Distribution Vegetation Management Standard (DVMS)

SUMMARY

The Distribution Vegetation Management (VM) Program has been designed and implemented to ensure safe and reliable operation of distribution facilities and to prevent vegetation foreseeable vegetation outages. In addition, the Distribution VM Program is designed to monitor compliance with state and federal laws and regulations including:

- CPUC General Order (G.O.) 95, Rule 35
- Public Resource Code (PRC) §4292
- Public Resource Code (PRC) §4293

TARGET AUDIENCE

- Vegetation Management Governance and Support
- Vegetation Management Operations
- VM Contractors: Pre-Inspection (PI), Tree Contractor (TC), Quality Control (QC), Quality Assurance (QA), Vegetation Control (VC)

SAFETY

PG&E and contract workers must review and follow all applicable safety standards and procedures before performing work, which includes review of tailboards and wearing appropriate Personal Protective Equipment for the job.

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REQUIREMENTS

1 Program Overview

1.1 Program Description

1. The Distribution VM Program consists of many different programmatic elements that intended for the safe and reliable operation of primary distribution circuits and secondary distribution lines, while complying with state laws and regulations including G.O. 95, Rule 35; PRC 4292 and 4293.

1.2 Program Strategy

1. The Routine VM program strategy is to perform an annual patrol and complete identified tree work on all overhead primary and secondary distribution facilities to maintain radial clearance between vegetation and conductors, and identify trees that will encroach within PG&E's minimum distance requirements (see Appendix A, Minimum Distance Requirements (MDR)) and hazard trees which have the potential to strike the conductors.

2. This approach allows for ongoing monitoring of vegetation conditions to prevent encroachment into the MDR, reasonably foreseeable outages and possible fire ignitions.

    a. Quality Assurance (QA) performs scheduled audits throughout the year, regardless of planned, pending, and completed inspection and tree pruning and removal work, to ascertain compliance with CPUC GO 95, Rule 35 and PRC 4293. Reporting on-going and relevant QA information allows for opportunities to take appropriate corrective action and to address gaps in processes and procedures.

    b. Quality Control (QC) monitors contractor work performed in the routine VM program. QC provides for on-going review of contractor work, relative to PG&E contract specifications and VM standards and procedures. Reporting on-going QC information related to strategic VM goals allows the opportunity to take appropriate corrective actions and to address gaps in processes and procedures.

1.3 Minimum Distance Requirements (MDR)

1. G.O. 95, Rule 35 and PRC 4293 require that utilities maintain minimum clearance distances between energized distribution conductors and vegetation. Appendix A displays a table and guidelines for determining Minimum Distance Requirement (MDR) to maintain separation between vegetation and distribution conductors in Local Responsibility Areas (LRAs) and State Responsibility Areas (SRAs).

1.4 Notification of Hazardous Condition

1. Transmission and Distribution Hazard Notification (HN) Procedure provides guidance for notifying and mitigating any vegetation condition which, under observed conditions, shows evidence of contact with a distribution conductor or has the potential to become an imminent threat.

2. This HN Procedure applies to all VM employees and VM contractors. The vegetation condition may arise from encroachment from growing vegetation or potential failure of limbs or trees, within or outside of the Right-of Way (ROW).

2 Routine Vegetation Management

2.1 Program Description – Routine

1. As described in the Distribution Routine Patrol Procedure (DRPP), Pre-Inspection (PI) contractors perform an annual patrol of all overhead distribution circuits, including stand-alone secondary lines.

   a. Patrols are performed by PI contractors, and the prescribed work is completed by the Tree Contractors (TC). When trees are present along the distribution line, a ground patrol is required to inspect the trees. However aerial patrols may also be used, including aerial patrols using Light Detection and Ranging (LiDAR).

   b. During the patrol, the PI identifies and prescribes work for trees that could grow into the MDR, and trees or portions of trees that could fail and make contact with conductors.

   c. Trees identified for work are issued on a Work Request to TC. Work completion is monitored by VM staff with additional validation through QC.

2.2 Planning and Scheduling

1. Detailed planning for the VM DRPP is conducted in the third and fourth quarter of each year for the following year. The detailed planning process includes forecasting the number of units that will be worked on each distribution circuit or project, and setting the following years' schedule.

