilities, a group of geothermal generating plants, are also situated on the same geyser field as NCPA's. These two facilities have similar wildfire risks in terms of surrounding vegetation, terrain, and firefighter access. All NCPA's geothermal facilities and the related tie-in lines are in a tier 3 High Fire Threat District.

The NCPA's hydroelectric facilities are situated on the west facing slopes of the Sierra Nevada Mountains with the generating stations located in drainages at the near the bases of several dams in Calaveras and Tuolumne Counties. There are four facilities plus one 230 kV tie-in line and a 17kV service line. The lands surrounding the hydroelectric facilities are undeveloped except for access roads and the related water infrastructure (e.g., dams, spillways, etc.). Surrounding lands are covered with continuous areas of grasslands, brush, and mixed forest-shrubland cover. NCPA's hydroelectric facilities are located both inside and outside of the High Fire Threat Districts. Two facilities plus the 17kV service line are located within a Tier 3 area, one facility is located within a Tier 2 area, and one facility is not located in a High Fire Threat District. The 230 kV tie-in line extends from Collierville powerhouse to the east through Tier 3 and Tier 2 areas as well as passing through areas outside of the High Fire Threat districts in the Central Valley near Linden, CA.

Including all facilities, tie-in lines, and service lines, 46% NCPA's service territory lies within a Tier 2 area and 26% lies within a Tier 3 area. Since NCPA is a generator of electrical power not a distributor and their facilities are in remote areas away from urban or developed areas, none of their service territory is classified as Wildland Urban Interface (WUI).

The NCPA 's service territory experiences a fire season that lasts from May to October during a typical year. During exceptionally dry years, the fire season can begin in April and extend into November. Both the hydroelectric facilities and the geothermal facilities have a fire history that includes several wildfire perimeters burning within 1 mile of NCPA facilities or lines. The 2004 Geysers fire perimeter includes NCPA's geothermal generating facilities (CAL FIRE 2020).

3 Statutory Requirements for Wildfire Mitigation Plans

PUC Section 8387(b)(2) lists the statutory requirements for WMPs. These are the specific elements that the independent evaluator must review to make its determination for this report. The specific elements that must be addressed in NCPA 's WMP are included in Attachment A and are summarized here for reference.

- Staff responsibilities
- General objectives
- Wildfire risk reduction program descriptions
- The metrics used to evaluate the WMP's performance.
- How the application of previously identified metrics has informed the WMP.
- Protocols for reclosers, de-energization, and public safety power shut-off.

- Procedures for community notification and outreach
- Vegetation management plans
- Electrical equipment and infrastructure inspection plans
- Description of wildfire risks and drivers for those risks throughout the service territory, including design, construction, operation, and maintenance of equipment and facilities and topographic and climatological risk factors
- Identification of any geographic area in the service territory that is a higher wildfire threat than is identified in a commission fire threat map.
- Identification of enterprise-wide safety risk and wildfire-related risks
- How the service will be restored after a wildfire
- The processes and procedures used to monitor and audit the implementation of the WMP and identify any deficiencies, and the effectiveness of electrical line and equipment inspections.

4 Public Utility Code Requirements

Dudek found that NCPA 's WMP meets the statutory requirements of comprehensiveness per PUC Section 8387. The review of the WMP's elements is summarized relative to the application of the WMP. Dudek's assessment is in **bold text** beneath the description of the requirement. The table in Attachment A lists each PUC required element for the NCPA 's WMP and provides Dudek's initial and final assessments of the comprehensiveness of that element.

Minimizing Wildfire Risks

PUC Section 8387(a) requires the following: "Each local publicly owned electric utility and electrical cooperative shall construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of wildfire posed by those electrical lines and equipment."

The NCPA 's WMP and the appendices referenced in the WMP comprehensively describe the safety-related measures that the NCPA follows to reduce its risk of causing wildfires. Dudek has determined that NCPA complies with this requirement through the design of its system, its operations, and the implementation of wildfire risk reduction and wildfire response strategies.

Evaluation of WMP Elements

Below is a summary of the WMP elements as required by PUC Section 8387, including restating sections of the WMP where applicable.

