Exhibit Petitioner JSD-2

vermont electric power company

VELCO

TRANSMISSION VEGETATION MANAGEMENT PLAN

Revision 6

Rev #	Date	Description
0	1999	Original issued
1	9/2007	Revised to comply with NERC FAC-003-1
2	12/05/11	4 Year Cycle Revision, Removed ISO-NE OP#3 References
3	6/30/14	Revised to comply with FAC-003-3
4	7/25/14	Complete review of document to include formatting changes. Added approval signature block
5	10/1/16	Revised to comply with FAC-003-4
6	6/28/21	4 Year Cycle Revision, added compliance objective and incompatible vegetation exceptions

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Contents

Vermont Electric Power Company, Inc. (VELCO)
Transmission Vegetation
Management Plan

I. Purpose

VELCO's **T**ransmission **V**egetation **M**anagement **P**lan (TVMP) intends to document the maintenance policy, procedures, and specifications it uses to prevent the encroachment of vegetation into the **M**inimum **V**egetation **C**learance **D**istances (MVCD) of its applicable lines[1], as specified in *NERC Reliability Standard FAC-003-4 Transmission Vegetation Management*.

Although NERC Reliability Standard FAC-003-4 applies to overhead lines greater than 200kV[2] and those identified as elements of an Interconnection Reliability Operating Limit (IROL)[3], VELCO applies the practices within this TVMP to its entire electric transmission system regardless of voltage class including the transmission line assets owned by Vermont Transco, LLC and Vermont Electric Transmission Company, Inc. (VETCO).

This document is also utilized to meet the requirements of other applicable permits, rules and regulations.

II. Introduction

The Vermont Electric Power Company (VELCO) is responsible for maintaining "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]

VELCO's electric transmission system includes over 722 miles of overhead conductor with voltages of 115kV, 230kV, 345kV, and 450kV DC that travel along 12,079 acres of ROW throughout the state of Vermont and portions of New Hampshire.

VELCO recognizes its responsibility to maintain its ROW in the manner that will most appropriately balance avoiding the unreasonable risk of impacts to the environment, neighbors, occupants, workers, and users of the land on which or adjacent to which its ROW lie, promoting the reliability of the VELCO electric transmission system, and minimizing the expense of vegetation management over the long term.

It is the objective of VELCO to manage the vegetation growing on its ROW in accordance with this TVMP and all other applicable rules and regulations.

This TVMP will be reviewed and updated at a minimum every four years following a complete cycle of the transmission system or as needed.

III. Goals and Objectives

The goal of the TVMP is to establish a sustainable vegetation management plan to minimize encroachments into the MVCD of VELCO's ROW. VELCO identifies encroachment as:

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[1] NERC Reliability Standard FAC-003-4 Requirement 3
[2] NERC Reliability Standard FAC-003-4 Requirement 2
[3] NERC Reliability Standard FAC-003-4 Requirement 1
[4] NERC Reliability Standard FAC-003-4 Purpose

- A fall-in from inside the ROW that causes a vegetation-related Sustained Outage[5];
- Blowing together of applicable lines and vegetation located inside the ROW that causes a vegetation-related Sustained Outage[6];
- Vegetation growth into the MVCD that causes a vegetation-related Sustained Outage.[7]

In order to accomplish this goal, VELCO utilizes a system of vegetation management that manages plant communities in which compatible and incompatible vegetation are identified, action thresholds are considered, control methods are evaluated, and selected control(s) are implemented to achieve a specific objective. The choice of control method or methods is based on safety, environmental impact, effectiveness, site characteristics, security, and economics. This system of vegetation management is called Integrated Vegetation Management.[8]

The purpose of Integrated Vegetation Management is to promote sustainable plant communities that are compatible with the intended use of the site and to discourage incompatible plants that may pose concerns, including safety, security, access, fire hazard, electric service reliability, emergency restoration, visibility, line of sight requirements, regulatory compliance, environmental, or other specific concerns.[9] The primary objectives of VELCO's TVMP are reliability, safety, compliance, environmental impact, economics, access, public land impacts, aesthetics, public outreach and education, as well as the investigation of new technologies. Each objective is listed below with a description of how each is accomplished.

A. Reliability

VELCO shall manage vegetation located on its ROW pursuant to *NERC Reliability Standard FAC-003-4 Transmission Vegetation Management* so to ensure the reliability of its electric transmission system. By so doing, VELCO, along with other regional transmission entities, maintain the reliability of the region's Bulk Electric System (BES). The NERC Reliability Standard FAC-003-4 was originally adopted after the blackout of August 14, 2003. One of the initiating events of this blackout was contact between a transmission line and vegetation below the line.

Additionally, VELCO's vegetation management practices are designed to conform to the *American National Standards Institute ("ANSI") Standard A300 – Standard Practices for Tree Shrub and Other Woody Plant Maintenance (Integrated Vegetation Management - Electric Utility Rights-of-Way)*. The ANSI standard is considered a utility best management practice.

Along with the aforementioned Standards, VELCO properly maintains vegetation on its ROW to allow for easier access, long lines of sight, and improved visibility of structures, all of which aids in reducing restoration time in the event of a service interruption.

B. Safety

Safety is of paramount importance in all aspects of VELCO's operation of its electric transmission system to include the field execution of this TVMP. Safety practices are not solely for VELCO personnel, but also for the vegetation management contractors, landowners, neighbors, occupants, workers, and users of the land or adjacent land to the

[5] NERC Reliability Standard FAC-003-4 Requirement 1 & 2

[6] NERC Reliability Standard FAC-003-4 Requirement 1 & 2

[7] NERC Reliability Standard FAC-003-4 Requirement 1 & 2

[8] American National Standard for Tree Care Operations - Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Integrated Vegetation Management a. Electric Utility Vegetation Management, ANSI A300 (Part 7)-2018 IVM (American National Standards Institute, Inc.)

[9] American National Standard for Tree Care Operations - Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Integrated Vegetation Management a. Electric Utility Vegetation Management, ANSI A300 (Part 7)-2018 IVM (American National Standards Institute, Inc.)

ROW. When vegetation comes in contact with or grows close enough to the conductors (wires), there is risk of electrical arcing. This can cause injury, wide spread power outages, and potential fires. Transmission interruptions can lead to loss of electricity to thousands. This can also cause safety concerns including but not limited to national security, heating of homes, as well as loss of electricity to hospitals, schools, traffic lights, etc. Therefore, minimum clearances from vegetation and the conductors must be met to mitigate these safety concerns. Additionally, VELCO requires all personnel performing vegetation management on the system to follow the ANSI Z133, OSHA and VELCO safety standards which address arboriculture safety requirements for pruning, repairing, maintaining and removing trees.

C. Compliance

VELCO's approach to vegetation management is designed to meet or exceed full compliance with all standards, regulations, rules and laws that pertain to ROW management. VELCO has implemented processes, procedures, and practices to ensure compliance with the following list including but not limited to:

- NERC – FAC-003-4
- PUC 3.6 Rules
- VT Agency of Agriculture - Regulations for the Control of Pesticides
- Vermont Agency of Natural Resources – Vermont Wetland Rules
- Vermont Agency of Natural Resources – Vermont Threatened and Endangered Species Rules
- OSHA 1910.269 Safety Standards
- ANSI Z133 vegetation Management safety standards

D. Environmental Impact

VELCO strives to have an approach to vegetation management that minimizes the impact to the environment. VELCO takes many aspects into consideration when prescribing various vegetation management techniques. Those aspects include streams, wetlands, wildlife habitat, plant bio-diversity, soil erosion, rare, threatened and endangered species, and significant natural communities; all which are discussed below in more detail.

1. Enhance Wildlife Habitat

VELCO strives to have an approach to vegetation management that enhances wildlife habitat. VELCO understands that properly maintained ROW results in improved wildlife habitat for numerous plant and animal species, including songbirds and rare plants. General observations on VELCO ROWs indicate a noticeable bio-diversity that provides very favorable habitat for many wildlife species. ROW corridors that promote low growing desirable vegetation that is maintained in a stable early successional habitat have been proven to be beneficial to many species of wildlife. VELCO's role in managing early successional habitat is becoming more important as this habitat type is disappearing throughout Vermont as farms are abandoned and the land is developed or reverts to forest. By managing for early successional habitat, the ROW develops into a stable habitat type that promotes wildlife habitat improvement.

There have been many studies on this subject that VELCO references when making vegetation management decisions. The most recognized effort is a continuing research project initiated by Purdue University Professor Dr. William Byrnes and Dr. William Bramble Professor of Forestry, Penn State. This study has been performed on a transmission line ROW in Pennsylvania over nearly the last 60 years. The project concentrated on the vegetation management on a utility ROW and the relationship to

the habitat of wildlife. The research documented the effects that many different vegetation management techniques have on forage and cover for whitetail deer, cottontail rabbit, ruffed grouse, wild turkey, songbirds, reptiles, and other small mammals and birds. This study has resulted in initial conclusions indicating that Integrated Vegetation Management practices on ROW are extremely beneficial to wildlife.

VELCO has also conducted its own wildlife habitat assessments with the goal of gaining information in order to make sound vegetation management recommendations and to better understand its role in wildlife habitat management along its ROW. These assessments are conducted periodically and designed so that any gained information and knowledge can be expanded and applied throughout VELCO's electric transmission system.

a) Wildlife Travel Lanes

Wildlife travel lanes are maintained on some VELCO rights of way in appropriate locations to promote the movement of white tailed deer and other wildlife across the maintained corridor. In general, the management objectives include favoring vegetation that can support snow loading and thereby keep the snow depth on the ground shallow enough for deer to move about easily and conceal wildlife as they cross through the wildlife crossings within the ROW.

Specific vegetation management practices in wildlife crossings may include:

1. Selective removal of trees favoring crown closure.
2. Removing cut material or cutting up small enough so as not to interfere with animal movement in the travel lane.
3. Promoting compatible species of trees and shrubs.
4. Favoring the continued growth and reproduction of vegetation with canopies that intercept snow.
5. Limiting the use of mechanical methods during the bird nesting season

b) Stream Crossings

Stream crossings and shore lands of the ROW are also of particular concern for wildlife and erosion that requires special management objectives. The objective of stream crossing and shore land management is to favor vegetation that will shade the stream, lake or pond and control erosion, and promote bank stability. Wildlife also use stream channels and the associated riparian buffer as wildlife crossings, and are managed as such.

