

Transmission Patrols and Enhanced Inspection Frequency Guidelines

SUMMARY

This utility procedure provides the following guidelines for inspecting overhead transmission lines:

- Baseline frequencies for enhanced inspections, patrols, and risk-based driven inspections
- Annual asset selection process for inspections
- Methods for conducting aerial inspections, including drone technology and high-definition helicopter inspections
- Aerial patrols

Level of Use: Informational Use

TARGET AUDIENCE

This procedure applies to the following electric transmission personnel involved in the maintenance of transmission line facilities:

- Asset strategy
- Standards
- Maintenance and construction (M&C)
- Work management
- System inspections (SIs)
- Centralized Inspection Review Team (CIRT)
- Quality control/compliance

SAFETY

This procedure describes administrative tasks that do not expose personnel or the public to any specific hazards.

BEFORE YOU START

NA

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PROCEDURE STEPS

1 Background Information

- 1.1 Before 2019, inspections were performed by electric transmission line (ETL), with frequencies based on the structure type (wood or steel). Inspection methodology involved aerial patrols and detailed ground and climbing inspections.
- 1.2 In 2019, findings from the Wildfire Safety Inspection Program (WSIP) resulted in inspections that generated more data, enabling a better understanding of the health of asset components. This led to the creation of an enhanced inspection methodology using multiple inspection types: aerial patrol, detailed ground, detailed aerial (drone/helicopter), and climbing.
- 1.3 In 2020 and 2021, enhanced inspection baseline frequencies were primarily based on geographic boundaries in the high fire threat districts (HFTDs) / high fire risk areas (HFRA).
- 1.4 Starting in 2022, with the increased availability of risk data, inspections are a part of a risk-based plan. Inspection frequencies guidelines will continue to evolve with improved risk data.

2 Enhanced Inspection Frequency and Schedule

- 2.1 High Fire Threat District (HFTD)/High Fire Risk Area (HFRA) Structures
 - 1. Starting in 2022, INSPECT HFTD and HFRA structures according to the baseline inspection cycles described in [Table 1](#) on Page 4. In addition to the baseline inspection cycles, structures are added to the inspection scope annually, based on the following criteria:
 - a. Wildfire risk, which is based on the annualized probability of failure multiplied by the Multi-Attribute Value Function (MAVF) wildfire consequence. The MAVF is calculated based on the results of Technosylva wildfire modeling.
 - b. Wildfire consequence, which is considered independently, in addition to the wildfire risk, to account for high-consequence, low-probability events.

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2.1 (continued)

- c. Other factors involving data not currently integrated into the wildfire risk and consequence models (inspection result trends, terrain/fire suppression difficulty, etc.).
2. The list of additional HFTD/HFRA structures is determined each year from a snapshot of the risk (probability and consequence) data.
 - a. The criteria or thresholds used to define the additional structures may vary each year, as the risk models mature and the overall risk of the transmission system evolves. These criteria are specified when the inspection plan is finalized.

2.2 Areas of Concern (AOC) Structures

1. Asset strategy personnel COMPILER a list of AOCs annually, with input from SI personnel, M&C personnel, and other organizations.
2. For non-HFTD areas, INSPECT AOC structures outside the baseline inspection cycle outlined in [Table 1](#) on Page 4. Examples of AOCs include the following:
 - Known encroachments
 - Interaction with public (e.g., structures that cross rivers, highways, and railroads; structures in locations with high population density)
 - Asset health trends (e.g., failure history; wind, corrosion, and snow loading threats; potential access issues)
 - External regulator queries

2.3 Diablo Canyon Power Plant (DCPP), Morro Bay Power Plant, and Western Electricity Coordinating Council (WECC) Lines

1. Circuits supporting the DCPP, Morro Bay Power Plant, and tie lines for the WECC require more frequent inspections. SEE the last column of [Table 1](#) on Page 4.

2.4 New Structures and Removed Structures

1. DO NOT INSPECT structures in the year they are installed.
2. DO NOT INSPECT structures in the year they are to be removed.

2.5 Due Dates and Exemptions

1. Detailed ground, climbing, and aerial inspections are due by July 31st in HFTDs and HFRA, and by December 31st in non-HFTD areas.

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2.5 (continued)

2. In “Can’t Get In” (CGI) locations, external factors prevent scheduled inspections.
 - a. CGIs for ground and climbing inspections receive a “B” tag to address access issues. The “B” tag due date OR the original inspection due date – whichever is later – becomes the new inspection due date.
 - b. CGIs for aerial inspections are tracked through an internal AIR+ process. Aerial CGIs have a due date of **90 days** after the CGI OR the original inspection due date, whichever is later.

