



# **Electric Transmission Preventive Maintenance Manual**

**TD-1001M**

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**Revision: 05**

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**Pacific Gas and Electric Company  
Technical Document Management  
Mail Code N9H  
P.O. Box 770000  
San Francisco, CA 94177**

## Introduction

Electric Transmission Preventive Maintenance (ETPM) Manual covers preventive maintenance for overhead and underground electric transmission facilities. These facilities must be inspected and patrolled in accordance with the following sections of this manual:

1. General: Purpose of Inspection and Patrol Activities
2. Inspections
3. Maintenance
4. Records

The procedures outlined in this manual (Sections 1 through 4) have been established to ensure uniform and consistent required procedures for inspections, patrols, equipment testing, and condition assessment of electric transmission line facilities.

This manual also includes requirements for the prioritization, scheduling, managing, and documentation of corrective actions identified on existing electric transmission facilities that affect safety and reliability. These requirements comply with PG&E standards and current industry practices.

In addition, utility procedure [TD-1001P-13, “Enhanced Inspection and Maintenance Requirements for Diablo Canyon and Morro Bay Power Plants Overhead Transmission Facilities”](#) provides specific enhanced inspection and maintenance requirements unique to facilities serving Diablo Canyon and Morro Bay Power Plants.

This manual supports [UO Policy 3-7, “Gas and Electric Operation, Maintenance, and Construction.”](#) [Utility Standard TD-1001S, “Electric Transmission Line Inspection and Preventive Maintenance Program”](#) and the requirements to comply with North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) Standard FAC-501-WECC-2 Transmission Maintenance and California Public Utilities Commission (CPUC) [General Order \(G.O.\) 165, “Inspection Requirements for Electric Distribution and Transmission Facilities”](#), as well as relevant portions of [G.O. 95, “Rules for Overhead Electric Line Construction,”](#) and [G.O. 128, “Rules for Construction of Underground Electric Supply and Communication Systems”](#). The requirements and actions described in this document reduce the potential for component failures and facilitate a proactive approach to repairing or replacing abnormal components. This manual does not necessarily identify nonconformance to PG&E standards.

This manual is to be reviewed annually for updates, changes, errors, or omissions. When it is updated, the Filed Maintenance Practice (FMP) with the California Independent System Operator (CAISO) must also be reviewed and revised, as necessary. Significant changes in the frequency or scope of patrols and inspections may also trigger a review with the CPUC.

For the acronyms and definition of terms used in this manual, see [Appendix A, “Acronyms and Definitions of Terms.”](#)

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# 1. General: Purpose of Inspection and Patrol Activities

Inspection, patrol, procedures, and job aids are key elements of the preventive maintenance program. The actions recommended in this manual reduce the potential for component failures and facility damage and facilitate a proactive approach to repairing or replacing identified, abnormal components.

Inspections include detailed visual observations of individual structures, components, and equipment; operational readings; and component testing (i.e., hammer test, etc.) to identify abnormalities or circumstances that will negatively impact safety, reliability, or asset life.

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

Procedures associated with the ETPM Manual provide detailed step-by-step requirements on inspections.

Job aids associated with the ETPM Manual give guidance for uniform evaluation of components of the assets.

Electric transmission line maintenance organizations will follow baseline work, but can establish additional inspection, patrol, testing, and/or preventive maintenance requirements that exceed the requirements in this manual, based on local area experience and local conditions, and as needed for special equipment unique to the area. Additionally, the Asset Management organization may require electric transmission line maintenance organizations to undertake unique, non-routine patrols and inspections as dictated by asset performance or other external factors.

Asset inspection and maintenance have progressed from time-based to risk-based. The first step was to look at the failure mode analysis for each type of equipment. In 2019 Failure Modes and Effects Analysis (FMEA) was performed to look at the various modes of failure for each equipment, including failures that could cause a fire ignition. In addition, the various inspection modes were reviewed to determine the most effective method of identifying the failure mode.

Inspectors following the procedures in this manual, inspect the electric facilities and identify the abnormalities requiring repairs. Field inspectors can also inspect the right-of-ways close to the facilities being inspected. If the inspectors need additional assistance to determine the need for repairs, subject matter experts are available within various departments, including Asset Strategy, Standards, Engineering, Vegetation Management, and Land.

Circuits supporting Diablo Canyon Power Plant (DCPP) and Morro Bay Power Plant (PP) will be inspected more frequently and follow more rigorous maintenance practices. Refer to [TD-1001P-13, "Enhanced Inspection and Maintenance Requirements for Diablo Canyon and Morro Bay Power Plants Overhead Transmission Facilities"](#) for the specifics of the DCPP and Morro Bay PP inspection and maintenance program. The enhanced inspection and maintenance requirements for the circuits supporting DCPP and Morro Bay PP apply to the 230 kV and 500 kV circuits listed in the [TD-1001P-13, "Enhanced Inspection and Maintenance Requirements for Diablo Canyon and Morro Bay Power Plants Overhead Transmission Facilities."](#)

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## 2. Inspections

The inspection procedures are a key element of the preventive maintenance program. These requirements reduce the potential for component failures and facility damage and facilitate a proactive approach to identify, repair, or replace abnormal components and correct circumstances that can impact safety, reliability, compliance, or asset life.

### 2.1. Problem Identification

PG&E performs periodic inspections, patrols, and maintenance on its overhead and underground transmission facilities. Identify abnormal or potentially hazardous conditions by any of the following means:

- Periodic inspections or patrols of facilities in accordance with existing procedural requirements.
- Condition-based and/or diagnostic testing and monitoring of facilities.
- Observation by any employee during other activities, such as normal job assignments and emergency patrols (a qualified company representative (QCR) must perform an assessment to confirm problem identification).
- Corrective Action Program (CAP) issue.
- Internal engineering reviews.
- Customer or general public reports (a QCR must perform an assessment to confirm problem identification).
- During emergency or storm activities.
- Material Problem Reports (MPR).

### 2.2. Inspection Approach

Periodic inspections are planned and assigned to inspectors. The proper method of inspection is determined based on the type of inspection (e.g., detailed ground, climbing, aerial, infrared). Inspectors perform the inspections by reviewing each asset (e.g., structure, conductor, foundation, hardware, insulator). The inspector does not define the specific corrective action to be performed but makes recommendations.

The proper form for the type of inspection is used to capture the inspection findings. The forms capture information on the condition of the asset, whether it is in good condition or needs repair.

A Line Corrective (LC) notification (see [Section 2.3.3, “Documentation and Forms”](#) on Page 7) is created for repairs that are required.

If additional analysis is needed, subject matter experts are available for additional support. The Centralized Inspection Review Team (CIRT) reviews all notifications and determines work required, if any, and timeframes (see [TD-1001P-10, “Centralized Inspection Review Team \(CIRT\)”](#)).

Short lead time repairs are scheduled and implemented within specified timeframes. When possible, long lead time repairs can be grouped for a circuit-based approach.

## Section 2.2 (continued)

When an abnormality or non-conformance is identified, create the LC notification using the inspection software:

- Choose the appropriate asset.
- Select the priority code for the condition to be addressed.
- Attach the required photos.
- Add comments describing the condition, access information, and any additional information that will be needed to schedule and perform the work.

[Table 4, "Guide for Assigning Priority Codes"](#) on Page 21 should be used as a reference to determine the overall condition of the equipment that requires repair or replacement. [Table 4](#) was developed and is regularly updated by a cross-functional team of field personnel and subject matter experts. In addition, subject matter experts in various departments are available for consultation. The LC notifications will be reviewed by CIRT for consistency and priority and then assigned to maintenance for scheduling of work required.

Priority A notifications require QCR to immediately notify and consult the supervisor for direction and further action, which may require stanby.

## 2.3. Overhead Inspection

It is important to have clear directions on the inspection methods and frequency of inspections. Inspectors are required to have knowledge regarding the condition of the assets. Clear directions on the method and frequency of inspections assures that all assets are reviewed, and appropriate actions are taken to repair any deficiencies. Proper documentation of all findings is essential for completing repairs and serving as reference for future inspections. Inspectors should review past records to reference any abnormality that does not require repair but should be tracked.

### 2.3.1. Overhead Inspection Methodology

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. 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 [FMEA for Transmission Line Electric Assets](#).

Inspected facilities include overhead assets, rights-of-way, fiber-optic facilities, and vegetation. The overhead inspections include an external visual evaluation of the overhead facilities. See [Section 3, "Maintenance"](#) for requirements that are part of the Company's overall maintenance program and are in addition to the visual inspection items identified in this section.

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

## Section 2.3.1 (continued)

Inspect overhead line facilities in accordance with the provisions in [Section 2, “Inspections.”](#) The inspections include detailed visual observations and physical testing as needed (wood pole hammer/bore test, guy tension, etc.) to identify abnormalities or circumstances that will negatively impact safety, reliability, or asset life. When performing the required visual inspection and hammer test on a wood pole, it might be determined that pole should be further evaluated by a bore test.

The primary responsibility of a QCR performing an overhead facility inspection is to examine the facilities and record any abnormal conditions. This inspection requires an extensive evaluation (e.g., visual observation, which could include using measuring devices or tools) to detect any abnormal structural problems or hazards that will 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 the ground (including line equipment). Evaluating line equipment requires a visual inspection of the following:

- Disconnect switches
- Control cabinets
- Switch platforms
- Lightning arrestors, etc.

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.

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 detailed ground, aerial inspection or patrol. Such conditions trigger a follow-up inspection to assign the proper Priority Code.

Patrols are another key element of the preventive maintenance program but are not considered an inspection. A patrol supplements the detailed facility inspection. An overhead patrol may be performed by walking, driving, or flying (helicopter only). All patrols must be conducted in a manner that will ensure the identification of the [typical electric overhead transmission problems](#) listed in [subsection 2.3.3.3, “Patrols”](#) on Page 9.

Specific conditions require follow-up inspections, or non-routine patrols, scheduled by the supervisor, independent of the routine schedule. The following are examples of situations that could prompt a non-routine patrol:

- Component defects identified from a less-than-ideal vantage point.
- Component failure (failure in like components) or components proven defective by testing or documented on a [Form 62-0113, “Material Problem Report”](#) (MPR).
- Wire/structure strike.
- Burned area or high fire hazard.

### Section 2.3.1 (continued)

- Severe or prolonged storms or flood areas
- Failures 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.
- Known, recurring conditions that jeopardize line integrity or reliability performance.
- Public Safety Power Shutoff (PSPS) to confirm line integrity.
- Suspected vegetation-to-conductor clearances less than required, less than legal vegetation-to-conductor clearances, or concerns about the 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.

For all 60 kV, 70 kV and 115 kV momentary outages, the line will be patrolled as soon as practical, but no later than the next business day.

#### **Examples:**

- If the momentary outage occurs on Tuesday, the line will be patrolled as soon as practical, but no later than Wednesday.
- If the momentary outage occurs on Friday and cannot be patrolled on that day, then the patrol will be conducted on Monday (or the next scheduled regular business day).

For all 230 kV and 500 kV momentary outages, the line will be patrolled as soon as practical, but no later than the next calendar day.

#### **Examples:**

- If a momentary outage occurs early in the morning, and responsible protection engineer confirms target information and a location, then the line will be patrolled on the same day.
- If the momentary outage occurs late in the afternoon or early in the evening, and it is not practical to attempt a patrol immediately due to darkness, then the line will be patrolled the next day. This requirement is in effect regardless of whether or not the next day is a regular workday.

### **2.3.2. Overhead Inspection Frequency**

Inspect overhead transmission facilities per [TD-1001M-B009, "Revised Inspection Guidelines."](#) Establish the maintenance plan that complies with the required inspection frequencies.



### 2.3.3. Documentation and Forms

Adequate, auditable records (inspection/patrol datasheets) must be kept to document all the facilities inspected or patrolled. SAP is the system of record for documenting the completion of inspections and patrols.

Inspection forms for the overhead electric facilities are available in the inspection software. Overhead inspection form templates will be retained **for reference** and underground inspection forms will be retained until the underground forms are available in the inspection software. 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 paper 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 patrol and inspection tasks. Where available, electronic patrol and inspection documentation is preferred. Where electronic documentation is available, paper forms may only be utilized in the rare occasion of an extended tech-down and with prior supervisor approval. Where electronic documentation is not regularly available (e.g., patrols, underground), completed paper forms will be retained in accordance with [GOV-7101S, "Enterprise Records and Information Management Standard."](#)

#### 2.3.3.1. Routine Inspections

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 detailed ground, climbing and aerial inspections. Inspection forms are available for steel structures (500 kV and non-500 kV), non-steel structures, and switches.

- Electronic patrol and inspection forms:
  - Inspections forms are available electronically for steel structures (500 kV and non-500 kV), non-steel structures, and switches.
  - Detailed ground inspections, climbing inspections, drone or helicopter high definition (aerial) inspections.
- Paper patrol and inspection forms:
  - Underground patrols, underground inspections, infrared inspections, or patrols.

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

- a. Before starting an inspection, the QCR must access the inspection software to identify which facilities will be inspected. The information available is the location of the facility, type of facility, and information on open LC notifications.
- b. For field inspectors, if the location cannot be accessed (e.g., CGI: road deteriorated, locked gate, vegetation issues), complete the appropriate notification to have the access issue addressed, and the inspection will need to be completed at a later date.
- c. Inspections will be performed on each asset, reviewing the current condition and, if there are any pending (open) notifications, address the following issues:

## Section 2.3.3.1 (continued)

- Did the condition of the facilities deteriorate faster than expected?
  - Has the work already been completed?
  - Is the required completion date still appropriate?
- 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 inspection.
- Document the required information to support the creation of individual LC notifications, detailing each abnormality as it was identified during the inspection.
  - Pictures and detailed comments should be included for each abnormality requiring an LC notification and conditions to be monitored.
- e. The applicable transmission supervisor (or relief) must review to confirm completion of patrols and inspections.
- f. Aerial photography is reviewed by QCRs within AIR+ (formerly known as Drone Inspection Review Team (DIRT)) to inspect overhead facilities, identify non-conformances and associated FDA codes and preliminary priority codes (see [TD-1001P-11, "Drone Inspection Review Team \(DIRT\)"](#)).
- g. Inspection information is entered into the SAP database and for CIRT or Gatekeeper reviews for approval of the (S5) staged SAP notifications, which are released as soon as practical (not to exceed 20 business days from the end of the inspection and before January 31 of the following year). This ensures that SAP notifications will be established in time to facilitate the proper planning, scheduling, and work to correct abnormal conditions by the due dates.
- h. If a piece of operating equipment has been identified as damaged or inoperative, the transmission supervisor or designee must notify the GCC of the equipment condition. Refer to [TD-2501M, "Electric Overhead Construction Manual"](#) and [TD-2502M, "Electric Underground Construction Manual."](#)
- GCC personnel enter the equipment into the Transmission Operations Tracking & Logging (TOTL) and, if the equipment meets the criteria as outlined in Utility Procedure: [TD-1400P-08, "Electric Transmission Operations, Line, and Substation COE Process."](#) assign a Critical Operating Equipment (COE) personal identification number (PIN).
  - The QCR, transmission supervisor, or designee must add the COE PIN to the notification's short text field in SAP and notify the GCC of the notification number associated with the PIN.

Inspection/patrol logs and notification forms are available in the inspection software application and are listed in [Appendix C, "Links to Forms and Flowcharts"](#) and are available in the Technical Information Library (TIL) on the Company Intranet.

### 2.3.3.2. Inspections Best-View Positions

See [Table 1, “Inspection Best-View Position”](#) for the best vantage points for inspections of specific items.

**Table 1. Inspection Best-View-Position**

Description	Aerial Inspection	Ground Inspection (below 10 feet)	Ground Inspection (above 10 feet)	Climbing Inspection (above 10 feet)
Cellular site	X	X	X	X
Insulators and hardware	X		X	X
Conductor and fittings	X		X	X
Switches and associated elements	X		X	X
Road access	X	X		X
Vegetation	X	X	X	X
Overhead ground wire / fiber optic cable (OPGW, ADSS, non-ADSS lashed )	X		X	X
Foundations	X	X		X
Anchors and guys	X	X		X
Structures	X	X	X	X
Electrical clearances	X		X	X
Arms/braces	X		X	X

### 2.3.3.3. Patrols

The patrol documentation process, as described below, is the responsibility of the transmission supervisor, QCR, and the clerk.

Before starting a patrol, the QCR must obtain the following documents for the patrol area:

- [TD-1001M-F01, “Transmission Line Inspection/Patrol Datasheet – Typical.”](#)
- An SAP report of all open notifications for the lines to be patrolled, with enough information provided to understand the nature of the problems.
- [TD-1001M-F05, “Object List – Typical.”](#)

The QCR’s primary responsibility when conducting an overhead electric facility patrol is to observe the electric facilities visually, looking for obvious structural problems or hazards without using measuring devices, tools, or diagnostic tests, and to record that the facilities have been patrolled. Abnormal conditions that, in the opinion of the QCR, warrant maintenance before the next scheduled patrol or inspection, must be identified, assigned a Priority Code, and recorded. The following list gives examples of some typical electric overhead transmission problems, but it is not complete or all-inclusive.

## Section 2.3.3.3 (continued)

**1 Typical Electric Overhead Transmission Problems:**

- Inadequate tree clearances
- Damaged or broken conductor
- Broken or leaning poles
- Missing or bent tower members
- Broken guys
- Broken crossarms/framing
- Broken or flashed insulators
- Inadequate conductor clearances
- Damaged line equipment
- Rights-of-way encroachments
- Bent, broken, or missing dampers
- Defective FAA obstruction lights (e.g., inoperable, damaged, misaligned) or dirt/debris on the solar panels

Assess and document any abnormal condition (other than those already documented in SAP) identified by the patrol in accordance with the requirements in [Section 2.4, “Asset Inspections.”](#)

If a condition cannot be assessed properly during a patrol, a follow-up inspection must be conducted to assess the condition and assign a Priority Code.

All non-routine patrols will be completed under a **Priority B – 3 Month** tag. This will allow for sufficient timekeeping, receipt of miscellaneous charges (e.g., helicopter), natural causes (fire, snow), and collection of all necessary information to complete the tag.

During the patrol, review pending notifications to:

- Confirm conditions still exist.
- Determine if the work has already been completed.
- In the event the work still needs to be done, determine if the required completion date is still appropriate.

## Section 2.3.3.3 (continued)

**2 Recordkeeping and Closeout**

Use the ETPM form [TD-1001M-F01, "Transmission Line Inspection/Patrol Datasheet – Typical,"](#) to document any new abnormalities and minor or incidental work corrected at the time of patrol. Document the required information in the inspection/patrol log to support individual LC notifications created in the inspection software, detailing each abnormality as it was identified during the patrol.

Patrol log forms are available in the inspection software applications and are listed in [Appendix C, "Links to Forms and Flowcharts,"](#) and are available in the TIL on the Company Intranet.

The QCR must fill out completely each required field in the inspection/patrol log heading and record each abnormality encountered during the patrol. Use inspection/patrol logs in conjunction with the LC notifications in the inspection software to capture the information needed to document the necessary maintenance work or action(s).

