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Subject: Independent Evaluator's Report of the Turlock Irrigation District's 2023 Wildfire Mitigation Plan

1 Introduction

The Turlock Irrigation District (TID) 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 TID. 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 TID's 2023 WMP from February 27 to April 29, 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 TID 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 TID, (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 TID 2022 WMP, (4) 2022 wildfire mitigation and prevention accomplishments of the TID, (5) an overview of the metrics used the TID's WMP, and (6) a comparison of wildfire risk reduction strategies used by the TID with those used by similar utilities and municipal utility industry standards.

2 An Overview of the Turlock Irrigation District

The TID's service territory covers 662 square miles extending from eastern slopes of the Coastal Ranges across the central valley and onto the western foothills of the Sierra Nevada mountain range. The TID service territory covers portions of three counties: Stanislaus, Merced, and Tuolumne and includes the communities of Delhi, Patterson, and Turlock. In addition to lines and equipment within its service territory, the TID operates several transmission lines that extend beyond the TID's service territory to substations in neighboring public utility districts (PUD) and several mini-hydroelectric generating facilities south the TID's service territory. The TID serves approximately 100,000 customers with residential customers making up the majority of its customers (72%) and business, agriculture, and government composing the remainder of the accounts. Land use in TID's large service territory depends on location. The lands within the Central Valley are primarily agricultural with islands of urban and developed areas. Large areas of natural vegetation or undeveloped lands are found on the more mountainous eastern and western edges of the TID's service territory where it extends into Coastal Ranges or the Sierra Nevada Mountains. Approximately 28% of the TID's service territory is located within a CPUC Tier 2 or Tier 3 High Fire Threat

District. TID's service territory is not densely populated and most of the populated areas are in the Central Valley surrounded by agricultural lands as such only 1.7% of their territory is classified as Wildland Urban Interface (WUI) (University of Wisconsin-Madison, 2020), the exception being the small communities in the foothills like Diablo Grande in the Coastal Ranges and Lake Don Pedro in the Sierra Nevada Mountains. The TID owns and operates transmission, distribution, and generation assets, with approximately 21% of their electrical lines located underground.

The TID '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. Large wildfires are rare throughout most of the TID service area particularly in the Central Valley due to the lack of continuous fuels. However, the portions of the TID service territory that extend into the mountains have experienced large wildfires with the portions on the west side in the Coastal Ranges experiencing the highest number of fires.

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 TID 's WMP are included in Table A-1 (see 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 TID '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 required element for TID 's WMP and provides Dudek's initial assessment and the final assessment of the comprehensiveness of that element within the WMP.

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 TID 's WMP comprehensively describes the safety-related measures that the TID follows to reduce its risk of causing wildfires. Dudek has determined that TID complies with this requirement through the design of its system, its operation procedures, 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 9 of the TID WMP comprehensively describes staff responsibilities and functions in the implementation of their WMP including staff titles wildfire prevention programs.

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

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

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

Chapter 6 in the TID WMP describes the utility's wildfire prevention strategies. It is very comprehensive, covering existing programs. Wildfire prevention program accomplishment information is provided by year.

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

Chapter 9 section 9.2 contains table 5. Table 5 lists the thirteen metrics that the TID uses to evaluate the effectiveness of their WMP. The metrics are organized into three general categories: external risk metrics, performance metrics, and outcome metrics. The metric data are very comprehensive and includes data about the TID's 2022 accomplishments for inspections and vegetation management.

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

Chapter 9 section 9.3 contains a statement about how TID maintains records of ignitions and other related fire data. Since the 2023 WMP's metrics were relatively recently adopted, the WMP states that the TID will monitor the metric data collected looking for trends in the data that identify areas where the TID can improve wildfire safety.

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

Chapter 6 section 6.7 describes the TID's protocols for when automatic reclosing schemes are disabled including when reclosers are disabled in the High Fire Threat Districts.

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

Chapter 7 section 7.4 describes the TID's customer notification protocols. This section comprehensively describes the TID's notification process and the means the TID has to notify customers (e.g., TID alert, TID website, etc.)

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

Chapter 6 section 6.4 contains a comprehensive description of the TIDs vegetation management program.

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

Chapter 6 section 6.5 of the TID 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 4.2 and Chapter 5 section 5.1 describes some risk drivers related to design, construction, operation and maintenance. Section 5.1 contains a table of the TIDs assets in high fire threat districts. Elsewhere in the WMP risk drivers such as having non-CAL FIRE exempt equipment (section 6.3) is described with the mitigation measure used to address this risk driver.

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

Chapter 4 Section 4.4-4.5 in the TID WMP provides a comprehensive description of the geographic and climatological factors present across the TID service territory including maps of the service territory showing areas with vegetation cover, terrain favorable to large fire growth, and fire history maps.

