


AEP Forestry: Vegetation Management Goals, Procedures & Guidelines for Distribution and Transmission Line Clearance Operations

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Revision History

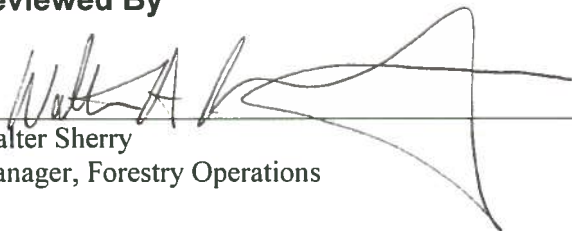
Rev.	Description of Change(s)	By	Date	Approved
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1	Update		5/14/2009	
2	Update; formatting changes; addition of company specific guidelines; addition of referenced documents table; addition of end notes to link to other documents; review of document performed by Legal;	Kevin Patton	9/10/2014	

Revision Cycle

This document will be reviewed every three to five years depending on the average contract length.

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I. Purpose

The purpose of these American Electric Power (“AEP”) Forestry Vegetation Management Guidelines is to document and inform AEP employees and its contractors of important criteria, practices, and procedures pertaining to initial vegetation clearing for construction projects and the management of vegetation within rights-of-way. AEP incorporates these guidelines into each vegetation management contract; a copy shall be kept in all vegetation management Contractor’s vehicles. These guidelines are to be read consistently with other contract documents by and between AEP and the Contractor. Variances and/or clarifications to these guidelines may be necessary and applied to specific operating companies.

These guidelines contain references to national industry standards; government regulations; and AEP standards and practices. Upon approval of this document, any editions referenced are valid. All standards, regulations and practices are subject to revision. AEP and the Contractor are encouraged to investigate the possibility of applying the most recent editions.

II. Definitions

Brush: Woody stem vegetation less than four (4) inches DBH.

Clearing: The physical cutting and/or removal of woody stem vegetation.

Control: 100% defoliation with no viable buds one year after application; or, on species that require a number of years to achieve control, significant signs of herbicidal activity.

Danger Tree: A tree on or off the right-of-way with the potential to contact electric supply lines.ⁱ

DBH: (Diameter at Breast Height) The diameter of a tree measured at the height of 4 ½ feet above the ground on the uphill side.

Debris: Vegetative and non-vegetative material such as bottles; cans; wires; paper; branches; or other residue from clearing operations.

Directional Pruning: The removal of limbs in a manner that provides increased conductor clearance and directs growth away from the conductors.ⁱⁱ

Hanger: A cut limb left hanging in a tree or on other facilities.

Hazard Tree: A structurally unsound tree that could strike a target when it fails. As used in this clause the target of concern is electric supply lines.ⁱⁱⁱ

Log: The merchantable portion of a tree as designated by AEP.


Lopping: The cutting of limbs and slash so that they lie in contact with the ground or as otherwise designated by AEP.

Refusal: A property owner/resident prohibiting the Contractor from managing vegetation as specified within the scope of, and according to, these guidelines and all applicable specifications, permits, and easements.

Removal: The cutting of trees/brush at or near ground line.

Slash: The un-merchantable portion of a tree.

Tree: Woody stem vegetation greater than four (4) inches DBH.

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III. Contractor Guidelines

A. Safety

Protecting the safety of all people (Contractors, public, and AEP employees) is of utmost importance to AEP. Contractors shall regard safety as a priority core value; their employees will recognize and follow all laws, rules, and regulations of public and worker safety. Any safety related incidents (e.g. personal injuries, vehicle accidents, outages, flashes, near misses, customer issues, etc.) that occur on the job shall be reported to the proper AEP personnel as specified by AEP management.^{iv}

B. Personnel

1. Contractors shall comply with all federal, state and local laws for permits, certifications and licensing requirements necessary to perform vegetation management in specified operating areas.^v
2. No private work may be solicited or performed by the Contractor or its employees while on AEP time. Contractors shall not seek nor receive compensation from anyone except AEP for any work that is a part of AEP's Forestry Vegetation Management program. The consequences will be crew and/or Contractor disciplinary actions.

