



## 5 Aerial

### SUMMARY

This chapter provides a general insight into the consistent aerial inspection process of PG&E's electric transmission overhead lines.

### LEVEL OF USE

Informational Use

### TARGET AUDIENCE

This chapter applies to personnel who manage, perform, or document aerial inspections including, but not limited to, the following:

- Aerial and Specialized Inspections
- Centralized Inspection Review Team (CIRT)
- Quality Management
- Electric Transmission Asset Strategy

### SAFETY

This chapter describes administrative tasks that do not raise the risk of a specific hazard to personnel, the public, or equipment.

### BEFORE YOU START

Use standard-issue personal protective equipment (PPE) and follow standard safe work practices.

Refer to [Uncrewed Aircraft Systems \(UAS\) Operations Manual](#) (AVI-4001M) and/or [Helicopter Operations Field Manual](#) (AVI-3001M).

When required, adhere to safe work practices and procedures related to aerial lifts (e.g., bucket truck).

Review PG&E Academy training curriculum for available updated courses and complete training requirements.

## 5.1. Introduction

This methodology establishes a consistent inspection sequence for components and determines the type of inspection that provides the best viewing position for identifying component defects. Failure Modes and Effects Analysis (FMEA) was developed to identify single points of failure of electric system components that could lead to a failure based on occurrence, severity, and detection risk priority. Inspection methods were developed that can most appropriately identify the condition of these respective components. Refer to [Transmission Line FMEA](#) (part of [TD-8123M, "Electric System Inspections and Preventative Maintenance Program"](#)).

Inspected facilities include overhead assets, rights-of-way, and fiber-optic facilities. The overhead inspections include an external visual evaluation of the overhead facilities. [ETPM Manual, Chapter 2, "Maintenance Overview,"](#) contains some of the requirements that are part of PG&E's overall maintenance program and are in addition to the visual inspection items identified in this chapter.

A detailed aerial inspection of an asset looks for abnormalities or circumstances that negatively impact safety, reliability, or asset life. Individual elements and components are examined carefully through visual and/or routine diagnostics, and each abnormal condition is graded and/or recorded.

Aerial team provides visual inspections of line facilities in accordance with the provisions in [ETPM Manual, Chapter 1, "Inspections Overview."](#) The inspections include detailed visual observations to identify abnormalities or circumstances that negatively impact safety, reliability, or asset life.

The primary responsibility of a qualified company representative (QCR), when performing an overhead facility inspection is to examine the facilities and record any abnormal conditions. An inspection requires extensive evaluation (e.g., visual observation which could involve measuring devices or tools) to detect any abnormal structural problems or hazards that adversely impact safety, service reliability, or asset life, and to evaluate when each identified abnormal condition warrants maintenance.

Inspections require viewing all sides of the facilities from multiple heights, including line equipment. Evaluating line equipment requires a visual inspection of the following:

- Disconnect switches
- Control cabinets
- Switch platforms
- Lightning arrestors

## 5.2. Asset Verification

As assets observed in the field differ from SAP object lists, drawings, schematics, or other formal references, they must be updated in accordance with the Electric Transmission Geographic Information System (ET GIS) asset creation or maintenance processes (refer to [Utility Procedure TD-3330P-30, "Electric Transmission Geographic Information System RW Notification Process"](#)). Following the ET GIS asset creation and maintenance processes ensures the transmission asset registry and mapping systems are kept current with actual field conditions.

New assets or removed assets must also be entered into ET GIS. Document discrepancies in asset data and submit them as Request for Work (RW) for map corrections. If a complete inspection cannot be performed due to the discrepancies in asset data or images that are inadequate for a thorough inspection, follow the "Cannot Inspect" (CNI) process, in accordance with [Utility Procedure TD-1001P-11, "T-Line Aerial Inspection Process."](#)

Specific conditions:

- If imagery provided to compliance inspectors is adequate, allowing a full inspection of the assets, an inspector completes the inspection along with all required forms.
- If imagery is **not** adequate, hindering a full inspection of the assets, an inspector identifies and documents the inadequacies of the image set. The compliance inspector must identify, notate, and document any existing nonconformance. Take the appropriate corrective actions to capture and process the required images, in accordance with [Utility Procedure TD-1001P-11, "T-Line Aerial Inspection Process."](#)

## 5.3. Routine Aerial Inspections

The inspection documentation process described below is the responsibility of the transmission supervisor and the QCR.