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

Chapter 6 section 6.1 in the TID WMP contains a discussion about the High Fire Threat District in TID's service territory. There is also a statement related to the extent of the fire threat district maps in the middle of the climate change discussion in section 4.3.

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

Chapter 4 section 4.1 of the TID WMP contains a comprehensive description of their enterprise-wide risk assessment process.

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

Chapter 8 of the TID WMP has a comprehensive overview of how the utility will restore service after an outage.

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 9 sections 9.4 & 9.5 E of the TID WMP describes the utility's processes for correcting WMP deficiencies and monitoring the effectiveness of inspections. Section 9.4 describes that the TID continuously evaluates its wildfire prevention programs and metric data for improvements that can be made. Also referenced is the annual review of the current year WMP by TID staff.

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 POU's and rural electrical cooperatives. In addition, the report 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 TID '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 WSAB has also previously requested some simple information about how Turlock budgets for WMP strategies and actions, but Turlock has not responded to this request.

There is a short statement at the beginning of the plan regarding budgeting. It is not clear why the WSAB would recommend this, it is not requested of other POU's and doesn't add information to the WMP that demonstrates effectiveness or completeness.

2. The WSAB notes that on page 42 an update would seem reasonable as the second paragraph on the page appears to be referring to notifying customers about an earlier potential de-energization but says this happened "... just before the publication of this plan, language identical to last year's WMP. Also, page 45 still discusses public outreach in relation to the original 2019 WMP, which seems outdated. The WSAB expects that Turlock will resolve these minor issues with their 2023 comprehensive revision WMP.

This has been corrected in the 2023 WMP.

3. The WSAB has previously appreciated Turlock's discussion of climate change their WMPs but encourages Turlock to take the next step and consider how such changes may affect wildfire mitigation activities. For example, would the likelihood of higher winds lead to changes in wind loading calculations for new construction and retrofits.

Not addressed in the 2023 WMP.

4. The WSAB applauds Turlock's comprehensive and clear description of metrics for evaluation of their WMPs but does have a few questions. First, the WSAB wonders about the value of the "red-flag warning" metric – Turlock or any mitigation actions Turlock takes cannot affect red-flag warnings. That results related to other metrics may be analyzed differentially with more or fewer red-flag days does not seem to justify the explicit metric. Second, Turlock continues to have a metric about conventional blown fuses but has also stated they no longer have those fuses – perhaps that metric can be retired. Third, there is paragraph explaining the "faults with no cause" metric but no such metric appears in the metric table. Additionally, it would seem like there has been enough history to start considering and tracking metric results in the WMP. The WSAB would appreciate such information in the 2023 comprehensive revision WMP.

The 2023 WMP has been updated to remove text that references elements of the metric table that are not present. The TID retained thirteen metrics on the 2023 WMP including external metrics such as Red Flag Warning Days. The Independent Evaluator agrees, that by themselves external metrics are not particularly helpful, but they are useful when they are completed with outcome metrics such as outage data.

6 Turlock Irrigation District 2022 Progress in Implementing Wildfire Mitigation Plan Wildfire Prevention Strategies

Section 6.3 contains the TID 's 2022 accomplishments regarding the wildfire prevention strategies described in their WMP. The TID accomplished the following in 2022.

System Hardening

- Deployed multiple weather stations Diablo Grande.
- Installed fault indicators in La Grange HFTD zones.

Vegetation Management

- Inspected and cleared vegetation along 212.6 miles of lines.

Inspections

- Performed equipment inspections on 106.9 miles of transmission and distribution lines.

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 2023 the California Municipal Utilities Association published an updated spreadsheet with several tables of potential metrics for POUs to use in the preparation of their WMPs. The CMUA template has three categories of metrics: external, performance, and outcome. In each category there are several potential metrics.

The TID adopted the updated metrics table published by the CMUA and incorporate a modified version of the spreadsheet into their WMP as their metrics table. The tables below are taken from section table 5 in section 9.2 of the WMP.

