

Northeast Utilities Overhead Transmission Line Standards

1. Scope

This standard describes the vegetation clearing along rights-of-way (ROW) of the NU operating companies in Connecticut and Massachusetts where overhead transmission lines are to be constructed. The practices described here apply to the construction requirements for all 115kV and 345kV ¹ electric transmission lines, and are consistent with the North American Electric Reliability Council (NERC) Vegetation Management Standard FAC-003-1 dated 2/16/2006, The New England Independent System Operator's (ISO-NE) vegetation clearing standard OP-3 dated 2/1/2005, and the National Electrical Safety Code (NESC) Rule 218 as adopted by the Connecticut Department of Public Utility Control (Regulation Sec. 16-11-134).

This standard applies to new construction clearing requirements and practices and not to on-going future vegetation maintenance of the ROW's. The initial clearance requirements outlined in this standard are intended to provide adequate clearances for a period of four (4) years at which time scheduled maintenance will be performed to reestablish or preserve the initial clearances. The maintenance of the vegetation following construction is addressed under the Northeast Utilities Specification for Rights-of-Way Vegetation Management. Low-maturing trees, which are allowed to remain after completion of vegetation clearing, are still subject to future trimming and removals, depending upon their growth and health, as well as the future needs of NU to operate, maintain, and add or replace electric facilities on the ROW.

NU operating companies typically obtain permanent easement rights for the placement of overhead transmission lines, including the right to clear vegetation within the fully defined limits of a ROW. In most locations the right to remove any tree or portion of tree outside the easement limits of the ROW ("danger tree") that by falling could endanger the transmission line facilities is also obtained. These rights are necessary to provide for the safe and reliable operation and maintenance of any overhead transmission line that is built on a ROW.

Notwithstanding these rights, the standard practice of the NU operation companies is to minimize tree and other vegetation removal that is required for new transmission line construction by:

- A. Designing new lines to keep the positions of new conductors as much as possible within any existing cleared ROW corridor, thus minimizing additional clearing
- B. Remove non-compatible vegetation (trees and tall growing shrub species) within the conductor clearance zone (area directly under the conductors extending 15 feet horizontally outward from the outermost line conductors)

¹ Except for possible modifications to existing 69kV lines, it is unlikely that NU will construct any new 69kV lines. Therefore, this standard covers 115 and 345kV lines only, and 115kV line clearances would apply to any new 69kV lines.

Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines			
Northeast Utilities Approved by: DEH, PJA	Design and Application	OTRM 030.001	Rev. 1 05/16/2008

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- C. Allowing low-maturing tree species such as dogwoods to remain within the side zones (area outside of the conductor clearance zone extending to the edge of the ROW clearing limits) where these low-maturing species exist
- D. Re-establishing pre-existing access roads for construction vehicles to minimize the clearing of low growth within the existing corridor for access
- E. Locating new line structures close to old structures and overlapping the work areas of old structures to reduce to the amount of clearing for the new structure work areas
- F. Where feasible, using existing conductors to pull in new conductors, thus reducing damage to low growth vegetation along the cleared corridor
- G. Engaging an arborist to determine individual “danger trees” for removal considering
 - 1) Species
 - 2) Soil conditions
 - a) including wetland vs. upland
 - b) susceptibility to flooding
 - c) depth to rock (and adaptability of the species to those conditions)
 - 3) Health of the tree
 - 4) Inclination of trunk
 - 5) shape of crown

Refer to figures V-1 through V-6 for diagrams of the conductor clearance zone and side zones associated with various line structure types.

2. Clearance between Conductors and Woody Vegetation

Transmission lines within the Northeast Utilities System present a variety of woody vegetation control situations. Regulatory authorities may require “buffers” or “screening” at visually sensitive highway and local road crossings or other locations, and such locations require special attention to achieve and maintain the necessary clearances. At all other locations, standard ROW vegetation clearing practices for new line construction are as follows:

- A. Within the ROW limits, as depicted on Figures A, B, and C, cut all tall-maturing tree species of any height while retaining existing compatible woody shrub species (see Appendix 1).
- B. Clear-cut construction areas at structure locations and access roads as depicted on Figure C.
- C. At road crossings, within side zones and other sensitive areas, as specified by ROW development and management plans, retain existing low-maturing tree species such as Flowering Dogwood (see Appendix 2) to the extent that these trees will not conflict with operation of the transmission line prior to the next scheduled vegetation maintenance.
- D. At ravines, river crossings, and similar locations: retain tree species on the ROW where the conductors will be significantly higher than normal and where the

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vegetation at full mature height would not violate Figure A clearances and will not cause construction or access problems.

The minimum clearances established in Figures A, B, and C between conductors and woody vegetation includes allowances for re-growth over the periodic maintenance cycle of four (4) years for vegetation within the cleared limits of the ROW, and ten (10) years for vegetation beyond the cleared limits of the ROW. The defined clearances cover all vegetation including natural growth, screens or buffers, orchards, ornamental plantings, nursery stock, and danger trees.

The minimum clearances applicable to woody vegetation are shown in the included figures.

- 1) Figure A; Minimum Conductor Clearances
- 2) Figure B; Danger Tree Clearance
- 3) Figure C; Conductor Clearance Zone, Side Zones and Structure Clearing Areas for New Construction

Where Orchards, ornamental plantings, or nursery stock is permitted by easement or license to exist, the maximum tree heights allowed within the conductor and side zones are shown in Figure A. Agreements with individual property owners may define site-specific maximum allowable tree heights and should be checked prior to scheduled maintenance activities.

Where rights exist beyond the edge of the ROW, any tree designated as a “danger tree,” i.e. a tree that can fall within the dimensions noted in Figure B that is determined to be an imminent hazard will be removed at the discretion of the arborist. In sensitive areas adjacent to or within the ROW or where rights or other permission to remove danger trees cannot be obtained, arborists will direct the removal of those portions of the tree canopy projecting into the ROW, and those portions of a tree which, if they become detached, may fall within the minimum clearance distances as shown on Figure B. On side-hill ROW's, danger trees can be found significantly further from the conductors on the uphill side of the ROW.

3. Clearing for New Construction

This clearing consists of clear cutting four distinct areas of the ROW as defined by Figure C. These clearing areas are:

- A. Basic clearing of the ROW width, which consists of a conductor clearance zone and side zones. Low-maturing woody shrub species are typically not removed from the side zones, and low maturing tree species such as Flowering Dogwood will be preserved where they do not conflict with construction needs.
- B. Clearing at each structure location as required for construction equipment
- C. Clearing the full length of all access road and spurs to structure sites for a cleared width of fifteen (15) feet
- D. Removal of danger trees that pose an imminent risk to the new line along the new or existing clearing edge

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For new line construction, in addition to the cleared area around each structure, a lay-down and assembly area may be required that is considerably larger. The size of this area depends upon topography, the type of structure to be assembled, and the type of foundation required at the site. Also at selected locations spaced several miles apart, setup sites for conductor-pulling equipment are required within the conductor zone and may require some removal of shrub growth.

The process to accomplish the clearing for new construction involves:

- A. Field survey and stake the edge of the clearing limits and conductor zone
- B. The NU "Owner's Representative" further reviews the survey staking before clearing begins
- C. Where specified in an existing agreement with individual landowners, the Owner's Representative or his designee marks acceptable low growing trees they will attempt to retain within a side zone
- D. The Owner's Representative contacts landowners before the clearing begins if they wish to discuss the clearing as marked out, and to ask if the property owner wishes to take ownership of the cut wood
- E. Where the landowner will take the cut wood, an agreement will specify the contractor's placement of cut wood outside the ROW, or the landowner's schedule for removal if at a location within the ROW
- F. Carry out the clearing operation
- G. Cut using chain saws within wetland areas, and minimize the use of mechanized equipment for removal (note: mechanized equipment may be used to remove the logs and tree tops from a wetland by positioning equipment outside wetlands to drag out logs and tops using cables)
- H. During or shortly after the initial clearing operation, an arborist will evaluate trees beyond the edge of the clearing limits to identify and mark danger trees that pose an imminent risk to the new line
- I. The landowner will then be given an opportunity to discuss the danger trees marked for removal with the Owner's Representative who will then give instructions to the contractor

Contracts for clearing will be structured to effectively implement the above process and this standard. Despite efforts to minimize tree and other vegetation removal, there may still be locations where the transmission facility requirements and/or the existing vegetation conditions are such that no substantial vegetation may remain within the ROW limits.

