



Energy Delivery

VM-ED-P025

Rev. 1

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Effective Date: 12/21/2007

FUNCTIONAL AREA													
AD	AM	BO	CM	CS	EA	EN	EP	EX	FM	GO	HR	IT	OP
PC	QA	RE	SA	SM	TQ	VM	WM						
						X							

## VEGETATION MANAGEMENT DISTRIBUTION AND TRANSMISSION CLEARANCE GUIDELINES

### 1 PURPOSE

To provide a clear understanding and consistent application of the Vegetation Management Department’s trimming practices for distribution and transmission systems.

The manual target audience includes Vegetation Management personnel, internal Exelon clients and contractors performing vegetation management work on the Exelon system.

Exelon’s goal is to provide electric power service in a safe, reliable, and cost effective manner through tree trimming, tree removal, and herbicide applications near power lines. This procedure will specifically focus on the tree trimming component.

Exelon’s vegetation management practices are developed in compliance with the National Electric Safety Code (NESC). American National Standards Institute (ANSI), and Occupational Safety and Health Administration (OSHA).

This tree trimming program is not intended and cannot be used to determine our rights-of-way contractor’s safety practices or work procedures. Our contractor, as an independent contractor, is a qualified expert in vegetation control and shall always determine its own safety practices, work procedures, and personnel policies

### 2 TERMS AND DEFINITIONS

2.1 ANSI A300: American National Standards Institute Standard Practices for Tree Care Operations -Tree, Shrub, and Other Woody Plant Maintenance (revised 2001).

- 2.2 ANSI Z133.1: American National Standards Institute Safety Requirements for Pruning, Repairing, Maintaining, and Removing Trees, and Cutting Brush (revised 2000).
- 2.3 Branch Bark Ridge: A ridge of bark in a branch crotch that marks where branch and trunk tissue meet and often extends down the trunk
- 2.4 Branch Collar: Raised ring around the branch of tree
- 2.5 Brush: Naturally occurring trees or other woody material, which is capable of growing into the conductors that is less than 4" in diameter at DBH.
- 2.6 Climbable Tree: A tree, which is easily, or readily climbed without the use of ladders or specialized climbing equipment.
- 2.7 Conifer: Cone bearing tree
- 2.8 Danger Tree: A tree, which is dead, or has visible defects in close proximity of the line, which is likely to strike the conductor when it fails (trees on the south or west side of the lines are more likely to strike the lines due to prevailing winds).
- 2.9 DBH: Diameter at Breast Height or 4.5 feet above the ground.
- 2.10 Distribution: Lines with voltages under 69kV.
- 2.11 Established Lead: A main stem of a tree that is at least 4" in diameter at the height of the conductor being trimmed.
- 2.12 Isolated Secondary: A secondary wire running pole-to-pole with no primary voltage lines located on the pole.
- 2.13 Multi-Stem: A tree with multiple stems that split above the ground-line and no visible bark seam down to the ground. If the tree splits at the ground-line, or has a visible seam down to the ground they are considered multiple trees.
- 2.14 NESC: – National Electric Safety Code
- 2.15 Open Wire Secondary/Service: A service or secondary line where the hot and neutral wires are strung separately in a vertical or horizontal configuration.
- 2.16 Overhang: Limbs or branches of a tree, which are located directly over the conductors.

