

Enhanced Inspection and Maintenance Requirements for Diablo Canyon and Morro Bay Power Plants Overhead Transmission Facilities

SUMMARY

This utility procedure provides enhanced inspection and maintenance requirements unique to facilities serving Diablo Canyon and Morro Bay Power Plants. The content of this procedure was migrated from [TD-1001M, *Electric Transmission Preventive Maintenance Manual*](#).

Level of Use: Informational Use

TARGET AUDIENCE

- Transmission line engineers
- Transmission line maintenance, inspection, and operations personnel
- Transmission line construction personnel
- Asset strategists
- Maintenance and construction (M&C) engineers
- Estimating personnel

SAFETY

Climbing inspection may pose risks associated with working at heights or getting close to energized equipment.

BEFORE YOU START

PERFORM all activities associated with this utility procedure safely and in accordance with applicable safety rules, the [Code of Safe Practices \(CSP\)](#), and [Utility Standard SAFE-1001S, "PG&E Injury & Illness Prevention Plan \(IIPP\) Standard."](#) In addition, ADHERE to the following safety guidelines:

- PERFORM a tailboard briefing in accordance with [CSP Section 1, Rule 1, "Tailboard Briefings."](#)
- WEAR Pacific Gas and Electric Company (Company)-approved protective clothing while installing and removing line equipment.
- USE only Company-approved tools to install and remove line equipment.

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PROCEDURE STEPS

1 General Information

- 1.1 Inspection procedures are a key element of the preventive maintenance program. The recommended maintenance priorities reduce the potential for component failures and facility damage, and facilitate a proactive approach to repairing or replacing identified abnormal components.
- 1.2 This procedure provides specific enhanced inspection and maintenance requirements unique to facilities serving Diablo Canyon Power Plant (DCPP) and Morro Bay Power Plant (PP). The enhanced inspection and maintenance requirements contained within this procedure apply to the 230 kilovolt (kV) and 500 kV circuits listed in [Table 1](#) below.

Table 1. Diablo Canyon PP and Morro Bay PP Enhanced Inspection Circuits

230kV	500kV
Morro Bay-Diablo 230 kV *	Diablo Unit #1 500 kV **
Morro Bay-Mesa 230 kV *	Diablo Unit #2 500 kV **
Diablo PP Stand-By Supply 230 kV **	Diablo-Gates #1 500 kV *
Diablo-Mesa 230 kV *	Diablo-Midway #2 500 kV *
	Diablo-Midway #3 500 kV *

* Transmission Line Maintenance Supervisor, Pismo Beach responsibility

** DCPP Switchyard Supervisor responsibility

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2 Detailed Overhead Inspection

- 2.1 Inspected facilities include overhead assets, rights-of-way, fiber-optic facilities, and vegetation.
- 2.2 The overhead inspections include an external visual evaluation of the overhead facilities.
 - 1. SEE Maintenance Procedures in [TD-1001M, *Electric Transmission Preventive Maintenance Manual*](#) for requirements that are part of the Company's overall maintenance program, and are in addition to the visual inspection items identified in this procedure.
- 2.3 A detailed ground, aerial, or climbing inspection of the asset looks for abnormalities or circumstances that will negatively impact safety, reliability, or asset life.
 - 1. EXAMINE individual elements and components carefully through visual and/or routine diagnostic tests.
 - 2. GRADE and/or RECORD each abnormal condition.
- 2.4 INSPECT overhead line facilities in accordance with the provisions in [TD-1001M](#).
 - 1. The inspections include detailed visual observations and physical testing, as needed (guy tension, etc.) to identify abnormalities or circumstances that will negatively impact safety, reliability, or asset life.

3 Overhead Inspection Frequency

- 3.1 INSPECT overhead transmission facilities as described in [Table 2, "Overhead Inspection Frequencies – DCCP and Morro Bay PP Transmission Lines"](#) on Page 4. These are enhanced inspections frequencies unique to the facilities covered in this procedure.
- 3.2 ESTABLISH schedules such that inspection frequencies meet the SAP maintenance dates.
 - 1. The schedules indicated in [Table 2](#) on Page 4 do not preclude assigning a more frequent inspection cycle to a circuit, when warranted by sound business reasons. However, increasing inspection frequency requires appropriate justification and approval by the transmission line superintendent, system inspections program owner, or designee.
 - 2. Inspections on less frequent cycles than those listed in [Table 2](#) on Page 4 are not allowed.