4. Clearing for Structure Maintenance or the Replacement of an Existing Line

Clearing for structure maintenance or replacement of an existing line is similar to that for new line construction with the following exceptions:

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- A. Clearing needs depend on the relative location of the rebuilt line with respect to the existing maintained area of the ROW and the proposed construction method for installation of conductors and shield wires. These factors may reduce the needed clearing.
- B. Structure site and access road clearing will still be required but may also be significantly reduced.
- C. When structures from the old line are removed, the cleared area at these sites and the access spurs to them will be allowed to naturally re-vegetate with native plant species, which may include native grasses, forbs or shrubs.

5. Decision Responsibility for Retention of Non-standard Woody Vegetation

The transmission line Construction Manager and Contractor Arborist will be responsible for obtaining approval from the Transmission Supervisor, Vegetation Management before allowing vegetation to remain which conflicts with the clearances shown in Figures A, B, and C.

6. Approving Managers and SME

Dorian Hill
Manager Transmission Line and Civil Engineering
Northeast Utilities

Peter Avery
Manager Transmission Line Construction and MTCE
Northeast Utilities

SME

Anthony Johnson III
Supervisor Transmission Vegetation Management
Northeast Utilities

7. Deviations

This standard sets forth the current NU 'best practices' for most applications of this subject matter. Therefore, deviation from this standard is generally not permitted. However, in unique instances a user may submit a written deviation request including justification to the listed Subject Matter Expert (SME). The SME must approve or deny the request in writing prior to the user commencing any non-standard activities. The SME may consult with his/her supervisor, co-SME if any and co-SME supervisor, and subsequently must copy any approval to them.

Revision History
Rev.0 – original issue
Rev. 1 – Clarified conductor zone and side zone definitions, and clearing practices to address NERC reliability requirements through strict conformance to the ISO-NE OP-3.

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APPENDIX 1

SHRUB SPECIES ALLOWED TO REMAIN: (PARTIAL LIST)

<u>COMMON NAME</u>	<u>GENUS/SPECIES</u>
Arrowwood Viburnum	<i>Viburnum dentatum</i>
Bayberry	<i>Myrica pennsylvanica</i>
Blueberry - Highbush	<i>Vaccinium corymbosum</i>
Blueberry - Lowbush	<i>Vaccinium angustifolium</i> & <i>V. vacillans</i>
Brambles	<i>Rubus</i> spp.
Buttonbush	<i>Cephalanthus occidentalis</i>
Dogwood - Gray	<i>Cornus racemosa</i>
Dogwood - Redosier	<i>Cornus stolonifera</i>
Dogwood - Silky	<i>Cornus amomum</i>
Elderberry	<i>Sambucus</i> spp.
Hazelnut	<i>Corylus americana</i> & <i>C. cornuta</i>
Honeysuckle - Bush	<i>Diervilla lonicera</i>
Honeysuckle - Fly	<i>Lonicera canadensis</i>
Honeysuckle - Tartarian	<i>Lonicera tatarica</i>
Huckleberry	<i>Gaylussacia</i> spp.
Maple-leaf Viburnum	<i>Viburnum acerifolium</i>
Meadowsweet - Broad-leaved	<i>Spirea latifolia</i>
Meadowsweet - Narrow-leaved	<i>Spirea alba</i>
Mountain Laurel	<i>Kalmia</i> spp.
Oblong Fruited Juneberry	<i>Amelanchier bartramiana</i>
Oldfield Common Juniper	<i>Juniperus depressa</i>
Pasture Juniper	<i>Juniperis communis</i>
Running Shadbush	<i>Amelanchier stolonifera</i>
Sheeplaurel	<i>Kalamia augustifolia</i>
Spicebush	<i>Lindera benzoin</i>
Steeplebush	<i>Spirea tomentosa</i>
Sumac - Smooth	<i>Rhus glabra</i>
Sweetfern	<i>Comptonia peregrina</i>
Sweetpepperbush	<i>Clethra alnifolia</i>
Winterberry	<i>Ilex verticillata</i>
Witch Hobble	<i>Vburnum alnifolium</i>
Witherod	<i>Viburnum cassinoides</i>

Appendix 1 Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines			
Northeast Utilities <small>Approved by: DEH, PJA</small>	Design and Application	OTRM 030.006	Rev. 1 05/16/2008

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APPENDIX 2

LOW-MATURING TREE AND SHRUB SPECIES ALLOWED TO REMAIN ALONG THE SIDE ZONES: (PARTIAL LIST)

All species listed above including:

Alder

Dogwood - Alternate-leaved

Dogwood - Flowering

Sumac - Shining

Sumac - Staghorn

Willows (except tree species)

Witch-Hazel

Alnus spp.

Cornus alternifolia

Cornus florida

Rhus copillina

Rhus typhina

Salix spp.

Hamamelis virginiana

Appendix 2 Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines			
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Figure A

Minimum Conductor Clearances

* All Other Woody Species		
Line Voltage	A (ft.)	B (ft.)
69 & 115 kV	12	11
230 & 345 kV	16	15

* Orchards		
Line Voltage	A (ft.)	B (ft.)
69 & 115 kV	14	11
230 & 345 kV	18	15

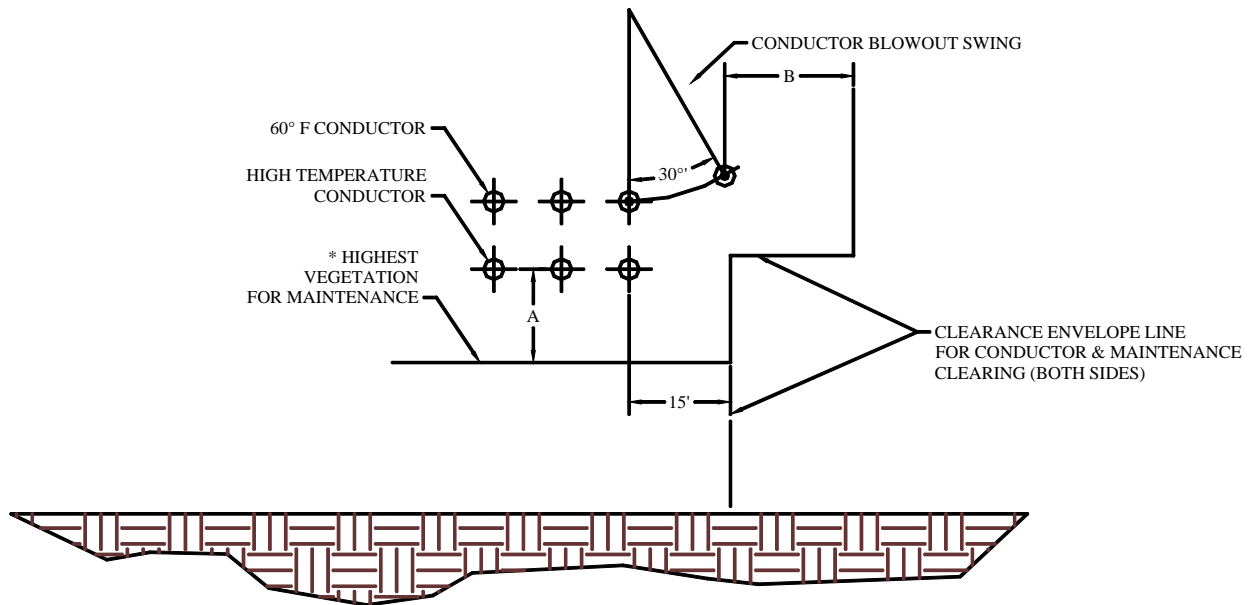


Figure A Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines			
Northeast Utilities Approved by: DEH, PJA	Design and Application	OTRM 030.008	Rev. 1 05/16/2008