The applicable supervisor (or a designee) must review and initial the QCR's patrol logs before the information is entered in the SAP database.

It is recommended the applicable supervisor (or designee) check the SAP database to ensure that duplicate notification data is not entered. For work requiring engineering and/or estimating, attaching a copy of the inspection map to the notification is recommended.

Patrol information must be entered into the SAP database and reviewed for approval. Any SAP notifications that CIRT reviews must be released as soon as practical (not to exceed 20 business days from the end of the patrol and before January 31 of the following year). This ensures that SAP notifications will be established in time to facilitate the proper planning, scheduling, and work to correct abnormal conditions by the due dates.

## 2.3.4. Corrective Notification: Facility, Damage, Action (FDA) Codes Facility Codes

Defective elements and abnormal conditions identified during inspections and patrols must be identified and recorded using the facility codes, damage, and action codes (FDA codes) as shown in [Table 2, “Overhead Facility, Damage, Corrective Action Codes”](#) on Pages 13 and 14.

The lists in the following tables are not all-inclusive. During inspections, identify any obvious component defects that are not listed. Where “Other” is selected, additional descriptive information must be recorded in the SAP Line Corrective (LC) notification form in the inspection software to describe the facility, damage, and action prescribed.

### 2.3.4.1. Facility Codes

Using [Table 2, “Overhead Facility, Damage, Corrective Action Codes.”](#) choose the appropriate facility code for the component being inspected. Note how codes vary depending on the type of structure – e.g., wood, steel, or tower (for some facility codes).

### 2.3.4.2. Damage Codes

At least one damage code must be assigned to defective elements found during inspections and patrols. These conditions are listed in [Table 2](#).

### 2.3.4.3. Corrective Action Codes

The QCR must recommend the required action(s) to correct the identified abnormal condition(s). These actions are listed in [Table 2](#).

IF more than one action is required at a facility,

THEN each must be identified.



**Table 2. Overhead Facility, Damage, and Corrective Action Codes**

Facility	Damage	Action
Anchor-Steel	Missing	Install
	No Good/Out of Std	Repair Replace
Anchor-Wood	Missing	Install
	No Good/Out of Std	Repair Replace
Animal Guard-Steel	Missing	Install
Animal Guard-Wood	Missing	Install
Anode-Tower	Missing	Install
	No Good/Out of Std	Repair Replace
Auto Guy Wire Splice-Steel		Repair
	No Good/Out of Std	Replace
Auto Guy Wire Splice-Wood		Repair
	No Good/Out of Std	Replace
Bay Water-Tower		Repair
	No Good/Out of Std	Replace
Boardwalk	Missing	Install
	No Good/Out of Std	Repair Replace
Conductor-Steel	Debris/Nest/etc.	Remove
	No Good/Out of Std	Repair Replace
Conductor-Wood	Debris/Nest/etc.	Remove
	No Good/Out of Std	Repair Replace
Connector	Missing	Install
	No Good/Out of Std	Repair Replace
Crossarm-Steel		Repair
	No Good/Out of Std	Replace
Crossarm-Tower	No Good/Out of Std	Repair
Crossarm-Wood		Repair
	No Good/Out of Std	Replace
Damper-Steel	Missing	Install
	No Good/Out of Std	Replace
Damper-Wood	Missing	Install
	No Good/Out of Std	Replace
Emergency	Fire	Replace
	Storm Related	Repair Replace
Emergency-Steel	Other	Replace
Emergency-Wood	Other	Replace
FAA Battery-Steel	No Good/Out of Std	Replace
FAA Battery-Wood	No Good/Out of Std	Replace
FAA Lighting-Steel	Missing	Install
	No Good/Out of Std	Repair Replace
FAA Lighting-Wood	Missing	Install
	No Good/Out of Std	Repair Replace
Fault Indicator-Steel	Missing	Install
	No Good/Out of Std	Replace
Fault Indicator-Wood	Missing	Install
	No Good/Out of Std	Replace

Facility	Damage	Action
Fee Property	Other	Other
Fence / Gate	Missing	Install
	No Good/Out of Std	Repair Replace
Foundation/Concrete-Tower	Earth Covered Tower	Repair
	No Good/Out of Std	Repair Replace
GO95 / Anti Climb	Clearance	Install
	Ground / Clearance	Repair
GO95 Clear Infract-Tower	Clearance	To Be Corrected
GO95 Clear Infract-Wood	Clearance	To Be Corrected
Ground Wire-Steel		Repair
	Missing	Install
Ground Wire-Tower		Replace
	No Good/Out of Std	Replace
Ground Wire-Wood	No Good/Out of Std	Repair
Guy Pole-Steel		Replace
	No Good/Out of Std	Replace
Guy Pole-Wood		Replace Stub
	Rotten	Replace
Guy Stub-Steel	No Good/Out of Std	Replace
Guy Stub-Wood		Replace
	No Good/Out of Std	Replace
Guy Wire Mark /Indic-Steel		Install
	Missing	Install
Guy Wire Mark /Indic-Wood		Install
	Missing	Install
Guy Wire-Steel		Install
	Missing	Install
Guy Wire-Wood		Install
	Missing	Install
Hardware-Steel		Install
	Missing	Install
Hardware-Tower		Install
	Missing	Install
Hardware-Wood		Install
	Missing	Install
Insulator		Ground Wash Helicopter Wash
	Contaminated	Repair
Insulator Bond Wire-Steel		Replace
	No Good/Out of Std	Replace
Insulator Bond Wire-Wood		Replace
	No Good/Out of Std	Replace
Insulator-Steel		Replace
	No Good/Out of Std	Replace
Insulator-Wood		Replace
	No Good/Out of Std	Replace
Jumper-Steel	No Good/Out of Std	Repair
Jumper-Wood	No Good/Out of Std	Repair

**Table 2. Overhead Facility, Damage and Corrective Action Codes, continued**

Facility	Damage	Action
Marker (i.e., signs)-Steel	Missing	Install
	No Good/Out of Stdrd	Install
Marker (i.e. signs)-Wood	Missing	Install
	No Good/Out of Stdrd	Install
Non-Routine Patrol	Investigate	Air Patrol
		Ground Patrol
		Infrared Patrol
Other	Other	Other
Raptor Guard-Steel	Missing	Install
	No Good/Out of Stdrd	Replace
Raptor Guard-Wood	Missing	Install
	No Good/Out of Stdrd	Replace
Right of Way	Encroachment	Remove
Road	Brush Fuel	Remove
	Encroachment	Remove
	Grade Change	Repair
	Missing	Install
	No Good/Out of Stdrd	Repair Replace
SCADA-Steel	No Good/Out of Stdrd	Replace
SCADA-Wood	No Good/Out of Stdrd	Replace
Shield Wire / OPGW-Steel *	No Good/Out of Stdrd	Repair
		Replace
Shield Wire / OPGW-Wood *	No Good/Out of Stdrd	Repair
		Replace
Spacer-Steel	Missing	Install
	No Good/Out of Stdrd	Replace
Spacer-Wood	Missing	Install
	No Good/Out of Stdrd	Replace
Splice-Steel	No Good/Out of Stdrd	Repair
		Replace
Splice-Wood	No Good/Out of Stdrd	Repair
		Replace

Facility	Damage	Action
Structure-Steel	Anti-Climbing Guard	Install
		Repair
	Debris/Nest/etc.	Remove
	Idle	Remove
	No Good/Out of Stdrd	Repair Replace
Structure-Tower	Paint/Coating	Other
	Anti-Climbing Guard	Install
		Repair
	Idle	Remove
	No Good/Out of Stdrd	Repair Replace
	Paint/Coating	Repaint
Soil	Remove	
Structure-Wood	Debris/Nest/etc.	Remove
	Idle	Remove
	No Good/Out of Stdrd	Repair
		Replace
	Rotten	Replace Stub
Switch	Out of Adjustment	Repair
Switch-Steel	No Good/Out of Stdrd	Replace
Switch-Wood	No Good/Out of Stdrd	Repair
		Replace
Tie Wire-Steel	No Good/Out of Stdrd	Replace
Tie Wire-Wood	No Good/Out of Stdrd	Replace
Vegetation	Overgrown	Remove
		Trim
Vegetation-Tower	Overgrown	Cage Clearing
WRO	Request	Agencies (i.e. Muni)
		Other
		Switching

\* Use Shield Wire/OPGW for all fiber cable, including OPGW, ADSS, or non-ADSS.



## 2.3.5. Assigning Priority Codes and Due Dates

### 2.3.5.1. Assessing Conditions

Evaluate the condition of the facilities at each location when performing patrols, inspections, or post-checking the completed work. [Section 2.4, “Asset Inspections”](#) identifies many of the field conditions that need to be evaluated.

Once identified, the QCR determines the severity of the condition, the risk factors, the appropriate priority level, and a reasonable time frame to plan, design, and complete any required corrective work. Recommendations of an appropriate priority/repair time frame by the QCR are based on experience and judgment.

In addition, the QCR or CIRT should consider the following risk factors and conditions encountered in the field when recommending priority/repair codes:

- The risk of exposure to the public, workers, or employees
- The abnormality encountered
- Risks if the condition continues to deteriorate
- Potential for the condition to further deteriorate
- Impact of the failure to system reliability, customers and service, and/or the potential for injury

[Table 3](#) lists the priority codes and the associated time frames for typical response/repair action.

**Table 3. Priority Codes**

Priority Code <sup>1</sup>	Priority Description
<b>A<sup>2</sup></b>	The condition is urgent and requires <b>immediate</b> response and continued action until the condition is repaired or no longer presents a potential hazard. SAP due date will be 30 days to allow time for post-construction processes and notification close-out.
<b>B<sup>3</sup></b>	Corrective action is required within <b>3 months</b> from the date the condition is identified. The condition must be reported to the transmission line supervisor as soon as practical.
<b>E</b>	Corrective action is required within <b>12 months</b> from the date the condition is identified <b>EXCEPT FOR ITEMS WITHIN HFTD TIER 3 ARE REQUIRED WITHIN 6 MONTHS.</b> <sup>4</sup>
<b>F</b>	Corrective action is recommended within <b>24 months</b> from the date the condition is identified, (due beyond 12 months, not to exceed 24 months). <b>EXCEPT FOR ITEMS WITHIN HFTD TIER 3 ARE REQUIRED WITHIN 6 MONTHS AND WITHIN HFTD TIER 2 ARE REQUIRED WITHIN 12 MONTHS.</b> <sup>5</sup>

<sup>1</sup> Refer to 2.3.5.2, “Priority Code Due Dates for High Fire Risk Conditions within HFTDs” and 2.3.5.3, “Priority Code Due Dates for Non-Fire Risk Conditions within HFTDs.”

<sup>2</sup> QCRs must report immediately any “Priority Code A” abnormal condition to the transmission line supervisor, and the transmission supervisor or QCR contacts GCC.

<sup>3</sup> In addition, QCRs must report any “Priority Code B” condition to the transmission line supervisor as soon as practical, to ensure that correction occurs within the appropriate time.

<sup>4</sup> If the condition in the HFTD Tier 3 does NOT create a fire risk (non-threatening) the corrective action is required within 12 months.

<sup>5</sup> If the condition in the HFTD Tier 3 OR Tier 2 does NOT create a fire risk (non-threatening) the corrective action is required within 24 months.

### 2.3.5.2. Priority Code Due Dates for High Fire Risk Conditions within HFTDs

During the Fire Safety Rulemaking in 2017 and 2018, new G.O. 95 requirements impacting transmission lines were adopted, including the items listed below.

- Rule 21.2D added a definition for High Fire-Threat Districts (HFTD)
  - Zone 1 – Tier 1 High Hazard Zones (HHZ) on the Tree Mortality Map
  - Tier 2 – areas on the CPUC Fire-Threat Map where there is an elevated risk for destructive utility-associated wildfires
  - Tier 3 – areas on the CPUC Fire-Threat Map where there is an extreme risk for destructive utility-associated wildfires
  - Where Zone 1 overlaps with Tier 2 and Tier 3 areas, the strictest regulations apply
- Rule 18 added requirements for the prioritization and correction of safety hazards that create a fire risk in HFTDs. The changes impacting transmission were:
  - Shortened not to exceed timelines for correcting safety hazards that create a fire risk in HFTDs
  - 6 months in Tier 3 (fully implemented 9/1/18)
  - 12 months in Tier 2 (fully implemented 6/30/19)
- Examples of facility conditions with fire risk and non-fire risk in different situations with different corrective timelines are shown below based on the risk and level of impact on safety and reliability.

[Drawing 072148, “Fire Responsibility and CPUC Fire-Threat Areas”](#) has been updated to reflect the CPUC HFTDs. ET GIS, MapGuide, and Google Earth have also been updated with this information.

Priority E and F notifications for facilities that are located in Tier 3 of the HFTD map will be assigned dates with a maximum 6-month duration, and facilities located in Tier 2 of the HFTD map will be assigned dates with a maximum 12-month duration. This maximum duration will be set in SAP. If the notification is determined to be non-fire risk (e.g., NOT a threat that would result in a fire risk), the CIRT will code it as non-threatening and adjust the Recommended Repair Date based on the Priority Code.

The following is a list of conditions for transmission line overhead facilities that may create a fire risk in the HFTDs, but it is not all-inclusive. In addition, any conditions found on distribution assets should be reported, per [Section 2.6.5, “Reporting Other Nonconformances with Distribution Facilities.”](#)

- Excessively sagging conductors
- Inadequate separation
- Damaged or deteriorated conductors and associated conductor hardware (e.g., splices, jumpers, dampers).
- Broken insulators compromising adequate insulation values
- Damaged equipment (e.g., switches)
- Damaged or deteriorated crossarms

## Section 2.3.5.2 (continued)

- Damaged or deteriorated bird guards
- Deteriorated, damaged or excessively leaning poles
- Deteriorated, damaged or excessively leaning towers or tower foundations
- Damaged or broken guys or guy systems (e.g., anchors, splices)
- Equipment found as burnt, flashed, or with evidence of arcing (e.g., insulators, jumpers)
- Sagging guys
- Deteriorated, damaged or missing hardware that creates a fire risk (e.g., could cause structural failure, sparking)
- Insufficient clearance from vegetation
- Vegetation causing strain or abrasion
- Dead trees that could strike facilities
- Broken or exposed ground wire
- Missing or damaged wood pole bridging on underbuild

**2.3.5.3. Priority Code Due Dates for Non-Fire Risk Conditions within HFTDs**

Examples of conditions that may not create a fire risk (non-threatening) in the HFTDs and associated notifications and are not subject to the shorter HFTD durations are shown below. The CIRT will code it as non-threatening and adjust the Recommended Repair Date based on the Priority Code. The list is not all inclusive.

- Missing/illegible high voltage sign in remote locations, inaccessible to pedestrians or vehicles
- Missing/illegible high voltage sign on crossarms or poles above legible high voltage marking on lower crossarm(s)
- Damaged or missing guy marker in remote locations, inaccessible to pedestrians or vehicles
- Anchor guy with minimal slack where a pole is straight or leaning towards the anchor
- Climbing space obstruction from vegetation when it (1) does not prevent work from being done and (2) does not violate Rule 35
- Damaged, loose, or idle hardware that (1) is not in the climbing space and (2) does not pose a risk to employees or the public
- Missing or damaged bolt covers where only exposure is to the qualified electrical workers (QEWs)
- Exposed ground rod in inaccessible or remote location
- Access (e.g., damaged gate) that does not pose a risk to employees or the public

#### 2.3.5.4. Guide for Assigning Priority Codes

The inspector's primary responsibility in an overhead electric facility inspection or patrol is to examine and record the specific condition of the facilities. This requires a detailed evaluation (e.g., visual observation, and potentially, use of measuring devices, tools, or routine diagnostic test) to determine if there are any structural problems or hazards that will adversely impact safety, service reliability, or asset life, and to evaluate when each abnormal condition identified warrants corrective action.

Use the guidelines in [Table 4, "Guide for Assigning Priority Codes,"](#) to grade abnormal conditions that will adversely impact safety, service reliability, or asset life, that, in the judgment of the inspector, require corrective action before the next scheduled inspection. [Table 4](#) does not provide a comprehensive list of conditions that can be encountered. The Priority Code levels are for typical adverse conditions and must be adjusted up or down based on the inspector's judgment of the actual condition observed.

See the following examples:

**Example 1:** A missing damper is identified during a routine aerial patrol.

- [Table 2, "Overhead Facility, Damage and Corrective Action Codes,"](#) provides the facility code for missing damper.
- Referring to [Table 4](#), B is a typical Priority Code for a missing damper.
- The patrol datasheet is completed with the following information:
  - Facility Code = Damper-Steel or Damper-Wood
  - Damage Code = Missing
  - Action Code = Install

**NOTE:** IF the inspector is aware that the transmission line with the missing damper has an aged conductor with a history of vibration-related problems, the inspector may, based on his knowledge of the line, assign a Priority Code A (30 days) to install vibration dampers based on [Numbered Document 015073, "Vibration Damper Requirements for Various Types of Overhead Conductors."](#)

**Example 2:** A loose "Danger High-Voltage" sign is identified during a detailed inspection at a wood pole.

- [Table 2, "Overhead Facility, Damage and Corrective Action Codes,"](#) provides loose markers.
- [Table 4](#), a typical Priority Code for a loose "Danger High-Voltage" sign would be F.
- The notification in the inspection software is completed with the following information:
  - Facility Code = Marker (i.e., signs)-Wood
  - Damage Code = No Good/Out of Std
  - Action Code = Install



## Section 2.3.5.4 (continued)

**Example 3:** A wood pole is identified with severe woodpecker damage during a detailed inspection.

- [Table 2, “Overhead Facility, Damage and Corrective Action Codes,”](#) provides code for structure wood damage.
- [Table 4,](#) a typical Priority Code for severe woodpecker damage would be B.
- The notification in the inspection software is completed with the following information:
  - Facility Code = Structure-Wood
  - Damage Code = No Good/Out of Std
  - Action Code = Replace

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**Table 4. Guide for Assigning Priority Codes**

Component <sup>1</sup>	Priority Code				
	A (Immediate)	B (3 months)	E (12 months)		F (24 months)
<b>Anchor-Steel (ANCS)</b>  <b>Anchor-Wood (ANCW)</b>  <b>Guy Wire-Steel (GYWS)</b> Rust >50% material loss  <b>Guy Wire-Wood (GYWW)</b> Worn >50% material loss  <b>Guy Splices</b>  <b>Guy Pole (GUYS, GUYD)</b>  <b>Guy Stub (STUS, STUW)</b>  <b>NOTE:</b> Anchor head buried (per Dwg. 025998, e.g., incomplete inspection) <sup>2</sup>		Cracked 30 - 50% Slack 500 kV guy Over tension >50%  Clearance from energized conductors  Broken or missing storm guy where required  Anchor rod concrete has significant cracking, needs repair and resealing (e.g., mastic)  For the following configurations: - tri-pin - arm construction - close vertical distances - close jumper distances - anywhere with limiting distance where a bird can land and reach energized parts <b>AND</b> guy bonded and not sectionalized (e.g., does provide a path to ground) <sup>3</sup>	Rust 30-50% material loss Worn 30-50% material loss Cracked 5 - 30%  Soil Movement/slide/standing water  Load bearing guy anchor being pulled out  Slack guy Over tension 10 – 50%  Twisted/Bent anchor rod  Guy insulator in poor condition Guy tails in contact with earth  Preform grips not in thimbles Preform cross ties not properly installed  Anchor rod concrete has minor cracking, needs resealing (e.g., mastic)	For the following configurations: - T1 or TH - vertical suspension - no bird perching opportunities - sufficient distance from bird perching to energized parts - guys under hard tension (not storm guy) connected to bond wire or guy fixture <b>AND</b> guy bonded and not sectionalized (e.g., does provide a path to ground)  Guy bonded and not sectionalized (e.g., does provide a path to ground) <b>BUT</b> over-insulated for the circuit voltage OR mitigating environmental condition (e.g., non-combustible terrain such as parking lot, irrigated agricultural or landscape)	Storm guy anchor being pulled out  Anchor in good condition/ extension needed  Anchor rod in concrete not sealed (e.g., mastic)

<sup>1</sup> For Action Code abbreviations use INST (install), REPA (Repair), REPL (Replace)

<sup>2</sup> Return to field for completion. Do not process notification (keep in S5 status) until completed in field and anchor condition identified.