2. Workload is forecasted using historical data on units worked in prior years, historical data on volume of trees pruned, and knowledge of local site conditions. After the current-year forecast is developed, the schedule for the year is determined, taking into consideration the following factors:

   - Last patrol date and duration
   - Line criticality

- Outage statistics
- Tag statistics
- Environmental restrictions, e.g. limited operating periods
- Stakeholder (contractor) feedback
- Accessibility (snow, flooding)
- Property owner activities (e.g. orchards)
- Distribution circuit length and tree density
- Resource availability

3. By following the Project Management Database (PMD) Standardization Guidelines (Dec. 2015) and with VPM approval, circuits and line sections may be segmented or combined into unique PMD projects.

4. The following are situations where unique PMD projects are considered:

- Highway projects
- Agency Projects (USFS, BLM)
- Geographic / District / Administrative Boundaries
- Orchards

NOTE

Commercial orchards are planned as “Orchard Projects”, and as a separate segment or project from non-orchard patrols. Whenever possible, VM contractors schedule distribution and transmission orchard work at the same property or corridor and coordinate schedules using PMD along with other considerations such as seasonal restrictions, and harvest schedules.

a. Once the plan is finalized, all distribution line sections and their associated forecasts are entered into PMD.

b. PMD is used throughout the year to monitor work progress and work completion status.

2.3 Work Practice and Procedure

1. Pre-Inspection and tree work is performed in accordance with PI Contract Specifications, TC Contract Specifications and Distribution Routine Patrol Procedure.

2. Pre-Inspection

   a. As described in the Distribution Routine Patrol Procedure, PI inspects all vegetation, both inside and outside of the ROW, which has potential to grow into or fall into distribution conductors.

   b. PI is required to use MDR to determine the minimum allowable clearance distances, and prescribe tree work accordingly.

   c. Once a tree is identified for work, the work prescription must consider local conditions which will occur prior to the next patrol. Local conditions may include, but are not limited to:

      - Reasonably anticipated tree and conductor movement
      - Species types and growth rates
      - Species failure characteristics
      - Local climate and rainfall patterns
      - Line terrain and elevation
      - Location of the vegetation within the span
      - Worker approach distance requirements
      - Snow load

   d. Trees identified by PI as requiring work are entered into a handheld device. Upon completion of the field inspection, the handheld data is downloaded to the Vegetation Management Database (VMD)

3. Work Completion – Tree Pruning and Removal

   a. Work identified by PI is issued to TCs as Work Requests generated through VMD.

   b. A Work Request identifies the work practice and work methodology most appropriate to the work location. Routine tree pruning work assigned solely by Work Request is performed as selective manual removal or pruning of individual trees in and along the ROW.

c. When the assigned tree work is complete, the Work Request is closed out in VMD, and the PMD project for that distribution line is updated as completed.

4. Refusals

a. PG&E will follow the Distribution Vegetation Refusal Procedure for all locations and incidents that result when work is constrained by external factors such as:

- Environmental Review or further work with a government agency.
- Customer refuses to allow VM access to property or hinders the ability to perform the work necessary to maintain compliance on distribution lines and facilities.

5. Work Completion Status

a. VM PMD is a software application, used for monitoring work status, adjustments to workload forecast, resources or and adjustments to the work schedule.

b. At the end of the planning process, information on distribution patrols is entered to PMD with a unit forecast and a planned start / completion date.

c. The work completion progress on each “Open” distribution patrol is updated weekly, and forecasted completion dates are adjusted as needed. When a line is reported as work complete by PI or TC, the date is entered as actual completion to PMD.

d. PMD has scheduling status reports which allow a Program Manager to monitor work completion and make resource adjustments.

e. PMD forecast and actual completion dates are used to document modifications to the annual work plan.

6. Quality Control

a. Monitoring PI and TC work performance is conducted by a separate QC contractor, described in the Quality Control Program section of this document.

3 Vegetation Control (VC) Program

3.1 Program Description

1. Vegetation Control (VC) is the PG&E system wide program of patrolling, identifying, prescribing work, conducting work, and documenting work around subject poles and towers to maintain compliance with California Public Resource Code (PRC) 4292 as well as PG&E standards.

2. Subject poles are those poles and towers with specific equipment in designated areas. During the declared fire season, the utility is required to maintain 10 feet of radial clearance and 8 feet of vertical clearance from vegetation that could allow the fire to spread at the base of subject poles and structures.

