

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

Development Steps Completed:

1. SC approved SAR for initial posting (January 11, 2007).
2. SAR posted for comment (January 15–February 14, 2007).
3. SAR posted for comment (April 10–May 9, 2007).
4. SC authorized moving the SAR forward to standard development (June 27, 2007).

Proposed Action Plan and Description of Current Draft:

This is the second posting of the proposed revisions to the requirements and measures in the standard. The drafting team added compliance elements to the standard and requests posting for a 45-day comment period.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Drafting team considers comments, makes conforming changes, posts for 45-day second comment period.	August 2009
2. Drafting team considers comments, makes conforming changes, posts for 30-day third comment period.	February 2010
3. Drafting team considers comments, makes conforming changes, and requests SC approval to proceed to pre-ballot comment period.	April 2010
4. First ballot of standards.	May 2010
5. Recirculation ballot of standards.	June 2010
6. Board adopts standards.	August 2010

Definitions of Terms Used in Standard+

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

Active Transmission Line Right of Way — A strip of land that is occupied by active transmission facilities. This corridor does not include the inactive or unused part of the Right of Way intended for other facilities.

~~**Critical Clearance Zone** — The area mapped by the radial distance around a conductor specified in Table I of Attachment 1 to reliability standard FAC-003-2 — Transmission~~

~~Vegetation Management Program when the conductor is energized and operating between no-load and its Rating, including the design blowout, however, the zone shall not extend beyond the limits~~
Inspection — The systematic examination of the vegetation conditions on an Active Transmission Line Right of Way. This inspection may be combined with a general line inspection. The inspection includes the documentation of any vegetation that may pose a threat to reliability prior to the next planned inspection or maintenance work, considering the current location of the conductor and other possible locations of the conductor due to sag and sway for rated conditions.

A. Introduction

1. **Title:** Transmission Vegetation Management Program
2. **Number:** FAC-003-2
3. **Purpose:** To improve the reliability of the ~~Bulk Electric System~~electric transmission system by preventing those vegetation related outages that could lead to Cascading.

4. **Applicability:**

Functional Entities:

- Transmission Owner
- Reliability Planning Coordinator

Facilities:

- Transmission lines (“applicable lines”) operated at 200kV or higher, and transmission lines operated below 200kV designated by the Reliability Planning Coordinator as being subject to this standard including but not limited to those that cross lands owned by federal¹, state, provincial, public, private, or tribal entities.
 - Transmission lines operated below 200kV designated by the Reliability Planning Coordinator as being subject to this standard become subject to this standard 12 months after the date the Reliability Planning Coordinator initially designates the transmission line as being subject to this standard.
 - Existing transmission lines operated at 200kV or higher which are newly acquired by a Transmission Owner and were not previously subject to this standard, become subject to this standard 12 months after the acquisition date of the transmission lines.
5. **Effective Dates:**

In those jurisdictions where regulatory approval is required, the first calendar day of the first calendar quarter one year after applicable regulatory authority approval for all requirements; or, in those jurisdictions where no regulatory approval is required, the first calendar day of the first calendar quarter one year following Board of Trustees adoption.

¹ EPA Act 2005 section 1211c: “Access approvals by Federal agencies””

B. Requirements

- R1. Each Transmission Owner shall have a documented transmission vegetation management program ~~designed to control vegetation that describes how it conducts work~~ on its Active Transmission Lines' Line Rights of Way ~~to prevent Sustained Outages due to vegetation, considering all possible locations the conductor may occupy under the effects of sag and sway throughout its operating range under rated conditions~~. The transmission vegetation management program shall: ~~[Violation Risk Factor – Lower][Time Horizon – Long-term planning]~~
- 1.1. Specify the ~~methodologies-methods~~ that the Transmission Owner ~~uses may use~~ to control vegetation.²
 - 1.2. Specify a ~~vegetation inspection~~ Vegetation Inspection frequency of at least once per calendar year that takes into account local³ and environmental factors.
 - 1.3. Require an annual work plan ~~that identifies~~. An annual work plan shall:
 - 1.3.1. Identify the applicable lines to be maintained ~~and associated~~
 - 1.3.2. Identify the work to be performed ~~during the year. It shall and methods to be used~~
 - 1.3.3. Be flexible to adjust to changing conditions and to findings from ~~vegetation inspections~~. Vegetation Inspections. Adjustments to the plan within the year are permissible. ~~The plan shall~~
 - 1.3.4. Take into consideration permitting and scheduling requirements from landowners or regulatory authorities. ~~It shall support the objectives of the transmission vegetation management program and use the methodologies outlined in the transmission vegetation management program.~~
 - 1.4. Require a process or procedure for response to an imminent ~~threats~~ threat of a vegetation-related Sustained Outage. The process or procedure shall specify actions which shall include immediate communication of the threat to the ~~Transmission Operator, and may include actions such as a temporary reduction in line Rating, switching lines out of service, or other actions.~~ responsible control center.
 - 1.5. Specify an interim corrective action process for use when the Transmission Owner is temporarily constrained from performing vegetation maintenance as planned.