<sup>3</sup> Mitigate using new guy standard /bird mitigation

Component <sup>1</sup>	Priority Code				
	A (Immediate)	B (3 months)	E (12 months)	F (24 months)	
<b>Conductor-Steel (CONS)</b>  <b>Conductor-Wood (CNDW)</b>  <b>Shield Wire/OPGW, ADDS, non-ADSS lashed<sup>4</sup> (SHLS) (SHLW)</b>  <b>Jumpers (JUMS) (JUMW)</b>  <b>Tie Wire (TIES, TIED)</b>  <b>Ground Wire (GRWS, GRWT, GRWW)</b>	Corrosion >50% material loss  Gunshot >40% of strands broken  Arcing  Broken or loose tie wire (conductor not well seated in the saddle with vertical load or not fully captured with tie wire)	Broken strands and out-of-lay strands (e.g., gunshot) 15 - 40% Dwg 028855  Corrosion 40% - 50% material loss Conductor clearances  Broken or loose tie wire (conductor well seated in the saddle with vertical load or partially captured with tie wire)  Broken ground wire, loose connector, tie wire, or weight  Twisted bundled conductor  Jumper clearance less than requirement Dwg 068177	Corrosion 10 - 40% material loss  Uneven sag (send to engineering for evaluation)  Conductor kinked/pinched at clamp	Broken strands and out-of-lay strands (e.g., gunshot) 5 - 15% Dwg 028855  Vibrating	24-month tags for fiber cable only. See Section 2.4.8.
<b>Damper-Steel (DAMS)</b>  <b>Damper-Wood (DAMW)</b>  <b>Spacers (SPAS, SPAW)</b>	Corrosion >50% material loss  Cracked >50%	Cracked 30 - 50% Corrosion 40% - 50% material loss Broken spacer Broken/missing/ out of position damper <sup>5</sup> Bent >45 degrees damper	Out of position damper  Missing spacer (where required)  Corrosion 10% - 40% material loss	Cracked 5 - 30%	No 24-month tags

<sup>4</sup> For OPGW, ADSS and non-ADSS lashed fiber cable, refer to associated Job Aids referenced in Section 2.4.8 for specific conditions and priorities

<sup>5</sup> May assign Priority E if multiple dampers per phase are present and only outboard damper is broken/missing



Component <sup>1</sup>	Priority Code				
	A (Immediate)	B (3 months)	E (12 months)		F (24 months)
<b>Splices (SPLS) (SPLW)</b>	Corrosion >50% material loss	Corrosion, Hot, Broken, Cracked, Split, Loose/Slipped Automatic Splice or Splice < 10' to clamp	Automatic splice (replace or shunt) >10' to clamp		No 24-month tags
<b>Electrical clearances: GO95 Clear Infract-Tower (GO9S) GO95 Clear Infract-Wood (GO9W)</b>	Tree contacting line or showing signs of contact (burnt leaves or limbs)	Circuit-to-circuit Burnt Trees Clearance < <a href="#">G.O. 95</a>	Ground Clearance < <a href="#">G.O. 95</a>	Grade change (Ground Clearance < <a href="#">G.O. 95</a> )	No 24-month tags
<b>Foundation/ Concrete-Tower (FOND)<sup>6</sup></b>  <b>NOTE:</b> Earth covered /buried foundation (covering steel member) (incomplete inspection) <sup>7</sup> <b>Direct buried grillage</b>  <b>NOTE:</b> Uncover 6" to determine conditions. If no issue, rebury, no tag needed. Based on condition seen, if additional excavation needed, expose stub <18" <sup>8</sup>	Significant soil erosion or movement causing lack of support around the foundation.  Damage to, or separation of, main structural support members or stub angle tower leg that compromises structural integrity  Direct buried grillage rust, corrosion >50% material loss	Rust (rebar exposed with >50% material loss) Cracked (cracks >1/2") Buckled rebar, concrete spalling  Stub in concrete, has significant cracking, needs repair and resealing (e.g., mastic)  Soil movement (e.g., movement causing significant bowing of tower members)  Erosion (vertical) > 3'	Stub in concrete, has minor cracking, needs resealing (e.g., mastic)  Soil movement (e.g., erosion or piled dirt, movement causing some bowing of tower main legs)  Slide 10 - 15 inches  Exposed wood pile  Erosion 1'-3'	Rust 30 - 50% material loss of foundation or stub Cracked (cracks > 1/16")  Direct buried grillage rust, corrosion 30% - 50% material loss  Rotated	For optimization of permitting, estimating, and engineering criteria; as well as long-lead time materials and environmental reviews  Stub in concrete needs resealing (e.g., mastic was previously applied)

<sup>6</sup> For structural integrity or other significant concerns request an engineering assessment by directly contacting civil engineering or through the local supervisor.

<sup>7</sup> Return to field for completion. Do not process notification (keep in S5 status) until completed in field and foundation condition identified.

<sup>8</sup> Less than 18" minimizes the need for extensive excavation that could compromise tower stability and compaction effort.

Component <sup>1</sup>	Priority Code				
	A (Immediate)	B (3 months)	E (12 months)		F (24 months)
<b>Insulator (INSU)</b> <b>Insulator-Steel (INSS)</b> <b>Insulator-Wood (INSW)</b> (Insulators with these conditions, see <b>Error! Reference source not found.</b> Flashed Cracked, Broken, Gunshot, Chipped >1½ inches) <sup>9</sup>	Rust >50% material loss  Worn >50% material loss  Cracked >50%  Porcelain cracked to the cap  Contaminated (arcing)	Cracked 30 - 50% Contaminated (heavy) Tracking (heavy)  Chalking/cracking on polymer  Missing/loose/not fully seated cotter key or retainer pin  Out-of-plumb post or suspension insulator exhibiting signs of impacting conductor	Rust 30–50% material loss Worn 30–50% material loss  Contaminated (medium) Tracking (medium)  Missing grading ring on polymer (where necessary)  Corona rings damaged, missing (where required) or improperly installed (500 kV only)	Cracked 5 - 30%  Out-of-plumb suspension insulator > 2 bells out-of-plumb  Out-of-plumb post insulator > 6"	<b>No 24-month tags</b>
<b>Hardware (HRDS) (HRDT) (HRDD)</b>  Bolts, J-Bolts, U-Bolts, links, clamps, hot-end or cold-end hardware, shoe assembly, shackles, cotter key/pin, turnbuckle  <b>Hanger Plates</b>	Rust >50% material loss  Worn >50% material loss Cracked >50%  Contaminated (arcing)  Cotter key missing AND retainer pin not fully seated  < ¼" material remaining on plate <sup>10</sup>	Cracked 30 - 50%  Rust 30 - 50% material loss  Worn 30 - 50% material loss  Missing hardware (if necessary, send to engineering for evaluation)  Missing or loose cotter key  ¼" – ½" material remaining on plate	Loose  Turnbuckle out of threads	Cracked 5 - 30%	Turnbuckle not punched

<sup>9</sup> Glass insulators retain 80% of the M&E rating, thus if glass insulator is broken, use TD-1001M-JA07 to assign priority code to replace the broken insulator(s).

<sup>10</sup> Thickness of material (i.e., plate thickness) can determine if Priority A or Priority B. A relatively thin plate (e.g., less material) will be a Priority A.



Component <sup>1</sup>	Priority Code				
	A (Immediate)	B (3 months)	E (12 months)	F (24 months)	
<b>Switch (SWTC)</b> <b>Switch-Steel (SWIS)</b> <b>Switch-Wood (SWIW)</b> (Switch insulators with these conditions, see <a href="#">TD-1001M-JA07</a> , Flashed, Cracked, Broken, Gunshot, Chipped >1½ inches)	Rust >50% material loss Cracked >50% Arcing Open (unlocked) Inoperable Out of adjustment (blades and load break devices not fully seated) Switch handle not bonded to platform	Cracked 30 - 50% Corrosion (heavy) Contaminated (heavy) Tracking (heavy) Burnt Loose Broken Missing	Rust 30 - 50% material loss Contaminated (medium) Tracking (medium) Heating Bent/Bowed	Cracked 5 - 30% Corrosion (medium)	No Priority F Tag except for optimization of permitting, estimating, and engineering criteria; as well as long-lead time materials and environmental reviews
<b>Structure-Steel (STRS)<sup>11</sup></b> <b>Structure-Tower (STRT)<sup>12</sup></b> <b>Shield Wire Plates</b> <b>Crossarms (CRSL, CRST)</b>	Critical/Main member: Rust/Worn >50% material loss Cracked >50% Broken/missing Severe damage to main structural support members compromising structural integrity (stub, leg, cross arm) Internal corrosion of tubular members	Moderate damage to main structural support members compromising structural integrity (stub, leg, cross arm) H-frame cross brace broken Missing bolts on single bolt connection on critical member Broken/missing secondary member Cracked 30 - 50%	Pack-rust at joints, crevices or overlaps Cracked 10 - 30% Buckled/bent secondary member Out of plumb (send to engineering for evaluation) Rust 30 - 50% material loss Worn 30 - 50% material loss	Vibrating members Twisted Loose bolts, etc. Single bolt missing of multi-bolt connection Climbing steps in poor condition	For optimization of permitting, estimating, and engineering criteria; as well as long-lead time materials and environmental reviews Bolts not punched Paint /Galvanizing finish deteriorating and little rust or metal loss

<sup>11</sup> For hanger plates, refer to Hardware section of this table.

<sup>12</sup> For structural integrity or other significant concerns, request an engineering assessment by directly contacting civil engineering or through the local supervisor.

Component <sup>1</sup>	Priority Code				
	A (Immediate)	B (3 months)	E (12 months)		F (24 months)
<b>Markers (i.e. signs)-Steel (MRKS)</b> <b>Markers (i.e. signs)-Wood (MRKW)</b> <b>Guy Markers (GMKS, GMKW)</b> <b>FAA Lighting and Batteries</b>	Facilities or structures which have a recent history of trespass or third-party unauthorized access	Marker balls in poor condition and wearing on conductor  FAA battery no good, FAA Lighting missing or no good	Marker balls damaged	Anti-climbing guards broken, cracked, damaged	Cracked, Broken, Loose, Missing  Anti-climbing guards missing where required per TD-1009S-F01
<b>Right of Way (ROW1)</b>  <b>Vegetation (VEGN)</b>  <b>Vegetation-Tower (VEGT)</b>	Tree contacting line or showing signs of contact (burnt leaves or limbs)  Encroachments	Tree clearance < <a href="#">G.O. 95</a>  Clearances < <a href="#">G.O. 95</a>	Significant vegetation around base of structure, maybe impacting climbing or ability to inspect base of structure		Grade change (Ground Clearance < <a href="#">G.O. 95</a> ) that do not impact facilities.  Encroachments to be resolved via Land Management
<b>Road (ROAD)</b>	If posing threat to facilities due to wash out or land motion	No B tags	No E tags		Access road repair or replacement
<b>SCADA-Steel (SCDS)</b> <b>SCADA-Wood (SCDW)</b>	Inform GCC that SCADA is not operational (no tag required unless instructed)	Repair SCADA	No E tags		Replace or install SCADA



Component <sup>1</sup>	Priority Code				
	A (Immediate)	B (3 months)	E (12 months)		F (24 months)
<p><b>Structure-Wood (STRW)</b> (see note below)</p> <p>Includes pole, crossarms (CRSW, CRSL), bonding, bearing plates</p>	<p>Burnt/Rotten &gt;50% material loss</p> <p>Crossarm bracing missing or broken</p> <p>Bond wire broken &lt; ¼" gap</p> <p>Severe pole top damage or split top compromising hardware or crossarm integrity</p>	<p>Burnt/Rotten 40 - 50% material loss Cracked &gt;50% Broken</p> <p>Twisted (severe)</p> <p>H-frame cross brace broken</p> <p>Out of plumb &gt;5 feet (causing insulators and conductor compromised)</p> <p>Slide &gt;5 feet</p> <p>Soil Movement (Erosion &gt;3 feet in the ground)</p> <p>Worn/woodpecker/insect damage (severe and/or near hardware) Crossarm bracing loose Moderate pole top damage or split top compromising hardware or crossarm integrity</p>	<p>Burnt/Rotten 20-40% material loss</p> <p>Cracked 10 - 50%</p> <p>Twisted (medium)</p> <p>Slide 1 - 5 feet</p> <p>Out of plumb 3 - 5 feet (causing insulators and conductor compromised)</p> <p>Erosion 1 - 3 feet in the ground</p> <p>Standing water (not including seasonal conditions)</p>	<p>Worn/woodpecker/ insect damage (medium or minor damage near hardware)</p> <p>Ground wire in poor condition (corrosion, flashed, broken, missing)</p> <p>Ground molding in poor condition or missing (230 kV with shield wire)</p> <p>Climbing steps in poor condition</p>	<p>For optimization of permitting, estimating, and engineering criteria; as well as long-lead time materials and environmental reviews</p> <p>Erosion &lt;1 foot in the ground</p>
<p><b>Structure (Fiberglass or concrete)</b></p>	<p>Crossarm bracing missing</p> <p>Buckled (deformation)</p>	<p>Cracked fiberglass</p> <p>Cracked concrete into rebar</p> <p>Out of plumb &gt;5 feet (causing insulators and conductor compromised)</p> <p>Soil Movement (Erosion &gt;3 feet in the ground)</p> <p>H-frame cross brace broken</p> <p>Crossarm bracing loose</p>	<p>Cracked concrete (cracks &gt; ½") not into rebar</p> <p>Out of plumb 3 - 5 feet (causing insulators and conductor compromised)</p> <p>Erosion 1 - 3 feet in the ground</p>	<p>Climbing steps in poor condition</p>	<p>For optimization of permitting, estimating, and engineering criteria; as well as long-lead time materials and environmental reviews</p> <p>Erosion &lt;1 foot in the ground</p>

Component <sup>1</sup>	Priority Code				
	A (Immediate)	B (3 months)	E (12 months)		F (24 months)
Idle Facilities (any facility type)	Removal of idle facilities posing an immediate threat to life, property or reliability	No B tags	No E tags	-	For planning optimization of removal of non-emergency idle facilities.

**NOTE:** If, on performing the required visual inspection and hammer test, the field inspector believes the pole to be suspect, the pole must be tested further in accordance with Utility Standard TD-2325S, "Wood Pole Inspection, Testing, and Maintenance," and Work Procedure TD-2325P-01, "Wood Poles - Testing, Reinforcing and Reusing." This standard establishes the requirements for inspecting and testing the structural integrity of wood poles, the requirements for reinforcing and reusing, and requirements for testing wood poles prior to climbing. After completing the pole inspection, the field inspector must complete the TD-2325P-01-F01, "Attachment 1 - Pole Inspection/Test Report," and forward it to the supervisor. The supervisor will forward it to the estimating group for further evaluation and appropriate corrective action identification.

### 2.3.5.5. Work Scope Changes

Work scope of a notification may change for various reasons, such as:

1. An action has been taken to correct the initial condition (temporary or otherwise). Example:
  - a. A partial or temporary repair was completed; thus, the condition has changed, requiring a new priority to complete the full repair or replacement.
2. New information becomes available that was not available at the time the initial priority was established. Examples are:
  - a. Photographs and a more accurate description of the condition is provided, and the conditions are significantly different than originally reviewed.
  - b. New information creates a significantly different perspective.

Shown below are the actions to take if a “Repair” notification is changed to a “Replace” notification:

1. Document the conditions that impact why the repair cannot be completed on the notification, which assumes that some repair actions have been taken to change the condition.
2. Close the “Repair” notification.
3. Initiate a new “Replace” notification in the staging (S5) status that describes the new conditions and refers to the closed “Repair” notification.
4. CIRT will review and prioritize the new “Replace” notification with the date of the new notification as the start date since the condition has changed.

Shown below are the actions to take if a “Replace notification” is temporarily repaired:

1. Perform the temporary repair to make the condition safer.
2. Update the “Replace” notification with the actions taken AND description of the new condition.
3. Close the “Replace” notification.
4. Initiate a NEW “Replace” notification:
  - a. Include the description of the new condition based on the temporary repair.
  - b. Reference the closed “Replace” notification and confirm actions for the temporary repair.
  - c. Reference the cost order of the closed “Replace” notification if the cost from the closed “Replace” notification is to be captured on the new notification.

## Section 2.3.5.5 (continued)

5. CIRT will review and prioritize the new “Replace” notification with the current start date since the condition has changed.

## 2.4. Asset Inspections

### 2.4.1. Transmission Line Steel Structures

#### 2.4.1.1. General

Inspect transmission line steel structures from the foundation to the peak of the structure. If abnormal conditions are found during this process, use forms in the inspection software app to record the physical condition of the structure. It is required to use digital pictures in conjunction with these forms. Reference [TD-1001M-JA04, “Identifying Levels of Deterioration and Corrosion on Transmission Line Steel Structures and Supports”](#) and [TD-1001M-JA12, “Identifying Foundation Condition on Transmission Line Structures and Supports”](#) for consistent application of priority and condition codes. For structural integrity or other significant concerns, request an engineering assessment by directly contacting civil engineering or through the local supervisor.

See [Table 4, “Guide for Assigning Priority Codes.”](#) for information about assigning notification priorities for the condition found.

#### 2.4.1.2. Analysis of Condition by Civil Engineering and Asset Strategy Engineering

If a structure, foundation, conductor, switch or any other element is not in immediate risk of failure, but is considered to be beyond economic repair, complete an LC notification:

- Damage Code = No Good/Out of Stdrd,
- Action Code = Replace
- Priority Code = F

Asset strategy and civil engineering will evaluate the facility or equipment and make the determination of when and how it should be replaced. An overall yearly review of notifications and projects are part of the annual planning process by Asset Strategy.

