

## Distribution Vegetation-Related Outage Investigation Procedure

### SUMMARY

The Vegetation-Related Outage Investigation Procedure describes how and when to perform investigations of vegetation-related outages. This procedure also provides direction on:

- Timeliness of investigations
- Collection & Reporting required outage information
- Categorizing types of outages which require investigation
- Correcting outage descriptions in the Integrated Logging Information System (ILIS) when outage causes are inconsistent with Vegetation Management (VM) investigation findings

All actions in this procedure are performed under the direction of PG&E Vegetation Program Managers (VPMs) and VM Investigators.

Level of Use: Information Use

### TARGET AUDIENCE

Vegetation Management Governance and Support

Vegetation Management Operations

Vegetation Management Contractors: Pre-Inspection (PI), Tree Contractor (TC), and Quality Control (QC)

### SAFETY

Some outage investigations are performed during adverse weather conditions. When storms arrive they not only bring large scale power outages, but can increase the population of hazard trees that require mitigation. Review the "Hazard Tree Safety Tailboard" prior to investigating outages during a storm event. Additional information can be found at:

<http://na.fs.fed.us/spfo/pubs/hazardtrees/treehazards/thazards.pdf>

PG&E and contract workers must review and follow all applicable safety standards and procedures before performing work. This includes reviewing tailboards as well as wearing appropriate Personal Protective Equipment (PPE) for the job.

### BEFORE YOU START

1. Read the Distribution Vegetation Management Standard (DVMS).
2. Review the Safety Tailboard - Emergency Response: Safety Stand-by Employees.
3. Review the Hazard Tree Safety Tailboard.

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### PROCEDURE STEPS

#### **1 Identify Outages in ILIS via VM Outage Reports Web Page**

- 1.1 On the morning of each business day, VM Investigator **REVIEWS** the Outage Reports search page on the VM web site for pending outage investigations.
- 1.2 VM Investigator will:
  1. **REPORT** any significant events (fires or large outages) to VPM.
  2. VPM **Immediately NOTIFIES** the Supervising VPM (SVPM), VM Operations Manager, and Sr. VM Manager of Operations of any significant event.

#### **2 Investigate Outages**

- 2.1 VM Fire Incidents
  1. IF there is a fire associated with a vegetation-related outage,  
  
THEN VM Investigator will **FOLLOW** the requirements of the Fire Investigation and Reporting Procedure.
- 2.2 Significant Events
  1. VPM will:
    - a. Initiate immediate field investigation.

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### 2.3 Sustained Outages VM investigator will: Initiate field investigations of all outages.

- Review all distribution-circuit outages, including transformer-only faults, within one week of the outage start date.
  - To ensure consistent system-wide practices, outage investigations may be limited in special circumstances if authorized by VM Operations Manager.
  - Significant storms and other Major Events may require VM investigations to be conducted outside of normal business hours.
  - VPM will not investigate outages affecting only service drops if neither a VM fire incident nor a significant event occurred.
- b. Complete investigation on all Wire Down or other high impact outages, and make details available to VPM for discussion on daily Outage Review Team (ORT) meeting / conference call, and no later than end of current business day.
- c. Review high-impact outages or Wire Down outages at daily ORT meeting / conference call.
- IF evidence of outage cause or Wire on Ground is not found,  
  
THEN contact Trouble Man (T-Man) to obtain additional information on outage.

### 2. IF tree was on an open work request or listed for work in the last 12 months,

THEN VM Investigator will ENTER Work Request number and RECORD root-cause analyses in Comment section of Outage Investigation form,

AND consult with VPM to discuss potential follow-up actions.

### 3. IF outage, including transformer only faults, was caused by 3<sup>rd</sup> party (excluding single customer or service drop outages),

THEN VM Investigator will COMPLETE Outage Investigation form with Name and Address of 3<sup>rd</sup> party in Comment section,

AND within two weeks of incident, PROVIDE information to VM Community Program Manager,

AND VPM must FOLLOW UP with Restoration and Law Claims to complete the required investigation forms.