- 2.17 Over Clearance: The distance between a tree limb located above the line, and the nearest energized conductor.
- 2.18 Primary Voltage Line: A high voltage distribution line (2.4kV – 34kV) feeding the distribution transformers. This line usually is not insulated, but may have a weather coating.
- 2.19 Primary Aerial Cable: A high voltage distribution line where the insulated primary phases are strung inside a flexible cable with the primary neutral.
- 2.20 Primary Hendrix Cable: A high voltage distribution line where the insulated primary phases are strung in brackets supported by the primary neutral.
- 2.21 Secondary/Service Cable: A secondary or service line where the hot wires are wrapped around a neutral wire and strung together.
- 2.22 Service Wire: A low voltage line (120-480 volts), which feeds a single building, or customer.
- 2.23 Secondary Wire: A low voltage pole-to-pole line (120-480 volts), which feed multiple buildings or customers.
- 2.24 Side Clearance: The side clearance is the distance between a tree limb located to the side of the line, and the nearest energized conductor.
- 2.25 Topping: Removal of top and upright branches with many internal cuts
- 2.26 Transmission Line: Lines with voltages of 69kV or greater.
- 2.27 Tree: A woody plant that is more than 4" in diameter at DBH.
- 2.28 Under Clearance: The under clearance is the distance between a tree or tree limbs located under the line, and the nearest energized conductor.

### 3 RESPONSIBILITIES

#### 3.1 VEGETATION MANAGEMENT PERSONNEL

- 3.1.1 Manage the tree trimming program to ensure that the goals of the program are met

#### 3.2 EXELON CONTRACTOR

- 3.2.1 Tree trimming in accordance with the clearance guidelines

4 **MAIN BODY**

4.1 **SAFETY MEASURES**

- 4.1.1 Know and practice OSHA and ANSI requirements
- 4.1.2 Use of mandatory PPE
- 4.1.3 Maintain minimal separation distance from conductors (distance is based on voltage)
- 4.1.4 Contractors must abide by all safe practices that are documented by the contract organization and approved by Exelon standards
- 4.1.5 Schedule outages as needed by contractors

4.2 **ENVIRONMENTAL CONCERNS**

4.3 **PRECAUTIONS**

- 4.3.1 Sensitivity to property owners, municipalities, and other regulating bodies concerns and compliance with all applicable agreements

4.4 **LIMITATIONS**

- 4.4.1 Exelon can not guarantee that trimming will be performed to the minimal recommended clearances based on the structure of the tree and the type of line
- 4.4.2 Large tree trunks or major limbs of established trees may be allowed to remain provided that (1) The movement of either the conductor or the tree will not result in contact between the tree and the conductor and (2) There is no evidence of re-growth or sprouting from the tree trunk towards the line

4.5 **PREREQUISITES**

- 4.5.1 Customer and municipal notification.
- 4.6 Exelon West notification will comply with the applicable state law (SA 91-0902) and the Municipal Tree Trimming Agreements.
- 4.7 De-energizing of electrical lines when necessary. All requests for planned outages by the contractor will be evaluated on site by the tree trimming contractor's representative, Exelon Vegetation Management and Exelon Construction to determine if alternative solutions can be implemented to reduce the impact to the customer.

4.8 Work scope packets are providing to contractor prior to trimming

4.9 SYSTEM SCOPE

4.9.1 Exelon East Vegetation Management Department administers tree trimming maintenance for 12,900 distribution miles and 1,000 transmission miles. The geographic scope of the territory is the southeast corner of Pennsylvania comprised of rural, urban and suburban areas in Bucks, Chester, Delaware, Montgomery, Philadelphia and York counties.

4.9.2 Exelon West Vegetation Management Department administers tree trimming maintenance for 34,500 distribution miles and 5400 transmission miles. The geographic scope of the territory is the northern portion of Illinois comprised of rural, urban and suburban areas in Boone, Carroll, Cook, Dekalb, DuPage, Jo Davies, Grundy, Henry, Kane, Kankakee, Kendall, Lake, LaSalle, Lee, McHenry, Ogle, Stephenson, Whiteside, Will, and Winnebago counties.

4.10 SYSTEM CYCLE

4.10.1 Scheduled planning and maintenance of the extensive line mileage on the distribution & transmission system is essential to economical and reliable customer service. The cycle objective is to return to the work unit for repeat right-of-way maintenance at the most economical time before conditions deteriorate to the point of causing outages. By considering the growth rates, the time that will elapse between returns to a maintained planning unit can be established. This interval between treatments is known as the maintenance cycle. The amount of clearance is dependant upon the cycle length. Exelon **REDACTED** West cycle lengths are described below for the distribution & transmission systems.