Specific vegetation management practices in stream crossings and shore lands shall include:

1. Selective removal of trees favoring crown closure to provide shade to the stream and shore land.
2. Removing cut material or cutting up small enough so as not to interfere with animal movement in the travel lane.
3. Favoring the continued growth and reproduction of compatible vegetation with canopies that provide shade to the stream or shore land.
4. Avoiding use of mechanical methods that may cause soil compaction or rutting to the greatest extent possible.
5. Leaving all stumps in place so that the root mats maintain bank stability.

6. Removing all slash and debris from the stream.

c) Wildlife Habitat Considerations

Wildlife habitat is also considered in areas other than wildlife Travel Lanes and Stream Crossings. Some of the practices employed to also enhance wildlife habitat include:

1. Promoting native biodiverse compatible vegetation that includes species that promote flowering grasses, shrubs, and forbs that promote pollinators.
2. Retaining fruit bearing trees and shrubs as incompatible vegetation exceptions as conditions allow.
3. Limiting the use of mechanical methods during the bird nesting season.

VELCO is actively or has been involved with many wildlife partnerships such as the National Wild Turkey Federation, The Ruffed Grouse Society, Wildlife Management Institute, Audubon Vermont and The Vermont Institute of Natural Sciences. VELCO has also partnered with Vermont Fish and Wildlife, Vermont Forests, Parks, and Recreation and the U.S. Fish and Wildlife to further improve wildlife habitat and actively seeks input from them when considering vegetation management policy changes. Examples of past VELCO wildlife habitat projects include:

1. Osprey Platform Installations – Vermont Fish and Wildlife
2. Woodcock Habitat Improvements – US Fish and Wildlife
3. Bald Eagle Nest investigation – Vermont Fish and Wildlife
4. Wild Turkey Habitat Improvements – NWTF
5. Bird Surveys – Audubon Vermont

2. Wetland Impacts

The intent of the VELCO TVMP is to approach vegetation management with the least amount of impact to Class 1 and Class 2 wetlands and their respective buffers. VELCO practices "The routine repair and maintenance of utility poles, lines and corridors in a manner which minimizes adverse impacts and is in accordance with Best Management Practices developed by the Secretary".[10] This practice is allowed without a permit.

A study was conducted in Massachusetts in 1989 concerning the use of ROW management techniques, including the use of herbicides to control undesirable vegetation in wetlands. The study concluded that there is no significant impact to wetlands from vegetation management techniques. Mechanical treatments resulted in relatively higher impacts than selective herbicide use. Mechanical techniques had a significantly higher impact on the cover value of herbaceous vegetation than herbicide techniques. Wildlife habitat values were rated low for mechanical techniques and medium for herbicide techniques. Residues from petroleum products such as bar and chain oil or hydraulic fluid were found in the leaf litter on mechanically treated sites. No herbicide residues were found on herbicide treated sites.[11] Many wetland species

[10] Vermont Wetland Rules (2020) Section 6

[11] Study of the Impacts of Vegetation Management Techniques on Wetlands for Utility Rights-of Way in the Commonwealth of Massachusetts, Environmental Consultants, Inc., June 1989, p ES-6

are low growing and are desirable species. By removing the undesirable species, the desirable species can out-compete undesirable species which reduces need for additional vegetation management during subsequent cycles.

3. Rare, Threatened, and Endangered Species Impacts

The intent of the VELCO TVMP is to approach vegetation management with the least amount of impact to rare, threatened, and endangered species as possible. VELCO has developed Best Management Practices (BMPs) in partnership with the Vermont Agency of Natural Resources to reduce potential impacts to threatened and endangered species while meeting the goals and objectives of the TVMP. VELCO also applies the BMPs to rare species, as warranted. ROW corridors promote low growing compatible vegetation that is maintained in a stable, early successional habitat. By managing for early successional habitat, the ROW develops into a stable habitat type that is favored and supports many rare, threatened and endangered species.

4. Significant Natural Community Impacts

VELCO approaches vegetation management with the least amount of impact to significant natural communities. VELCO is collaborating with the Vermont Agency of Natural Resources to map significant natural community areas as they are identified. This will assist VELCO in having the least amount of impact possible while meeting the overall goals and objectives of the TVMP.

5. Invasive Species

Invasive non-native species of plants are of concern. In areas where invasive non-native plants are being controlled or attempted to be controlled off the ROW by a landowner, VELCO will work with the landowner to control the invasive non-native species on the ROW as well. VELCO will also attempt to control non-native pioneer occurrences of invasive species that are identified. These invasive non-native species may include but are not limited to: glossy and common buckthorn, oriental bittersweet, Japanese knotweed, Japanese barberry, phragmites or common reed, and several species of honeysuckle.

6. Erosion Control

Erosion control becomes a concern when vegetation is completely removed from the ROW. Promoting stable plant communities on the ROW allows strong, healthy root-mat conditions that are effective in stabilizing soil and controlling erosion. This vegetation management plan encourages the growth of compatible plant species such as ferns and grasses, sweet-fern, blueberries, blackberries, raspberries, dogwood and other low-growing shrubs as well as a variety of wild flowers. In areas where there are compatible species, erosion control is typically less of a concern due to the fact that most plant species are not removed. In areas where incompatible species dominate the ROW, erosion controls may be needed if root-mat conditions of the incompatible species are not effective in controlling erosion until either compatible species begin to grow in or incompatible species re-sprout.

Erosion along stream banks is of particular concern when removing vegetation near streams to avoid sediment transport into the stream. VELCO encourages compatible vegetation to grow along stream banks. If incompatible species dominate the species composition of a stream crossing, removing all vegetation during one cycle will be avoided, if possible. If removing all vegetation cannot be avoided, appropriate erosion control methods would be used.

If it is determined that erosion control measures are required, they will be implemented in accordance with the VELCO Environmental Guidance Manual.

E. **Economics**

VELCO approaches vegetation management in a manner that has the least cost to Vermont's rate payers as possible while being effective at mitigating vegetation caused interruptions and outages. Various vegetation management strategies and techniques as well as various vegetation management cycle intervals can have an impact to the cost of maintaining the VELCO electric transmission system. VELCO considers these economic factors when making vegetation management decisions.

F. **Public Land Impacts**

VELCO executes vegetation management with the least amount of impact to public lands such as State of Vermont Wildlife Management Areas, State Forests and Parks, Green Mountain National Forests and many municipal forests and parks. VELCO will work with various agencies to develop vegetation management strategies to meet the objectives of the TVMP and the goals of the site.

G. **Maintain Access**

VELCO controls vegetation along access roads on and off the ROW corridor to allow for crews to be able to safely and efficiently traverse the ROW to access structures, guy wires and other equipment for emergency and routine transmission line and vegetation maintenance. Vegetation will be maintained in an herbaceous state on access roads, around structures, guy wires and other equipment.

H. **Aesthetics**

VELCO endeavors to establish aesthetically pleasing ROWs and effective road screens where feasible. This will be accomplished by promoting low growing compatible vegetation to the greatest extent possible to ensure normal vegetation management cycle intervals. Incompatible tall growing species will not be allowed to grow in road screens and the continued growth and reproduction of compatible vegetation will be favored.

I. **Public Outreach and Education**

VELCO understands that for a vegetation management program to be successful, the plan needs to inform the public and all stakeholders of the vegetation management plan, techniques implemented, and the status of the program used by VELCO. VELCO will proactively seek opportunities to engage the public and other stakeholders. VELCO will accomplish this through public outreach to various partners and affiliations including:

1. National Arbor Day Foundation – Tree Line USA
2. United States Environmental Protection Agency – Pesticide Environmental Stewardship Partnership
3. Vermont Urban and Community Forestry Council
4. National Wild Turkey Federation – Energy for Wildlife
5. Utility Arborists Association
6. International Society of Arboriculture
7. ROW Steward Accreditation

J. **Investigate New Technology**

As new technologies immerge, VELCO shall investigate and evaluate them for their ability to meet the goals and objectives of the TVMP and, if warranted, add them to the ROW management program. The items that should be considered when evaluating new technologies are:

- Need - does the new technology fill a need in gaps to meet or exceed the goals and objectives of the TVMP in existing program?
- Synergy - does the new technology fit well into existing goals and objectives of the TVMP?
- Cost/Benefit - does the new technology make a solid business case when comparing the financial cost to the proposed value?

IV. Integrated Vegetation Management Program

A. Description

VELCO utilizes a system of vegetation management that manages plant communities in which compatible and incompatible vegetation are identified, action thresholds are considered, control methods are evaluated, and selected control(s) are implemented to achieve a specific objective. Choice of control methods is based on effectiveness, environmental impact, site characteristics, safety, security, and economics. This system of vegetation management is called Integrated Vegetation Management.[12]

The primary factors in determining the compatible and incompatible species of vegetation are:

- Growth rate potential of the vegetation;
- Engineering design of the line to NESC minimum ground clearances at maximum operating conditions operating under its highest seasonal rating based on Facility Ratings.
- Movement of the conductors including sag and sway along with its relationship to vegetation
- Required MVCD

Based on those criteria, VELCO has developed three categories of vegetation growing within the ROW.

- Compatible Vegetation - Vegetation that does not mature at heights greater than 12 feet. The ROW must be maintained with compatible vegetation that doesn't mature at heights greater than 12 feet and grows very slowly.
- Incompatible Vegetation – Vegetation that matures at heights greater than 12 feet. All incompatible species must and will be removed because they have the potential to exceed the safe tree height in the four-year cycle interval.
- Incompatible Exceptions – Vegetation that matures at heights of greater than 12 feet however due to various exceptions may be allowed to remain within the ROW.