Table 5: External Risk Metrics						
Metric type	External Risk Event	2021	2022	2023	Unit(s)	Comments
1. Red Flag Warnings	Red Flags Warning Days* for Weather Zone that includes Utility Service Territory	20	6		#Days	Summation of TID's service area
2. [Particularly Dangerous Situation (PDS)/Extreme Fire Threats]	[PDS/Extreme Threat] Days for Weather Zone that includes Utility Service Territory	0	0		#Days	No extreme fire threats reported
2. Wind Conditions	High Wind Warning Days* in Weather Zone that includes Utility Service Territory – what is considered high wind warning days. Get with Adam	0	0		#Days	No high wind warning days reported

Table 5: External Risk Metrics

4. Increase of Customers/Infrastructure in High-Risk Areas	Circuit Miles in [high risk area as defined by POU]	0	0		#Miles	
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Table 5 Continued: Performance Metrics

Metric type	Progress metric name	Actual 2020	Actual 2021	Actual 2022	Unit(s)	Comments
1. Distribution Inspections	Patrol Inspections <i>Performed</i>	39.4	39.4	39.4	# circuit miles	
	Intrusive Inspections <i>Performed</i>	82 Miles	0	0	# circuit miles	
	Routine Vegetation Management <i>Performed</i>	39.4	39.4	78.8	# circuit miles	Circuit miles are doubled in 2022 as line crews went through inspections twice in the year.
2. Transmission Inspections	Patrol Inspections <i>Performed</i>	66.9	66.9	66.9	# circuit miles	
	Intrusive Inspections <i>Performed</i>	4	0	0	# circuit miles	
	Routine Vegetation Management <i>Performed</i>	66.9	66.9	133.8	# circuit miles	Circuit miles are doubled in 2022 as line crews went through inspections twice in the year.

Table 5 Continued: Outcome Metrics

Event Category	Cause category	2019 In HFTD	2020 In HFTD	2021 In HFTD	2022 In HFTD	2023 In HFTD	Unit(s)	Comments
Outage Event - Distribution	Contact from object - Distribution (non-vegetation)	0	0	0	1		# outages	
	Vegetation caused - Distribution	0	0	0	0		# outages	
	Equipment / facility failure - Distribution	0	2	1	0		# outages	
	Wire-to-wire contact - Distribution	0	0	0	0		# outages	
	Contamination - Distribution	0	2	0	0		# outages	
	Utility work / Operation	0	0	0	0		# outages	
	Vandalism / Theft - Distribution	0	0	0	0		# outages	
	Other-Distribution	0	3	5	3		# outages	
	Unknown-Distribution	0	1	1	1		# outages	
Outage Event - Transmission	Contact from object - Transmission	0	0	0	0		# outages	
	Vegetation caused - Transmission	0	0	0	0		# outages	
	Equipment / facility failure - Transmission	0	0	0	0		# outages	
	Wire-to-wire contact - Transmission	0	1	2	1		# outages	
	Contamination - Transmission	0	3	5	1		# outages	
	Utility work / Operation	0	0	0	0		# outages	
	Vandalism / Theft - Transmission	0	0	0	0		# outages	
	Other-Transmission	0	1	0	2		# outages	

Table 5 Continued: Outcome Metrics

	Unknown-Transmission	4	9	4	6		# outages	
Utility-Caused Ignitions Distribution	Contact from object - Distribution	0	0	0	0		# ignitions	
	Vegetation caused - Distribution	0	0	0	0		# ignitions	
	Equipment / facility failure - Distribution	0	0	0	0		# ignitions	
	Wire-to-wire contact - Distribution	0	0	0	0		# ignitions	
	Contamination - Distribution	0	0	0	0		# ignitions	
	Utility work / Operation	0	0	0	0		# ignitions	
	Vandalism / Theft - Distribution	0	0	0	0		# ignitions	
	Other-Distribution	0	0	0	0		# ignitions	
	Unknown-Distribution	0	0	0	0		# ignitions	
Utility-Caused Ignitions Transmission	Contact from object - Transmission	0	0	0	0		# ignitions	
	Vegetation caused - Transmission	0	0	0	0		# ignitions	
	Equipment / facility failure - Transmission	0	0	0	0		# ignitions	
	Wire-to-wire contact - Transmission	0	0	0	0		# ignitions	
	Contamination - Transmission	0	0	0	0		# ignitions	
	Utility work / Operation	0	0	0	0		# ignitions	
	Vandalism / Theft - Transmission	0	0	0	0		# ignitions	
	Other-Transmission	0	0	0	0		# ignitions	
	Unknown-Transmission	0	0	0	0		# ignitions	
Vegetation	Off cycle Treatment -	1585	1585		1585		# poles	Pole base clearing

Table 5 Continued: Outcome Metrics

Table 5 Continued: Outcome Metrics								
Management (No Outage/Ignition)	Distribution							
	Off cycle Treatment - Transmission	79	79	79	79		# poles	Fire break clearing around tower
System wide Information	SAIDI	59	56	75	68	NA	All Events, # minutes/year	2022 Data available Jan '23
	SAIFI	0.59	0.57	0.88	0.5	NA	All Events, # times/year	2022 Data available Jan '23

The thirteen metrics provide a description of the accomplishments of several of the TID’s wildfire prevention programs and insight into the outage causes. Including metric data about the data of Red Flag Warnings and outages as well as information about whether outages occurred in or out of a HFTD would clarify if outages are related to weather factors like high winds.