8387(b)(2)(A): Responsibilities of Persons Responsible for Executing the Plan.

Chapter 3 of the NCPA WMP comprehensively describes staff responsibilities and functions in the implementation of their WMP.

8387(b)(2)(B): Objectives of the Wildfire Mitigation Plan

Chapter 2 of the NCPA WMP comprehensively describes the utility's WMP three objectives.

8387(b)(2)(C): Prevention Strategies and Programs

Chapter 5 in the NCPA WMP describes the utility's wildfire prevention strategies. It is very comprehensive, covering existing programs. System hardening/facilities upgrade information provided by facility.

8387(b)(2)(D): Metrics and Assumptions for Measuring WMP Performance

Chapter 7 section A contains a description of the three metrics used by the NCPA in their WMP. Also included is 2020-2021 data for each metric.

8387(b)(2)(E): Impact of Previous Metrics on WMP

Chapter 7 section B describes the NCPA's plans to continue tracking the three metrics described in in section A. Section B also provides a frame of reference for '0' event metrics by comparing the NCPA's incident rate for wires down to PG&E's (NCPA's tie-in lines connect to PG&E lines).

8387(b)(2)(F): Reclosing Protocols

Chapter 5 section H states that the NCPA does not use automatic reclosers on 230 kV lines (their tie-in lines).

8387(b)(2)(G): De-energization Notification Procedures

Chapter 5 section J.2 describes the NCPAs customer notification protocols. This section contains an explanation of the notification methods and referenced NCPA policies (PM-501). Attachment D in the WMP has PM-501.

8387(b)(2)(H): Vegetation Management

Chapter 5 section E contains a comprehensive description of the NCPAs vegetation management program including fuel breaks installed around their geothermal facilities. Appendix 5 in the WMP an example of the firebreaks NCPA has installed at their geothermal facilities. Based on conversations with NCPA staff, NCPA does not install fuel breaks at their hydroelectric sites because the hydroelectric sites are located on smaller, less accessible sites.

8387(b)(2)(I): Inspections

Chapter 5 section F of the NCPA WMP comprehensively describes the utility's inspection program including the type and frequency of inspections.

8387(b)(2)(J)(i): Risks and Risk Drivers Associated with Design and Construction Standards

Chapter 4 section B in the NCPA WMP provides an overview of wildfire risk drivers in of risk drivers associated with design and construction standards.

8387(b)(2)(J)(ii): Risks and Risk Drivers Associated with Topographic and Climatological Risk Factors

Chapter 4 Section A in the NCPA WMP provides a comprehensive description of the geographic and climatological factors present across the NCPA service territory.

8387(b (2)) (K): Geographical Area of Higher Wildfire Threat

Chapter 4 Section C in the NCPA WMP describes the utility's review of the CPUC fire threat map and their conclusions about the geographical area of the high fire threat areas.

8387(b)(2)(L): Enterprise-wide Safety Risks

The introduction to chapter 4 describes that the NCPA does not have an agency-wide enterprise-risk identification and presentation. In its place is a safety policy for each type of generation asset (e.g., geothermal plant) that includes a risk-assessment process specific to that asset.

8387(b)(2)(M): Restoration of Service

Chapter 7 of the NCPA WMP has a general overview of how the utility will restore service after an outage. Two NCPA policies are referenced PM-201 and GEO-646 that specifically address restoration of service.

8387(b)(2)(N)(i): Monitoring and Auditing WMP Implementation, 8387(b)(2)(N)(ii): Identifying and correcting WMP deficiencies, 8387(b)(2)(N)(iii): Monitoring and Auditing the effectiveness of inspections.

Chapter 7 section C, D, and E of the NCPA WMP describes the utility's processes for monitoring and auditing WMP implementation, correcting WMP deficiencies, and monitoring the effectiveness of inspections. NCPA uses an ongoing process to identify risks and inefficiencies, and to develop means to address the identified issues.

5 Wildfire Safety Advisory Board Guidance Advisory Opinions

In November 2022, the WSAB published a report with a description of general recommendations for improving the WMPs for POUs and rural electrical cooperatives. At the end of the report the WSAB provided specific recommendations for each utility that submitted a WMP for review by the board. Dudek reviewed the WSAB's report, and the section below contains a summary of each recommendation the WSAB had for the NCPA 's 2022 WMP and whether the 2023 WMP has addressed the WSAB's recommendation (WSAB 2022). The materials published by the WSAB and the recommendations within are for guidance and are not statutory requirements.