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Figure B

Danger Tree Clearances

Line Voltage	A (ft.)
69 & 115 kV	6
230 & 345 kV	10

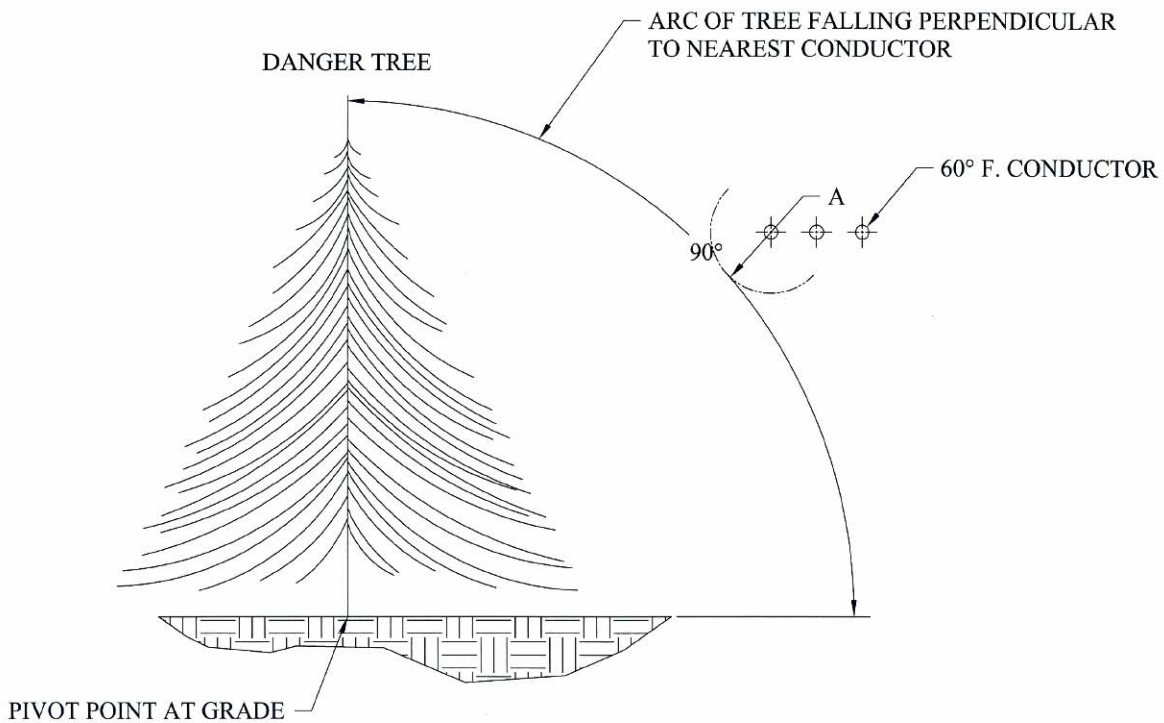


Figure B			
Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines			
Northeast Utilities Approved by: DEH, PJA	Design and Application	OTRM 030.009	Rev. 1 05/16/2008

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Figure C

Conductor Clearance Zone, Side Zones
and Structure Clearing Areas for New Construction

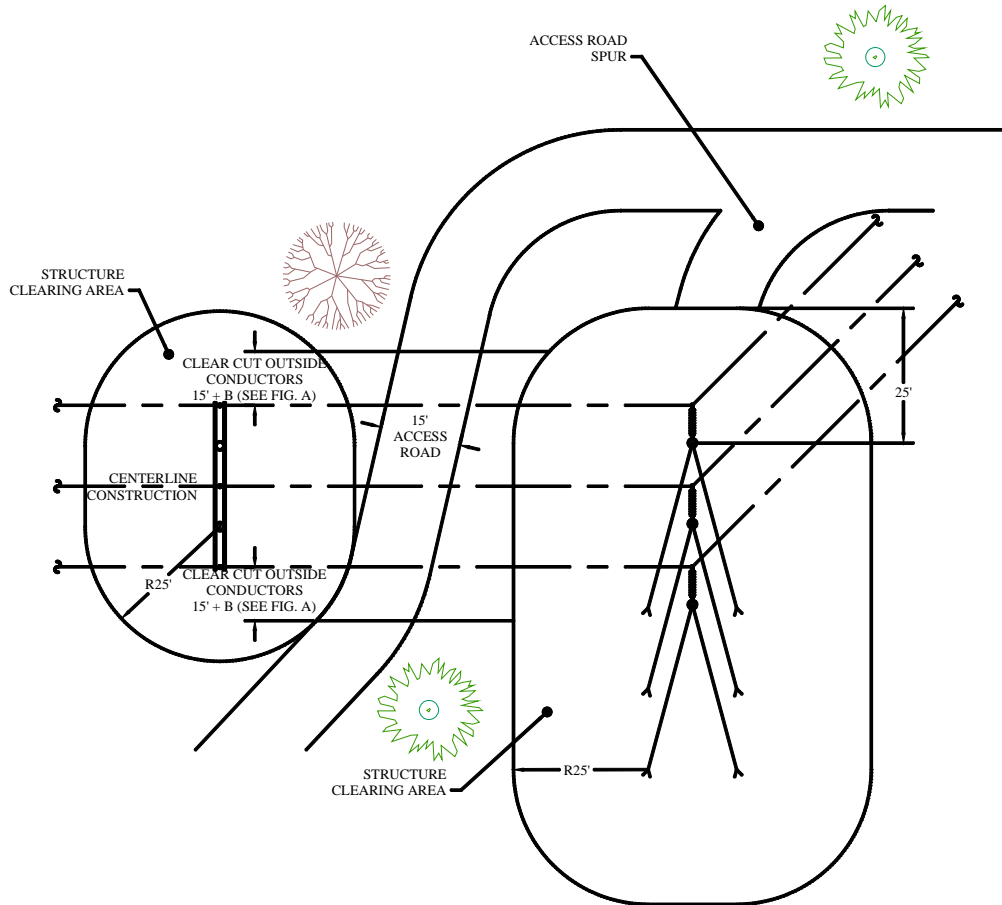
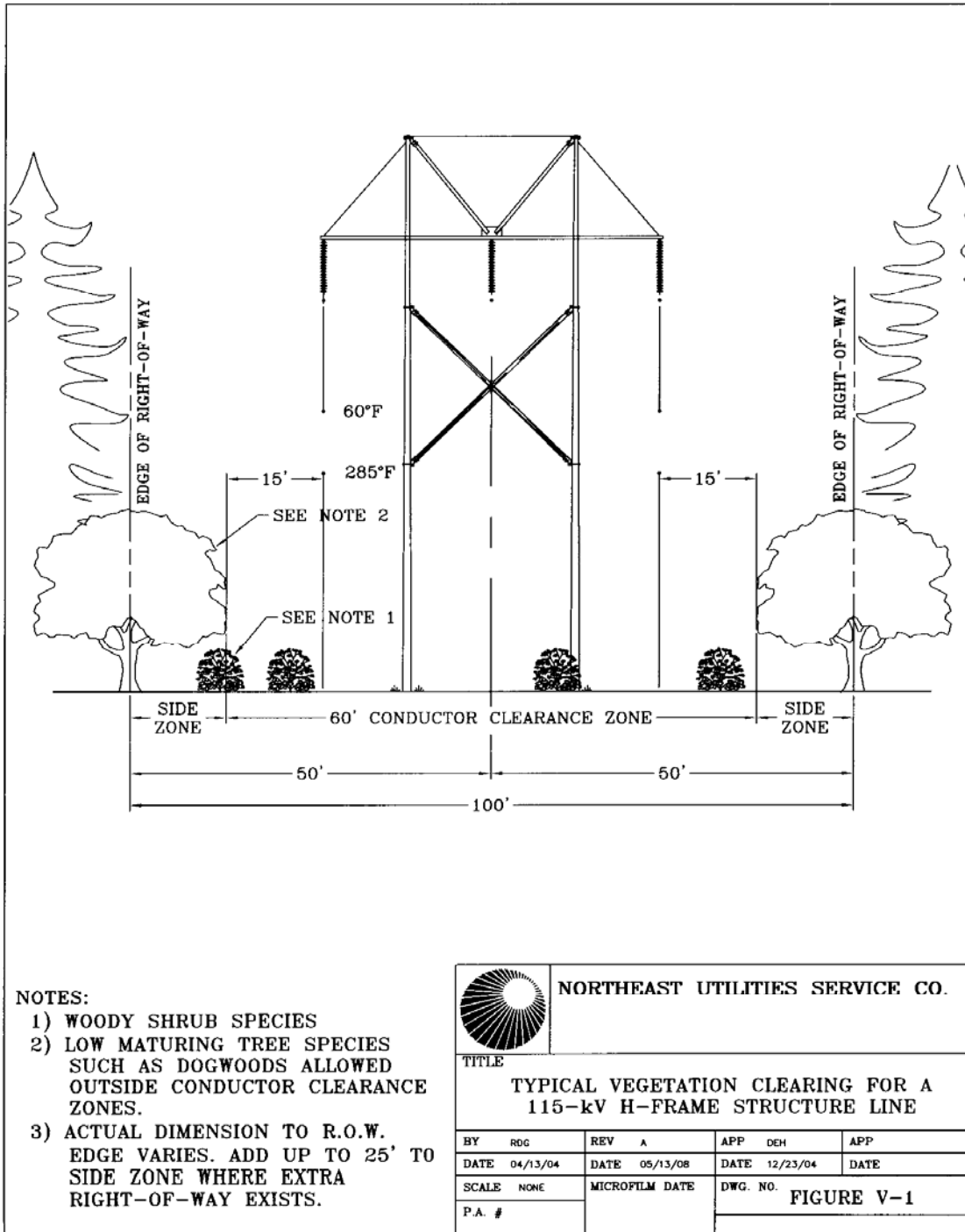