C. Equipment


1. Contractors shall provide sufficient equipment in working order to operate their business.
2. The minimum number of chainsaws on the job shall equal the number of personnel on the crew, or as per contract agreement. Chainsaws shall not be billed separately unless approved by AEP Forestry personnel.
3. Each climber shall be provided with a complete set of equipment including: rope, saddle, chainsaw, pruner and handsaw. Each tree crew shall be properly equipped so that, if necessary, a tree rescue can be performed.
4. The use of spurs/climbers/hooks should be avoided.

D. Overtime

Overtime is billable as designated by each operating company.

E. Work Procedures

1. Contractor practices shall be compliant with applicable industry standards (e.g., ANSI, OSHA, and NESC) whenever practical unless the use of such standards increase the risk of injury or property damage.^{vi}
2. Changes in the work schedule due to inclement weather, equipment breakdowns, or other circumstances must have prior approval by AEP Forestry personnel.
3. The Contractor will be responsible for the development of a plan to complete the assigned tasks. The plan must meet AEP approval before work begins.^{vii}
4. It is the Contractor's responsibility to ensure that the plan is followed, including time estimates to complete the assigned tasks.

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5. Contractors shall provide daily work locations to AEP, including changes to these locations throughout the day.
6. Prior to work in any location and before any changes in procedures or activities are made, the Contractor shall perform a job briefing in written/report form to identify all potential work site risks. At least one copy of all documents and reports, including job briefings, shall be prepared in English.^{viii}
7. An ongoing list of refusals, scheduled outages, or areas that have not been worked, including reasons, shall be provided to AEP Forestry personnel. Undocumented skips may be worked at the Contractor's expense.
8. Contractor's work should be inspected for clearance and quality compliance on an ongoing basis by the Contractor and AEP Forestry. When an assigned task is complete, the Contractor shall notify AEP Forestry for final inspection.
9. The Contractor shall notify AEP of any hazardous conditions found during the performance of work under this contract.

F. Public Relations

Public relations are important to AEP. Proper notification can eliminate most property owner issues before they arise.


1. When required, an attempt will be made to contact property owners through personal notification, door hangers, news releases, letters, etc. AEP will attempt to contact an absentee landowner only if the landowner provides AEP with a method to contact the landowner.
2. During emergency work, the Contractor will attempt to notify the property owner/resident of the crew's arrival. Discretion should be used during late night or early morning work. If no personal contact is made, a door card may be left to explain the emergency work performed.
3. Contractor shall document all locations where door cards were left, including address and date. A monitored local or toll-free telephone number to reach the Contractor shall be on the door card.

G. Refusals

1. The Contractor shall notify the proper AEP Forester with all pertinent information for all refusals.
2. If the Contractor is unable to resolve the refusal, the refusal shall be turned over to AEP Forestry.
3. Undocumented refusals may be worked at the Contractor's expense.

H. Damage Claims and Complaints

1. The Contractor shall be responsible for all damage claims and complaints due to its negligence. AEP shall be notified immediately of all claims and complaints.^{ix}
2. An on-site investigation with the resident/property owner shall be made as soon as possible. A documented attempt to contact the complainant shall be made within twenty-four (24) hours of receipt of the complaint. AEP's representative may accompany the Contractor during the investigation.


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3. All valid claims resulting from the Contractor's negligence shall be settled within thirty (30) days by the Contractor, or the Contractor shall provide evidence he is trying to reach a reasonable settlement.^x
4. The Contractor shall keep AEP informed of the status of all complaints. When a settlement is reached, a written release for both AEP and the Contractor shall be obtained from the property owner/resident.^{xi} The Contractor shall provide a copy of all supporting documentation to AEP.
5. If a settlement cannot be reached, the Contractor shall confirm in writing to AEP the final settlement offer and briefly summarize events pertaining to the offer.
6. After thirty (30) days, if a Contractor fails to resolve a claim, does not continue attempts to resolve the claim or keep AEP fully informed, AEP may settle the claim and bill the Contractor.^{xii}
7. Costs to restore outages or repair AEP's facilities due to negligence may be billed to the Contractor as determined by AEP.