Use the proper form in the inspection software app to record the physical condition of the structure whether it is a 500 kV or non-500 kV steel structure. Digital pictures may be used in conjunction with this form. Enter the conditions found in the SAP system in the inspection software. Reference the following documents for additional instructions to complete the form:

- [TD-1001M-JA02, “Detailed and Climbing Overhead 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”](#)



### Section 2.4.1.2 (continued)

The inspection software forms provide a ready reference to ensure a thorough inspection. It is intended that the items on the form will be inspected during the climbing inspection, along with recording other line-related component deficiencies that might be noticed during the inspection.

The “Tower Diagrams” part of [TD-1001M-F03](#) provides a framework to record guy tensions for the 500 kV steel structures.

### 2.4.2. Foundations

Inspection of the foundations for steel structures must be completed during each inspection. Reference [TD-1001M-JA12, “Identifying Foundation Condition on Transmission Line Structures and Supports”](#) for specific characteristics to look for during the inspection and compare what conditions are considered good and what conditions require repairs. Asset strategy and civil engineering can provide additional analysis to determine if and how a foundation should be replaced.

### 2.4.3. Steel Poles

Steel poles refers to various types of steel poles that are not lattice towers, including:

- Tubular steel poles
- Weathered steel poles

Currently, the steel structure inspection form is used for the inspection of these steel poles (tubular steel and weathered steel); however, routine climbing inspections are not expected for these steel poles. However, light duty steel poles are inspected using the non-steel structure inspection form.

### 2.4.4. Wood Poles

Inspectors should reference the Wood Pole job aid [TD-1001M-JA06, “Identifying Levels of Damage and Condition of Wood Poles and Non-Steel Framing on Transmission Line Structures and Supports”](#) to inspect wood poles. The job aid provides useful information on how to compare woodpecker holes, cracks, deterioration, and other abnormalities associated with the wood poles and crossarms. As CIRT reviews the LC notifications, the test and treat records for the individual pole are available for reference.

Over-stressed/overloaded wood poles can occur as a result of underbuilt distribution facilities, underbuilt third-party facilities, or as a result of reconductoring without an associated pole replacement.

If there is any reason to believe or suspect that wood poles are overloaded or over-stressed, record specific information about the situation and CIRT will assign it to the appropriate transmission line estimating office for further action. The information recorded must include, but is not limited to, the following items:

- Line name/ETL number, structure number, and location
- Wire size, cable size, span length, attachment height

#### Section 2.4.4 (continued)

- Pole size and class
- Any additional information deemed necessary for identification or explanation

Complete the LC notification form in the inspection software using the FDA codes provided in [Section 2.3.4, "Corrective Notification: Facility, Damage, Action \(FDA\) Codes Facility Codes."](#)

#### 2.4.5. Other Poles

Besides steel structures and wood poles, other poles in the field might be laminate, concrete, aluminum, or fiberglass. Individual forms are not available for these materials, thus the non-steel structure inspection form should be used. Use the comments section effectively to make allowances for non-steel or non-wood structures.

#### 2.4.6. Guy Wires and Guy Anchors

Guy wires and guy anchors are primarily installed to support mechanical strength in dead-ends, angles, and spans where tensions run higher than adjacent spans. This assembly can be subject to various types of exposure, such as dampness or soil disturbance due to construction or agriculture activities. Inspect guy wires, splices and automatic guy dead-ends and replace when necessary by means of utilizing a U-shape guy preform. Existing guy wire splices must be capable of supporting the intended strains.

During detailed inspections, the QCR will inspect all guy wire assemblies, looking for any indication which may suggest the guy splice, automatic guy dead-end, guy anchor, or buried guy anchor has internal deterioration occurring per [TD-1001M-JA13, "Identifying Levels of Damage and Condition of Guys and Anchors on Transmission Line Structures and Supports"](#) and [TD-06537B-001, "Automatic Guy Strand Dead Ends and Splices Supporting Transmission Facilities"](#).

Refer to [TD-06537B-001, "Automatic Guy Strand Dead Ends and Splices Supporting Transmission Facilities"](#) for conditions that might drive deterioration on guy wires and two options for acceptable repairs for the automatic splices. If in doubt of whether the splice can support the intended strains, replace or repair regardless of the visual condition if warranted. Inspect the existing guy assembly to ensure all other components are in an acceptable condition and will not pose a hazard during either option for reinforcement.

#### 2.4.7. Conductor Inspections

Inspect transmission lines and their associated conductors on a regular basis. If an abnormal condition is found during this process, use the inspection software to record the physical condition of the conductor. Refer to [Table 4, "Guide to Assigning Priority Codes"](#) and [TD-1001M-JA10, "Identifying Conductor Conditions"](#) for information about assigning Priority Codes.

If a conductor is not in immediate risk of failure, but is considered beyond economical repair, contact Asset Strategy for advice and to consider replacement.

## 2.4.8. OPGW, ADSS, and non-ADSS Lashed Fiber Cable Inspection

When inspecting OPGW, ADSS, and non-ADSS lashed fiber cable, refer to [TD-1001M-JA11, "Evaluating Conditions of OPGW in Transmission Line,"](#) [TD-1001M-JA21, "Evaluating Conditions of ADSS in Transmission Line,"](#) and [TD-1001M-JA22, "Evaluating Conditions of Non-ADSS Lashed Fiber Cable in Transmission Line."](#) Some installations of OPGW have been deteriorating due to the non-standard installation of the hanging hardware, as well as internal corrosion build-up. The non-standard installation includes, but is not limited to, the following: incorrect placement of U-Bolt Dead-End spacer bar, incorrect U-Bolt Dead-End ground types, missing vibration dampers, improperly placed down-lead cushions, and not maintaining minimum separation between OPGW cables on splice towers. This situation has resulted in broken outer layer OPGW strands and corrosion.

Some installations of ADSS cable have been deteriorating due to dry band arcing/tracking and corona discharge. This is the situation where the electric field is too high for the ADSS cable to survive and over time the electric field has burned through the cable jacket.

Some installations on transmission poles with distribution underbuild have non-ADSS fiber cable with broken lashing/messenger wire. In this situation, the messenger wire may be at risk of flipping up into electric conductors during a high wind event.

During patrols and inspections, when possible, examine the cable and hardware installation of the OPGW, ADSS, and non-ADSS lashed fiber cable.

If signs of tracking, broken strands, separating strands, bare fiber, exposed buffer tubes, or any other signs of deterioration or damage are detected, create an SAP notification indicating the following:

- Facility Code = Shield Wire/OPGW (Steel or Wood)
- Damage Code = No Good/Out of Std
- Action Code = Repair or Replace

**NOTE:** The facility code for all fiber cable is "Shield Wire/OPGW" – whether the fiber is OPGW, ADSS, or non-ADSS lashed.

If the damage on the OPGW, ADSS or non-ADSS lashed fiber cable creates an imminent threat (refer to [TD-1001M-JA11, "Evaluating Conditions of OPGW in Transmission Line,"](#) [TD-1001M-JA21, "Evaluating Conditions of ADSS in Transmission Line,"](#) and [TD-1001M-JA22, "Evaluating Conditions of Non-ADSS Lashed Fiber Cable in Transmission Line,"](#)), the QCR must immediately notify the supervisor and the IT Emergency Network Operating Center (ENOC). Provide the following information:

- Description of the shield wire condition
- Location, including the line name and tower number
- Field conditions, including information on environmentally sensitive areas
- Location access

## Section 2.4.8 (continued)

ENOC can be contacted at [REDACTED]. Unless otherwise directed, initiate an SAP notification, as shown above, including comments regarding date and time of notification to ENOC and associated contact name and work order number provided by ENOC, if applicable.

The IT department manages most shield wire notifications. It will verify the condition, confirm the work to be completed, and confirm the need to create the LC notification. IT must notify the issuing department when the conditions have been corrected or resolved and ensure that the LC notification has been closed.

### 2.4.9. Splice Inspections

When inspecting splices, refer to [TD-1001M-JA14, "Identifying Levels of Damage and Condition of Splices on Transmission Line Structures and Supports."](#) Look for deterioration and refer to the job aid for comparison of the condition found. It is possible that the splice may be an older style. Refer to the job aid to identify the type of splice being inspected.

### 2.4.10. Insulator Inspections

When inspecting insulators, refer to [TD-1001M-JA07, "Identifying Levels of Corrosion and Condition of Hardware and Insulators on Transmission Line Structures and Supports."](#)

For barehand work, refer to the [TD-1248M, "Electric Transmission Live Line Barehand Work Procedures Manual"](#) for the minimum number of insulators and clearance requirements.

### 2.4.11. Hardware Inspections

The category of hardware encompasses a broad range of equipment. This includes bolts, J-Bolts, U-Bolts, links, clamps, hot-end or cold-end hardware, shoe assembly, shackles, cotter key/pin, and turnbuckle. When inspecting hardware's, refer to [TD-1001M-JA07, "Identifying Levels of Corrosion and Condition of Hardware and Insulators on Transmission Line Structures and Supports."](#)

### 2.4.12. Switch Inspection

Transmission line switches must be inspected in accordance with circuit inspection cycles, and maintained in accordance with procedures, per [TD-1006P-02, "Switch Maintenance and Inspection Program for Electric Transmission"](#), [TD-1006P-02-JA-01, "Electric Transmission Line Switch Inspection/Function Test Job Aid"](#) and [TD-1001M-JA15, "Identifying Levels of Deterioration and Corrosion on Transmission Line Switches."](#) Transmission line switches must be numbered in accordance with [TD-1006B-004, "Procedure for Marking Duplicate Transmission Switches."](#)

If a switch is not in immediate risk of failure, but is considered beyond economical repair, follow the process described in [Section 2.4.1.2, "Analysis of Condition by Civil Engineering and Asset Strategy Engineering"](#) and refer to Section [2.6.2, "Reporting Inoperative Equipment."](#)

### 2.4.13. Animal Guard Inspection and Bird Nests

Inspectors reviewing animal guard equipment should refer to [TD-1001M-JA08, "Identifying Levels of Damage and Condition of Animal Guards on Transmission Line Structures and Supports."](#) The equipment should be reviewed for appropriate location, deterioration that inhibits protecting animals, and deterioration that could wear on the electrical equipment, such as the conductor. Refer to [TD-1001M-JA09, "Identifying Maintenance Work on Bird Nests for Transmission Line Structures and Supports"](#) for guidance when a bird nest is found on the asset. If the Inspector believes the bird nest causes a Priority A or B condition, contact local transmission line maintenance supervisor.

### 2.4.14. Idle Facilities

Idle facilities and suspected idle facilities are inspected and patrolled similarly to other overhead assets. When an abnormality or non-conformance is identified for idle facilities, create an LC notification using the inspection software. Idle facility inspection is described in [TD-1003S-B001, "Idle Line Investigation and De-Energization"](#) document.

IF the QCR finds or suspects facilities inspected or patrolled are idle,

THEN the QCR should:

- a. Indicate the FDA in the inspection software:
  - Facility Code = Structure (Steel, Tower or Wood)
  - Damage Code = Idle
  - Action Code = Remove
- b. Idle facility notifications will be reviewed by CIRT and the process for deenergizing lines will be initiated by Asset Strategy.
- c. Reference internal standard [TD-1003S, "Management of Idle Electric Transmission Line Facilities"](#) to nominate for removal

### 2.4.15. FAA Lighting and Aerial Ball Inspection

Federal Aviation Administration (FAA) obstruction lighting must be reviewed for obvious defects (e.g., damaged, misaligned, dirt/debris on solar panels) and must be verified operational.

IF the QCR identifies inoperable, damaged, misaligned, or otherwise non-functional Obstruction Lighting,

THEN the QCR should refer to [TD-1001P-03, "Obstruction Lighting Failure Notification Process"](#) for procedure on notifying Helicopter Operations, who will notify the FAA (e.g., the 15-day periods).

- The QCR must notify the transmission supervisor regarding an inoperable, damaged, misaligned, or otherwise non-functional Obstruction Lighting with the information required in [TD-1001P-03, "Obstruction Lighting Failure Notification Process."](#)

## Section 2.4.15 (continued)

- The transmission supervisor or designee will contact Helicopter Operations (707-449-5833) to notify the FAA (refer to [TD-1001P-03, "Obstruction Lighting Failure Notification Process"](#)) to initiate the FAA Notice to Airmen (NOTAM), request 15 day extensions, and communicate when repairs are complete.
- The transmission supervisor will document in the SAP notification the NOTAM and dates/times/information for each associated communication with Helicopter Operations."

For FAA lighting that is not functioning properly, and where repairs are impractical or uneconomic, complete an LC notification in the inspection software with the appropriate information below.

- Facility Code = FAA Battery (Steel or Wood)
- Damage Code = No Good/Out of Stdrd
- Action Code = Replace

OR

- Facility Code = FAA Lighting (Steel or Wood)
- Damage Code = Missing
- Action Code = Install

OR

- Facility Code = FAA Lighting (Steel or Wood)
- Damage Code = No Good/Out of Stdrd
- Action Code = Repair or Replace

THEN: Priority Code = B

## 2.5. Infrared (IR) Inspection

IR inspection is an effective tool in a preventive maintenance program. IR inspection reduces the potential for component failures and facility damage and facilitates a proactive approach to identifying abnormal components for repair/or replacement. See [TD-1001P-14, "Infrared \(IR\) Inspection Procedures"](#) for the procedures and requirements and [TD-1001M-JA19, "Evaluating Conditions from Infrared \(IR\) Inspection in Transmission Line"](#) for condition assessment.

### 2.5.1. Overhead

IR inspections are performed as required, per [TD-1004P-04, "Conductor Rerate Process for Overhead Transmission Circuits,"](#) or as triggered.

IR inspections may be performed in conjunction with overhead inspections, but must not be considered as, or substituted for, a detailed inspection.



### Section 2.5.1 (continued)

IR inspections are performed on overhead transmission circuits on a 5-year cycle, on a circuit-based frequency, with approximately 20% of the lines scheduled for an infrared inspection throughout the year. However, for circuits with critical operational impact, maintenance plans should include periodic IR inspections, if recommended by the local transmission line maintenance supervisor. Local transmission line maintenance supervisors should also consider adding lines to the annual summer readiness IR inspection in their area for conditions such as listed below:

- High concentration of bolted connectors on dissimilar conductors (copper to aluminum).
- Line averages one sleeve failure every 3 to 5 years.
- Radial line where previous splices/sleeves have been replaced as normal maintenance with signs of deterioration.
- Line has experienced at least two or more tree contacts annually (high fault current), which could have caused stresses on sleeves/connectors.
- Type of terrain and vegetation on the path of the line circuit.
- Age of line exceeds 70+ years with original insulators, mechanical connectors, and hot end hardware showing signs of deterioration.

IR 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. IR inspections are dependent on adequate circuit loading and weather conditions, and scheduling IR inspections on specific circuits must take into consideration average line loads experienced during that month. For example, a circuit on the coast must have IR performed in the winter, when lines are more heavily-loaded or it may not be possible to obtain adequate results from the IR inspection.

- Perform IR inspections when required by Utility Procedure [TD-1004P-04, "Conductor Rerate Process for Overhead Transmission Circuits,"](#) or as triggered.
- In addition, lines that have exceeded their emergency ratings for 30 minutes or more must be IR-inspected for possible component damage. Schedule this inspection as soon as possible or when conditions allow (line loading, weather, etc.).

It is the responsibility of Electric Grid Operations to make notifications in accordance with Utility Procedure: O-63, "Reporting Transmission Line Loading Exceedances to Asset Strategy."

Infrared inspectors must refer to [TD-1001P-14, "Infrared \(IR\) Inspection Procedures"](#) for specific infrared methodology and [TD-1001M-JA19, "Evaluating Conditions from Infrared \(IR\) Inspection in Transmission Line"](#) for condition assessment.

### **2.5.2. Determining the Maintenance Priority**

To assess and prioritize the relative severity of the conditions found during the IR inspection, as based on the measured temperatures and/or temperature rise, refer to [TD-1001P-14, "Infrared \(IR\) Inspection Procedures"](#) and [TD-1001M-JA19, "Evaluating Conditions from Infrared \(IR\) Inspection in Transmission Line."](#)

## Section 2.5.2 (continued)

IF IR system does not provide temperature readings, and there are no obvious visual signs of deterioration,

THEN make a Priority B tag and complete as soon as possible.

## 2.6. Other Abnormalities and Nonconformances

### 2.6.1. Reporting Nonconformance with CPUC General Orders

Any nonconformance with [G.O. 95, "Rules for Overhead Electric Line Construction,"](#) and [G.O. 128, "Rules for Construction of Underground Electric Supply and Communication Systems,"](#) that impacts safety or reliability, or an abnormal condition caused by third-parties that negatively impacts Company facilities, must be documented on an SAP notification. Abnormal conditions caused by third parties must be reported to Land Management.

### 2.6.2. Reporting Inoperative Equipment

If a piece of equipment has been identified as damaged or inoperative, the supervisor or designee must notify the GCC of the equipment condition.

GCC personnel enter the equipment into the Transmission Operations Tracking & Logging (TOTL) and if the equipment meets the criteria as outlined in [TD-1400P-08, "Electric Transmission Operations, Line, and Substation COE Procedure,"](#) assign a Critical Operating Equipment (COE) personal identification number (PIN).

The QCR, transmission supervisor, or designee must add the COE PIN to the notification's short text field in SAP and notify the GCC of the notification number associated with the PIN.

### 2.6.3. Reporting Abnormalities in Manufacture

Abnormal conditions or failures that could be the result of a manufacturer or workmanship defect must be reported on a [Form 62-0113, "Material Problem Report"](#) (MPR), and submitted to supplier quality improvement personnel for follow-up action, as described in [SCM-2106P-01, "Material Problem Report Procedure."](#)

IF material is sent to Applied Technology Services (ATS) personnel for testing,

THEN include a form [TD-1957P-01-F01, "Component Testing Information Sheet,"](#) as described in [Utility Procedure TD-1957P-01, "Electric Transmission Line Equipment Failure Analysis Procedure."](#)

**CAUTION:** When collecting failed components, care should be taken to protect the failed surfaces by avoiding touching the failed sections. Even minimal contact with the failed surfaces can prevent an accurate failure analysis.

MPRs are **not** to be used for material which has failed as a result of end-of-service life or because of normal wear.



## 2.6.4. Reporting Vegetation Nonconformance

Initiate an SAP notification if trees or brush are within the vegetation-to-conductor clearance distances or pose an imminent threat to fall into a conductor.

In addition to initiating the notification, take the action required, as based on the voltage class and the vegetation-to-conductor clearance distance listed in [Table 5, "Vegetation-to-Conductor Clearance Distance."](#)

**Table 5. Vegetation-to-Conductor Clearance Distance**

Voltage (kV)	Clearance Distance	Action Required
60/70*	4 feet or less	Call VPM (Veg Program Manager)
115*	10 feet or less	Call VPM
230	10 feet or less	Call GCC and VPM
500	15 feet or less	Call GCC and VPM

\* If the line is NERC/CAISO critical (Spaulding – Summit 60 kV, Drum-Summit #1 115 kV and Drum-Summit #2 115 kV), call the GCC and VPM as required for 230 kV and 500 kV lines.

