Document title

Transmission Vegetation Management Program

Document number

MNT-TRMX-00176

Applies to: Transmission Operations & Planning Department – Carolinas and Florida

Keywords: maintenance; transmission – maintenance line

1.0 Introduction

Progress Energy Transmission employs an Integrated Vegetation Management Program (IVMP) that combines various components to manage the growth of vegetation on the electric transmission utility right of way (ROW). Through the use of different, integrated methods, the optimum results (reliability, etc.) occur reducing the need to employ reliability-based trimming/removal and danger tree cutting.

Progress Energy Transmission utilizes easements, permits and/or company owned lands for the right of way on which the transmission lines are constructed. The routine inspection and maintenance of the right of ways (ROW) are extremely important for the safety of the public and the personnel that are responsible for the operation/maintenance of the transmission lines. Maintaining right of ways in accordance with established procedures results in a high level of transmission line reliability.

2.0 Program Policies, Procedures, Components and Specifications (FAC-003 R1)

2.1 Program Objectives

Ensure the reliability of the transmission system by minimizing vegetation related interruptions, while maintaining compliance with regulatory, environmental and safety requirements/standards.

2.2 Philosophy

Our philosophy is based upon employing the proper, most economical vegetation management techniques to ensure the effectiveness of our program in a wide variety of environments. This is achieved through communication, continuous learning and assessing best management practices throughout the industry.

2.3 Program Scope

The visual inspection and appropriate maintenance of transmission line right of ways comprise the Transmission Vegetation Management Program.

Inspections (periodic aerial and as needed ground patrols) are performed to monitor vegetation growth, right of way contractor effectiveness and encroachments within the right of way. Maintenance activities may include any of the following: re-clearing vegetation (mechanical clearing, hand cutting and herbicide application), tree trimming/removal, danger tree cutting and encroachment licensing/removal.

All transmission lines at voltages of 200 KV and higher will maintain 100% compliance with the MNT-TRMX-00176 specifications and cycle frequencies. All transmission lines at voltages less than 200KV will utilize MNT- TRMX-00176 as a standard and apply appropriate IVM methods as required to ensure the reliability of the line.

2.4 Program Work Components

All work performed shall be in accordance with ANSI, OSHA and other applicable safety requirements, laws and Progress Energy guidelines. The following describes the various components that are utilized in the Progress Energy Transmission's Integrated Vegetation Management Program.

Right of way re-clearing (using mechanical equipment – e.g., rotary mowers, Kershaw, Hydro-Ax, etc.) - All of the wooded sections of the right-of-way are to be re-cleared with mechanical equipment, where possible, to the full width as noted in a detail description. All undergrowth is to be cut within six (6) inches of the ground. All vines on poles and brush around poles in fields are to be cut and removed out of cropped areas. Cut all leaning trees that have been pulled into the right-of-way by storms. All brush cut from stream banks or drainage ditches must be removed from streams and ditches so as not to impede the flow of water. When run ways are cut through existing canals, the canal must be restored to original condition allowing drainage to continue as it did before our operation. Vista screens and trimmed trees are not to be cut during re-clearing operations without specific instructions from Company representative.

Right of way re-clearing (hand-cutting) - All of the wooded sections of the right-of-way that cannot be re-cleared with mechanical equipment are to be hand cut to the full width as noted in a detail description. All undergrowth is to be cut within six (6) inches of the ground or current water level. All vines on poles and brush around poles in fields are to be cut and removed out of cropped areas. Cut all leaning trees that have been pulled into the right-of-way by storms. All brush cut from stream banks or drainage ditches must be removed from streams and ditches so as not to impede the flow of water. Vista screens and trimmed trees are not to be cut during re-clearing operations without specific instructions from a Progress Energy representative.

Right of way re-clearing (herbicides) – Where appropriate, the primary method of vegetation control on transmission right of ways may be established as, or converted to, the use of herbicides. Herbicides may also be applied on a case by case basis on areas of line right of ways that cannot be effectively, or efficiently, mowed or hand-cut. The application of herbicides on Transmission ROW shall be in accordance with procedure EVC-EDGC-00001 (Herbicide Usage on Rights-of-Way *Energy Delivery Carolinas only*) and all applicable TVM specifications.