IV. Performance Guidelines

A. Removals

1. Stumps shall be cut as close to the ground as practical, but not to exceed a three inch maximum height and treated with approved herbicide, unless the situation prevents application according to label instructions; there is a documented customer refusal; or an AEP Forester directs otherwise.
2. Tree removal shall be completed in one operation. If this is not practical, hazardous conditions shall not be left while the work is not actively in progress. Trees shall be removed in a manner to protect electric lines, yards, fences, houses, and other facilities.
3. Targets for removal are:
 - a. All trees with the potential of growing into the conductor.
 - b. Trees where adequate clearance cannot be obtained using proper pruning practices.
 - c. Trees that will take less than three times the amount of time to remove as they would take to prune.
 - d. Trees within five (5) feet of poles.
 - e. Mature trees where more than 50% of the crown must be removed to obtain clearance.
 - f. Young, vigorously growing trees where more than 66% of the crown must be removed to obtain clearance.
 - g. Palm species.
4. At property owner's request, any tree situated such that the location of AEP's facilities impede, or add significantly to the cost of, the safe removal of the tree and an additional burden is placed upon the property owner, AEP should take the steps necessary to mitigate the impediment or to relieve the additional burden placed upon the property owner. AEP

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actions may include, but not be limited to, moving or protecting its facilities, removing portions of the tree to provide the clearances required by ANSI, OSHA, or any other regulatory authority, to allow removal by “non-line clearance” qualified arborists or non-professionals. Except in case of emergency, AEP must evaluate the property owner’s request and prioritize any necessary work according to its benefit to the provision of electric service to all customers. At property owner’s request, debris will be left for disposal by the property owner.

5. State and local ordinances shall be obeyed during the disposal of debris.

B. Pruning


1. Contractor practices should be compliant with all applicable industry standards (i.e., ANSI, OSHA, and NESC) whenever practical unless the use of such standards increase the risk of injury or property damage.^{xiii}
2. Pruning shall provide at least the minimum specified clearance from electrical conductors as set forth below in Section V. Distribution Clearances or Section VI.C. Transmission Clearances or as designated by the operating company.
3. Reasonable care should be exercised to help prevent the spread of insects and pathogens.
4. Portions of wild cherry, black walnut and other vegetation toxic to livestock (i.e., wilted leaf material) that has been pruned, cut, treated with herbicide, or damaged by the Contractor’s activities, should be removed from active pasture areas accessible to livestock, unless agreed to by the property owner in writing.
5. State and local ordinances shall be obeyed during the disposal of debris.

C. Hangers and Cleanup

1. All hangers shall be removed from the pruned tree before leaving the job site.
2. Work sites shall be left in a neat and orderly condition.
3. A minimum amount of cleanup work should be performed. Unless otherwise designated by AEP Forestry, chipping the brush, cutting wood into lengths that can be handled and raking the site is the maximum cleanup that should be performed.
4. All streams and/or drainage ditches shall be kept free of any limbs or woody debris cut by the Contractor.

D. Clearing and Re-clearing


1. AEP will provide the width of the right-of-way.
2. All woody plants that have the potential to grow into and interfere with service reliability; restoration; patrolling; or other maintenance operations of AEP facilities should be controlled by the operating company guidelines.
3. During scheduled maintenance operations, any vegetation adjacent to station facilities that may affect the safe operation of those facilities should be brought to the attention of the proper AEP personnel.