Figure C			
Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines			
Northeast Utilities Approved by: DEH, PJA	Design and Application	OTRM 030.0010	Rev. 1 05/16/2008

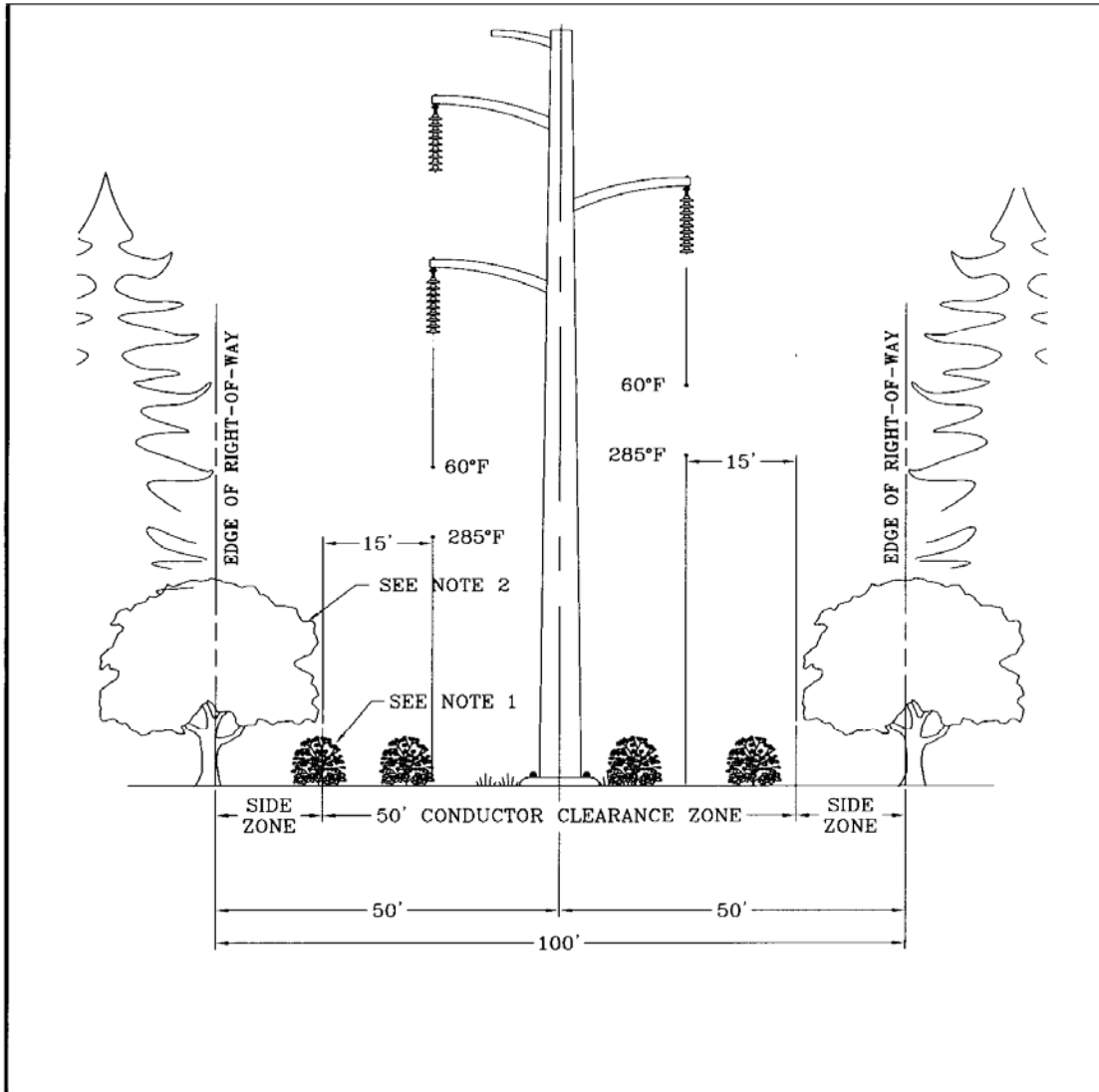
Northeast Utilities Overhead Transmission Line Standards



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Figure V-1 Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines			
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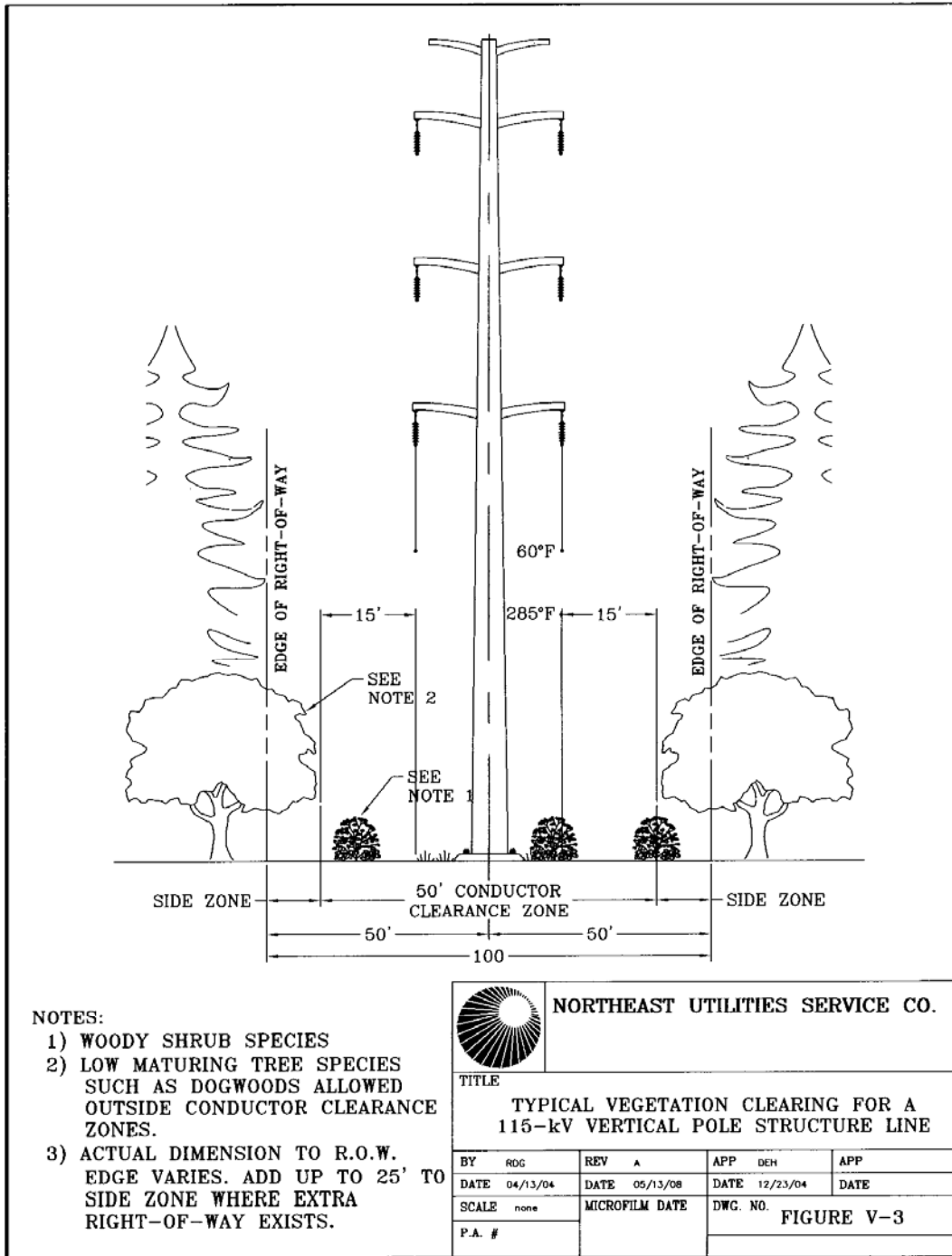
- 1) WOODY SHRUB SPECIES
- 2) LOW MATURING TREE SPECIES SUCH AS DOGWOODS ALLOWED OUTSIDE CONDUCTOR CLEARANCE ZONES.
- 3) ACTUAL DIMENSION TO R.O.W. EDGE VARIES. ADD UP TO 25' TO SIDE ZONE WHERE EXTRA RIGHT-OF-WAY EXISTS.