² ANSI A300, Tree Care Operations – Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices, while not a requirement of this standard, is considered to be an industry best practice.

³ Local factors include items such as treatment cycle, extent and type of treatment, and their relationship to the normal growth rate.

- 1.6. Specify the maintenance strategies used (such as minimum vegetation-to-conductor distance or maximum vegetation height) to ensure that Table 1 clearances in Attachment 1 are never violated. The maintenance strategies shall consider the sag and sway of the conductor throughout its operating range under rated conditions.
- R2. Each Transmission Owner shall implement its imminent threat process or procedure when the Transmission Owner has actual knowledge of such a threat, obtained through normal operating practices ~~or notification from others, that the Critical Clearance Zone is approached by vegetation to prevent an encroachment of the Critical Clearance Zone.~~ [Violation Risk Factor – Medium][Time Horizon – Real Time]
- R3. Each Transmission Owner shall conduct ~~inspections~~ Vegetation Inspections of all applicable lines (as measured in line miles) in accordance with the frequency specified in its transmission vegetation management program ~~-, unless constrained by natural disasters⁴. When constrained by a natural disaster, the Transmission Owner shall conduct the Vegetation Inspection(s) within six months or a period agreed to by its Regional Entity, whichever is greater.~~ [Violation Risk Factor – Medium][Time Horizon – Operations Planning]
- R4. Each Transmission Owner shall prevent encroachment ~~within of vegetation into the Critical Minimum Vegetation Clearance Zone of Distances (MVCD) listed in FAC-003-2 - Attachment 1 for its applicable lines as observed in real-time operating between no-load and their Rating,~~ with the following exceptions: [Violation Risk Factor – Medium][Time Horizon – Real Time]
- ~~Encroachments of~~ Encroachment into the ~~Critical~~ MVCD listed in FAC-003-2-Attachment 1 resulting from natural disasters.⁴
 - ~~Encroachments of~~ Encroachment into the ~~Critical~~ MVCD listed in FAC-003-2-Attachment 1 resulting from human or animal activity.⁵
 - Encroachment into the MVCD listed in FAC-003-2-Attachment 1 resulting from falling vegetation.
- R5. Each Transmission Owner shall prevent Sustained Outages⁶ of applicable lines⁷ that are identified as an element of an Interconnection Reliability Operating Limit (IROL) (or Major WECC Transfer Path) due to vegetation growing into a conductor operating between no-load and its Rating, with the following exceptions: [Violation Risk Factor – High][Time Horizon – Real Time]

⁴ Examples include, but are not limited to, earthquakes, fires, tornados, hurricanes, landslides, wind shear, fresh gale, major storms as defined either by the Transmission Owner or an applicable regulatory body, ice storms, and floods.

⁵ Examples 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.

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

- Sustained Outages of applicable lines that result from natural disasters.⁴
 - Sustained Outages of applicable lines that result from human or animal activity.⁵
- R6.** Each Transmission Owner shall prevent Sustained Outages⁶ of applicable lines⁶ lines that are not an element of an IROL (or major WECC Transfer Path) due to vegetation growing into a conductor operating between no-load and its Rating, with the following exceptions: [Violation Risk Factor – Medium][Time Horizon – Real Time]
- Sustained Outages of applicable lines that result from natural disasters.⁴
 - Sustained Outages of applicable lines that result from human or animal activity.⁵
- R7.** Each Transmission Owner shall prevent Sustained Outages⁶ of applicable lines due to the blowing together of vegetation and a conductor within an Active Transmission Line Right of Way (operating within design blow-out conditions) with the following exception: [Violation Risk Factor – Medium][Time Horizon – Real Time]
- Sustained Outages of applicable lines that result from ~~sustained winds or gusts due to natural disasters.~~⁴ natural disasters⁴ or wind-blown debris.
- R8.** Each Transmission Owner shall prevent Sustained Outages⁶ of applicable lines⁶ lines due to vegetation falling into a conductor from within an Active Transmission Line Right of Way with the following exceptions: [Violation Risk Factor – Medium] [Time Horizon – Real Time]
- Sustained Outages of applicable lines that result from natural disasters:⁴ or wind-blown debris.
 - Sustained Outages of applicable lines that result from human or animal activity.⁵
- R9.** Each Transmission Owner shall implement its annual work plan for vegetation management to accomplish the purpose of this standard ~~within the extent of its easement and/or legal rights.~~ [Violation Risk Factor – Medium] [Time Horizon – Operations Planning]
- R10.** Each Reliability Planning Coordinator ~~in consultation with its Transmission Owner(s) and neighboring Reliability Coordinator(s)~~ shall jointly prepare and keep current, review annually, a list of ~~designated applicable~~ lines that are operated below ~~200~~200kV, if any, which are subject to this standard. Each Planning Coordinator shall consult with its Transmission Owner(s) and neighboring Planning Coordinators to obtain input to develop the list. [Violation Risk Factor – Lower] [Time Horizon – Long-term Planning]
- ~~**R10.**~~ Each Reliability Planning Coordinator shall develop and document its method for assessing the reliability significance of sub-200kV ~~lines considering all of the following:~~
- ~~**R10.1**~~ Transmission lines whose loss would result in the exceedance of an Interconnection Reliability Operating Limit (IROL)