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3.2 (continued)

Table 2. Overhead Inspection Frequencies – DCPD and Morro Bay Power Plant Transmission Lines

Voltage (kV)	Inspection Type	Structure Type	Inspection Frequency
500	Detailed inspection (ground)	Steel	Annually
	Climbing *	Steel	3 years (and as triggered)
	Patrol **	Steel	Quarterly
	Infrared/Corona	Steel	Annually (and as triggered)
230	Detailed inspection (ground or aerial)	Steel	Annually
	Climbing or aerial lift	Steel	As triggered
	Patrol **	Steel	Quarterly
	Structure Inspection ***	Steel	3 years (and as triggered)
	Infrared/Corona	Steel	Annually (and as triggered)

* Detailed 500 kV climbing inspections must include information about guy tensions.

** This patrol is only performed during the quarters when a Detailed Inspection is not completed.

*** Structure inspections are to only be performed on DCPD Structures 0/1A and 0/1B of the Diablo PP Stand-By Supply 230 kV overhead transmission line.

3.3 Triggers are specific conditions that require follow-up inspections and/or maintenance scheduled by the supervisor, independent of the routine schedule.

The following triggers can be applied to one unit of inspection or many units, either grouped or spread over a line section/area:

- Component defects identified by inspection
- Component failure (including failure in like components)
- Components proven defective by testing
- Wire/structure strike
- Burned area or high fire hazard
- Damage caused by natural disaster or storm
- Third-party observations and complaints
- Observed third-party development or construction conflict
- Marginal capability components of a re-rated line section

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3.3 (continued)

- Known, recurring conditions that jeopardize line integrity
- Suspected vegetation-to-conductor clearances less than required or less than legal vegetation-to-conductor clearances, or concerns about fast growth of vegetation that could lead to insufficient clearances before the next patrol date; concerns about dead or dying trees that could strike facilities

4 Climbing and Structure Inspections

4.1 Climbing Inspections

1. A climbing inspection is a detailed, supporting-structure-based observation of the facilities installed to determine if there are any abnormal or hazardous conditions that adversely impact safety, service reliability, or asset life – and to evaluate when each identified abnormal condition warrants maintenance.
2. Climbing inspections also might be required for specific structures or components to assess a condition that could not be adequately assessed when identified during a ground or aerial inspection or patrol. Such conditions trigger a follow-up inspection to assign the proper Priority Code. In some cases, this requires a climbing inspection.
3. PERFORM routine, time-based 500 kV climbing inspections, focusing primarily on structural components, on all 500 kV structures, in accordance with the inspection frequencies listed in [Table 2](#) on Page 4.
 - a. Climbing inspections extend from the ground line to the top of the tower.
 - b. In addition to the documentation and record-keeping requirements associated with other routine inspections, FORWARD the results of 500 kV climbing inspections to the Transmission Tower Davis Headquarters for record retention.

4.2 Structure Inspections

1. A structure inspection is a detailed ground, drone, or aerial lift-based observation of the facilities installed, to determine if there are any abnormal or hazardous conditions that adversely impact safety, service reliability, or asset life, and to evaluate when each identified abnormal condition warrants maintenance.
2. PERFORM routine, time-based 230 kV structure inspections, focusing primarily on structural components, on the specified 230 kV structures, in accordance with the inspection frequencies listed in [Table 2](#) on Page 4.
 - a. In addition to the documentation and record-keeping requirements associated with other routine inspections, FORWARD the results of 230 kV structure inspections to the Transmission Tower Davis Headquarters for record retention.

