

NextEra Energy Transmission New York, Inc.

(NEETNY)

Empire State Line

Case 18-T-0499

Appendix E

Long-Range Right-of-Way Management Plan

June 2020



LONG-RANGE RIGHT-OF-WAY
MANAGEMENT PLAN FOR THE
NEETNY ELECTRIC TRANSMISSION
SYSTEM

June 23, 2020

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INTRODUCTION

This Long Range Right-of-Way Management Plan for the NEETNY Electric Transmission System (Plan) is organized to meet the specific requirements of the New York Codes, Rules and Regulations, Title 16, Chapter I, Subchapter F, Part 84 requiring the development of a long-range right-of-way management plan for electric transmission systems. In accordance with these requirements, the Plan is intended to be a working guide for NEETNY personnel who work on various aspects of the transmission vegetation management program. It sets forth the basic procedures and practices that NEETNY uses in planning, implementing, and controlling its right-of-way vegetation management program on approximately 20 miles of transmission line rights-of-way in New York.

The intention of the Plan remains that it be long-range in nature. However, changes and revisions will be made as necessary.

I. DESCRIPTION OF NEXTERA ENERGY TRANSMISSION NEW YORK, INC.

A. ROW Management Structure & Organization for Planning and Operations

The management structure for NEETNY's right-of-way vegetation management program is shown on the organization chart on the following page. Overall vegetation management responsibilities reside in the Power Delivery Business Unit. Personnel in this department establish the Company-wide policies, procedures, techniques and co-ordination for the program. It also provides most of the operational implementation of the program, with vegetation specialist providing guidance and oversight.

B. Key Positions in Vegetation Management Program and General Functions

Responsible for general administration and coordination of the program, including procedures and techniques to implement the program.

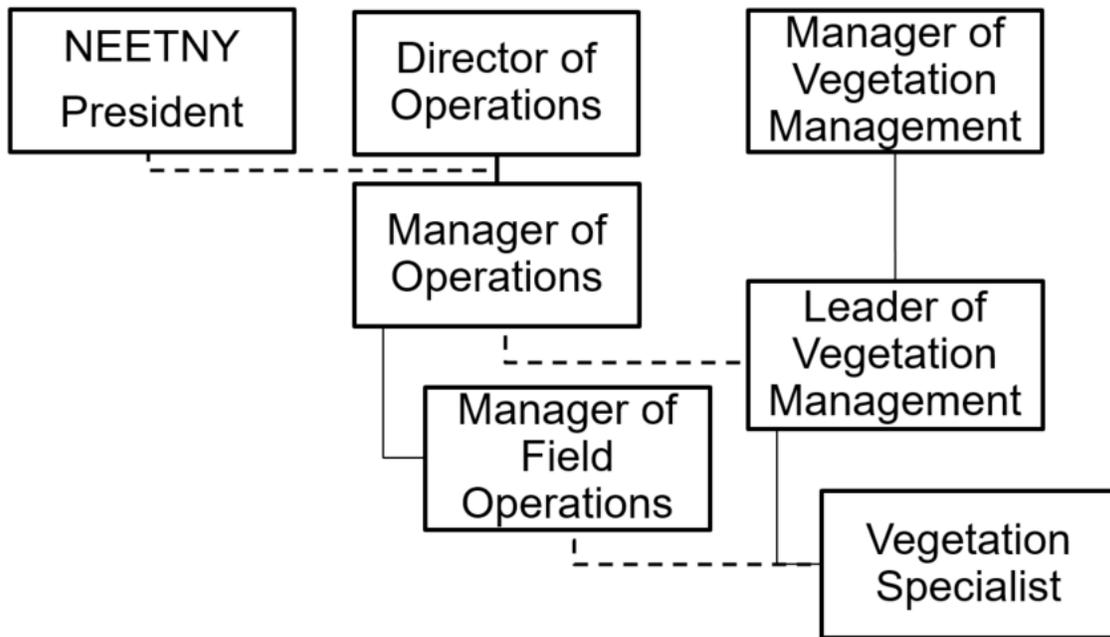
Manager of Field Operations Responsible for budget oversight and reviewing contract services.

Manager of Vegetation Management - Responsible for general administration and coordination of the program

Leader of Vegetation Management Operations - Responsible for general administration and coordination of the program, including procedures and techniques to implement the vegetation program. Supervises the Vegetation Specialist to assure that the vegetation management program is implemented effectively and prudently. Responsible for addressing customer issues to minimize PSC complaints and improve customer satisfaction. Responsible for verification that QA/QC activities are implemented comprehensively and in a consistent manner to ensure that regulatory requirements are fully complied with.

Vegetation Specialist - Develops specifications, standards, work procedures, and materials for program utilization. Conducts annual inspections, quality assurance audits across the transmission system. Performs planning, initiates work, contract crew oversight and customer conflict resolution.

Vegetation Management Staff



C. Description of NEETNY Transmission Right-of-Way System

1. System Location

The NEETNY transmission system within New York State is comprised of an approximately 20-mile 345kV voltage transmission line, and is shown on the NextEra Energy Transmission New York, Inc. Transmission System Map in Appendix A. This map also includes transmission facilities of other utilities in New York.

2. Components of the Transmission System

Transmission Pole Line Mileage	
Voltage	Mileage
345kV	20
Total	20

3. Right-of-Way Width

Widths of rights-of-way generally vary according to the voltage and type of supporting structure. A range of widths is given to account for variations in the types of supporting structures, e.g. single pole v. H-frame.

Typical Transmission ROW Widths Voltage ROW Width

<u>Voltage</u>	<u>ROW width</u>
345kV	100' - 205'

Although the right-of-way widths usually fall within the above ranges at the stated voltages, there are situations in which the right-of-way width will vary on a given line segment. For example, the right-of-way width may be greater than normal for clearance when a span is extra-long. Conversely, the right-of-way width could be less than normal where the line is routed through a sensitive area requiring special construction design and right-of-way clearing. These locations must also receive special consideration for right-of-way management.

4. Right-of-Way Acreage

County	Total ROW/Easement Acreage	Wooded ROW/Easement Acreage
Niagara County	70.18	1.68
Erie County	310.84	28.21

D. Transmission Right-of-Way Ownership

NEETNY will acquire property rights to erect, operate, and maintain its transmission system through the acquisition of easements from the property owners. These easements leave the ownership of the land in the hands of the owner, so that they can continue to use the land, subject to certain restrictions that insure the owner's and the public's safety, while also permitting the operation and maintenance of the NEETNY transmission facility. NEETNY's rights include, among others, the right to initially clear vegetation from the right-of-way to facilitate construction, and to subsequently perform operations that will control vegetation to provide for the safe and reliable operation of the transmission line.

In the event easements are not acquired, rights-of-way may be owned in fee by NEETNY or, in the case of rights-of-way across public lands, rights are secured by way of permits. These permits generally provide NEETNY the same rights as those in an easement however there are sometimes special conditions and may include an annual fee paid to the entity issuing the permit.

1. Vegetation Management Restrictions

Any landowner or land user restrictions that may impact right-of-way vegetation management are incorporated at the time of initial right-of-way conveyance into the legal document and/or agreement, which grants NEETNY the right to erect, operate, and maintain its facilities. These restrictions are incorporated into all work specifications to assure compliance. Landowner or land user requests to NEETNY for modification of vegetation management practices are analyzed and considered. The analysis considers such factors as the economics, environmental impact, safety, operational feasibility, and practicality of the request.

2. Work Notification Procedures

NEETNY, at a minimum, performs contacts to notify the landowner of planned vegetation management operations in the following situations:

- When easement restrictions require prior notification.
- When the work effort involves lands that are off the right-of-way either for access or for tree removals.
- When State law requires notification pursuant to herbicide applications.

II. RIGHT-OF-WAY MANAGEMENT POLICIES AND PRACTICES

A. Past Practices and Policies

NEETNY's affiliates have the experience and a long history of vegetation management on transmission right-of-ways across the United States and Canada using Integrated Vegetation Management practices to manage vegetation to control compatible and non-compatible vegetation in a cost effective and safe manner. The same experience and practices that have been used to meet the varying regulations and guidelines required in other states will be utilized to ensure the NEETNY meets the goals of managing right-of-ways free from interruptions caused by vegetation.

B. Practices and Policies

The primary goal of the NEETNY right-of-way management program is to maintain the transmission system essentially free from interruptions caused by trees falling on or growing into the conductors. There are numerous methods and materials available to the leader of vegetation operations that can be used to accomplish this objective. It is NEETNY's policy to accomplish this objective while minimizing long-term vegetation management costs and maintaining the environmental quality of the area through management practices that are in harmony with existing land uses. NEETNY employs a vegetation management staff of professionals trained in the biological sciences whose job it is to implement this policy on the transmission system. Implementation is carried out through a prescription process whereby a treatment method is selected on a site-by-site basis that will maintain the reliability of the facility at the lowest long-term cost in a manner that is compatible with both on-site and adjacent land uses.

Methods available for maintaining the reliability of the system can be generally categorized as chemical and non-chemical. NEETNY realizes through experience that long-term vegetation management costs are minimized through a program that employs chemical methods of control. This is due to the previously described ability of herbicides to root-kill undesirable vegetation, as opposed to mechanical non-chemical methods, which only temporarily retards growth, and often encourages re-growth at an accelerated rate. Selective vegetation management practices protect and encourage shrub and herbaceous plant communities that are aesthetically pleasing and provide food and cover for many wildlife species.

NEETNY's use of herbicides in an environmentally compatible manner begins with the selection of herbicides to be used as part of the program. Only products that are registered and labeled for use on rights-of-way by the U.S. Environmental Protection Agency and the N.Y. State Department of Environmental Conservation are used as part of the program. The NEETNY vegetation department monitors the scientific literature and

attends workshops and seminars focusing on herbicides and vegetation management to stay current on information concerning these materials.

When a mechanical or chemical technique is selected during inspection for use by NEETNY, the specifications are developed for safe and effective management on the rights-of-way. For chemical methods, the specifications always follow the product label and any state or federal environmental guidelines. Procedures for handling and application are designed to protect applicators, the public, desirable vegetation, and such areas as croplands, waterways, residential and recreational areas that may be sensitive to herbicide exposure. The specifications for right-of-way maintenance define the management tools which are available to the leader of vegetation operations. The leader of vegetation operations makes the final decision on which technique to employ - chemical or mechanical -based on site conditions on and adjacent to the right-of-way. It is the vegetation specialist job to recommend vegetation management techniques and monitor the work, insuring that it is completed satisfactorily in accordance with NEETNY specifications, in accordance with appropriate Federal and State regulations, and in a manner satisfying the goals of the vegetation management plan. All herbicide applications on the NEETNY transmission system are performed under the on-site supervision of a New York State Certified Pesticide Applicator. (See Appendix D, ROW Maintenance Worker Training and Protection of Sensitive Areas). NEETNY specifications for vegetation management of the transmission right-of-way system are included in Appendix C.

C. Wire Zone I Border Zone Concept of Integrated Vegetation Management

The wire security zone is a space around the conductor into which vegetation is not allowed to grow. The desirable species list for the wire zone consists of species whose mature height prevents them from growing into the wire security zone. The species list for the outer edges of the right-of-way, (AKA the border zone), consists of taller species that cannot fall into the wire security zone.

Management of the center portion of the right-of-way (the wire zone) that utilizes a lower-height species list than the outer portion of the right-of-way (the border zone) is referred to as the wire zone/border zone concept. This concept has been successfully implemented in other states, and was recommended as a best management practice in the FERC report that was issued after the August 14, 2003 blackout.

The NEETNY voltage-specific wire security zones and the implementation of the wire zone/border zone concept are described in section IV of this Plan.

III. GOALS OF THE RIGHT-OF-WAY MANAGEMENT PLAN

A. Maintain the Transmission System Free from Tree-Caused Interruptions

Vegetation shall be managed so that it is not a limiting factor in the continuous operation of the transmission system. This is to be accomplished by carrying out a regular maintenance and patrol routine that will identify and correct vegetation conditions that could potentially lead to line interruptions.

B. Minimize Long-Term Vegetation Management Costs by Encouraging the Development of Naturally Occurring, Relatively Stable, Low-Growing Plant Communities That Are Capable of Effectively Inhibiting Invasion by Tall-Growing, Undesirable Trees, Thereby Reducing the Density of Undesirable Tall-Growing Species Over Time

Site-specific prescriptions for attaining system reliability will be done in a manner that retains as much low-growing desirable vegetation as is physically and economically practical while removing undesirable tall-growing vegetation.

C. Maintain The Rights-of-Way in A Manner That Does Not Compromise the Quality of the Environment

NEETNY right-of-way management practices will be implemented in such a way that appropriate measures are taken to minimize adverse impacts on the environment.

D. Manage The Rights-of-Way in Harmony with Existing Land Uses

The vegetation management program will recognize and permit multiple uses of rights-of-way which are compatible with the reliable and safe operation of the transmission facilities.

E. Minimize Long-Term Vegetation Management Costs

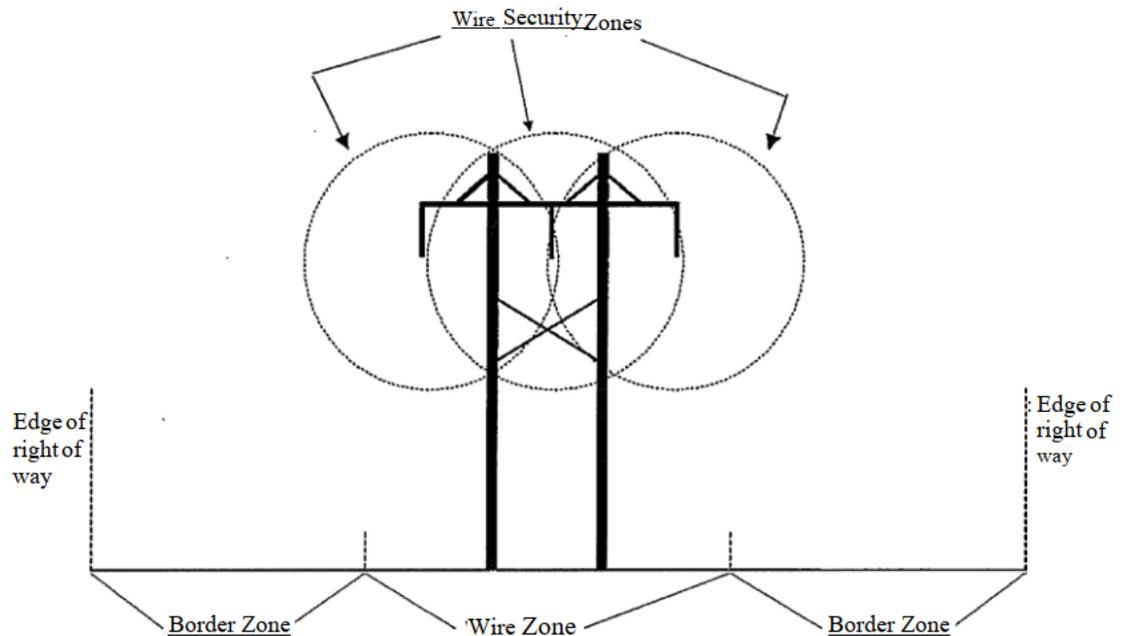
Costs will be minimized by selecting the most economical, site-specific vegetation management techniques that will meet all other goals.

F. Minimize Herbicide Use

Overall herbicide use will be minimized by prescribing herbicides and methods of application that will effectively control undesirable species, maximizing retention of desirable species and also minimizing herbicide usage during future treatments.

IV. TRANSMISSION RIGHT-OF-WAY VEGETATION MANAGEMENT PROCEDURES

It is the responsibility of the NEETNY vegetation management staff to design and implement a program to accomplish the previously identified goals utilizing the methods and techniques described in this Plan.



A. Implementation of the Wire Zone / Border Zone Method

As previously described this method consists of managing the right-of-way as two distinct zones. The center portion of the right-of-way or wire zone is defined as the floor of the right-of-way under the conductors, plus an additional ten feet horizontally either side. The border zone is the outer portion of the right-of-way floor, extending from the outside edge of the wire zone to the edge of the specified right-of-way clearing width.

1. The Wire Zone

The wire zone will be managed to retain herbaceous vegetation and woody species that will not grow into the wire security zone. The wire security zone shall be defined as the clearance achieved at the time of vegetation management. The wire security zone clearances vary by voltage.

The NEETNY wire security zone clearances are as follows:

- 25 feet for 345 kV

Generally, the woody species that will be retained in the wire zone are those found on the list of Woody Shrubs (item 5. of this section). Due to the variation in ground clearance for individual transmission lines, it may be necessary to remove certain species that appear on the list of Woody Shrubs, where the mature height of an individual specie would intrude into the wire security zone.

The wire zone will also be managed to provide for visibility and ease of movement within the wire zone as necessary. Desirable vegetation within the wire zone will not be allowed to form a solid contiguous barrier that prevents a visual inspection either across or along the ROW to allow for identification of escaped undesirable stems under the conductors. Openings for ease of movement are necessary so that vegetation management workers can reach undesirable stems for treatment. The goal will be to keep up to 30% of the wire zone open or free of woody vegetation that matures at over five feet in height.

Locations where wire security zone clearances cannot be achieved at the time of vegetation maintenance will be inspected and treated as necessary to achieve sufficient clearance for protection of the facility.

2. The Border Zone

The border zone, or the floor of the right-of-way extending from a point ten feet outside the outside conductor to the edge of the cleared right-of-way, will be managed to retain herbaceous vegetation and all species found on both the list of Woody Shrubs (item 5. of this section) and the list of Tall Shrubs and Small Trees (item 4. of this section).

3. Undesirable Tall Growing Species

The following is a list of tall growing tree species that are considered undesirable in most right-of-way situations and should be removed from the right-of-way floor wherever practicable, to the extent permitted by landowner constraints and easement conditions. The primary objective of the Transmission Right-of-Way Management Program is to effectively remove and control the re-growth and re-invasion of these species.

Species	Species	Species
Ash	Black Locust	Maple
Mountain Ash	Black Walnut	Oak
Balsam Fir	Butternut	Pine
Basswood	Catalpa	Poplar/Aspen
Beech	Cedar	Red Mulberry
Birch	Chestnut	Sassafras
Black Cherry	Cucumber Tree	Spruce
Choke Cherry	Elm	Tamarack/Larch
Domestic Cherry	Hemlock	Tree-of-Heaven
Pin/Fire Cherry Black	Hickory	Tulip/Yellow Poplar
Gum/Tupelo	Hophornbeam	Willow

4. Woody Shrubs

The following is a list of shrub species commonly found on rights-of-way across the service territory. While they are nearly always compatible in the border zone, in the wire zone several may grow tall enough to enter the wire security zone. Any plant that enters the wire security zone will be removed.

The conductor to ground clearances, the wire security zone requirements, and the mature height for each species will be key factors in determining which shrubs may be retained in the wire zone at. For example, a bulk transmission line, with mid-span conductor-to-ground clearances of 38 feet and a wire security zone of 25 feet can have shrubs with a mature height of up to 13 feet in that site. Shrubs that have invaded the wire security zone will be targeted for removal. As shrub densities in the wire zone exceed 70%, by span, taller growing shrubs may be targeted for removal in an effort to maintain visibility and ease of movement and access in the wire zone.

Species	Species	Species
Barberry	Huckleberry	Sweetfern
Black Chokeberry	Honeysuckle	Arrowwood Viburnum
Red Chokeberry	Mountain Holly	Highbush Cranberry
Blueberry	Mountain Laurel	Mapleleaf Viburnum
Button Bush	New Jersey Tea	Witherod
Dewberry	Privet	Hobblebush
Red Osier Dogwood	Gooseberry	Winterberry Holly
Grey Dogwood	Multiflora Rose	American Yew

Species	Species	Species
Silky Dogwood	Rubus spp.	Spicebush
Elderberry	Smooth Sumac	Spirea
American Hazelnut	Winged Sumac	Juniper
Beaked Hazelnut		

Note that some of the species on these lists can be classified as either exotic or invasive - particularly Autumn and Russian Olive. In addition, some of these species are noxious plants - particularly Multiflora Rose and Poison Sumac. In some situations, management objectives within and adjacent to the right-of-way may warrant the removal or reduction of these species. Future discussions with State and Federal agencies to address invasive and exotic species on a landscape scale may require modifications of the current treatments for some species.

B. Selection of Vegetation Management Techniques

When selecting a technique, many factors are evaluated and their relative importance considered. These factors include:

- Height, density, and composition of undesirable vegetation.
- Susceptibility of undesirable vegetation to treatment techniques.
- Density and composition of desirable vegetation.

Specific site conditions such as:

- Land use
- Presence of water bodies
- Presence of sensitive crops
- Accessibility
- Visual Sensitivity
- Soil Sensitivity
- Relative costs of using various techniques on the specific site.
- Past management activities.
- Conditions subject to governmental regulation.
- Easement restrictions

C. Definition of Vegetation Densities

The density of desirable and undesirable vegetation on the right-of-way is a very important factor when selecting a management technique. The following density classes, determined by a visual estimate, are used to describe woody vegetation:

Class	% Ground Cover
Very Light	Less than 100 stems/acre
Light	Up to 30% (100 to 1000 stems/acre)
Medium	30% to 60% (1000 to 2000 stems/acre)
Heavy	> 60%% (more than 2000 stems/acre)

D. Description of Vegetation Management Techniques and Conditions of Use

Each technique currently used is described below, along with the right-of-way conditions for which that technique will typically be prescribed. The vegetation specialist uses their professional judgment to assess the site conditions and select one of these techniques.