1. The text on page 6 that indicates that the current WMP was initiated in 2019 and on page 7 a statement that this WMP was presented at an NCPA committee meeting – this is confusing as the 2022 updated is a complete WMP in itself. In the comprehensive revision in 2023, the WSAB expects that text like this will be resolved.

   The dates on page 6 & 7 have updated to 2022 and the current version of the WMP.

6 Northern California Power Agency 2022 Progress in Implementing Wildfire Mitigation Plan Wildfire Prevention Strategies

This section describes the NCPA's accomplishments in 2022 for the wildfire prevention program and strategies described in the WMP.

Vegetation Management

Geothermal

- Completed annual maintenance of BLM firebreaks around Plant # 1 & # 2 in March 2022.
- Completed vegetation management and line clearance work along 230 kV tie-in lines and around all nine tower bases in June 2022.
- Completed annual maintenance of vegetation around Plant #1 & #2 perimeters plus along access roads in 2022.

Hydroelectric

- Completed annual maintenance of vegetation around powerhouses and substations in 2022.
- Completed vegetation management and line clearance work along 230 kV tie-in lines and around tower bases in April 2022.

Inspections

Geothermal

- 230 kV transmission line inspection completed July 21, 2022.
- 21 kV line inspection completed July 21, 2022.
- 230 kV Drone line inspection completed October 24, 2022. Conducted by PG&E, damaged conductor found by PG&E and repaired by WAPA.
- 230 kV Physical Inspections completed October 24, 2022

Hydroelectric

- 230 kV transmission line inspection completed March 15, 2022

- 17 kV line Wood pole inspections completed June 15, 2022
- 230 kV line daycore corona and IR inspection completed June 1,2022
- 230 kV LiDAR transmission line inspection completed August 1, 2022
- NSM-Cabbage Patch 21 kV cable tests completed September 16, 2022

7 Wildfire Mitigation Plan Metric Overview

Metrics help POUs determine if their wildfire prevention strategies are effective for reducing the risk of a wildfire ignited by their electrical equipment. In 2020 the California Municipal Utilities Association published a WMP template for POUs to use in the preparation of their WMPs. This template included two metrics: number of fire ignition events and wires down events.

The NCPA adopted the two metrics suggested by the CMUA in the first and second iterations of their WMP. In 2022 the NCPA adopted an additional metric, Fall in Hazard Trees Ignitions. These three metrics: fire ignitions, wires down, and fall in hazard tree ignitions are utilized in the 2023 WMP.

The NCPA records metric data in monthly outage reports. For each event NCPA records date and time of the event, a description of the event and the cause of the event (if known), if the event was the result of an external cause, whether the outage was forced or planned, and how long the event lasted. If the event occurred along one the tie-in lines, then the location of the event along the line is described.

For the three metrics the NCPA recorded the following data in table 1 from 2020 to April 2023.

Table 1 Metric Event Record in 2020-2023

Metric	Geothermal	Hydroelectric
Fire Ignitions	0	0
Wire Down	0	0
Fall in Hazard Tree Ignitions	10 locations, 0 fall-ins	2 locations, 0 fall-ins

These three metrics with the supplemental data regarding date and time of the event, and cause of the event are useful for informing the NCPA about the effectiveness of their wildfire prevention strategies. Comparing their outage event rate on their transmission lines to PG&E's outage event rate for their transmission lines provides a good perspective on why the '"0" metric events for the wire down metric is indicative of success and not an indicator of an ineffective metric.

The NCPA is considering adding metrics in future versions of the WMP including a performance-based metric that tracks overhead line inspection and includes location plus date & time data.