Tree removal/trimming - All trees requiring removal/trimming should be removed or trimmed so as to obtain sufficient clearance to prevent a hazard to operations for the removal/trimming cycle. Vegetation within the ROW that will reach a height of more than 12’ at maturity will be evaluated for removal including follow up with the landowners.

Off right of way tree cutting – Off right of way trees are those trees located outside the defined right of way width. These trees, due to their height if they were to fall could make contact with the conductor or fall to within five feet of the outermost conductor, grow into the conductor or due to conductor blowout could make contact with the conductor. All trees cut are to be cut according to MNT-TRMX-00193 (TVM: Off Right of Way Tree Cutting Guidelines).

Danger tree cutting – Danger trees are those trees located inside or outside the designated right of way that are in decline/diseased, have structural defects, leaning towards the right of way or are dead. These trees, due to there height if they were to fall could make contact with the conductor or fall to within five feet of the outermost conductor. These trees should be inspected and assessed thoroughly for structural integrity before climbing is performed. When the safety of the crew is at risk if the tree is climbed, alternate mechanical or other methods shall be utilized to perform the removal safely.

2.4.1 Program Component Frequency Targets

The actual frequency for specific facilities may vary significantly from the target frequency based on the integrated program components that are being employed and on site/facility specific factors (such as - but not limited to: indigenous vegetation, easement/permit width and rights, construction type, voltage, IVM activities, environmental restrictions, regulatory requirements, etc.) Right of way maintenance frequency intervals for program component tasks are identified below. These frequency intervals will be used to determine the calendar year in which the work will be scheduled.

	Task	PE Carolinas	PE Florida
2.4.1.1	Right of Way		
	1. Re-clearing (mechanical)	36 months	48-60 months
	2. Re-clearing (hand-cutting)	36 months	48-60 months
	3. Re-clearing (herbicides)	36 months	48 months
	4. Tree removal/trimming	36 months	48-60 months
	5. Off-R/W Tree Cutting	As Needed*	As Needed*

* Reliability-based danger tree cutting is performed as needed when danger trees are identified.

2.5 Work Specifications and Procedures

2.5.1 Work Specifications

Standards for specific work will be developed for all work practices and incorporated into contract documents for each project or work activity. These standards/specifications will incorporate ANSI-300 and ANSI-Z133 as appropriate.

2.5.2 Off Right-of-Way Tree Cutting

Standards found in MNT-TRMX-00193 (TVM: Off Right of Way Tree Cutting Guidelines).

3.0 Inspections (FAC-003 R1.1)

Aerial patrols will be conducted in accordance with all applicable Progress Energy Safety Rules, OSHA regulations, work practices, and regulatory requirements. Patrols will be conducted with qualified Progress Energy Transmission personnel to look for and document conditions of the following: ROW/Vegetation clearances - encroachments - line equipment - substation equipment.

Guidelines). The general guidelines for TVM Aerial Patrol Inspections, reactive work completion and frequencies that impact Right of Way are defined in procedure MNT-TRMX-00195 (TVM Program: Aerial Patrol Inspection Guidelines).

When multiple aerial patrols are planned for a calendar year, they will be scheduled across the growing season to ensure that growth issues are detected.

4.0 TVM Clearance Requirements (FAC-003 R1.2)

Progress Energy Transmission vegetation clearance requirements for the TVM program have been established. These clearances comply with the program vegetation clearances requirements of FAC-003.