1. Compatible Vegetation

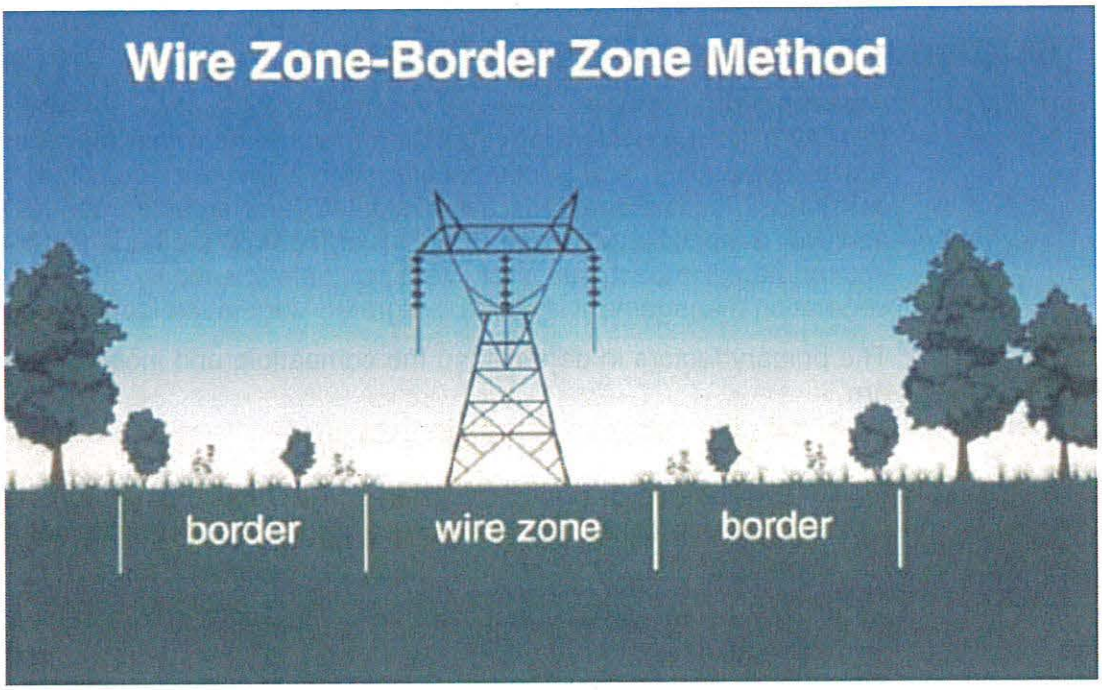
Compatible Vegetation is defined as vegetation that is allowed to grow on the ROW that does not mature at heights greater than 12 feet. We further break down compatible vegetation into 2 zones, the Wire Zone and the Border Zone.

Integrated Vegetation Management as described in the ANSI A300 (Part 7) also promotes the Wire Zone/Border Zone (WZ/BZ) approach for the management of ROW vegetation. The wire zone is typically a band of low-growing grasses and shrubs that do not typically mature at heights of 12 feet, which are referred to as wire zone

[12] American National Standard for Tree Care Operations - Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Integrated Vegetation Management a. Electric Utility Vegetation Management, ANSI A300 (Part 7)-2018 IVM (American National Standards Institute, Inc.)

compatible species. The border zone may have taller species that, at their mature height, may occasionally exceed the 12-foot mature height. We refer to these as border zone compatible species.

Figure 1 illustrates a typical Wire Zone/Border Zone.



a) Wire Zone

The Wire Zone is described as the area directly under the conductors and 15 feet beyond the conductors on each side of directly underneath the conductors. This area varies due to different construction types and structure cross arm lengths. The main concerns in maintaining vegetation in the wire zone is to ensure vegetation does not grow tall enough to grow into the wires and wires do not sag into the vegetation during heavy load conditions, or a combination of both does not occur. This area is managed for vegetation that does not mature at heights greater than 12 feet under normal conditions. If a compatible species exceeds the 12-foot height restriction, it is assessed through a reliability risk assessment during the inventory process and scheduled for control if determined to exceed the action threshold. Below is a list of example compatible vegetation for the wire zone area:

Wire Zone Compatible Vegetation[13]		
American Elder	Northern Dewberry	Arrowwood
Red Chokeberry	Red Raspberry	Creeping Juniper
Japanese Barberry*	Black Elderberry	Mountain Laurel
Buttonbush	Green Briar	Spicebush
Sweet Pepper Bush	Meadowsweet	Sweet Gale

[13] Northeastern Shrub and Short Tree Identification: A guide for ROW Vegetation Management, Ballard, Benjamin; Whittier, Heather; Nowak, Christopher, Eastwood Litho Syracuse, NY, 2004.

Silky Dogwood	Snowberry	Mountain Holly
Round Leaf Dogwood	Low bush Blueberry	Ninebark
American Hazelnut	Cranberry	Pinkster-flower Azalea
Bush Honeysuckle	Maple-leaf Viburnum	Shining Sumac
Huckleberries	Northern Wild Raisin	Roses
Winterberry	Thimble Berry	Northern Blackberry
Common Juniper	Black Chokeberry	Running Blackberry
Sheep Laurel	Bearberry	Black Raspberry
Common Privet	Common Barberry	Red Elderberry
Honeysuckles*	Leather Leaf	Bull Briar
Northern Bayberry	Sweet Fern	Steeplebush
Virginia Creeper	Gray Dogwood	American Yew
Beach-plum	Red Osier Dogwood	High bush Blueberry
Swamp Azalea	Beaked Hazelnut	Deer berry
Gooseberries	Autumn Olive*	Witch-hobble
Multiflora Rose*	Inkberry	High bush Cranberry

* Denotes species that are known to have non-native invasive characteristics in Vermont.

b) Border Zone

The border zone is described as the area outside of the wire zone on both sides of the wire zone that extend out to the edge or cleared width of the ROW. The main concern for maintaining the vegetation in the border zone is to ensure that vegetation does not grow tall enough to grow or blow into the MVCD or fall into the conductors during wind events. This area is managed for vegetation that does not normally mature at heights greater than 12 feet, but may occasionally. If the vegetation exceeds the 12- foot maximum safe tree height restriction, it is removed. The main factors in allowing the taller species is for aesthetics, wildlife habitat concerns, wildlife crossings, stream crossings and other environmentally sensitive areas, and obtaining biological control of incompatible species through the development of a complex shrub mosaic. However, all required minimum clearances as described above must be met. Below is a list of example compatible vegetation for the border zone area:

Border Zone Compatible Vegetation		
Speckled Alder	Smooth Sumac	American Holly
Serviceberry	Pussy Willow	Prickly Ash
Blue Beech	Shining Willow	Choke Cherry
Eastern Red Cedar	American Mountain Ash	Scrub Oak
Flowering Dogwood	Crab Apples	Glossy Buckthorn*
Witch-hazel	Common Alder	Staghorn Sumac
Mountain Maple	American Hornbeam	Diamond Willow
Common Apples	White Cedar	Purple Willows
Common Pears	Alternate-leaf Dogwood	Striped Maple
Common Buckthorn*	Hawthorns	

* Denotes species that are known to have non-native invasive characteristics in Vermont.

2. Incompatible Vegetation

Incompatible Vegetation is vegetation that exceeds a height of greater than 12 feet at maturity. These species typically grow very fast, especially at early stages of their life cycles. The fast growing nature of these species is often emphasized when they exceed the height of the compatible species canopy and receive full sunlight. Many of these species also re-sprout very quickly and densities increase substantially with most control measures with exception of chemical controls. Due to these factors, these incompatible plants are removed in both the wire zone and border zone. Below is a list of example incompatible vegetation.

Incompatible Vegetation		
Common Name	Scientific Name	Mature Height
Ash, White, Green	Fraxinus	40-80'
Aspen, Quaking, Big Tooth	Populus	50-80'
Basswood, Lindens	Tilia	60-80'
Beech, American	Fagus	70-80'
Birch, Black, Yellow, White, Grey	Betula	50-70'
Boxelder	Acer	50-70'
Butternut	Juglans	40-60'
Catalpa	Catalpa	90-120'
Cherry, Black, Pin, Fire	Prunus	30-60'
Cottonwood	Populus	80-100'
Elm, American, Slippery	Ulmus	60-90'
European Larch	Larix	40-80'
Fir, Balsam	Abies	40-60'
Hemlock	Tsuga	60-80'
Hickory, Shagbark, Bitternut	Carya	70-80'
Hop Hornbeam	Ostrya	30-50'
Maple, Red, Sugar, Norway, Silver	Acer	60-90'
Oak, Black, Red, Chestnut, White, Burr	Quercus	60-80'
Pine, White, Red, Scotch	Pinus	70-100'
Sycamore	Platanus	80-100'
Spruce, Red, White, Black, Norway	Picea	60-80'
Yellow Poplar, Tulip tree	Liriodendron	70-90'
Willow, Weeping, Crack, Black	Salix	30-40'

3. Incompatible Exceptions to the maximum safe tree height

In certain locations, there may be exceptions to the maximum safe tree height. These locations require a significant air gap between the conductors and the maximum tree height. In certain areas, trees may be allowed to remain at heights greater than the 12-foot maximum as specified in annual work plans. LiDAR may be utilized to assist in validating these exceptions.

Exceptions may include but are not limited to:

1. Deep valleys
2. Wildlife trees including wild apple trees
3. Wildlife crossings

4. Planted landscape trees

The relationship between the vegetation and the engineering design of the line including the conductors sag and sway are critical in maintaining an air gap to ensure that vegetation does not encroach on the Minimum Vegetation Clearance Distance (MVCD) to prevent flash over from conductors to vegetation. The air gap between the maximum safe tree height of 12 feet and the MVCD during all operating conditions of the line as the conductors sag and sway allows for a buffer of tree growth between the maximum safe tree height and the MVCD to ensure the MVCD is not encroached.

The Figures in Appendix A show the relationship between the maximum safe tree heights of 12 feet and how the line design, conductor sag and sway and the MVCD during all operating conditions of the line for the various voltages in the system.

Minimum Vegetation Clearance Distances (MVCD) [14]
For AC & DC Voltages

System Voltage (KV)		Minimum Vegetation Clearance Distances (MVCD) In Feet												
		OVER	Sea Level	500	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
AC		UP TO	500	1000	2000	3000*	4000	5000	6000	7000	8000	9000	10000	11000
Nominal	Max[1]													
345	362		4.3ft	4.3ft	4.4ft	4.5ft	4.6ft	4.7ft	4.8ft	4.9ft	5.0ft	5.1ft	5.2ft	5.3ft
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
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
±500 kV DC			8.03ft	8.16ft	8.44ft	8.71ft	8.99ft	9.25ft	9.55ft	9.82ft	10.1ft	10.38ft	10.65ft	10.92ft

B. Action Threshold

A four-year vegetation management cycle has been established as an action threshold. This vegetation management cycle has been time tested since 1980 and is based on the engineering design of the line, the growth rate potential of the vegetation, and required Minimum Vegetation Clearance Distance (MVCD). Appendix B illustrates the four-year vegetation management cycle.

C. Annual Work Plan Development

In keeping with an integrated approach to vegetation management, prior to each management cycle an inventory of vegetation conditions shall be completed. The inventory will record information utilizing a GIS based computer program called Vegetation Inventory Program (VIP) of existing ROW conditions. VIP also has data layers that assist in decision making as to the prescribed vegetation management. The data layers consist of line and ROW data, environmental data, LiDAR data, landowner and other stakeholder information.