3.2 Planning and Scheduling

1. The VC program's project year generally runs from October through the following September. The location and number of subject poles is stable; the annual work plan is based on the geographical locations of the subject poles and historical knowledge relative to the timing of fire season. An annual work plan is developed by the VC contractor and submitted to Sr. Vegetation Program Manager overseeing VC, for approval by September 15th of each year.

2. PI and VC work is scheduled based on a combination of the work activity needed and the anticipated date for fire season declaration.

   a. Subject poles where the property owner / land manager allows application of herbicide must be pre-inspected from October through March; the subject pole will be cleared and herbicide applied at the time of inspection.

      - These poles will be inspected a second time between May and August and re-cleared of vegetation as needed.

   b. Subject poles where the property owner / land manager will not allow application of herbicide are pre-inspected from October through March; the pole is cleared from March through June, depending on the start of fire season.

      - These poles must be inspected a second time between May and August and re-cleared as needed.

      - Between the months of July through September, these subject poles are re-inspected a third time and cleared of vegetation as needed.

3.3 Planning and Work Practice

1. VC maintains an inventory of all distribution subject poles that require clearing. An annual patrol is conducted generally between the months of October through March, with work prescribed at each location.

   a. When the prescribed work is to clear and treat the area around the subject pole / tower with herbicides the work is done during the patrol.

   b. When the prescribed work is to clear the pole / tower without use of herbicides, the work is conducted generally between the months of April through June.

   c. All distribution subject poles / towers are re-cleared as needed between the months of May through August.

   d. Every distribution subject pole / tower has an associated annual record that documents the patrol and work completed.

3.4 Work Completion

1. Bi-weekly, the VC Contractor provides a report of completed VC work on subject poles to the Sr. Vegetation Program Manager overseeing the VC Program. These reports are compared against the original plan and the projected fire season to monitor status and to adjust forecast schedule, if needed.

2. As Work Requests are completed by the VC contractor, they are documented in the Pole Clearing Database (PCD) as completed locations.

3.5 Quality Control

1. VC work is monitored and audited by sampling, and reviewed for work complete and compliance with PRC 4292 by QA and QC Quality Programs.

4 Quality Control (QC) Program

4.1 Program Description

1. The QC program monitors contractor work for accuracy, quality, and contractual conformance.

2. To maintain appropriate separation, audits are performed by a separate third-party contractor whose only function in the VM Program is Quality Control.

3. There are three primary types of QC audits:

   - Review of PI work complete
   - Review of TC / tree removal work complete
   - Mid-cycle reviews

4. Work complete audits verify conformance of completed contractor work to VM contract specifications and VM work procedures.

5. During mid-cycle reviews, QC audits line sections to assess whether contractor work was sufficient to maintain regulatory compliance.

4.2 Work Practice and Procedure

1. QC work is performed in accordance with VM contract specifications and VM standards and procedures. The progress of QC work is monitored on an ongoing basis by the Sr. Quality Assurance Specialist overseeing the QC Program.

4.3 Work Identification and Completion

1. For Routine VM Program, PI and TC work complete audits; audited distribution circuit locations are selected from a computer-generated, randomized list of locations. Sample locations are reviewed by the auditor after completion of PI and TC work.

   a. Auditor completes the field audit by answering a pre-determined set of questions on work quality at each sample location.

   b. Review findings are sent to VM Operations.

   c. Corrective actions are pre-determined and assigned by the QC database to local operations.

2. Mid-cycle line section audits are performed on sections of distribution lines that were worked during routine maintenance, at least five months prior to the audit date.

a. The start point of a line section review is selected from a computer-generated list of randomized Source Side Devices (SSDs) on those circuits that meet the time criteria.

b. The auditor completes the audit in the field by identifying any hazard trees which may fail prior to the next scheduled cycle and any trees that will not hold MDR until the next scheduled patrol / pruning.

c. The auditor documents findings on field data sheets which are forwarded to local VM Operations.

d. As needed, local operations sets requirements for corrective action by the PI or TC.

3. VC audits are performed on a random, representative set of PI and VC work complete distribution subject poles in each division.

a. The auditor completes the audit in the field by answering a pre-determined set of questions on work quality at each sample location.

b. When the field review for a VC work complete audit is finished, the auditor forwards the findings to the Sr. Vegetation Program Manager overseeing the VC Program.

c. As needed, Sr. Vegetation Program Manager overseeing VC will set requirements for corrective action by the VC contractor.