Herbicide formulations that are utilized with the various techniques are included in the specification found in Appendix C.

1. Conventional Stem Foliar Technique

Using this technique, the entire stem and foliage of the target plant is thoroughly wetted to the point of run-off. The spray formulation is normally made up of a systemic herbicide in a water carrier. The herbicide enters the target plant primarily through absorption and translocates throughout the plant. Stem foliar sprays are applied during the growing season, after full leaf development and before dormancy begins. Stem foliar spraying that employs the proper herbicide formulation can be very effective in obtaining root kill, especially of root suckering species.

Stem foliar sprays are normally applied with hydraulic sprayers, equipped with 200 - 500 gallon tanks and two spray guns attached to hoses that are at least 100 feet long. Sprayers are mounted on 4-wheel drive or on all-terrain vehicles. Water is supplied to the spray vehicle with a 500 to 1000-gallon supply truck. The supply truck is not used for mixing or for transporting chemicals which ensures that sources of water used for spray operations will not be contaminated with herbicide. Stem foliar spray volumes normally range between 75 and 150 gallons of formula per acre. Over-spray is minimized by spraying at the lowest effective

pressure from a distance no more than 10 feet from the target plant, by limiting applications to sites where that average height of undesirables is 15 feet or less, and by adding a drift control agent to the spray formulation. Some foliar spray formulations have the advantage of being selective in that they do not kill narrow-leaf herbaceous plants. The method is an efficient, economical technique for treating dense concentrations of undesirable vegetation. The stem foliar technique is utilized where brown-out of the vegetation is not a concern, and where:

- Densities of undesirable species are medium to heavy.
- Densities of undesirable species are light to medium, while desirable specie densities are scattered to light. This will result in smaller quantities of desirable vegetation being effected when utilizing the conventional stem-foliar technique.
- Undesirable species are primarily root-suckering types which are most effectively controlled by foliar-applied techniques

In addition, the following sites are not treated with the conventional stem foliar technique:

- Within 25 feet of any stream or water body, or within 100 feet of a regulated wetland without a permit as applicable, or where specifically instructed by the Vegetation Specialist.
- Within 100 feet of a potable water supply.
- Within any orchard, nursery, or crop planting.
- Within 10 feet of a fence which encloses an active pasture.
- Within any area restricted by the herbicide label.
- Any other special site identified by the Vegetation Specialist.

2. Low Volume Foliar Technique

Using this technique, a concentrated waterborne herbicide formulation is applied in a uniform pattern to the top and leads on all sides of the target plant. Coverage must be uniform so that most leaves are treated but not to the point of run-off. The herbicide enters the tree through the foliage and translocates throughout the plant. Low volume foliar sprays are applied during the growing season, after full leaf development and before dormancy begins.

Low volume foliar sprays are applied with a pump-up backpack sprayer or with a motorized back-pack sprayer. Sprayers are equipped with at least two types of nozzles for treatment of trees

of different heights. Low volume foliar spray volumes normally range between 5 and 10 gallons of formulation per acre.

Because of the low volume of spray that is applied, and the low pressure provided by the back-pack sprayer, this method can be very selective. This technique requires a less precise application than selective basal sprays, allowing for greater production while at the same time giving the applicator the ability to be selective. This technique is an ideal method for treating undesirable vegetation up to eight feet in height that is light to medium in density. Occasionally the technique is also used on taller target plants up to twelve feet in height, so long as the applicator is prudent in avoiding over spray. The low volume stem foliar technique is utilized where brown-out of vegetation is not a concern.

In addition, the following sites will not be treated with the low volume stem foliar technique:

- Within 15 feet of any stream or water body, or within 100 feet of a regulated wetland without a permit as applicable, or where specifically instructed by the Vegetation Specialist.
- Within 100 feet of a potable water supply.
- Within any orchard, nursery, or crop planting.
- Within active pastures unless the herbicide label specifically allows for this, and the property owner or farm operator approves of the application.
- Within any area restricted by the herbicide label.
- Any other special site identified by the Vegetation Specialist.

3. Basal Technique

Using this technique, the lower 12 - 18 inches of the stem of each target plant is thoroughly wetted with an oil-borne herbicide formulation. The purpose of the oil carrier is to facilitate bark penetration to carry the herbicide into the tree's system. To be effective, it is imperative that the treatment completely encircle the stem, and wet the root crown area and all exposed roots. Basal spraying is effective when applied at any time of the year, as long as snow or ice do not prevent spraying to the ground line. Since only the bottom 12 - 18 inches of each stem is treated and coarse sprays are used, this technique can be very selective with little chance of drift. The technique can also be very effective in achieving root-

kill, except for several species that commonly root sucker after being top-killed. When performed during the dormant season, brown-out can be greatly reduced.

Hand-powered back-pack sprayers are used to apply the formulations. In either case a wand or extension is attached to the spray gun, delivering the spray pattern directly to the target area and minimizing the size of the spray pattern. Historically, basal spraying has been more expensive than stem foliar spraying due to more intense labor requirements.

The selective basal spray technique is utilized where:

- Densities of the undesirable species are light.
- Densities of the undesirable species are light to medium, while the desirable densities are either light to medium or medium to heavy.
- Brown-out of the vegetation that would result from selective foliar sprays would be objectionable.
- The right-of-way agreement restricts the use of foliar techniques.
- Target vegetation is in a pasture and must be treated during the dormant season when livestock is not present.
- The site to be treated is inaccessible during the growing season due to the presence of crops and must be treated during the dormant season.
- The target vegetation is located in a hedgerow or other area that is too close to sensitive crops to utilize a foliar technique.
- Vegetation densities meet the criteria for foliar techniques, however the average height of the undesirable species is greater than 15 feet.
- In addition, the following sites will not be treated with the selective basal technique:
 - Within 15 feet of any stream or water body, or within 100 feet of a regulated wetland without a permit as applicable, or where specifically instructed by the Vegetation Specialist.
 - Within 100 feet of a potable water supply.
 - Within any orchard, nursery, or crop planting.
 - Within active pastures.

- Within any area restricted by the herbicide label.
- Any other special site identified by the Vegetation Specialist.

4. Cutting and Stump Treatment Technique

Using this technique, individual stems are cut, and the resulting stumps and root collars are treated with an herbicide to prevent re-sprouting. Cutting is usually performed with a chainsaw or a brush saw. An oil borne herbicide is applied to wet the outer perimeter of the stump, the bark, and all exposed roots. Water borne formulations are applied only to the cambium of the cut surface. The application equipment for oil borne formulations is the same as for the basal technique, described in the previous section. For water borne applications, a hand held squirt bottle is used.

Stump treatment prevents the emergence of dormant buds from the stump and the root collar; however, stump treatment does not normally prevent root-suckering species from sprouting from dormant buds located along the root system.

Vegetation that is cut using this technique is disposed of using several methods, depending on the sensitivity of the site. The following methods are listed in order of increasing cost:

- Lop and Scatter - Vegetation is felled and cut up so that it is in close contact with the ground. Access roads or a swath under the conductors is kept free of such cut vegetation to ensure access is not hindered.
- Windrow - Vegetation is cut and piled away from structures and outside of the access road.
- Chipping - Vegetation is cut and then reduced to chips with a brush chipper. Chips are normally left on site.
- Off-Site Disposal - Vegetation is completely removed from the site, although in some cases it may be moved to another site on the right-of-way.

Due to the additional labor required for cutting the vegetation, this technique is more costly than the basal technique. The cutting and stump treatment technique is utilized where:

- Standing dead stems would be objectionable due to aesthetic concerns.
- Clearance concerns exist where cutting is required to address the concern; i.e. the retention of tall treated stems that result

from using one of the other methods would not leave adequate clearance.

- The right-of-way agreement requires that cut vegetation is to be removed.
- The presence of foliage that is potentially toxic to livestock requires that the vegetation either be cut during the dormant season, or cut and removed during the growing season.
- Vegetation to be removed is too tall to foliar spray (>15') and density is too high for cost effective basal spraying.

In addition, the following sites will not use the cutting and stump treatment technique:

- Within 5 feet of any stream or water body, or within 100 feet of a regulated wetland without a permit as applicable, or where specifically instructed by the Vegetation Specialist.
- Within 100 feet of a potable water supply.
- Within any orchard, nursery, or crop planting.
- Within active pastures unless the herbicide label specifically allows for this, and the property owner or farm operator approves of the application.
- Within any area restricted by the herbicide label.
- Any other special site identified by the Vegetation Specialist.

5. Cutting/Trimming Technique (with no herbicide treatment)

Using this technique, undesirable vegetation is either cut down or partially removed by trimming those portions of the tree that are capable of reaching the wire security zone. Trimming is normally performed by using the drop-crotch or natural trimming technique, meaning the limbs to be removed are cut back to the next lateral limb. Trimming is performed by the tree workers either manually climbing the tree, or with the assistance of aerial lifts.

Cut vegetation is disposed of in the same manner as the cutting and stump treatment technique, described in the previous section. Cutting and trimming are labor intensive techniques, and to control re-growth, they must be repeated on shorter rotations than techniques using herbicides. Hence this technique is less cost effective than techniques employing herbicides.

The cutting/trimming technique is utilized where:

- The target vegetation is located in a sensitive area such as residential lawn, park, etc.
- The right-of-way agreement restricts the use of herbicides.
- NEETNY specifications restrict the use of herbicides.
- A buffer zone is needed to screen the facility in a visually sensitive area.
- Side encroachment exists on a site where the right-of-way agreement will not allow for the total removal of the targeted vegetation.

6. Mechanical Mowing Technique

Using this technique, the vegetation is cut with a large mowing machine attached to an all-terrain vehicle. The cutting swath is normally about 8 feet wide, making the technique relatively non-selective. Where the terrain allows for the use of this equipment, mechanical mowing is more cost-effective than hand cutting. If herbicides are not used in conjunction with mechanical mowing, the resulting re-growth will necessitate a short rotation, increasing the cost of using this technique compared to using other techniques that employ herbicides.

Mechanical mowing is utilized where:

- The terrain is accessible to mowing equipment, the use of herbicides is restricted, and the acreage is large enough to make the use of a mowing machine economically feasible.
- The density of the target vegetation meets the same criteria as the conventional stem foliar technique; however, the average height of the target vegetation is over 15 feet. Under these conditions, mechanical mowing would be followed up where possible either by a stem foliar application after re-sprouting has occurred, or by using a mower that also applies herbicide to the cut surface of the mowed stubble.

E. Danger Tree Program

Danger trees are either located outside of the right-of-way width, or outside of the easement width when the easement is less than the right-of-way width. In either case, the tree must pose a threat to the reliability of the line. In order to threaten the line, the tree must be sufficiently tall to strike the line if it falls, **and** it must exhibit one or more of the following characteristics that would make it likely to fall:

- The tree displays excessive lean toward the line.
- The tree is diseased or has a defect that increases the risk that it will fall toward or into the conductors.
- The root system is shallow due to moisture conditions or species characteristics, making wind throw a concern.

1. Danger Tree Identification

Experience has shown that individual danger trees are difficult to identify. Often trees that fall into the right-of-way that strike the conductors exhibit no outward characteristics that would have identified them as a danger tree ahead of time. In other instances, a large tree located far outside the right-of-way (10'+) will fall and start a chain reaction that results in an otherwise sound or healthy tree along the edge to be pushed into the conductors.

The danger tree program starts at the time a line is built by clearing a right-of-way to a standard width that provides reasonable protection. The wider the right-of-way is initially cleared, the lower the probability that a tree falling into the right-of-way will hit the conductors.

The transmission line is inspected for danger trees annually. The number of inspections is prioritized by voltage, with the bulk and critical lines receiving the most inspections. Details of the inspection schedule are listed below in the Right of Way Inspection Schedule.

RIGHT OF WAY INSPECTION SCHEDULE

Voltage Class	Aerial Flyover (Late Summer)	Ground Patrol (Spring)
Bulk Lines: 345kV	X 1 per year	X 1 per year

2. Danger Tree Removal

By definition all danger trees represent a threat to line reliability. Danger tree removal is scheduled in accordance with the level of threat they represent. Some danger trees represent an immediate threat to the line, such as trees that are leaning toward the line as a result of wind storms, flooding etc. Danger trees posing such a threat are likely to fail at any time, even without the influence of additional forces such as wind, ice or snow load. Other danger trees represent a long term threat, in that these trees may be dead and fail over time as they decay, losing their structural integrity; or

they may have a defect or weakness that makes them vulnerable to failure during a storm event.

Immediate Threat - Danger trees that are deemed an immediate threat are cut as soon as possible; however, in most cases, a tree presenting such a threat will require that the line be de-energized before the tree can be cut safely without damaging the line. Once the danger tree is identified, Transmission Operations will determine whether to apply for a scheduled or emergency interruption. The time required to schedule the interruption will determine how quickly the tree can be removed.

Long Term Threat - Danger trees that pose less than an immediate threat shall be cut as soon as arrangements can be made for removal, including a determination by Transmission Operations as to whether an interruption is necessary, scheduling a crew to do the removal, and securing the necessary rights if the easement does not have provisions for removing danger trees. In some cases, cutting may be deferred for a time to take advantage of an interruption that has already been scheduled for purposes other than the tree removal. In any case, danger trees shall be removed before the next scheduled patrol.

3. Budgeting for Danger Tree Removal

Removal of danger trees is considered to be critical to maintain reliability. Therefore, the cutting of danger trees that have been identified will not be deferred due to budgetary constraints. Even if it would be necessary to defer other, less critical activities, funds will be made available for danger tree removal.

V. PLANNING THE ANNUAL VEGETATION MANAGEMENT PROGRAM

The vegetation specialist will develop an annual vegetation management program based on the objectives and be reviewed by leader of vegetation operations to ensure they are consistent with the long-term goals identified in this Plan.

A. Maintenance Cycle and Relationship to Goals

- B. Because of its dynamic nature, right-of-way vegetation must be maintained on a periodic cycle to insure the reliable operation of the transmission system. The length of the cycle should be established so that the interval between treatments prevents any vegetation from reaching a height that could threaten reliability. Determination of Rights-of-Way to Be Treated

The vegetation specialist identifies the rights-of-way to be included in the annual vegetation management program. Rights-of-way to be treated will be identified after the ground inspection the year prior to treatment. This allows for adequate time to develop a cost estimate to include in the following year's budgets. Rights-of-way will be selected for inclusion in the annual program based on electrical clearance standards and with the objective of treating the right-of-way to maintain safety and reliability of the system.

1. Right-of-Way Treatment Determinations Based on Electrical Clearance Criteria

To insure that the transmission system is free from tree-caused interruptions, minimum clearances must be maintained that will prevent arcing or an electrical flashover between the conductors and the vegetation that could result in a line interruption. To meet this reliability goal, the clearances identified in the table below shall be met. The clearances listed as Priority #I shall also represent the Minimum Clearance Distances required to bring this Plan into compliance.

Priority #1 Shall be cut within 72 hours after identification (I)	
Voltage (kV)	Clearance (from vegetation)
345	11.75' or less

Priority #2 Shall be cut before or during next growing season after identification	
Voltage (kV)	Clearance (from vegetation)
345	> 11.75' and < 20.67'
Priority #3 Shall be treated before or during second growing season after identification	
Voltage (kV)	Clearance (from vegetation)
345	> 20.67'

- (1) Immediately after identification, Operations, the Leader of Vegetation Operations and the Vegetation Specialist will coordinate a plan for removal of the Priority # 1 tree within 72 hours.

In addition to these basic electrical clearances, the following items are also factored into the determination of when to schedule treatment:

- The effect of wire sag during high conductor temperature.
- The effect of wire swing during high wind conditions.

The annual vegetation management program will include correcting all conditions that are identified as requiring treatment based on the above electrical clearance criteria. When the electrical clearance criteria require treatment at only a few scattered locations on a given right-of-way, those locations will be spot-treated. The remainder of the right-of-way will be scheduled for treatment based on the general condition of the remaining vegetation. When the electrical clearance criteria is violated at several locations, the entire right-of-way will be scheduled for treatment based on the priority ratings 1, 2, or 3. Except where emergency spot-treatment is required, rights-of-way will generally be treated from substation to substation, or in other contiguous segments defined by division boundary or from substation to junction with another right-of-way, etc.

C. Line Patrols

The transmission line is routinely patrolled, on an annual basis, by vegetation management personnel. Lines that lock out or trip for unknown reasons are patrolled on an emergency basis by Company personnel.

1. Annual Patrols

All transmission lines are patrolled twice annually. The first annual patrol is a

ground patrol, done in the spring after foliage has matured to inventory and identify locations with Priority #1 and #2 clearances between trees and conductors, including any danger trees. The second annual patrol is an aerial patrol designed to identify Danger trees along the ROW edge

2. Emergency Patrols

Whenever an unexplained interruption occurs on a transmission line, an emergency patrol will be performed to identify the interruption cause. Emergency patrols may be performed either by foot or by helicopter, depending on weather conditions, time of day, helicopter availability, and length of the line. The problem causing the interruption will be corrected as soon as possible after it is identified.

If it is determined that the problem causing the interruption is tree-related, the leader of vegetation operations is notified by the construction department. The vegetation specialist or other company personnel will then investigate any such tree-caused interruptions, and submit a Transmission Vegetation Outage Report with vegetation management department to document the circumstances that led to the interruption.

D. Detailed Right-of-Way Inventory and Management Criteria

After the rights-of-way that are to be included in the annual vegetation management program have been identified, the vegetation specialist conducts a detailed vegetation inventory of each right-of-way, determining the method of treatment to be employed on each site. All pertinent information concerning special conditions and restrictions will be reviewed and recorded by the vegetation specialist and factored into the annual work plan. Other special conditions that could impact right-of-way management are noted in the Transmission Vegetation Management Software. These conditions will be reviewed and considered by the vegetation specialist during inspection. Special conditions may include:

- Article VII certification conditions
- Access agreements
- Department of Health and Department of Environmental Conservation specific right-of-way management recommendations

During this detailed review of the right-of-way, the following information is collected and recorded in the Transmission Vegetation Management (TVMS) Geographic Information System (GIS) based work management system.

1. Work Prescriptions

A work prescription is identified work in the right-of-way with which can be treated using the same vegetation practice. When a change in condition warrants a change in the work prescription, a new work prescription is identified and created. Work prescriptions are assigned a work ticket, and location and relevant corridor information is recorded on each prescription.

2. Prescription Types and Identification

Work identified through the inspection process requires creation of a prescription in transmission vegetation management software (TVMS).

3. Quantity of Work

The area or unit of each work type calculated and recorded to the nearest hundredth of an acre or unit of work in TVMS.

4. Prescriptions Work Types

A prescription defines the method of each work type after considering the land use, right-of-way agreements, and guidelines for using various vegetation management techniques, as described in Section 2 of Appendix C.

5. Site Location

The location of each work prescription is recorded in geospatially in TVMS.

E. Budget Development

After the detailed inventory is completed, a summary of the prescribed work is made. This summary lists the total acreages of work to be performed, sorted by the vegetation management techniques prescribed. A cost estimate is then made, by multiplying these acreages by an estimated cost per acre for each vegetation management technique. Summing these costs for each vegetation management technique yields the total project cost. The estimates for all rights-of-way can then be totaled to get an overall annual cost estimate, to be included in the following year's annual transmission vegetation management budget.

F. Program Review

The annual work plan will be submitted to the vegetation management department for review. This submittal will include the budget and vegetation activities for the entire right-of-way.

The vegetation management department will review the annual work plan, insuring its compliance with the Plan.

VI. IMPLEMENTING THE ANNUAL VEGETATION MANAGEMENT PROGRAM

Due to the seasonal nature of vegetation management work, it is economically prudent for NEETNY to employ contractors to perform this work. These contractors are capable of providing specialized labor, equipment, materials, and supervision necessary to perform this work on an as-needed basis. Occasionally Company personnel are used to perform unscheduled emergency work.

A. Selection of a Contractor

Contractors are selected through a competitive bidding process.

The contractor with the lowest overall estimated 3-year price will be awarded the work. The successful bidders' unit costs will be incorporated into contracts, and will be used as the primary payment mechanism.

After the 3-year contract duration is up, the work will either be bid again to determine the low bidder or a contract extension with the existing contractors will be allowed with new rates negotiated. The extension possibility will be based primarily on NEETNY's judgment of the contractors' overall satisfactory performance over the 3-year duration, and on the economic viability of such an extension.

B. Program Monitoring

The program is administered in the field by the vegetation specialist.

1. Scheduling

The vegetation specialist works out scheduling with the contractor performing the work, to insure all work is completed within seasonal and contractual parameters.

2. Specific Instructions

The vegetation specialist insure that all work is completed in compliance with the Company specifications and with any other specific instructions that apply to the job. Any significant change in work instructions is authorized by the appropriate vegetation specialist in writing.

3. Work Reports

The contractor will complete the work tickets and report completion of work tickets by batch manifest weekly to the Vegetation Specialist. Any significant change in the scope of work will be reviewed with the Vegetation Specialist prior to beginning the work and the Vegetation Specialist will approve. When the work batch has been completed all records are submitted to the Vegetation Specialist and updated in TVMS.