LiDAR data is also an information layer that is utilized in the inventory process to assist VELCO vegetation management staff as a decision making tool. LiDAR technology allows for a visualization of vegetation impacts to a modeled transmission system at maximum operating conditions, including sag and sway. The vegetation impacts can also have buffer triggers added to allow for tree growth to visually predict and project vegetation issues caused by trees growing into, swaying into, or falling into the MVCD. This data may be utilized to determine if incompatible exceptions may be allowed without any potential to encroach upon the MVCD.

[14] 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.

These data layers are utilized to assist in the determination of a vegetation risk assessment, level of control that is required, which method of control should be prescribed, whether the ROW edge has encroached and needs to be widened, and any restrictions that may affect the vegetation management that is prescribed.

Additionally, current vegetation conditions are collected such as compatible and incompatible stem densities and adjacent land use. This data can provide insight as to the effectiveness of vegetation management treatments.

The inventory is developed into the Annual Work Plan.

D. Methods of Vegetation Control

VELCO will maintain its rights of way in the manner that most appropriately balances avoiding unreasonable risk of harm to the environment, workers, neighbors, occupants, and users of the land on which or adjacent to which its rights of way lie, promoting the reliability of the VELCO transmission system, and minimize expenses over the long term. The overall strategy is implementing the vegetation management technique that best meets the goals and objectives of the TVMP.

The methods of vegetation control are Manual, Mechanical, Biological and Chemical. Each method has various types of tools and applications.

1. Manual Methods

Manual methods of vegetation control include the use of chainsaws and brush saws. They are frequently used in areas where chemical methods are restricted and where non- chemical alternatives are favored.

Advantages of Manual methods are:

- Can be employed year round
- Generally accepted by the public
- Selective as only incompatible species are removed

Disadvantages of Manual methods are:

- Loss of plant bio-diversity as generally promotes higher densities of incompatible plant species.
- Most incompatible species re-sprout, increasing stem densities therefore only gaining short term control.
- More exposure to personal injuries as chainsaws can be hazardous to operate.
- Increase in illegal dumping due to increased brush density and decreased lines of sight.
- Reduced wildlife habitat due to higher densities of incompatible vegetation that develop cyclic rather than stable plant communities.
- Increase in petroleum product pollution from bar and chain oil which does not break down quickly and is prone to migrating.
- Manual methods are labor intensive and higher cost than other methods.

2. Mechanical Methods

Mechanical methods of vegetation control include mowing of brush with specialized equipment designed for cutting and grinding brush. They are used in areas where Chemical methods are restricted and non-chemical alternatives are favored.

Advantages of Mechanical methods are:

- Can be employed year round with the exception of deep snow cover or extreme cold temperatures.
- Generally accepted by the public.

Disadvantages of Mechanical methods are:

- Loss of plant bio-diversity as generally this practice promotes monocultures of incompatible plant species.
- Non-selective as compatible as well incompatible species are removed.
- Most incompatible species re-sprout, increasing stem densities, therefore only short term control is achieved.
- More exposure to personal injuries from flying debris can be hazardous to operators, bystanders and the public.
- Due to the need for heavy equipment, there is potential for soil compaction and rutting that can lead to soil erosion problems.
- Increase in illegal dumping due to increased brush density and decreased lines of sight.
- Reduced wildlife habitat due to monocultures of incompatible vegetation that develop cyclic rather than stable plant communities.
- Risk for petroleum product pollution from hydraulic oil leaks and spills which do not break down quickly and are prone to migrating.
- Mechanical methods require heavy equipment and are typically more costly than other methods.
- Mechanical methods may be a potential fire hazard during extremely dry conditions.

3. Biological / Cultural Methods

Biological methods are used in limited locations. The most common is converting ROW to a higher use. Planting in the ROW is difficult because of existing root masses. Grubbing of stumps and preparing the soil to be suitable for planting is expensive and is the main limiting factor of this method. The introduction of vegetation eating insects, wood decaying fungus and burning the ROW are not practical and present risks due to the high probability of those methods leaving the ROW onto adjacent lands.

In some cases, typically following multiple cycles of chemical applications, plant communities can convert to ecosystems that are resistant to the establishment of incompatible vegetation. In this process the compatible vegetation, in particular compatible woody shrubs, out compete the incompatible species and serve as natural biological control. Some example communities present on VELCO's rights of way include ferns, golden rod, blackberry, raspberry, alder, some species of shrub willow, and native and non-native grasses.

Advantages of Biological Control Methods are:

- Generally accepted by the public.
- Typically, longer term than manual or mechanical methods, however tree seedlings will eventually seed back into the right way if not maintained.

Disadvantages of Biological methods are:

- Typically has a loss of plant bio-diversity as generally promotes monocultures.

- Typically cost prohibitive to establish.
- Due to need for heavy equipment, there is potential for soil compaction and rutting that can lead to soil erosion problems.
- High probability of those methods leaving the ROW onto adjacent lands.

4. Chemical Methods

VELCO currently employs Ultra Low Volume Foliar, Low Volume Basal, and Cut Stump herbicide application methods. The application method is selected depending on site characteristics such as stem densities, environmental concerns, aesthetic concerns, and landowner preferences.

Advantages of Chemical Control Methods

- Safest vegetation management practice for vegetation management workers.
- Only long term vegetation management method.
- Hand held applications allow species selectivity.
- Regulated activity, which controls product and application.
- Promotes bio-diversity among plants and wildlife.
- Products used bio-degrade quickly.
- Products used are not prone to leaching.
- Only method that reduces stem densities of undesirable plant species reducing future management costs.
- Stable plant communities lead to long term aesthetic improvement.
- Stable plant communities improve wildlife habitat.
- Only feasible control method for invasive species.

Disadvantages of Chemical Control Methods

- Generally, less acceptable to the public.
- Limited window of opportunity for application.
- Requires additional training of workers.
- Applications limited to annual permit requirements.
- Short term aesthetic concerns.

Each application method is explained in detail below:

a) Ultra Low Volume Foliar

Ultra Low Volume Foliar is an herbicide application method where the herbicide solution is applied directly to the foliage of the incompatible species of vegetation. This application is very selective as there is little to no runoff and in low densities of incompatible species can be controlled as a spot type treatment. This application is typically made from a back pack sprayer following full leaf out which is typically the middle to the end of June until leaf coloration which is usually the first of October. This application is 90-95% effective in controlling the incompatible species in one application.

b) Low Volume Basal

Low Volume Basal applications are made to the stems of individual trees. The application is made to the complete circumference of lower 6-18 inches of the

tree depending on the diameter. This application can be made during the growing or dormant season with the exception of frozen ground or snow cover using a back pack sprayer and low volume wand or hand spray bottle. The application is very selective as only stems of undesirable vegetation are treated. This application is 85-90% effective in controlling the incompatible species in one application.

c) Cut Stump Treatment

Cut Stump Treatments are made directly to stumps of undesirable trees following manual treatments and sometimes following mechanical treatments. This application can also be made during the growing or dormant season with the exception of frozen ground or snow cover using a back pack sprayer and low volume wand. The application is very selective as only the stumps of undesirable vegetation are treated. This application is 85-90% effective in controlling the incompatible species in one application.

d) High Volume Foliar

High Volume Foliar is an herbicide application method where the herbicide application is made directly to the foliage of the incompatible species of vegetation. This application can be selective in low densities of incompatible species when used as a spot type treatment. This application is typically made from a piece of equipment with a machine/trailer mounted bulk tank following full leaf out which is typically the middle to the end of June until leaf coloration which is usually the first of October. This application is 90-95% effective in controlling the incompatible species in one application. This application is typically used on high density undesirable vegetation. Due to the prevalent vegetation composition of VELCO's ROW, VELCO does not typically employ this application method. However, this may be the method of choice to reclaim areas where herbicides have not been used in the past or when new lines are constructed, or in areas of high density incompatible vegetation to lower stem densities prior to employing other application techniques.

e) Aerial Herbicide Applications

Aerial Herbicide applications are herbicide applications made from helicopters or fixed wing aircraft to the foliage of vegetation. VELCO does not utilize this method.

VELCO has conscientiously assessed the significant benefits and risks of the use of herbicides and their alternatives in the maintenance of its rights of way. Consequently, VELCO has concluded that it will best fulfill its responsibilities to ensure a reliable transmission system by utilizing the limited and selective use of herbicides as described in this plan.

VELCO shall not use herbicides for ROW vegetation management unless it is:

- registered for general use by the U.S. Environmental Agency (under authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), EPA must classify all pesticide products for either "general" or "restricted" use),
- Approved for use by the Vermont Agency of Agriculture,
- Determined by the Company's experience, or the experience of others, to be effective for the purposes for which it is used.

General use pesticides, as defined by the EPA, are those that will not cause unreasonable adverse effects to the user or the environment when used in accordance with the label instructions. Under FIFRA, "unreasonable adverse effects on the environment" means any unreasonable risk to man or the environment, taking into

account the economic, social, and environmental costs and benefits of the use of any pesticide.

Restricted use pesticides are those which may cause adverse effects to the applicator or the environment unless applied by persons who have been specifically trained in their use. VELCO does not use any EPA restricted use herbicides.

The following describes VELCO's specific methods of herbicide use.

- Herbicides shall be applied only by manual methods that target individual plants or compact clusters of plants. Aerial or broadcast applications of herbicides shall not be utilized for ROW vegetation management.
- Shall be applied only by applicators trained as required by FIFRA or, if FIFRA has no training requirements for the particular herbicide, then the applicator shall be trained by, or according to the direction of and to the satisfaction of VELCO's Supervisor of ROW Management.
- Herbicides shall be applied in strict accordance with the instructions of the manufacturer and the requirements of any applicable state or federal agency, provided that, if VELCO's experience, or generally accepted practices within the industry, indicate the need for more restrictive application, then such greater restrictions shall be applied.
- Herbicides shall be applied in accordance with the products label directions to be effective for the purposes for which they are used.
- VELCO will participate in the US EPA Pesticide Environmental Stewardship Program (PESP) to minimize the impacts to the environment.
- The requirements and limitations of this TVMP shall apply both to VELCO personnel and to any outside contractor engaged to perform ROW vegetation management.

Prohibition on use of herbicides

- Herbicides shall not be used in violation of any applicable law or regulation.
- Herbicides shall not be used at locations where or during times when they may pose a greater than normal risk of off-target dispersion (e.g. rain, snow, frozen ground, adjacent to streams or gardens, or in more than moderate wind).
- Herbicides shall not be used within water supply buffer zones as required by Agency of Agriculture Permit requirements.
- Herbicides shall not be used in easements within the property of any landowner who has, pursuant to the procedures of Vermont Public Service Board Rule No. 3.640, requested that they not be used.