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- 4.3 Local tower supervisor or designee MUST REVIEW all inspection results.
1. REFER to the following job aids for additional instructions on how to complete the forms:
 - [TD-1001M-JA02, "Detailed Climbing Inspection Job Aid"](#)
 - [TD-1001M-JA04, "Identifying Levels of Deterioration and Corrosion on Transmission Line Steel Structures and Supports"](#)
 - [TD-1001M-JA12, "Identifying Foundation Condition on Transmission Line Structures and Supports"](#)

5 Patrols

- 5.1 Overhead patrol procedures are a key element of the preventive maintenance program. The recommended actions reduce the potential for component failures and facility damage, and facilitate a proactive approach to repairing or replacing identified abnormal components.
- 5.2 A patrol supplements the detailed inspection.
1. Patrol frequencies on those facilities listed in [Table 1](#) on Page 2 must be in accordance with the schedule listed in [Table 2](#) on Page 4, which shows enhanced frequencies unique to the facilities covered in this procedure.
 2. A detailed inspection can be considered as a patrol, but a patrol cannot be considered as, or substituted for, a detailed inspection.
- 5.3 An overhead patrol can be performed by walking, driving, drone, or flying (helicopter only).

6 Infrared (IR)/Corona Inspections

- 6.1 IR and corona inspections are effective tools in a preventive maintenance program.
1. IR and corona inspections reduce the potential for component failures and facility damage, and facilitate a proactive approach to identifying abnormal components for repair or replacement.
 2. SEE [TD-1001P-14, "Infrared \(IR\) Inspection Procedures"](#) and [TD-1001M-JA19, "Evaluating Conditions from Infrared \(IR\) Inspection in Transmission Line,"](#) for the procedures and requirements.
- 6.2 IR and corona inspections on DCPD and Morro Bay PP 500 kV and 230 kV transmission line facilities listed in [Table 1](#) on Page 2 are performed on a specified schedule, as listed in [Table 2](#) on Page 4, due to their critical operational impact. Maintenance plans for the listed circuits must include periodic IR and corona inspections at intervals listed in [Table 2](#) on Page 4.
- 6.3 Infrared inspections can be performed in conjunction with overhead inspections, but must not be considered as, or substituted for, an overhead inspection.

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7 Dirty/Contaminated Insulator Cleaning

- 7.1 PERFORM insulator washing based on local environmental conditions, operating experience, and the predetermined wash cycles established in SAP.
1. WASH insulators in accordance with the [TD-1257M, "Insulator Cleaning Manual", Section 3, "Program."](#)
 2. Maintenance plans must be created in SAP for the circuits (or portions of circuits) listed in [Table 1](#) on Page 2 that require quarterly insulator washing.
- 7.2 For the Diablo PP Stand-By Supply 230 kV circuit and the silicone coated insulators on the Diablo Unit #1 and Diablo Unit #2 500 kV circuits, PERFORM de-energized insulator washing during scheduled plant outages. For all other insulators on the Diablo Unit #1 and Diablo Unit #2 500 kV circuits, PERFORM hot washing of insulators on a six-month basis.
- 7.3 For all other circuits in [Table 1](#) on Page 2, PERFORM hot washing of insulators on a quarterly basis for structures within one mile of DCP, and for structures within two miles of Morro Bay PP.
1. It may be possible to defer a scheduled wash for these facilities to coordinate with scheduled plant outages. These deferrals would only be considered for a specific exception, and not on a routine basis.
 2. IF a deferral is requested,

THEN the transmission maintenance supervisor responsible for the circuits MUST ASSESS the amount of contamination on the facility components, and DETERMINE if a scheduled wash should be considered for deferral.
 - a. The supervisor MUST ARRANGE for the wipe samples (Equivalent Salt Deposit Density (ESDD) samples) to be taken and sent to the Applied Technology Services (ATS) for processing.
 - b. ATS PROCESSES the wipe samples, SENDS the results to the requesting supervisor, and SAVES the results in the ATS records.
 - c. The contamination grade listed in [Table 3, "ESDD Contamination Grades"](#) on Page 8 must be used to determine the ability to defer a scheduled wash.