4. Monitoring of Work in Progress

To insure the work is completed in compliance with the specifications, the vegetation specialist will spot check the work in progress. Particular attention is paid to handling and application of herbicides in relation to NEETNY specifications and all state and federal regulations. The vegetation specialist will assure that all spray personnel are familiar with and understand the work specifications and instructions.

5. Landowner Inquiries and Concerns

Any right-of-way management inquiries or concerns from landowners that are received by the contractor shall be forwarded to the appropriate vegetation specialist. For any such inquiry or concern that cannot be promptly resolved by the contractor, the vegetation specialist will contact the land owner as soon as possible, attempting to address the inquiry or concern in a timely manner.

C. Quality Control and Guarantee

1. Completion

Before payment for any work is released, the responsible vegetation specialist must be satisfied that:

- All specified cutting has been satisfactorily completed.
- All specified herbicide applications have been satisfactorily completed.

2. Guarantee

By August 1 of the year following initial treatment, the contractor guarantees that the work has been completed in accordance with the specifications. (See Section 5 of Appendix C, NEETNY Specifications for Vegetation Management).

D. Record Development

Upon completion of the annual right-of-way management program, the responsible vegetation specialist and the leader of vegetation operations will:

- Review the completed batch manifest for accuracy. Upon completion of this review, the batch manifest will be submitted to the vegetation management department to be included in the annual work plan so that it can be documented.
- Make a record of any changes in field conditions in the transmission

vegetation management software. The leader of vegetation operations will be advised of the proposed changes.

VII. REGULATORY REQUIREMENTS

In carrying out the annual vegetation management program, regulations of the following federal, state, and local regulatory bodies will be complied with.

A. U.S. Environmental Protection Agency

The EPA is the federal agency that administers the Federal Insecticide, Fungicide, and Rodenticide Act, or FIFRA. The Act covers the manufacture, sale, and use of all pesticides. Herbicide applications on the NEETNY system are performed by contractors who, by law, are obligated to comply with FIFRA. The NEETNY vegetation management staff, in writing specifications, prescribing right-of-way treatments, and in supervising vegetation management operations, will insure that all such operations are performed in compliance with FIFRA.

B. New York State Department of Environmental Conservation

1. Bureau of Pesticide Management

This bureau of the DEC is responsible to the EPA for the certification and enforcement of FIFRA and State rules and regulations (6NYCRR 325) relating to the manufacture, sale, and use of all pesticides within New York State. The NEETNY vegetation management staff, in writing specifications, prescribing right-of-way treatments, and in supervising vegetation management operations, will insure that all such operations are performed in compliance with 6NYCRR 325.

The Bureau also administers Article 33 of the Environmental Conservation Law, relative to applicator certification, herbicide notification and posting requirements for landowners and the general public. NEETNY complies with the requirements of Article 33 as they apply to utility rights-of-way, and through its specifications directs its contractors to be in compliance with the certification, notification, and posting requirements of Article 33.

2. Bureau of Lands and Forests

This bureau of the DEC is responsible for the protection of the forests of the State from fires, and has declared certain towns within the State as fire towns. This law regulates the disposal of cut vegetation within these towns that may constitute a fire hazard. Within designated fire towns, the NEETNY vegetation management staff will dispose of cut woody vegetation in compliance with ECL Sections 9-1105 and 9-1107.

C. New York State Public Service Commission

NEETNY shall prepare and file with the PSC, by March 31 of each year, a system wide description of the vegetation maintenance program and schedule of work to be done in that year. Additionally, NEETNY shall file an herbicide application filing in a format to be provided by Staff, including the amount and cost of herbicide applied, by acre and technique, for each application management type employed.

Article VII of the New York State Public Service Law -NEETNY has completed at least one maintenance treatment on all electric transmission lines that were licensed under Article VII of the Public Service Law. Vegetation management activities on these facilities have been subsumed into this Plan. Any specific restrictions or requirements that apply to vegetation management on these rights-of-way appear on the Plan and Profile Drawings and will be complied with during maintenance activities.

Order Requiring Enhanced Transmission ROW Management Practices by Electric Utilities

Ordering Clause 7

NEETNY shall submit to the Secretary annually by March 31, or as the Secretary may require, for Staff's review, an original and two copies of a report, discussing the amount of "danger tree" work completed by line in the preceding calendar year. Reported data shall include line name or number, miles trimmed and/or number of trees removed.

Ordering Clause 8

NEETNY shall investigate, record, and submit to the Secretary, for Staff's review, an annual report by March 31, discussing each vegetation-caused outage in the preceding calendar year. 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 could create non-reportable outages include, but are not limited to earthquakes, fires, tornadoes, hurricanes, landslides, wind shear, ice storms, floods, or major storms as defined by the PSC. Also, vegetation-related outages due to human or animal activity shall not be considered reportable. Examples of human or animal activity that could cause a non-reportable outage include, but are not limited to, logging, animals severing tree, vehicle contact with tree, arboricultural activities or horticultural or agricultural activities, or removal or digging of vegetation. Information for each

outage in voltage classes 69kV and above shall include line number, location (i.e. tower number), tree location (i.e., inside or outside the ROW), species height, condition, distance from conductor to base of tree, slope, and weather condition at the time of the outage.

D. New York Independent System Operator (NYISO)

All vegetation related transmission line trips on lines 200kV or higher and any other lower voltage lines designated by NYISO to be critical to the reliability of the electric system will be reported to the NYISO within 14 calendar days of the outage in accordance with NERC FAC-003-4.

E. North American Electric Reliability Corporation (NERC)

The NEETNY transmission vegetation management program must be implemented in accordance with the requirements of the NERC Vegetation Management Standard FAC-003-4 as found in Appendix F of this Plan.

F. Other Regulatory Contacts

On an annual basis, the New York State Departments of Health and Environmental Conservation are notified of all scheduled electric transmission vegetation maintenance projects that include herbicide applications. The DOH county field offices and regional DEC offices receive a specific list of the lines that are scheduled for treatment in their counties/regions. The list is supplied on an annual basis, and includes the herbicides planned for use, and a tentative schedule of when the work will be performed. These lists will provide both State agencies with an awareness of NEETNY's annual work locations, and aid them should the public approach them with any questions regarding NEETNY's work.

A second copy of the list of all scheduled electric transmission vegetation maintenance projects will be sent to the Department of Environmental Conservation's Natural Heritage Program, for their review to see if these work locations relate to endangered and threatened species information they possess. Should they have any concerns based on the information provided, NEETNY will work with the National Heritage Program to address those concerns. The information to be provided to the National Heritage Program will be provided in a GIS format when available.

VIII. GENERAL BUDGETING REQUIREMENTS

NEETNY's annual budget is designed to include treatment of all locations where priority #1 and #2 clearances have been identified. The budget required to perform this work is estimated based on costs experienced in past years, plus anticipated inflationary costs. The overall average cost per acre for the annual program will depend on the mix of methods prescribed for treatment. At all times, the method prescribed will be the most economical option that will accomplish the goals identified in this Plan.

IX. PLANEVALUATION, REVIEW AND UPDATING

A. Evaluation

The success of the Plan is measured against the goal it is designed to accomplish:

1. Maintain the Transmission System Free from Tree-Caused Interruptions:

Assessment: Tree-caused interruptions are monitored by the Corporate Forestry Section. Each interruption is investigated and a determination is made as to whether or not it could reasonably have been prevented. The monitoring process will identify if there is a need to modify the Plan.

2. Minimize Long-Term Vegetation Management Costs by Encouraging the Development of Naturally Occurring, Relatively Stable, Low-Growing Plant Communities That Are Capable of Effectively Inhibiting Invasion By Tall-Growing, Incompatible Trees, Thereby Reducing the Density of Undesirable Tall-Growing Species Over Time

Assessment: The success of the Plan in accomplishing this goal is monitored over the long term by comparing vegetation inventories from one cycle to the next. Over the long term, the density of tall-growing target species should decrease or at least remain flat, while the densities of desirable species increase. As this occurs, costs per acre treated should decrease or at least remain stable, providing another method of evaluation.

3. Maintain The Rights-of-Way in A Manner That Does Not Compromise the Quality of the Environment

Assessment: The success of this goal will be judged by assessing the public comment or concerns received, and also in any regulatory action that potentially results from such concerns. Any feedback from PSC staff that result from their annual field reviews will also be a measure of success. The Leader of Vegetation Management will make observations in the field, and review current literature, as part of an ongoing evaluation to assure that this goal is being met.

4. Manage The Rights-of-Way in Harmony with Existing Land Uses

Assessment: This goal will be measured primarily through assessing the comments and concerns received from property owners, property users, and the general public.

5. Minimize Long-Term Vegetation Management Costs

Assessment: This goal will be assessed by reviewing costs. Annual treatment cost records will be monitored and analyzed, both on a yearly basis, and on a cycle vs. cycle basis to assess the cost trends.

6. Minimize Herbicide Use

Assessment: This goal will be assessed by reviewing the quantity of herbicide applied per acre of ROW treated on an annual basis. Annual treatment application records will be monitored and analyzed, both on a yearly basis, and on a cycle vs. cycle basis.

B. Review and Updating

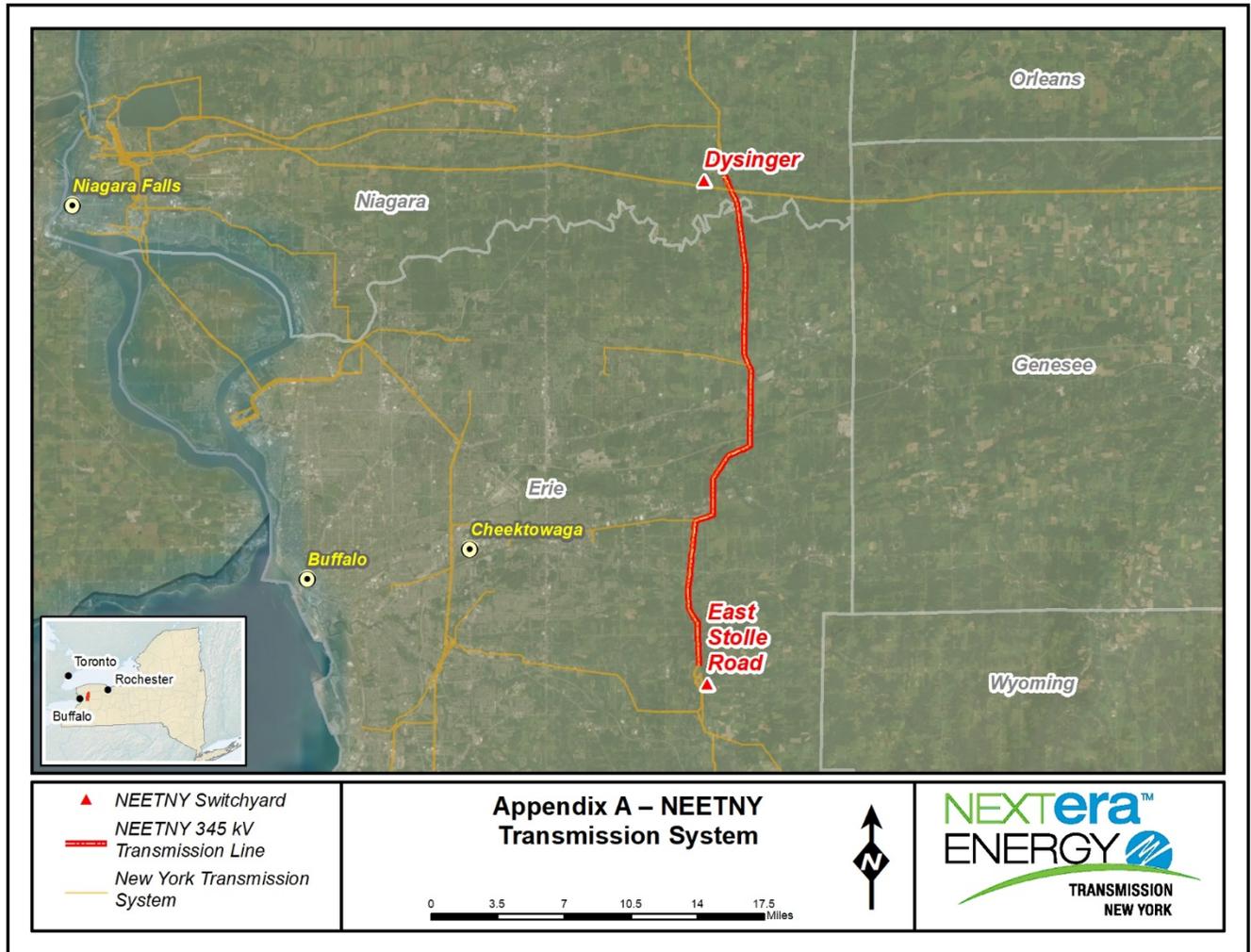
NEETNY reviews its work specifications regularly to assure they are effectively meeting the program objectives. Whenever the NEETNY work specifications are modified, they are sent to the Commission Staff to likewise be considered an update of this Plan.

In addition, NEETNY will periodically review and assess the Plan at least every six years, or two complete cycles, whichever comes first. Subjects to be reviewed include but are not limited to reliability, cost, herbicide use, and customer concerns.

Any proposed changes to the Plan will be brought to the attention of the PSC Staff. Minor changes to the plan will be those having no significant adverse impact to reliability or to the environment (including public health). Minor changes to the Plan will be referred to the Commission Secretary by the PSC Staff. All other proposed changes would be considered major and will be referred to the Commission for action pursuant to the State Administrative Procedures Act.

APPENDIX A

Map of the NEETNY Service Area & Transmission System



APPENDIX B

Component Lines of the NEETNY Transmission System

County	Line Designation		Operating Voltage (kV)	Structure Type	Length (miles)
	From	To			
Niagara/Erie County	Dysinger	East Stolle Road	345	Steel Monopole	20.5
Niagara County	Dysinger	Somerset Tap	345	Steel Monopole	0.15
Niagara County	Dysinger	Somerset Tap	345	Steel Monopole	0.15

NextEra Energy Transmission New York, Inc.

(NEETNY)

Empire State Line

Case 18-T-0499

Appendix C

**Detailed Specifications for Transmission Right-of-way
Vegetation Maintenance**

June 2020



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1.0 GENERAL

1.1 General Instruction

All work shall be performed in a workmanlike manner according to these specifications. The Contractor shall at all times exercise care to prevent injury to any persons and to prevent damage to any property during performance of the work. A particular right of way may be treated by one or several of the treatment methods included in this specification, but in any respect, the method or methods to be used will be specified by the Company. Any discrepancies between field conditions and instructions for completion of work are to be reported to the Vegetation Specialist immediately. It is the responsibility of the Contractor to perform the work as specified and ensure that all vegetation scheduled for removal is treated to the specified width.

1.2 Precautions

Contractor employees performing line clearance work near energized conductors shall have received electrical safety training in accordance with OSHA standard 29 CFR 1910.269, paragraphs (a)(2), (b), (c), (g), (k), (p), and (r) and in accordance with ANSI standard Z 133.1. It shall be understood and agreed by the Contractor that work near existing electric transmission and distribution lines shall be undertaken while the lines are presumed to be energized and operating at voltages up to and including 345 kV. Extreme caution shall be taken to provide safety for personnel and to prevent damage to the line.

Contractor employees shall wear hard hats and safety glasses at all times, and wear chainsaw chaps when using a chainsaw while standing on the ground.

No trimming or removal of trees or vines shall be done when the trees or vines to be removed within the minimum approach distance, specified in Table R-6 of OSHA standard 29 CFR 1910.269, of an energized transmission circuit.

The Vegetation Specialist or Transmission shall be notified immediately when trees are identified within these minimum approach distances. Tree that are located outside the minimum approach distances that could fall into an energized conductor shall be not be removed until:

- The tree has been topped to a height that makes it impossible to fall into the line or;
- The tree has been roped guyed to prevent it from falling into the line and Operations has informed the Contractor that the recloser circuit “off” switch has been replaced in the off position.

1.3 Definitions

Buffer Zone	Areas adjacent to highways, streams, public property, scenic area, historic sites or other areas of special concern.
Herbicide Applications	The application of a chemical herbicide formulation to vegetation for the purpose of removing the vegetation.
Company	NextEra Energy Transmission New York, Inc.
Vegetation Specialist	Person or persons designated as such by the Company.
Operations	Person or persons designated as such by the Company
Contractor	Firm that has been awarded a formal contract to perform work described in these specifications.
Danger Trees	Trees designated as such by the Company, which are located outside the specified ROW clearing lines and whose retention would jeopardize line reliability.
Disposal Method	A specific technique utilized for disposing of cut vegetation.
Property Owner	Party from whom easements or other permits and licenses have been secured.
ROW	Right-of-way
Selective Treatment	The removal, by spraying or cutting, of vegetation designated for removal and the retention of vegetation designated to be preserved.
Trimming	The removal of branches from tree growing alongside the transmission line.
Slash	Debris including tree branches, etc., resulting from cutting
Treatment Method	A specific technique utilized for removing vegetation from a ROW.

1.4 Scope of Work**A. Obligation of Contractor**

The contractor shall furnish all supervision, labor, tools, equipment, materials, and transportation necessary to perform the contract. The Contractor shall:

1. Arrange for weekly updates with the Vegetation Specialist, advising of the work locations and work planned for the week.
2. Complete and update the work batch manifest as instructed by the Vegetation Specialist. All such completed reports are to be available for inspection by the

- Vegetation Specialist at all times and submitted to Vegetation Management department upon completion of work on each project.
3. Cut and/or spray all vegetation designated for removal in accordance with these specifications.
 4. Cut or drop-crotch all danger trees as specified by the Vegetation Specialist.
 5. Provide protection for existing structures, communication lines, power lines, pipelines, fences roads, and trees within and adjacent to the ROW.
 6. Dispose of all cut vegetation in accordance with these specifications as directed by the Vegetation Specialist.
 7. Adequately instruct employees on the selective vegetation retention requirements and environmental protection measures set forth in these specifications.
 8. Maintain a designated job foreman on the project site on a full-time basis during the course of the work performed. The Contractor shall provide the foreman with the instructions and drawings for the work to be performed. If it becomes necessary to change foremen, it shall be the responsibility of the Contractor to provide the new foreman with instructions and drawings.
 9. Provide full time on-site supervision by a certified pesticide applicator who is certified in the right-of-way category within the state where the work is being performed. There shall be a certified pesticide applicator for each crew applying herbicides at separate sites.
 10. Notify Operations and the Vegetation Specialist at least one week prior to beginning the job.
 11. Report immediately to the Vegetation Specialist any inquiry complaint or claim received during the course of the work.
 12. Place a brightly colored marker at the edge of the specified treatment width, at each end of every site requiring treatment. Markers shall also be placed along both edges of each treatment site every 150 feet or less.
 13. Provide signs displaying the Contractor's Company name for all vehicles used on the right-of-way or for vehicles used during contacts with property owners for access or notification.
 14. Provide notification to the company regarding starting and stopping of each project. Such notification shall be made in accordance with the specific instructions provided by the Vegetation Specialist. The contact numbers for these notifications are listed in Appendix M.

15. All general foremen, crew foremen and any other individuals making property owner contacts shall have a wallet-size, laminated picture I.D. The I.D. shall include the individual's name and the contractor's company name.
16. All workers shall have their name prominently displayed on the front of their hard hats.
17. Report to the Vegetation Specialist and/or Operations any abnormalities on the right-of-way such as encroachments, damaged poles, broken or slack guy wires, etc.
18. Report to Operations any incidents such as damage to facilities, contact with a live conductor serious personal injuries, etc.
19. Provide for work zone traffic control in accordance with the state and/or federal Manual of Uniform Traffic Control Devices when working with any public highway right-of-way.

B. Obligation of the Company

The Company shall:

1. Specify and provide GPS locations of marked danger trees.
2. Provide batch manifest for reporting records of vegetation treatment.
3. Conduct all ROW negotiations with property owners.
4. Authorize in writing to the Contractor any change in the scope of the work.
5. Where possible, provide a map of the ROWs to be treated showing all ROW restrictions.
6. Specify to the Contractor the specific treatment methods disposal methods and herbicide formulations to be utilized.

1.5 Access to the Right-of-Way

- A. Existing public roads shall, whenever possible, be used for access to the ROW.
- B. Private access to the ROW shall not be used without the consent of the property owner.
- C. Where private access to the ROW is utilized, the Contractor shall be responsible for any damage thereto.
- D. Access shall be in accordance with the EM&CP

1.6 Access on the Right-of-Way

Where requested by the Vegetation Specialist or Operations, to facilitate access for visual inspection of the facilities or for emergency repairs, a sixteen-foot access path shall be clear cut of

all woody vegetation except through road screens. Where an access road exists, the access road shall serve as the path and it shall be clear cut of all woody vegetation. Where no access road exists a sixteen-foot access path shall be clear cut under the conductors. When clear cutting the access road or path, the following shall apply:

- A. All woody vegetation cut from the path or access road shall be piled to the side of the clear cut area.
- B. Stumps within the clear cut area shall have a maximum height of three inches.
- C. Where chemical treatment is specified it shall be performed in accordance with Section 5.05 of this specification.