Regulatory Herbicide Use Instructions

Specific instructions for the use of herbicides in Vermont are listed in the Revised Regulation for Control of Pesticides in Accordance with 6 V.S.A. Chapter 87. These regulations are administered through the Vermont Agency of Agriculture, Plant Industry Division. A request for a permit to apply herbicides on rights of way must be submitted to the Agency of Agriculture on an annual basis.

The application is reviewed by the Vermont Pesticide Advisory Council and they make recommendations to the Commissioner of Agriculture regarding the approval of the permit. The Agency of Agriculture conducts field inspections on programs having approved permits to ensure compliance with regulations, according to labeling instructions and permit conditions.

The following items are required to be on site and available to the herbicide application crews prior to and during herbicide application operations:

- Vermont Agency of Agriculture issued permit and permit application material (including all herbicide labels and SDS sheets).
- At least one crew member that is a Vermont Agency of Agriculture Certified Pesticide Applicator.
- A VELCO line map or GIS program showing details such as: county lines, town boundaries, property ownership, known water supplies, wetlands, access routes, environmental concerns and any special data available or gathered over the years (property owner requests, etc.).
- Required personal protective equipment in accordance with herbicide labels.
- Drinking water and wash water.
- VELCO Vegetation Management Policies and Procedures Manual.
- Spill Kit (including spill response instructions), shovel, absorbent material and container.
- Herbicide Spill Response Instructions

VELCO and its contractors shall conduct annual training on herbicide use for all members of the herbicide application crews prior to beginning the vegetation control program.

Miscellaneous

- Any person who requests that herbicides not be used on ROW located on land that he or she owns or occupies shall be informed of the provisions of Vermont Public Service Board Rule No. 3.640.
- The Supervisor of ROW Management or a person designated by the Supervisor of ROW Management shall be responsible for acquiring and maintaining a high level of expertise in all relevant subjects related to the use of herbicides for ROW vegetation management, including, but not limited to the effectiveness, benefits and risks of all herbicides used by or considered for use by the company or its contractors, regulatory requirements concerning such use, and the need for and techniques of the training of personnel in the application, transport, and storage of herbicides.
- The Supervisor of ROW Management will maintain current and sufficiently comprehensive files on all herbicides that it uses. The files shall cover such subjects as toxicities, effectiveness, regulatory developments, environmental and health effects, cost-effectiveness, industry practices, etc.

In summary Manual, Mechanical, and Biological methods are effective but are typically short term, more expensive, and have more impact on the environment than the selective use of Chemical methods.

V. Danger Trees

VELCO requires the removal of trees outside of the cleared ROW to ensure that the TVMP meets the goals and objectives of the plan. Typically, easements allow for the removal of trees outside of the easement area that VELCO deems may have an impact to the safe and reliable operation of the line. Trees that are tall enough to make contact with the conductors or are capable of growing tall enough over the next four-year cycle are evaluated based on the ISA best management

practices for tree risk assessment. Danger-trees that are deemed to be removed are marked and added to the vegetation cycle inventory for removal during the following year's maintenance.

If a danger-tree is determined to have a high likelihood of failure within a 1-year timeframe, it is called a hazard-tree. Hazard-trees identified shall be entered into VELCO's VIP and all necessary actions are taken to have it removed as soon as possible.

A. Evaluation Criteria (including but not limited to)

1. Species
   - Expected failure rates of tree species
   - Tensile strengths of wood
   - Longevity
   - Rooting characteristics

2. Growth Patterns
   - Phototropism-tree growing towards sunlight
   - Lean
   - Location
   - Slope
   - Shallow soils
   - Wet soils
   - Stream banks
   - Erosion

3. Structural Defects
   - Poorly attached leaders / crotches with included bark
   - Multi stems – co-dominant leaders
   - Rubbing leaders or rubbing other trees

4. Disease / Insect damage
   - Defects caused by disease or insects

5. Decay – caused from
   - Storm damage
   - Mechanical damage
   - Disease
   - Frost cracks
   - Sun scald

VI. Widening of the Row

Periodically VELCO also needs to widen the edges of the rights of way. Trees growing along the edges seek sunlight in the ROW and either bend out towards the sunlight or all their branches grow on the side of the tree closest to the ROW. This establishes an aesthetically pleasing condition of a feathered edge. However, tree seedlings can become established under these branches and encroach the easement. This encroachment needs to be removed to ensure the goals and

objectives of the TVMP are met. This is reviewed as part of the vegetation cycle inventory and completed as needed during each vegetation management cycle.

VII. Implementation of Annual Work Plan

The Annual Work Plans are utilized as a scope of work for vegetation management services from qualified vegetation management contractors. Contracts are developed for each line or line segment into project areas that includes a work scope, pricing, schedule of performance, general conditions, key personnel, and special conditions.

Following the award of the work to a specific contractor, and the approval of an herbicide use permit, meetings are held with the contractor to review the Annual Work Plan and to discuss the details of the permit application and the approved permit issued by the Vermont Department of Agriculture.

The following and their requirements are discussed during these meetings:

1. Agreement for Vegetation Management Services
2. Permit Application
3. Herbicide Use Permit Issued

Additionally, the following issues and maps are reviewed in detail:

1. Community and private water supplies
2. Wetlands
3. Significant resources and habitat

VELCO is required to complete 100% of its annual vegetation work plan of applicable lines to ensure no vegetation encroachments occur within the MVCD[15] for the four-year cycle. VIP is utilized by the vegetation contractors to track and sign off on work scope as it is completed. The VIP system is then also utilized by VELCO vegetation management staff to complete a quality assurance sign off that all work was completed in the annual work plan as specified or, if a change of treatment type occurred, that vegetation was maintained as to not encroach on the MVCD prior to the next 4-year cycle.

Modifications to the Annual 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 will be documented. Examples of reasons for modification to the annual plan may include:

- Change in expected growth rate/ environmental factors
- Circumstances that are beyond the control of an applicable Transmission Owner or applicable Generator Owner rescheduling work between growing seasons
- Crew or contractor availability/ Mutual assistance agreements
- Identified unanticipated high priority work
- Weather conditions/Accessibility
- Permitting delays
- Land ownership changes/Change in land use by the landowner
- Emerging technologies

[15] NERC Reliability Standard FAC-003-4 Requirement 7

1. Work Constraint Mitigation Plan[16]

The 4-year vegetation management cycle allows VELCO to execute its annual vegetation work plan for each of its electric transmission lines once every four years. If, during the annual vegetation work plan, it is determined that the objectives of the Integrated Vegetation Management cannot be maintained through to the next cycle of the work plan, the following mitigation steps shall be followed.

1. The condition will be immediately reported to the Supervisor of ROW Management.
2. The Supervisor of ROW Management will review easement documents and exercise legal vegetation management rights per easement language.
3. If easement language does not allow proper clearances to be met, the Supervisor of ROW Management will work with VELCO's Legal and Real Estate and ROW Department to obtain appropriate easement rights for vegetation management.

VIII. ROW Inspections

Growth rates of vegetation vary due to species, soil, site conditions and climate conditions. It is therefore required that each line be periodically patrolled for the purposes of detecting locations where minimum vegetation clearance distances are being approached between vegetation management cycles.

VELCO shall perform a Vegetation Inspection of 100% of its applicable transmission lines[17] at least once per calendar year and with no more than 18 calendar months between inspections on the same ROW. These inspections will determine where vegetation is not in compliance with the standard clearances.

The following instances illustrate events where emergent patrols are performed:

- Following a weather event that has the potential to cause changes in vegetation conditions such as heavy wet snows, ice accumulations, or high wind events.
- Prior to line maintenance work that may subject more than normal reliability requirements on a particular line or group of lines.

ROW Management staff will also participate in routine aerial line patrols to the greatest extent possible.

Inspections shall focus on any vegetation conditions that may have an immediate effect on the operation or maintenance of the line(s). All observations shall be recorded.

The following list is representative of observations to make:

- Vegetation which is not in compliance with standard clearances to ensure vegetation does not enter the MVCD prior to next vegetation management cycle.
- Clearance vegetation at road crossing screens, wildlife crossings, stream crossings, and other environmental buffers.
- Any evidence of vegetation encroachment of the MVCD.
- Trees which, because of their condition, are an imminent threat to the lines and may be deemed a hazard tree.

[16] NERC Reliability Standard FAC-003-4 Requirement 5

[17] As defined in FAC-003-4 R6 and the Purpose of this TVMP

- Trees which, because of their condition, may be deemed a danger tree and need further evaluation prior to the next vegetation management cycle.
- Encroachment of trees along the edge of the ROW that may pose a threat to the reliability of the line or enter the MVCD prior to the next vegetation management cycle.

IX. Imminent Threat Procedures

When vegetation is confirmed to be an imminent threat to the reliability of the line or has encroached the MVCD, the condition shall be immediately communicated to the VELCO control room (1-802-770-6261) without any intentional time delay. [18] Actions to avoid unscheduled interruption of service will be taken as needed by the control room. Vegetation found not to be in compliance with the standards but not an imminent threat shall be reported to the Supervisor of Right of Management and action shall be initiated within a reasonable time frame to obtain clearance to maintain standard clearances to ensure that vegetation does not encroach into the MVCD prior to the next vegetation management cycle.

X. Guidance, Control & Evaluation of Contractors

The TVMP will also serve as a guide for vegetation management contractors. VELCO expects the vegetation management contractors to train its field personnel (supervisors & technicians) in the contents of this TVMP.

Contractors are required to conduct an annual training session which includes topics such as electrical safety considerations, chainsaw safety, herbicide use safety and applications, safe driving techniques, positive public relations habits, tree & shrub identification and various logistical matters.

VELCO's ROW Management staff will inspect the contract field crews on a frequent basis to monitor activities and ensure compliance with this vegetation management plan and all related regulations and safety standards. It is the responsibility of VELCO's ROW Management staff and the vegetation management contractor's supervisors to evaluate the quality of work and overall performance of the contract field crews.

The elements of an evaluation include:

1. Compliance with all safety regulations including, but not limited to, OSHA 1910.269 and ANSI Z133.
2. Compliance with contract specifications.
3. Appropriate work production.
4. Acceptable work quality.
5. Acceptable public relations with property owners and the general public.
6. Dependability.
7. Communications with VELCO vegetation management staff.
8. Quality daily records/herbicide data, time sheets, etc.
9. Equipment maintained in good and safe condition.