8 Comparison of Industry Standards and Similar Utility Wildfire Prevention Strategies

As part of this review of the NCPA 's 2023 WMP, Dudek compared the wildfire prevention strategies described in the WMP to the strategies being implemented by POUs and accepted electrical industry practices for reducing wildfire risk. The NCPA is unique in that they are primarily a producer of electrical power whose transmission lines are limited to tie-ins with electrical utilities who provide the distribution of electrical power to retail customers. NCPA's service territory is unique in that their facilities including generators and tie-lines are dispersed in areas with no development save for infrastructure related to their operations. This is particularly important in that places a greater risk to their facilities from wildfire and greater responsibility for vegetation management/defensible space to protect their facilities. Therefore, there are no comparable POU's in the state and it is more appropriate to compare their wildfire prevention programs to a relevant industry standard such the National American Electric Reliability Corporation (NERC), California Public Utility Code General Order 95 (GO 95), Public Resource Code 4292-4293, and CAL FIRE's California Power Line Fire Prevention Field Guide

8.1 Vegetation Management

The NCPA's vegetation management can be categorized as the vegetation management work done along their tie-in lines and the vegetation management work done around their facilities. For their transmission tie-ins the NCPA maintains the vegetation within the right-of-way of its transmission tie-in lines to NERC FAC-003-4. There is at least 30 feet of vertical clearance between the trees and vegetation along the tie-in lines and the wires. The corridors containing the transmission wires are typically one hundred feet in width except where terrain makes it unsafe to maintain the full 100-foot width. For their generation facilities the NCPA meets PRC 4292 & 4293 requirements as well as PUC GO 95 requirements, typically maintains a 50- to 100-foot-wide perimeter around structures.

8.2 System Hardening

Equipment Maintenance and Upgrades

All NCPA transmission line towers are entirely constructed of lattice or tubular steel and so are inherently noncombustible. Conductors and other electrical equipment attached to NCPA towers are also constructed of metal or other non-combustible materials. Transformers, circuits, and other types of electrical equipment located at substations are also constructed entirely of non-combustible materials and surrounded by a large area of bare ground. No system hardening or equipment upgrades would result in significant improvements to fire resistance of NCPA equipment. The NCPA inspects its transmission towers on a regular basis, issues with towers or tower equipment that is discovered during the inspection is repaired at the same time.

The NCPA utilizes wood poles for the 17kV distribution line at the McKay's point facility and a 21 kV lines at the NCPA's geothermal facilities. The NCPA recently rebuilt the 21 kV line and is in the process of upgrading the equipment on the 17kV.

Construction Standards

The NCPA has construction standards designed to reduce the risk of fire ignited by the failure of their electrical equipment, which include the use of animal deterrents, lightning arresters, and arc suppression fusing. The NCPA does not use expulsive fuses on any of its lines that pass over areas of vegetation.

Recloser Policy

The NCPA does not have reclosers on its 230 kV transmission lines. Relaying equipment on their 21kV Bear Canyon line is set to a zero-reclose to lockout scheme.

8.3 Situational Awareness

Patrols and Visual Inspections

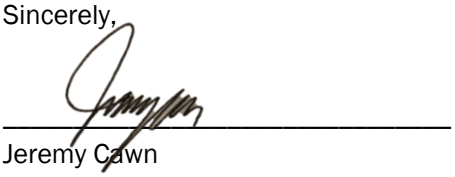
The NCPA has a Transmission Maintenance and Inspection Program (TMIP) that meets the standards described in NERC FAC-501-WECC-3. NCPA regularly performs visual inspections of its equipment and lines including those in remote areas. Regular and thorough inspections particularly for transmission lines is a nationally accepted best practice for early equipment fault detection and hazardous vegetation identification.

9 Conclusion

The NCPA has prepared a comprehensive WMP for 2023. The plan meets all statutory requirements described in PUC Section 8387(b)(2) for a POU. The NCPA has also considered the recommendations of the Wildfire Safety Advisory Board and revised their WMP appropriately. The NCPA 's WMP with the provided appendices describes a wildfire mitigation program that accurately assesses the risks and risk drivers present in their service territory and implements preventative strategies that are effective at reducing the wildfire risk of these risks and risk drivers.

Based on the wildfire prevention programs described in the WMP and the progress the NCPA has made in its wildfire prevention programs, the NCPA is taking an active role in minimizing the risk its equipment starts a wildfire and minimizing the risk a wildfire near their facilities can impact their operations.