1.7 Buffer Zones

At road crossings and stream crossings, designated by the Vegetation Specialist, additional vegetation shall be left or trimmed to provide visual screening of the ROW or to provide shade to a stream. In buffer zones the following shall apply:

- A. Vehicle traffic shall be restricted to a single lane roadway through the buffer zone.
- B. Vegetation cut in a buffer zone shall be disposed of outside of the buffer zone.
- C. Trees designated for removal from buffer zones shall be removed so as not to damage remaining vegetation.
- D. Plants designated by the Vegetation Specialist to remain that are inexcusably damaged or removed by the Contractor shall be replaced by the Contractor. Replacements shall be planted at sites selected by the Company with species having total value equal to those damaged.

1.8 Crossing of Stream and Wet Areas

While working in the immediate area of stream crossings or wet areas, the

- A. Contractor shall employ all necessary precautions to protect the waterway from pollution caused by vehicular movement or disturbance to the stream bed and banks.
- B. The Contractor shall comply with all applicable Federal, State, and local laws and regulations; and the rules and regulations of any agency having jurisdiction over any crossing of a stream or wet area.

- C. Where access roads are indicated on plan and profile drawings, the Contractor shall cross streams and wet areas with vehicles only at the crossings indicated on the plan and profile drawings.
- D. Where access roads are not indicated on plan and profile drawings, the Contractor shall contain crossings of streams and wet areas, with vehicles, to one location.
- E. The Contractor shall limit the number of times any one stream or wet areas is crossed with vehicles to the minimum number necessary for completion of the work.
- F. The Contractor shall be responsible for repairing any damage such as deep ruts or scarified areas which in the opinion of the Vegetation Specialist or Operations could cause erosion.

2.0 TREATMENT METHODS

The treatment method or methods to be utilized will be specified by the Vegetation Specialist at the time of bidding:

2.1 Selective Treatment

The following shall apply in areas designated for selective treatment:

- A. Selective treatment shall be performed utilizing one of the following methods as described in Section 5 of these specifications:
 - 1. Selective Cutting and Stump Treatment
 - 2. Selective Basal Spray
 - 3. Selective Stem Foliar Spray
 - 4. Selective Low Volume Foliar Spray
- B. All tall-growing woody vegetation including but not necessarily limited to those listed in Appendix I, except those designated for trimming, shall be removed by cutting and/or herbicide application as specified.
- C. All low growing vegetation including but not necessarily limited to those listed in Appendix J shall be retained, except as otherwise requested by the Vegetation Specialist.
- D. Low growing woody vegetation shall, when possible, be avoided by vehicles used for traversing the ROW. Where driving over low growing vegetation cannot be avoided, any low growing vegetation which is damaged shall be cut and lopped so as to be in close contact with the ground.
- E. Each spray applicator and saw operator shall be able to differentiate between those species which are to be treated and those that are to be retained.
- F. No treatment shall be performed in ravine and valley crossings where conductor height is sufficient to allow for all species to remain at their mature height. The Vegetation Specialist shall determine at what point, in ravines and valleys, treatment should cease.
- G. All woody vegetation within 15 feet of a structure and all vines growing on guy wires poles or towers shall be removed by cutting and/or herbicide application as specified.

2.2 Selective Cutting

All tall-growing woody vegetation including but not necessarily limited to those listed in Appendix I shall be cut. Selective cutting shall be performed in accordance with the following:

- A. Trees to be removed shall be cut to a maximum stump height of 6 inches.
- B. Stumps shall have a smooth surface, free of splinters.
- C. Cut vegetation shall be disposed of by one of the methods described in Section III of these specifications as requested by the Vegetation Specialist.
- D. Care shall be taken in felling tree such that they do not fall into power and communications lines pavements, roads, etc.
- E. Care shall be taken to avoid damage to compatible vegetation to be retained.

2.3 Cutting

A. Trimming

Where trimming is specified the following shall apply:

- 1. Trees designated by the Vegetation Specialist shall be trimmed to provide the clearance specified by the Vegetation Specialist.
- 2. The Vegetation Specialist shall specify whether trees shall be trimmed to the cutting line or back to the trunk.
- 3. Limbs shall be felled inside the ROW to avoid damage to trees and property outside the ROW.
- 4. Caution shall be taken to see that the falling limbs do not come in contact with conductors, guys, poles, or other facilities.
- 5. Cut material shall be disposed of by the disposal method designated by the Vegetation Specialist as described in Section 3 of these specifications.

2.4 Mechanized Cutting

A. Selective Sites Such as Electric Rights-of-Way

Mechanized cutting shall be performed by cutting all woody vegetation within the ROW, except as noted below, with rotary or flail type cutters. Where mechanized cutting is specified the following shall apply:

- 1. Vegetation shall be cut to a maximum stump height of 6 inches.

2. Slash shall be cut so that it lies in close contact with the ground.
3. Pure stands of low growing vegetation listed in Appendix J shall be preserved.
4. Vegetation shall be cut so that slash and other debris does not enter water bodies, highways, lawn areas, agricultural fields, or other areas where personal injury or property damage could result.
5. Where wet ground conditions would result in rutting, incompatible vegetation shall be selectively cut as per Section 2.02 of this specification. The slash resulting from selective cutting shall be disposed of as specified by the Vegetation Specialist.
6. Streams shall be crossed at one point only.
7. Vegetation to be cut from stream bank shall be selectively cut as per Section 2.02 of this specification. Slash shall be removed from areas subject to flooding.
8. Deep ruts or erosion caused by mechanical cutting shall be repaired and seeded with a seed formulation approved by the Vegetation Specialist.
9. Measures including hand cutting shall be taken to protect structures, guy, communication lines, power lines, pipe lines, fences, roads, and trees to remain within and adjacent to the ROW.
10. All vines which are growing on guy wires, poles, or towers shall be hand cut and removed.

B. Non-selective Sites Such as Pipelines and Access Paths

Mechanized cutting shall be performed by cutting all vegetation within the ROW, or designated access path except as noted below, with rotary or fail type cutters. Where mechanized cutting is specified, the following shall apply:

1. Vegetation shall be cut to a maximum stump height of 6 inches.
2. Slash shall be cut so that it lies in close contact with the ground.
3. Vegetation shall be cut so that slash and other debris does not enter water-bodies, highways, lawn areas, agricultural fields, or other areas where personal injury or property damage could result.
4. Where wet ground conditions would result in rutting; all woody vegetation shall be cut by hand. The slash resulting from hand cutting shall be disposed of as specified by the Vegetation Specialist.
5. Streams shall be crossed at one point only.
6. Vegetation to be cut from stream buffers shall be cut by hand. Slash shall be removed from areas subject to flooding.

7. Deep ruts or erosion caused by mechanical cutting shall be repaired and seeded with a seed formulation approved by the Vegetation Specialist.
8. Measures including hand cutting shall be taken to protect structures, guys, communication lines, power lines, pipelines, fences, roads, and trees to remain within and adjacent to the ROW.

3.0 SLASH DISPOSAL

3.1 General Instructions

- A. Cut vegetation shall not be disposed of in the following locations:
 - 1. Access roads
 - 2. Within 25 feet of a structure
 - 3. In streams or low lying areas subject to flooding
 - 4. In buffer zones
 - 5. In agricultural fields
 - 6. In areas maintained as lawns
- B. Vegetation cut from scattered areas, fence ROWs, or isolated trees in cultivated areas shall be removed and placed along the nearest fence line or accepted area for piling.
- C. Toxic vegetation, such as cherry, which presents a hazard to livestock, shall be disposed of outside of active pasture areas.
- D. In those locations where vegetation is cut and no method of disposal is specified, the Lop and Scatter method of disposal shall be utilized in accordance with Section 3.04 of this specification.

3.2 Piling

Where cut vegetation is to be piled, the piles shall have a maximum height of 3 feet and a maximum width of 15 feet. The piles shall have a 20 foot break every 100 feet of pile length to serve as a fire break. Piles shall have a neat and orderly appearance. Void of any excessive protruding material.

A. Piling with Equipment

Piling with equipment shall be performed in accordance with the following:

- 1. Cut vegetation shall be carried or dragged, not pushed, to pile locations.
- 2. Piles shall be compacted to less than the specified maximum height by traversing with tracked vehicles and/or other equipment.

3.3 Chipping

Cut vegetation shall be reduced to chips by the use of an approved chipping machine in accordance with the following:

- A. Chips shall be disposed of such that chips accumulate to depths no greater than 3 inches to serve as a mulch for erosion control purposes.
- B. No chips shall enter any watercourse, wetland area, or agricultural fields.
- C. Vegetation which cannot be chipped shall be disposed of by another method approved by the Vegetation Specialist.

3.4 Lop and Scatter

Trees to be removed shall be felled, de-limbed of all branches greater than 2 inches in diameter and cut into sections such that the entire length of each tree is in close contact with the ground. Vegetation disposed of in this manner shall not protrude more than 2 feet above the surface of the ground.

Where an access road exists cut vegetation shall not be disposed of within the access road. Where no access road exists a sixteen-foot swath, directly under the conductors, shall remain clear of cut vegetation.

4.0 HERBICIDE APPLICATIONS

4.1 General

- A. All herbicide applications shall be done in a manner that will prevent damage to trees and property outside the ROW.
- B. Spraying shall be discontinued when windy conditions may result in off-target spray drift.
- C. The Contractor shall be registered with the New York State Department of Environmental Conservation as a Pesticide Applicator Business for the current application year for work done in New York State.
- D. The Contractor shall provide fulltime on-site supervision by a certified pesticide applicator within the state where the work is being performed. There shall be a certified pesticide applicator for each crew applying herbicides at separate sites.
- E. The application of herbicides shall be performed in accordance with the product label, appropriate governmental regulations, and these specifications. The Contractor shall be in compliance with the OSHA Hazard Communication standard 29 CFR 1910 1200.
- F. The Company shall consider unskilled or careless application by workmen as just cause for stopping work or cancellation of the contract.
- G. Foliar spray units shall be refilled with water from a supply vehicle. Water shall not be pumped directly from a water source into the spray tank.
- H. Herbicide concentrate shall not be transported on a vehicle used for supplying water to foliar spray equipment.
- I. Each vehicle used for herbicide application or for transportation of herbicide concentrate on the right-of-way shall be equipped with a shovel and absorptive material for containing and controlling spills. All herbicide spills shall be reported immediately of the Vegetation Specialist.
- J. All evergreens scheduled to be removed shall be cut and disposed of unless otherwise directed.
- K. The Contractor shall periodically review the results of the work to insure adequate coverage of target species.

4.2 Record Keeping

The Contractor shall complete Herbicide Treatment Form (Appendix K) on a daily basis as required by the herbicide contractor and the Vegetation Specialist. All information requested shall be supplied. Reports shall be turned over to the Vegetation Specialist at the completion of work

on each transmission line. The Company may issue a stop work order when these reports become delinquent and withhold payment for work performed until all reports have been submitted.

4.3 Security of Spray Equipment and Herbicides

The Contractor shall take the following precautions to protect his equipment and materials from vandalism and unauthorized use when left unattended on the ROW or on Company property not within a locked fence.

- A. Power-pack or back-pack sprayers shall be emptied or stored in locked compartments.
- B. Ignition keys shall be removed for all vehicles used for spraying vehicles containing herbicide concentrate, or spray solution.
- C. Ignition keys shall be removed from engines which provide power to pumps on power-driven spray equipment. Engines without lockable ignition systems shall have the sparkplug wire disconnected or made inoperable in some similar fashion.
- D. The opening to the spray tank, on power spray units, shall be locked.
- E. Drains on spray tanks shall be fitted with lockable valves or threaded caps.
- F. Containers carrying herbicide concentrate shall be securely locked or bolted to spray units or other vehicles used to transport herbicide concentrate.
- G. Valves or barrel pumps on containers carrying herbicide concentrate shall be locked or removed and replaced with threaded plugs. Threaded plugs shall be mechanically tightened to prevent removal by hand.
- H. The pressure control valve shall be closed.
- I. Any equipment used for operations involving herbicide applications shall not be left unattended within 100 feet of any stream, water body, or wetland.

5.0 HERBICIDE TREATMENT METHODS

5.1 Selective Cutting and Stump Treatments

All tall-growing woody vegetation shall be cut as described in Section 2.02 of these specification. All stumps of vegetation out shall be treated in accordance with the following:

- A. **Spray Formulation** The formulation to be used shall be specified by the Company and it shall be one of those listed in Section 6.02 of these specifications. The formulation types are described below:
 - 1. **Low Volume** - The herbicide concentrate is mixed with a mineral oil type carrier specifically designed and labeled for this purpose. The herbicide concentrate comprises 20% to 30% of the total mix.
 - 2. **Cut Surface Concentrate** - The herbicide is applied as a ready-to-use concentrate or it is diluted with water.
- B. **Application** The formulation shall be applied in accordance with methods described below:
 - 1. **Low Volume** - The formulation shall be applied to wet the cut surface, bark, root crown, and exposed roots. Particular attention shall be given to a complete encircling and wetting of the root collar at the ground line.
 - 2. **Cut Surface Concentrate** - The concentrate shall be applied only to the cut surface of the stump. Particular attention shall be given to wetting the entire cambium area next to the bark.
- C. **Equipment** The application equipment to be used is dependent on the formulation type and shall be as follows:
 - 1. **Low Volume** - Application to be made with a hand operated backpack sprayer equipped with approved spray gun and cone jet nozzle or equivalent gun and nozzle.
 - 2. **Cut Surface Concentrate** - Application to be made with a hand operated sprayer or trigger operated squirt bottle.
- D. **Weather Conditions** - No application shall be made while rain is falling. Low volume formulations shall not be applied when snow or ice is two or more inches in depth around the stumps to be treated. Cut surface concentrates may be applied when snow or ice is present as long as the cut surface to be treated is free of ice and snow. Stumps treated one hour or less prior to rain shall be sprayed again but not until one hour after runoff has stopped.

- E. Timing - The stump shall be treated before cutting (pre-spray) or immediately after they are cut. Where pre-spray is specified a waiting period between spraying and cutting, established by the Company, shall be observed. Where a pre-spray is utilized, only formulations containing an oil type carrier may be used.
- F. Restrictions - The following areas, even though within the ROW, are not to be sprayed; vegetation to be removed shall be cut and dispose of as requested by the Vegetation Specialist:
 - 1. Within 5 feet of any stream or water body or within 100' of a regulated wetland without a permit, or where specifically instructed by the Vegetation Specialist.
 - 2. Within 100' of a potable water supply.
 - 3. Within any orchard, nursery planting, or crop planting.
 - 4. Within active pasture areas.
 - 5. Areas identified on plan and profile sheets or in written instructions to the Contractor.
- G. Guarantee - The Contractor shall guarantee that the percentage of kill will be at least 95% as determined during the next growing season in the year following the treatment.

5.2 Selective Basal Treatment

All tall growing woody vegetation including but not necessarily limited to those listed in Appendix I shall be sprayed. Selective basal spraying shall be done in accordance with the following:

- A. Spray Formulation - The formulation to be used shall be specified by the Company and it shall be one of those listed in Section 6.02 of these specifications. The herbicide concentrate is mixed with a mineral oil type carrier specifically designed and labeled for this purpose. The herbicide concentrate comprises 20% to 30% of the total mix.
- B. Application - The solution shall be applied to each stem from a point 18 inches high on the stem to ground line completely encircling the stem and any exposed roots. The solution shall be applied only to wet the stem and all exposed roots. Where sprout growth originates from a stump, the treatment shall also be applied to completely encircle the stump and any exposed roots.
- C. Equipment - Application to be made with a hand operated backpack sprayer equipped with an approved spray gun and cone jet nozzle or equivalent.
- D. Weather Conditions - No application shall be made while rain is falling or when snow or ice is two inches or more in depth around the stems to be treated. Stems treated one hour or less prior to rain shall be sprayed again but not until one hour after runoff has stopped.

- E. Timing - Basal spray may be applied at any time of the year unless the selective basal spray shall be done between the time of fall foliage coloration and bud break in the spring. All species of ash, oak, and hickory shall be cut and stump treated when treatment occurs between September 15 and March 1.
- F. Restrictions - The following areas, even though within the ROW are not to be sprayed; vegetation to be removed shall be cut and disposed of as requested by the Vegetation Specialist.
 - 1. Within 15 feet of any stream or water body, or within 100' of a regulated wetland without a permit, or where specifically instructed by the Vegetation Specialist.
 - 2. Within 100' of potable water supply.
 - 3. Within any orchard, or nursery planting, or crop planting
 - 4. Within active pasture areas.
 - 5. Areas identified on plan and profile sheets or in written instructions to the Contractor.
- G. Special Conditions - All species of oak greater than two inches in diameter shall be cut and the stumps sprayed when using formula C.
- H. Guarantee - The Contractor shall guarantee that the percentage of kill will be at least 95% as determined during the next growing season in the year following the treatment.

5.3 Selective Stem Foliar Treatment

All tall growing woody vegetation including but not necessarily limited to those listed in Appendix I shall be treated. Selective stem foliar treatment shall be done in accordance with the following.

- A. Application - The solution shall be applied so as to thoroughly wet the entire stem and foliage to achieve runoff. The applicator shall stand within 10 to 15 feet of the target vegetation.
- B. Spray Formulation - The formulation to be used shall be specified by the Company and it shall be one of those listed in Section 6.03 of these specifications.
- C. Equipment - The spray solution shall be applied with power-driven equipment. Spray nozzles shall be adjusted to produce a coarse spray of large droplets at a maximum of 50 psi at the nozzle. Spray nozzles shall be equipped with a No. 8 or larger office disc.
- D. Weather Conditions - Spraying shall not be done during rain or while rain is dripping from the foliage. Foliage sprayed one hour or less prior to rain shall be sprayed again after runoff has stopped.

- E. Timing - Spraying shall be done during the growing season while the foliage is fully developed and still has its normal green color and vigor, approximately from mid-June to the end of August.
- F. Restrictions - The following areas, even though within the ROW, are not to be sprayed; vegetation to be removed shall be cut and disposed of as requested by the Vegetation Specialist.
 - 1. Within 25 feet of any stream or water body, or within 100' of a regulated wetland without a permit, or where specifically instructed by the Vegetation Specialist.
 - 2. Within 100' of potable water supply.
 - 3. Within any orchard, nursery, or crop planting.
 - 4. Within active pasture areas or within ten feet of a fence which encloses an active pasture area.
 - 5. Areas identified on plan and profile sheets or in written instruction to be Contractor;
- G. Guarantee The Contractor shall guarantee that the percentage of kill will be at least 95% as determined during the next growing season in the year following the treatment.

5.4 Selective Low Volume Foliar Treatment

All tall-growing woody vegetation including but not necessarily limited to those listed in Appendix I shall be treated. Selective low volume foliar treatment shall be done in accordance with the following:

- A. Application - The solution shall be applied so as to partially wet all foliage.
- B. Spray Formulation - The formulation to be used shall be specified by the Company and it shall be one of those listed in Section 6.04 of these specifications.
- C. Equipment - The spray solution shall be applied with either a motorized or hand operated backpack sprayer.
 - 1. Motorized Backpacks - Motorized units shall operate at pressures from 50 to 90 psi. The spray gun shall be equipped with at least two spray tips: one for tall and one for short vegetation.
 - 2. Hand Operated Backpacks - Hand operated units shall be equipped with spray guns that have at least two spray tips: one for tall and one for short vegetation.
- D. Weather Conditions - Spraying shall not be done during rain or while rain is dripping from foliage. Foliage sprayed one hour or less prior to rain shall be sprayed again after run-off has stopped.

- E. Timing - Spraying shall be done during the growing season while the foliage is fully developed and still has its normal green color and vigor, approximately from mid-June to the end of August.
- F. Restrictions - The following areas, even though within the ROW, are not to be sprayed, vegetation to be removed shall be cut and disposed of as requested by the Vegetation Specialist.
 - 1. Within 15 feet of any stream or water body or within 100' of a regulated wetland without a permit, or where specifically instructed by the Vegetation Specialist.
 - 2. Within 100' of a potable water supply.
 - 3. Within any orchard, nursery, or crop planting.
 - 4. Within active pasture areas or within ten feet of a fence which encloses an active pasture area.
 - 5. Areas identified on plan and profile sheets or in written instructions to the Contractor.
- G. Guarantee - The Contractor shall guarantee that the percentage of kill will be at least 95% as determined during the next growing season in the year following the treatment.

5.5 Access Path Follow-up Treatment

A non-selective stem foliar treatment shall be applied to areas cleared for access paths and designated for follow up herbicide treatment by the Vegetation Specialist. The non-selective stem foliar treatment shall be applied one year after initial path clearing and in accordance with the following:

- A. Spray Formulation - The formulation to be used shall be specified by the Company and it shall be one of those listed in Section 6.03 of these specifications.
- B. Application - The spray formulation shall be uniformly applied over the area to be treated so as to wet all vegetation in the treated area. Each successive application pattern shall overlap the previous pattern to avoid untreated strips.
- C. Equipment - The spray solution shall be applied with power-driven equipment. Spray nozzles shall be adjusted to produce a coarse spray of large droplets at a maximum of 50 psi at the nozzle. Spray nozzles shall be equipped with a No. 8 or larger orifice disc.
- D. Weather Conditions - Spraying shall not be done during rain or while rain is dripping from the foliage. Foliage sprayed one hour or less prior to rain shall be sprayed again after run-off has stopped.