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4. Trees, brush, and existing stumps within the right-of-way shall be cut as close to the ground as practical, but not to exceed three inches in maximum height above the ground line. Where possible, the cut shall be parallel to the slope.
5. Trees shall be felled to avoid damage to crops, fences, and other facilities. Any trees felled into crops, ditches, streams, roads, or across fences shall be promptly removed. No trees shall be felled in such a manner as to endanger AEP facilities or the property of third parties, or hinder access along the right-of-way.
6. Trees, brush, and slash shall be lopped as designated by AEP Forestry.
7. Hazard Trees are identified and addressed/worked at the discretion of the individual operating companies or regions. Consideration for hazard tree removal shall be made for those trees that are an immediate threat to AEP facilities. Hazard Trees may include, but are not limited to, trees that have severe lean or sweep; are dead; or have visible defect or damage.
8. Stumps of trees growing in fences may be cut at fence post height. Logs may be left in tree lengths or as designated by AEP Forestry. If so designated, the merchantable value of logs shall be preserved as much as practical.
9. As designated by AEP Forestry, brush and logs may be piled at the edge of the right-of-way for wildlife habitat.
10. Brush and debris from vegetation clearing shall not be left in managed agricultural areas or other maintained areas. Piled and/or windrowed materials shall not be left on or interfere with fences or other facilities of the landowner or AEP unless designated by AEP Forestry.

E. Herbicide Application

1. All woody plants that have the potential of growing into the lines or impair access should be controlled, as designated by AEP Forestry.
2. Contractors are required to maintain accurate and up to date records of all herbicide applications made as required by all Federal, State, and local laws.
3. The Contractor shall be required to control at least 90% or a percentage as designated by operating company of the targeted vegetation. Any areas not meeting the control requirements shall be retreated at the Contractor's expense.^{xiv}
4. AEP Forestry may make vegetation management prescriptions in consultation with Contractors.
5. Property owner notification requirements vary by locale. Contractor shall contact local AEP Forestry representative for requirements.^{xv}
6. Managers of public rights-of-way involved in the treatment area shall be notified, where appropriate.
7. Contractor shall be responsible for training of herbicide applicators.
8. Unless specifically prohibited by property owners or AEP Forestry, stumps shall be treated with an appropriate herbicide treatment.

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F. Tree Growth Regulator Application

1. Trees designated for tree growth regulation shall be treated with an approved tree growth regulator (“TGR”) in accordance with label instructions.
2. All trees shall be inspected by the Contractor for health and vigor prior to treatment. Trees found in excessive state of decline shall not be treated unless directed by AEP Forestry.
3. Property owner notification requirements vary by locale. Contractor shall contact local AEP Forestry representative for requirements.^{xvi}

G. Vines

Vines shall be cut, **BUT NOT REMOVED** from AEP or other facilities, and treated with an appropriate herbicide as designated by AEP Forestry representative. Pulling/removing vines from the facilities may damage equipment and endanger the employee.


V. Distribution Clearances

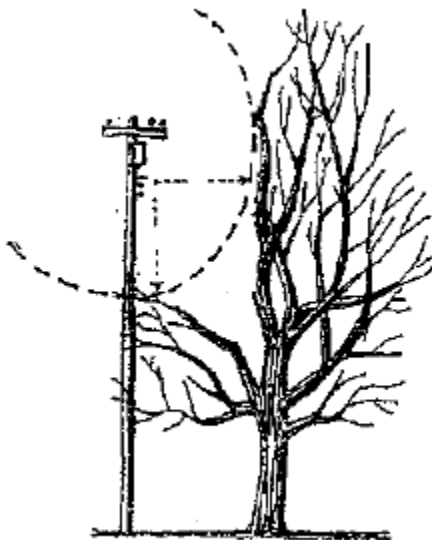
Variances to this recommendation may be necessary and applied due to specific operating company guidelines or specific restrictions in permits and/or easements.