8 Comparison of Industry Standards and Similar Utility Wildfire Prevention Strategies

As part of this review of the TID 's 2023 WMP, Dudek compared the wildfire prevention strategies described in the plan to the strategies being implemented by POUs that are similar to the TID in terms of service territory characteristics, customer class, owned assets, and wildfire risk. The TID is similar to several of the adjacent POU's in the Central Valley in terms of similar land uses, assets (having distribution, transmission, and generation assets), and similar customer populations. The adjacent utilities also share similarities in the terrain and vegetation cover within their service territory, specifically the areas within the Central Valley being dominated by agricultural lands and the mountainous area along the edges of Central Valley being covered with a mix of grasslands, chaparral, and woodlands. Finally, adjacent POU's contain several communities composed of urban or semi-urban areas as opposed to a single concentrated urban area common with municipal utilities.

For this independent evaluator's report, the strategies of Modesto Irrigation District (MID) and Merced Irrigation District (MID) were selected to compare against the TID 's wildfire prevention strategies. The TID has the largest service territory and the largest portion of its territory in a High Fire Threat District but in other respects the three POUs are similar.

8.1 Vegetation Management

All three utilities implement vegetation management programs that meet GO 95 requirements for both transmission and distribution facilities. All three utilities meet the North American Electric Reliability Corporation (NERC) FAC-003-4 for their transmission lines. Merced Irrigation District does have any assets in a High Fire Threat District but both Turlock and Modesto Irrigation Districts do. Both Turlock and Modesto Irrigation Districts comply with PRC 4292 and use CAL FIRE's Power Line Fire Prevention Field Guide as a treatment standard for maintaining surface vegetation within ten feet of non-exempt poles and equipment in the High Fire Threat District. All three utilities meet CPUC requirements clearance around facilities including maintaining a 30-foot-wide zone around substations and generation facilities that is free of combustible vegetation.

8.2 System Hardening

Equipment Upgrades

All three utilities have ongoing upgrade programs that are designed to reduce the risk of outage, equipment failure, and new wildfire ignitions. These include the following:

- Replacing non-exempt and explosive fuses in the High Fire Threat District
- Installing animal deterrents, e.g., perch deterrents and conductor covers.
- Increasing spacing between wires attached to cross arms mounted on poles in High Fire Threat Districts.

Construction Standards

Turlock Irrigation District's construction standard is designed to reduce the risk of fire ignited by the failure of their electrical equipment, which include animal deterrents and utilizing CAL FIRE exempt equipment. This standard is in line with Modesto Irrigation District. Merced Irrigation District adheres to industry standards without providing specific instances where the POU is reducing wildfire risk.

Pole Upgrades and Replacement

Turlock Irrigation District has ongoing programs to identify and replace structural weakened wooden poles according to GO 95 requirements. Turlock Irrigation District does replace wooden poles that fail the intrusive testing with non-combustible poles. Turlock Irrigation District recently made a policy change and now preforms intrusive wood pole inspections in the fire zones every five years as opposed to ten. Turlock Irrigation District's ongoing programs align with Modesto Irrigation District's to identify and replace structural weakened poles according to GO 95 requirements. Merced Irrigation District's WMP does not state whether they have a pole replacement program.

Recloser Policy

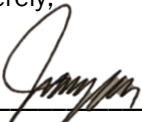
TID has reclosers on lines in a High Fire Threat District. The TID has a policy of turning automatic reclosing schemes off when Red Flag Conditions are declared. Turlock Irrigation District's policy is in line with prudent business practices at other utilities such as Modesto Irrigation District and Merced Irrigation District.

9 Conclusion

The TID has prepared a comprehensive WMP for 2023. The plan meets all statutory requirements described in PUC Section 8387(b)(2) for a POU. The TID has also considered the recommendations of the Wildfire Safety Advisory Board and revised their WMP appropriately. The TID 's WMP 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 TID has made in its wildfire prevention programs, the TID takes the risk of wildfire in its service territory seriously and is making a serious effort to reduce the risk that its equipment starts or aids in the spread of a wildfire.

Sincerely,



Jeremy Cawn
Fire Protection Planner

Att.: A: Turlock Irrigation District WMP IE Report

10 References

Carlson, A.R., Helmers, D.P., Hawbaker, T.J., Mockrin, M.H., and Radeloff, V.C., 2022, Wildland-urban interface maps for the conterminous U.S. based on 125 million building locations: U.S. Geological Survey data release, <https://doi.org/10.5066/P94BT6Q7>.

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