- R11. ~~R10.2~~ — ~~Transmission-transmission~~ lines whose loss would place the grid at an unacceptable risk of instability, separation, or cascading failures. — ~~_____~~
~~[Violation Risk Factor – Lower] [Time Horizon – Long-term Planning]~~

C. Measures

- M1. The Transmission Owner has a documented transmission vegetation management program ~~designed to control (paper or electronic copy of dated, current, in force document with specified elements) that describes how it conducts work on its Active Transmission Line Rights of Way to prevent Sustained Outages due to vegetation on the Active Transmission Line Right of Way.~~, ~~considering all possible locations the conductor may occupy under the effects of sag and sway throughout its operating range under rated conditions.~~ (R1)
- 1.1. The Transmission Owner’s transmission vegetation management program ~~documentation~~ specifies the ~~methodologies~~~~methods~~ that the Transmission Owner ~~uses~~~~may use~~ to control vegetation.
 - 1.2. The Transmission Owner’s transmission vegetation management program ~~documentation~~ specifies a ~~vegetation inspection~~~~Vegetation Inspection~~ frequency ~~of at least once per calendar year~~ that takes into account local and environmental factors. ~~This inspection frequency shall be at least once per calendar year.~~
 - 1.3. The Transmission Owner’s transmission vegetation management program ~~requires~~~~contains~~ an annual ~~work~~ plan ~~and it which:~~
 - 1.3.1. Identifies the applicable lines to be maintained ~~and related vegetation management work to be performed during the calendar year while taking into consideration~~
 - 1.3.2. ~~Identifies the work to be performed and the methods used~~
 - 1.3.3. ~~Shows flexibility to adjust to changing conditions and to findings from Vegetation Inspections~~
 - 1.3.4. ~~Considers~~ permitting and scheduling requirements from landowners or regulatory authorities.
 - 1.4. The Transmission Owner’s transmission vegetation management program ~~requires~~~~documentation specifies~~ an imminent threat process or procedure for responding to imminent threats of a vegetation-related Sustained Outage including ~~immediate~~ communication of the threat to the ~~Transmission Operator,~~ ~~and may include a temporary reduction in line Rating, switching lines out of service, and/or other actions that may be taken until the threat is relieved~~~~responsible control center.~~
 - 1.5. The Transmission Owner’s transmission vegetation management ~~program~~~~program documentation~~ specifies the interim corrective action process for use when the Transmission Owner is ~~temporarily~~ constrained from performing vegetation maintenance as planned.

- 1.6. The Transmission Owner's transmission vegetation management program documentation specifies the maintenance strategies used (such as minimum vegetation-to-conductor distance or maximum vegetation height) to ensure that Table 1 clearances in Attachment 1 are never violated. The maintenance strategies consider the sag and sway of the conductor throughout its operating range under rated conditions.
- M2. The Transmission Owner has evidence ~~that it implemented its~~ of the implementation of its vegetation imminent threat process or procedure ~~when it obtained knowledge that the Critical Clearance Zones~~ showing what was ~~approached by vegetation done with dates and activities accomplished.~~ (R2)
- M3. The Transmission Owner has evidence that it conducted ~~vegetation inspections of all applicable transmission lines~~ Vegetation Inspections in accordance with ~~the frequency specified in its transmission vegetation management program.~~ (Requirement R3).
- M4. ~~The Transmission Owner has evidence such as inspection records, imminent threat reports or quality assurance reports, demonstrating there were no vegetation encroachments into the Critical Clearance Zone.~~ The Transmission Owner has evidence from inspections that indicate there was no vegetation encroachment into the Minimum Vegetation Clearance Distances listed in FAC-003-2-Attachment 1 for its applicable lines as observed in real-time operating between no-load and their Rating, considering exceptions. (R4)
- M5. The Transmission ~~Owner has~~ Owner's self-certification reports are adequate evidence ~~that there was not a~~ of no Sustained Outage of ~~an any~~ applicable line that is identified as an element of an IROL (or Major WECC Transfer Path) due to vegetation growing into a conductor operating between no-load and its Rating. (R5)
- M6. The Transmission Owner's self-certification reports are adequate evidence of no Sustained Outage of any applicable line that is not identified as an element of an IROL (or Major WECC Transfer Path) due to vegetation growing into a conductor operating between no-load and its Rating. (R5R6)
- M7. The Transmission ~~Owner has~~ Owner's self-certification reports are adequate evidence ~~that there was not a~~ of no Sustained Outage of ~~an any~~ applicable line due to the blowing together of vegetation and a conductor within the Active Transmission Line Right of Way. (R6R7)
- M8. The Transmission ~~Owner has~~ Owner's self-certification reports are adequate evidence ~~that there was not a~~ of no Sustained Outage of ~~an any~~ applicable line due to vegetation falling into a conductor from within the Active Transmission Line Right of Way. (R7R8)
- M9. The Transmission Owner has evidence that it is implementing, or has implemented, its annual work plan. (R8) An example of evidence is a paper or electronic copy of work plan and work records. (R9)
- M10. The Reliability Planning Coordinator has evidence that it consulted with its Transmission Owner(s) and adjacent Reliability neighboring Planning Coordinator(s), prepared and kept current reviewed annually a list of designated sub-200kV transmission lines, if any, which are subject to this standard. (R9R10)