- a. To begin an inspection, the QCR must access inspection software.
  - The asset is assigned to the QCR, who is responsible for performing a full inspection within the inspection software.
  - Facility, facility type, and information on open line corrective (LC) notifications are available to the QCR during each inspection.
  - For the process of aerial inspections, refer to [Utility Procedure TD-1001P-11, "T-Line Aerial Inspection Process."](#)
- b. Conduct inspections on each asset, reviewing the current condition.
- c. If there are any pending (open) notifications, address the following questions:
  - Did the condition of the facilities deteriorate faster than expected?
  - Has the work already been completed?
  - Is the required completion date still appropriate?

### 5.3 (continued)

- d. Use the inspection form to document the existing condition of each element on the structure, including any new abnormalities and minor or incidental work corrected at the time of the inspection.
  - Document the required information to support the creation of individual LC notifications, detailing each abnormality identified during the inspection.
  - Include pictures and detailed comments for each abnormality requiring an LC notification and exhibiting conditions that require monitoring.
- e. The applicable transmission inspection review specialist (IRS), or relief, must review and confirm completion of inspections.
- f. Emergency nonconformances are processed the same day they are identified by the team. At that point, the cause and reasoning behind the emergency nonconformance is adequately noted in all documentation.

#### 5.3.1. Documentation and Forms

Inspection forms within the inspection software provide adequate, consistent, and auditable inspection records, and must be used to document the inspection. Inspection forms are used for aerial inspections. Inspection forms are available for steel structures (500 kV and non-500 kV) and non-steel structures, and contain specific conditions for all present assets. The QCR creates the inspection documents during the inspection process.

The aerial inspection forms must contain the following information:

- Name of the QCR
- Date of the inspection
- Name of the circuit inspected
- Structure number(s)
- Facility found abnormal
- Damage indicated
- Action (e.g., recommended maintenance activities and associated priority)
- Significant comments regarding special work requirements, access notes, etc.

### 5.3.1 (continued)

Inspection forms for the overhead electric facilities are available in the inspection software. Overhead inspection form templates will be retained for reference. Overhead inspections **MUST** be completed in the inspection software **except** in the rare situation there is tech-down AND there is supervisor approval to use the manual form. The QCR may have access to information on open LC notification(s) for each asset to prevent duplicating LC notifications and provide CIRT information on existing LC notifications.

SAP is the system of record to document completion of transmission inspection tasks. Where available, electronic inspection documentation is preferred.

## 5.4. Records

This section provides general records guidance and retention requirements for corrective actions identified on the electric transmission line system.

### 5.4.1. General Guidelines for Company Records and Documentation

All records must comply with the Information & Records Governance policy, standards, and the Information and Records Retention Schedule. Records must be stored electronically, unless impractical. Refer to Section 7 of the [GOV-7101S, "Enterprise Records and Information Management Standard,"](#) for details.

**There is no need to store hard copies when electronic records exist in SAP or other enterprise systems of record.**

**NOTE:** A legal hold supersedes all record retention requirements listed in this section. Do not destroy any records designated as part of a legal hold, no matter how old those records are. All Electric Operations records are still under legal hold as of publishing of this manual.

Completed paper inspection datasheets and forms must be kept at the responsible transmission line maintenance supervisor's headquarters, in files arranged by circuit name. Any records stored electronically supersede and are preferable to hard copy versions.

### 5.4.2. Electronic Records and Signatures

Transmission line has electronic processes for activities such as notification creation (i.e., a mobile computer with the inspection software to create notifications).

To ensure proper documentation, both the traditional "wet" signature and an electronic signature are acceptable to certify compliance documents or to satisfy the valid signature requirements.