To accomplish this evaluation VELCO vegetation management staff must:

1. Make frequent visits to the active job sites and observe activities.
2. Look ahead to preview upcoming work and communicate with crew foreman so plans can be made in a timely manner.
3. Review work previously completed to evaluate effectiveness and quality and to determine whether or not plans were understood and followed.

As a result of this process, compliments and/or comments can be given to the crew. Adjustments can be made to improve or correct work activities if necessary.

[18] NERC Reliability Standard FAC-003-4 Requirement 4

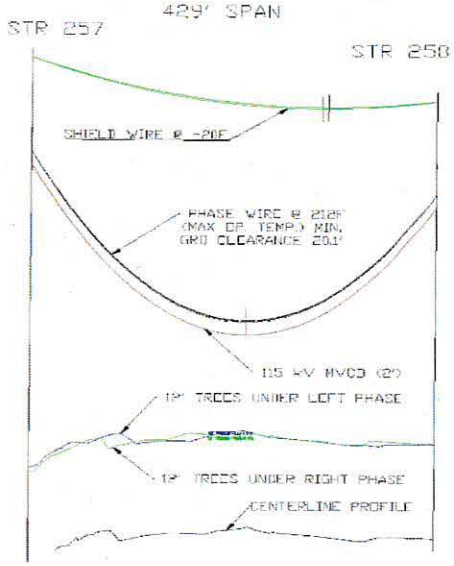
VELCO will require that its contractors apply current techniques and are in compliance with all Local, State and Federal Laws and Regulations, and the principles of the TVMP. These principles have the primary purpose of assuring the continuous safe and reliable operation of the New England power grid and Vermont's electric transmission network.

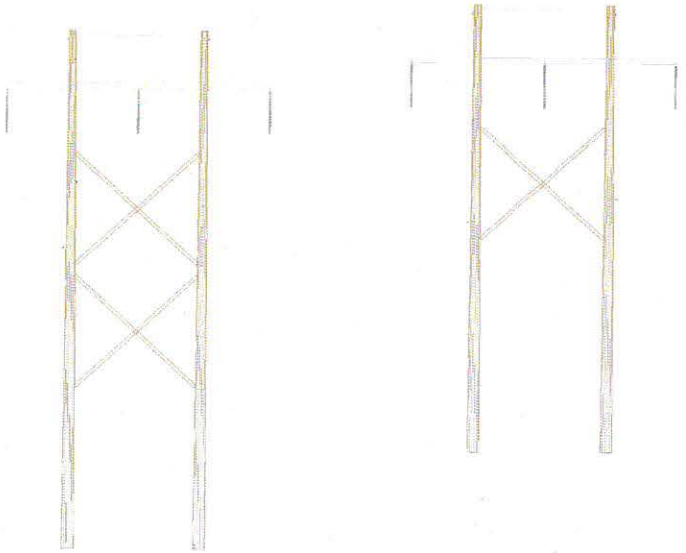
Appendix A: Sample Line Sag and Sway Diagrams

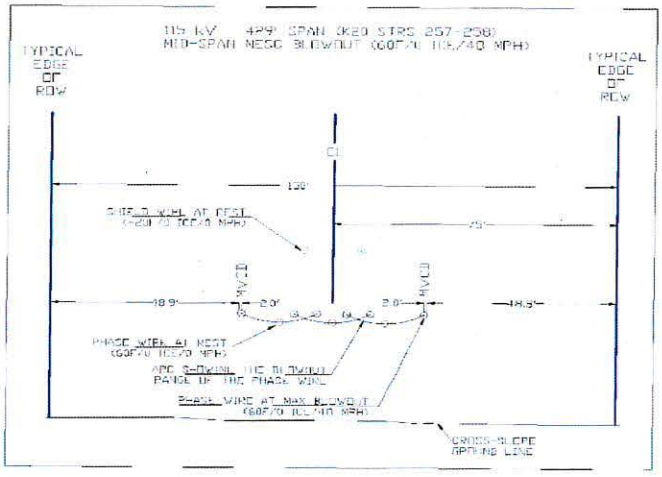
The Figures below show the relationship between the maximum safe tree height of 12 feet for compatible species and the MVCD during all operating conditions of the line as the conductors sag. The black lines depict the conductor height minimum according to the NESC standards at maximum operating conditions. The red lines below show the MVCD distance in feet which comes from Table 1 as shown on page 14. The blue, black, and green lines depict the 12-foot maximum safe tree height above ground level for each phase. The air gap remaining between the trees and the MVCD allows for a buffer of tree growth between the maximum safe tree height and the MVCD to ensure the MVCD is not encroached.

The Figures also show the relationship between the maximum safe tree height of 12 feet and the MVCD during all operating conditions of the line as the conductors sway. The diagrams show magenta dots that depict the conductors at rest with 0 mph of wind at maximum operating conditions. The black dots depict the conductors at full sway at maximum operating conditions. The MVCD distances are shown in Table 1 on page 14 as well as the remaining air gap between the edge of the ROW and trees. The air gap allows for a buffer of tree growth between the conductors at maximum sway and the trees to ensure the MVCD is not encroached.

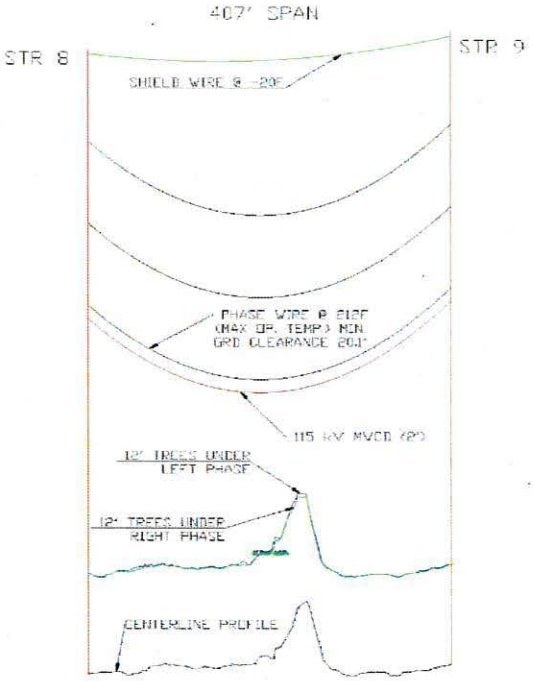
GRAPHIC DEPICTION OF 115 kV MVCD - H-FRAME
429' SPAN