M11. The Reliability Planning Coordinator has documented evidence ~~that it has defined its methods such as planning study criteria or other analysis used to develop its method~~ for assessing the reliability significance of sub-200kV lines ~~and has developed selection criteria for listing any sub-200kV lines. (R10 whose loss would place the grid at an unacceptable risk of instability, separation, or cascading failures. (R11)~~

D. Compliance

1. Compliance Monitoring Process

1.1 Compliance Enforcement Authority

Regional Entity

1.2 Compliance Monitoring Period and Reset Timeframe

Not Applicable

1.3 Compliance Monitoring and Enforcement Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

Periodic Data Submittals for Sustained Outages caused by vegetation

1.4 Data Retention

The Transmission Owner and Planning Coordinator 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 Transmission Owner shall retain as evidence of Requirements 1 through 9, Measures 1 through 9 for three years.
- The Planning Coordinator shall retain evidence of Requirement 10 and 11, Measure 10 and 11 for one year.

If a Transmission Owner or Planning Coordinator is found non-compliant, it shall keep information related to the non-compliance until found compliant.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

1.5 Additional Compliance Information

All compliance information is new and shown without "track changes" for ease in reading

The Transmission Owner shall report quarterly to its Regional Entity, or the Regional Entity's designee, Sustained Outages of its transmission lines determined by the Transmission Owner to have been caused by vegetation, including the following:

The name of the circuit(s), the date, time and duration of the outage; a description of the cause of the outage; other pertinent comments; and any countermeasures taken by the Transmission Owner, and Sustained Outage Category based on 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 Active Transmission Line 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 Active Transmission Line ROW;
- Category 2 — Fall-ins: Sustained Outages caused by vegetation falling into lines from within the Active Transmission Line ROW;
- Category⁸ 4 — Blowing together: Sustained Outages caused by vegetation and lines blowing together from within the Active Transmission Line ROW.

⁸ Category 3 reporting is eliminated.

Violation Severity Levels

R#	Violation Risk Factor	Violation Severity Level			
		Lower	Moderate	High	Severe
R1	Lower	The Transmission Owner has a transmission vegetation management program, but the transmission vegetation management program is missing one of the following: Requirement 1, Part 1.1, or Requirement 1, Part 1.2	The Transmission Owner has a transmission vegetation management program, but the transmission vegetation management program is missing either Requirement R1, Part 1.5 or Requirement R1, Part 1.1 and Part 1.2	The Transmission Owner has a transmission vegetation management program, but the transmission vegetation management program is missing up to two of the following parts of Requirement R1: Parts 1.3, 1.4 and 1.6	The Transmission Owner does not have transmission vegetation management program or the transmission vegetation management program is missing all of the following Parts of Requirement R1: Parts 1.3, 1.4 and 1.6
R2	Medium				The Transmission Owner did not implement its imminent threat process or procedure when the Transmission Owner had actual knowledge of such a threat, obtained through normal operating practices
R3	Medium	The Transmission Owner inspected greater than 75% but less than 100% of the total line miles specified by its transmission vegetation management program.	The Transmission Owner inspected greater than 50% but less than or equal to 75% of the total line miles specified by its transmission vegetation management program.	The Transmission Owner inspected greater than 25% but less than or equal to 50% of the total line miles specified by its transmission vegetation management program.	The Transmission Owner inspected less than or equal to 25% of the total line miles specified by its transmission vegetation management program.
R4	Medium				The Transmission Owner has failed to prevent

R#	Violation Risk Factor	Violation Severity Level			
		Lower	Moderate	High	Severe
					vegetation from encroaching into the minimum vegetation clearance distance.
R5	High				The Transmission Owner incurred a Sustained Outage due to vegetation growing into an applicable transmission line that is identified as an element of an IROL (or Major WECC Transfer Path).
R6	Medium				The Transmission Owner incurred a Sustained Outage due to vegetation growing into an applicable transmission line that is not identified as an element of an IROL (or Major WECC Transfer Path).
R7	Medium				The Transmission Owner incurred a Sustained Outage due to the blowing together of vegetation and a conductor of an applicable transmission within an Active Transmission Line Right of Way.
R8	Medium				The Transmission Owner incurred a Sustained Outage

