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-informed inspections
- Annual asset selection process for inspections
- Methodology for detailed ground and aerial inspections
- Aerial and ground 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 (SI)
- 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

Transmission Patrols and Enhanced Inspection Frequency Guidelines

TABLE OF CONTENTS

PROCEDURE STEPS

1 Background Information

1.1 Before 2019, electric transmission line (ETL) personnel performed inspections 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, ground 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) and high fire risk areas (HFRAs).

1.4 Starting in 2022, with the increased availability of wildfire risk data, inspections are informed by wildfire consequence and asset health. Inspection frequencies guidelines continue to evolve with improved risk data.

1.5 This document contains inspection requirements specific to lines critical for systemwide reliability, including those surrounding Diablo Canyon Power Plant (DCPP). The DCPP License Renewal Application filed in 2023 commits to the inspection frequencies for routine inspection of on-site 230-kV and 500-kV transmission lines and components known as the "DCPP tie lines."

Transmission Patrols and Enhanced Inspection Frequency Guidelines

2 Enhanced Inspection Frequency and Schedule

2.1 HFTD and HFRA Structures

1. INSPECT HFTD and HFRA structures according to the baseline inspection cycles described in Table 1, “Overhead Enhanced Inspection and Patrol Baseline Frequencies,” on Page 6.

    a. Detailed ground and aerial inspections must occur within the prescribed baseline cycle time in Table 1 on Page 6,but not necessarily in the same calendar year, allowing for staggered inspection methods across multiple years.

2. ADD the risk-informed structures based on the following considerations:

    a. Wildfire risk, which is informed by the Transmission Composite Model (TCM), annualized probability of failure, and Wildfire Consequence score.

    b. Other factors involving data not currently integrated into the Wildfire Transmission Risk Model (e.g., inspection result trends, terrain/fire suppression difficulty, historic fire locations).

NOTE

The considerations 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 considerations are specified when the inspection plan is finalized.

2.2 Non-HFTD Structures

1. INSPECT non-HFTD structures according to the baseline inspection cycles listed in Table 1.

    a. At least one method of inspection – detailed ground or aerial – must occur within the prescribed baseline cycle time in Table 1.

    b. Both ground and aerial inspections must be performed for 500-kV non-HFTD structures within the prescribed baseline cycle time in Table 1, but not necessarily in the same calendar year, allowing for staggered inspection methods across multiple years.

2.3 Areas of Concern (AOC) Structures

1. Asset Strategy personnel COMPILE a list of AOCs annually, with input from SI personnel, M&C personnel, and other organizations. Examples of AOCs include the following:

    - Known encroachments

2.3 (continued)

- 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. INSPECT AOC structures outside the baseline inspection cycles outlined in Table 1 on Page 6 with any detailed inspection method.

2.4 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 have more frequent inspections to maintain critical system reliability. SEE the last column of Table 1. These inspections include both detailed ground and aerial within the same calendar year.

2. SEE Appendix A, "DCPP Tie Line and Morro Bay System Inspections," on Page 10 for the list of DCPP and Morro Bay Power Plant lines.

a. For a subset of lines marked with an asterisk in Table A-1 in Appendix A, CONDUCT quarterly patrols.

(1) A detailed inspection counts as a quarterly patrol.

(2) The quarterly patrol informs the insulator wash program on these lines, as described in TD-1257M-09, "Section 9: Diablo Canyon Facilities," (part of the *Insulator Cleaning Manual* [TD-1257M]).

2.5 New, Replaced, and Removed Structures

1. DO NOT INSPECT structures in the year they are installed.

a. An asset's installation/replacement year counts as the first year of its baseline cycle.

2. DO NOT INSPECT structures in the year they are removed.

2.6 Due Dates and Exemptions

1. Due dates for detailed ground, climbing, and aerial inspections are as follows:

- HFTD and HFRA: July 31
- Non-HFTD: December 31

2.6 (continued)

2. IF an asset meets **both** of the following criteria:

- Was either added to the registry OR changed HFTD/HFRA designation after January 1 of the given year.
- Is due for baseline frequency inspection.

