VEGETATION MANAGEMENT OPERATIONS MANUAL

Contents

1 Objective

The objective of this vegetation management operations manual is to establish an integrated vegetation management program on transmission right-of-way for the Project to preserve the reliability of the electric transmission systems by preventing outages from vegetation located on transmission rights-of-way (ROW) and minimizing outages from vegetation located adjacent to ROW by maintaining clearances between transmission lines and vegetation on and along transmission ROW.

The basic philosophy of the program is to target only those plants that are incompatible with the Applicant's (Eight Point Wind, LLC) use of the land with the following objectives:

- Transmission Reliability – the reliability of electrical service through vegetation control regardless of accessibility or workability.
- Minimizing Fire Hazards - through first identifying potential problems and then by reducing fuel levels to acceptable limits.
- Compliance - ensuring that the Applicant is compliant with governmental vegetation related regulations and restrictions. Adherence to NERC Standard FAC 003-3 Vegetation Management and state statutes is paramount.
- Resource Management - the ability to control resources by identifying work load. Treatments will be applied only on an as needed basis, thus allowing allocated resources to be utilized efficiently. As a result, work load and resources will be balanced.
- Improving/Maintaining Accessibility - promoting accessibility to structures and right-of-way by controlling vegetation on and around structure pads and patrol roads where practical.

2 Definitions

- **Right-of-Way (ROW):** The corridor of land under a transmission line(s) needed to operate the line(s). The width of the corridor is established by engineering or construction standards as documented in either construction documents, pre-2007 vegetation maintenance records, or by the blowout standard in effect when the line was built. The ROW width in no case exceeds the Transmission Owner's legal rights but may be less based on the aforementioned criteria.
- **Inspector:** Individual assigned with the responsibility of evaluating clearances in the Transmission Right-of-Way.
- **Clearance 1:** Defines the expected extent of clearing. The minimum distance is determined by the distances identified in Table 2 of ANSI Z133.1-2012 (note that average species growth rate is added to Table 2 for span lengths of 1320' or greater).
- **Trigger Distance:** The distance between the conductor and vegetation in real time that initiates implementation of a control method (ANSI Z133.1, table 1). Vegetation inside the trigger distance will initiate the imminent threat process.
- **Imminent Threat:** Is any vegetation at or within trigger distance.
- **MVCD:** Minimum Vegetation Clearance Distance.
- **VEL:** Vegetation Encroachment Limit is calculated by adding MVCD to sag/blowout (appendix 3).
- **Applicable Line:** An overhead transmission line that meets the FAC-003-3 applicability section.

3 System Structure/Work Prescriptions

3.1 Geographical Structure

The transmission system is first organized by the Transmission Management Areas. Within those areas the corridors are identified. A corridor is a single line circuit or several lines circuits running parallel and organized in such a manner that can be efficiently managed together. Whenever possible the corridors should begin and end at substations. The corridor should be easily identifiable and follow normal patrol patterns. Corridors are the largest management unit in a transmission area.

The corridors are subdivided in to stands. A stand is the basic management unit, generally longer than a span length, represented by an area of vegetation sufficiently uniform in species, composition, age, condition and/or land use to manage as a unit.

Individual stands are identified and quantified for the ROW. The stand is then field inventoried to develop a description (identifying stand types and use, species composition, acreage, density, height, growth, fire hazard, and accessibility) and prescription (prescribing an individual, site specific vegetation control method based on the stand description and a date).

3.2 Land Use Description

The description identifies the location, classifies the type of land use, quantifies the size and identifies other attributes that would affect management of the land.

3.3 Practices and Prescriptions

The Applicant's vegetation management practices represent a system of managing plant communities through identifying compatible and incompatible vegetation. The evaluation, selection and implementation of appropriate control method or methods to achieve set objectives are taken into consideration. The choice of control method or methods are based on environmental impact and anticipated effectiveness, along with site characteristics, security, economics, current land use and other factors. These methods include, but are not limited to pruning, removal, herbicide application and mowing.