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R#	Violation Risk Factor	Violation Severity Level			
		Lower	Moderate	High	Severe
					due to vegetation falling into an applicable transmission from within an Active Transmission Line Right of Way.
R9	Medium	The Transmission Owner failed to implement 5% or less of its annual work plan.	The Transmission Owner failed to implement more than 5% but less than or equal to 10% of its annual work plan.	The Transmission Owner failed to implement more than 10% but less than or equal to 15% of its annual work plan.	The Transmission Owner failed to implement more than 15% of its annual work plan.
R10	Lower	The Planning Coordinator failed to consult with one of its Transmission Owners or one of its adjacent Planning Coordinators in developing its list of designated sub-200kV transmission lines, if any, that are subject to this standard..	The Planning Coordinator failed to consult with more than one of its Transmission Owners or more than one of its adjacent Planning Coordinators in developing its list of designated sub-200kV transmission lines, if any, that are subject to this standard.	The Planning Coordinator has not annually reviewed its list of designated sub-200kV transmission lines, if any, that are subject to this standard.	The Planning Coordinator has not prepared a list of designated sub-200kV transmission lines, if any, that are subject to this standard.
R11	Lower	The Planning Coordinator has not documented its method for assessing the reliability significance of sub-200kV lines.	The Planning Coordinator has not considered lines whose loss would place the grid at an unacceptable risk of instability, separation, or cascading failures in developing its method for assessing the reliability significance of sub-200kV lines.	NA	The Planning Coordinator has not developed a method for assessing the reliability significance of sub-200kV lines.

Regional Variances

None identified.

Associated Technical Reference Documents

FAC-003 Reference — Transmission Vegetation Management — White Paper.

Version History

Version	Date	Action	Change Tracking
1	TBA	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.	01/20/06
1	April 4, 2007	Regulatory Approval — Effective Date	New
<u>2</u>		Complete revision	

FAC-003-2-Attachment 1

The Critical Clearance Zone is the area mapped by the radial distance around a conductor specified in TABLE I below when the conductor is energized and operating between no load and its Rating, including the design blow out, however, the zone shall not extend beyond the limits of the Active Transmission Line Right of Way.

TABLE I — Minimum Vegetation Clearance Distances (MVCD)
For Alternating Current Voltages

(AC) Nominal System Voltage (kV)	(AC) Maximum System Voltage (kV)	D-feet (meters) sea-level	- D-feet (meters) 3,000ft (914.4m)	- D-feet (meters) 4,000ft (1219.2m)	- D-feet (meters) 5,000ft (1524m)	- D-feet (meters) 6,000ft (1828.8m)
765	800	8.06ft (2.46m)	8.89ft (2.71m)	9.17ft (2.80m)	9.45ft (2.88m)	9.73ft (2.97m)
500	550	5.06ft (1.54m)	5.66ft (1.73m)	5.86ft (1.79m)	6.07ft (1.85m)	6.28ft (1.91m)
345	362	3.12ft (0.95m)	3.53ft (1.08m)	3.67ft (1.12m)	3.82ft (1.16m)	3.97ft (1.21m)
230	242	2.97ft (0.91m)	3.36ft (1.02m)	3.49ft (1.06m)	3.63ft (1.11m)	3.78ft (1.15m)
161*	169	2ft (0.61m)	2.28ft (0.69m)	2.38ft (0.73m)	2.48ft (0.76m)	2.58ft (0.79m)
138*	145	1.7ft (0.52m)	1.94ft (0.59m)	2.03ft (0.62m)	2.12ft (0.65m)	2.21ft (0.67m)
115*	121	1.41ft (0.43m)	1.61ft (0.49m)	1.68ft (0.51m)	1.75ft (0.53m)	1.83ft (0.56m)
88*	100	1.15ft (0.35m)	1.32ft (0.40m)	1.38ft (0.42m)	1.44ft (0.44m)	1.5ft (0.46m)