	NORTHEAST UTILITIES SERVICE CO.		
TITLE TYPICAL VEGETATION CLEARANCE FOR A 115-kV DELTA POLE STRUCTURE LINE			
BY	RDG	REV	RDG
DATE	04/13/04	DATE	05/13/08
SCALE	none	MICROFILM DATE	DWG. NO. FIGURE V-2
P.A. #			

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Figure V-2			
Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines			
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Figure V-3			
Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines			
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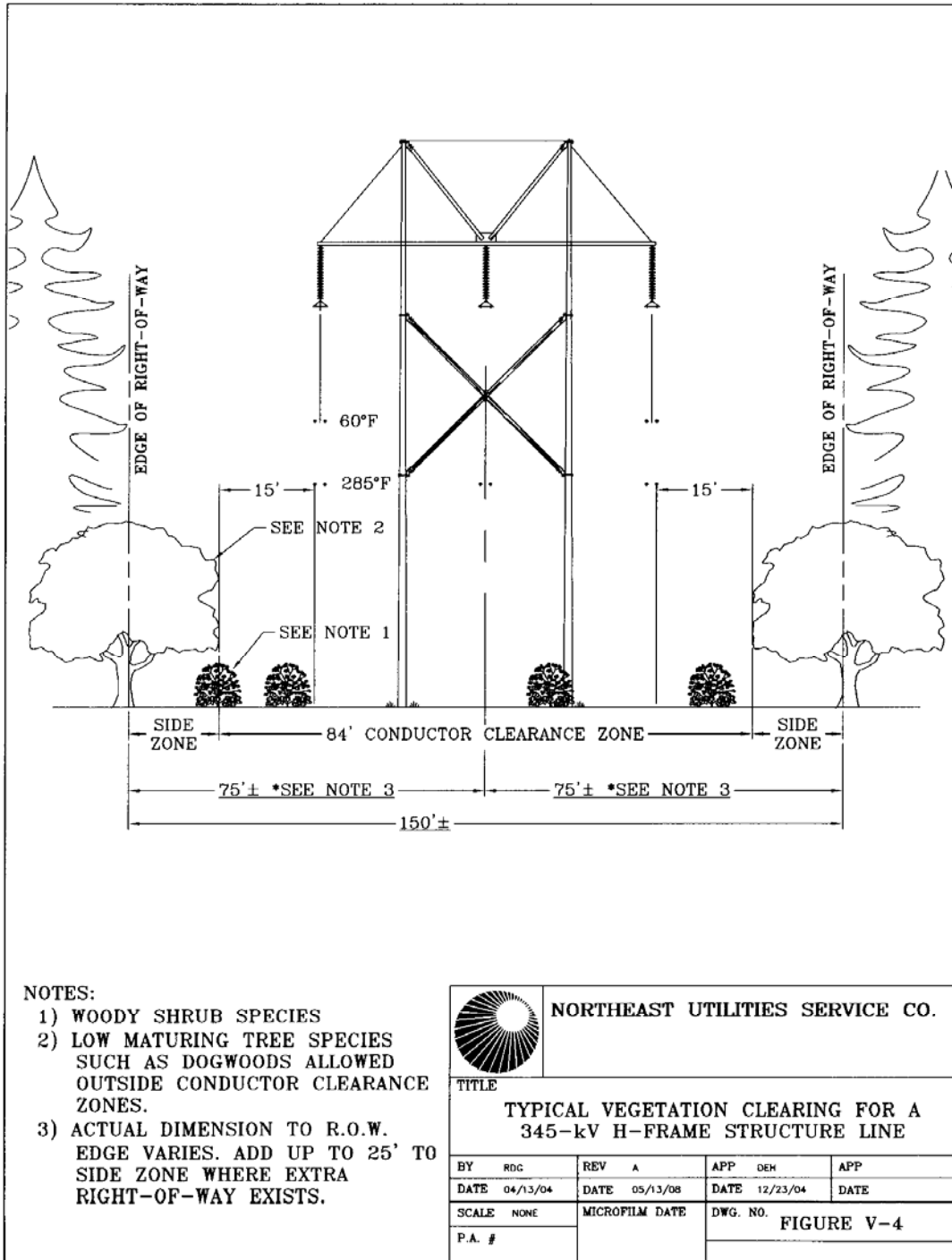
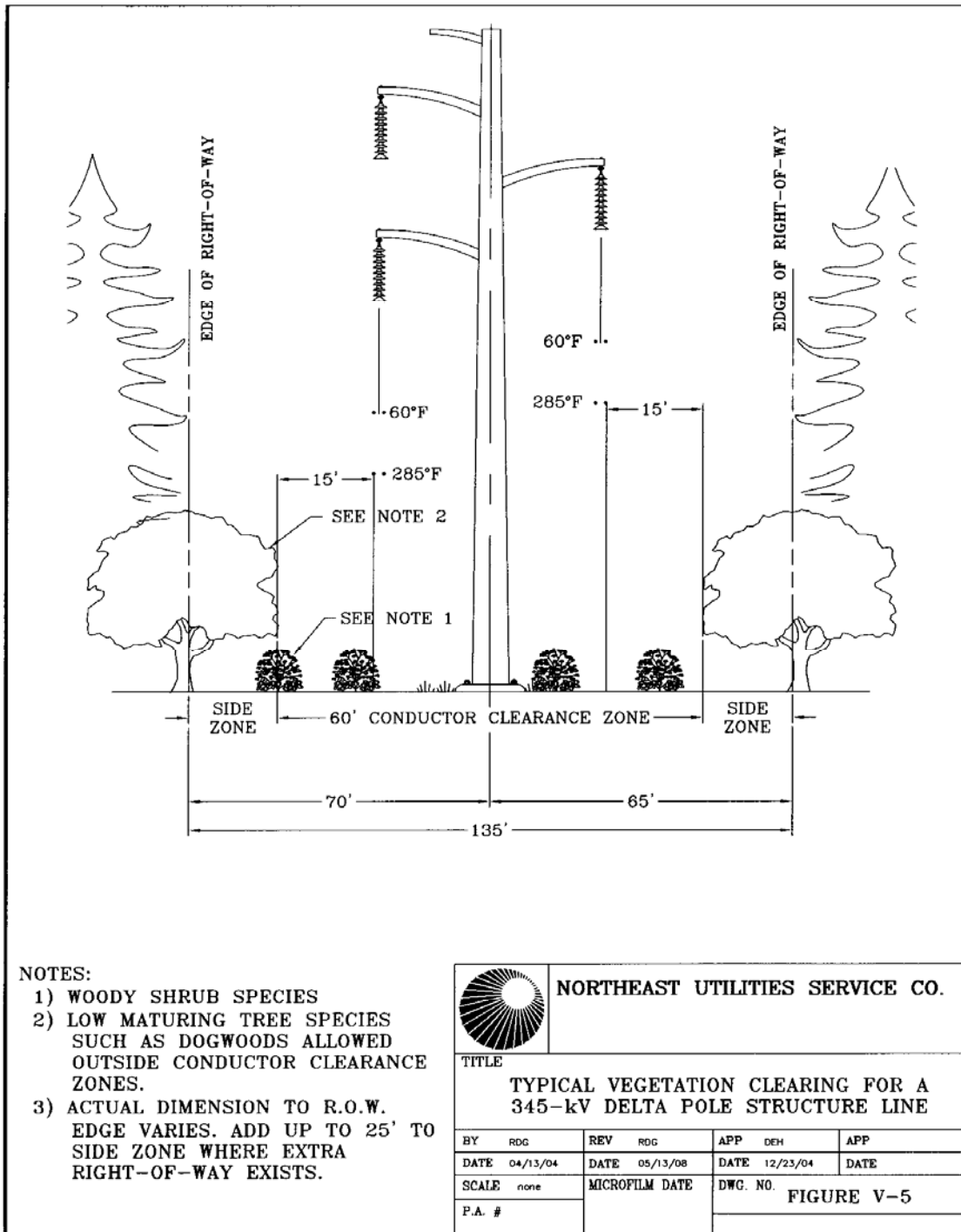