Each stand shall have a prescription. The prescription defines what work activity is scheduled to meet the objectives of the plan, quantifies the work and sets an estimated schedule of when the work should be done.

Our methods / prescriptions are defined as follows:

- Remove Trees - To cut a tree or shrub (4" or greater at DBH, 5" or greater stump) at ground level and treat with the appropriate herbicide where necessary to prevent re-sprouting. Unit is number of trees.
- Mow - normal - Mow, cut or chop grass and brush in right-of-way to a height of less than six (6) inches. Brush diameter in right-of-way is less than two (2) inches. Unit is number of acres.
- Mow - heavy - Mow, cut or chop grass and brush in right-of-way to a height of less than six (6) inches. Brush diameter in right-of-way is greater than two (2) inches. Unit is number of acres.

- Mow - wet - Mow, cut or chop grass and brush in right-of-way to a height of less than six (6) inches. The average soil in right-of-way is sufficiently wet to require low ground pressure equipment (ground pressure ratio of less than 4 pounds per square foot). Unit is number of acres.
- Mow - Specialized – Vegetation clearing using unique methods with specialized equipment. Unit is number of acres.
- Mow Pads & Roads - Mow, cut or chop grass and brush Thirteen (13) feet on each side of the center line of the road or structure to a height of less than six (6) inches. Unit is number of acres.
- Roll ROW – Roll the grass down using the tracks and a chopper (under wet conditions).
- Trim Trees to Standard - To remove branches from a tree in accordance with ANSI A300 standards as they apply to utility pruning. Unit is number of trees.
- Spot Treat Light - Application of an approved herbicide to the target species on a plant by plant basis. The application shall achieve a 90% kill after three months of all target species. Care should be taken to minimize over spray and drift so as to retain the native plant community. Excessive kill of non-target species will not be permitted. Target species density is less than two hundred (200) stems per acre or less than thirty percent (30%) of the area of the span. Unit is number of acres.
- Spot Treat - heavy - Application of an approved herbicide to the target species on a plant by plant basis. The application shall achieve a 90% kill after three months of all target species. Care should be taken to minimize over spray and drift so as to retain the native plant community. Excessive kill of non-target species will not be permitted. Target species density is greater than two hundred (200) stems per acre or greater than thirty percent (30%) of the area of the span. Unit is number of acres.
- Broadcast Treat - Application of an herbicide to the entire right-of-way to achieve a species shift in the right-of-way diversity (necessary when one or two incompatible species dominate the right-of-way). Contractor shall achieve a 90% kill after three months of those target species. The process of broadcast spray recognizes that the entire right-of-way will brown-out. Unit is number of acres.
- Clear and Treat Brush - Remove woody species and apply herbicide to stumps or basal treat stems from around poles, guys, fence right-of-ways, ditch banks as directed. Unit is number of acres.
- Critical Trim - A tree or group of trees that poses an increased risk to the system and must be trimmed or removed off-cycle or on short-notice. These trees are directly related to reliability. Unit is number of trees.
- VEL Trim – Trim or remove a tree that has been designated as being inside the vegetation encroachment Limit which must be done off-cycle or on short notice
- TGR - Apply an approved tree growth regulator to a tree in order to slow its growth. Results should be evident within six (6) months and last for three years. Unit is number of trees.
- Pad Treatment - Spray structure pad to remove woody species for a minimum distance of ten (10) feet around the structure and one and one-half feet (1.5) around down guys. The area may vary. Unit is number of acres.
- Chop right-of-way - Chop right-of-way to a height of less than eighteen (18) inches. Unit is Number of acres.
- Linear Trim - To trim specifically identified spans of trees of high enough density that it is not practical to obtain a tree count in advance of trimming. In many cases, there will be some trees that require removal during the linear trimming process. It is not necessary to document the count of these removals during linear trimming because linear trimming is

based on length of work (not tree counts). Unit is based on linear footage for each side of right-of-way.