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69*	72	0.82ft (0.25m)	0.94ft (0.29m)	0.99ft (0.30m)	1.03ft (0.31m)	1.08ft (0.33m)
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<u>(AC)</u> <u>Nominal</u> <u>System</u> <u>Voltage</u> <u>(kV)</u>	<u>(AC)</u> <u>Maximum</u> <u>System</u> <u>Voltage</u> <u>(kV)</u>	<u>MVCD</u> <u>feet</u> <u>(meters)</u> <u>sea level</u>	<u>MVCD</u> <u>feet</u> <u>(meters)</u> <u>3,000ft</u> <u>(914.4m)</u>	<u>MVCD</u> <u>feet</u> <u>(meters)</u> <u>4,000ft</u> <u>(1219.2m)</u>	<u>MVCD</u> <u>feet</u> <u>(meters)</u> <u>5,000ft</u> <u>(1524m)</u>	<u>MVCD</u> <u>feet</u> <u>(meters)</u> <u>6,000ft</u> <u>(1828.8m)</u>	<u>MVCD</u> <u>feet</u> <u>(meters)</u> <u>7,000ft</u> <u>(2133.6m)</u>	<u>MVCD</u> <u>feet</u> <u>(meters)</u> <u>8,000ft</u> <u>(2438.4m)</u>	<u>MVCD</u> <u>feet</u> <u>(meters)</u> <u>9,000ft</u> <u>(2743.2m)</u>	<u>MVCD</u> <u>feet</u> <u>(meters)</u> <u>10,000ft</u> <u>(3048m)</u>	<u>MVCD</u> <u>feet</u> <u>(meters)</u> <u>11,000ft</u> <u>(3352.8m)</u>
<u>765</u>	<u>800</u>	<u>8.06ft</u> <u>(2.46m)</u>	<u>8.89ft</u> <u>(2.71m)</u>	<u>9.17ft</u> <u>(2.80m)</u>	<u>9.45ft</u> <u>(2.88m)</u>	<u>9.73ft</u> <u>(2.97m)</u>	<u>10.01ft</u> <u>(3.05m)</u>	<u>10.29ft</u> <u>(3.14m)</u>	<u>10.57ft</u> <u>(3.22m)</u>	<u>10.85ft</u> <u>(3.31m)</u>	<u>11.13ft</u> <u>(3.39m)</u>
<u>500</u>	<u>550</u>	<u>5.06ft</u> <u>(1.54m)</u>	<u>5.66ft</u> <u>(1.73m)</u>	<u>5.86ft</u> <u>(1.79m)</u>	<u>6.07ft</u> <u>(1.85m)</u>	<u>6.28ft</u> <u>(1.91m)</u>	<u>6.49ft</u> <u>(1.98m)</u>	<u>6.7ft</u> <u>(2.04m)</u>	<u>6.92ft</u> <u>(2.11m)</u>	<u>7.13ft</u> <u>(2.17m)</u>	<u>7.35ft</u> <u>(2.24m)</u>
<u>345</u>	<u>362</u>	<u>3.12ft</u> <u>(0.95m)</u>	<u>3.53ft</u> <u>(1.08m)</u>	<u>3.67ft</u> <u>(1.12m)</u>	<u>3.82ft</u> <u>(1.16m)</u>	<u>3.97ft</u> <u>(1.21m)</u>	<u>4.12ft</u> <u>(1.26m)</u>	<u>4.27ft</u> <u>(1.30m)</u>	<u>4.43ft</u> <u>(1.35m)</u>	<u>4.58ft</u> <u>(1.40m)</u>	<u>4.74ft</u> <u>(1.44m)</u>
<u>230</u>	<u>242</u>	<u>2.97ft</u> <u>(0.91m)</u>	<u>3.36ft</u> <u>(1.02m)</u>	<u>3.49ft</u> <u>(1.06m)</u>	<u>3.63ft</u> <u>(1.11m)</u>	<u>3.78ft</u> <u>(1.15m)</u>	<u>3.92ft</u> <u>(1.19m)</u>	<u>4.07ft</u> <u>(1.24m)</u>	<u>4.22ft</u> <u>(1.29m)</u>	<u>4.37ft</u> <u>(1.33m)</u>	<u>4.53ft</u> <u>(1.38m)</u>
<u>161*</u>	<u>169</u>	<u>2ft</u> <u>(0.61m)</u>	<u>2.28ft</u> <u>(0.69m)</u>	<u>2.38ft</u> <u>(0.73m)</u>	<u>2.48ft</u> <u>(0.76m)</u>	<u>2.58ft</u> <u>(0.79m)</u>	<u>2.69ft</u> <u>(0.82m)</u>	<u>2.8ft</u> <u>(0.85m)</u>	<u>2.91ft</u> <u>(0.89m)</u>	<u>3.03ft</u> <u>(0.92m)</u>	<u>3.14ft</u> <u>(0.96m)</u>
<u>138*</u>	<u>145</u>	<u>1.7ft</u> <u>(0.52m)</u>	<u>1.94ft</u> <u>(0.59m)</u>	<u>2.03ft</u> <u>(0.62m)</u>	<u>2.12ft</u> <u>(0.65m)</u>	<u>2.21ft</u> <u>(0.67m)</u>	<u>2.3ft</u> <u>(0.70m)</u>	<u>2.4ft</u> <u>(0.73m)</u>	<u>2.49ft</u> <u>(0.76m)</u>	<u>2.59ft</u> <u>(0.79m)</u>	<u>2.7ft</u> <u>(0.82m)</u>
<u>115*</u>	<u>121</u>	<u>1.41ft</u> <u>(0.43m)</u>	<u>1.61ft</u> <u>(0.49m)</u>	<u>1.68ft</u> <u>(0.51m)</u>	<u>1.75ft</u> <u>(0.53m)</u>	<u>1.83ft</u> <u>(0.56m)</u>	<u>1.91ft</u> <u>(0.58m)</u>	<u>1.99ft</u> <u>(0.61m)</u>	<u>2.07ft</u> <u>(0.63m)</u>	<u>2.16ft</u> <u>(0.66m)</u>	<u>2.25ft</u> <u>(0.69m)</u>
<u>88*</u>	<u>100</u>	<u>1.15ft</u> <u>(0.35m)</u>	<u>1.32ft</u> <u>(0.40m)</u>	<u>1.38ft</u> <u>(0.42m)</u>	<u>1.44ft</u> <u>(0.44m)</u>	<u>1.5ft</u> <u>(0.46m)</u>	<u>1.57ft</u> <u>(0.48m)</u>	<u>1.64ft</u> <u>(0.50m)</u>	<u>1.71ft</u> <u>(0.52m)</u>	<u>1.78ft</u> <u>(0.54m)</u>	<u>1.86ft</u> <u>(0.57m)</u>
<u>69*</u>	<u>72</u>	<u>0.82ft</u> <u>(0.25m)</u>	<u>0.94ft</u> <u>(0.29m)</u>	<u>0.99ft</u> <u>(0.30m)</u>	<u>1.03ft</u> <u>(0.31m)</u>	<u>1.08ft</u> <u>(0.33m)</u>	<u>1.13ft</u> <u>(0.34m)</u>	<u>1.18ft</u> <u>(0.36m)</u>	<u>1.23ft</u> <u>(0.37m)</u>	<u>1.28ft</u> <u>(0.39m)</u>	<u>1.34ft</u> <u>(0.41m)</u>