Minimum clearance for distribution lines is that distance that will prevent regrowth into any AEP conductors for a minimum of three (3) years. (See **Error! Reference source not found.**, pg.**Error! Bookmark not defined.**) The species, site, limb, conductor sag and sway during windy conditions; and the effect of electrical load should all be considered when determining the clearance requirement.

A. Primary Conductors

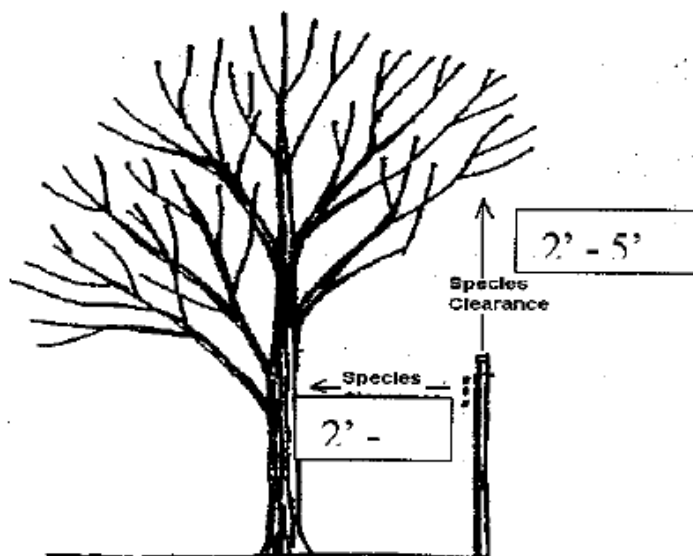
Limbs should be pruned for a minimum of three (3) years clearance. Overhanging limbs should be removed. Top of tree should be directionally pruned unless prior arrangements have been made with the proper AEP Forestry representative.

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B. Secondary Conductors

Limbs should be pruned for two (2) to five (5) feet of clearance without removing overhanging branches unless otherwise specified by an AEP Forestry representative.



C. Service Drops and Street Light Conductors

Trees near service drops and street light conductors will not be pruned unless specified by an AEP Forestry representative. Do not prune for street light illumination except at the specific direction of the proper AEP Forestry representative.


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D. Poles and Guys

1. Heavy limbs applying pressure on the span guy should be pruned or removed at the specific direction of the proper AEP Forestry representative.
2. Trees, brush, and slash should be cleared to obtain a minimum of a five (5) foot radius of clearance around the pole or guy unless otherwise specified by an AEP Forestry representative.

E. Vines

Vines shall be cut, **BUT NOT REMOVED** from AEP or other facilities, and treated with an appropriate herbicide as designated by AEP Forestry representative. Pulling/removing vines from the facilities may damage equipment and endanger the employee.

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VI. Transmission

A. Hazard Trees

Trees may exhibit potential threats to AEP facilities due to disease, damage, physical location, growth characteristics or environmental problems. Where these trees exist, AEP considers them high priority risks that need to be addressed and remediated.^{xvii}

1. Visual Assessment

While performing work on a circuit, contract crews shall conduct a visual assessment to identify trees with imminent¹ and/or probable² likelihood of failure inside and outside the right-of-way. The tree should be viewed from some distance away, if possible, to consider crown shape and surroundings.

Any tree identified to be a potential imminent threat to an AEP Transmission line shall be reported to the responsible transmission forester.

2. Ground Evaluation

If a Hazard Tree is identified during the visual assessment, a 360° ground evaluation shall be required. The evaluations should include an inspection of:

- Tree crown
- Trunk
- Trunk flare
- Above-ground roots
- Site conditions around the tree in relation to targets.

The Contractor shall report risk and mitigation options to the responsible transmission forester.