4.1 Vegetation Clearances Following VM Work (FA-003 R1.2.1)

The vegetation clearances to be achieved at the time of TVM work completion will comply with the following guidelines:

4.1.1 Clearances Achieved at the Time of TVM Work

4.1.1.1 Vegetation Clearance: Floor Growth

The vegetation to conductor clearances to be obtained at the time of TVM work completion will use the maximum operating sag of the conductor as the reference point for TVM work for vegetation clearances. The clearance to be obtained at the time of TVM work will use the following criteria to target the clearances at the time of TVM work:

- Clearances will include the appropriate 'minimum' conductor to vegetation clearances defined in Table 4 or Table 5 of MNT-TRMX-00191 (TVM Program: Vegetation Clearance Tables)
- Clearances will also include distances for vegetation re-growth as defined in Table 3 of MNT-TRMX-00191 (TVM Program: Vegetation Clearance Tables)
- These combined distances are to be obtained at the time of TVM work below the maximum operating sag point of the conductor
- Minimum safe working distances may also impact clearance requirements at the time work is completed as defined in Table 1 or Table 2 of MNT-TRMX-00191 (TVM Program: Vegetation Clearance Tables)

4.1.1.2 Vegetation Clearance: Side Growth

To ensure side growth and conductor side-swing impacts are limited, the TVM program targets providing vegetation side growth clearance based on the following criteria:

- Vegetation clearances will be maintained to provide for conductor blowout from less than 4.1 psf wind loading or equivalent to approximately 40 mph winds (i.e., sub-tropical storm winds)
- Clearances will include the appropriate 'minimum' conductor to vegetation clearances as defined in Table 4 or Table 5 of MNT-TRMX-00191 (TVM Program: Vegetation Clearance Tables)

4.1.2 Safe Working Clearances

For all vegetation work, the minimum safe working distances defined in Table 1 and Table 2 of MNT-TRMX-00191 (TVM Program: Vegetation Clearance Tables) will be observed.

The majority of all work is normally completed at normal operating (loading/temperature) conditions that ensure the safe working clearances can be observed with no special precautions. When operating conditions and vegetation growth reduce clearances to less than the minimum safe working distances, the work will be rescheduled under the appropriate operating conditions to ensure that safe working clearances can be observed.

4.2 Minimum Vegetation to Conductor Clearances (FA-003 R1.2.2)

The minimum conductor to vegetation clearances, Clearance 2 in FAC-003 (R1.2.2), will be maintained under all rated electrical operating conditions. These clearances are defined in Table 4 and Table 5 of MNT-TRMX-00191 (TVM Program: Vegetation Clearance Tables).

The clearances included in these tables were developed and based on Table 5, IEEE 516-2003, phase to ground distances with appropriate altitude correction factors applied.

5.0 Personnel Qualifications (FAC-003 R1.3)

The following qualifications represent the minimum level of experience and/or education to be hired for the following positions.

5.1 Field Inspector/Right of Way Specialist

Minimum Qualifications:

1. Bachelors Degree in Forestry or related field, or 2 year technical degree with 1 years experience, or 5 years experience in utility vegetation management
2. General understanding of Integrated Vegetation Management techniques
3. Understanding of ANSI Z-133 and A-300
4. Understanding of basic electrical systems and causes of vegetation related interruptions
5. General knowledge of proper herbicide uses and application methods
6. Must obtain state pesticide applicators license within 1 year, or work under the direction of an Area Forester
7. Must obtain ISA certification within 1 year, or work under the direction of an Area Forester

5.2 Lead Forester/Area Forester

Minimum Qualifications:

1. Bachelors degree in forestry or related field and 3 years utility vegetation management experience or 2 year technical degree and 5 years experience in utility vegetation management
2. Working knowledge of Integrated Vegetation Management techniques
3. Knowledge of NERC Standard FAC-003-1 and its requirements for the Transmission Vegetation Management Program
4. Working knowledge of ANSI Z-133 and A-300
5. Working knowledge of an Integrated Vegetation Management Program including practical applications of herbicides

6.0 Corrective Action Plan (FAC-003 R1.4)

For all locations (spans) on the transmission system where the minimum vegetation clearances cannot be obtained to meet the target frequency cycle for the program component activity, the location will be documented. The following will provide the documentation for all mitigation sites and reactive work:

Corrective Action Plan– planned/documented vegetation management work that is scheduled more frequently than TVM program standard frequencies to mitigate vegetation-related clearance issues to ensure the reliability of the system.