Figure V-4			
Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines			
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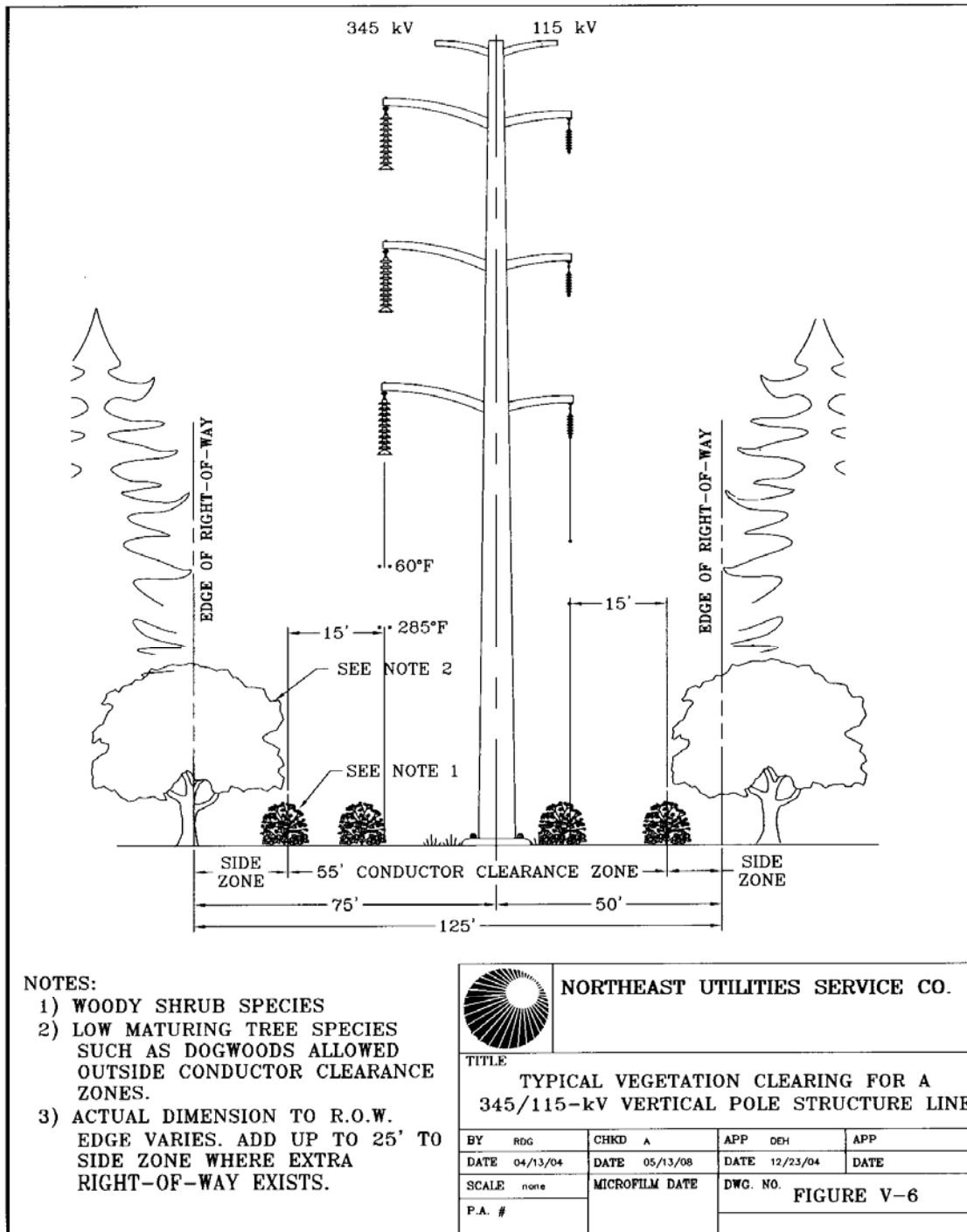


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**Figure V-5
Right-of-Way Vegetation Initial Clearance Standard
for 115- and 345-kV Transmission Lines**

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Figure V-6			
Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines			
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Northeast Utilities Overhead Transmission Line Standards

1. Scope

This standard details the procedures for:

1. Cutting, pruning, and disposal of trees, tree parts and other woody vegetation within Right-of-Way (“ROW”) areas requiring clearing; the Conductor Clearance Zone and Side Zones.
2. Structure Clearing Areas and access routes on or to the ROW.
3. Cutting, trimming and disposal of danger trees located outside the construction clearing limits.

Contract clearing scopes vary depending upon the classification of the area to be cleared. Contract drawings will designate two categories of Clearing Areas; the Conductor Clearance Zone and Side Zones.

2. Related NU and National Standards

- A. OTRM 030 Right-of-Way Vegetation Initial Clearance Standard for 115kV and 345-kV Transmission Lines
- B. Occupational Health and Safety Regulations (29 CFR 1910.269 and ANSI Z-133)
- C. OTRM 222 Operation of Equipment on NU Rights-of-Way

3. Definitions

For further illustration of definitions, 2.1 through 1.12 see OTRM 030 Figures A through C and V-1 through V-6

- A. Clearing Area – The work area, which includes a central Conductor Clearance Zone flanked by two Side Zones.
- B. Conductor Clearance Zone – Areas normally located along the center portion of the width to be cleared that includes the structures and areas beneath the conductors. The width varies with the type of structure to be installed. Contract drawings provide details of the locations of the conductor clearance zones.
- C. Side Zones – Areas adjoining the Conductor Clearance Zone to the edge of the cleared limits of the right-of-way to provide for clearances between conductors and vegetation. Contract drawings provide details of the locations of side zones.
- D. Water Supply Area – Areas owned or controlled by a public or private water supply agency for water supply purposes.
- E. Tree – A woody plant normally maturing at 20 feet or more in height, usually with a single trunk un-branched for several feet above the ground, with a definite crown.
- F. Danger Tree – Any tree located outside the limits of clearing shown on the drawing identified by the owner’s representative, which could endanger the transmission line by falling closer than 6 feet to the normal 60°F sag position of a conductor.
- G. ROW Access Route – Routes within the limits of the right-of-way generally but not necessarily within the area to be cleared, to which construction traffic is to be

Vegetation Clearing Procedures and Practices for Transmission Line Sections			
Northeast Utilities	Construction and	OTRM 230	Rev. 1
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confined. This route shall be cleared for a width of 15 feet in the manner specified within the project documents.