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### NOTE

Accurate and timely data collected from vegetation-related outages field reviews is an important tool for preventing future outages. Data obtained from VM Outage Investigations helps in identifying trends and areas of focus.

Each field on the Outage Investigation must be filled out accurately and completely.

### 3 Document Investigation Findings

3.1 Within 3 business days of Investigation, VM Investigator will ENTER results into the online VM Distribution Outage Investigation Report.

1. IF outage is coded as “avoidable” in VM Outage Database,

THEN VM Investigator will PROVIDE additional root cause analysis information in Comment section,

AND consult with VPM to discuss potential follow-up actions.

### 4 Initiate Corrections to ILIS

4.1 IF the outage cause or Wire on Ground notation is incorrect in ILIS,

THEN VPM will direct the Distribution Operator (DO) responsible for updating ILIS to CORRECT the outage cause in ILIS.

1. PRESENT correction change request at daily ORT call or with an email to DO as soon as investigation report is complete.

2. DOs have up to 7 days to UPDATE the Basic and Supplemental Cause type on an outage record.

- IF required update continues past 7 day limit,

THEN contact the Outage Quality team at:  
[EOPerformanceAnalysisReviewTeam@pge.com](mailto:EOPerformanceAnalysisReviewTeam@pge.com).

4.2 VPM CONFIRMS change request completion to ILIS.

**END of Instructions**

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### DEFINITIONS

**Significant Event:** Includes, but is not limited to:

- Any outage that results in a large fire, injury, significant property damage, media attention, or a large outage with a significant community impact.
- A significant fire, as per the VM Fire Investigation and Reporting Procedure.
- A fire associated with a major woody stem.
- An outage caused by a PG&E contractor (i.e., work procedure error).

**High-impact Outage:** Defined as follows:

- Sustained outage to circuit breaker, line recloser, sectionalizer, or switch,
  - or, when over 100,000 customer outage minutes occur,
  - or, when over 500 customers affected,
  - or, when outage is marked for review on Daily Reliability Scorecard on daily Outage Reduction Team (ORT) call.

**Wire on Ground Outage:** Defined as follows:

- A primary distribution outage where the conductor is physically on the ground or resting on a foreign object (e.g., trees, vehicles, fences, structures).
- Reported by T-Man and noted by DO in ILIS Equipment Condition as “Broken, Wire on Ground”; “Broken, Wire on Object”; or “On Ground”.

**Outage Level:** There are four outage levels:

- Service Drop: Single customer served by low-voltage secondary.
- Transformer-Only: Outage on low-voltage secondary where protection prevents outage from becoming a distribution-circuit outage.
- Distribution-Circuit: Outage on high-voltage primary not caused by loss of transmission.
- Transmission-Line: Distribution outage is caused by loss of transmission.

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### ILIS Customer Counts:

- CESO: Total number of customers that experienced a sustained outage.
- CEMO: Total number of customers that experienced a momentary outage (less than 5 minutes after the FNL or start of the outage event).
- Initial: Total number of customers without power initially at the FNL or start of the outage event.

### IMPLEMENTATION RESPONSIBILITIES

The Vegetation Management document owner is responsible for the rollout and communication of this Procedure as well as the review of this document every two years. VM Operations is responsible for the implementation of this Procedure by providing training and conducting regular reviews of the Vegetation and Pole Clearing Databases.