- Aerial Spray – To broadcast treat using helicopters or fixed wing aircraft.
- Critical Removal – To remove a tree that is designated as critical (tree must be removed out of cycle and on short notice).
- Imminent Threat – Removal or Tree Trim to Standard of a tree that has been designated as an Imminent Threat.
- Widen ROW Edge – To extend the existing ROW wall beyond the point that it is currently cleared.
- Restricted Work – Vegetation work being done under restrictions placed on the site or job by a governmental agency.
- Remove Vines – The severing of vines at the base of the pole or above ground line and treating them with the appropriate approved herbicide. (Under no circumstances are vines to be removed from the pole if they are closer in elevation than ten (10) feet below energized facilities).
- Tree Group Removed – Trees removed and treated with appropriate herbicide in a specified area. (trees counted)
- Tree Group Trim – Trees trimmed to standard in a specified area. (trees counted)
- Clear Area – Vegetation removed in a specified area. (measured by area)
- Trim Area – Vegetation in a specific area that is trimmed to standard. (measured by area)
- Special – Unique vegetation work that is not currently in the prescription List.

4 Inspections

4.1 ROW Inspection Schedule (NERC Standard FAC-003-3, Requirement R6)

Generally, scheduled work will be determined by the inspection process. Routine inspections will normally occur on the ground. The Applicant may elect to utilize aerial inspections or LiDAR. All transmission circuits subject to FAC-003-3 are inspected at minimum annually with no more than 18 months between inspections.

The timing and number of inspections is flexible in order to respond to changing conditions such as fuel loading from drier than normal conditions. Other conditions resulting in adjusted schedules could include heavy rain falls, high winds, landowner intervention and tree mortality caused by disease outbreaks or insect infestations.

Any change to the inspection schedule must be approved by the regional lead. Approval can be granted provided there is sufficient knowledge of the line that no vegetation encroachment would be expected, and timeframe does not exceed annual with no more than 18 months between inspections.

4.2 Inspection Purpose

- To inventory vegetation conditions that may impact the safe reliable operation of the transmission line.
- To prioritize work appropriate to species and site specific conditions.
- To adjust schedule for vegetation that has grown faster than predicted and prevent encroachment of MVCD area.

4.2.1 Inspection Elements

The inspections will identify the following:

1. Work prescriptions (sec 4.3) that are covered by this manual and potential violation of FAC-003-3 requirements.
2. Trees approaching the Trigger Distance or VEL (whichever is greater, appendix 3), taking into consideration species, site specific conditions, and local climate conditions.
3. Trees posing a fall-in threat should be examined to determine if they are danger trees.
4. Tree hazards caused by man that pose a risk of fall-in.
5. Additionally a review of completed routine annual maintenance will be documented

4.3 Inspection Records

Any observed conditions requiring work, which are identified through the inspection process, will be recorded and stored electronically. The inspection records will identify and prioritize work based on the risk to the line reliability. Each inspection shall be documented electronically with the date completed and the name of the Inspector.

4.4 Clearances at Time of Inspection (NERC Standard FAC-003-3, Requirement R2.1)

When inspecting lines and establishing prescriptions (work type, date needed, quantity) the arborist should plan work to meet one of the following conditions.

Below the line:

1. Vegetation growing under the lines shall be trimmed/removed prior to encroaching into the VEL.

Beside the line:

2. Prescribe work to maintain vegetation on each side of the line by trimming vegetation encroaching the edge of easement or other right of way or before vegetation encroaches into the VEL. At time of trimming Clearance 1 (plus 2-3 years of growth) shall be obtained.