- H. Off-ROW Access Route – Routes outside of the limits of the ROW on private property for which rights have been or will be obtained. Such routes provide shortened access from public highways or circumvent obstacles on the ROW. This route shall be cleared for a width of 15 feet in a manner specified elsewhere.
- I. Structure Clearing Area – Area that is required for the installation, equipment set up or removal work, within the conductor clearing area as shown in OTRM 030 Figure C.
- J. 60° Sag Position – Conductor design elevation at any given point at 60°F – no wind.
- K. Maximum Hot Sag Position – Conductor elevation at any given point under emergency high temperature operation 285°F unless otherwise noted on project profile drawings.

4. General Requirements

A. Access to and along the ROW

The owner has acquired entry and access rights to the ROW covering the project as stated elsewhere in the contract documents. The contractor shall obtain the approval of the owner’s representative prior to the clearing and use of each section of access routes.

The normal access to any job site is along the owner’s ROW from the intersection with the nearest public way. The ROW Development and Management (D & M) Plan for the project, which is a part of the contract drawings, establishes the location of access roads along the ROW. The contractor shall confine all travel within the ROW to the routes designated on the D & M plan. Alternative access routes shall not be used without the approval of the owner’s representative who will ascertain if any additional regulatory approval is required before use. Use of alternative access will typically result in owner’s re-designation of identified access routes.

Temporary rights of access over adjacent land may also be indicated on the drawings or subsequently be available via the owner’s representative or construction manager. The contractor shall strictly observe established conditions attendant to the use of any temporary rights.

Continuing negotiations with property owners and regulatory authorities may result in access roads being located other than shown on the contract drawings. The owner’s representative or construction manager shall instruct the contractor regarding such changes. The contractor shall make no access route changes except on the instruction of the owner’s representative.

B. Site Location

The owner will flag the limits of clearing work to be done by the contractor; this shall include the limits of the clearing areas on the ROW and the location of all access routes, structures, Conductor Clearing Areas and Side Zones. The owner will identify individual trees that have been approved by the owner’s representative to remain and mark them for preservation. The contractor shall confirm the location of all access

Vegetation Clearing Procedures and Practices for Transmission Line Sections			
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routes both on and off the ROW with the owner's representative before commencing work or making entry into a new work area.

The contractor shall preserve these field markings established by the owner for the duration of the project. The contractor is further responsible to preserve and leave undisturbed all permanent property monuments.

C. Contact with Property Owners and the Public

Property owners along the ROW will be advised by the owner's representative or construction manager of the nature of the work to be conducted on the ROW in advance of any contractor entry. All subsequent contacts with property owners on or adjacent to the ROW and access routes will be established by or with the prior specific permission of the owner's representative. The contractor shall immediately advise the owner's representative of any inquiries or complaints made by property owners during the progress of the work.

The owner reserves unto itself the responsibility for public relations. The contractor shall make no statements regarding the work in progress. The contractor shall refer to the owner's representative any interest in the work expressed by individuals or groups for the general public.

D. Regulatory Aspects

The owner has general environmental obligations as well as specific development and management (D & M) plan obligations relative to the overall construction of the transmission line. As applied to the work under this specification, these obligations bear on the elimination or reduction of adverse environmental effects on desirable vegetation, fish, wildlife, forests, water purity, and water resources.

Stream crossings with equipment shall only be performed in a manner consistent with the D & M plan to avoid disturbance of stream banks and stream bottoms, which would result in siltation.

Where a wet area must be traversed by an access road or other construction, careful provision must be made to assure that surface and subsurface drainage is not impaired. The contractor shall repair any disturbance to natural drainage caused by the contractor's operation to the equivalent of the original condition.

The contractor shall take special care when moving equipment to prevent erosion on slopes leading to wetland areas. Disturbed surfaces caused by the contractor's operation which may lead to erosion or siltation shall be quickly repaired to the equivalent original condition by the contractor.

Any storage yards for trucks, equipment, etc, shall be located as far as practical away from stream and wetland buffer zones to minimize the potential adverse effects on these resources. The recommended distance for storage of equipment is 100 feet from the edge of any stream or wetland.

The statements above shall serve to advise the contractor of the scope and character of any Environmental Protections for which he shall be responsible.

Vegetation Clearing Procedures and Practices for Transmission Line Sections			
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The conduct of the work may be monitored by representatives of appropriate regulatory agencies. All contacts with such agencies and their representatives will be initiated by or referred to the owner's representative.

E. Contractor's Field Headquarters

The owner has made no provision for a contractor's field headquarters near the right-of-way. The contractor shall make their own provisions for a field reporting headquarters off the ROW and the cost thereof shall be included as part of their operating overhead. The cost of the contractor's field reporting headquarters shall not be separately billed to the owner. The contractor shall obtain the approval of the owner's representative as to the location of any field reporting headquarters.

F. Fences

No fence on the ROW or crossing access routes may be cut without permission of the owner's representative. Fences cut for any temporary purpose shall be repaired immediately upon completion of that purpose.

Gates may exist or be required along the ROW. The contractor shall furnish and install such gates as the owner's representative may direct as an extra cost to the owner.

The contractor shall keep closed except when moving personnel and equipment, all fence openings or gates. Particular care shall be taken to see that livestock are not allowed out of their intended bounds. The contractor is responsible for all consequential damages arising out of livestock being allowed out of their intended bounds or unauthorized access and damage from the general public as a result of their activities.

G. Overhead Electric Lines

Overhead lines energized at various voltages may be located within the ROW, cross the ROW and/or be parallel to the ROW at various locations. Such lines shall be considered energized at all times.

When in proximity to any overhead line:

- 1) The contractor is responsible to alert their people to the energized potential electrical hazard
- 2) The contractor is independently responsible to train maintain working clearance required by Occupational Health and Safety Regulations (29 CFR 1910.269 and ANSI Z-133)
- 3) The contractor shall further respond to applicable requirements of the owner's safety manual as the owner's representative may direct.

Should conditions develop where the performance of the work and overhead lines on the ROW are in conflict, the contractor shall not proceed with the work until after the situation has been reviewed with the owner's representative and all appropriate arrangements to address safety concerns or corrective actions made by the contractor.

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During ROW clearing operations, including travel to and from worksites, the contractor shall set up equipment and arrange procedures to maintain safe vertical and horizontal clearances in accordance with OTRM 222.001. Elevating equipment shall be positioned in a manner and location so that the operation of this equipment would not violate owner requirements or safety regulations.

In any case, where equipment must be positioned so that it is capable of contacting any conductors, the owner's representative may require that the work proceed under the owner's protective tagging system. In such cases, the owner's representative shall define to the contractor whether the application of the protective tagging system provides an energized or de-energized line, and if energized, the limits of the protection provided.

H. Water Supply Areas

The owner will show on the project drawings where any portion of the work falls within a public water supply watershed or well field. It is the contractor's responsibility in a water supply area to:

- 1) Immediately remove any litter originating with his operations
- 2) Provide commercial toilet service for the control and removal of wastes
- 3) Ensure proper storage and containment of all chemicals and petroleum products. Prevent the spillage of any chemical or petroleum products. In the event of a spill, the contractor shall immediately report the spill to the owner's representative to initiate the necessary regulatory notifications and corrective action. Payment under the contract documents shall not be made for the work and materials expended to accomplish the required spill cleanup and rehabilitation.

I. Wetlands

Wetland areas designated on the plans or drawings shall be avoided to the extent practical and all activities within or adjacent to wetland areas shall follow the prescribed procedures or practices to be followed when working within or in close proximity to these areas.

- 1) Heavy machinery or equipment shall not be used in wetland areas
- 2) All vegetative debris must be removed immediately from wetland areas.
- 3) Storing of equipment and refueling shall not be allowed within 100 feet of any designated wetland boundary.
- 4) Prevent the spillage of any chemical or petroleum products. In the event of a spill, the contractor shall immediately report the spill to the owner's representative to initiate the necessary regulatory notifications and corrective action. Payment under the contract documents shall not be made for the work and materials expended to accomplish the required spill cleanup and rehabilitation.