Refer to [TD-1001M-JA20, "Evaluating Conditions for Vegetation Nonconformance in Transmission Line"](#) if a tree poses an **imminent threat** (e.g., the tree is uprooting and can fall into conductors), but not within the clearance distances shown in Table 2, "Imminent Threat Vegetation-to-Conductor Clearance Distance" in [TD-1001M-JA20, "Evaluating Conditions for Vegetation Nonconformance in Transmission Line."](#) Contact the VPM directly. A voice mail is not considered notification for an imminent threat. The information must be given directly to a person. If the VPM is not available, contact the next person within VM. The VM department will verify the condition per utility procedure [TD-7103P-05, "Transmission Vegetation Management Imminent Threat Procedure."](#) Provide the following information:

- Description of the vegetation condition
- Location, including the line name, nearest tower number and approximate distance to the tower
- Field conditions, including information on environmentally sensitive areas
- Location access

For all vegetation notifications and hazard conditions that are encroaching on the vegetation-to-conductor clearance distance listed in [Table 5, "Vegetation-to-Conductor Clearance Distance"](#) the SAP notification form must indicate the following information:

- Facility Code = Vegetation
- Damage Code = Overgrown
- Action Code = Remove
- Priority A = Emergency Unsafe Condition

Refer to [TD-1001M-JA20, "Evaluating Conditions for Vegetation Nonconformance in Transmission Lines"](#) for additional information and how to evaluate the condition. The VM group manages all vegetation notifications and will verify the condition and confirm the clearance distance per Utility Procedure [TD-7103P-09, "T&D Vegetation Management Hazard Notification."](#) VM must notify the issuing department when the conditions have been corrected or resolved and ensure that the notification has been closed.

## Section 2.6.4 (continued)

As part of the routine VM work, VM inspects 100% of overhead lines annually and performs work necessary to ensure that no vegetation encroaches on PG&E clearance distances (see [Table 5, "Vegetation-to-Conductor Clearance Distance"](#) on Page 39). Clearance distances are based on regulatory clearance requirements plus a buffer and vary by voltage. VM also manages a transmission reliability program designed to improve reliability and reduce fire risk by clearing incompatible vegetation from the full width of the right-of-way. This work is planned annually in collaboration with T-Line Asset Strategy.

In addition, VM performs tower and pole clearing as part of their routine tree work, to allow for the inspections of tower and pole bases and footings and down guys. The pre-inspection and tree crew contractors will inspect the vegetation around the poles, towers and down guys while doing their patrols and inspections. If woody vegetation is in contact with the pole or tower, or significantly interferes with the inspection of the pole or tower base or footings, then the contractors will arrange for appropriate vegetation work. If woody vegetation is in contact with the guy wire, the contractors will determine if vegetation work will be required and arrange for any necessary work. Refer to [TD-1001M-JA20, "Evaluating Conditions for Vegetation Nonconformance in Transmission Lines"](#) for additional information and how to evaluate the condition. See Utility Procedures [TD-7103P-01, "Transmission Non-Orchard Routine Patrol Procedure \(TRPP\)"](#) and [TD-7103P-02, "Transmission Orchard Patrol Procedure \(TOPP\)."](#)

### 2.6.5. Reporting Other Nonconformance with Distribution Facilities

When QCRs are performing patrols and inspections on facilities with distribution assets, a patrol of the distribution assets should also be performed. Examples of the type of issues that could be identified are:

- Damaged or broken poles
- Broken or decayed crossarms
- Broken insulators
- Damaged tie wire
- Vegetation issues
- Missing or broken bridging wire

If there is an immediate hazard and/or emergency, contact the transmission supervisor or designee and standby, if needed. If a structural problem or hazard is identified, that is NOT an emergency, then, if applicable, note the issue on the List of the Datasheet, and submit a digital photo documenting the issue and pole number to the local PS&R Supervisor OR initiate an SAP notification noting "DISTRIBUTION" as the first word in the comments section and CIRT will coordinate with Distribution Gatekeepers.

If the local PS&R Supervisor is contacted, leave a voice mail message if not available, including the following information:

- Issue identified (e.g., broken crossarm)
- Transmission pole number (if distribution underbuild) or distribution pole number
- Confirmation that a map will be emailed if there is no pole number

## Section 2.6.5 (continued)

- Latitude and longitude of the pole

The transmission line maintenance supervisor will review the finding while reviewing the patrol or inspection documents. The clerk will create an email outlining the above details to the local PS&R Supervisor with a cc: to the QCR and the transmission line maintenance supervisor and attach the copy of the map with the location identified and all photos. The clerk will print a copy of the email and file it with the completed datasheets.

PS&R Supervisor is required to respond to email within 5 business days, confirming what action was taken:

- If work is required, then reference the new EC notification number created for work to be completed.
- If work is required, but was already documented on an existing EC notification in SAP, then provide the existing EC notification number.
- If work is not required, then provide information as to why there is no work required (not a safety issue per current standards/guidelines, etc.)

Upon receipt of the response email from T-Line, the P&R Clerk will save a copy of the response email with the following naming convention Div\_Plat Map\_MMDDYY (month/day/year of finding from daily log).

**NOTE:** Based on a recent FERC ruling, Transmission Line (T-Line) is no longer authorized to complete Distribution bridging work under Transmission FERC funding. As a result, all Distribution bridging work will be completed under Distribution budget authority. Any nonconformance regarding bridging at the distribution level should be reported using the steps outlined in this section.

### 2.6.6. Reporting Nonconformance With Access Roads and Gates

Access related work generally falls into several primary categories:

- Create road – there is no road or trail and one is needed.
- Vegetation clearing – road or other access routes (whether established or not) to facilities are overgrown, or vegetation is encroaching, so road/access needs to be “brushed.” Use Brush/Fuel in inspection software.
- Vegetation in proximity of lines or vegetation in contact with or obstructing structure footings – refer to [Section 2.6.4, “Reporting Vegetation Nonconformance.”](#)
- Road work – can be a range of issues from rockslides and small cutslope slumps of dirt to larger fillslope failures, downed trees or boulders blocking access, rills and gullies (erosion from drainage problems), blown out crossings, etc.
- Watercourse crossings – (e.g., culverts and bridges) blowout or failed.
- Road work encroachment – refer to [Section 2.6.8, “Reporting Nonconformance with Trespass or Encroachment.”](#)
- Gates – existing gate is broken or damaged and needs to be replaced; gate has been stolen, or there is no gate and one is needed. (If gate is locked, refer to [Section 2.6.8, “Reporting Nonconformance with Trespass or Encroachment.”](#))



## Section 2.6.6 (continued)

- IF no gate is present and a new gate is needed for access,  
THEN consider this for Capital work. QCR would need to make a note of this in the Field Comments.

For any type of access issue, the Corrective Work Form (Facility-Damage-Action) approach to creating a new LC notification should be followed. By selecting Facility type “Road,” the appropriate management team will receive the corrective work notification.

If QCR determines access is needed, Damage should be “Missing,” and Action should be “Install.” Use Field Comments to indicate type of vehicle for which access is needed – Bucket truck, Pickup, OHV – Razor, Foot trail.

If there is a road in the Right-of-Way, treat it like any road, and Damage should be “Brush Fuel.” If work area is a hard surface area (e.g., paved or rock) and is greater than 10,000 square feet, approximately longer than ¼ mile of road, then consider this for Capital work. QCR must need to make a note of this in the Field Comments.

### 2.6.7. Reporting Nonconformance With Boardwalks

Boardwalk reconstruction and renovation are part of a program-based approach that prioritizes all issues to determine the need to reconstruct, repair, or abandon the boardwalk to ensure safe and reliable access to facilities. Construction work is complicated due to short construction windows and alignment with environmental agencies permitting cycles. Natural Resources Management (NRM) is working with T-Line to rebuild all boardwalks in the service territory. Currently there are multiple projects underway to rebuild sections of boardwalks; however, complete renovation will take 5–7 years with a completion date for full reconstruction projected for 2024. NRM has completed inspections of all boardwalks which led to the current renovation program. Contact NRM for specific questions. Additional nonconformance LC notifications are **not necessary**.

If it is necessary to utilize a boardwalk, all safety precautions listed in [5MM, “Boardwalk Access Safety,” issued 05/29/18](#), must be followed.

### 2.6.8. Reporting Nonconformance With Trespass or Encroachment

When encroachments or other uses on PG&E property or easements are identified, they are evaluated for interference with maintaining, operating, or constructing electric transmission facilities as described in utility procedure [TD-1005P-03, “Evaluating Uses of Company Transmission Line Easements by Others”](#) and utility standard [TD-1005S, “Right-of-Way and Encroachments.”](#)

Evaluate the proposed use or encroachment.

- If the activity poses a threat of potential damage to facilities that could cause an immediate danger, contact your supervisor immediately.
- Determine if there is interference and whether permanent access can be maintained for inspections, routine maintenance, reconstruction, growth of facilities and emergency response.
- Confirm there is sufficient conductor-to-ground clearance, radial line clearances and clearances around structures.

## Section 2.6.8 (continued)

- Confirm whether excavation, grading, equipment use, or land erosion is impacting pole or tower stability.
- Determine if there are any uses or encroachments that require grounding or there are any prohibited uses (e.g., buildings, structures, pools or wells).
- Refer to [TD-1005S, Attachment 1, "Permissible Uses of Pacific Gas and Electric Company \(Company\) Easements."](#)

Specifically, complete a notification to report any overhead conductors above buildings, swimming pools, wells, or similar structures that are not permitted in the easements. The exception are buildings that house the equipment of third parties, but these are subject to complete and ongoing review.

Verify if the encroachment has already been submitted. If it hasn't, complete a notification in SAP, including digital photographs, if appropriate.

The SAP notification form must indicate the following information:

- Facility Code = Right of Way
- Damage Code = Encroachment
- Action Code = Remove

The QCR's supervisor reviews the location and sends to Asset Strategy Manager or Specialist. The Asset Strategy Manager or Specialist will approve or disapprove of any encroachment or other use. The supervisor will send an email or hard copy to the land agent summarizing:

- How the encroachment or use interferes with utility operation.
- What modifications could be implemented to eliminate any interference.
- Whether Land Management should abate the encroachment or compel the user to enter into an encroachment agreement.
- What measures might be taken to protect facilities during future changes or installations (e.g., maintaining minimum approach distances during construction).
- Any issues that might jeopardize safety or service reliability (e.g., construction near conductors).
- Any steps to meet regulatory requirements (e.g., grounding metal fences).
- Any utility activity that could damage the new use, with a statement that the Company is not liable for such damage.

The land agent will negotiate the Company position with the third party, if required, and discuss the proposed agreement with the electric transmission stakeholders, including the Asset Strategy Manager or Specialist and the transmission line maintenance supervisor.

The Asset Strategy Manager or Specialist and the transmission line maintenance supervisor must review and approve the land agent's proposed agreement, which the land agent will present to the third party. When this process is complete, the land agent will notify the transmission line maintenance supervisor that the work is completed and the transmission line maintenance supervisor will close the notification in SAP.

### 2.6.8.1. Metal/Masonry Fences within 8ft of an Asset

Third-party attachments of metal fences (cyclone, barbed wire, etc.) to steel towers, wood poles, and/or transmission down guys are not permitted. Remove all attachments and instruct the fence owner that this attachment or contact is not allowed. Include comments in the inspection form regarding work done, fence removal, and owner interaction.

### 2.6.9. Conductive Objects within Eight Feet of an Asset

Conductive objects embedded in the ground and extending upward within 8 feet of PG&E's steel towers or steel/concrete poles (e.g., signposts, fence posts) need to be reviewed for touch potential. Create an LC notification using:

- Facility Code = Structure (steel/tower/wood)
- Damage = Out of Stdrd
- Action Code = Repair.

Include comments regarding the third-party fence, proximity distance, and take pictures.

## 2.7. Underground Inspection

Underground inspection methodology follows the same basic process as overhead inspection. Inspectors are assigned the asset to inspect and perform the inspection based on specific procedures. However, underground assets do require different types of inspections, which are addressed in the asset inspection section below and associated Job Aids [TD-1001M-JA16, "Identifying XLPE Conditions,"](#) [TD-1001M-JA17, "Identifying Underground Pipe-Type Conditions,"](#) and [TD-1001M-JA18, "Identifying Underground Manhole and Enclosure Conditions."](#)

### 2.7.1. Underground Inspection Frequencies

See [Table 6. Underground Inspection Frequencies](#) for the underground inspection frequencies. Use the underground transmission inspection sheets and forms TD-1001M-F06 through TD-1001M-F11, depending on the inspection performed, to document test results and any abnormal conditions encountered in the field.

**Table 6. Underground Inspection Frequencies**

Voltage (kV)	Inspection Type	Cable Type	Inspection Frequency (years)
All	Detailed	Pipe-type	Once every calendar year
	Detailed	XLPE	Once every 2 calendar years
	Routine	Pipe-type	Once each month
	Routine	XLPE	Once every 3 months
	Infrared	Pipe-type	Every 2 calendar years on riser terminations
	Infrared	XLPE	Every 2 calendar years on riser terminations
All	Detailed	Submarine	Once every for first 5 years, then adjust to every 2 calendar years, if warranted*
	Routine	Submarine	Once every 3 months*
	Marine Monitoring	Submarine	Various

\*Land portion of the submarine cable – Perform same detailed inspection as for XLPE cable.



### 2.7.1.1. Substitution of Inspections

- It is permissible to substitute a detailed inspection for a routine inspection.
- It is not permissible to substitute routine inspections for detailed inspections.
- It is not permissible to substitute an infrared inspection for either a detailed or routine inspection. It is also not permissible to substitute a detailed or routine inspection for an infrared inspection.

### 2.7.2. Underground Non-Routine Patrol

Specific conditions require follow-up inspections scheduled by the supervisor, independent of the routine schedule.

The following are examples of situations that could prompt a non-routine patrol:

- Component failure (like components) or components proven defective by testing
- Failures caused by natural disaster or storm
- Third-party observations and complaints
- Observed third-party development or construction conflict
- Known, recurring conditions that jeopardize line integrity or reliability performance
- Directional drilling or trenching in the vicinity of an underground transmission line not identified by Underground Service Alert (USA) locating and marking
- Encroachment of the underground easement by third parties affecting access to underground transmission line for inspection or repairs
- Public events with extremely large attendance

### 2.7.3. Documentation and Forms

Underground inspections have forms assigned specifically for the inspection of underground assets. The forms are designed to capture the results of the visual inspections along with any readings or measurements that are performed. Any abnormalities or non-conformances require the creation of an LC notification. The processing of the forms and notifications are identical to the overhead process, except the supervisor provides the review and processing of the LC notifications, and not CIRT.

#### 2.7.3.1. Facility, Damage, and Action Codes

Underground has facility, damage, and action codes that are used in the LC notifications, as shown in [Table 7, "Underground Facility, Damage and Corrective Action Codes"](#) on Page 46.

#### 2.7.3.2. Priority Codes

Priority codes are assigned based on the inspector's knowledge of the condition of the asset and the Priority Codes assigned in Standard [TD-8123S, "Electric System \(T/S/D\) Patrol, Inspection, and Maintenance Program."](#)

Section 2.7.3.2 (continued)

**Table 7. Underground Facility, Damage and Corrective Action Codes**

Facility	Damage	Action	Facility	Damage	Action
Alarm	Missing	Install	Hardware	Missing	Install
	No Good/Out of Std	Repair		No Good/Out of Std	Repair
		Replace			Replace
Cable	No Good/Out of Std	Repair	Insulator	No Good/Out of Std	Repair
		Replace		Replace	
	Dig In	Repair	Contaminated	Clean	
		Replace	Non-Routine Patrol	Lock Out	Ground Patrol
Lockout	Ground Patrol	Relay		Infrared Patrol	
Cable Termination	No Good/Out of Std	Repair	Oil System	Leak	Repair
		Replace			Replace
Cover/Manhole	Missing	Install		Inad Pressure	Adjust
	No Good/Out of Std	Repair	Other		Other
Cathodic Protection-Anode		Missing	Install	Pipe Duct	No Good/Out of Std
	No Good/Out of Std	Repair	Pump Plant-Control Cabinet	No Good/Out of Std	Repair
Replace		Replace			
Cathodic Protection- Isolator Surge Protector (ISP)	Missing	Install	Pump Plant-Pump	No Good/Out of Std	Repair
	No Good/Out of Std	Repair			Replace
		Replace	Riser	Missing	Install
Cathodic Protection- Rectifier	Missing	Install		No Good/Out of Std	Replace
	No Good/Out of Std	Repair	Encroachment		Remove
Replace		Clearance Infraction	Other	Other	
Distr Temp Sensor (DTS)	Missing		Install	Road	Missing
	No Good/Out of Std	Repair	No Good/Out of Std		Repair
		Replace			Replace
Emergency	Fire	Repair	Brush Fuel		Remove
		Replace	Encroachment	Remove	
	Storm	Repair	Grade Change	Repair	
		Replace	Right of Way	Encroachment	Remove
Other	Other	SCADA		Missing	Install
Enclosure/Vault	No Good/Out of Std		Repair	No Good/Out of Std	Repair
		Replace	Replace		
	Flooded	Pump	Transition Station-Fence/Gate	Missing	Install
Debris	Clean	No Good/Out of Std		Repair	
Fee Property	Other		Other	Transition Station-Lighting	No Good/Out of Std
		Foundation/Concrete			Missing
No Good/Out of Std	Repair		No Good/Out of Std	Replace	
	Replace			Earth Covered	Repair
Gas System	Leak	Repair	No Good/Out of Std	Install	
		Replace		Vegetation	Overgrown
	Inad Pressure	Adjust	Trim		
Gauge	Missing	Install	Work Requested by Others	WRO	Agency
	No Good/Out of Std	Repair			Other
		Replace			Switching
Grounds	Missing	Install			
	No Good/Out of Std	Repair			
		Replace			

#### **2.7.4. Asset Inspections**

Specific information is available in work procedure [TD-1001P-12, "Underground Inspection and Maintenance Procedures."](#)

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## 3. Maintenance

Before scheduling clearances for maintenance work, identify all maintenance work on a transmission line by using object lists, notifications, and other sources to minimize the number of clearances required on any given circuit.

### 3.1. Resolving Abnormal Conditions during Patrol or Inspection

The field inspector must complete all possible minor/incidental repairs or replacements to correct abnormal conditions that can be performed safely by an individual during the inspection. See [Section 3.2, "Minor/Incidental Maintenance"](#) below. For abnormal conditions not corrected during the inspection, the field inspector must prepare an LC notification based on the inspection datasheets or forms.

### 3.2. Minor/Incidental Maintenance

Minor/incidental work is completed by the field inspector at the time of the inspection and recorded on the forms shown below.

To facilitate completing repairs during the inspection, the field inspector must be equipped with the appropriate safety equipment, tools, and materials to perform required maintenance.