4.4.1 Trigger Distance and Vegetation Encroachment Limit

The Applicant's Vegetation Management program maintains vegetation to prevent outages and encroachment into MVCD on applicable lines. The following must be considered when inspecting and prescribing work so that the MVCD is not encroached:

1. Elevation
    a. (1) Elevation is determined using topographical maps, siting information, and real time elevation detection (i.e. GPS technology). We manage lines in locations throughout the United States (though the majority is in Florida at an elevation of approximately 153 ft above sea level)
2. Sag and Sway potential of the line
    a. Sag and Sway potential of the line as measured in typical constructed span lengths is provided by the Applicant's Engineering team.

3. Growth and bend-in potential of the vegetation
    a. Growth and bend-in potential are gauged through the course of patrol/inspection by our Arborists who are trained in the identification and plausible growth and bend-in potential of vegetation

At the time of inspection our Arborists take into account these 3 variables when utilizing the range finder to help enforce the Trigger Distance and VEL, whichever is greater. This serves as a vegetation encroachment buffer against MVCD issues.

- The Vegetation Encroachment Limit (VEL) is utilized to further protect the facilities from MVCD encroachment by adding sag and blowout to MVCD and factoring in vegetation growth.
- Anything that is observed encroaching on the Trigger Distance or VEL distance that, under the expert opinion of the Arborist, shows potential for encroachment under other ambient conditions (such as bend-in potential) triggers the Imminent Threat process.

5 Annual Work Plan (NERC Standard FAC-003-3, Requirement R3)

5.1 Annual Plan

During the budget process the Applicant's Vegetation Management team will review in the database the most current inspection and data collected on the condition of vegetation in the ROW. Work shall be prioritized and scheduled according to the following specifications:

- Clearance 1 shall be achieved by reducing all site specific variables of vegetation to a non-risk level within the ROW, complying with ANSI A300, Part 1 and Part 7, and ANSI Z133.1.
- Maintains the requirements of this manual, including Clearance 1 and MVCD encroachment.
- Reduces risk of trees falling into the corridor from outside of the ROW.
- Local site specific variables include operating voltage, appropriate vegetation management techniques, fire risk, reasonably anticipated tree and conductor movement, species types and growth rates, species failure characteristics, local climate and rainfall patterns, line terrain and elevation, location of the vegetation within the span, worker approach distance requirements, and protected species.
- Any trees approaching the VEL, taking into consideration species, site specific conditions, local climate conditions and the maximum sag and sway of the line will be mitigated to avoid violating MVCD.
- Allows the appropriate lead times for resolving permits, permissions, and resources.
- Is adjustable to accommodate changing conditions during implementation.
- All changes will be documented in the Vegetation Management Annual Plan (VMAP).

Annually the Applicant's Vegetation Management team will designate the database batches as the Annual Work Plan for the upcoming year. Periodically the plan will be reviewed and adjusted for changing condition of the vegetation. Deletion of entire batches will be documented. Individual prescriptions can be adjusted or changed based on the field conditions.

5.2 Work Specifications

Work specifications will be developed for each vegetation contract or job. The specifications will be consistent with Clearance 1 set forth in this document and will comply with the objectives of FAC 003-3 in the context of the specific prescription in the Vegetation Management Annual Plan. The specifications should take into consideration those standards set forth in the following documents:

- ANSI Z133.1-2006 Safety Requirements for Arboricultural Operations.
- OSHA 1910.269 Electric Power Generation, Transmission and Distribution.
- ANSI A300 (Part 1) 2006 Pruning for Tree Care Operations—Tree, Shrub and Other Woody Plant Maintenance—Standard Practices
- ANSI A300 (Part 7) 2006 IVM Tree, Shrub, and Other Woody Plant Maintenance—Standard Practices (Integrated Vegetation Management a. Electric Utility Rights-of-way)
- Integrated Vegetation Management Best Management Practices, Companion publication to ANSI A300 Part 7.

The Vegetation Management Annual Plan for the current year is maintained in the database.

The methods utilized for vegetation management are further described in the Applicant's contract specifications. Specific work specifications will be developed as work is bid or assigned. The specifications will be in compliance with the standards set forth for Clearance 1 and MVCD of this document.