**REDACTED**

4.10.3 Cycle Sequence – Exelon West

1. Distribution Maintenance:

Tree trimming	4-year cycle	(8,625miles/year) (6,500 miles/year for lift) (2,125 miles/year for manual)
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2. Transmission Maintenance:

Tree trimming	5-year cycle	(1,100 miles/year)
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4.10.4 Tree Trimming Techniques

The ANSI A300 Standard Practices for Pruning will be utilized during routine line clearing operations.

1. Height Reduction

Height reduction or crown reduction is achieved by cutting back portions of the upper crown of the tree. This is often required when a tree is located directly beneath the conductors. The main leader or leaders are cut back to a suitable lateral.

2. Through Trimming

Through trimming is utilized for large trees located directly beneath lines in which branches are removed within the crown to allow lines to pass through the tree. Cuts should be made at crotches to encourage growth away from the lines.

3. Side Trimming

Side trimming consists of cutting back or removing the side branches that are threatening the conductors. Side trimming is required where trees are growing adjacent to utility lines. Limbs should be removed at a lateral branch or the main trunk. Proper side trimming of conifers will often minimize or eliminate the need to trim them in future cycles.

4. Overhang Trimming

Overhang trimming is the removal of limbs hanging over the top of the conductors. When trees are of sufficient height and lines are directly underneath, it is necessary to elevate limbs to the appropriate clearance. All dead limbs should be removed over the primary wire regardless of height.

5 **DOCUMENTATION**

1. Documentation generated during performance of this procedure SHALL BE
  - a FILED by the Project Lead
  - b MAINTAINED for 7 years.

6 **REFERENCES**

- 6.1 VM-ED-P025-1, Exelon West Standard Clearances – Distribution  
[http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared/Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-1 Exelon West Standard Clearances for Distribution.doc](http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared/Documents/VM-ED-P025%20Distribution%20and%20Transmission%20Guidelines/VM-ED-P025-1%20Exelon%20West%20Standard%20Clearances%20for%20Distribution.doc)
- 6.1.1 VM-ED-P026-1.1 ComEd Guidelines and Exceptions  
[http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared/Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-1.1 ComEd Guidelines and Exceptions.doc](http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared/Documents/VM-ED-P025%20Distribution%20and%20Transmission%20Guidelines/VM-ED-P025-1.1%20ComEd%20Guidelines%20and%20Exceptions.doc)



- 6.4 VM-ED-P025-4, Exelon Transmission Clearances  
[http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared/Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-4 Exelon Transmission Clearances.doc](http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared/Documents/VM-ED-P025%20Distribution%20and%20Transmission%20Guidelines/VM-ED-P025-4%20Exelon%20Transmission%20Clearances.doc)
- 6.4.1 VM-ED-P025-4.1, VM1-REV4.pdf  
[http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared/Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-4.1 thru VM-ED-P025-4.12 Transmission diagrams.doc](http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared/Documents/VM-ED-P025%20Distribution%20and%20Transmission%20Guidelines/VM-ED-P025-4.1%20thru%20VM-ED-P025-4.12%20Transmission%20diagrams.doc)