- E. Timing - Spraying shall be done during the growing season while the foliage is fully developed and still has its normal green color and vigor, approximately from mid-June to the end of August.
- F. Restrictions - The following areas even though within the ROW, are not to be sprayed; vegetation to be removed shall be cut and disposed of as requested by the Vegetation Specialist.
 - 1. Within 25 feet of any stream or water body, or within 100' of a regulated wetland without a permit, or where specifically instructed by the Vegetation Specialist.
 - 2. Within 100' of a potable water supply.
 - 3. Within any orchard, nursery, or crop planting.
 - 4. Within active pasture areas or within ten feet of a fence which enclosed an active pasture area.
 - 5. Areas identified on plan and profile sheets or in written instructions to the Contractor.
- G. Guarantee The Contractor shall guarantee that the treated area shall be at least 95% free of broadleaf vegetation as determined during the next growing season in the year following the treatment.

6.0 HERBICIDE FORMULATIONS

6.1 General

All label restrictions for mixing shall be adhered to. The formulations listed to these specifications specify minimum quantities of active ingredients. The Contractor may increase the quantity of active ingredients as long as label recommendations are not exceeded. The Contractor shall seek the prior approval of the Vegetation Specialist concerning any deviation from the formulation specified by the Company.

Trade names are mentioned here only for ease of understanding. It does not constitute endorsement of one product over another. Any product, labeled by the appropriate State and Federal regulatory bodies for the specified use, which meets this specification may be substituted.

Each formulation shall be agitated sufficiently to insure proper mixing. The Contractor shall notify the Vegetation Specialist as to the source of water, to be used for mixing, prior to withdrawing water from any sources.

6.2 Formulations for Selective Basal Spray and Stump Treatment

Formula	Type	Minimum Quantities of Active Ingredient	Type or Active Ingredient	Quantity of Concentrate	Type and Quantity of Carrier
C	Low Volume Basal & Stump Treatment	4 lbs. Triclopyr	Buxtoxyethyl Ester	1 gal. Garlon 4 Ultra ⁽¹⁾	3 gallons of an approved mineral oil diluent that is labeled for this purpose
D	Low Volume Basal & Stump Treatment	3 lbs. Triclopyr 25 lbs. Imazapyr	Buxtoxyethyl Ester Isopropylamine Salt	3 qt. Garlon 4 Ultra ⁽¹⁾ 16 oz. Stalker ⁽³⁾	3 gallons of an approved mineral oil diluent that is labeled for this purpose
E	Stump Treatment	1.6 lbs. Glyphosate 0.08 lbs. Imazapyr	Isopropylamine Salt Isopropylamine Salt	38 oz. Aquastar ⁽²⁾ 5 oz. Arsenal ⁽³⁾	85 oz. Water 0.64 oz. Marking dye
F	Stump Treatment	1lb. 2,4-D 0.25 lb. Picloram	Trilsopropanolamine Salts	1 gal. Pathway ⁽¹⁾	Undiluted
P	Stump Treatment	2 lbs. Glyphosate	Isopropylamine Salt	0.5 gal. Aquastar ⁽²⁾	0.5 gal water 0.64 oz. Marking Dye

⁽¹⁾ Trademark of Corteva Agrosciences LLC⁽²⁾ Trademark of Albaugh, LLC/Agri Star⁽³⁾ Trademark of BASF Professional and Specialty Solutions

6.3 Formulations for Selective Stem Foliar Spray

The Contractor shall add a drift control additive, a surfactant and any other adjuvant specified on the product label to all selective stem foliar spray formulations. These adjuvants shall be mixed according to the manufacturer's directions. Adjuvants shall be selected for those listed under Section 6.05 of these specifications.

Formula	Minimum Quantities of Active Ingredient	Type of Active Ingredient	Quantity of Concentrate	Type And Quantity of Carrier
G	6 lbs. Fosamine 1.5 oz. Imazapyr 0.6 oz. Metsulfuron Methyl	Ammonium Salt Isopropylamine Salt	1.5 gal Krenite S ⁽²⁾ 6 oz. Arsenal ⁽⁴⁾ 1 oz. Escort XP ⁽⁵⁾	98.5 gal. Water
H	5 lbs. Glyphosate 1.5 oz. Imazapyr	Isopropylamine Salt Isopropylamine Salt	4 qts. Aquastar ⁽¹⁾ 6 oz. Arsenal	99 gal Water
K	1.5 lbs. Triclopyr 0.5 lb. Picloram	Triethylamine Salt Potassium Salt	0.5 gal Garlon 3A ⁽³⁾ + 1 qt. Tordon K ⁽³⁾	99.25 gal. Water
M	5.4 lbs. Glyphosate	Isopropylamine Salt	4 qts. Aquastar ⁽¹⁾	99 gal. Water
N	4 lbs. Glyphosate 0.6 oz. Metsulfuron Methyl	Isopropylamine Salt	3 qts. Aquastar ⁽¹⁾ 1 oz. Escort XP ⁽⁵⁾	99.25 gal. Water
S ⁽⁷⁾	2.25 lbs. Triclopyr 0.6 oz. Metsulfuron Methyl	Triethylamine	3 qts. Garlon 3A ⁽³⁾ 1 oz. Escort XP ⁽⁵⁾	99.25 gal. Water

⁽¹⁾ Trademark of Albaugh, LLC/Agri Star

⁽²⁾ Trademark of Albaugh Inc.

⁽³⁾ Trademark of Corteva Agrosiences LLC

⁽⁴⁾ Trademark of BASF Professional and Specialty Solutions

⁽⁵⁾ Trademark of Bayer Environmental Services

⁽⁶⁾ Any surfactant at the rate of 2 qts. Per 100 gal mix

⁽⁷⁾ An equivalent amount of Garlon 4 in Terms of active ingredient may be substituted for Garlon 3A with the written authorization of the Company Representative

6.4 Formulations for Selective Low Volume Foliar Spray

The Contractor shall add a surfactant, and any other adjuvant recommended on the product label, to the formulation at the manufacturer’s recommended rate. Adjuvants shall be selected from those listed under Section 6.05 of these specifications.

Formula	Minimum Quantities of Active Ingredient	Type of Active Ingredient	Quantity of Concentrate	Type And Quantity of Carrier
T	21.6 lbs. Glyphosate 75 lbs. Imazapyr	Isopropylamine Salt Isopropylamine Salt	4 qts. Aquastar ⁽¹⁾ 48 oz. Arsenal ⁽³⁾	96 gal. Water
W	21.6 lbs. Glyphosate 1.8 oz. Metsulfuron Methyl	Isopropylamine Salt	4 qts. Aquastar ⁽¹⁾ 3 oz. Escort XP ⁽⁴⁾	96 gal. Water
Y	20 lbs. Fosamine 0.5 oz. Imazapyr 1.8 oz. Metsulfuron Methyl	Ammonium Salt Isopropylamine Salt	5 gal. Krenite S ⁽²⁾ 32 oz. Arsenal ⁽³⁾ 3 oz. Escort XP ⁽⁴⁾	94.75 gal. Water
Z	27 lbs. Glyphosate	Isopropylamine Salt	5 gal. Aquastar ⁽¹⁾	95 gal. Water

⁽¹⁾ Trademark of Albaugh, LLC/Agri Star

⁽²⁾ Trademark of Albaugh Inc.

⁽³⁾ Trademark of BASF Professional and Specialty Solutions

⁽⁴⁾ Trademark of Bayer Environmental Services

6.5 Spray Adjuvants and Basal Oil Diluents

Drift control additives, surfactants and basal oil diluents shall be selected from those listed below or an equivalent. Equivalents shall be labeled for such use and approved by the Vegetation Specialist prior to use.

A. Drift Control Additives

1. Arborchem 41A (Arborchem Products Co.)
2. Alligare Drift Control (Alligare)
3. Non-ionic Drift and Deposition Aid (Generic)

B. Surfactants

1. Agri-Dex (Helena Chemical Co.)
2. Arborchem Aquatic Surfactant (Arborchem Products Co.)

3. Arbochem Kingpin (Arborchem Products Co.)

4. Nu-Film-IR (Miller Chemical Co.)

C. Basal Diluents

1. Arborchem Basal Oil (Arborchem Products Co.)

2. Hy-Grade EC (CWC Chemical, Inc.)

7.0 QUALITY CONTROL AND GUARANTEE

7.1 Completion of Work

When all work has been completed, the Contractor shall review the job and insure that:

- A. All specified cutting has been completed and all cut vegetation disposed of in accordance with the job instructions.
- B. All areas scheduled for herbicide application have been treated and all areas where incomplete application is discernible have been retreated. After this review, the Contractor shall invoice the Company of all work performed less any retainage that is to be held by the Company.
- C. Receipt of the invoice by the Company shall serve as notice that the work has been completed and that items A and B above have been performed. Upon receipt of the invoice, the Vegetation Specialist shall review the completed work and, if in agreement, process the invoice for payment. If the Vegetation Specialist is not in agreement with the invoice or some aspect of the work, the Contractor will be notified so that correction can be made.

7.2 Guarantee

During the next growing season after completion of the work, the Contractor shall review the job and insure that:

- A. All specified cutting has been completed and all cut vegetation disposed of in accordance with the job instructions.
- B. The percentage of kill is 95% or greater on each site where herbicide application was specified.
- C. There are no living incompatible species greater than 6 feet in height located in the area extending from the centerline of the right-of-way horizontally to a point ten feet outside the conductors. Trees greater than 6 feet in height found within this area during the final review shall be cut and the stumps treated. The formulation utilized for stump treatment shall be approved by the Vegetation Specialist.
- D. Upon completion of this review and any necessary corrections to the work, the Contractor shall submit a written statement certifying that items A, B, and C above have been completed and that the job is submitted for final acceptance by the Company. The written statement shall be provided to the Vegetation Specialist no later than August 1 during the year following treatment.

If the review is not completed by August 1, the Vegetation Specialist may have the final review performed and any necessary corrective action completed at the expense of the Contractor.

7.3 Final Company Review

The Vegetation Specialist will verify the work in the field and then process the invoice of any retainage that has been withheld. Any locations found that are not in accordance with A, B, or C of Section 7.02 may jeopardize the Contractor's standing under this contract and their future inclusion on the list of approved bidders

8.0 QUALITY CONTROL AND GUARANTEE

8.1 Completion of Work

When all work has been completed, the Contractor shall review the job and insure that:

- A. All specified cutting has been completed and all cut vegetation disposed of in accordance with the job instructions.
- B. All areas scheduled for herbicide application have been treated and all areas where incomplete application is discernible have been retreated. After this review, the Contractor shall invoice the Company of all work performed less any retainage that is to be held by the Company.
- C. Receipt of the invoice by the Company shall serve as notice that the work has been completed and that items A and B above have been performed. Upon receipt of the invoice, the Vegetation Specialist shall review the completed work and, if in agreement, process the invoice for payment. If the Vegetation Specialist is not in agreement with the invoice or some aspect of the work, the Contractor will be notified so that correction can be made.

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During the next growing season after completion of the work, the Contractor shall review the job and insure that:

- A. All specified cutting has been completed and all cut vegetation disposed of in accordance with the job instructions.
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- D. Upon completion of this review and any necessary corrections to the work, the Contractor shall submit a written statement certifying that items A, B, and C above have been completed and that the job is submitted for final acceptance by the Company. The written statement shall be provided to the Vegetation Specialist no later than August 1 during the year following treatment.

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The Vegetation Specialist will verify the work in the field and then process the invoice of any retainage that has been withheld. Any locations found that are not in accordance with A, B, or C of Section 7.02 may jeopardize the Contractor's standing under this contract and their future inclusion on the list of approved bidders.

APPENDIX D

ROW Maintenance Worker Training and Protection of Sensitive Areas

NEETNY uses contractors to apply herbicides and perform vegetation maintenance on its transmission rights-of-way. All work is performed under standard specifications (Appendix C).

The standard specification specifically states the genus and in some cases the species of woody vegetation to be removed and to be retained on the right-of-way. (The lists can be found in appendices J and K). The responsibility for instructing the contractor workforce in plant species identification is placed upon the contractor, as per section 1.04 (A) (7) of the standard specification.

NEETNY's standard specification also sets forth minimum requirements for the protection of sensitive areas. These requirements include:

- Instructions for operations in buffer zones; section 1.07 (A - E)
- Instructions concerning operations in the vicinity of streams and wetlands; sections 1.07, 1.08 (A- F), 4.03 (I), 5.01 (F), 5.02 (F), 5.03 (F), 5.04 (F), and 5.05 (F)
- Instructions concerning agricultural operations; sections 5.01 (F), 5.02 (F), 5.03 (F), 5.04 (F), and 5.05 (F)

Instructions for operations in populated areas are covered by section 4.01 (E), which requires that the contractor follow the requirements on the pesticide label. The product label sets forth the necessary protection measures for the particular product as required by federal law.

Sections 4.01 (C&D) require that the contractor be registered with the NYSDEC, and provide on-site supervision by a certified pesticide applicator certified in New York State in the right-of-way category.

To provide company supervision and guidance for contractors who are performing vegetation management work on Company rights-of-way, NEETNY has a vegetation management staff overseeing the contractor's work. For each job, a vegetation specialist holds an instruction and work procedure review with the contractor's foreman and crew members. At a minimum, this review is held at the beginning of each job, and consists of addressing such items as the product label precautions, sensitive areas, safe mixing procedures, equipment inspection and operation, application procedures, spill prevention and clean-up procedures, and species identification.

This instruction and work procedure review, when coupled with the Company's requirement that the contractors' supervisors be conversant with NEETNY's standard specifications and pass this information on to the rest of the contractor workforce, is adequate to insure that the NEETNY transmission vegetation management program is performed in an environmentally sound manner.

A. Introduction

1. **Title:** Transmission Vegetation Management
2. **Number:** FAC-003-4
3. **Purpose:** To maintain a reliable electric transmission system by using a defense-in-depth strategy to manage vegetation located on transmission rights of way (ROW) and minimize encroachments from vegetation located adjacent to the ROW, thus preventing the risk of those vegetation-related outages that could lead to Cascading.
4. **Applicability:**
 - 4.1. **Functional Entities:**
 - 4.1.1. Applicable Transmission Owners
 - 4.1.1.1. Transmission Owners that own Transmission Facilities defined in 4.2.
 - 4.1.2. Applicable Generator Owners
 - 4.1.2.1. Generator Owners that own generation Facilities defined in 4.3.
 - 4.2. **Transmission Facilities:** Defined below (referred to as “applicable lines”), including but not limited to those that cross lands owned by federal¹, state, provincial, public, private, or tribal entities:
 - 4.2.1. Each overhead transmission line operated at 200kV or higher.
 - 4.2.2. Each overhead transmission line operated below 200kV identified as an element of an IROL under NERC Standard FAC-014 by the Planning Coordinator.
 - 4.2.3. Each overhead transmission line operated below 200 kV identified as an element of a Major WECC Transfer Path in the Bulk Electric System by WECC.
 - 4.2.4. Each overhead transmission line identified above (4.2.1. through 4.2.3.) located outside the fenced area of the switchyard, station or substation and any portion of the span of the transmission line that is crossing the substation fence.
 - 4.3. **Generation Facilities:** Defined below (referred to as “applicable lines”), including but not limited to those that cross lands owned by federal², state, provincial, public, private, or tribal entities:

¹ EPAAct 2005 section 1211c: “Access approvals by Federal agencies.”

² *Id.*

4.3.1. Overhead transmission lines that (1) extend greater than one mile or 1.609 kilometers beyond the fenced area of the generating station switchyard to the point of interconnection with a Transmission Owner's Facility or (2) do not have a clear line of sight³ from the generating station switchyard fence to the point of interconnection with a Transmission Owner's Facility and are:

4.3.1.1. Operated at 200kV or higher; or

4.3.1.2. Operated below 200kV identified as an element of an IROL under NERC Standard FAC-014 by the Planning Coordinator; or

4.3.1.3. Operated below 200 kV identified as an element of a Major WECC Transfer Path in the Bulk Electric System by WECC.

5. Effective Date: See Implementation Plan

6. Background: This standard uses three types of requirements to provide layers of protection to prevent vegetation related outages that could lead to Cascading:

- a) Performance-based defines a particular reliability objective or outcome to be achieved. In its simplest form, a results-based requirement has four components: *who, under what conditions (if any), shall perform what action, to achieve what particular bulk power system performance result or outcome?*
- b) Risk-based preventive requirements to reduce the risks of failure to acceptable tolerance levels. A risk-based reliability requirement should be framed as: *who, under what conditions (if any), shall perform what action, to achieve what particular result or outcome that reduces a stated risk to the reliability of the bulk power system?*
- c) Competency-based defines a minimum set of capabilities an entity needs to have to demonstrate it is able to perform its designated reliability functions. A competency-based reliability requirement should be framed as: *who, under what conditions (if any), shall have what capability, to achieve what particular result or outcome to perform an action to achieve a result or outcome or to reduce a risk to the reliability of the bulk power system?*

The defense-in-depth strategy for reliability standards development recognizes that each requirement in a NERC reliability standard has a role in preventing system failures, and that these roles are complementary and reinforcing. Reliability standards should not be viewed as a body of unrelated requirements, but rather should be viewed as part of a portfolio of requirements designed to achieve an overall defense in-depth strategy and comport with the quality objectives of a reliability standard.

³ "Clear line of sight" means the distance that can be seen by the average person without special instrumentation (e.g., binoculars, telescope, spyglasses, etc.) on a clear day.

This standard uses a defense in-depth approach to improve the reliability of the electric Transmission system by:

- Requiring that vegetation be managed to prevent vegetation encroachment inside the flash-over clearance (R1 and R2);
- Requiring documentation of the maintenance strategies, procedures, processes and specifications used to manage vegetation to prevent potential flash-over conditions including consideration of 1) conductor dynamics and 2) the interrelationships between vegetation growth rates, control methods and the inspection frequency (R3);
- Requiring timely notification to the appropriate control center of vegetation conditions that could cause a flash-over at any moment (R4);
- Requiring corrective actions to ensure that flash-over distances will not be violated due to work constraints such as legal injunctions (R5);
- Requiring inspections of vegetation conditions to be performed annually (R6); and
- Requiring that the annual work needed to prevent flash-over is completed (R7).

For this standard, the requirements have been developed as follows:

- Performance-based: Requirements 1 and 2
- Competency-based: Requirement 3
- Risk based: Requirements 4, 5, 6 and 7

R3 serves as the first line of defense by ensuring that entities understand the problem they are trying to manage and have fully developed strategies and plans to manage the problem. R1, R2, and R7 serve as the second line of defense by requiring that entities carry out their plans and manage vegetation. R6, which requires inspections, may be either a part of the first line of defense (as input into the strategies and plans) or as a third line of defense (as a check of the first and second lines of defense). R4 serves as the final line of defense, as it addresses cases in which all the other lines of defense have failed.

Major outages and operational problems have resulted from interference between overgrown vegetation and transmission lines located on many types of lands and ownership situations. Adherence to the standard requirements for applicable lines on any kind of land or easement, whether they are Federal Lands, state or provincial lands, public or private lands, franchises, easements or lands owned in fee, will reduce and manage this risk. For the purpose of the standard the term “public lands” includes municipal lands, village lands, city lands, and a host of other governmental entities.

This standard addresses vegetation management along applicable overhead lines and does not apply to underground lines, submarine lines or to line sections inside an electric station boundary.

This standard focuses on transmission lines to prevent those vegetation related outages that could lead to Cascading. It is not intended to prevent customer outages due to tree contact with lower voltage distribution system lines. For example, localized customer service might be disrupted if vegetation were to make contact with a 69kV transmission line supplying power to a 12kV distribution station. However, this standard is not written to address such isolated situations which have little impact on the overall electric transmission system.

Since vegetation growth is constant and always present, unmanaged vegetation poses an increased outage risk, especially when numerous transmission lines are operating at or near their Rating. This can present a significant risk of consecutive line failures when lines are experiencing large sags thereby leading to Cascading. Once the first line fails the shift of the current to the other lines and/or the increasing system loads will lead to the second and subsequent line failures as contact to the vegetation under those lines occurs. Conversely, most other outage causes (such as trees falling into lines, lightning, animals, motor vehicles, etc.) are not an interrelated function of the shift of currents or the increasing system loading. These events are not any more likely to occur during heavy system loads than any other time. There is no cause-effect relationship which creates the probability of simultaneous occurrence of other such events. Therefore these types of events are highly unlikely to cause large-scale grid failures. Thus, this standard places the highest priority on the management of vegetation to prevent vegetation grow ins.

B. Requirements and Measures

- R1.** Each applicable Transmission Owner and applicable Generator Owner shall manage vegetation to prevent encroachments into the Minimum Vegetation Clearance Distance (MVCD) of its applicable line(s) which are either an element of an IROL, or an element of a Major WECC Transfer Path; operating within their Rating and all Rated Electrical Operating Conditions of the types shown below⁴ [*Violation Risk Factor: High*] [*Time Horizon: Real-time*]:

⁴ This requirement does not apply to circumstances that are beyond the control of an applicable Transmission Owner or applicable Generator Owner subject to this reliability standard, including natural disasters such as earthquakes, fires, tornados, hurricanes, landslides, wind shear, fresh gale, major storms as defined either by the applicable Transmission Owner or applicable Generator Owner or an applicable regulatory body, ice storms, and floods; human or animal activity such as logging, animal severing tree, vehicle contact with tree, or installation, removal, or digging of vegetation. Nothing in this footnote should be construed to limit the Transmission Owner's or applicable Generator Owner's right to exercise its full legal rights on the ROW.