THEN INSPECT the asset as follows:

a. HFTD and HFRA: Within 90 days or by July 31 of the given year, whichever is later.

b. Non-HFTD: Within 90 days or in the following year's inspection scope, if added after September 30 of the given year.

3. In "Can't Get In" (CGI) locations, external factors prevent scheduled inspections.

a. CGIs for ground and climbing inspections receive a 3-month "E" tag to address access issues. The new inspection due date is the 3-month "E" tag due date OR the original inspection due date – whichever is later.

b. CGIs for aerial inspections are tracked through an internal AIR+ process. Inspections for aerial CGIs are due **3 months** after the CGI OR the original inspection due date – whichever is later.

3 Patrol Frequency and Schedule

3.1 Patrols are performed by ETL. Each structure requires at least one patrol per calendar year. A detailed inspection within the calendar year counts toward a patrol for that structure.

1. Any line not detailed-inspected end-to-end that calendar year requires a patrol.

2. A non-routine patrol, if the entire circuit is patrolled, may satisfy the routine patrol requirement.

3.2 Due dates for patrols are as follows, barring external factors resolved through CGIs:

1. Circuits with any host/guest structure in HFTD and HFRA: July 31

2. Circuits with only host/guest structures in Non-HFTD: December 31

3.3 DO NOT SUBSTITUTE patrols for any of the inspection methods.

Transmission Patrols and Enhanced Inspection Frequency Guidelines

3.3 (continued)

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[2]	Steel (critical)[1]	3 (and as triggered)	3	Annually
		Steel (non-critical)	12 (and as triggered)	3	Annually
230 115 70 60	Detailed ground and/or aerial	Steel or wood	5 (at least one method)	3	Annually
	Climbing or aerial lift[3]	Steel or wood	As triggered	As triggered	As triggered
All voltages	High Water Table Inspection (Bay Waters Foundation)[4]	Steel	5	NA	NA
	Infrared	Steel or wood	5 (and as triggered)	Tier 3 – Annually Tier 2, Zone 1, and HFRA – 3	Annually
	Patrol	Annually, unless enhanced inspected. See Appendix A on Page 10 for DCPP and Morro Bay lines requiring quarterly patrol.			

[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] Detailed 500-kV climbing inspections must include information about guy tensions. SEE Utility Procedure TD-1001P-15, "Enhanced Inspection and Maintenance Requirements for 500 kV Transmission Structures Supported by Guy Wires."

[3] Non-500-kV steel structures: No prescribed climbing or aerial lift frequency.

Wood poles: Typically, climbing or aerial lift 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."

[4] SEE 1999 report, "Inspection Program for Transmission Tower Foundations in San Francisco Bay Water Environment."

4 Enhanced Inspection Methodology

4.1 Inspections identify abnormalities or circumstances that negatively impact safety, reliability, or asset life (SEE *Electric Transmission Preventive Maintenance Manual* [TD-1001M]). Inspections may include the following:

- Visual observations of individual structures, components, and equipment
- Component testing (e.g., hammer test on wood poles)

4.2 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 selected assets annually.

2. Climbing inspections: PERFORM in addition to detailed ground and/or aerial inspections, either on a prescribed schedule for 500-kV structures OR as triggered.

4.3 Inspections on DCPP Tie Lines should also follow DCPP Utility Procedure AWP E-052, “Transmission Conductors, Switchyard Bus and Connectors and HV Insulators AMP.”

NOTE

There is no requirement to conduct different methods of inspections at the same time; however, aligning the timing of inspection methods may improve the efficiency for the completion of maintenance notifications.

5 Patrol Methodology

5.1 Patrols include visual observations to identify abnormalities (i.e., obvious structural problems or hazards) or circumstances that negatively impact safety or reliability.

1. CONDUCT all patrols to identify the typical electric overhead transmission problems listed in *Electric Transmission Preventive Maintenance Manual* (TD-1001M), Section 2.3.3.3, “Patrols.”

5.2 Patrols can be aerial or ground (applicable to no-fly zones).

1. Personnel may PERFORM patrols by walking, driving, or flying.

NOTE

A detailed ground, aerial, or climbing inspection may be considered a patrol.