For a list of common safety equipment, tools, and maintenance materials, refer to the tables listed in [Appendix B, "Equipment, Tools, and Materials"](#):

- [Table 9, "Safety Equipment List"](#)
- [Table 10, "Tool List"](#)
- [Table 11, "Materials List"](#)

In addition, reasonable and appropriate maintenance tasks may be performed by one or two QCRs during inspection.

- IF the work performed takes **less than 15 minutes** per location for Overhead OR Underground transmission,  
THEN note the completed maintenance tasks on the following forms:
  - **For Overhead**, on form [TD-1001M-F01, "Transmission Line Inspection/Patrol Datasheet - Typical"](#) or on the inspection software form.
  - **For Underground**, in the "Comments" section of the forms TD-1001M-F06 through TD-1001M-F11, depending on the inspection performed.
  - **Do not** record the maintenance tasks as an LC notification. For accounting purposes, consider the work to be part of the inspection.
- IF the work takes **longer than 15 minutes** per location for Overhead OR Underground transmission,  
THEN consider the time as a separate maintenance notification, and record the **completed** maintenance tasks as follows:



## Section 3.2 (continued)

- **For Overhead:**
  - On form [TD-1001M-F01, “Transmission Line Inspection/Patrol Datasheet – Typical”](#) or as comments in the inspection software form.
  - Create the LC notification.
  - CIRT processes LC notification.
  - **AND** the clerk will complete the LC notification in the SAP database.
  - **AND** record the completed maintenance in the QCR’s timecard with the appropriate accounting.
- **For Underground:**
  - In the “Comments” section of forms TD-1001M-F06 through TD-1001M-F11, depending on the inspection performed.
  - Create the LC notification in the inspection software.
  - **AND** the clerk will record the completed maintenance task(s) in the SAP database.
  - **AND** record the completed maintenance tasks in your timecard with the appropriate accounting.

### 3.3. LC Notification Maintenance Approach

It is the Company’s intent to correct identified abnormal conditions by the established due date. However, it is sometimes not feasible to always correct abnormal conditions by their established due date based on unforeseen events or uncontrollable situations. As such, a rigorous, risk-based approach is being used to perform maintenance on all outstanding notifications, with the goal of addressing higher-risk conditions before lower-risk conditions (“LC Notification Prioritization”).

Additionally, for those notifications that are not corrected by their due date and where the condition of the notification could change over time, a Field Safety Reassessment (FSR) will be completed prior to the due date to ensure the condition of the asset is adequate for its purpose.

Refer to [TD-1001M-B011, “PG&E’s LC Notification Maintenance Approach”](#) regarding the processes for:

- Prioritization of notifications resulting from inspections.
- Reassessments that are performed for notifications with conditions that may deteriorate.
- Notifications that fall under the category of opportunity maintenance per G.O. 95.
- Notifications that may be exempted from their required end date under specific circumstances.

## 3.4. Overhead Maintenance Procedures

The following exhibits contain procedures and flowcharts that provide required, step-by-step processes for performing maintenance to correct abnormal conditions identified during routine inspections:

- [Exhibit 1, “Notification Initiation Flowchart”](#)
- [Exhibit 2, “Notification/Completed Patrol Review”](#)

### 3.4.1. Dirty/Contaminated Insulator Cleaning

Perform insulator washing based on local environmental conditions, operating experience, and the predetermined wash cycles established in SAP.

- Wash insulators in accordance with the [TD-1257M, “Insulator Cleaning Manual.”](#) The [TD-1257M, “Insulator Cleaning Manual”](#) provides guidance on contamination assessment and insulator cleaning frequency.
- Maintenance plans must be created in SAP for circuits that require annual (or more frequent) insulator washing, as determined by the local transmission line maintenance supervisor, based on insulator contamination and performance.
- By agreement, maintenance plans must be created in SAP for Diablo Canyon Power Plant (DCPP) 500 kV and 230 kV transmission line circuits utilizing frequencies and wash instructions specified in [TD-1001P-13, “Enhanced Inspection and Maintenance Requirements for Diablo Canyon and Morro Bay Power Plants Overhead Transmission Facilities.”](#)

### 3.4.2. Insulator Replacement During Maintenance

Usually, dead-end insulators are loaded to a higher percentage of their design strength than are suspension insulators. Typically, suspension insulators are loaded 30% to 50% of the design strength of dead-end insulators.

Listed below are the criteria for replacing insulators during maintenance:

- Replace suspension and dead-end insulators if they exhibit signs of deterioration or corrosion or have been subjected to some unusual loading condition. If insulators are in good condition, loading and unloading the insulator string during routine maintenance will not degrade the insulators.
- Replace all suspension or dead-end insulators that have been affected by shock loading (impact loads that exceed the normal loading and are generally associated with broken wire conditions on steel structures with normal sag tensions that exceed 3,000 pounds).
- All insulators not listed as “approved for purchase” or as a “salvable substitute” are obsolete and must not be used.
  - Salvable substitute insulators that are more than 20 years old are not to be used and should be disposed of.
  - Salvable substitute insulators less than 20 years old that have not been in service may be used.

## Section 3.4.2 (continued)

- Suspension type porcelain insulators shall not be used on new construction without approval from transmission line standards engineer per [TD-015014B-001, "Approval Required for Installation Suspension Type Porcelain Insulators."](#)

### 3.4.3. PAL Nuts – Remedy for Loose or Missing Tower Bolts

#### 3.4.3.1. General

An evaluation after a Type HVD 500 kV tower failed due to missing bolts determined the optimum locking device to use on tower bolts. Though a properly center-punched tower bolt will prevent a nut from backing off, it is difficult to determine when a standard bolt has been properly center-punched. Using a PAL nut over the standard tower nut to prevent the tower nut from backing off due to vibration is the preferred method.

#### 3.4.3.2. Required Action

Install PAL nuts at the discretion of the supervisor when a tower has a history of loose or missing bolts, or at critical tower locations where the failure of the structure could have serious consequences.

Field experience has shown that PAL nuts are easier to install with a ratchet-type box-end wrench to prevent the wrench catching on the underlying standard nut. Install PAL nuts with the flat side toward the standard nut.

This requirement applies to towers of all voltages.

The code numbers for PAL nuts are as follows:

- 190774: for use with 1/2" bolts
- 190775: for use with 5/8" bolts
- 190776: for use with 3/4" bolts

## 3.5. Underground Maintenance Procedures

### 3.5.1. Requirements

Appropriate maintenance activity is determined based on inspection results, historical operation of the facilities, utility best practices, and sound engineering. Refer to [TD-1001P-12, "Underground Inspection and Maintenance Procedures."](#)

Maintenance can be risk-based, condition-based, triggered by specific events, or as identified during emergency, routine, and/or detailed field inspections. Conditions requiring maintenance are assigned a Priority Code on a notification, and repairs must be performed within the period determined by the Priority Code.

## 4. Records

This section provides general records guidance and retention requirements for the maps, logs, and notifications used to document the inspections, patrols abnormalities, and corrective actions identified on the electric transmission line system.

### 4.1. Asset Creation

As assets observed in the field differ from SAP object lists, drawings, schematics, or other formal references, they must be updated per the Electric Transmission Geographic Information System (ET GIS) asset creation or maintenance processes (ET GIS Process maps 1.1 through 1.16). These processes apply to overhead and underground assets. Following the ET GIS asset creation and maintenance processes will ensure the transmission asset registry and mapping systems are kept current with actual field conditions.

New assets or removed assets must also be entered in ET GIS.

- Use [TD-1001M-F13, "Request to Add Equipment Records to the Asset Registry"](#) to add new equipment.
- Use [TD-1001M-F14, "Request to Delete Equipment Records to WM SAP"](#) to delete equipment in ET GIS.
- Refer to [ET GIS SAP – Request for Work Job Aid – Creation](#) for specific details.

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

Records must be stored electronically, unless impractical. Refer to Section 7 of the [GOV-7101S, "Enterprise Records and Information Management Standard."](#)

#### 4.2.1. Electronic Records and Signatures

Transmission line has electronic processes for activities such as notification creation. A mobile computer is utilized with the inspection software to create notifications. To ensure proper documentation, both the traditional wet signature and an electronic signature will be acceptable forms of certifying compliance documents or to satisfy signature or verification purposes. Note that 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).

#### 4.2.2. Hand-Written Records

Although use of electronic signatures and certifications are now allowed, the requirements for hand-written records have not changed.

All hand-written records must be completed using non-erasable ink. To correct an item on a hand-written record, the following requirements must be met:

- 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.

## Section 4.2.2 (continued)

- 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 to meet this requirement ([FRO: Bulletin 247, "Gas and Electric M&O Record Requirements,"](#) 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 print-outs with the date and LAN ID are acceptable; however, all signatures on paper must be "wet."

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

- [TD-1001M-F01, "Transmission Line Inspection/Patrol Datasheet - Typical"](#)
- [TD-1001M-F03, "Climbing Inspection Form and Tower Diagrams"](#)
- [TD-1001M-F04a, "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"](#)
- [TD-1001M-F11 "Electric Pumping Plant Annual Calibration Sheet – Typical"](#)

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

In general, additional notes and comments should not be added to forms unless they further describe the findings captured. Acceptable notes for patrol and inspection field documentation include:

- 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.



### 4.2.3. Records Retention Requirements

**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 a legal hold as of publishing of this ETPM.

Refer to Section 9 of the [GOV-7101S, "Enterprise Records and Information Management Standard"](#) for more information on legal holds.

Overhead and underground transmission line inspection and maintenance records must be maintained in accordance with [CPUC General Order \(G.O.\) 165](#). Records may be in paper and/or electronic form and must be kept for 10 years, with the exception of climbing inspections on the 500 kV system, which must be maintained for 14 years.

If paper forms are completed, inspection datasheets and forms must be kept in files by circuit name at the responsible transmission line maintenance supervisor's headquarters. Any records stored electronically supersede and are preferable to hard copy versions. There is no need to store hard copies when electronic records exist in SAP or other enterprise systems of record.

If required, the clerk will scan the datasheet and attach it to the patrol in SAP. Refer to [Appendix E: Line Patrol File Guidelines](#) for requirements on how to complete the forms and how to store the files.

Annually for each circuit, two folders should be created. There will be one folder for Annual Patrols and one folder for the Line Files. Print the appropriate forms and include in the specific folder for each circuit.

The following are typical management reports and records used to track required inspection and maintenance work. When applicable, these documents should be included in the respective circuit files at the transmission line maintenance supervisor's headquarters/central filing office.

- Underground Transmission Line Inspection Sheets
- Overhead Transmission Line Datasheets
- Completed LC Notification forms within SAP for maintenance work performed by transmission employees. LC notification forms are not required when LC notification documentation is submitted electronically via a PG&E Lan ID and all required information is available (e.g., identity of person completing work, date work completed, description of work completed, proper photographic and as-built documentation).
- Object lists
- Notification forms submitted to other support groups not using the inspection software that will be performing the maintenance, such as contractors, vegetation management (VM) personnel, pole asset management (PAM) personnel, etc.
- Completion notices in SAP for work performed by transmission employees using paper format
- Completion notices for work performed by others
- Poles Inspection Test Reports

### 4.3. Creating and Closing Inspection/Patrol and Maintenance Records

All inspection and patrol records must be filled out completely and accurately and maintained in the appropriate files. Refer to [TD-1001M-JA01, "Patrol, Inspection and Closing Process,"](#) for directions on completing and reviewing the forms and the SAP closing process. Refer to [Appendix E, "Line Patrol File Guidelines"](#) for additional requirements on how to complete the forms and how to store the files. [Subsection 4.3.1, "Inspection/Patrol Records" – "Records and Deadlines"](#) below provides specific timelines for QCRs, clerks, supervisors and/or SAP "gatekeepers" to enter all information into SAP.

#### 4.3.1. Inspection/Patrol Records

##### Overhead Patrols:

Use the overhead ETPM Form [TD-1001M-F01, "Transmission Line Inspection/Patrol Datasheet – Typical,"](#) to document any abnormal conditions as they are encountered in the field. See [Appendix C, "Links to Forms and Flowcharts"](#) for a list of and links to overhead inspection/patrol datasheets.

##### Overhead Inspections:

Use the inspection software or the object list, [TD-1001M-F05, "Object List - Typical"](#) and the datasheet [TD-1001M-F01, "Transmission Line Inspection/Patrol Datasheet – Typical,"](#) to document inspections and to verify the assets.

See [Appendix C, "Links to Forms and Flowcharts"](#) for a list of and links to overhead inspection/patrol datasheets and object lists.

##### Underground:

Use the underground transmission inspection sheets and forms TD-1001M-F06 through TD-1001M-F11, depending on the inspection performed, to document test results and any abnormal conditions encountered in the field.

##### Records and Deadlines:

Electronic overhead LC notifications are processed through CIRT for gatekeeping, typically within 1-2 business days. After an overhead patrol or underground inspection, any completed paper copies of overhead and underground inspection/patrol datasheets and inspection/patrol forms must be signed, dated, and submitted to the transmission line supervisor for review and approval. Notwithstanding extraordinary circumstances, such as a major emergency response, upon completion of the field patrol or inspection, QCRs are expected to:

- Submit required paperwork to the local clerk **within five (5) business days or by the end of the calendar month** the patrol was completed in, whichever is sooner.

##### Supervisors must:

- Review forms, when required, for accuracy (i.e., completion of all fields).
- Confirm the priority code and due date.
- Confirm clearance requirements or hot work.
- Ensure ink was used on paper forms.

## Section 4.3.1 (continued)

- Confirm signature, date, and LAN ID.

**Timeline Detail:**

- a. QCR finds abnormal condition during inspection/patrol on Day 00.
- b. QCR delivers completed forms when required to clerk by business Day 05.
- c. When required, clerk enters inspection and patrol information into the SAP system by business Day 15.
- d. Gatekeeper reviews and rejects/modifies/approves S5 to create new LC by business Day 20, thus establishes SAP notifications within 20 business days to facilitate proper work planning, scheduling, and to correct abnormal conditions by the required due dates.
- e. Document the reason for non-routine and emergency patrols on the notification.

The overhead [TD-1001M-F01, "Transmission Line Inspection/Patrol Datasheet – Typical,"](#) and the underground transmission "Routine" and "Detailed" inspection forms (TD-1001M-F06 through TD-1001M-F11, depending on the inspection performed) **must** contain the following information:

- Name of the QCR
- Date of the inspection/patrol
- Name of the circuit inspected/patrolled
- Structure number/s
- FDA condition
- Facility found abnormal
- Damage indicated
- Action, such as recommended maintenance activities and the priority of these recommendations
- Significant comments regarding special work requirements, access notes, etc.

**4.3.2. Maintenance Records**

Record routine, non-routine, and emergency maintenance performed in the SAP database or on inspection/patrol datasheets. Maintain records in accordance with [Section 2, "Inspections"](#) and [Section 3, "Maintenance."](#) These records **must** include, at a minimum, the person responsible for performing the maintenance, the date of the maintenance, the name of the circuit, the facility maintained, and a description of the maintenance performed.

Keep these records in the SAP database and field inspection and patrol files at the responsible transmission line supervisor's headquarters.

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## 5. Document Governance

### 5.1. Document Approver(s)

██████████ Director, Standards and Work Methods

### 5.2. Document Owner(s)

██████████ Manager, Transmission Standards and Work Methods

### 5.3. Document Contact(s)

██████████ Sr. Standards Engineer, Standards and Work Methods

██████████ Sr. Standards Engineer, Standards and Work Methods & Procedures

██████████ Expert Specialist, Transmission Standards and Work Methods



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## 6. Revision Notes

Document Location	Date of Change	Change Log
Change Log	05/2017	Added change log.
Entire Document	05/2017	Minor revisions and change to verbiage.
Section 1.3.4 – Reporting DO nonconformance	05/2017	Added reference to October 2015 5MM with additional process details and link to said document. Added language clarifying bridging as Distribution work funded through the GRC rate case as communicated in 04/2016 bulletin “TD-1001B-001 Transmission Bridging Tag Creation and Completion.”
Section 1.6.1 – Inspection/Patrol Records	05/2017	Updated verbiage to reflect 07/2016 bulletin ‘TD-1001B-002 Inspection/Patrol Records and Deadlines’ clarifying timing of paperwork handoff between QCR and clerical.
Section 1.7; Table 6 – Guide for Assigning Priority Codes	05/2017	Updated verbiage to reflect 08/2016 bulletin ‘TD-1001B-003 Foundations Priority Code F’ clarifying allowance of priority code F (24 months) for foundation repair work, especially in sensitive environmental areas where typical permitting and project timelines are significantly longer.
Section 1.5.3 & 1.5.3.1	05/2017	Modified Section 1.5.3 – Notifications Extending Beyond Due Dates and added Section 1.5.3.1 – LC Past Due Exemption Process outlining the requirements of the past due exemption process and referencing the job aid with full details (TD-1001M-JA03). This change incorporates 04/2017 bulletin “TD-1001B-004 – LC Past Due Exemption Process.”
Section 1.1 – Record Keeping	05/2017	Updated verbiage to reflect 01/2017 bulletin ‘TD-1001B-005 Electronic Signature’ clarifying that PG&E single sign-on electronic devices can be used as signatures for all purposes formerly requiring wet paper signature (e.g., email, SAP gatekeeper).
Section 1.1.2 – Records Retention Requirements	05/2017	Added a note on legal holds & provided notice that as of publishing date Electric Operations is still under a legal hold for all records.
Entire Document	09/2018	Minor revisions, updated FDA codes, updated links, updated table numbers and change to verbiage.
Section 1.3.3 Reporting Vegetation Nonconformance	09/2018	Added NERC/CAISO critical lines and updated section per Vegetation Management
Sections 1.3.5 through 1.3.7	09/2018	Updated sections per Land Operations and added more specific information on encroachment
Section 1.4 OH Methodology, Facility, Damage and Action Codes	09/2018	Updated section to reflect ET AI App and new codes for overhead and underground. Deleted cause codes
Section 1.5	09/2018	Added and Due Dates to the title
Section 1.5.1 Resolving Abnormal Conditions during Patrol or Inspection	09/2018	Updated method for charging maintenance tasks > 15 minutes and how to capture on the time card