### GOVERNING DOCUMENT

UO Standard S2010 – Electric System Outage Review Process

Distribution Vegetation Management Standard (DVMS)

### COMPLIANCE REQUIREMENT / REGULATORY COMMITMENT

[General Order 95, Rule 35](#)

[Public Resource Code 4292](#)

[Public Resource Code \(PRC\) 4293](#)

### REFERENCE DOCUMENTS

Electric Incident Reporting Criteria (CPUC EIR), effective Aug 2008

VM Fire Investigation and Reporting Procedure

Utility Standard: TD-2200S - Electric Customer Outage Reporting

Utility Procedure: TD-2200P-01 - Outage Reporting Details and Accuracy Verification Process

### APPENDICES

Appendix A: On-line Outage Investigation Form Data Entry Fields

### ATTACHMENTS

NA



## Distribution Vegetation-Related Outage Investigation Procedure

### DOCUMENT REVISION

Vegetation-Related Outage Investigation: Distribution, Version 5, Revised 11/2010

### DOCUMENT APPROVER

██████████, Vegetation Management, Operations Manager - North

██████████, Vegetation Management, Operations Manager - South

### DOCUMENT OWNER

██████████

### DOCUMENT CONTACT

██████████

### REVISION NOTES

Where?	What Changed?
Entire Document	Reformatted to meet GDM requirements.
Page 1 -Safety	<ul style="list-style-type: none"> <li>Updated <b>Safety</b> section to include tips specific to Outage Investigation field work</li> <li><b>Transformer level</b> outages require investigations. Previously, these only needed to be investigated if there was a fire and/or claim associated.</li> <li>Outage Investigations may be limited if authorized by <b>VM Manager</b>. Previously SVPM</li> <li>Complete investigation on all Wire Down or other high impact outages so that details are available to VPM for discussion on daily ORT meeting, and no later than end of current business day</li> <li>New direction around investigating <b>3<sup>rd</sup> party outages</b></li> <li>New direction on having cause changes made in ILIS</li> </ul>
Page 3- 2.3.1.a	
Page 3 - 2.3.1.a	
Page 3 - 2.3.1.b	
Page 5 - 3 Page 5 - 4	
Entire Document	Reformatted per GDM Numbering Procedure in preparation for Documentum migration.

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### Appendix A: On-line Outage Investigation Form - Data Entry Fields

On-line Outage Investigation Form Data Entry Fields
<b>Outage Date / Time:</b> Field is auto-filled for distribution outages from ILIS. Transmission date & time should match transmission control center morning report.
<b>Division:</b> Division of outage location.
<b>Line Type:</b> The type of line contacted by the tree (transmission, primary distribution, or secondary). Default is determined by outage level from ILIS – correct as needed.
<b>Equipment ID:</b> The protection device number of the device that operated or should have operated to limit the outage. Default is SSD from ILIS – correct as needed.
<b>Equipment Condition:</b> Pre-populated from ILIS to identify Wire on Ground or On Ground
<b>Equipment Type:</b> The type of protection device that operated or should have operated to limit the outage. Default is equipment type from ILIS-Investigator should correct with appropriate device.
<b>Inspector:</b> Default is name of person logged on. Use inspector's name.
<b>Outage Location:</b> Description of fault location where tree contacted line. Where Lat / Long taken. Auto-filled from ILIS – correct as needed.
<b>Did you find where the outage occurred:</b> Answer YES if investigator was in the vicinity of the fault location (or information was provided by first responder to complete form).
<b>Was Outage Vegetation Related:</b> Answer YES if the basic cause in ILIS should be "Vegetation." Answer YES if evidence unavailable to contradict ILIS cause. If NO, explain in comments.
<b>Was there Wire on Ground or On Ground:</b> Select Yes or No based on observation or conclusion
<b>Lat / Long:</b> Use GPS unit to create entry. Use decimal-degree format only, such as Lat=38.550296 and Long=121.710591. If GPS co-ordinates are not available in field, estimate using GIS, etc. <b>Mandatory</b>
<b>Work Request#:</b> Only list WR# if tree that caused an outage was on a pending WR <u>or</u> had been identified for tree work within the last 12 months.
<b>Was tree (or branch) found:</b> Answer YES if investigator found tree (or branch) or first responder provided information to complete form.