- 1.1.** An encroachment into the MVCD as shown in FAC-003 Table 2, observed in Real time, absent a Sustained Outage,⁵
 - 1.2.** An encroachment due to a fall-in from inside the ROW that caused a vegetation-related Sustained Outage,⁶
 - 1.3.** An encroachment due to the blowing together of applicable lines and vegetation located inside the ROW that caused a vegetation-related Sustained Outage⁷,
 - 1.4.** An encroachment due to vegetation growth into the MVCD that caused a vegetation-related Sustained Outage.⁸
- M1.** Each applicable Transmission Owner and applicable Generator Owner has evidence that it managed vegetation to prevent encroachment into the MVCD as described in R1. Examples of acceptable forms of evidence may include dated attestations, dated reports containing no Sustained Outages associated with encroachment types 2 through 4 above, or records confirming no Real-time observations of any MVCD encroachments. (R1)
- R2.** Each applicable Transmission Owner and applicable Generator Owner shall manage vegetation to prevent encroachments into the MVCD of its applicable line(s) which are not either an element of an IROL, or an element of a Major WECC Transfer Path; operating within its Rating and all Rated Electrical Operating Conditions of the types shown below⁹ [*Violation Risk Factor: High*] [*Time Horizon: Real-time*]:
- 2.1.** An encroachment into the MVCD, observed in Real time, absent a Sustained Outage,¹⁰
 - 2.2.** An encroachment due to a fall-in from inside the ROW that caused a vegetation-related Sustained Outage,¹¹
 - 2.3.** An encroachment due to the blowing together of applicable lines and vegetation located inside the ROW that caused a vegetation-related Sustained Outage,¹²
 - 2.4.** An encroachment due to vegetation growth into the line MVCD that caused a vegetation related Sustained Outage.¹³

⁵ If a later confirmation of a Fault by the applicable Transmission Owner or applicable Generator Owner shows that a vegetation encroachment within the MVCD has occurred from vegetation within the ROW, this shall be considered the equivalent of a Real-time observation.

⁶ Multiple Sustained Outages on an individual line, if caused by the same vegetation, will be reported as one outage regardless of the actual number of outages within a 24-hour period.

⁷ *Id.*

⁸ *Id.*

⁹ See footnote 4.

¹⁰ See footnote 5.

¹¹ See footnote 6.

¹² *Id.*

¹³ *Id.*

- M2.** Each applicable Transmission Owner and applicable Generator Owner has evidence that it managed vegetation to prevent encroachment into the MVCD as described in R2. Examples of acceptable forms of evidence may include dated attestations, dated reports containing no Sustained Outages associated with encroachment types 2 through 4 above, or records confirming no Real-time observations of any MVCD encroachments. (R2)
- R3.** Each applicable Transmission Owner and applicable Generator Owner shall have documented maintenance strategies or procedures or processes or specifications it uses to prevent the encroachment of vegetation into the MVCD of its applicable lines that accounts for the following: *[Violation Risk Factor: Lower] [Time Horizon: Long Term Planning]*:
- 3.1.** Movement of applicable line conductors under their Rating and all Rated Electrical Operating Conditions;
 - 3.2.** Inter-relationships between vegetation growth rates, vegetation control methods, and inspection frequency.
- M3.** The maintenance strategies or procedures or processes or specifications provided demonstrate that the applicable Transmission Owner and applicable Generator Owner can prevent encroachment into the MVCD considering the factors identified in the requirement. (R3)
- R4.** Each applicable Transmission Owner and applicable Generator Owner, without any intentional time delay, shall notify the control center holding switching authority for the associated applicable line when the applicable Transmission Owner and applicable Generator Owner has confirmed the existence of a vegetation condition that is likely to cause a Fault at any moment *[Violation Risk Factor: Medium] [Time Horizon: Real-time]*.
- M4.** Each applicable Transmission Owner and applicable Generator Owner that has a confirmed vegetation condition likely to cause a Fault at any moment will have evidence that it notified the control center holding switching authority for the associated transmission line without any intentional time delay. Examples of evidence may include control center logs, voice recordings, switching orders, clearance orders and subsequent work orders. (R4)
- R5.** When an applicable Transmission Owner and an applicable Generator Owner are constrained from performing vegetation work on an applicable line operating within its Rating and all Rated Electrical Operating Conditions, and the constraint may lead to a vegetation encroachment into the MVCD prior to the implementation of the next annual work plan, then the applicable Transmission Owner or applicable Generator Owner shall take corrective action to ensure continued vegetation management to prevent encroachments *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*.

- M5.** Each applicable Transmission Owner and applicable Generator Owner has evidence of the corrective action taken for each constraint where an applicable transmission line was put at potential risk. Examples of acceptable forms of evidence may include initially-planned work orders, documentation of constraints from landowners, court orders, inspection records of increased monitoring, documentation of the de-rating of lines, revised work orders, invoices, or evidence that the line was de-energized. (R5)
- R6.** Each applicable Transmission Owner and applicable Generator Owner shall perform a Vegetation Inspection of 100% of its applicable transmission lines (measured in units of choice - circuit, pole line, line miles or kilometers, etc.) at least once per calendar year and with no more than 18 calendar months between inspections on the same ROW¹⁴ [*Violation Risk Factor: Medium*] [*Time Horizon: Operations Planning*].
- M6.** Each applicable Transmission Owner and applicable Generator Owner has evidence that it conducted Vegetation Inspections of the transmission line ROW for all applicable lines at least once per calendar year but with no more than 18 calendar months between inspections on the same ROW. Examples of acceptable forms of evidence may include completed and dated work orders, dated invoices, or dated inspection records. (R6)
- R7.** Each applicable Transmission Owner and applicable Generator Owner shall complete 100% of its annual vegetation work plan of applicable lines to ensure no vegetation encroachments occur within the MVCD. Modifications to the work plan in response to changing conditions or to findings from vegetation inspections may be made (provided they do not allow encroachment of vegetation into the MVCD) and must be documented. The percent completed calculation is based on the number of units actually completed divided by the number of units in the final amended plan (measured in units of choice - circuit, pole line, line miles or kilometers, etc.). Examples of reasons for modification to annual plan may include [*Violation Risk Factor: Medium*] [*Time Horizon: Operations Planning*]:
- 7.1.** Change in expected growth rate/environmental factors
 - 7.2.** Circumstances that are beyond the control of an applicable Transmission Owner or applicable Generator Owner¹⁵
 - 7.3.** Rescheduling work between growing seasons
 - 7.4.** Crew or contractor availability/Mutual assistance agreements

¹⁴ When the applicable Transmission Owner or applicable Generator Owner is prevented from performing a Vegetation Inspection within the timeframe in R6 due to a natural disaster, the TO or GO is granted a time extension that is equivalent to the duration of the time the TO or GO was prevented from performing the Vegetation Inspection.

¹⁵ Circumstances that are beyond the control of an applicable Transmission Owner or applicable Generator Owner include but are not limited to natural disasters such as earthquakes, fires, tornados, hurricanes, landslides, ice storms, floods, or major storms as defined either by the TO or GO or an applicable regulatory body.

- 7.5. Identified unanticipated high priority work
 - 7.6. Weather conditions/Accessibility
 - 7.7. Permitting delays
 - 7.8. Land ownership changes/Change in land use by the landowner
 - 7.9. Emerging technologies
- M7.** Each applicable Transmission Owner and applicable Generator Owner has evidence that it completed its annual vegetation work plan for its applicable lines. Examples of acceptable forms of evidence may include a copy of the completed annual work plan (as finally modified), dated work orders, dated invoices, or dated inspection records. (R7)

C. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority:

“Compliance Enforcement Authority” means NERC or the Regional Entity, or any entity as otherwise designated by an Applicable Governmental Authority, in their respective roles of monitoring and/or enforcing compliance with mandatory and enforceable Reliability Standards in their respective jurisdictions.

1.2. Evidence Retention:

The following evidence retention period(s) identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full-time period since the last audit.

The applicable entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

- The applicable Transmission Owner and applicable Generator Owner retains data or evidence to show compliance with Requirements R1, R2, R3, R5, R6 and R7, for three calendar years.
- The applicable Transmission Owner and applicable Generator Owner retains data or evidence to show compliance with Requirement R4, Measure M4 for most recent 12 months of operator logs or most recent 3 months of voice recordings or transcripts of voice recordings, unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

- If an applicable Transmission Owner or applicable Generator Owner is found non-compliant, it shall keep information related to the non-compliance until found compliant or for the time period specified above, whichever is longer.

1.3. Compliance Monitoring and Enforcement Program

As defined in the NERC Rules of Procedure, “Compliance Monitoring and Enforcement Program” refers to the identification of the processes that will be used to evaluate data or information for the purpose of assessing performance or outcomes with the associated Reliability Standard.

1.4. Additional Compliance Information

Periodic Data Submittal: The applicable Transmission Owner and applicable Generator Owner will submit a quarterly report to its Regional Entity, or the Regional Entity’s designee, identifying all Sustained Outages of applicable lines operated within their Rating and all Rated Electrical Operating Conditions as determined by the applicable Transmission Owner or applicable Generator Owner to have been caused by vegetation, except as excluded in footnote 2, and including as a minimum the following:

- The name of the circuit(s), the date, time and duration of the outage; the voltage of the circuit; a description of the cause of the outage; the category associated with the Sustained Outage; other pertinent comments; and any countermeasures taken by the applicable Transmission Owner or applicable Generator Owner.

A Sustained Outage is to be categorized as one of the following:

- Category 1A — Grow-ins: Sustained Outages caused by vegetation growing into applicable lines, that are identified as an element of an IROL or Major WECC Transfer Path, by vegetation inside and/or outside of the ROW;
- Category 1B — Grow-ins: Sustained Outages caused by vegetation growing into applicable lines, but are not identified as an element of an IROL or Major WECC Transfer Path, by vegetation inside and/or outside of the ROW;
- Category 2A — Fall-ins: Sustained Outages caused by vegetation falling into applicable lines that are identified as an element of an IROL or Major WECC Transfer Path, from within the ROW;
- Category 2B — Fall-ins: Sustained Outages caused by vegetation falling into applicable lines, but are not identified as an element of an IROL or Major WECC Transfer Path, from within the ROW;
- Category 3 — Fall-ins: Sustained Outages caused by vegetation falling into applicable lines from outside the ROW;
- Category 4A — Blowing together: Sustained Outages caused by vegetation and applicable lines that are identified as an element of an IROL or Major WECC Transfer Path, blowing together from within the ROW;

- Category 4B — Blowing together: Sustained Outages caused by vegetation and applicable lines, but are not identified as an element of an IROL or Major WECC Transfer Path, blowing together from within the ROW.

The Regional Entity will report the outage information provided by applicable Transmission Owners and applicable Generator Owners, as per the above, quarterly to NERC, as well as any actions taken by the Regional Entity as a result of any of the reported Sustained Outages.

Violation Severity Levels (Table 1)

R #	Table 1: Violation Severity Levels (VSL)			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.			The responsible entity failed to manage vegetation to prevent encroachment into the MVCD of a line identified as an element of an IROL or Major WECC transfer path and encroachment into the MVCD as identified in FAC-003-4-Table 2 was observed in real time absent a Sustained Outage.	The responsible entity failed to manage vegetation to prevent encroachment into the MVCD of a line identified as an element of an IROL or Major WECC transfer path and a vegetation-related Sustained Outage was caused by one of the following: <ul style="list-style-type: none"> • <i>A fall in from inside the active transmission line ROW</i> • <i>Blowing together of applicable lines and vegetation located inside the active transmission line ROW</i> • <i>A grow-in</i>
R2.			The responsible entity failed to manage vegetation to prevent encroachment into the MVCD of a line not identified as an element of	The responsible entity failed to manage vegetation to prevent encroachment into the MVCD of a line not identified as an element of

			an IROL or Major WECC transfer path and encroachment into the MVCD as identified in FAC-003-4 Table 2 was observed in real time absent a Sustained Outage.	an IROL or Major WECC transfer path and a vegetation-related Sustained Outage was caused by one of the following: <ul style="list-style-type: none"> • <i>A fall-in from inside the active transmission line ROW</i> • <i>Blowing together of applicable lines and vegetation located inside the active transmission line ROW</i> • <i>A grow-in</i>
R3.		The responsible entity has maintenance strategies or documented procedures or processes or specifications but has not accounted for the inter-relationships between vegetation growth rates, vegetation control methods, and inspection frequency, for the responsible entity's applicable lines. (Requirement R3, Part 3.2.)	The responsible entity has maintenance strategies or documented procedures or processes or specifications but has not accounted for the movement of transmission line conductors under their Rating and all Rated Electrical Operating Conditions, for the responsible entity's applicable lines. (Requirement R3, Part 3.1.)	The responsible entity does not have any maintenance strategies or documented procedures or processes or specifications used to prevent the encroachment of vegetation into the MVCD, for the responsible entity's applicable lines.
R4.			The responsible entity experienced a confirmed	The responsible entity experienced a confirmed

			vegetation threat and notified the control center holding switching authority for that applicable line, but there was intentional delay in that notification.	vegetation threat and did not notify the control center holding switching authority for that applicable line.
R5.				The responsible entity did not take corrective action when it was constrained from performing planned vegetation work where an applicable line was put at potential risk.
R6.	The responsible entity failed to inspect 5% or less of its applicable lines (measured in units of choice - circuit, pole line, line miles or kilometers, etc.)	The responsible entity failed to inspect more than 5% up to and including 10% of its applicable lines (measured in units of choice - circuit, pole line, line miles or kilometers, etc.).	The responsible entity failed to inspect more than 10% up to and including 15% of its applicable lines (measured in units of choice - circuit, pole line, line miles or kilometers, etc.).	The responsible entity failed to inspect more than 15% of its applicable lines (measured in units of choice - circuit, pole line, line miles or kilometers, etc.).
R7.	The responsible entity failed to complete 5% or less of its annual vegetation work plan for its applicable lines (as finally modified).	The responsible entity failed to complete more than 5% and up to and including 10% of its annual vegetation work plan for its applicable lines (as finally modified).	The responsible entity failed to complete more than 10% and up to and including 15% of its annual vegetation work plan for its applicable lines (as finally modified).	The responsible entity failed to complete more than 15% of its annual vegetation work plan for its applicable lines (as finally modified).

D. Regional Variances

None.

E. Associated Documents

- [FAC-003-4 Implementation Plan](#)

Version History

Version	Date	Action	Change Tracking
1	January 20, 2006	<ol style="list-style-type: none"> 1. Added "Standard Development Roadmap." 2. Changed "60" to "Sixty" in section A, 5.2. 3. Added "Proposed Effective Date: April 7, 2006" to footer. 4. Added "Draft 3: November 17, 2005" to footer. 	New
1	April 4, 2007	Regulatory Approval - Effective Date	New
2	November 3, 2011	Adopted by the NERC Board of Trustees	New
2	March 21, 2013	<p>FERC Order issued approving FAC-003-2 (Order No. 777)</p> <p>FERC Order No. 777 was issued on March 21, 2013 directing NERC to "conduct or contract testing to obtain empirical data and submit a report to the Commission providing the results of the testing."¹⁶</p>	Revisions

¹⁶ Revisions to Reliability Standard for Transmission Vegetation Management, Order No. 777, 142 FERC ¶ 61,208 (2013)

FAC-003-4 Transmission Vegetation Management

2	May 9, 2013	Board of Trustees adopted the modification of the VRF for Requirement R2 of FAC-003-2 by raising the VRF from "Medium" to "High."	Revisions
3	May 9, 2013	FAC 003 3 adopted by Board of Trustees	Revisions
3	September 19, 2013	A FERC order was issued on September 19, 2013, approving FAC-003-3. This standard became enforceable on July 1, 2014 for Transmission Owners. For Generator Owners, R3 became enforceable on January 1, 2015 and all other requirements (R1, R2, R4, R5, R6, and R7) became enforceable on January 1, 2016.	Revisions
3	November 22, 2013	Updated the VRF for R2 from "Medium" to "High" per a Final Rule issued by FERC	Revisions
3	July 30, 2014	Transferred the effective dates section from FAC 003-2 (for Transmission Owners) into FAC-003-3, per the FAC-003-3 implementation plan	Revisions
4	February 11, 2016	Adopted by Board of Trustees. Adjusted MVCD values in Table 2 for alternating current systems, consistent with findings reported in report filed on August 12, 2015 in Docket No. RM12-4-002 consistent with FERC's directive in Order No. 777, and based on empirical testing results for flashover distances between conductors and vegetation.	Revisions
4	March 9, 2016	Corrected subpart 7.10 to M7, corrected value of .07 to .7	Errata
4	April 26, 2016	FERC Letter Order approving FAC-003-4. Docket No. RD16-4-000.	

**FAC-003 — TABLE 2 — Minimum Vegetation Clearance Distances (MVCD)¹⁷
For Alternating Current Voltages (feet)**

(AC) Nominal System Voltage (kV) ⁺	(AC) Maximum System Voltage (kV) ¹⁸	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	MVCD feet Over 11000 ft up to 12000 ft	MVCD feet Over 12000 ft up to 13000 ft	MVCD feet Over 13000 ft up to 14000 ft	MVCD feet Over 14000 ft up to 15000 ft
765	800	11.6ft	11.7ft	11.9ft	12.1ft	12.2ft	12.4ft	12.6ft	12.8ft	13.0ft	13.1ft	13.3ft	13.5ft	13.7ft	13.9ft	14.1ft	14.3ft
500	550	7.0ft	7.1ft	7.2ft	7.4ft	7.5ft	7.6ft	7.8ft	7.9ft	8.1ft	8.2ft	8.3ft	8.5ft	8.6ft	8.8ft	8.9ft	9.1ft
345	362 ¹⁹	4.3ft	4.3ft	4.4ft	4.5ft	4.6ft	4.7ft	4.8ft	4.9ft	5.0ft	5.1ft	5.2ft	5.3ft	5.4ft	5.5ft	5.6ft	5.7ft
287	302	5.2ft	5.3ft	5.4ft	5.5ft	5.6ft	5.7ft	5.8ft	5.9ft	6.1ft	6.2ft	6.3ft	6.4ft	6.5ft	6.6ft	6.8ft	6.9ft
230	242	4.0ft	4.1ft	4.2ft	4.3ft	4.3ft	4.4ft	4.5ft	4.6ft	4.7ft	4.8ft	4.9ft	5.0ft	5.1ft	5.2ft	5.3ft	5.4ft
161*	169	2.7ft	2.7ft	2.8ft	2.9ft	2.9ft	3.0ft	3.0ft	3.1ft	3.2ft	3.3ft	3.3ft	3.4ft	3.5ft	3.6ft	3.7ft	3.8ft
138*	145	2.3ft	2.3ft	2.4ft	2.4ft	2.5ft	2.5ft	2.6ft	2.7ft	2.7ft	2.8ft	2.8ft	2.9ft	3.0ft	3.0ft	3.1ft	3.2ft
115*	121	1.9ft	1.9ft	1.9ft	2.0ft	2.0ft	2.1ft	2.1ft	2.2ft	2.2ft	2.3ft	2.3ft	2.4ft	2.5ft	2.5ft	2.6ft	2.7ft
88*	100	1.5ft	1.5ft	1.6ft	1.6ft	1.7ft	1.7ft	1.8ft	1.8ft	1.8ft	1.9ft	1.9ft	2.0ft	2.0ft	2.1ft	2.2ft	2.2ft
69*	72	1.1ft	1.1ft	1.1ft	1.2ft	1.2ft	1.2ft	1.2ft	1.3ft	1.3ft	1.3ft	1.4ft	1.4ft	1.4ft	1.5ft	1.6ft	1.6ft

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

+ Table 2 – Table of MVCD values at a 1.0 gap factor (in U.S. customary units), which is located in the EPRI report filed with FERC on August 12, 2015. (The 14000-15000 foot values were subsequently provided by EPRI in an updated Table 2 on December 1, 2015, filed with the FAC-003-4 Petition at FERC)

¹⁷ The distances in this Table are the minimums required to prevent Flash-over; however prudent vegetation maintenance practices dictate that substantially greater distances will be achieved at time of vegetation maintenance.

¹⁸ Where applicable lines are operated at nominal voltages other than those listed, the applicable Transmission Owner or applicable Generator Owner should use the maximum system voltage to determine the appropriate clearance for that line.

¹⁹ The change in transient overvoltage factors in the calculations are the driver in the decrease in MVCDs for voltages of 345 kV and above. Refer to pp.29-31 in the Supplemental Materials for additional information.