The Annual Plan and schedule shall be maintained by the Applicant's personnel. Work and status updates by the Applicant and contract personnel shall be kept current in the database.

5.3 Implementation (NERC Standard FAC-003-3, Requirement R7)

Tracking – Monthly, the Applicant's Vegetation Management team will review the progress of inspections, and work scheduled in the Annual Work Plan. Resource movements and schedule adjustments will be made as necessary to ensure work plan objectives are met. The Annual Work Plan completion is due at the end of the calendar year.

Quality Assurance and Auditing - Upon completion the contractor will certify the work as completed to the specification. In addition the work is inspected documented in the database by the Applicant's employee or representative.

Documentation - The work plan is maintained in the database. Reports are monitored to ensure work plan is complete and exceptions are noted. Archiving the documentation in the database occurs and ends the process**.**

6 Mitigation Measures (NERC Standard FAC-003-3, Requirement R5)

Clearance 1 requirements define the expected extent of clearing. If the Clearance 1 specifications cannot be achieved at the time of scheduled maintenance, the Applicant shall implement mitigation measures. These measures shall be documented as prescriptions or inspections. These may include short prescription cycles or more frequent inspections to monitor the risk to the system.

Restrictions on scheduled work may include refusals by property owners to access or perform work, orders to stop work by local authorities, or restrictions by federal and state agencies. These restrictions will be brought to management for action. While negotiations or legal action with governmental entities or landowners is under way the field arborist will manage the restriction to prevent encroachment into MVCD.

6.1 Communication of Imminent Outage Threat (NERC Standard FAC-003-3, Requirement R4)

The Applicant shall communicate vegetation conditions that present an imminent threat to the appropriate control center.

Immediate Communication Requirements for the Applicant's Employees and Contractors:

When a vegetation condition representing an imminent threat is discovered, it will be promptly reported to the vegetation specialist. The vegetation specialist will verify the distance to conductor. After the imminent threat is confirmed, the verifying employee will establish communications with the appropriate control center and area operations. In that communication they will jointly formulate a plan to resolve the risk timely.

Action:

After the appropriate personnel are apprised of the imminent threat, action will be delegated to appropriate personnel to remediate the emergency. Safety and system reliability shall be guiding factors for the plan of action. Actions may be to reduce line load or switch the line out of service until the vegetation threat has been removed.

Documentation:

The vegetation specialist will maintain a detailed log of the event to track the work until completion. The Imminent Threat reporting will be documented and maintained by the Applicant's Vegetation Management team.

7 Reporting of Transmission Line Outages Caused by Vegetation (NERC Standard FAC-003-3, Requirement R2)

7.1 Quarterly Reporting to the Regional Entity (RE)

The Applicant shall report at least quarterly to the RE, sustained transmission line outages determined by the Applicant to have been caused by vegetation. (Some REs require monthly reporting). Vegetation outages should be reviewed against the requirements for reporting in R 2 of FAC 003-3 of the NERC Standards.

If outages have occurred that meet the requirements for reporting, the Applicant's Vegetation Management team will review with the corporate compliance group prior to submission. Annual Completed Inspection and Workplan Review

Annually the Applicant's Vegetation Management team shall review documents related to the inspections, completed vegetation Annual Work Plan to ensure completion. The Applicant's Vegetation Management team shall certify that the Applicant's transmission system is in compliance with the NERC Standard FAC 003-3 as required by each RE.

8 Quality Assurance, Quality Control, and Independent Patrol

- **Quality Assurance and Quality Control (QAQC):** A random, statistically representative sample of open, scheduled and completed work will be selected and reviewed annually to improve our ability to capture and assess performance improvement opportunities.
- **Independent Patrols:** Additional patrols of the system will be completed annually by an independent patroller. This will help ensure vegetation management practices are aligned with Vegetation Management Program expectations.
- QAQC and Independent Patrol will enable our program to derive an independent picture of the overall management of ROWs as well as bolster continuous improvement.