Table 1. Overhead Enhanced Inspection and Patrol Baseline Frequencies

Voltage (kV)	Inspection Type	Structure Type	Non-HFTD (Years)	HFTD Tier 3, Tier 2, Zone 1, and HFRA (Years)	DCPP/Morro Bay /WECC Lines (Years)
500	Detailed ground and aerial	Steel	3	3	Annually
	Climbing	Steel (critical) ¹	3 (and as triggered)	3	Annually
		Steel (non-critical)	12 (and as triggered)	3	Annually
	High Water Table Inspection (Bay Waters Foundation)	Steel	5	NA	NA
	Infrared	Steel	5 (and as triggered)	Tier 3 – Annual Tier 2 & Zone 1 – 3	Annually
230 115 70 60	Detailed ground and aerial	Steel or wood	5	3	Annually
	Climbing ² or aerial lift	Steel or wood	As triggered	As triggered	As triggered
	High Water Table Inspection (Bay Waters Foundation)	Steel	5	NA	NA
	Infrared	Steel or wood	5 (and as triggered)	Tier 3 – Annual Tier 2 & Zone 1 – 3	Annually
All voltages	Patrol ³	Patrols are performed by ETL. Each structure requires a patrol per calendar year. A detailed inspection within the calendar year counts toward a patrol for that structure. Any line not detailed-inspected end-to-end that calendar year requires a patrol. A non-routine patrol, if the entire circuit is patrolled, may satisfy the routine patrol requirement.			

¹ Critical 500-kV structures are defined as the top 2% of structures by “Importance Factor” in the 1993 report, “500 kV Emergency Restoration Project.”

² Non-500 kV steel structures: No prescribed climbing frequency.

Wood poles: Typically, climbing is not a part of routine inspections. PERFORM climbing of wood poles as triggered, in accordance with [Utility Standard TD-2325S, “Inspecting, Testing, and Maintaining Wood Poles.”](#)

³ SEE [Utility Procedure TD-1001P-13, “Enhanced Inspection and Maintenance Requirements for Diablo Canyon and Morro Bay Power Plants Overhead Transmission Facilities.”](#) for the patrol frequency on DCP/Morro Bay Power Plant lines.

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3 Enhanced Inspection Methodology

- 3.1 Inspections identify abnormalities or circumstances that negatively impact safety, reliability, or asset life. Inspections include the following:
- Visual observations of individual structures, components, and equipment
 - Component testing (hammer test).
- 3.2 Inspection results have shown that different inspection methods are effective for identifying different conditions.
1. Detailed ground and aerial (drone or helicopter) inspections: **PERFORM** on each asset scheduled for an inspection.
 2. Climbing inspections: **PERFORM** in addition to detailed ground and aerial inspections, either on a prescribed schedule for 500-kV structures **OR** as-triggered for other structures.

NOTE

There is no requirement to conduct inspections at the same time.

- 3.3 **COMPLETE** all inspection types in the same year, **preferably** close to the same time.
1. Performing all inspection types close to the same time on a line reduces repeated clearances associated with the execution of any identified “A” or “B” tags.
- 3.4 The inspection is complete only when all inspection methods have been completed.

4 Patrol Methodology

- 4.1 Patrols include visual observations to identify abnormalities (i.e., obvious structural problems or hazards) or circumstances that negatively impact safety or reliability.
- 4.2 Patrols can be either aerial or ground (applicable to no-fly zones).
- 4.3 **DO NOT SUBSTITUTE** patrols for any of the inspection methods. SEE [Table 1](#) on Page 4.

NOTE

A detailed ground inspection may be considered a patrol.

- 4.4 Personnel may **PERFORM** patrols by walking, driving, or flying (helicopter only).

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- 4.5 CONDUCT all patrols to identify the typical electric overhead transmission problems listed in TD-1001M, [Electric Transmission Preventative Maintenance Manual](#), Section 2.3.3.3, "Patrols."

END of Instructions

DEFINITIONS

NA

IMPLEMENTATION RESPONSIBILITIES

NA

GOVERNING DOCUMENT

[Utility Standard TD-8123S, "Electric System \(T/S/D\) Patrol, Inspection, and Maintenance Program"](#)

COMPLIANCE REQUIREMENT / REGULATORY COMMITMENT

Records and Information Management:

Information or records generated by this procedure must be managed in accordance with the Enterprise Records and Information Management (ERIM) program policy, standards, and Enterprise Records Retention Schedule (ERRS). Refer to [GOV-7101S, "Enterprise Records and Information Management Standard,"](#) and related standards. Management of records includes, but is not limited to:

- Integrity
- Storage
- Retention and Disposition
- Classification and Protection

REFERENCE DOCUMENTS

Developmental References:

- [Utility Bulletin TD-8999B-001, "PG&E's 2019 Corrective Tag Execution Approach"](#)
- [Utility Standard TD-1464S, Attachment 3, "Relationship Between Fire Index Areas, High Fire Threat District, and High Fire Risk Area"](#)

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REFERENCE DOCUMENT (continued)

Supplemental References:

- [Utility Manual TD-1001M, "Electric Transmission Preventative Maintenance Manual"](#)
- [Utility Procedure TD-1001P-13, "Enhanced Inspection and Maintenance Requirements for Diablo Canyon and Morro Bay Power Plants Overhead Transmission Facilities"](#)
- [Utility Standard TD-2325S, "Inspecting, Testing, and Maintaining Wood Poles"](#)

APPENDICES

NA

ATTACHMENTS

NA

DOCUMENT REVISION

This utility procedure cancels and supersedes Utility Bulletin TD-1001M-B009, "Revised Inspection Guidelines," Rev. 1, dated 08/31/2020.

DOCUMENT APPROVER

██████████ Electric Transmission Asset Strategy – Substation and Transmission

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REVISION NOTES

Where?	What Changed?
NA	This is a new utility procedure.