4.4 Quality Control - Contractor

1. The QC contractor has an ongoing internal quality control process. On a monthly basis, each QC field technician will have one completed audit reviewed by a QC Supervisor.

2. QC Management will require internal corrective actions when necessary.

3. QC Management will schedule quarterly meetings with the Sr. Quality Assurance Specialist overseeing QC to analyze review processes.

5 Quality Assurance (QA) Program

5.1 Program Description

1. The QA program consists of a team of QA Specialists located throughout the PG&E service territory who perform scheduled audits throughout the year, regardless of planned, pending, or completed inspection and tree pruning / removal work, to ascertain a true “real-time” condition of the system.

a. QA performs an annual assessment to identify areas of higher potential risk, and develops an annual audit plan. Audits are conducted to measure compliance with G.O. 95, Rule 35; PRC 4292 and PRC 4293.

b. Each audit process uses statistical sampling methods and randomly selects portions of the overhead system to audit for compliance. The auditors perform root-cause analysis on observed compliance issues and any approaching non-compliances, identify trends, and report the results to the Department Director, the Operations Manager, Supervising Vegetation Program Manager (SVPM) and the area Vegetation Program Manager (VPM).

c. The Supervising Vegetation Program Manager (SVPM) is responsible for taking action to correct identified deficiencies, and communicating required corrective actions to the contractors.

d. IF a recurring or systemic issue is identified, then VM Operations, working in conjunction with QA, develops a Corrective and Preventative Action Plan (CAPA) for its contractors to reduce or prevent recurrence.

5.2 Planning

1. The QA annual work plan is developed annually. Developing the audit plan includes consideration of:

- Voltage levels
- Mileage (exposure)
- Historical VMD tree count by division or area
- Forecasted tree count by division or area for the upcoming year
- Historical QA audit results by division or area
- Contractor make up or recent contract changes
- Recent changes in process or procedures

2. Operations and Governance and Support Managers are solicited for input; the final annual plan is reviewed and authorized by the Department Director.

5.3 Scheduling

1. QA audits are performed by the Quality Assurance Specialists (QAS). Each QAS is responsible for scheduling and conducting distribution audits in their areas of responsibility and within the parameters of the annual work plan.

5.4 Work Status

1. Each QA audit has an associated Audit Plan which defines the scope and projected timeline of the audit.

2. Status and work progress monitoring is conducted through weekly update reports which is provided to the QA Program Manager, Operations, and Governance and Support Managers and the area SVPM.

3. The weekly report also provides work complete percentages, preliminary findings and any critical observations.

5.5 Work Practice and Procedure

1. QA audit practices are consistent with ANSI/ISO/ASQC Q10011 Guidelines for Auditing Quality Systems. A standardized distribution audit process is used that addresses planning, performing, analysis, reporting, communications, corrective action, and follow-up.

2. Each audit is independent of the operations work stream and includes all lines and poles in the audit population regardless of the operations work plan.

   a. Random sampling is used to ensure a statistically valid representation of the audit area.

   b. Audit areas are stratified by voltage level; audit locations are randomly selected (MS EXCEL random number generator) and reviewed prior to field work by using satellite and aerial photographic images available through PG&E's Geographic Information System (GIS) and Google Earth.

   c. Where available, LiDAR data may also be reviewed and used as part of the audit process.

3. Audit transects are entire SSDs including hard taps; the auditor evaluates all vegetation under and adjacent to the audit line.

   a. In the field, the auditor uses field data sheets to identify and document trees or vegetation that:

      (1) Are non-compliant with regulations

      (2) May become non-compliant prior to the next pruning cycle

      (3) Exhibit signs that may indicate a potential failure into overhead facilities

   b. Field data sheets are provided at least weekly to the VPM and SVPM as notice of existing non-compliant locations.

4. Upon completion of field work, the auditor performs a root cause analysis for any non-compliant or projected non-compliant locations. A final report is submitted to and reviewed by the QA Program Manager. The QA Program manager submits the final report to department Director.

5. Upon receipt of the final report, the SVPM must develop and complete an appropriate CAPA.

5.6 Quality Control

1. The QA program has three activities to maintain QC for their work performance:

   a. Detailed audit processes and flow charts are used to maintain consistency within the QAS group.

   b. The QA Program Manager performs periodic evaluations of the audit preparation, related field work and any root cause analysis performed by the QAS.