- 6.4.2 VM-ED-P025-4.2, VMC-138-1A REV2.pdf  
<http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-4.1 thru VM-ED-P025-4.12 Transmission diagrams.doc>
- 6.4.3 VM-ED-P025-4.3, VMC-138-1B REV2.pdf  
<http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-4.1 thru VM-ED-P025-4.12 Transmission diagrams.doc>
- 6.4.4 VM-ED-P025-4.4, VMC-138-2A REV2.pdf  
<http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-4.1 thru VM-ED-P025-4.12 Transmission diagrams.doc>
- 6.4.5 VM-ED-P025-4.5, VMC-345-1A REV2.pdf  
<http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-4.1 thru VM-ED-P025-4.12 Transmission diagrams.doc>
- 6.4.6 VM-ED-P025-4.6, VMC-345-2A REV2.pdf  
<http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-4.1 thru VM-ED-P025-4.12 Transmission diagrams.doc>
- 6.4.7 VM-ED-P025-4.7, VMC-345-2B REV2.pdf  
<http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-4.1 thru VM-ED-P025-4.12 Transmission diagrams.doc>
- 6.4.8 VM-ED-P025-4.8, VMC-345-2C REV2.pdf  
<http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-4.1 thru VM-ED-P025-4.12 Transmission diagrams.doc>
- 6.4.9 VM-ED-P025-4.9, VMC-345-2D REV2.pdf  
<http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-4.1 thru VM-ED-P025-4.12 Transmission diagrams.doc>
- 6.4.10 VM-ED-P025-4.10, VMC-765-1A REV2.pdf  
<http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-4.1 thru VM-ED-P025-4.12 Transmission diagrams.doc>

- 6.4.11 VM-ED-P025-4.11, Zones1.pdf  
[http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared/Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-4.1 thru VM-ED-P025-4.12 Transmission diagrams.doc](http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared/Documents/VM-ED-P025%20Distribution%20and%20Transmission%20Guidelines/VM-ED-P025-4.1%20thru%20VM-ED-P025-4.12%20Transmission%20diagrams.doc)
- 6.4.12 VM-ED-P025-4.12, Trim 230.ppt  
[http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared/Documents/VM-ED-P025 Distribution and Transmission Guidelines/VM-ED-P025-4.1 thru VM-ED-P025-4.12 Transmission diagrams.doc](http://exelonweb.exeloncorp.com/sites/VegetationManagement/Shared/Documents/VM-ED-P025%20Distribution%20and%20Transmission%20Guidelines/VM-ED-P025-4.1%20thru%20VM-ED-P025-4.12%20Transmission%20diagrams.doc)
- 6.5 ANSI A300 (rev. 2001)
- 6.6 ANSI Z133.1 (rev. 2000)
- 6.7 Pruning Trees Near Electric Utility Lines, Dr. Alex L. Shigo
- 6.8 Tree Pruning Guidelines, International Society of Arboriculture
- 6.9 *Pruning Standards for Shade Trees* by the National Arborist Association
- 6.10 Trees and Power Lines/Cautions and Recommendations by Kris R. Bachell as published in the Plant Information Bulletin of the Morton Arboretum.
- 6.11 Line Clearance Contractors Quality Control Procedure
- 6.12 Exelon Vegetation Management Quality Program Plan
- 6.13 Public Act 91-0902 of the Illinois 91st General Assembly
- 6.14 Tree and Overhead Electric Wires, D. L. Ham
- 6.15 EEI clearances.pdf
- 6.16 S-7000 to 04 Clearances.pd

7 **ATTACHMENTS**

- 7.1 None

8 **DEVELOPMENT HISTORY**

<b>Revision 0</b>		<b>Date 03/27/2006</b>
Writer	Jeff Watson – PECO Vegetation Management, Merle Turner - ComEd Vegetation Management]	
Reviewer(s)	Chuck Sheppard, Fabiola Amezcua– Exelon Vegetation Management	
Approver(s)	Doreen Masalta	
Reason Written	Procedure VM-ED-649-803 Rev 0 (5/31/2005) has been rewritten and is now Process VM-ED-P025 to reflect EED Management Model Hierarchy.	

Writer	<b>REDACTED</b>
Reviewer(s)	
Approver(s)	
Reason Written	

<b>Revision 2</b>		<b>Date XX/XX/XXXX</b>
Writer	Writer's Name (work group) [text will wrap as necessary for all lines in table]	
Reviewer(s)	Reviewer's Name (work group); Reviewer's Name (work group)	
Approver(s)	Approver's Name(s)	
Reason Written	Brief description explaining why the procedure was written or revised.	