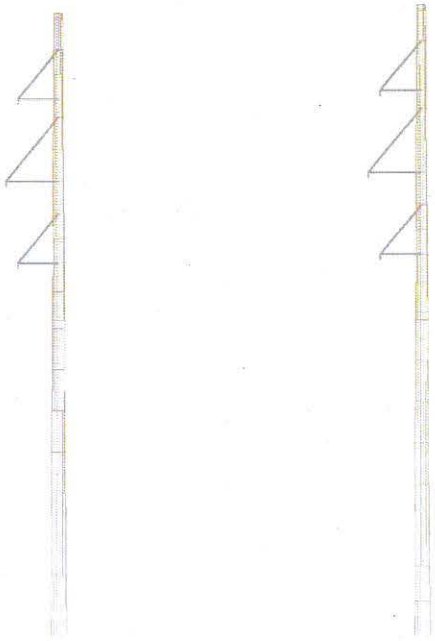


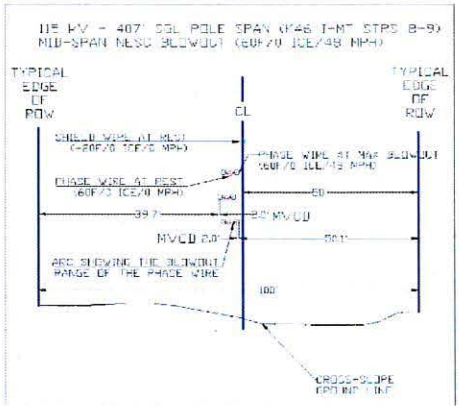


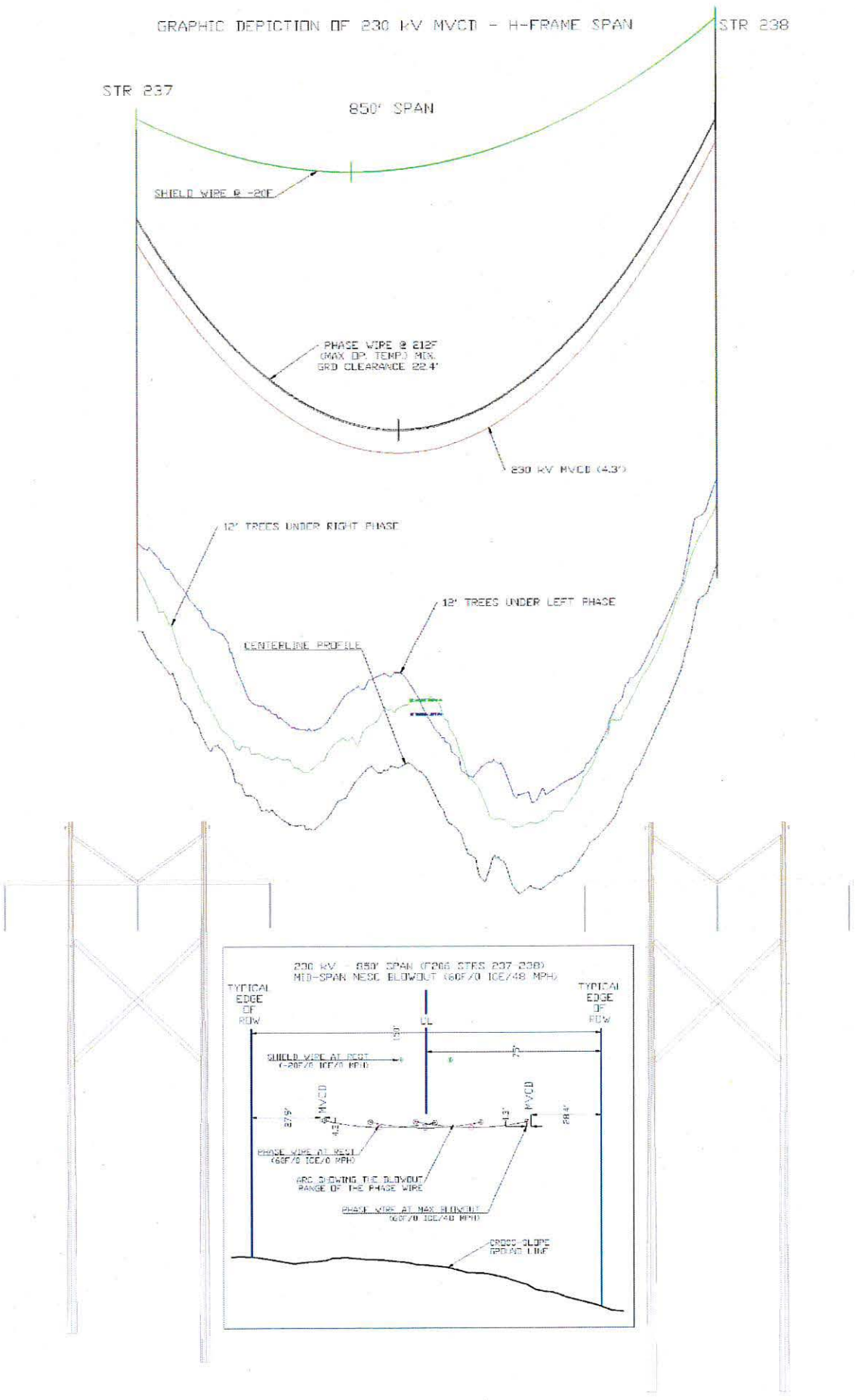


GRAPHIC DEPICTION OF 115 kV MVCD - SGL POLE

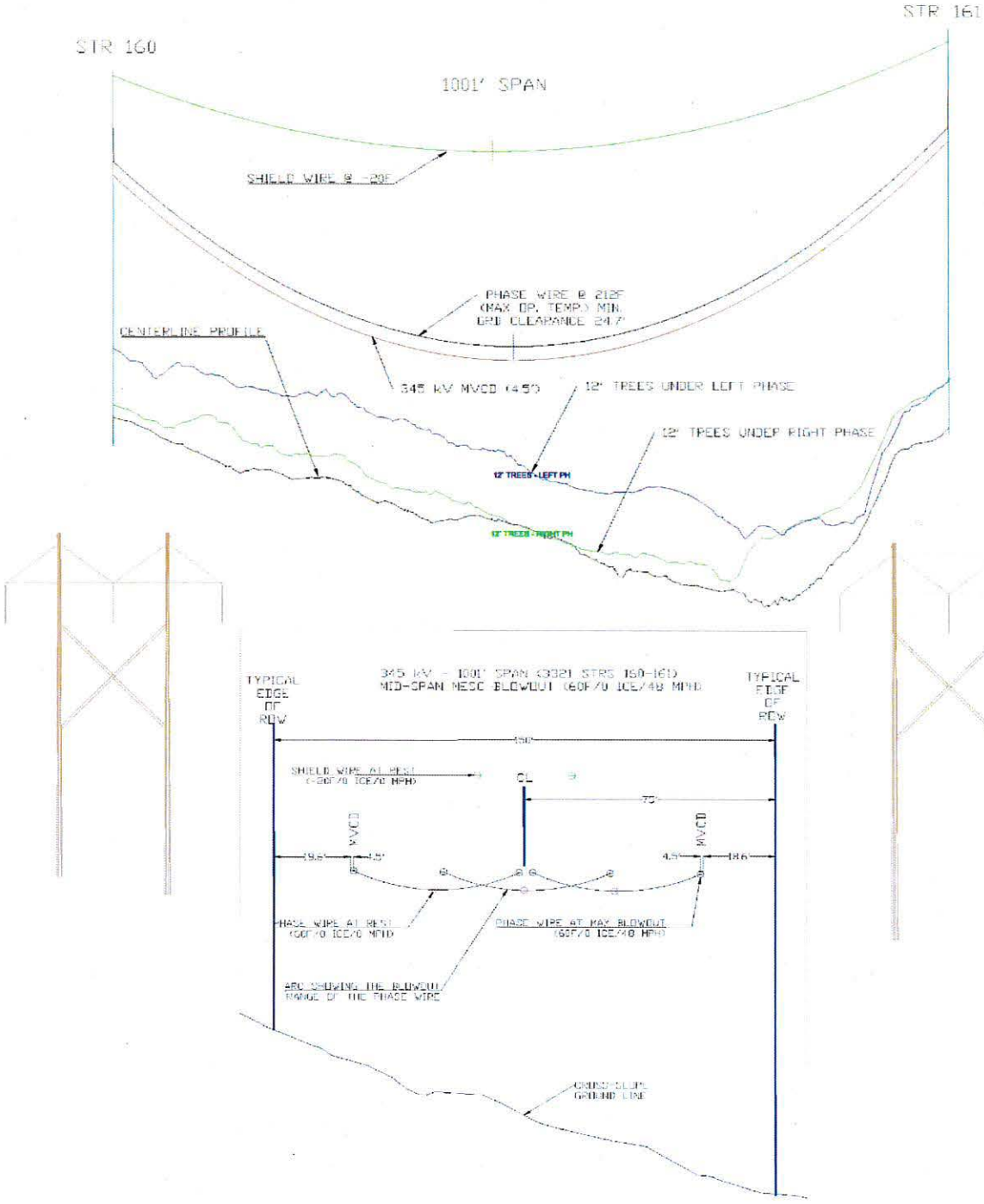




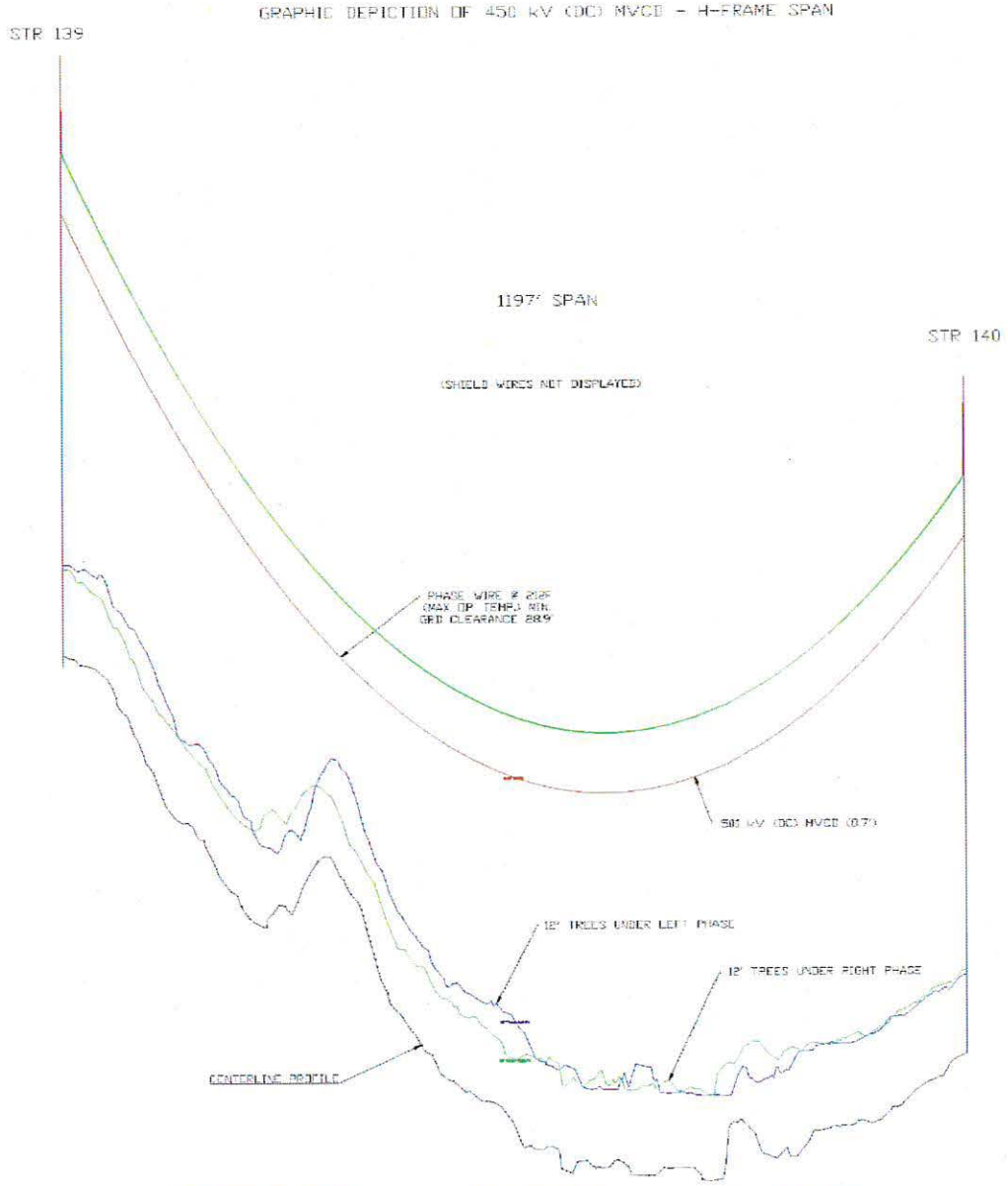


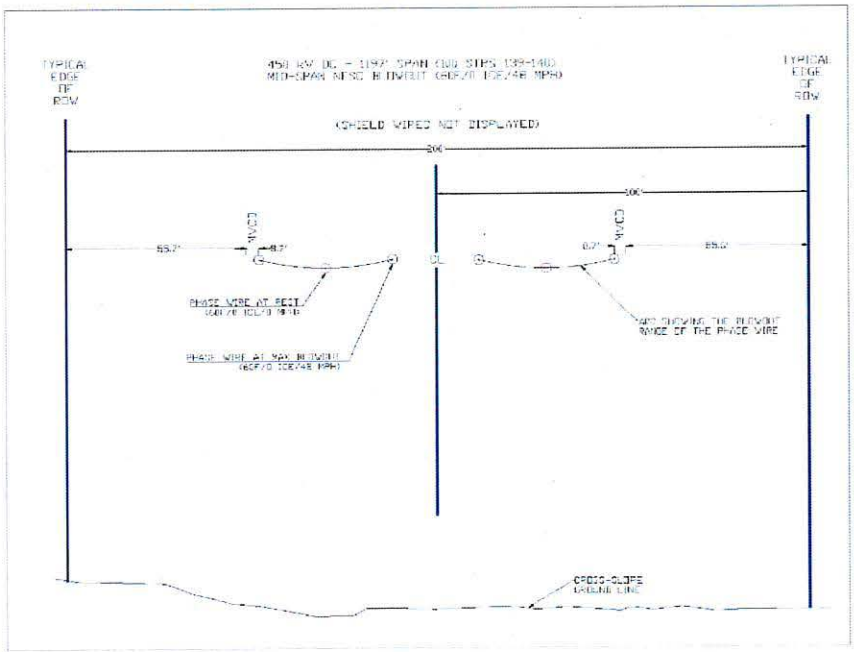

GRAPHIC DEPICTION OF 230 kV MVCD - H-FRAME SPAN
STR 237
STR 238
850' SPAN
SHIELD WIRE @ -20F
PHASE WIRE @ 212F
(MAX OP. TEMP.) MIN.
GRD CLEARANCE 22.4'
230 kV MVCD (4.3')
12' TREES UNDER RIGHT PHASE
12' TREES UNDER LEFT PHASE
CENTERLINE PROFILE
230 kV - 850' SPAN (P266 STRS 237-238)
MID-SPAN NESC BLOWOUT (60F/0 ICE/48 MPH)
TYPICAL EDGE OF ROW
TYPICAL EDGE OF ROW
CL
MVCD
MVCD
PHASE WIRE AT REST
(60F/0 ICE/0 MPH)
ARC SHOWING THE BLOWOUT
RANGE OF THE PHASE WIRE
PHASE WIRE AT MAX BLOWOUT
(60F/0 ICE/48 MPH)
CROSS SLOPE
(GROUND LINE