B. Tree Felling


Before beginning any tree felling operation, the Contractor shall consider relevant factors³ pertaining to the tree and site and shall take appropriate actions to ensure a safe removal operation.^{xviii}

1. When there is a danger that the tree pieces or tree being removed may fall in the wrong direction and contact utility facilities or damage other property, appropriate methods shall be used to control the direction of fall.^{xix}
2. All limbs shall be removed to a height and width sufficient to allow the tree parts or tree to fall clear of hazards.^{xx}

¹ Imminent – failure has started or is most likely to occur in the near future, even if there is no significant wind or increased load. (Tree Risk Assessment Manual, pg. 100)

² Probable – failure may be expected under normal weather conditions within the specified time frame. (Tree Risk Assessment Manual, pg. 100)

³ ANSI Z133-2012 Annex C.3, Manual Tree Felling Procedures contains a list of relevant factors to be considered during tree felling.

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3. Notches shall be used on all trees and trunks greater than five inches DBH.^{xxi}
4. Contractors shall provide evidence of training to employees related to tree felling upon request.

C. Clearances

The ultimate goal of vegetation maintenance is to provide for the safe, reliable operation of the AEP transmission system. When performing maintenance, the objective for locations on spans with less than 100' vertical clearance at maximum sag from conductor to ground is the removal of all woody-stemmed vegetation to the appropriate width, leaving the cleared area of the right-of-way populated with grasses and herbaceous growth. Under certain circumstances (unique topographic and/or environmentally sensitive conditions), AEP may allow compatible, low growing species to remain in the right-of-way. In maintained areas (mowed yards, lawns, and public areas), trees deemed compatible with the safe operation of the line may remain, although AEP strongly discourages this practice. Compatible species will be limited to those that grow no more than 15' tall or actively maintained trees that could be considered a crop, such as in nurseries and orchards.

When removal of all woody-stemmed vegetation is not achievable (i.e. there are restrictions), AEP will endeavor to cut or trim so that upon completion of the work no vegetation will be closer to conductors at maximum sag than the distances outlined in Columns A and C. Distances are based on completed work meeting or exceeding the minimum approach distances to energized conductors for persons *other than qualified* line clearance arborists and qualified line-clearance arborist trainees (Columns A and C).

Table 1: Clearance Table Guidelines⁴

Right-of-way No Restrictions	Right-of-way with Restrictions
< 100' Vertical Clearance between Conductors at Maximum Sag and Ground	< 100' Vertical Clearance between Conductors at Maximum Sag and Ground
1) Remove all woody-stemmed vegetation	1) Trim or remove vegetation to meet Column C, Table 2 .
2) Do not allow vegetation closer than Column E, Table 2 .	2) Do not allow vegetation closer than Column E, Table 2 .
3) Trigger distances to schedule maintenance per Column D, Table 2 .	3) Trigger distance to schedule maintenance per Column D, Table 2 .
> 100' Vertical Clearance between Conductors at Maximum Sag and Ground	> 100' Vertical Clearance between Conductors at Maximum Sag and Ground
1) Trim or remove vegetation to meet Column B, Table 2 .	1) Trim or remove vegetation to meet Column C, Table 2 .
2) Do not allow vegetation closer than Column E, Table 2 .	2) Do not allow vegetation closer than Column E, Table 2 .
3) Trigger distances to schedule maintenance per Column D, Table 2 .	3) Trigger distance to schedule maintenance per Column D, Table 2 .

⁴ Upon completion of maintenance

Table 2: Transmission Line Clearance Guidelines

Column A	Column B	Column C	Column D	Column E
Nominal Voltage (kV phase to phase)	AEP Clearance 1 (no restrictions) Desired Clearance Between Conductor and Vegetation	AEP Clearance 1 (with restrictions) Desired Clearance between Conductor and Vegetation	ANSI⁵ Clearance between Conductor and Vegetation	AEP Clearance 2 between Conductor and Vegetation
765kV	45	35'00"	27'04"	14'00"
500kV	45'	26'08"	19'00"	10'00"
345kV	30'	20'05"	13'02"	7'06"
230kV	30'	16'05"	7'11"	5'02"
161kV	25'	14'00"	6'00"	3'05"
138kV	25'	13'02"	5'02"	2'11"
115kV	25'	12'04"	4'06"	2'06"
88kV	25'	12'04"	4'06"	2'06"
69kV	25'	10'09"	4'02"	2'06"
46kV	20'	10'00"	3'04"	2'06"
34.5 kV	20'	10'00"	3'04"	2'06"
23 kV	20'	10'00"	3'00"	2'06"

D. Transmission Dispatch Communication Procedures

The Contractor shall log on and off transmission circuits per the policy of the responsible Transmission Dispatch Center ("TDC").