- Every span that requires maintenance other than the Program Component Frequencies, in paragraph 2.4.1, will be documented and tracked, including the mitigation measures for that location (i.e., shorter frequencies, etc).

Reactive Work – vegetation related work identified in the field, not previously documented or planned, that requires action before scheduled cycle work to mitigate a potential reliability clearance issue.

- The TVM Program reactive work scheduling and tracking process will track all reactive work assigned and completed by TVM personnel.

7.0 Imminent Threat Communications (FAC-003 R1.5)

During the course of TVM work and inspections, any situation or condition that is observed and deemed to present an imminent threat to the Transmission System shall be reported in accordance with the MNT-TRMX-00192 (TVM: Imminent Threat Communication Procedure).

8.0 Annual Work Plan (FAC-003 R2)

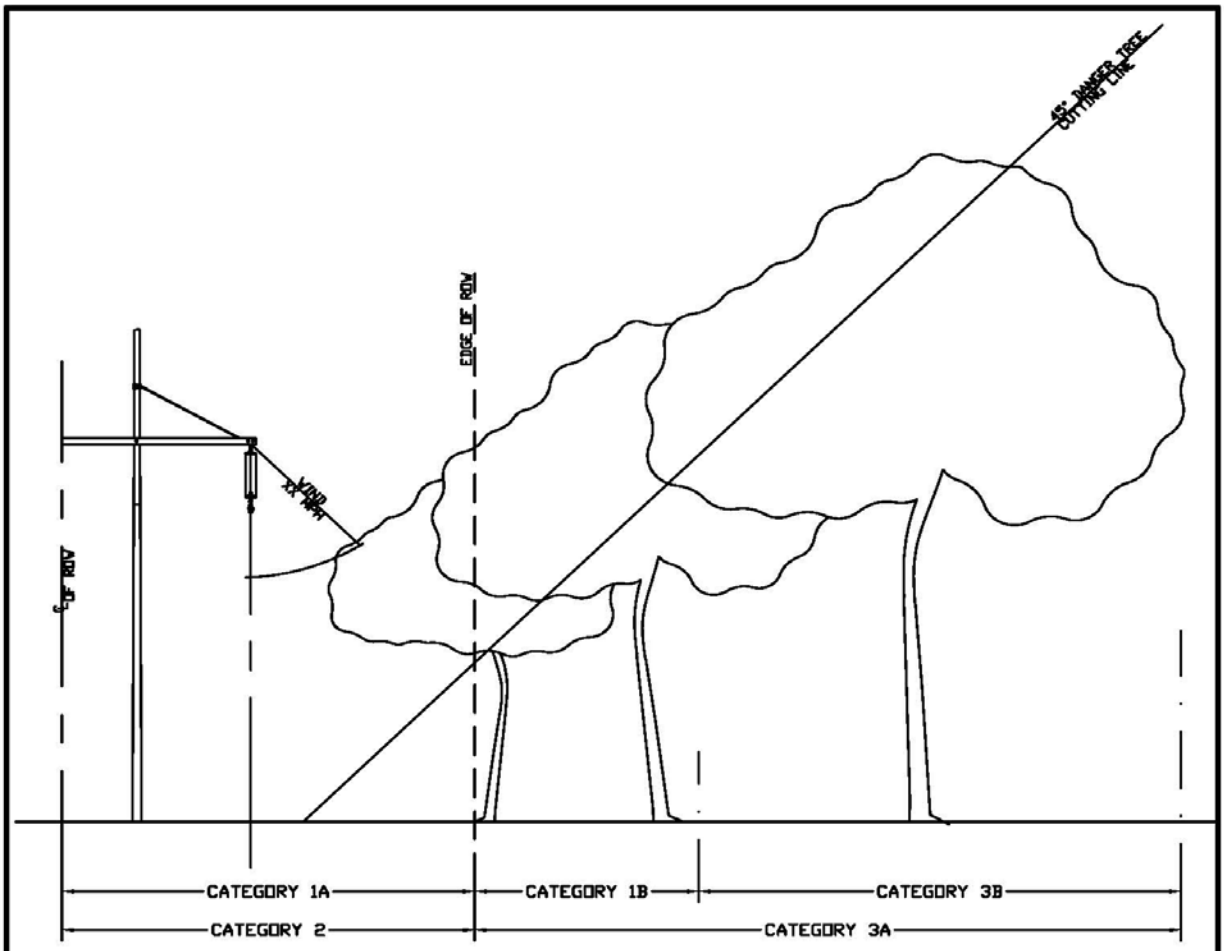
An annual work plan for the year will be maintained for each area managed by an area forester. The plan will be developed for each component activity by line or complete line maintenance. The plan will be developed using previous work completion dates, cycle length and based on annual growth cycles. Changes to the annual plan shall be documented with criteria for any changes and mitigation plans. Each area forester shall maintain a file for reportable lines with work completion information and a line completion form for each activity or complete line maintenance.