## Section 6 (continued)

Document Location	Date of Change	Change Log
Section 1.5.2	09/2018	Noted Director approval for Priority Code F and added information on High Fire Threat Districts
Section 1.5.3.2	09/2018	Added new section on approval of past due notifications
Section 1.6 Creating and Closing Inspection/Patrol and Maintenance Records	09/2018	Updated based on electronic work and timelines
Table 6	09/2018	Updates from experts throughout table for Priority Codes. Added to Note regarding Pole Test and Treat reference.
Section 1.8.1 Insulator Strength and Loading	09/2018	Added information on suspension type porcelain insulators
Section 1.11.3	09/2018	Added section on OPGW and ADSS cable to focus on during patrols inspection
Section 1.16 Equipment Replacement Notifications	09/2018	Updated to reflect no LR notifications through the LC notification and how asset strategy reviews notifications for equipment replacement. Also updated FAA notifications to reflect Priority B
Section 2.1.1 Procedures	09/2018	Updated to reflect ET AI App instead of form F02
Section 2.2 Climbing Inspections	09/2018	Clarified non-routine patrols are Priority B
Section 2.3.3 Detailed Inspections for Pipe-Type Circuit	09/2018	Added Fulton-Lakeville #1A and #1B (Oakmont) Pump Plant Test Procedures
Section 2.3.6	09/2018	Added updates for roads and right-of-ways
Section 2.3.7 Routine Inspection for Submarine Circuits	09/2018	Removed Transition Manhole information that is covered in other sections
Section 5.2 UG Job Aid For Maintenance Procedures	09/2018	Removed information on polarization cells and chart motors
Appendix A: Acronyms and Definition of Terms	09/2018	Removed definitions that were not used
Appendix B: Equipment, Tools, and Materials	09/2018	Updated codes
Appendix C: Links to Forms and Flowcharts	09/2018	Removed F02 since it is the ET AI App
Appendix D: Summary of Links to Related Documents	09/2018	Added new documents



Section 6 (continued)

Document Location	Date of Change	Change Log
Appendix E: Line Patrol File Guidelines	09/2018	Updated to reflect ET AI App and new deadlines
Appendix F: ET AI App Process Guidelines	09/2018	New
TD-1001M-F01 and TD-1001M-F12	09/2018	Removed old FDA codes
TD-1001M-F02	09/2018	Deleted
TD-1001M-F03 and TD-1001M-F04	09/2018	Replaced with updated form
Introduction	06/2020	Changed reference to DCPD and Morro Bay Power Plant information to a Procedure
Entire Document	06/2020	Updated verbiage, moved details to Job Aids and Work Procedures, removed ET AI App due to new inspection software
Section 1. General: Purpose of Inspection and Patrol Activities	06/2020	Updated this section to only contain an overview of the purpose of inspections and patrols. Details from this section were moved to later in the Manual, Job Aids or Work Procedures
Section 2: Inspections	06/2020	Updated this section and added information from the previous General section. It now includes: problem identification, component inspection, methodology and frequency (including removing the frequency table and referencing TD-1001M-B009, "Revised Inspection Guidelines"), best-view-position, documents and forms, record keeping, FDA codes, Priority Codes and due dates, updated Table Guide for Assigning Priority Codes, Asset Inspection (including references to updated and new Job Aids and Work Procedures), IR inspection (including a reference to a new Work Procedure), and other abnormalities and nonconformance (including references to new Job Aids) This section was moved from the previous section and updated with references to new Job Aids and a Work Procedure. This section contains the underground inspection frequency and underground FDA codes.
Section 3: Maintenance	06/2020	This section still contains maintenance information, such as underground maintenance (including references to new Job Aids and a new Work Procedure), but it also contains information on other maintenance procedures and notifications (including a reference to TD-1001M-B11, "PG&E's LC Maintenance Notification Approach"), insulator cleaning, insulator replacement during maintenance and PAL nut maintenance which were moved from other sections.
Section 4: Records	06/2020	This section contains information previously in Section 1.
Section 6	06/2020	The previous Section 6 Enhanced Inspection and Maintenance Requirements for Diablo Canyon and Morro Bay Power Plants Overhead Transmission Facilities was moved to a Work Procedure
Appendix D: List of Links to Related Documents	06/2020	Added new documents
Appendix F: ET AI App Process Guidelines	06/2020	Removed. New inspection software applications are being utilized and changed.

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## Appendix A: Acronyms and Definition of Terms

The following definitions of terminology are used in this manual.

**Table 8. Acronyms and Definition of Terms**

Terms	Definitions
<b>Abnormal Condition</b>	A condition that adversely impacts or has the potential to adversely impact safety, service reliability, or asset life.
<b>ADSS Cable</b>	All Dielectric Self-Supporting fiber optic cable
<b>Aerial</b>	An inspection that might be completed by drone, helicopter or other aircrafts
<b>Ambient Temperature</b>	The prevailing temperature in the immediate vicinity of the object or target, i.e., the temperature of the target's environment.
<b>Apparatus (or Fault) Temperature</b>	The temperature of the targeted surface that the thermographer is evaluating.
<b>ATS</b>	Applied Technology Services
<b>Auditable Records</b>	Documentation, written and electronic, that shows the results of an inspection (as defined in this section), the facility condition assessment, and the subsequent maintenance and/or repair activity.
<b>Bay Waters</b>	Saltwater environments located in the nine counties of the San Francisco Bay area.
<b>CAISO</b>	California Independent System Operator.
<b>Calendar Year</b>	January 1 through December 31 of any year. For maintenance interval purposes, for example, if a task is performed on June 17, 2009 and is on a "1 calendar year interval," the task is required to be performed again on or before December 31, 2010
<b>CAP</b>	Corrective Action Program
<b>CIRT</b>	Centralized Inspection Review Team
<b>COE</b>	Critical Operating Equipment
<b>Component</b>	A specific item of a unit of inspection, e.g., structure, terminal, right-of-way, pumping plant, manhole, insulator, etc.
<b>Corrective Maintenance</b>	Maintenance activities that restore facilities that have failed or contributed to an unacceptable operation condition, typically following an unusual and unforeseen incident. These may include inspection, assessment, repair, and replacement activities associated with restoring the facility.
<b>CPUC</b>	California Public Utilities Commission
<b>Critical 500 kV Towers</b>	The 2% most critical 500 kilovolt (kV) towers, as identified in the Pacific Gas and Electric Company (Company) "500 kV Emergency Restoration Study" (1993), based upon an equal weighting of the "susceptibility to failure" and "benchmark restoration time" factors.
<b>Decayed Wood</b>	Wood that has lost its strength due to insect infestation or decomposition caused by fungi.
<b>Electric Transmission Asset</b>	Rights-of-way (R/Ws), fee property, fences, buildings, conductors, structures, and associated hardware and equipment that operate at voltages above 50,000 volts (V).



Terms	Definitions
<b>Emergency Patrol</b>	A patrol performed as a result of a momentary or sustained outage caused by an unknown condition on an overhead or underground transmission line. It is a visual check made either by ground or air to look for the specific condition that caused the outage. An emergency patrol must not be considered as, or substituted for, an inspection of electric transmission facilities.
<b>Emissivity</b>	The relative ability of a surface to emit heat by radiation. Emissivity is the ratio of the heat emitted by a surface compared to that emitted by a blackbody.
<b>Emittance Value</b>	The ratio of the intensity of thermal radiation, at a given wavelength or spectral waveband, from a target to the thermal radiation emitted by a blackbody of the same temperature as the target.
<b>ETL</b>	Electric Transmission Line
<b>ETPM</b>	Electric Transmission Preventive Maintenance
<b>FAA</b>	Federal Aviation Administration
<b>FDA</b>	Facility, Damage, and Action codes
<b>FERC</b>	Federal Energy Regulatory Commission
<b>Field of View</b>	The size of the scene surrounding the target, as observed by the infrared scanner and expressed as the ratio between the size of the scene surrounding the target and the distance between the target and the scanner.
<b>FMEA</b>	Failure Mode Equipment and Effects Analysis
<b>FMP</b>	Filed Maintenance Practice
<b>G.O.</b>	General Order
<b>GCC</b>	Grid Control Center
<b>HFTD</b>	High Fire-Threat District
<b>HHZ</b>	High Hazard Zone
<b>Hot Item</b>	An apparatus, device, or equipment found to have excessive apparatus ("fault") temperature.
<b>HVD</b>	A type of tower: 500 kV start with HV and the rest are alphabetical order.
<b>Identified Maintenance Condition</b>	Abnormal conditions that require corrective action before the next inspection cycle.
<b>Infrared (IR) Inspection</b>	A diagnostic test using IR thermography technology to identify abnormal conditions.
<b>Infrared (IR) Radiation</b>	IR radiation (or energy) is a part of the electromagnetic spectrum lying outside of the visible spectrum on the red end. Visible light and IR have similar behavior; the main difference is wavelength. IR has a wavelength between 2 and 1,000 micrometers. Visible light has a wavelength of between 0.4 and 0.75 micrometers.



Terms	Definitions
<b>Inspection/Patrol Datasheet or Form</b>	A datasheet or form used to document the inspection and/or patrol of a facility, and to identify abnormalities that require corrective action or follow-up inspection; for example, the ETPM form <a href="#">TD-1001M-F01, "Transmission Line Inspection/Patrol Datasheet - Typical,"</a> and the underground inspection datasheets shown in the ETPM forms: <a href="#">TD-1001M-F06, "Monthly Pipe-Type Routine Inspection - Typical"</a> and <a href="#">TD-1001M-F07, "Detailed Pipe-Type Inspection – Typical."</a>
<b>Inspection</b>	A detailed ground, aerial, or climbing observation of the asset installed, looking for abnormalities or circumstances that will negatively impact safety, reliability, or asset life. Individual elements and components are examined carefully through visual and/or routine diagnostic tests, and the abnormal conditions of each are graded and/or recorded.
<b>Interval</b>	A specified, maximum time period between inspections of overhead and underground electric transmission facilities.
<b>ISO</b>	Independent System Operator
<b>ISP</b>	Isolator Surge Protector
<b>LC</b>	Line Corrective (notification)
<b>Line Section</b>	A group of structures and conductor, often terminal-to-terminal, excluding line breakers and associated disconnect switches.
<b>Long Wave</b>	The portion of the electromagnetic spectrum that ranges from 8 to 14 microns.
<b>Maintenance</b>	Preventive or corrective actions to ensure the safety and reliability of electric transmission facilities. It includes capital and expense expenditures for tasks associated with the inspection, repair, refurbishment, and possible replacement of existing electric transmission facilities to ensure safe and reliable operation.
<b>Material Problem Report (MPR)</b>	A report written to document damage resulting from faulty materials or workmanship, impacts from sources other than the asset or its intended use, sabotage, criminal acts, negligence, etc.
<b>Micron</b>	A unit of length equal to one millionth of a meter, which is used to describe the wavelength of infrared radiation. "Micron" is the popular name for "micrometer."
<b>Minor/Incidental Work</b>	Work that can safely be accomplished at the site by a QCR during a detailed and/or routine inspection.
<b>Missing</b>	Used to describe a component that is required, but not present. It is not intended to describe components that are not required to be present (i.e., dampers or high-voltage signs that are not required are not considered to be "missing").
<b>Notification</b>	A document identifying an abnormality that requires corrective action, follow-up inspection, or referral to other departments or entities. Notifications generated in the field by QCRs at the time the abnormal condition is observed must be entered into the Systems Application and Products in Data Processing (SAP) program.
<b>Notification Form</b>	A recorded document identifying a specific facility condition that requires corrective action, follow-up inspection, or referral to other departments or entities.



Terms	Definitions
<b>NRM</b>	Natural Resources Management
<b>Object List</b>	An SAP-generated form that lists (by circuit) structure numbers, SAP equipment numbers, structure framing and description; Geographic Information System (GIS) coordinates, and access information. The object list is used as a daily patrol/inspection log to verify overhead assets. The "Note" section is used for recording access information only.
<b>OPGW Cable</b>	Overhead Ground Wire/Fiber Optic Cable
<b>PAM</b>	Pole Asset Management.
<b>Patrol</b>	A brief, visual inspection of applicable utility facilities (equipment and structures) that is designed to identify obvious structural problems and hazards. Patrols may be carried out in the course of other Company business, provided certain requirements are met. An emergency patrol, which is usually precipitated by an unusual system incident, must not be considered as, or substituted for, a regularly scheduled inspection or patrol of electric transmission line facilities.
<b>PIN</b>	Personal Identification Number
<b>Preventive Maintenance (PM)</b>	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.
<b>PS&amp;R</b>	Public Safety and Regulatory
<b>Qualified Company Representative (QCR)</b>	A Company representative, who, by knowledge, required training, and/or work experience, is able and allowed to perform a specific job. For the purposes of this manual, QCR refers to an employee qualified to prepare an accurate and complete assessment of electric transmission facilities.
<b>Radiate</b>	To emit. When an object radiates, it emits or sends out electromagnetic waves.
<b>Reference Temperature</b>	The temperature of a like piece of equipment at the same location as that registering the apparatus ("fault") temperature.
<b>Reflective</b>	The ability of a target to reflect or send back rays. A mirror has a reflective surface with respect to visible light.
<b>Reflectivity (also known as reflectance)</b>	The amount of radiation that is reflected from a surface. Reflected radiation is not absorbed or transmitted. The reflectivity of a surface equals 1 - (emittance + transmittance).
<b>Reinforcement</b>	Mechanical technique(s) that restores the strength of a wood pole, decayed at or near the ground line, to serviceable condition.
<b>Restoration</b>	Mechanical techniques(s) that restores the shell or the heart of a wood pole, decayed or damaged above the ground line, to serviceable condition.
<b>SAP</b>	Systems Application and Products in Data Processing. An information system used to record, schedule, and manage work activities such as inspection maintenance.
<b>Stub</b>	Usually a short length of steel truss or wood pole, driven or set into the ground and attached to the existing pole by suitable and adequate fastenings. A stub provides the support originally afforded by the pole butt.
<b>Subject Pole</b>	A pole that is "non-exempt" per the <a href="#">Power Line Fire Prevention Field Guide</a> .



Terms	Definitions
<b>System</b>	One or more line section(s) that perform the same defined function.
<b>Temperature Rise</b> (or Temperature Differential)	The difference in temperature between the apparatus (“fault”) temperature and the reference temperature.
<b>Testing</b>	A method or process used to conduct an examination or trial to obtain a positive indicator, along with recording data from the event.
<b>Thermographer</b>	A person who performs an IR inspection to obtain information concerning a target, object, structure, system, or process.
<b>Thermography</b>	Any photographic, videotaped, computer-generated, or graphic record of information derived from an IR inspection.
<b>TIL</b>	Technical Information Library
<b>TOTL</b>	Transmission Operations Tracking & Logging
<b>Transmission Control Agreement (TCA)</b>	An inspection and maintenance agreement filed with the CAISO that outlines the Company’s Electric Transmission Inspection and Maintenance Program.
<b>Transmission Facilities</b>	Conductors, structures, and/or associated equipment that are constructed to transport electric power of 50,000 V and above, from one point to another.
<b>Transmissive</b>	The ability of a medium to allow electromagnetic radiation to pass through it without being reflected or absorbed (to send or transmit rays from one point to another). Glass is highly transmissive to visual light.
<b>Transmissivity</b> (also known as transmittance)	The amount of radiation that is transmitted through a surface. Transmitted radiation is not reflected or absorbed. The transmissivity of a surface equals $1 - (\text{emittance} + \text{reflectance})$ .
<b>Trigger</b> (Non-Routine Patrol)	A condition that may require follow-up inspection and/or maintenance of facilities at a frequency different than the intervals determined by line prioritization or condition assessment.
<b>Underground Transmission Facilities</b>	Any conductors and associated equipment that are constructed at or below ground level for the purpose of transporting electric power of 50,000 V and above, from one point to another.
<b>Unit of Inspection</b>	A portion of a line section identified as a structure and its “ahead” span.
<b>USA</b>	Underground Service Alert
<b>Vegetation Management (VM)</b>	The inspection, trimming, and removal of trees and brush within the vicinity of electric facilities to ensure safe and reliable transmission service. The acronym VM also is used to refer to the Company’s Vegetation Management Department.
<b>VPM</b>	Vegetation Program Manager?
<b>WECC</b>	Western Electricity Coordinating Council
<b>WSIP</b>	Wildfire Safety Inspection Program
<b>XLPE</b>	Cross Linked Polyethylene Cable



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## Appendix B: Equipment, Tools, and Materials

The tables below list items an employee or field inspector may need to perform inspections and minor maintenance activities. The tables are intended as a reference resource and include safety equipment to ensure worker and public safety, as well as tools and materials that enable field inspectors to perform minor/incidental maintenance work. The material codes are listed to assist with procuring these items when establishing the contents of vehicles used during the inspection process.

**Table 9. Safety Equipment List**

Description	Information Source	Code
Barricade Frame, Manhole	Code of Safe Practices, Section 7, Rule 708	M205092
Barrier Tape, 3 Inches Wide	Work Area Protection Guide (623151)	E620421
Cones, Traffic, 18 Inches High	Work Area Protection Guide (623151)	E206240
Cones, Traffic, 28 Inches High	Work Area Protection Guide (623151)	M206391
Flag, Red	Work Area Protection Guide (623151)	E202416
Hard Hat, Cap Style	Code of Safe Practices, Section 1, Rule 3	E207761
Hard Hat, Standard Style	Code of Safe Practices, Section 1, Rule 3	M206153
Safety Glasses, Black Frame	Code of Safe Practices, Section 1, Rule 17	Various
Stand, for Sign and Flag	Work Area Protection Guide (623151)	E030512
Vest, Traffic, Size Large	Work Area Protection Guide (623151)	RHPVF-3091E-L
Vest, Traffic, Size Extra Large	Work Area Protection Guide (623151)	RHPVF-3091E-XL

**Note:** “M”-coded items indicate PG&E Material Codes; “E”-coded items are purchased thru Ariba.

## Appendix B (continued)

**Table 10. Tool List**

Description	Code	Description	Code
Air Monitor, Personal	M231805	Kit, First Aid	E622724
Binoculars	231088	Knife, Dexter	E200632
Bit, 9/16-Inch × 18-Inch, Shaper Auger	E200038	Knife, Putty, 1¼-Inch	E200510
Blades, for Hacksaw	M200886	Ladder, 10-Foot	M203122
Broom, House	M209004	Line, Hand	NA
Brush, Wire	M209013	Manhole Lifting Tool	E202439
Case, Carrying, for Extension Stick	M205548	Meter, Volt, Fluke #77	M244287
Chasers, Thread, Set ¼-Inch to 1-Inch	E205794	Pigtail, With Pulling Eye	M205447
Computers, Hammerhead With GPS/GIS	NA	Pin, Clothes, Clamp, Plastic	E206187
Cutters, Bolt, 18-Inch Handles	E202974	Press, MD6	NA
Cutters, Cable, HK Ptr. #8690	Various	Press, XMJ, Nicopress #53	M201009
Cutters, Cable, T&B #364	M201553	Pump, Water, Hand	M202565
Die, WBG	M202848	Rope, Hot, ½-Inch Diameter, 100-Foot	E102020
Die, W249	M203039	Saw, Chain, 14-Inch (Optional)	210603
Drill, Hand, Brace	NA	Saw, Hack	M201110
Drill, Rechargeable, ½-Inch Drive	NA	Saw, Tree, Hand, Fanno #7	E200986
Driver, Screw, 6-Inch, Philips	NA	Saw, Tree, With Pruner	E201946
Driver, Screw, 6-Inch, Standard	M200598	Scabbard, for Fanno #7 Saw	M200987
Driver, Screw, 10-Inch, Standard	M200600	Shears, Pruning	NA
Extinguisher, Indian Backpack	E481006	Shotgun, 6-Foot	M205395
Eye, Guy-Pulling	M201114	Shovel, Flat	M200609
Flashlight Rechargeable Mag.	M200306	Shovel, Round	M200608
Fault-Indicator Reset Tool	M202248	Socket, Penthead	M202233
Gun, Caulking	NA	Stick, SL Catalog #2596, 1¼-Inch Diameter, 8-Foot	M205565
Gun, Infrared, 3M	NA	Tape, Measuring, 100-Foot	E201877
Hammer, Claw, 22-Ounce	M200432	Tool, Combination, for Pad-Mounted Equipment	M208094
Hardhat Light	E204958	Weed Eater	NA
Hook, Manhole, Flexible Type	E200479	Switch Lock, 2 ¼ inch long shank SEECO	M170030
Hook, Manhole, Ridged Type	E200480	New Switch Locks	TBD
Hook, Switch Fuse, With QC	M205668	-	-