END of Instructions

DEFINITIONS

NA

IMPLEMENTATION RESPONSIBILITIES

Transmission Line Asset Strategy personnel ensure that this document is provided to SI, CIRT, M&C, Work Management, and other appropriate personnel.

Transmission Patrols and Enhanced Inspection Frequency Guidelines

GOVERNING DOCUMENT

Utility Standard TD-8123S, “Electric System (T/S/D) Patrol, Inspection, and Maintenance Program”

COMPLIANCE REQUIREMENT / REGULATORY COMMITMENT

Records and Information Management:

PG&E data, information, and records are Company assets that must be traceable, verifiable, accurate, and complete and can be retrieved upon request. Functional areas are responsible for complying with the Information and Records Governance policy, standards, and the Information and Records Retention Schedule. Refer to GOV-7101S, “Enterprise Records and Information Management Standard,” for further guidance or contact Information and Records Governance at Information&RecordsGovernance@pge.com.

REFERENCE DOCUMENTS

Developmental References:

TD-8123M, “Transmission Line Failure Mode Effect Analysis (FMEA)”

Utility Procedures:

- TD-1001P-11, “T-Line Aerial Inspection Process”
- TD-1001P-12, “Underground Inspection and Maintenance Procedures”
- TD-1001P-14, “Infrared (IR) Inspection Procedures”
- TD-1006P-02, “Switch Maintenance and Inspection Program for Electric Transmission”

Utility Standard TD-8124S, “Detailed System Inspections Framework”

Supplemental References

DCPP Utility Procedure AD7.ID4, “On-Line Maintenance Scheduling”

DCCP Utility Procedure AWP E-052, “Transmission Conductors, Switchyard Bus and Connectors and HV Insulators AMP”

Dispatch Instruction O-23, “Operating Instructions for Reliable Transmission Service to Diablo Canyon Power Plant”

Electric Transmission Preventive Maintenance Manual (TD-1001M)

Insulator Cleaning Manual (TD-1257M), TD-1257M-09, “Section 9: Diablo Canyon Facilities”

Transmission Patrols and Enhanced Inspection Frequency Guidelines

REFERENCE DOCUMENTS (continued)

Utility Procedure TD-1001P-15, “Enhanced Inspection and Maintenance Requirements for 500-kV Transmission Structures Supported by Guy Wires”

Utility Standard TD-2325S, “Inspecting, Testing, and Maintaining Wood Poles”

APPENDICES

Appendix A, “DCPP Tie Line and Morro Bay System Inspections”

ATTACHMENTS

Attachment 1, “T-Line Overhead Inspection Creation Playbook”

Attachment 2, “T-Line Overhead Inspection Validation Playbook”

Attachment 3, “T-Line Overhead Infrared Inspection Creation Playbook”

DOCUMENT RECISION

This utility procedure supersedes Utility Procedure TD-8123P-100, “Transmission Patrols and Enhanced Inspection Frequency Guidelines,” Rev. 1, dated 03/10/2023.

This utility procedure also obsoletes Utility Procedure TD-1001P-13, ““Enhanced Inspection and Maintenance Requirements for Diablo Canyon and Morro Bay Power Plants Overhead Transmission Facilities,” Rev. 1, dated 12/01/2022.

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Transmission Patrols and Enhanced Inspection Frequency Guidelines

REVISION NOTES

Where?	What Changed?
Subsection 1.5	New section introducing inspections of DCPP tie lines.
Subsection 2.4	Added new Step 2 to reference new Appendix A that lists DCPP and Morro Bay Power Plant lines.
Subsection 2.6	Added new Step 2 with instructions regarding inspections of assets that were added to the registry or changed designation after January 1.
Subsection 3.3, Table 1	Updated entry for patrols to include information on DCPP and Morro Bay Power Plant requirements and reference to Appendix A.
Section 4.3	New section that references DCPP Utility Procedure AWP E-052.
Compliance Requirement / Regulatory Commitment	Updated the statement under Records and Information Management according to the latest GDM template.
Reference Documents	Updated references and links.
Appendix A	New appendix that incorporates the information formerly contained in Utility Procedure TD-1001P-13, “Enhanced Inspection and Maintenance Requirements for Diablo Canyon and Morro Bay Power Plants Overhead Transmission Facilities,” (to be obsoleted). Added timelines for completing inspections on newly identified assets.
ATTACHMENTS	Listed Attachments 1, 2, and 3.
Document Owner and Document Contact sections	Updated names and titles.