9.0 Transmission Vegetation Outage Reporting (FAC-003 R3)

On a periodic basis, as defined by the Region Reliability Organization, the TVM Program will report any outage that meets the criteria defined in FAC-003. In addition, the outage reporting will utilize the following criteria for meeting the FAC-003 reporting requirements:

- The general exclusion criteria in the MNT-TRMX-00194 (Transmission Outage Reporting Process)
- Side growth vegetation-related outages resulting from tropical storm or higher winds (40 mph or greater)
- Vegetation-related outages due to human or animal interference, such as: animal severing tree; vehicle contact with tree, removal or digging or moving of vegetation; logging; arboricultural or horticultural or agricultural activities; etc.)
- Vegetation related outages that result from vegetation falling into lines from outside the ROW that result from natural disasters shall not be considered reportable (examples of disasters that create non-reportable outages include, but are not limited to, earthquakes, fires, tornados, hurricanes, landslides, wind shear, major storms as defined either by MNT-TRMX-00194 --- the Transmission Outage Reporting Process, ice storms, and floods)
- Transmission vegetation categories (Attachment A, Attachment B, Attachment C & Attachment D)

Attachment A
Transmission Vegetation Categories



Vegetation categories.... Reliability compliance categories

NERC Category 1 - Code/Compliance Trees
PE A - Grow in trees located inside the right of way that could make contact with the conductor.
PE B - Trees located outside the right of way that could contact the conductor due to side growth into the right of way or conductor blow out.