## Appendix B (continued)

**Table 11. Materials List**

Description	Code	Description	Code
Bolt, Penthead, 3/8-Inch × 1¼-Inch	192831	Nut, With Spring, ½-Inch, 13 NC Thread (P1010) (Old Penthead Cast in Frame)	580143
Bolt, Penthead, 3/8-Inch × 2-Inch	192896	Nut, With Spring, ½-Inch, 13 NC Thread (P4010) (Horizontal With Wood Enclosure)	580152
Bolt, Penthead, ½-Inch × 1-Inch	192081	Paint, for Pad-Mounted Equipment, Green, Aerosol Can	130458
Bolt, Penthead, ½-Inch × 1¾-Inch	192832	Paint, Zinc Rich Primer for Pad-Mounted equipment, Aerosol Can	130479
Bolt, Penthead, ½-Inch × 2-Inch	NA	Plug, Set Screw, Bus Bar, CMC	019683
Bolt, Penthead, ½-Inch × 2½-Inch	192853	Plug, Set Screw, Bus Bar, Homac	019684
Bolt, Penthead, ½-Inch × 3½-Inch	017488	Plug, Wooden Dowel, 5/8-Inch	NA
Bolt, Penthead, ½-Inch × 4½-Inch	017489	Screw, 5/16-Inch, Allen, Flat Head, SS, ½-Inch × ¾-Inch (# Plate Holders)	193391
Bolt, Penthead, Coil Thread, ½-Inch × 1¾-Inch	190068	Splice, Auto Guy, 7/32-Inch	186150
Bolt, Penthead, Coil Thread, ½-Inch × 2-7/16-Inch	031412	Splice, Auto Guy, 5/16-Inch	186128
Caulking, Sealant	495228	Splice, Auto Guy, 3/8-Inch	186129
Ground Molding, Plastic U-Shape, 1½-Inch Diameter	360008	Splice, Auto Guy, 7/16-Inch	186130
Ground Molding, PVC Conduit, ½-Inch Diameter	360368	Tag, High Voltage/Clearance Label for Pad-Mounted Equipment	621599
Guy Guard, Cattle	186186	Tag, High Voltage/PG&E Nameplate for Underground Enclosures	015543
Guy Marker, Plastic	186045	Tags, Phase and Voltage	See Note
Guy Marker, Steel	186176	Tag, High Voltage/Clearance Label for Pad-Mounted Equipment	621599
Guy, Preform, 7/32-Inch	186149	Tags, Red Plastic, Write-On	031811
Guy, Preform, 5/16-Inch	186118	Tags, Yellow Plastic, Write-On	031809
Guy, Preform, 3/8-Inch	186119	Visibility Strip, Barrier Post	374440
Lock, Corporation	016583	Visibility Strip, Guy	373278
Lock, Equipment Safety, 1-Inch	170115	Visibility Strip, Pole	373271
Lock, Equipment Safety, 2-Inch	170116	Wire, Six-Strand, Copper, Hand Coil	290072
Molding, Hardwood	149005	Wire, Four-Strand, Copper, Hand Coil	NA
Nut, With Spring, 3/8-Inch, 16 NC Thread (Old Penthead Cast in Frame)	580142	Wire, Two-Strand, Copper, Hand Coil	NA
Nut, With Spring, ½-Inch, 13 NC Thread (AS-100) (Covers Before 1986)	580211	-	-

**Note:** See [Numbered Document 033582, "Tags for Identifying Underground Cables and Equipment,"](#) Table 1.

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## Appendix C: Links to Forms and Flowcharts

**Table 12. Forms Index**

Forms Index
<b>Overhead Inspection Forms</b>
<a href="#">TD-1001M-F01, "Transmission Line Inspection/Patrol Datasheet - Typical"</a>
<a href="#">TD-1001M-F03, "Climbing Inspection Form and Tower Diagrams"</a>
<a href="#">TD-1001M-F04a, "Steel Structure Detailed Inspection Form"</a>
<a href="#">TD-1001M-F04-b, "Non-Steel Structure Detailed Inspection Form"</a>
<a href="#">TD-1001M-F05, "Object List - Typical"</a>
<a href="#">TD-1001M-F16, "Pile Foundation Inspection Form"</a>
<b>Underground Inspection Forms</b>
<a href="#">TD-1001M-F06, "Monthly Pipe-Type Routine Inspection - Typical"</a>
<a href="#">TD-1001M-F07, "Detailed Pipe-Type Inspection - Typical"</a>
<a href="#">TD-1001M-F08, "Quarterly XLPE Routine Inspection - Typical"</a>
<a href="#">TD-1001M-F09, "Detailed XLPE Inspection - Typical"</a>
<a href="#">TD-1001M-F10, "Alarms/SCADA Annual Test Sheet - Typical"</a>
<a href="#">TD-1001M-F11, "Electric Pumping Plant Annual Calibration Sheet - Typical"</a>
<a href="#">TD-1001M-F12, "Corrective Work Form Electric Transmission Underground"</a>
<b>Equipment Record Forms</b>
<a href="#">TD-1001M-F13, "Request to Add Equipment Records to the Asset Registry"</a>
<a href="#">TD-1001M-F14, "Request to Delete Equipment Records to WM SAP"</a>
<b>Infrared Forms</b>
<a href="#">TD-1001M-F15, "Transmission Line Infrared Data Sheet" (Excel)</a>
<b>Material Forms</b>
<a href="#">Form 62-0113, "Material Problem Report" (MPR)</a>
<a href="#">TD-1957P-01-F01, "Component Testing Information Sheet"</a>
<b>Flowcharts</b>
These flowcharts illustrate typical processes for overhead electric transmission maintenance procedures: <ul style="list-style-type: none"> <li><a href="#">Exhibit 1, "Notification Initiation Flowchart"</a></li> <li><a href="#">Exhibit 2, "Notification/Completed Patrol Review"</a></li> <li><a href="#">Exhibit 4, "Transmission Vegetation Management Notifications – Steel Structure Clearing"</a></li> <li><a href="#">Exhibit 5, "Transmission Vegetation Management Notifications – Wood Pole Clearing"</a></li> <li><a href="#">Exhibit 6, "Transmission Vegetation Management Notifications – VM Compliance Work"</a></li> <li><a href="#">Exhibit 7, "Transmission Vegetation Management Notifications – Access Work"</a></li> <li><a href="#">Exhibit 8, "Wood, Fiberglass/Composite Poles 60 kV, 70 kV, 115 kV Fiberglass Guys Strain Insulator"</a></li> <li><a href="#">Exhibit 9, "Transmission Wood Pole Repair vs Replace Decision Tree"</a></li> <li><a href="#">Exhibit 10, "Insulator Decision-Making Trees"</a></li> </ul>

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## Appendix D: List of Links to Related Documents

The following is a list of links contained in this manual, with the exception of those already listed in [Appendix C, "Links to Forms and Flowcharts."](#)

- [TD-1248M, "Barehand Work Procedures Manual"](#)
- [Engineering Document 033582, "Tags for Identifying Underground Cables and Equipment"](#)
- [ET GIS SAP – Request for Work Job Aid – Creation](#)
- [General Order \(G.O.\) 95, "Rules for Overhead Electric Line Construction"](#)
- [General Order \(G.O.\) 128, "Rules for Construction of Underground Electric Supply and Communication Systems"](#)
- [General Order \(G.O.\) 165 "Inspection Requirements for Electric Distribution and Transmission Facilities"](#)
- [TD-015014B-001, "Approval Required for Installation Suspension Type Porcelain Insulators"](#)
- [TD-06537B-001, "Automatic Guy Strand Dead Ends and Splices Supporting Transmission Facilities"](#)
- [TD-1257M, "Insulator Cleaning Manual"](#)
- [Power Line Fire Prevention Field Guide](#)
- [SCM-2106P-01, "Material Problem Report Procedure"](#)
- [TD-1003S-B001, "Idle Line Investigation and De-Energization"](#)
- [TD-1001M-B009, "Revised Inspection Guidelines"](#)
- [TD-1001M-B011, "PG&E's LC Notification Maintenance Approach"](#)
- [TD-1001M-JA01, "Patrol, Inspection and Closing Process"](#)
- [TD-1001M-JA02, "Detailed and Climbing Overhead Inspection Job Aid"](#)
- [TD-1001M-JA03, "Transmission LC Past Due Exemption Process"](#)
- [TD-1001M-JA04, "Identifying Levels of Deterioration and Corrosion on Transmission Line Steel Structures and Supports"](#)
- [TD-1001M-JA06, "Identifying Levels of Damage and Condition on Wood Poles and Non-Steel Framing on Transmission Line Structures and Supports"](#)
- [TD-1001M-JA07, "Identifying Levels of Corrosion and Condition of Hardware and Insulators on Transmission Line Structures and Supports"](#)
- [TD-1001M-JA08, "Identifying Levels of Damage and Condition of Animal Guards on Transmission Line Structures and Supports"](#)
- [TD-1001M-JA09, "Identifying Maintenance Work on Bird Nests on Transmission Line Structures and Supports"](#)
- [TD-1001M-JA10, "Identifying Conductor Conditions"](#)
- [TD-1001M-JA11, "Evaluating Conditions of OPGW in Transmission Line"](#)

## Appendix D (continued)

- [TD-1001M-JA12, "Identifying Foundation Condition on Transmission Line Structures and Supports"](#)
- [TD-1001M-JA13, "Identifying Levels of Damage and Condition of Guys and Anchors of Transmission Line Structures and Supports"](#)
- [TD-1001M-JA14, "Identifying Levels of Damage and Condition of Splices on Transmission Line Structures and Supports"](#)
- [TD-1001M-JA15, "Identifying Levels of Deterioration and Corrosion on Transmission Line Switches"](#)
- [TD-1001M-JA16, "Identifying Underground XLPE Conditions"](#)
- [TD-1001M-JA17, "Identifying Underground Pipe-Type Conditions"](#)
- [TD-1001M-JA18, "Identifying Underground Manhole and Enclosure Conditions"](#)
- [TD-1001M-JA19, "Evaluating Conditions from Infrared \(IR\) Inspection in Transmission Line"](#)
- [TD-1001M-JA20, "Evaluating Conditions for Vegetation Nonconformance in Transmission Line"](#)
- [TD-1001M-JA21, "Evaluating Conditions of ADSS in Transmission Line"](#)
- [TD-1001M-JA22, "Evaluating Conditions of Non ADSS Lashed Fiber Cable in Transmission Line"](#)
- [TD-1001P-03, "Obstruction Lighting Failure Notification Process"](#)
- [TD-1001P-06, "Electric Underground Transmission Pump Plant Inspections for San Mateo-Martin 230 kV High Pressure Fluid-Filled \(HPFF\)"](#)
- [TD-1001P-07, "Electric Underground Transmission Pump Plant Inspections for HZ-1 and HZ-2 230 kV, High Pressure, Fluid Filled \(HPFF\)"](#)
- [TD-1001P-08, "Electric Underground Transmission Pump Plant Inspections for Figarden Tap #1 and #2 230 kV \(HPFF\)"](#)
- [TD-1001P-09, "Fulton-Lakeville #1A and #1B \(Oakmont\) Pump Plant Test Procedures"](#)
- [TD-1001P-10, "Centralized Inspection Review Team \(CIRT\)"](#)
- [TD-1001P-11, "Drone Inspection Review Team \(DIRT\)"](#)
- [TD-1001P-12, "Underground Inspection and Maintenance Procedures"](#)
- [TD-1001P-13, "Enhanced Inspection and Maintenance Requirements for Diablo Canyon and Morro Bay Power Plants Overhead Transmission Facilities"](#)
- [TD-1001P-14, "Infrared \(IR\) Inspection Procedures"](#)
- [TD-1001S, "Electric Transmission Line Inspection and Preventive Maintenance Program"](#)
- [TD-1003S, "Management of Idle Electric Transmission Line Facilities"](#)
- [TD-1004P-04, "Conductor Rerate Process for Overhead Transmission Circuits"](#)
- [TD-1005P-03, "Evaluating Uses of Company Transmission Line Easements by Others"](#)
- [TD-1005S, "Right-of-Way and Encroachments"](#)
- [TD-1006P-02, "Switch Maintenance and Inspection Program for Electric Transmission"](#)

## Appendix D (continued)

- [TD-1006P-02-JA01, "Electric Transmission Line Switch Inspection/Function Test Job Aid"](#)
- [TD-1006B-004, "Procedure for Marking Duplicate Transmission Switches"](#)
- [TD-1957P-01, "Electric Transmission Line Equipment Failure Analysis Procedure"](#)
- [TD-2325P-01, "Wood Poles - Testing, Reinforcing and Reusing"](#)
- [TD-2325P-01-F01, "Attachment 1 - Pole Inspection/Test Report"](#)
- [TD-2325S, "Wood Pole Inspection, Testing, and Maintenance"](#)

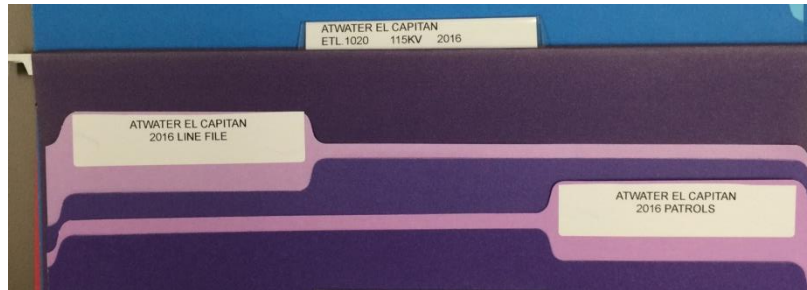


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## Appendix E: Line Patrol File Guidelines

The following lists contain a summary of what should be included in the folders that are in the transmission line maintenance supervisor’s office. Annually for each circuit, two folders should be created. There will be one folder for Annual Patrols and one folder for the Line Files (see Figure 1).

Print the appropriate forms and include in the specific folder for each circuit.



**Figure 1. Line Folder Examples**

### Folder 1 – Annual Patrols (Line Name, Year, Patrols)

#### 1) Detailed Inspections (for paper copies only)

- a) Operational Control Ticket (9010)
- b) Transmission Line Inspection Datasheet (9970)
  - i) Datasheets must be filled out completely. QCR must complete top of datasheet, sign and date the body of the datasheet.
  - ii) One notification must be created for each finding, except for minor maintenance work (less than 15 minutes) that has been completed. The datasheets should include each finding with the notification number AND any minor maintenance completed in the field.
  - iii) List on the datasheet if no findings were found.
  - iv) Supervisors must sign and date.
  - v) Scan completed datasheet and attach to the order.
- c) Transmission Line Object List (9971)
  - i) Each page should have QCR’s name and inspection date listed at the top.
  - ii) Check only one box.
  - iii) Include changes in directions, combination lock codes, LIDAR measurements (one location/mile with height, temperature, date and time), etc.
  - iv) Any changes on the object list must be scanned and an RW created.
- d) List of existing notifications (IW28) from SAP
- e) Map of line with species (Fresno, Midway & Victor only)

## Appendix E (continued)

**2) Air and Ground Patrols**

- a) Operation Control Ticket (9010)
- b) Transmission Line Inspection Datasheet (9970)
  - i) Datasheet must be filled out completely. QCR must complete top of datasheet, sign and date the body of the datasheet.
  - ii) One notification must be created for each finding. The datasheets should include each finding with the notification number.
  - iii) List on the datasheet if no findings were found
  - iv) Supervisors must sign and date.
  - v) Scan completed datasheet and attach to the order.
- c) Transmission Line Object List Coversheet (9971 or 9972, either form is appropriate)
  - i) For 9971:
    - (1) Each page should have QCR's name and inspection date listed at the top
    - (2) Check only one box
    - (3) Include changes in directions, combination lock codes, LIDAR measurements (one location/mile with height, temperature, date and time), etc.
    - (4) Any changes on the object list must be scanned and a RW created
  - ii) For 9972:
    - (1) Sign and date with the structures completed, e.g., 1/1 through 20/155
- d) List of existing notifications (IW28 from SAP)

**Folder 2 – Line File (Line Name, Year, Line File)**

- Any records stored electronically supersede and are preferable to hard copy versions. There is no need to store hard copies when electronic records exist in SAP or other enterprise systems of record.
- LC notification forms are not required when LC notification documentation is submitted electronically via a PG&E LAN ID and all required information is available (e.g., identify of person completing work, date work completed, description of work completed, proper photographic and as-built documentation).
- Construction Completion Standards Checklist (CCSC) can be completed in either paper or electronic form and is not required in the line files when an electronic record is stored in SAP or other enterprise systems of record.

## Appendix E (continued)

Within the Line File Folder, file the completed notifications and miscellaneous information.

**1) Non-Routine Patrols**

- a) Completed Notification must be scanned and attached to notification in SAP.

**2) Completed Notifications**

- a) Only print notification (computer generated SAP notification) when work completed thus including the most updated information.
- b) Completed notifications must include what work was completed, the date completed and the signature and LAN ID of the person who completed the work.
- c) Each notification should have a Construction Completion Standard Checklist (CCSC) attached. If the location has underbuild, there must be a Distribution CCSC form attached also.
- d) If notification is noted as found in field completed, then the notification should be set for deletion. If the notification is linked to a capital order, the notification should be de-linked before deleting and notify engineering to cancel the order. If the notification is linked to an expense order, notify the asset/maintenance planner to cancel the order.
- e) If the crew finds a problem at an adjacent location and corrects the problem while working a notification, then:
  - i) Foreman completes the notification, signs and dates
  - ii) Supervisor reviews and signs
  - iii) SAP notification created electronically

***THERE SHOULD BE NO PENDING FILE OR WORKING FILE IN YOUR LINE FILES.***

**3) Miscellaneous Information**

- a) Miscellaneous Information
  - i) Miscellaneous notifications should be kept to a minimum
  - ii) Important information should be scanned and attached to the completed notification. Do not copy unnecessary information into the body of a notification (e.g., emails).
  - iii) Information unrelated to notifications should be kept to a minimum

***DO NOT COPY UNNECESSARY INFORMATION INTO THE BODY OF A NOTIFICATION i.e., EMAILS. ATTACHMENTS ARE FOR INTERNAL VIEWING.***

**NOTE:** Capital notifications should not be filed in the capital jobs or in the line files. Completed capital jobs should be filed in a completed capital file by line name also by year.