Sincerely,



Jeremy Cawn
Fire Protection Planner

10 References

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Attachment A

Northern California Power Agency WMP Review Summary Tables

CPUC Requirement

Public Utility Code 8387(b)(2)	Description of Required Element	Final Review Comment	Initial Review Comment
A	Staff Responsibilities	Good. Describes WMP responsibilities down to oversight of prevention strategies	Good.
B	General Objectives	Good.	Good.
C	Program Descriptions	Good.	Good.
D	Evaluation Metrics	Good.	Good.
E	Lessons learned, metrics application	Need to update text. WSAB expects that utilities will have a good understanding of whether their metrics are useful. Elaborate why '0' events means success.	Updated with a description of the use of metric data and plans to incorporate new metrics. Good.
F	Protocols for reclosers, de-energization, and PSPS mitigation	No reclosers. De-energization & PSPS-good.	Good.
G	Community Notification	Good. Either attached NCPA-PM-501 or briefly describe how NCPA communicates with PG&E and member agencies.	Updated with an explanation of notification methods. Good.
H	Vegetation Management	Good.	Good.
I	Infrastructure Inspections	Good.	Good.
J(i)	Grid Design, construction, and operation risks	Good. Include CALPINE facilities as a risk driver for your GEO operations.	Updated, added risk drivers for adjacent facilities. Good.
J(ii)	Vegetation, topographic, and climate risks	Comprehensive. Add in NCPA territory specific details. For example: Where do Diablo winds impact NCPA equipment or facilities? IS there a specific vegetation cover type that is high risk to the NCPA?	Updated, added detail about site or area specific risk drivers related to vegetation cover for geothermal and hydroelectric operations.

K	Identification and expansion of higher wildfire threat areas	Good.	Good.
L	Identify enterprise-wide risk	Missing	Resolved. NCPA does not utilize an enterprise-wide risk assessment process. Instead relies on location specific safety plans. Provides an equivalent level of safety
M	Restoration of Service	Good. Attach PM-201 and GE-646 to WMP if relevant.	Good.
N(i)	Monitoring and auditing of WMPs	Good. If NCPA evaluates the accomplishments or progress made with wildfire prevention strategies during the year, describe them here.	Good. NCPA staff provided spreadsheets with inspection and Veg. mgmt. accomplishments
N(ii)	Identifying and correcting deficiencies	Good. If NCPA adjusts wildfire prevention strategies during the year, describe them here.	Good. Detail added that NCPA use an ongoing process to review program accomplishments and changes in program priorities or goals due to changing conditions (e.g., weather)
N(iii)	Monitoring asset inspections	Good.	Good.

NCPA Specific WSAB Recommendations

WSAB 2023 POU WMP Guidance Advisory Opinion	Description of the WSAB Recommendation	Final Review Comment	Initial Review Comment
A3-40	The text on page 6 that indicates that the current WMP was initiated in 2019 and on page 7 a statement that this WMP was presented at an NCPA committee meeting – this is confusing as the 2022 updated is a complete WMP in itself. In the comprehensive revision in 2023, the WSAB expects that text like this will be resolved.	Update the text on page 6 that states "*In 2019, NCPA initiated the development of this current WMP*". NCPA completed the development of the initial WMP in 2020. It would be more accurate to state when you began your internal review and revision of the 2022 WMP. For example, "*In November of 2022, NCPA initiated the development of this current WMP*". Update the text on page 7 that states "*In 2019, this WMP was presented at the NCPA Commission Meeting, a public meeting, and is posted on NCPA's public website domain*" to state that the "*2023 WMP will be adopted by the NCPA Commission and presented at the NCPA Commission Meeting, a public meeting, and after adoption by the commission this 2023 WMP will be posted on NCPA's public website domain*."	Dates have been updated. Good.

NCPA WMP Comments

Location	Page	Initial Review Comment	Final Review Comment
5.A	20	Consider removing the 2020 accomplishments from this section or shortening the statement to "Major improvements and system hardening upgrades were made to this line in 2020".	Updated. Good.
5.H	25	This sentence is missing the word 'line' "…. or use automatic reclosers on its 230 kV within the scope…."	Corrected.