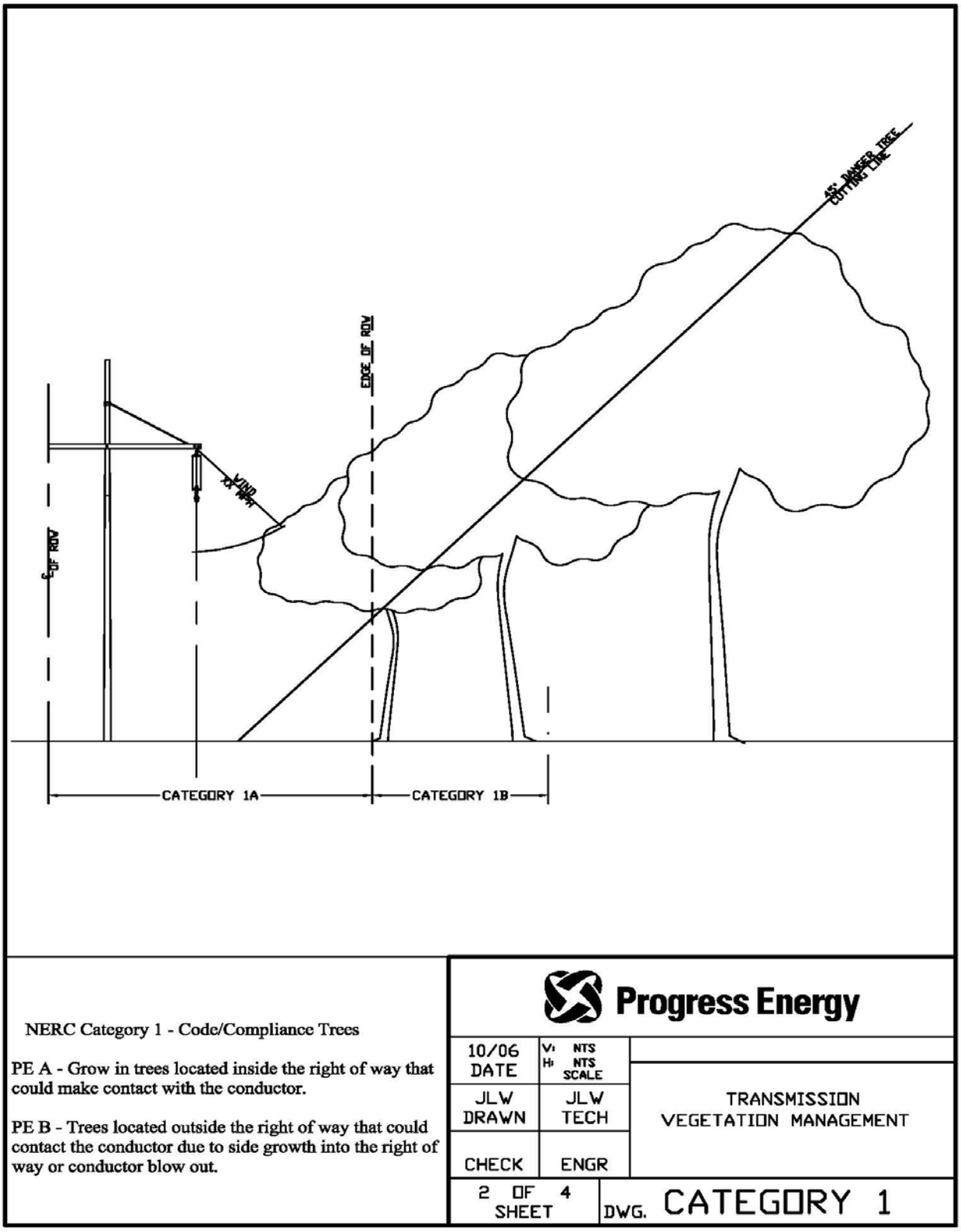
NERC Category 2 - Any tree that falls into the line from within the right of way.

NERC Category 3
PE A - Immediate Reliability Risk: Diseased, damaged, leaning, structurally unsound or dead trees located outside the right of way that would make contact with the conductor or fall to within 5 feet of a point on the ground directly beneath the outside conductor.
PE B - Long Term Reliability Risk: Trees that are outside of the right of way and could make contact with the conductor or fall to within 5 feet of a point on the ground directly beneath the outside conductor.