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<b>Species:</b> Provide species-specific choice from VM's Species List.
<b>Height and DBH:</b> Answer accordingly. Estimate as necessary.
<b>Distance of trunk from lines:</b> Horizontal distance from trunk's outer surface at breast height to the point directly below the outer phase.
<b>Weather at time of outage:</b> Default is from ILIS – correct as needed.
<b>Construction type:</b> At fault location.
<b>Insulation:</b> At fault location.
<b>Tree Growth (Cause of Outage):</b> Assumes unbroken, attached plant parts. <u>Tree grew into line:</u> Tree grew into contact with line. <u>Wind blew tree into line:</u> Wind blew branch or portion of tree into contact with line. <u>Snow loaded tree into line:</u> Snow loaded tree made contact with line.
<b>Tree Failure (Cause of Outage):</b> Assumes plant part is either broken, or detached. <u>Trunk failure:</u> failure of main stem. If the tree has two or more co-dominant stems, breakage in any one of the stems would be considered a trunk. If tree has a strong central leader, the trunk may fail at any point from the base to the top of the tree. <u>Branch Failure:</u> Above ground failure other than failure in the trunk. In trees lacking a strong central leader, the trunk will transition to a series of scaffold branches. <u>Root Failure:</u> Failure of the roots, even if they are above grade, as well as failures that involve both roots and a portion of the lower trunk. Root failure encompasses broken roots, cut roots, and root plate lifting out of the ground (wind throw). <u>Palm Frond Failure:</u> Almost invariably, this is a dead frond blown from a fan palm. <u>Bark Shedding:</u> Almost invariably, this is bark from a blue gum eucalyptus.
<b>Tree Cutting (Cause of Outage):</b> Outage is caused by human activity. <u>3<sup>rd</sup> Party:</u> Logger, homeowner, or independent tree trimmer, cuts a tree into the line. <u>PG&amp;E Contractor:</u> A PG&E tree trimming contractor causes the outage, resulting from a work procedure error (WPE). This includes cases where their equipment caused the outage. If emergency shutdown occurs, do not list as Tree Cutting, PG&E contractor: choose most logical Tree Growth or Tree Failure cause and use the keyword "shutdown" in comments explaining what happened.
<b>Describe Tree Conditions and reasons for outage:</b> Provide concise, objective narrative to clarify findings and root cause analysis results.
<b>Was Tree adjacent to road? (General Information):</b> Tree trunk occurs within 25 ft of road.

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<b>Was tree in slide? (General Information):</b> Answer if tree failed because of a slide. Active slide only.
<b>Soil, topography and slope questions (General Information):</b> Answer each in terms of the location of the tree trunk.
<b>Even aged stand (Tree Information):</b> Refers to whether the group of trees (up to several acres) is of the same age irrespective of species or species mix.
<b>Was tree native? (Tree Information):</b> Answer YES if tree naturally regenerated. This includes exotic species, such as blue gum, that have naturalized.
<b>Was tree leaning toward line? (Tree Information):</b> Answer whether the tree or the failed part of the tree was leaning toward the line before it failed.
<b>Rot present inside log? (Tree Information):</b> Answer whether the wood inside the log is rotted near break.
<b>Defects present? (Tree Information):</b> List what defects are present in the portion that failed. More than one may be present - so, list all.
<b>Did wind cause failure? (Tree Information):</b> Answer YES if wind load precipitated branch, trunk or root failure. <b>Did snow cause failure?</b> Check Y/N
<b>Original location of tree limb (Limb Failure):</b> Overhang is directly over a phase.
<b>Angle of limb at attachment (Limb Failure):</b> Measure from vertical.
<b>Length of Tree limb:</b> Measure the entire length of the failed branch from its point of attachment to the tips of the branch. If the failure occurred at a point other than the junction, add the length of the failed portion (the part on the ground) to the length of the stub on the tree.
<b>Species of the first tree (Domino Effect):</b> The first tree that failed.