*As designated by the Reliability Planning Coordinator

TABLE H1 (CONT.) — Minimum Vegetation Clearance Distances (MVCD)s (D)
For Alternating Current Voltages

(AC) Nominal System Voltage (kV)	(AC) Maximum System Voltage (kV)	- D-feet (meters) 7,000ft (2133.6m)	- D-feet (meters) 8,000ft (2438.4m)	- D-feet (meters) 9,000ft (2743.2m)	- D-feet (meters) 10,000ft (3048m)	- D-feet (meters) 11,000ft (3352.8m)
765	800	10.01ft (3.05m)	10.29ft (3.14m)	10.57ft (3.22m)	10.85ft (3.31m)	11.13ft (3.39m)
500	550	6.49ft (1.98m)	6.7ft (2.04m)	6.92ft (2.11m)	7.13ft (2.17m)	7.35ft (2.24m)
345	362	4.12ft (1.26m)	4.27ft (1.30m)	4.43ft (1.35m)	4.58ft (1.40m)	4.74ft (1.44m)
230	242	3.92ft (1.19m)	4.07ft (1.24m)	4.22ft (1.29m)	4.37ft (1.33m)	4.53ft (1.38m)
161*	169	2.69ft (0.82m)	2.8ft (0.85m)	2.91ft (0.89m)	3.03ft (0.92m)	3.14ft (0.96m)
138*	145	2.3ft (0.70m)	2.4ft (0.73m)	2.49ft (0.76m)	2.59ft (0.79m)	2.7ft (0.82m)
115*	121	1.91ft (0.58m)	1.99ft (0.61m)	2.07ft (0.63m)	2.16ft (0.66m)	2.25ft (0.69m)
88*	100	1.57ft (0.48m)	1.64ft (0.50m)	1.71ft (0.52m)	1.78ft (0.54m)	1.86ft (0.57m)
69*	72	1.13ft (0.34m)	1.18ft (0.36m)	1.23ft (0.37m)	1.28ft (0.39m)	1.34ft (0.41m)

*As designated by the Reliability Coordinator

**TABLE I — Minimum Vegetation Clearance Distances (MVCD)
For Direct Current Voltages**

(DC) Pole to Pole Nominal Voltage (kV)	- D-feet (meters) sea level -	- D-feet (meters) 3,000ft (914.4m) Alt. -	- D-feet (meters) 4,000ft (1219.2m) Alt. -	- D-feet (meters) 5,000ft (1524m) Alt. -	- D-feet (meters) 6,000ft (1828.8m) Alt. -
1500	13.92ft (4.24m)	15.07ft (4.59m)	15.45ft (4.71m)	15.82ft (4.82m)	16.2ft (4.94m)
1200	10.07ft (3.07m)	11.04ft (3.36m)	11.35ft (3.46m)	11.66ft (3.55m)	11.98ft (3.65m)
1000	7.89ft (2.40m)	8.71ft (2.65m)	8.99ft (2.74m)	9.25ft (2.82m)	9.55ft (2.91m)
800	4.78ft (1.46m)	5.35ft (1.63m)	5.55ft (1.69m)	5.75ft (1.75m)	5.95ft (1.81m)