Progress Energy

10/06 DATE	V: NTS H: NTS SCALE	
JLW DRAWN	JLW TECH	TRANSMISSION VEGETATION MANAGEMENT
CHECK	ENGR	
1 OF 4 SHEET	DWG.	TVG

Attachment B
Category 1 Vegetation



NERC Category 1 - Code/Compliance Trees

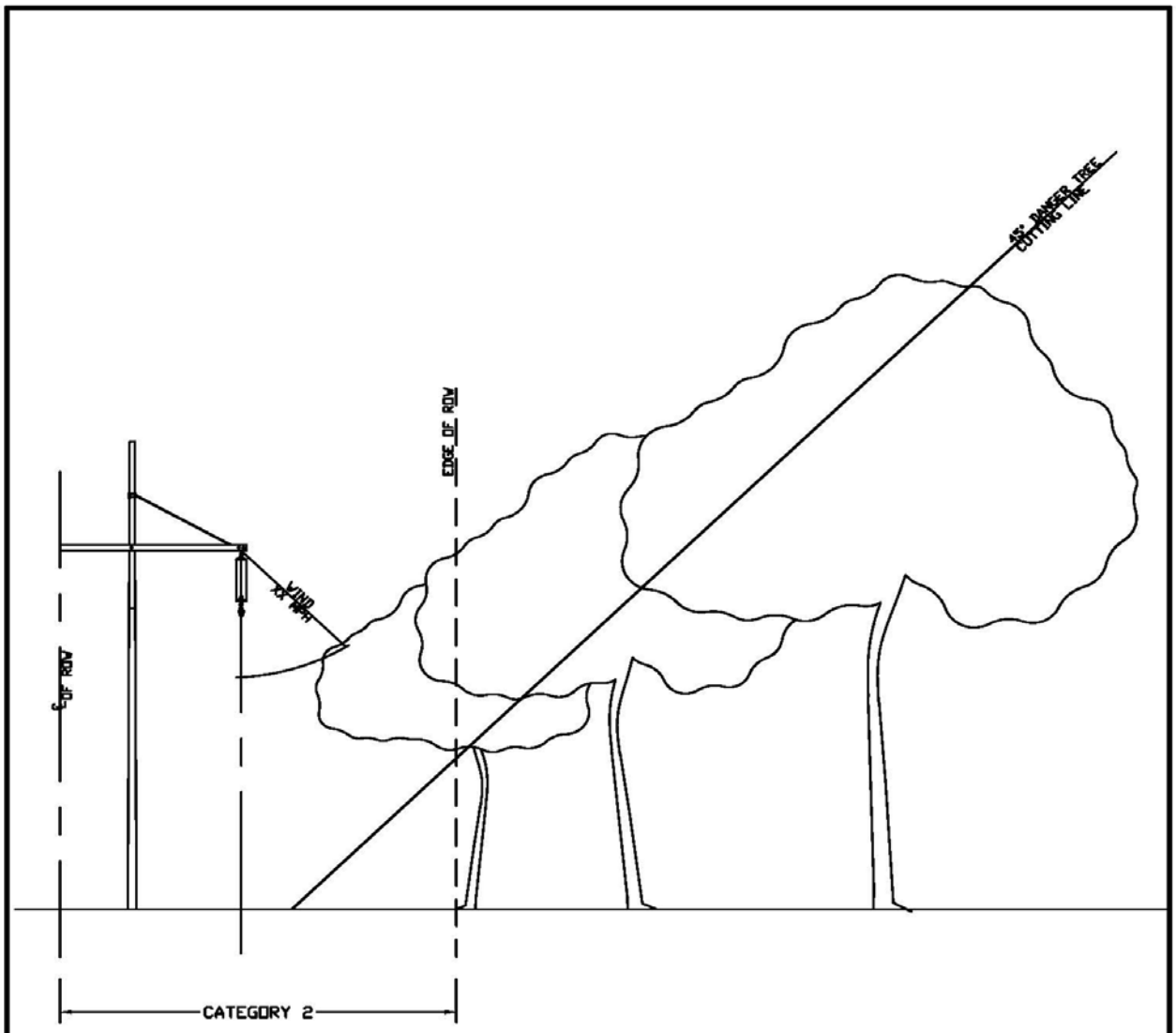
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Progress Energy

10/06 DATE	V: NTS H: NTS SCALE	
JLW DRAWN	JLW TECH	TRANSMISSION VEGETATION MANAGEMENT
CHECK	ENGR	
2 OF 4 SHEET	DWG. CATEGORY 1	