⁵ANSI Z133-2012.

VII. Appendices

A. Distribution Line Clearance Guidelines

These growth rates and clearance distances are guidelines for the minimum clearances required. These distances are not static and should serve as minimum clearance requirements unless designated otherwise by the operating company. Good soils and high moisture may cause many species to grow faster. These clearance guidelines are not meant as a requirement for all trees on AEP's rights-of-way. It is understood that within maintenance intervals, trees may encroach into these minimum clearance zones. These guidelines are meant to be used as an aid for pruning clearances from AEP facilities.

Table 3: Minimum Clearance from Distribution Conductors

Re-growth Rates	Minimum Clearance from Conductors	Species
Fast	Minimum clearance of 20 feet	Cottonwood Poplar species Silver Maple Sycamore Willow Ailanthus Box Elder Elm species
Medium	Minimum clearance of 15 feet	Locust Red maple species Ornamental pear species Fruit trees (apple, pear, etc.) Pine, Spruce and Hemlock species Sweet gum Catalpa Hackberry Hickory Crabapple Red oak Ash Species Mulberry Bois d'arc (Osage orange, hedge tree)


Re-growth Rates	Minimum Clearance from Conductors	Species
Slow	Minimum clearance of 10 feet	Cedar Chinaberry Magnolia Any small variety species Persimmon White oak (round lobes) (Redbud, dogwood, etc.)

1. Exceptions

1. When the entire trunk of a tree falls within the minimum clearance specifications
2. When less pruning would still provide adequate clearance and an overall healthier tree.
3. As approved by AEP Forestry Representative.

B. Distribution Operating Company Specific Guidelines


- 1. AEP Ohio**
- 2. AEP Texas**
- 3. Appalachian Power**
- 4. Indiana Michigan Power**
- 5. Kentucky Power**
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C. Referenced Documents and Specifications

Title	Year	Version	Pages
<i>AEP General Terms and Conditions for Labor and Services.</i> American Electric Power	2012	Revision 2	1-23
<i>AEP Vegetation Management Ground Spray Requirements</i>	2014		1-3
<i>Aerial Patrol Training.</i> American Electric Power	2013	TVMD-015	
<i>American National Standard for Arboricultural Operations – Safety Requirements.</i> International Society of Arboriculture. Champaign, IL	2012	ANSI [®] Z133-2012	1-71
<i>American National Standard for Tree Care Operations – Tree, Shrub, and Other Woody Plant Management – Standard Practices (Pruning).</i> Tree Care Industry Association. Londonberry, NH	2008	ANSI [®] A300 (Part 1)-2008	1-13
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⁶ Definition of Danger Tree and Hazard Tree were removed in the 2012 revision.

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ⁱ *American National Standard for Tree Care Operations – Tree, Shrub and Other Woody Plant Maintenance – Standard Practices (Integrated vegetation Management a. Electric Utility Rights-of-way (Part 7 - 2006),* Tree Care Industry Association, Manchester, NH

ⁱⁱ *Best Management Practices – Utility Pruning of Trees.* International Society of Arboriculture. Champaign, IL

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^{iv} *Supplementary Terms and Conditions for Forestry Contracts.* American Electric Power

^v *AEP General Terms and Conditions for Labor and Services.* American Electric Power

^{vi} *AEP General Terms and Conditions for Labor and Services.* American Electric Power

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