J. Herbicide Treatments

Herbicides are not usually applied within the scope or during the schedule of work under a ROW clearing specifications. Any unusual case, which is an exception to this generality, shall be specified elsewhere in the contract documents.

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5. Cutting

A. General Requirements

- 1) **Stump Height** - All stumps except those within access route areas shall be cut to a height above ground of not more than one-half the stump diameter. However, in no case shall stumps be left higher than 10" on the uphill side unless used as a support for a fence or for removal in areas where stumps will be removed. Within the Conductor Clearance Zone, all access routes and at all Structure Clearing Areas stumps shall be cut to within 3" of the ground. Stumps in developed lawn areas shall be ground to 6" below the surface, covered with 6" of soil, seeded, and mulched.
- 2) **Cordwood** – Where specifically designated on the drawings or in the Special Conditions, cordwood shall be cut in four (4) foot lengths and piled in accordance with the Disposal section.
- 3) **Tree-length Logs** – All logs not designated for use as cordwood shall be limbed-out into tree-length logs and disposed of as indicated in the Disposal section. The contractor may elect to cut the logs into shorter lengths.
- 4) **Brush** – The remaining limbed-out branches and small stems measuring less than 3" in diameter on the large end are designated "brush" and shall be disposed of as indicated in the Disposal section.
- 5) **Danger Trees** – The owner's representative shall designate removal of certain danger trees situated outside the limits of clearing shown on the drawings for which rights of removal have been obtained. These trees shall be removed and disposed of under the same provisions of the contract documents applying to these activities on the adjacent cleared ROW. Re-inspection of the ROW after the initial removal of marked danger trees may result in the owner's representative marking additional danger trees for removal.
- 6) **Prohibitive Cutting** – The contractor shall not remove trees outside the limits of clearing shown on the drawings unless marked by the owner's representative as a danger tree to be removed or in an Off-ROW Access Route marked by the owner's representative.

B. Cutting Areas

- 1) **Conductor Clearance Zone** – Within these areas all tall-maturing tree species as well as low growing shrub species shall be cut in order to provide a clear and accessible area for the construction of the new facilities.
- 2) **Side Zones** – Within these areas all tall-maturing tree species shall be removed. Where the density of trees to be removed in a given area will allow practical preservation of specimens in good condition, the owner's representative will preserve low-growing desirable species listed under OTRM 030 Appendix 1 and Appendix 2 to the extent practical. This will be allowed where vegetation to be preserved will not impinge upon the clearance envelope nor with construction, maintenance or operation of the proposed transmission line.

- C. **Pruning Practices** – Trimming shall be accomplished in accordance with proper arboricultural practices and follow the guidelines established under ANSI Z-133;

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- 1) When cutting back or topping trees, drop crotch trimming shall be used as much as possible and avoid cutting back to small suckers.
- 2) In general reduction of size (cut back or topping) not more than 1/3 of the total area should be reduced at a single operation.
- 3) All cuts shall be made sufficiently close to the parent stem so that healing can readily start under normal conditions.
- 4) All limbs 1 inch in diameter (size of a quarter) or over must be pre-cut to prevent splitting.
- 5) Trees showing visible signs of disease or damage shall be reported to the owner who will decide whether they will be trimmed or removed.

6. Disposal

A. General

- 1) Techniques – Disposal techniques will be as hereinafter specified or as may be more explicitly called for on the drawings or plans at a specific location.
- 2) Fallen Trees and Limbs – All trees and limbs in the proposed clearing area, which have fallen or were cut prior to the clearing of the ROW shall be considered part of the contract and disposed of accordingly. This does not apply to cuttings that were stacked to decay and provide wildlife habitat.
- 3) Danger Trees – Danger trees shall be disposed of under the same provisions of the contract documents that apply to disposal on the adjacent cleared ROW.
- 4) Cherry Tree Disposal Precaution – Wilted cherry leaves are poisonous to livestock, therefore, in areas frequented by livestock any cherry cuttings shall be disposed of immediately out of reach of livestock.

B. Logs

- 1) Tree-Length Logs – Removal of tree length logs in all areas shall be the primary method of disposal. Tree length logs including shorter lengths and limbs measuring at least three (3) inches in diameter on the small end shall be temporarily piled neatly within the cleared portions of the ROW outside the conductor clearance zone and as near the ROW boundaries as possible. However, none shall be piled within roads, paths, cleared areas for access roads, within 100 feet of a wetland boundary or within 100 feet longitudinally on either side of an angle point.

Each pile shall be no higher than then (10) feet and no wider on the ground than sixteen (16) feet. Each pile shall be spaced at least six (6) feet from adjacent log piles or brush piles.
- 2) Cordwood – Where specified on the drawings cordwood in four (4) foot lengths shall be piled in four (4) foot high piles parallel to the sides of the ROW along the edges of the cleared areas. Single piles of cordwood shall not exceed sixteen (16) feet in length.
- 3) Salvageable Wood Products – For those forest products owned by the NU Operating Subsidiary and for which there is marketable value, NU will estimate the value of the timber and it shall be the contractor's responsibility to validate the value of the timber, to perform the cutting, salvage, and marketing operation

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at his sole discretion, and shall be conducted subject to the constraints expressed below.

- a) All forest products cut by the contractor for market become the property of the contractor and shall be removed from the ROW. Cutting remnants shall be disposed by either the manner specified for brush disposal at the cutting location, or when larger than brush size, shall be combined with the disposal of unmarketable logs in the manner specified for logs at the cutting location.
- b) The contractor shall state the scope of their marketing intentions in their proposal, and shall quote a unit price or prices, which apply to material actually removed for market. The contractor shall report, subject to confirmation by the owner's representative, the materials actually removed from the ROW.
- c) The contractor shall complete his removals for market within 90 days after cutting. With the expiry of the stated time, all materials then remaining on the ROW reverts to being the property of the owner.
- d) The contractor may not conduct sales to the general public at or on the ROW locations
- e) Sawlog measurement shall be based on the international (1/4" kerf) log scale. Trees cut for sawlogs shall be to a minimum of:
 - i) 10" tip DIB for hardwoods (deciduous)
 - ii) 6" tip DIB for softwoods (coniferous, including cedar)

Other measurements shall be as follows:

- i) Posts – linear foot, 10"DIB maximum
- ii) Cordwood – Standard Cord, 4X4X8
- iii) Wood Chips – cubic yard

C. Brush

- 1) Chipping – shall be the primary method of disposal. The chips shall not be left in piles but shall be spread on the ROW. The maximum depth of fresh chips shall be no greater than three (3) inches. Avoid burying desirable low-growing shrubs such as lowbush blueberries as practicable. Chips shall not be placed within access roads, structure-clearing areas, or within defined wetlands.
- 2) Piling – to the extent, may be allowed as method of disposal in some areas if noted on the Development and Management Plan. Brush shall be piled within the same cleared areas as the log piles. Each brush pile shall be no higher than four (4) feet and no longer than sixteen (16) feet on its maximum horizontal dimension. Each brush pile shall be separated from any other brush or log pile by at least six (6) feet. Care shall be taken not to pile within the Conductor Clearance zone or within 100 feet longitudinally in both directions from an angle point.

D. Burying

Burying of vegetative debris is not permitted as a means of disposal

E. Burning

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Burning is not permitted as a method of disposal.

7. Deviations

This standard sets forth the current NU 'best practices' for most applications of this subject matter. Therefore, deviation from this standard is generally not permitted. However, in unique instances a user may submit a written deviation request including justification to the listed Subject Matter Expert (SME). The SME must approve or deny the request in writing prior to the user commencing any non-standard activities. The SME may consult with his/her supervisor, co-SME if any and co-SME supervisor, and subsequently must copy any approval to them.

8. Approving Managers and SME's

Manager-Transmission Line Construction & Maintenance; NU

Manager of Transmission Engineering; PSNH

SME

Supervisor Transmission Vegetation Management NU

Revision History

Rev.0 – original issue 8/22/2006

Rev 1- Complete rewrite to comply with new national standards 7/29/2008

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