Electronic signatures or verifications must come from a valid user logged onto a PG&E-certified account (such as any account associated with PG&E single sign-on or SAP).

### 5.4.3. Hand-Written Records

Although electronic signatures and certifications are now allowed, the requirements for hand-written records have not changed. Complete all hand-written records using non-erasable ink. To correct an item on a hand-written record, take the following steps:

- Use a non-erasable black or blue ink pen.
- Do not erase or white out any portion of the log.
- Draw a single line through the entry(s) being deleted.
- Enter the correct information into the log.
- Initial and date the change.

To ensure legibility, personnel must print their full name, initials, or LAN ID, as required, on these documents. Rubber stamps are not allowed (see [Bulletin 247, "Gas and Electric M&O Record Requirements," \[FRO\], 12/31/07](#)).

All hand-written forms and paperwork requiring a QCR or supervisor signature must be "wet"-signed by hand in non-erasable blue or black ink by the respective personnel. Computer printouts with the date and LAN ID are acceptable; however, all signatures on paper must be "wet."

Routine, non-routine, and emergency circuit inspection reports generated by the QCR must be recorded in the appropriate SAP database. The records must be maintained in accordance with the Independent System Operator (ISO) Transmission Control Agreements (TCAs). QCRs use the following ETPM forms to document abnormal conditions identified during the inspection:

- [TD-1001M-F01, "Transmission Line Inspection Datasheet OH"](#)
- [TD-1001M-F04-a, "Steel Structure Detailed Inspection Form"](#)
- [TD-1001M-F04-b, "Non-Steel Structure Detailed Inspection Form"](#)
- [TD-1001M-F06, "Monthly Pipe-Type Routine Inspection – Typical"](#)
- [TD-1001M-F07, "Detailed Pipe-Type Inspection Sheet – Typical"](#)
- [TD-1001M-F08, "Quarterly XLPE Routine Inspection – Typical"](#)
- [TD-1001M-F09, "Detailed XLPE Manhole Inspection – Typical"](#)
- [TD-1001M-F10, "Alarms/SCADA Annual Test Sheet – Typical"](#)

These documents must validate that all structures and facilities were inspected, and that all abnormal conditions observed were either corrected or captured as maintenance notifications during the inspection.

#### 5.4.3 (continued)

In general, do not provide additional notes and comments on the forms, unless they further describe the findings captured. Acceptable notes for patrol and inspection field documentation include the following:

- Access notes describing the navigation path or procedure used to safely and efficiently access the target structure or equipment.
- Range finder readings describing the target span, temperature, date, time, and laser range finder (or similar) result.
- Status of non-findings being monitored, such as woodpecker hole position and size; ground movement near the structure; species presence.

### 5.5. Additional Information

#### 5.5.1. Definitions

See [Appendix A, "Acronyms and Definitions of Terms."](#)

#### 5.5.2. Reference Documents

See [Appendix B, "References – Forms, Job Aids, Flowcharts, and Related Documents."](#)

## APPENDICES

- [Appendix A, "Acronyms and Definitions of Terms"](#)
- [Appendix B, "References – Forms, Job Aids, Flowcharts, and Related Documents"](#)
- [Appendix C, "Equipment, Tools, and Materials"](#)
- [Appendix D, "Line Patrol File Guidelines"](#)
- [Appendix E, "Boardwalk Access and Personal Safety"](#)

## ATTACHMENTS

NA

## IMPLEMENTATION RESPONSIBILITIES

Supervisor communicates the contents of this chapter to employees during annual training and ensures its implementation.

## GOVERNING DOCUMENT

[Utility Standard TD-1001S, "Electric Transmission Line Inspection and Preventive 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 & 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 & Records Governance at [Information&RecordsGovernance@pge.com](mailto:Information&RecordsGovernance@pge.com).

## DOCUMENT REVISION

This chapter supersedes corresponding information in TD-1001M, "Electric Transmission Preventative Maintenance Manual," Rev. 5, dated 08/31/2020.

## DOCUMENT APPROVER

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## REVISION NOTES

Where?	What Changed?	Updated by (LAN ID)
NA	This is a new document.	