10 Appendixes

10.1 Appendix 1 – Clearance 1

Table 2. Minimum approach distances to energized conductors for persons other than qualified line-clearance arborists and qualified line-clearance arborist trainees.

Nominal voltage in kilovolts (kV) phase-to-phase*	Distance	
	feet-inches	meters
0.0 to 1.0	10-00	3.05
1.1 to 15.0	10-00	3.05
15.1 to 36.0	10-00	3.05
36.1 to 50.0	10-00	3.05
50.1 to 72.5	10-09	3.28
72.6 to 121.0	12-04	3.76
138.0 to 145.0	13-02	4.00
161.0 to 169.0	14-00	4.24
230.0 to 242.0	16-05	4.97
345.0 to 362.0	20-05	6.17
500.0 to 550.0	26-08	8.05
785.0 to 800.0	35-00	10.55

* Exceeds phase to ground. Per 29 CFR 1910.333

10.2 Appendix 2 – Minimum Vegetation Clearance Distance

FAC-003 — **TABLE 2** — Minimum Vegetation Clearance Distances (MVCD)[16]
For **Alternating Current** Voltages (feet)

(AC) Nominal System Voltage (KV)	(AC) Maximum System Voltage (kV)[17]	MVCD (feet) Over sea level up to 500 ft	MVCD (feet) Over 500 ft up to 1000 ft	MVCD feet Over 1000 ft up to 2000 ft	MVCD feet Over 2000 ft up to 3000 ft	MVCD feet Over 3000 ft up to 4000 ft	MVCD feet Over 4000 ft up to 5000 ft	MVCD feet Over 5000 ft up to 6000 ft	MVCD feet Over 6000 ft up to 7000 ft	MVCD feet Over 7000 ft up to 8000 ft	MVCD feet Over 8000 ft up to 9000 ft	MVCD feet Over 9000 ft up to 10000 ft	MVCD feet Over 10000 ft up to 11000 ft
765	800	8.2ft	8.33ft	8.61ft	8.89ft	9.17ft	9.45ft	9.73ft	10.01ft	10.29ft	10.57ft	10.85ft	11.13ft
500	550	5.15ft	5.25ft	5.45ft	5.66ft	5.86ft	6.07ft	6.28ft	6.49ft	6.7ft	6.92ft	7.13ft	7.35ft
345	362	3.19ft	3.26ft	3.39ft	3.53ft	3.67ft	3.82ft	3.97ft	4.12ft	4.27ft	4.43ft	4.58ft	4.74ft
287	302	3.88ft	3.96ft	4.12ft	4.29ft	4.45ft	4.62ft	4.79ft	4.97ft	5.14ft	5.32ft	5.50ft	5.68ft
230	242	3.03ft	3.09ft	3.22ft	3.36ft	3.49ft	3.63ft	3.78ft	3.92ft	4.07ft	4.22ft	4.37ft	4.53ft
161*	169	2.05ft	2.09ft	2.19ft	2.28ft	2.38ft	2.48ft	2.58ft	2.69ft	2.8ft	2.91ft	3.03ft	3.14ft
138*	145	1.74ft	1.78ft	1.86ft	1.94ft	2.03ft	2.12ft	2.21ft	2.3ft	2.4ft	2.49ft	2.59ft	2.7ft
115*	121	1.44ft	1.47ft	1.54ft	1.61ft	1.68ft	1.75ft	1.83ft	1.91ft	1.99ft	2.07ft	2.16ft	2.25ft
88*	100	1.18ft	1.21ft	1.26ft	1.32ft	1.38ft	1.44ft	1.5ft	1.57ft	1.64ft	1.71ft	1.78ft	1.86ft
69*	72	0.84ft	0.86ft	0.90ft	0.94ft	0.99ft	1.03ft	1.08ft	1.13ft	1.18ft	1.23ft	1.28ft	1.34ft

* Such lines are applicable to this standard only if PC has determined such per FAC-014 (refer to the Applicability Section above)