TABLE 2 (CONT) — Minimum Vegetation Clearance Distances (MVCD)²⁰
For Alternating Current Voltages (meters)

(AC) Nominal System Voltage (KV) ⁺	(AC) Maximum System Voltage (kV) ²¹	MVCD meters Over sea level up to 153 m	MVCD meters Over 153m up to 305m	MVCD meters Over 305m up to 610m	MVCD meters Over 610m up to 915m	MVCD meters Over 915m up to 1220m	MVCD meters Over 1220m up to 1524m	MVCD meters Over 1524m up to 1829m	MVCD meters Over 1829m up to 2134m	MVCD meters Over 2134m up to 2439m	MVCD meters Over 2439m up to 2744m	MVCD meters Over 2744m up to 3048m	MVCD meters Over 3048m up to 3353m	MVCD meters Over 3353m up to 3657m	MVCD meters Over 3657m up to 3962m	MVCD meters Over 3962 m up to 4268 m	MVCD meters Over 4268m up to 4572m
765	800	3.6m	3.6m	3.6m	3.7m	3.7m	3.8m	3.8m	3.9m	4.0m	4.0m	4.1m	4.1m	4.2m	4.2m	4.3m	4.4m
500	550	2.1m	2.2m	2.2m	2.3m	2.3m	2.3m	2.4m	2.4m	2.5m	2.5m	2.5m	2.6m	2.6m	2.7m	2.7m	2.7m
345	362 ²²	1.3m	1.3m	1.3m	1.4m	1.4m	1.4m	1.5m	1.5m	1.5m	1.6m	1.6m	1.6m	1.6m	1.7m	1.7m	1.8m
287	302	1.6m	1.6m	1.7m	1.7m	1.7m	1.7m	1.8m	1.8m	1.9m	1.9m	1.9m	2.0m	2.0m	2.0m	2.1m	2.1m
230	242	1.2m	1.3m	1.3m	1.3m	1.3m	1.3m	1.4m	1.4m	1.4m	1.5m	1.5m	1.5m	1.6m	1.6m	1.6m	1.6m
161*	169	0.8m	0.8m	0.9m	0.9m	0.9m	0.9m	0.9m	1.0m	1.0m	1.0m	1.0m	1.0m	1.1m	1.1m	1.1m	1.1m
138*	145	0.7m	0.7m	0.7m	0.7m	0.7m	0.7m	0.8m	0.8m	0.8m	0.9m	0.9m	0.9m	0.9m	0.9m	1.0m	1.0m
115*	121	0.6m	0.6m	0.6m	0.6m	0.6m	0.6m	0.6m	0.7m	0.7m	0.7m	0.7m	0.7m	0.8m	0.8m	0.8m	0.8m
88*	100	0.4m	0.4m	0.5m	0.5m	0.5m	0.5m	0.6m	0.7m	0.7m							
69*	72	0.3m	0.3m	0.3m	0.4m	0.4m	0.4m	0.4m	0.4m	0.4m	0.4m	0.4m	0.4m	0.4m	0.5m	0.5m	0.5m

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

+ Table 2 – Table of MVCD values at a 1.0 gap factor (in U.S. customary units), which is located in the EPRI report filed with FERC on August 12, 2015. (The 14000-15000 foot values were subsequently provided by EPRI in an updated Table 2 on December 1, 2015, filed with the FAC-003-4 Petition at FERC)

²⁰ The distances in this Table are the minimums required to prevent Flash-over; however prudent vegetation maintenance practices dictate that substantially greater distances will be achieved at time of vegetation maintenance.

²¹Where applicable lines are operated at nominal voltages other than those listed, the applicable Transmission Owner or applicable Generator Owner should use the maximum system voltage to determine the appropriate clearance for that line.

²² The change in transient overvoltage factors in the calculations are the driver in the decrease in MVCDs for voltages of 345 kV and above. Refer to pp.29-31 in the supplemental materials for additional information.

TABLE 2 (CONT) — Minimum Vegetation Clearance Distances (MVCD)²³
 For Direct Current Voltages feet (meters)

(DC) Nominal Pole to Ground Voltage (kV)	MVCD meters Over sea level up to 500 ft (Over sea level up to 152.4 m)	MVCD meters Over 500 ft up to 1000 ft (Over 152.4 m up to 304.8 m)	MVCD meters Over 1000 ft up to 2000 ft (Over 304.8 m up to 609.6m)	MVCD meters Over 2000 ft up to 3000 ft (Over 609.6m up to 914.4m)	MVCD meters Over 3000 ft up to 4000 ft (Over 914.4m up to 1219.2m)	MVCD meters Over 4000 ft up to 5000 ft (Over 1219.2m up to 1524m)	MVCD meters Over 5000 ft up to 6000 ft (Over 1524 m up to 1828.8 m)	MVCD meters Over 6000 ft up to 7000 ft (Over 1828.8m up to 2133.6m)	MVCD meters Over 7000 ft up to 8000 ft (Over 2133.6m up to 2438.4m)	MVCD meters Over 8000 ft up to 9000 ft (Over 2438.4m up to 2743.2m)	MVCD meters Over 9000 ft up to 10000 ft (Over 2743.2m up to 3048m)	MVCD meters Over 10000 ft up to 11000 ft (Over 3048m up to 3352.8m)
±750	14.12ft (4.30m)	14.31ft (4.36m)	14.70ft (4.48m)	15.07ft (4.59m)	15.45ft (4.71m)	15.82ft (4.82m)	16.2ft (4.94m)	16.55ft (5.04m)	16.91ft (5.15m)	17.27ft (5.26m)	17.62ft (5.37m)	17.97ft (5.48m)
±600	10.23ft (3.12m)	10.39ft (3.17m)	10.74ft (3.26m)	11.04ft (3.36m)	11.35ft (3.46m)	11.66ft (3.55m)	11.98ft (3.65m)	12.3ft (3.75m)	12.62ft (3.85m)	12.92ft (3.94m)	13.24ft (4.04m)	13.54ft (4.13m)
±500	8.03ft (2.45m)	8.16ft (2.49m)	8.44ft (2.57m)	8.71ft (2.65m)	8.99ft (2.74m)	9.25ft (2.82m)	9.55ft (2.91m)	9.82ft (2.99m)	10.1ft (3.08m)	10.38ft (3.16m)	10.65ft (3.25m)	10.92ft (3.33m)
±400	6.07ft (1.85m)	6.18ft (1.88m)	6.41ft (1.95m)	6.63ft (2.02m)	6.86ft (2.09m)	7.09ft (2.16m)	7.33ft (2.23m)	7.56ft (2.30m)	7.80ft (2.38m)	8.03ft (2.45m)	8.27ft (2.52m)	8.51ft (2.59m)
±250	3.50ft (1.07m)	3.57ft (1.09m)	3.72ft (1.13m)	3.87ft (1.18m)	4.02ft (1.23m)	4.18ft (1.27m)	4.34ft (1.32m)	4.5ft (1.37m)	4.66ft (1.42m)	4.83ft (1.47m)	5.00ft (1.52m)	5.17ft (1.58m)

²³ The distances in this Table are the minimums required to prevent Flash-over; however prudent vegetation maintenance practices dictate that substantially greater distances will be achieved at time of vegetation maintenance.

Guideline and Technical Basis

Effective dates:

The Compliance section is standard language used in most NERC standards to cover the general effective date and covers the vast majority of situations. A special case covers effective dates for (1) lines initially becoming subject to the Standard, (2) lines changing in applicability within the standard.

The special case is needed because the Planning Coordinators may designate lines below 200 kV to become elements of an IROL or Major WECC Transfer Path in a future Planning Year (PY). For example, studies by the Planning Coordinator in 2015 may identify a line to have that designation beginning in PY 2025, ten years after the planning study is performed. It is not intended for the Standard to be immediately applicable to, or in effect for, that line until that future PY begins. The effective date provision for such lines ensures that the line will become subject to the standard on January 1 of the PY specified with an allowance of at least 12 months for the applicable Transmission Owner or applicable Generator Owner to make the necessary preparations to achieve compliance on that line. A line operating below 200kV designated as an element of an IROL or Major WECC Transfer Path may be removed from that designation due to system improvements, changes in generation, changes in loads or changes in studies and analysis of the network.

<u>Date that Planning Study is completed</u>	<u>PY the line will become an IROL element</u>	<u>Effective Date</u>		
		<u>Date 1</u>	<u>Date 2</u>	<u>The later of Date 1 or Date 2</u>
05/15/2011	2012	05/15/2012	01/01/2012	05/15/2012
05/15/2011	2013	05/15/2012	01/01/2013	01/01/2013
05/15/2011	2014	05/15/2012	01/01/2014	01/01/2014
05/15/2011	2021	05/15/2012	01/01/2021	01/01/2021

Defined Terms:

Explanation for revising the definition of ROW:

The current NERC glossary definition of Right of Way has been modified to include Generator Owners and to address the matter set forth in Paragraph 734 of FERC Order 693. The Order pointed out that Transmission Owners may in some cases own more property or rights than are needed to reliably operate transmission lines. This definition represents a slight but significant departure from the strict legal definition of “right of way” in that this definition is based on engineering and construction considerations that establish the width of a corridor from a technical basis. The pre-2007 maintenance records are included in the current definition to allow the use of such vegetation widths if there were no engineering or construction standards that

referenced the width of right of way to be maintained for vegetation on a particular line but the evidence exists in maintenance records for a width that was in fact maintained prior to this standard becoming mandatory. Such widths may be the only information available for lines that had limited or no vegetation easement rights and were typically maintained primarily to ensure public safety. This standard does not require additional easement rights to be purchased to satisfy a minimum right of way width that did not exist prior to this standard becoming mandatory.

Explanation for revising the definition of Vegetation Inspection:

The current glossary definition of this NERC term was modified to include Generator Owners and to allow both maintenance inspections and vegetation inspections to be performed concurrently. This allows potential efficiencies, especially for those lines with minimal vegetation and/or slow vegetation growth rates.

Explanation of the derivation of the MVCD:

The MVCD is a calculated minimum distance that is derived from the Gallet equation. This is a method of calculating a flash over distance that has been used in the design of high voltage transmission lines. Keeping vegetation away from high voltage conductors by this distance will prevent voltage flash-over to the vegetation. See the explanatory text below for Requirement R3 and associated Figure 1. Table 2 of the Standard provides MVCD values for various voltages and altitudes. The table is based on empirical testing data from EPRI as requested by FERC in Order No. 777.

Project 2010-07.1 Adjusted MVCDs per EPRI Testing:

In Order No. 777, FERC directed NERC to undertake testing to gather empirical data validating the appropriate gap factor used in the Gallet equation to calculate MVCDs, specifically the gap factor for the flash-over distances between conductors and vegetation. See, Order No. 777, at P 60. NERC engaged industry through a collaborative research project and contracted EPRI to complete the scope of work. In January 2014, NERC formed an advisory group to assist with developing the scope of work for the project. This team provided subject matter expertise for developing the test plan, monitoring testing, and vetting the analysis and conclusions to be submitted in a final report. The advisory team was comprised of NERC staff, arborists, and industry members with wide-ranging expertise in transmission engineering, insulation coordination, and vegetation management. The testing project commenced in April 2014 and continued through October 2014 with the final set of testing completed in May 2015. Based on these testing results conducted by EPRI, and consistent with the report filed in FERC Docket No. RM12-4-000, the gap factor used in the Gallet equation required adjustment from 1.3 to 1.0. This resulted in increased MVCD values for all alternating current system voltages identified. The adjusted MVCD values, reflecting the 1.0 gap factor, are included in Table 2 of version 4 of FAC-003.

The air gap testing completed by EPRI per FERC Order No. 777 established that trees with large spreading canopies growing directly below energized high voltage conductors create the

greatest likelihood of an air gap flash over incident and was a key driver in changing the gap factor to a more conservative value of 1.0 in version 4 of this standard.

Requirements R1 and R2:

R1 and R2 are performance-based requirements. The reliability objective or outcome to be achieved is the management of vegetation such that there are no vegetation encroachments within a minimum distance of transmission lines. Content-wise, R1 and R2 are the same requirements; however, they apply to different Facilities. Both R1 and R2 require each applicable Transmission Owner or applicable Generator Owner to manage vegetation to prevent encroachment within the MVCD of transmission lines. R1 is applicable to lines that are identified as an element of an IROL or Major WECC Transfer Path. R2 is applicable to all other lines that are not elements of IROLs, and not elements of Major WECC Transfer Paths.

The separation of applicability (between R1 and R2) recognizes that inadequate vegetation management for an applicable line that is an element of an IROL or a Major WECC Transfer Path is a greater risk to the interconnected electric transmission system than applicable lines that are not elements of IROLs or Major WECC Transfer Paths. Applicable lines that are not elements of IROLs or Major WECC Transfer Paths do require effective vegetation management, but these lines are comparatively less operationally significant.

Requirements R1 and R2 state that if inadequate vegetation management allows vegetation to encroach within the MVCD distance as shown in Table 2, it is a violation of the standard. Table 2 distances are the minimum clearances that will prevent spark-over based on the Gallet equations. These requirements assume that transmission lines and their conductors are operating within their Rating. If a line conductor is intentionally or inadvertently operated beyond its Rating and Rated Electrical Operating Condition (potentially in violation of other standards), the occurrence of a clearance encroachment may occur solely due to that condition. For example, emergency actions taken by an applicable Transmission Owner or applicable Generator Owner or Reliability Coordinator to protect an Interconnection may cause excessive sagging and an outage. Another example would be ice loading beyond the line's Rating and Rated Electrical Operating Condition. Such vegetation-related encroachments and outages are not violations of this standard.

Evidence of failures to adequately manage vegetation include real-time observation of a vegetation encroachment into the MVCD (absent a Sustained Outage), or a vegetation-related encroachment resulting in a Sustained Outage due to a fall in from inside the ROW, or a vegetation-related encroachment resulting in a Sustained Outage due to the blowing together of the lines and vegetation located inside the ROW, or a vegetation-related encroachment resulting in a Sustained Outage due to a grow in. Faults which do not cause a Sustained outage and which are confirmed to have been caused by vegetation encroachment within the MVCD are considered the equivalent of a Real-time observation for violation severity levels.

With this approach, the VSLs for R1 and R2 are structured such that they directly correlate to the severity of a failure of an applicable Transmission Owner or applicable Generator Owner to manage vegetation and to the corresponding performance level of the Transmission Owner's

vegetation program's ability to meet the objective of "preventing the risk of those vegetation related outages that could lead to Cascading." Thus violation severity increases with an applicable Transmission Owner's or applicable Generator Owner's inability to meet this goal and its potential of leading to a Cascading event. The additional benefits of such a combination are that it simplifies the standard and clearly defines performance for compliance. A performance-based requirement of this nature will promote high quality, cost effective vegetation management programs that will deliver the overall end result of improved reliability to the system.

Multiple Sustained Outages on an individual line can be caused by the same vegetation. For example initial investigations and corrective actions may not identify and remove the actual outage cause then another outage occurs after the line is re-energized and previous high conductor temperatures return. Such events are considered to be a single vegetation-related Sustained Outage under the standard where the Sustained Outages occur within a 24 hour period.

If the applicable Transmission Owner or applicable Generator Owner has applicable lines operated at nominal voltage levels not listed in Table 2, then the applicable TO or applicable GO should use the next largest clearance distance based on the next highest nominal voltage in the table to determine an acceptable distance.

Requirement R3:

R3 is a competency based requirement concerned with the maintenance strategies, procedures, processes, or specifications, an applicable Transmission Owner or applicable Generator Owner uses for vegetation management.

An adequate transmission vegetation management program formally establishes the approach the applicable Transmission Owner or applicable Generator Owner uses to plan and perform vegetation work to prevent transmission Sustained Outages and minimize risk to the transmission system. The approach provides the basis for evaluating the intent, allocation of appropriate resources, and the competency of the applicable Transmission Owner or applicable Generator Owner in managing vegetation. There are many acceptable approaches to manage vegetation and avoid Sustained Outages. However, the applicable Transmission Owner or applicable Generator Owner must be able to show the documentation of its approach and how it conducts work to maintain clearances.

An example of one approach commonly used by industry is ANSI Standard A300, part 7. However, regardless of the approach a utility uses to manage vegetation, any approach an applicable Transmission Owner or applicable Generator Owner chooses to use will generally contain the following elements:

1. *the maintenance strategy used (such as minimum vegetation-to-conductor distance or maximum vegetation height) to ensure that MVCD clearances are never violated*

2. *the work methods that the applicable Transmission Owner or applicable Generator Owner uses to control vegetation*
3. *a stated Vegetation Inspection frequency*
4. *an annual work plan*

The conductor's position in space at any point in time is continuously changing in reaction to a number of different loading variables. Changes in vertical and horizontal conductor positioning are the result of thermal and physical loads applied to the line. Thermal loading is a function of line current and the combination of numerous variables influencing ambient heat dissipation including wind velocity/direction, ambient air temperature and precipitation. Physical loading applied to the conductor affects sag and sway by combining physical factors such as ice and wind loading. The movement of the transmission line conductor and the MVCD is illustrated in Figure 1 below.

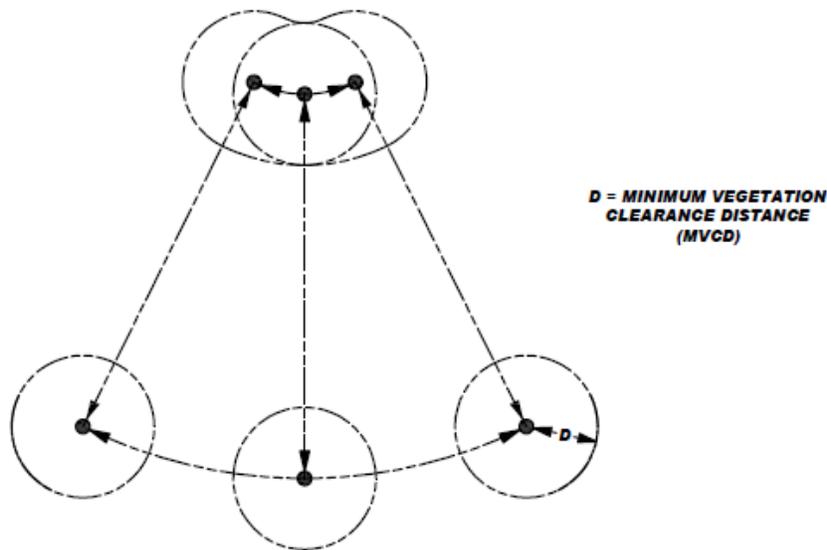


Figure 1

A cross-section view of a single conductor at a given point along the span is shown with six possible conductor positions due to movement resulting from thermal and mechanical loading.

Requirement R4:

R4 is a risk-based requirement. It focuses on preventative actions to be taken by the applicable Transmission Owner or applicable Generator Owner for the mitigation of Fault risk when a vegetation threat is confirmed. R4 involves the notification of potentially threatening vegetation conditions, without any intentional delay, to the control center holding switching authority for that specific transmission line. Examples of acceptable unintentional delays may

include communication system problems (for example, cellular service or two way radio disabled), crews located in remote field locations with no communication access, delays due to severe weather, etc.

Confirmation is key that a threat actually exists due to vegetation. This confirmation could be in the form of an applicable Transmission Owner or applicable Generator Owner employee who personally identifies such a threat in the field. Confirmation could also be made by sending out an employee to evaluate a situation reported by a landowner.

Vegetation-related conditions that warrant a response include vegetation that is near or encroaching into the MVCD (a grow-in issue) or vegetation that could fall into the transmission conductor (a fall-in issue). A knowledgeable verification of the risk would include an assessment of the possible sag or movement of the conductor while operating between no-load conditions and its rating.

The applicable Transmission Owner or applicable Generator Owner has the responsibility to ensure the proper communication between field personnel and the control center to allow the control center to take the appropriate action until or as the vegetation threat is relieved. Appropriate actions may include a temporary reduction in the line loading, switching the line out of service, or other preparatory actions in recognition of the increased risk of outage on that circuit. The notification of the threat should be communicated in terms of minutes or hours as opposed to a longer time frame for corrective action plans (see R5).

All potential grow in or fall in vegetation related conditions will not necessarily cause a Fault at any moment. For example, some applicable Transmission Owners or applicable Generator Owners may have a danger tree identification program that identifies trees for removal with the potential to fall near the line. These trees would not require notification to the control center unless they pose an immediate fall-in threat.

Requirement R5:

R5 is a risk-based requirement. It focuses upon preventative actions to be taken by the applicable Transmission Owner or applicable Generator Owner for the mitigation of Sustained Outage risk when temporarily constrained from performing vegetation maintenance. The intent of this requirement is to deal with situations that prevent the applicable Transmission Owner or applicable Generator Owner from performing planned vegetation management work and, as a result, have the potential to put the transmission line at risk. Constraints to performing vegetation maintenance work as planned could result from legal injunctions filed by property owners, the discovery of easement stipulations which limit the applicable Transmission Owner's or applicable Generator Owner's rights, or other circumstances.

This requirement is not intended to address situations where the transmission line is not at potential risk and the work event can be rescheduled or re-planned using an alternate work methodology. For example, a land owner may prevent the planned use of herbicides to control incompatible vegetation outside of the MVCD, but agree to the use of mechanical clearing. In

this case the applicable Transmission Owner or applicable Generator Owner is not under any immediate time constraint for achieving the management objective, can easily reschedule work using an alternate approach, and therefore does not need to take interim corrective action.

However, in situations where transmission line reliability is potentially at risk due to a constraint, the applicable Transmission Owner or applicable Generator Owner is required to take an interim corrective action to mitigate the potential risk to the transmission line. A wide range of actions can be taken to address various situations. General considerations include:

- Identifying locations where the applicable Transmission Owner or applicable Generator Owner is constrained from performing planned vegetation maintenance work which potentially leaves the transmission line at risk.
- Developing the specific action to mitigate any potential risk associated with not performing the vegetation maintenance work as planned.
- Documenting and tracking the specific action taken for the location.
- In developing the specific action to mitigate the potential risk to the transmission line the applicable Transmission Owner or applicable Generator Owner could consider location specific measures such as modifying the inspection and/or maintenance intervals. Where a legal constraint would not allow any vegetation work, the interim corrective action could include limiting the loading on the transmission line.
- The applicable Transmission Owner or applicable Generator Owner should document and track the specific corrective action taken at each location. This location may be indicated as one span, one tree or a combination of spans on one property where the constraint is considered to be temporary.