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7.3 (continued)

- d. The supervisor **REVIEWS** the results and, if necessary, **MAKES** a recommendation (referencing the ESDD results) via EDRS for approval of the deferral.
 - (1) For circuits that are under the DCPD responsibility, the Transmission Line Maintenance and Construction Director **MUST CONCUR**, and the DCPD Switchyard Supervisor **MUST APPROVE** in EDRS, based on the results of the DCPD Preventive Maintenance (PM) deferral process.
 - (2) For circuits that are under the transmission line responsibility, the DCPD Switchyard Supervisor **MUST CONCUR**, and the Transmission Line Maintenance and Construction Director **MUST APPROVE** in EDRS.

Table 3. ESDD Contamination Grades

Contamination Grade*	ESDD (mg/cm ²)	Washing Schedule
Light	0.03 – 0.08	Wash may be deferred to scheduled outage, not to exceed 90 days without an additional wipe test
Medium	0.08 – 0.25	Wash may be deferred, but not more than 60 days without an additional wipe test
Heavy	0.25 – 0.60	Wash may not be deferred
Extra Heavy	> 0.60	Wash must be done immediately

* From IEEE C57.19.100-2012

END of Instructions

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DEFINITIONS

Climbing Inspection: a detailed, supporting-structure-based observation of the facilities installed to determine if there are any abnormal or hazardous conditions that adversely impact safety, service reliability, or asset life – and to evaluate when each identified abnormal condition warrants maintenance

Preventive Maintenance (PM): Activities that ensure facilities and their associated components will continue to perform within accepted parameters. These activities may include inspection, assessment, maintenance, and replacement activities that occur before an abnormal condition exists.

Structure Inspection: a detailed ground, aerial drone, or aerial lift-based observation of the facilities installed, to determine if there are any abnormal or hazardous conditions that adversely impact safety, service reliability, or asset life, and to evaluate when each identified abnormal condition warrants maintenance.

IMPLEMENTATION RESPONSIBILITIES

Transmission Supervisor implements a scheduled inspection of the overhead transmission facilities for these power plants.

System Inspections establishes SAP patrol and inspection cycles of the overhead transmission facilities for the power plants.

GOVERNING DOCUMENT

[Utility Standard TD-1001S, “Electric Transmission Line Inspection and Preventive Maintenance Program”](#)

COMPLIANCE REQUIREMENT / REGULATORY COMMITMENT

[General Order 165, “Inspection Requirements for Electric Distribution and Transmission Facilities”](#)

Records and Information Management:

The document owner, or designee, ensures any records generated by this procedure are maintained in accordance with the Enterprise Records and Information (ERIM) program policy, standards, and Enterprise Records Retention Schedule (ERRS). Refer to [GOV-7101S, “Enterprise Records and Information Management,”](#) and related standards.

Management of records includes, but is not limited to:

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

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REFERENCE DOCUMENTS

Developmental References:

NA

Supplemental References:

Job Aids:

- [TD-1001M-JA02, "Detailed Climbing Inspection Job Aid"](#)
- [TD-1001M-JA04, "Identifying Levels of Deterioration and Corrosion on Transmission Line Steel Structures and Supports"](#)
- [TD-1001M-JA12, "Identifying Foundation Condition on Transmission Line Structures and Supports"](#)
- [TD-1001M-JA19, "Evaluating Conditions from Infrared \(IR\) Inspection in Transmission Line."](#)

Manuals:

- [Code of Safe Practices \(CSP\)](#)
- [Electric Transmission Preventive Maintenance Manual \(TD-1001M\)](#)
- [Insulator Cleaning Manual \(TD-1257M\)](#)

Utility Procedure [TD-1001P-14, "Infrared \(IR\) Inspection Procedures"](#)

[Utility Standard SAFE-1001S, "Injury & Illness Prevention Plan \(IIPP\) Standard"](#)

APPENDICES

NA

ATTACHMENTS

NA

DOCUMENT REVISION

This utility procedure cancels and supersedes TD-1001P-13, "Enhanced Inspection and Maintenance Requirements for Diablo Canyon and Morro Bay Power Plants Overhead Transmission Facilities," Rev. 0, published 08/31/2020.

Enhanced Inspection and Maintenance Requirements for Diablo Canyon and Morro Bay Power Plants Overhead Transmission Facilities

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REVISION NOTES

Where?	What Changed?
Section 7.2	Updated exceptions for quarterly wash requirement