Transmission Patrols and Enhanced Inspection Frequency Guidelines

Appendix A, DCPP Tie Line and Morro Bay System Inspections

Table A-1. Diablo Canyon Power Plant and Morro Bay Power Plant Enhanced Inspection Circuits*

Responsibility	230 kV	500 kV
Transmission Line Maintenance Supervisor, Pismo Beach	• Morro Bay-Diablo** • Morro Bay-Mesa** • Diablo-Mesa** • Caliente Sw Sta-Midway #1 • Caliente Sw Sta-Midway #2 • Solar Sw Sta-Caliente Sw Sta #1 • Solar Sw Sta-Caliente Sw Sta #2 • Morro Bay-Solar Sw Sta #1 • Morro Bay-Solar Sw Sta #2 • Morro Bay-California Flats Sw Sta • California Flats Sw Sta-Gates • Morro Bay-Templeton • Templeton-Gates	• Diablo-Gates #1** • Diablo-Midway #2** • Diablo-Midway #3**
DCPP Switchyard Supervisor *DCPP Tie Lines*	Diablo PP Stand-By Supply**	• Diablo Unit #1** • Diablo Unit #2**

* Lines in Table A-1 were added in Rev. 2 as part of CAP 126032700. Refer to System Dispatch Instruction O-23, "Operating Instructions for Reliable Transmission Service to Diablo Canyon Power Plant."

** Lines for quarterly patrol. DCPP tie line patrols are the responsibility of the DCPP switchyard supervisor.

Below are DCPP tie-line specific inspection scheduling requirements as outlined in DCPP internal procedure AD7.ID4, "On-Line Maintenance Scheduling," Section 5.7.

1. COMPLETE inspections and maintenance activities on 500-kV lines that affect DCPP before the summer peak period (June 1st).

2. SEND inspection schedules to DCPP work week managers (WWM) [redacted] 60 days (T-09) in advance.

3. WWM or switchyard coordinator REVIEWS transmission inspections schedule (TAFW ECCO LOGS) weekly.

4. The inspections team SENDS daily communications about DCPP lines being inspected and the inspections to be reviewed on DCPP data to the following:

   - DCPP WWM [redacted]
   - DCPP switchyard coordinator [redacted]

Transmission Patrols and Enhanced Inspection Frequency Guidelines

Appendix A, DCPP Tie Line and Morro Bay System Inspections

4 (continued)

ENSURE that communications include known out-of-service lines and planned blackout dates, AND REQUEST DCPP WWM confirmation.

a. In the event of a potential A-tag, EMAIL DCPP WWM [redacted] and the DCPP switchyard coordinator [redacted] AND INCLUDE the following information:

- Expected time of work window and return to service.
- Whether the work will take the line out of service.

5. USE inspection guidelines as follows:

a. Inspections, other than infrared, are preferred on lines that are already out of service.

(1) IF a 500-kV line is already out of service,

THEN DO NOT PERFORM any other inspections on that system.

- **Exception:** Inspections may be authorized in the last hours of return to service of the line.

(2) DO NOT PERFORM 230-kV tower or line inspections while a 230-kV radial feed condition exists.

b. Inspections on two lines in the same system are permissible.

- **Exception**: If an A-tag is required, inspections are halted on the remaining line.

c. DO NOT PERFORM inspections on 230-kV or 500-kV lines during diesel generator maintenance outage windows.

d. DO NOT PERFORM inspections of the remaining power source during startup (230-kV) or Aux Bank (500-kV) clearance as part of a refueling outage.

e. DO NOT PERFORM inspections on the 230-kV systems during Auxiliary Feedwater Pump (AFW) maintenance outage windows on the Turbine Driven AFW Pumps (AFWP 1-1 and 2-1).

f. DO NOT PERFORM inspections on the 230-kV or 500-kV systems during DCPP high trip risk activities, such as power system stabilizer testing.