Requirement R6:

R6 is a risk based requirement. This requirement sets a minimum time period for completing Vegetation Inspections. The provision that Vegetation Inspections can be performed in conjunction with general line inspections facilitates a Transmission Owner's ability to meet this requirement. However, the applicable Transmission Owner or applicable Generator Owner may determine that more frequent vegetation specific inspections are needed to maintain reliability levels, based on factors such as anticipated growth rates of the local vegetation, length of the local growing season, limited ROW width, and local rainfall. Therefore it is expected that some transmission lines may be designated with a higher frequency of inspections.

The VSLs for Requirement R6 have levels ranked by the failure to inspect a percentage of the applicable lines to be inspected. To calculate the appropriate VSL the applicable Transmission Owner or applicable Generator Owner may choose units such as: circuit, pole line, line miles or kilometers, etc.

For example, when an applicable Transmission Owner or applicable Generator Owner operates 2,000 miles of applicable transmission lines this applicable Transmission Owner or applicable

Generator Owner will be responsible for inspecting all the 2,000 miles of lines at least once during the calendar year. If one of the included lines was 100 miles long, and if it was not inspected during the year, then the amount failed to inspect would be $100/2000 = 0.05$ or 5%. The “Low VSL” for R6 would apply in this example.

Requirement R7:

R7 is a risk-based requirement. The applicable Transmission Owner or applicable Generator Owner is required to complete its annual work plan for vegetation management to accomplish the purpose of this standard. Modifications to the work plan in response to changing conditions or to findings from vegetation inspections may be made and documented provided they do not put the transmission system at risk. The annual work plan requirement is not intended to necessarily require a “span-by-span”, or even a “line-by-line” detailed description of all work to be performed. It is only intended to require that the applicable Transmission Owner or applicable Generator Owner provide evidence of annual planning and execution of a vegetation management maintenance approach which successfully prevents encroachment of vegetation into the MVCD.

When an applicable Transmission Owner or applicable Generator Owner identifies 1,000 miles of applicable transmission lines to be completed in the applicable Transmission Owner’s or applicable Generator Owner’s annual plan, the applicable Transmission Owner or applicable Generator Owner will be responsible completing those identified miles. If an applicable Transmission Owner or applicable Generator Owner makes a modification to the annual plan that does not put the transmission system at risk of an encroachment the annual plan may be modified. If 100 miles of the annual plan is deferred until next year the calculation to determine what percentage was completed for the current year would be: $1000 - 100$ (deferred miles) = 900 modified annual plan, or $900 / 900 = 100\%$ completed annual miles. If an applicable Transmission Owner or applicable Generator Owner only completed 875 of the total 1000 miles with no acceptable documentation for modification of the annual plan the calculation for failure to complete the annual plan would be: $1000 - 875 = 125$ miles failed to complete then, 125 miles (not completed) / 1000 total annual plan miles = 12.5% failed to complete.

The ability to modify the work plan allows the applicable Transmission Owner or applicable Generator Owner to change priorities or treatment methodologies during the year as conditions or situations dictate. For example recent line inspections may identify unanticipated high priority work, weather conditions (drought) could make herbicide application ineffective during the plan year, or a major storm could require redirecting local resources away from planned maintenance. This situation may also include complying with mutual assistance agreements by moving resources off the applicable Transmission Owner’s or applicable Generator Owner’s system to work on another system. Any of these examples could result in acceptable deferrals or additions to the annual work plan provided that they do not put the transmission system at risk of a vegetation encroachment.

In general, the vegetation management maintenance approach should use the full extent of the applicable Transmission Owner’s or applicable Generator Owner’s easement, fee simple and

other legal rights allowed. A comprehensive approach that exercises the full extent of legal rights on the ROW is superior to incremental management because in the long term it reduces the overall potential for encroachments, and it ensures that future planned work and future planned inspection cycles are sufficient.

When developing the annual work plan the applicable Transmission Owner or applicable Generator Owner should allow time for procedural requirements to obtain permits to work on federal, state, provincial, public, tribal lands. In some cases the lead time for obtaining permits may necessitate preparing work plans more than a year prior to work start dates. Applicable Transmission Owners or applicable Generator Owners may also need to consider those special landowner requirements as documented in easement instruments.

This requirement sets the expectation that the work identified in the annual work plan will be completed as planned. Therefore, deferrals or relevant changes to the annual plan shall be documented. Depending on the planning and documentation format used by the applicable Transmission Owner or applicable Generator Owner, evidence of successful annual work plan execution could consist of signed-off work orders, signed contracts, printouts from work management systems, spreadsheets of planned versus completed work, timesheets, work inspection reports, or paid invoices. Other evidence may include photographs, and walk-through reports.

Notes:

The SDT determined that the use of IEEE 516-2003 in version 1 of FAC-003 was a misapplication. The SDT consulted specialists who advised that the Gallet equation would be a technically justified method. The explanation of why the Gallet approach is more appropriate is explained in the paragraphs below.

The drafting team sought a method of establishing minimum clearance distances that uses realistic weather conditions and realistic maximum transient over-voltages factors for in-service transmission lines.

The SDT considered several factors when looking at changes to the minimum vegetation to conductor distances in FAC-003-1:

- avoid the problem associated with referring to tables in another standard (IEEE-516-2003)
- transmission lines operate in non laboratory environments (wet conditions)
- transient over-voltage factors are lower for in-service transmission lines than for inadvertently re-energized transmission lines with trapped charges.

FAC-003-1 used the minimum air insulation distance (MAID) without tools formula provided in IEEE 516 2003 to determine the minimum distance between a transmission line conductor and vegetation. The equations and methods provided in IEEE 516 were developed by an IEEE Task Force in 1968 from test data provided by thirteen independent laboratories. The distances provided in IEEE 516 Tables 5 and 7 are based on the withstand voltage of a dry rod-rod air gap,

or in other words, dry laboratory conditions. Consequently, the validity of using these distances in an outside environment application has been questioned.

FAC-003-1 allowed Transmission Owners to use either Table 5 or Table 7 to establish the minimum clearance distances. Table 7 could be used if the Transmission Owner knew the maximum transient over-voltage factor for its system. Otherwise, Table 5 would have to be used. Table 5 represented minimum air insulation distances under the worst possible case for transient over-voltage factors. These worst case transient over-voltage factors were as follows: 3.5 for voltages up to 362 kV phase to phase; 3.0 for 500 - 550 kV phase to phase; and 2.5 for 765 to 800 kV phase to phase. These worst case over-voltage factors were also a cause for concern in this particular application of the distances.

In general, the worst case transient over-voltages occur on a transmission line that is inadvertently re-energized immediately after the line is de-energized and a trapped charge is still present. The intent of FAC 003 is to keep a transmission line that is in service from becoming de-energized (i.e. tripped out) due to spark-over from the line conductor to nearby vegetation. Thus, the worst case transient overvoltage assumptions are not appropriate for this application. Rather, the appropriate over voltage values are those that occur only while the line is energized.

Typical values of transient over-voltages of in-service lines are not readily available in the literature because they are negligible compared with the maximums. A conservative value for the maximum transient over-voltage that can occur anywhere along the length of an in-service ac line was approximately 2.0 per unit. This value was a conservative estimate of the transient over-voltage that is created at the point of application (e.g. a substation) by switching a capacitor bank without pre-insertion devices (e.g. closing resistors). At voltage levels where capacitor banks are not very common (e.g. Maximum System Voltage of 362 kV), the maximum transient over-voltage of an in-service ac line are created by fault initiation on adjacent ac lines and shunt reactor bank switching. These transient voltages are usually 1.5 per unit or less.

Even though these transient over-voltages will not be experienced at locations remote from the bus at which they are created, in order to be conservative, it is assumed that all nearby ac lines are subjected to this same level of over-voltage. Thus, a maximum transient over-voltage factor of 2.0 per unit for transmission lines operated at 302 kV and below was considered to be a realistic maximum in this application. Likewise, for ac transmission lines operated at Maximum System Voltages of 362 kV and above a transient over-voltage factor of 1.4 per unit was considered a realistic maximum.

The Gallet equations are an accepted method for insulation coordination in tower design. These equations are used for computing the required strike distances for proper transmission line insulation coordination. They were developed for both wet and dry applications and can be used with any value of transient over-voltage factor. The Gallet equation also can take into account various air gap geometries. This approach was used to design the first 500 kV and 765 kV lines in North America.

If one compares the MAID using the IEEE 516-2003 Table 7 (table D.5 for English values) with the critical spark-over distances computed using the Gallet wet equations, for each of the nominal voltage classes and identical transient over-voltage factors, the Gallet equations yield a more conservative (larger) minimum distance value.

Distances calculated from either the IEEE 516 (dry) formulas or the Gallet “wet” formulas are not vastly different when the same transient overvoltage factors are used; the “wet” equations will consistently produce slightly larger distances than the IEEE 516 equations when the same transient overvoltage is used. While the IEEE 516 equations were only developed for dry conditions the Gallet equations have provisions to calculate spark-over distances for both wet and dry conditions.

Since no empirical data for spark over distances to live vegetation existed at the time version 3 was developed, the SDT chose a proven method that has been used in other EHV applications. The Gallet equations relevance to wet conditions and the selection of a Transient Overvoltage Factor that is consistent with the absence of trapped charges on an in-service transmission line make this methodology a better choice.

The following table is an example of the comparison of distances derived from IEEE 516 and the Gallet equations.

**Comparison of spark-over distances computed using Gallet wet equations vs.
IEEE 516-2003 MAID distances**

(AC) Nom System Voltage (kV)	(AC) Max System Voltage (kV)	Transient Over-voltage Factor (T)	Clearance (ft.) Gallet (wet) @ Alt. 3000 feet	Table 7 (Table D.5 for feet) IEEE 516-2003 MAID (ft) @ Alt. 3000 feet
765	800	2.0	14.36	13.95
500	550	2.4	11.0	10.07
345	362	3.0	8.55	7.47
230	242	3.0	5.28	4.2
115	121	3.0	2.46	2.1

Rationale:

During development of this standard, text boxes were embedded within the standard to explain the rationale for various parts of the standard. Upon BOT approval, the text from the rationale text boxes was moved to this section.

Rationale for Applicability (section 4.2.4):

The areas excluded in 4.2.4 were excluded based on comments from industry for reasons summarized as follows:

- 1) There is a very low risk from vegetation in this area. Based on an informal survey, no TOs reported such an event.
- 2) Substations, switchyards, and stations have many inspection and maintenance activities that are necessary for reliability. Those existing process manage the threat. As such, the formal steps in this standard are not well suited for this environment.
- 3) Specifically addressing the areas where the standard does and does not apply makes the standard clearer.

Rationale for Applicability (section 4.3):

Within the text of NERC Reliability Standard FAC 003 3, “transmission line(s)” and “applicable line(s)” can also refer to the generation Facilities as referenced in 4.3 and its subsections.

Rationale for R1 and R2:

Lines with the highest significance to reliability are covered in R1; all other lines are covered in R2.

Rationale for the types of failure to manage vegetation which are listed in order of increasing degrees of severity in non-compliant performance as it relates to a failure of an applicable Transmission Owner's or applicable Generator Owner's vegetation maintenance program:

1. This management failure is found by routine inspection or Fault event investigation, and is normally symptomatic of unusual conditions in an otherwise sound program.
2. This management failure occurs when the height and location of a side tree within the ROW is not adequately addressed by the program.
3. This management failure occurs when side growth is not adequately addressed and may be indicative of an unsound program.
4. This management failure is usually indicative of a program that is not addressing the most fundamental dynamic of vegetation management, (i.e. a grow-in under the line). If this type of failure is pervasive on multiple lines, it provides a mechanism for a Cascade.

Rationale for R3:

The documentation provides a basis for evaluating the competency of the applicable Transmission Owner's or applicable Generator Owner's vegetation program. There may be many acceptable approaches to maintain clearances. Any approach must demonstrate that the

applicable Transmission Owner or applicable Generator Owner avoids vegetation to-wire conflicts under all Ratings and all Rated Electrical Operating Conditions.

Rationale for R4:

This is to ensure expeditious communication between the applicable Transmission Owner or applicable Generator Owner and the control center when a critical situation is confirmed.

Rationale for R5:

Legal actions and other events may occur which result in constraints that prevent the applicable Transmission Owner or applicable Generator Owner from performing planned vegetation maintenance work.

In cases where the transmission line is put at potential risk due to constraints, the intent is for the applicable Transmission Owner and applicable Generator Owner to put interim measures in place, rather than do nothing.

The corrective action process is not intended to address situations where a planned work methodology cannot be performed but an alternate work methodology can be used.

Rationale for R6:

Inspections are used by applicable Transmission Owners and applicable Generator Owners to assess the condition of the entire ROW. The information from the assessment can be used to determine risk, determine future work and evaluate recently-completed work. This requirement sets a minimum Vegetation Inspection frequency of once per calendar year but with no more than 18 months between inspections on the same ROW. Based upon average growth rates across North America and on common utility practice, this minimum frequency is reasonable. Transmission Owners should consider local and environmental factors that could warrant more frequent inspections.

Rationale for R7:

This requirement sets the expectation that the work identified in the annual work plan will be completed as planned. It allows modifications to the planned work for changing conditions, taking into consideration anticipated growth of vegetation and all other environmental factors, provided that those modifications do not put the transmission system at risk of a vegetation encroachment.

APPENDIX G - LINE PATROL AND INTERRUPTION REPORT

NEETNY INSPECTION REPORT

Corridor Name	Patrol Name	Patrol By	Due Date	NERC/NON-NERC	Status	Patrol Type	Patrol Method	Patrol Year	Region	Complete User	Completed DTM	GlobalID
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9. VEGETATION MANAGEMENT

Transmission Owners shall have a vegetation management program to improve 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**, maintaining clearances between transmission lines and vegetation on and along transmission **ROW**, and reporting vegetation related outages of the transmission systems to the respective **Regional Reliability Organizations (RRO)** and the North American Electric Reliability Council (NERC).(FAC-003)

9.1. VEGETATION RELATED OUTAGES

All vegetation related outages have to be classified as one of the following: Category 1 (Grow-ins: Outages caused by vegetation growing into lines from vegetation inside and/or outside the **Right-of-Way**), Category 2 (Fall-ins: Outages caused by vegetation falling into lines from inside the **Right-of-Way**), or Category 3 (Fall-ins: Outages caused by vegetation falling into lines from outside the **Right-of-Way**). All sustained vegetation-related transmission line outages on lines of 200kV or higher and any other lower voltage lines designated by NPCC (TFCO) to be critical to the reliability of the electric system will be reported by each RC and **Transmission Owner** to NPCC, or the **RRO**'s designee on a quarterly basis.

Those category 3 vegetation related outages that result from (1) vegetation falling into lines from outside the **Right-of-Way (ROW)** that result from natural disasters shall not be considered reportable (examples of disasters that could create non-reportable outages include, but are not limited to, earthquakes, fires, tornados, hurricanes, landslides, wind shear, major storms as defined either by the **Transmission Owner** or an applicable regulatory body, ice storms, and floods), and (2) Vegetation-related outages due to human or animal activity shall not be considered reportable (examples of human or animal activity that could cause a non-reportable outage include, but are not limited to, logging, animal severing tree, vehicle contact with tree, arboricultural activities or horticultural or agricultural activities, or removal or digging of vegetation) (FAC-003).

Appendix I

List of tall growing trees to be removed

*This is not intended to be a definitive list of shrubs and trees that cannot be left in the right-of-way. The vendor shall be responsible for knowing non-compatible trees and shrubs that will exceed 15 feet in the right-of-way

Common Name

Scientific Name

Balsam Fir	<i>Abies balsamea</i>
Maple	<i>Acer spp.</i>
Birch	<i>Betula spp.</i>
Hickory	<i>Carya spp.</i>
American Chestnut	<i>Castanea dentata</i>
Hornbeam	<i>Carpinus caroliniana</i>
Hackberry	<i>Celtis occidentalis</i>
Eastern Redbud	<i>Cercis canadensis</i>
Fringetree	<i>Chionanthus virginicus</i>
Flowering Dogwood	<i>Cornus Florida</i>
American Beech	<i>Fagus grandifolia</i>
Ash	<i>Fraxinus spp.</i>
Eastern Red Cedar	<i>Juniperus virginiana</i>
Sweet Gum	<i>Liquidambar styraciflua</i>
Tulip Poplar	<i>Liriodendron tulipifera</i>
Sweetbay Magnolia	<i>Magnolia virginiana</i>
Black Gum	<i>Nyssa sylvatica</i>
Spruce	<i>Picea spp.</i>
Pine	<i>Pinus spp.</i>
American Sycamore	<i>Plantanus occidentalis</i>
Cottonwood and Aspen	<i>Populus spp.</i>
Cherries	<i>Prunus spp.</i>
Oak	<i>Quercus spp.</i>
Willow	<i>Salix spp.</i>
Sassafras	<i>Sassafras albidum</i>
Basswood	<i>Tilia americana</i>
Elm	<i>Ulmus spp.</i>

Appendix J

Small Trees and Shrubs to be retained in the right-of-way

*This is not intended to be a definitive list of shrubs and trees that can be left in the right-of-way. The vendor shall be responsible for knowing compatible shrubs and trees that will not exceed 15 feet to be left in the right-of-way

Common Name

Arrowwood
Beach Plum
Black Chokeberry
Black Haw
Buttonbush
Common Ninebark
Cranberry Bush
Elderberry
Fragrant Sumac
Gray Dogwood
Marsh Elder
Nannyberry
Northern Bayberry
Red Chokeberry
Red-osier Dogwood
Sea Myrtle
Silky Dogwood
Silky Willow
Smooth Sumac
Spicebush
Staghorn Sumac
Swamp Rose
Sweet Pepperbush
Virginia Sweetspire
Winterberry

Scientific Name

Viburnum dentate
Prunus maritima
Caronia melanocarpa
Viburnum prunifolium
Cephalanthus occidentalis
Physocarpus opulifolius
Viburnum trillium
Sambucus canadensis
Rhus aromatica
Cornus racemosa
Iva frutescens
Viburnum lentago
Myrica pensylvanica
Caronia arbutifolia
Cornus sericea
Baccharis halimifolia
Cornus amomum
Salix sericea
Rhus glabra
Lindera benzoin
Rhus typhina
Rosa palustris
Clethra alnifolia
Itea virginica
Ilex verticillata

APPENDIX K
HERBICIDE TREATMENT FORM

Submit this form: **(1) immediately if any unusual circumstances occurred during treatment**
(2) as soon after treatment as possible, no later than 30 days

Treatment Information				
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Treatment Date (mm/dd/yyyy)	Starting Time (24 hr)	Ending Time (24 hr)	Ambient Air Temp (°F)	Water Temp (°F)
Wind Speed (mph)	Wind Direction	Expected Duration of Chemical Residuals		
Adverse Conditions Noted				

 If adverse conditions noted, indicate corrective actions taken

Onsite Supervision Present? <input type="radio"/> Yes <input type="radio"/> No	If Yes, Supervisor Name
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 Mixing and Loading Site Location (if other than business site or from prepackaged retail container or applied with equipment with a total capacity of not more than 5-gallons liquid or 50-pounds dry)

Applicator shall provide each customer with a free copy of each pesticide label used (if requested)

Applicator Information	
------------------------	--

Individual or Business Name	Telephone Number
Street Address	

City	State	ZIP Code
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Individuals Making Pesticide Application:	Last Name	First	Certification #
	Last Name	First	Certification #
	Last Name	First	Certification #

Name of Person Completing Form	Signature	Date Signed	Received by Initials

APPENDIX L: NEETNY VEGETATION OUTAGE REPORT

CORRIDOR NAME	
OUTAGE DATE AND TIME	
LINE SECTION NAME	
TYPE OF OUTAGE	
NERC REGION	
NERC LINE (OVER 200KV)	
TRANSMISSION OWNER	
Assigned To	
TYPE OF ROW	
WAS TREE PREVIOUSLY IDENTIFIED IN TV	
POLE #, STREET ADDRESS AND GPS POSITION	
PHOTOS TAKEN?	
SPECIES, HEIGHT AND DBH	
GENERAL TERRAIN CHARACTERISTICS AT SITE	
WAS TREE ALIVE OR DEAD	
HEIGHT OF ANY CHARRING OR DISCOLORATION THAT MAY HAVE OCCURED	
DISTANCE FROM CLOSEST TOWER/POLE FROM INCIDENT?	
DISTANCE TREE IS LOCATED TO THE OUTER EDGE OF EASEMENT	
HEIGHT OF CONDUCTORS AT INCIDENT SITE AND CONDITIONS	
OTHER EVIDENCE OR NOTE OF IMPORTANCE	
FACTS AND COUNTERMEASURES	
WEATHER DOCUMENTATION?	
REASON FOR TREE FAILURE	
DURATION OF OUTAGE	

APPENDIX M

NEETNY CONTACT LIST FOR NOTIFICATIONS

NEETNY Site	NEETNY Personnel Name	Contact Number(s)	Department	Position
Empire State Line	TBD		Operations	Field Tech
Empire State Line	Aaron Neville	561-904-3282	Vegetation Management	Leader Vegetation Operations – T/S
Empire State Line	Colleen Zak	941-423-4889	Vegetation Management	Sr. Vegetation Specialist