2. All reports are reviewed and approved by the QA Program Manager and authorized by the department Director.

END of Requirements

Distribution Vegetation Management Standard (DVMS)

DEFINITIONS

Aerial Patrol – Use of a helicopter or other aircraft with or without LiDAR capability for the purpose of visual inspection of vegetation.

Distribution Underbuild – The presence of electric distribution lines located directly under and parallel with the transmission lines, and attached to the same pole or structure.

Easement (or Right of Way) – For the purposes of this Standard it is the as-built condition of a geographically described strip of land upon which PG&E's electric facilities are constructed, operated and maintained. "Easement" refers specifically to the legal description of that corridor.

Hazard Condition – A vegetation condition affecting transmission or distribution lines which does not pose an imminent threat, but where the condition has the potential to become an imminent threat and is at or encroaching the PG&E clearance distance.

Hazard Trees - Any tree whose height is at or approaching the PG&E Minimum Clearance Requirements (Appendix A).

- **All lines**: Trees that are dead, show signs of disease, decay or ground or root disturbance, which may fall into or otherwise impact the conductors, towers or guy wires before the next inspection cycle.

Light Detection and Ranging (LiDAR) – Technology used to determine vegetation conditions, predominantly distances and clearances, in relation to the electric conductors and easement boundaries.

Minimum Clearance Requirement – PG&E defined minimum clearance designed to meet or exceed all applicable regulatory requirements at all times.

Orchard – Any commercial-producing orchard. Only includes trees that are part of the production crop.

Orchard Tree – Any commercial-producing fruit or nut tree that is part of a production crop.

Right-of-Way – See Easement

Riparian Area – A geographic area within 25 feet of the high water mark or the top of the bank, including but not limited to steams and watercourses, with or without water during dry season, wetlands, ditches, and ponds.

Refusal – A situation that occurs when a customer / property owner refuses to allow PG&E to perform pre-inspection work or to complete 100% of the work prescribed.

Distribution Vegetation Management Standard (DVMS)

IMPLEMENTATION RESPONSIBILITIES

The Vegetation Management Document Owner is responsible for the rollout and communication of this Standard as well as the periodic review of this document. Vegetation Management Operations is responsible for the distribution of this Standard.

GOVERNING DOCUMENT

Transmission Vegetation Management Standard

COMPLIANCE REQUIREMENT / REGULATORY COMMITMENT

General Order 95, Rule 35

Public Resource Code (PRC) 4292

Public Resource Code (PRC) 4293

ANSI/ISO/ASQC Q10011 Guidelines for Auditing Quality Systems

REFERENCE DOCUMENTS

Database Monitoring Procedure

Transmission & Distribution Vegetation Hazard Notification Procedure

Distribution Vegetation Refusal Procedure

Distribution Routine Patrol Procedure (DRPP)

Mapping Procedure

Transmission Routine Patrol Procedure (TRPP)

Project Management Database (PMD) Standardization Guidelines (Dec. 2015)

APPENDICES

Appendix A: Minimum Distance Requirements (MDR)

ATTACHMENTS

NA

DOCUMENT RECISION

NA

Distribution Vegetation Management Standard (DVMS)

DOCUMENT APPROVER

[redacted] Director, Compliance and Risk Management

DOCUMENT OWNER

[redacted] Vegetation Program Manager

DOCUMENT CONTACT

[redacted] Vegetation Program Manager

REVISION NOTES

Where?	What Changed?
Entire document	New document, formatted to GDM requirements.

Distribution Vegetation Management Standard (DVMS)

Appendix A: Minimum Distance Requirements (MDR)

CPUC Rule 35 Applicable at all times (1) (feet)	**Santa Barbara County CPUC Rule 35, Table 1, Case 14 (hhh)** Applicable in extreme and very high fire threat zones in Southern California at all times (1) (feet)	**PRC 4293** Applicable in SRA during fire season (1) (feet)	**Potential Line Sag** (2) (feet)
1.5'	4'	4'	1 - 4'

1) Vegetation shall not encroach within the minimum distance at any time between inspection and one year or next scheduled tree work cycle.

2) Depending on span length, facility construction and conductor material, potential sag and sway can range from 1’ at quarter-span to 4’ at mid-span.