GRAPHIC DEPICTION OF 345 kV MVCD – H-FRAME SPAN



GRAPHIC DEPICTION OF 450 kV (DC) MVCD - H-FRAME SPAN





Appendix B. Line Cycle List (yellow highlighted lines are applicable to FAC-003-4)

VOLTAGE	LINE #	Line Name	MILES	LAST CYCLE YEAR	NEXT CYCLE YEAR	AVG. ROW WIDTH	TOTAL LINE ACRES	Project
115	K26	HARTFORD TO WILDER	1.30	2017	2021	150	23.29	K26
115	K28	ST JOHNSBURY TO LYNDONVILLE	8.54	2017	2021	150	155.82	K28
115	K39	LYNDONVILLE TO SHEFFIELD	11.97	2017	2021	150	217.24	K39
115	K47	SHEFFIELD TO IRASBURG	15.96	2017	2021	150	290.13	K47
115	K50	CHELSEA TO HARTFORD	21.38	2017	2021	150	388.49	K50
115	K51	GRANITE TO CHELSEA	11.27	2017	2021	150	203.41	K51
115	K54	BARRE TO GRANITE	5.63	2017	2021	150	101.84	K54
115	K60	ST JOHNSBURY TO LITTLETON NH	8.69	2017	2021	150	173.06	K60
115	1400 (K48)	BORDER TO NEWPORT	6.92	2017	2021	100	84.30	1400
115	K46 I-MT	IRASBURG TO MOSHER'S TAP	6.49	2017	2021	100	78.57	K46
115	K4	BENNINGTON TO NORTH ADAMS	12.04	2017	2021	150	219.30	K46 I-MT
115	K6	BENNINGTON TO HOOSICK	6.04	2017	2021	150	109.90	K6
115	K300	NEWPORT TO MOSHER'S TAP	3.10	2017	2021	100	37.37	K300
115	K149	ASCUTNEY TO NH	0.23	2018	2022	150	25.14	25.14
115	K15	ASCUTNEY TO WINDSOR	7.98	2018	2022	150	119.99	119.99
115	K174	ASCUTNEY TO NH (RIVER)	0.22	2018	2022	150	0.00	0.00
115	K186	VERNON TO NH	0.16	2018	2022	150	0.00	0.00
115	K31	COOLIDGE TO ASCUTNEY	13.94	2018	2022	150	263.09	263.09
115	K38	COOLIDGE TO NEXT ERA RISER POLE	0.06	2018	2022	150	0.20	0.20
115	K41	JAY TO HIGHGATE	32.36	2018	2022	150	508.00	508.00
115	K46	MOSHERS TAP TO JAY	12.66	2018	2022	150	151.27	151.27
115	T1 TRANSFORMER	T1 TRANSFORMER	0.15	2018	2022	150	0.00	0.00
115	K40	VERNON TO VY 115	0.04	2018	2022	150	0.00	0.00
115	1429	HIGHGATE TO CANADA	7.60	2019	2023	150	137.54	1429
115	K80	GEORGIA TO FAIRFAX	14.55	2019	2023	150	263.62	K80
115	K18	LIMEKILN TO EAST AVE	1.45	2019	2023	150	0.00	K25/K23/K18
115	K19	SANDBAR TO GEORGIA	8.90	2019	2023	150	86.53	K19
115	K20	EAST CABLE TO APPLE TREE (UNDERGROUND)	1.99	2019	2023	150	0.00	K20
115	K20	SANDBAR TO SOUTH HERO	6.90	2019	2023	150	0.00	K20
115	K20	SOUTH HERO TO GRAND ISLE	2.37	2019	2023	150	167.71	K20
115	K21	ESSEX TO GEORGIA	18.05	2019	2023	150	364.74	K21/K19
115	K22	ESSEX TO SANDBAR	11.18	2019	2023	150	195.87	K22
115	K23	ESSEX TO TAFTS CORNERS	2.96	2019	2023	150	53.47	K23
115	K23	LIMEKILN TO ESSEX TAP	3.14	2019	2023	150	0.00	K25/K23/K18
115	K23	ESSEX TAP TO ESSEX	0.23	2019	2023	150	0.00	K25/K23/K18
115	K24	ESSEX TO MIDDLESEX	26.51	2019	2023	150	475.60	K24
115	K24 T	DUXBURY TO STOWE	9.79	2019	2023	100/150	129.77	K24T
115	K25	ESSEX TO EAST AVE	4.78	2019	2023	150	92.14	K25/K23/K18
115	K27	TAFTS CORNERS TO WILLISTON	2.06	2019	2023	150	36.71	K27
115	K42	TAP TO HIGHGATE CONVERTER	0.10	2019	2023	150	0.00	K42H
115	K42	ST ALBANS TAP TO ST ALBANS	1.05	2019	2023	150	18.72	K42T
115	K42	GEORGIA TO ST ALBANS TAP TO HIGHGATE	16.73	2019	2023	150	304.90	K42
115	K55	BERLIN TO BARRE	5.59	2019	2023	150	101.08	K55
115	K56	MIDDLESEX TO BERLIN	4.75	2019	2023	150	85.93	K56
115	PV20 (3-1000 MCM)	GRANDISLE TO NY (SUBMARINE CABLE)		2019	2023	25	0.00	PV20
115	PV20 (4-500 MCM)	GRANDISLE TO NY (SUBMARINE CABLE)		2019	2023	25	0.00	PV20
115	K33	WILLISTON TO QUEEN CITY TAP	6.27	2020	2024	150	80.70	K33
115	K30	FLORENCE TAP	0.05	2020	2024	150	0.00	370/K30/K63
115	K30	WEST RUTLAND TO MIDDLEBURY	28.03	2020	2024	150	0.00	370/K30/K63
115	K32	COLD RIVER TO COOLIDGE	18.20	2020	2024	150	24.50	350/K32
115	K34	WEST RUTLAND TO BLISSVILLE	11.61	2020	2024	150	189.16	K34
115	K35	NORTH RUTLAND TO COLD RIVER	5.62	2020	2024	150	97.09	K35
115	K37	NORTH RUTLAND TO WEST RUTLAND	5.12	2020	2024	150	70.80	K37
115	K43	NEW HAVEN TO WILLISTON	20.86	2020	2024	150	380.90	K43
115	K63	MIDDLEBURY TO NEW HAVEN	7.54	2020	2024	100	0.00	370/K30/K63
115	K64	NEW HAVEN TO VERGENNES	6.72	2020	2024	100	77.49	K64
115	K65	BAY ROAD UNDERGROUND TO QUEEN CITY	1.80	2020	2024	100	225.11	K65/K33
115	K65	CHARLOTTE TO BAY ROAD	6.74	2020	2024	100	0.00	K65
115	K65	VERGENNES TO FERRY ROAD	9.06	2020	2024	100	0.00	K65
115	K65 Bay Rd (Undergr	BAY ROAD UNDERGROUND	1.73	2020	2024	25	0.00	K65
115	K65 Ferry Rd (Underg	FERRY ROAD UNDERGROUND	0.45	2020	2024	25	0.00	K65
115	K7	BLISSVILLE TO WHITEHALL	1.66	2020	2024	150	29.69	K7
			115 kV TOTAL MILES				*115 kV TOTAL ACRES*	
115			*469.27*				*6840.18*	
230	F206	GRANITE TO COMERFORD	32.49	2017	2021	150	589.59	F206/F206 NH
			230 kV TOTAL MILES				*230 kV TOTAL ACRES*	
230			*32.49*				*589.59*	
345	340	VERNON TO COOLIDGE	50.90	2018	2022	150	1567.09	3320/340, 3321/340
345	379	VT YANKEE TO SCOBIE	0.10	2018	2022	150	0.00	381/379/K186
345	381	VT YANKEE TO NORTHFIELD	0.09	2018	2022	150	10.49	381/379/K187
345	3320	VERNON TO NEWFANE	17.37	2018	2022	125	0.00	3320/340
345	3321	NEWFANE TO COOLIDGE	35.43	2018	2022	125	0.00	3321/340
345	3381	VERNON TO VY	0.24	2018	2022	150	0.00	3340/3381/T1/K40
345	3340	VERNON TO VY	0.24	2018	2022	150	7.60	3340/3381/T1/K40
345	350	COOLIDGE TO WEST RUTLAND	27.36	2020	2024	250	709.02	350/K34/K37/K32
345	370	WEST RUTLAND TO NEW HAVEN	35.69	2020	2024	250	1084.02	370/K30/K63
			345 kV TOTAL MILES				*345 kV TOTAL ACRES*	
345			*167.42*				*3378.22*	
450 HVDC	100	450 HVDC NORTON TO COMERFORD	52.37	2018	2022	200	1270.52	450/451/100
			450 HVDC TOTAL MILES				*450 HVDC TOTAL ACRES*	
450 HVDC			*52.37*				*1270.52*	
			ALL VOLTAGES TOTAL MILES				*ALL VOLTAGES TOTAL ACRES*	
ALL			*721.55*				*12078.51*	

Appendix B. Cycle Map