Attachment C
Category 2 Vegetation

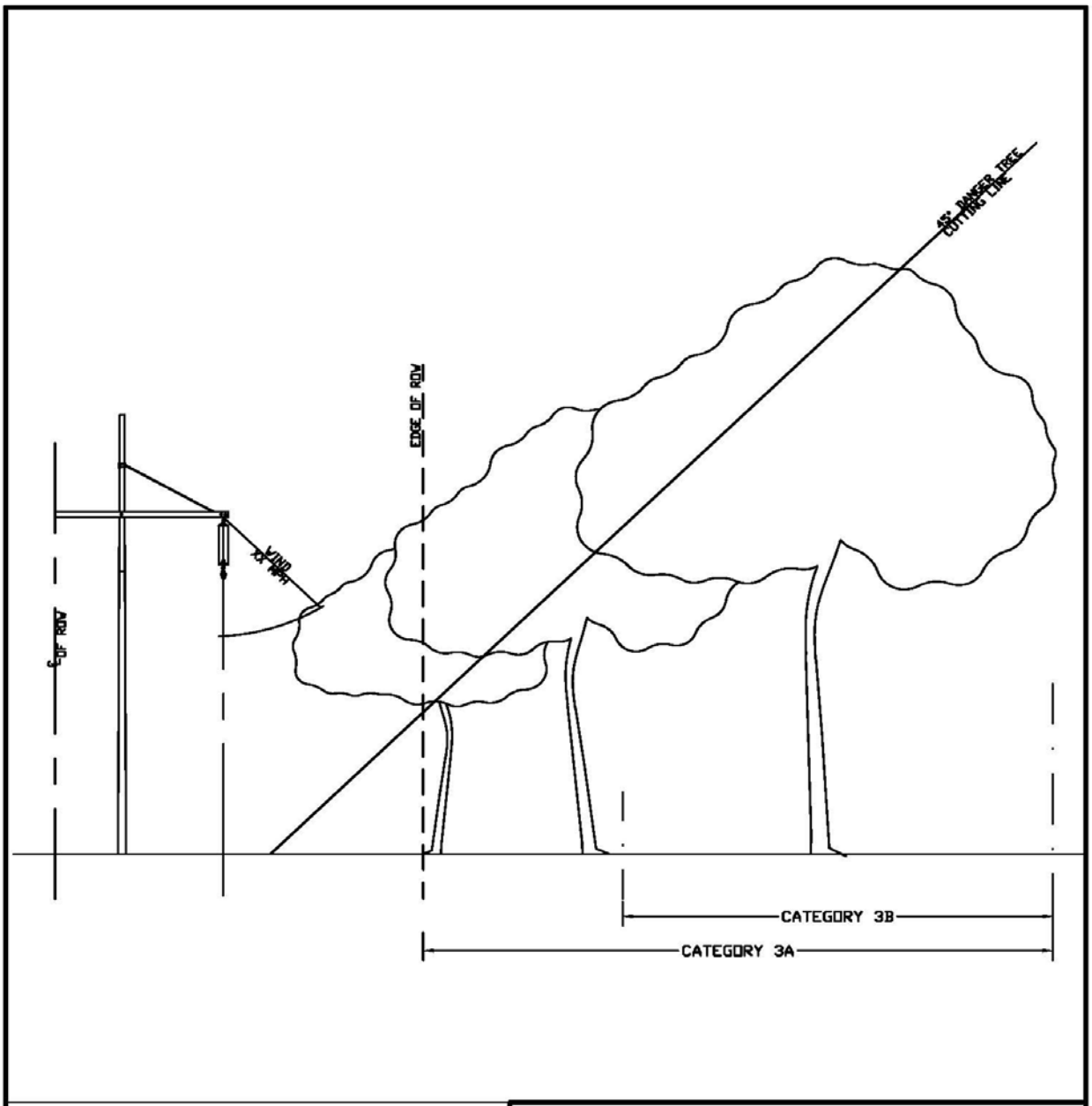


NERC Category 2 -
Any tree that falls into the line from within the right of way.

Progress Energy

10/06 DATE	V: NTS H: NTS SCALE	
JLW DRAWN	JLW TECH	TRANSMISSION VEGETATION MANAGEMENT
CHECK	ENGR	
3 OF 4 SHEET	DWG. CATEGORY 2	

Attachment D
Category 3 Vegetation



NERC Category 3

PE A - Immediate Reliability Risk: Diseased, damaged, leaning, structurally unsound or dead trees located outside the right of way that would make contact with the conductor or fall to within 5 feet of a point on the ground directly beneath the outside conductor.

PE B - Long Term Reliability Risk: Trees that are outside of the right of way and could make contact with the conductor or fall to within 5 feet of a point on the ground directly beneath the outside conductor.

Progress Energy

10/06 DATE	V: NTS H: NTS SCALE	
JLW DRAWN	JLW TECH	TRANSMISSION VEGETATION MANAGEMENT
CHECK	ENGR	
4 OF 4 SHEET	DWG. CATEGORY 3	