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500	3.43ft (1.05m)	4.02ft (1.23m)	4.02ft (1.23m)	4.18ft (1.27m)	4.34ft (1.32m)
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Pole-to-Pole Nominal Voltage (kV)	D-feet (meters) 7,000ft (2133.6m) Alt. -	D-feet (meters) 8,000ft (2438.4m) Alt. -	D-feet (meters) 9,000ft (2743.2m) Alt. -	D-feet (meters) 10,000ft (3048m) Alt. -	D-feet (meters) 11,000ft (3352.8m) Alt. -
1500	16.55ft (5.04m)	16.9ft (5.15m)	17.27ft (5.26m)	17.62ft (5.37m)	17.97ft (5.48m)
1200	12.3ft (3.75m)	12.62ft (3.85m)	12.92ft (3.94m)	13.24ft (4.04m)	13.54ft (4.13m)
1000	9.82ft (2.99m)	10.1ft (3.08m)	10.38ft (3.16m)	10.65ft (3.25m)	10.92ft (3.33m)
800	6.15ft (1.87m)	6.36ft (1.94m)	6.57ft (2.00m)	6.77ft (2.06m)	6.98ft (2.13m)
500	4.5ft (1.37m)	4.66ft (1.42m)	4.83ft (1.47m)	5ft (1.52m)	5.17ft (1.58m)

(DC) Nominal Pole to Ground Voltage (kV)	MVCD feet (meters) sea level	MVCD feet (meters) 3,000ft (914.4m) Alt.	MVCD feet (meters) 4,000ft (1219.2m) Alt.	MVCD feet (meters) 5,000ft (1524m) Alt.	MVCD feet (meters) 6,000ft (1828.8m) Alt.	MVCD feet (meters) 7,000ft (2133.6m) Alt.	MVCD feet (meters) 8,000ft (2438.4m) Alt.	MVCD feet (meters) 9,000ft (2743.2m) Alt.	MVCD feet (meters) 10,000ft (3048m) Alt.	MVCD feet (meters) 11,000ft (3352.8m) Alt.
<u>±750</u>	<u>13.92ft</u> (4.24m)	<u>15.07ft</u> (4.59m)	<u>15.45ft</u> (4.71m)	<u>15.82ft</u> (4.82m)	<u>16.2ft</u> (4.94m)	<u>16.55ft</u> (5.04m)	<u>16.9ft</u> (5.15m)	<u>17.27ft</u> (5.26m)	<u>17.62ft</u> (5.37m)	<u>17.97ft</u> (5.48m)
<u>±600</u>	<u>10.07ft</u> (3.07m)	<u>11.04ft</u> (3.36m)	<u>11.35ft</u> (3.46m)	<u>11.66ft</u> (3.55m)	<u>11.98ft</u> (3.65m)	<u>12.3ft</u> (3.75m)	<u>12.62ft</u> (3.85m)	<u>12.92ft</u> (3.94m)	<u>13.24ft</u> (4.04m)	<u>13.54ft</u> (4.13m)
<u>±500</u>	<u>7.89ft</u> (2.40m)	<u>8.71ft</u> (2.65m)	<u>8.99ft</u> (2.74m)	<u>9.25ft</u> (2.82m)	<u>9.55ft</u> (2.91m)	<u>9.82ft</u> (2.99m)	<u>10.1ft</u> (3.08m)	<u>10.38ft</u> (3.16m)	<u>10.65ft</u> (3.25m)	<u>10.92ft</u> (3.33m)

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<u>±400</u>	<u>4.78ft</u> <u>(1.46m)</u>	<u>5.35ft</u> <u>(1.63m)</u>	<u>5.55ft</u> <u>(1.69m)</u>	<u>5.75ft</u> <u>(1.75m)</u>	<u>5.95ft</u> <u>(1.81m)</u>	<u>6.15ft</u> <u>(1.87m)</u>	<u>6.36ft</u> <u>(1.94m)</u>	<u>6.57ft</u> <u>(2.00m)</u>	<u>6.77ft</u> <u>(2.06m)</u>	<u>6.98ft</u> <u>(2.13m)</u>
<u>±250</u>	<u>3.43ft</u> <u>(1.05m)</u>	<u>4.02ft</u> <u>(1.23m)</u>	<u>4.02ft</u> <u>(1.23m)</u>	<u>4.18ft</u> <u>(1.27m)</u>	<u>4.34ft</u> <u>(1.32m)</u>	<u>4.5ft</u> <u>(1.37m)</u>	<u>4.66ft</u> <u>(1.42m)</u>	<u>4.83ft</u> <u>(1.47m)</u>	<u>5ft</u> <u>(1.52m)</u>	<u>5.17ft</u> <u>(1.58m)</u>