

February 2, 2012

**VIA ELECTRONIC FILING**

Ms. Erica Hamilton, Commission Secretary  
British Columbia Utilities Commission  
Box 250, 900 Howe Street  
Sixth Floor  
Vancouver, B.C.  
V6Z 2N3

Re: *North American Electric Reliability Corporation*

Dear Ms. Hamilton:

The North American Electric Reliability Corporation (“NERC”) hereby submits  
this Notice of Filing of:

- Reliability Standard FAC-003-2 — Transmission Vegetation Management (FAC-003-2) and the associated Violation Risk Factors (“VRFs”) and Violation Severity Levels (“VSLs”), included in **Exhibit A** to the Notice, effective the first day of the first calendar quarter one year following approval;<sup>1</sup>
- three proposed definitions to be added to the NERC Glossary of Terms used in the NERC Reliability Standards effective the first day of the first calendar quarter one year following approval:
  - Right-of-Way
  - Vegetation Inspection
  - Minimum Vegetation Clearance Distance (“MVCD”)
- the implementation plan for Reliability Standard FAC-003-2 — Transmission Vegetation Management which is included in **Exhibit B** to the Notice; and

<sup>1</sup> Because the proposed FAC-003-2 standard has been substantially revised, a redlined version of FAC-003-2 is not included in this filing, as it would be difficult to read and of limited value.

- the retirement of Reliability Standard FAC-003-1 — Transmission Vegetation Management Program (FAC-003-1) and the currently effective NERC Definitions for “Right-of-Way” and “Vegetation Inspection” effective midnight immediately prior to the first day of the first calendar quarter that is a year following approval:

The proposed FAC-003-2 standard addresses the important goal of managing vegetation to maintain a reliable electric transmission system and presents three themes that all help to improve reliability. First, reliability will be improved with implementation of the new standard. Second, enforceability of FAC-003-2, as compared to FAC-003-1, will be improved and cleaner for NERC and the Regional Entities. And third, NERC registered entities will have greater flexibility to address local vegetation management conditions.

Ineffective vegetation management was identified as a major cause of the August 14, 2003, blackout, and has also been a causal factor in other large-scale North American outages such as those that occurred in the summer of 1996 in the western United States.<sup>2</sup> Recommendation 16 of the Blackout Report<sup>3</sup> suggests the establishment of enforceable standards for maintenance of electrical clearances in right-of-way areas. NERC “raised the bar” with the development of the FAC-003-1 Reliability Standard, and the enhancements to the standard included with this filing represents another “raising of the bar.” Unlike the previous standard, which is primarily focused on the “Transmission Vegetation Management Program,” the new version of FAC-003 has a broader focus on

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<sup>2</sup> See, *Final Report on the August 14, 2003 Blackout in the United States and Canada: causes and Recommendations*, U.S.-Canada Power System Outage Task Force, April 5, 2004, at p. 154 (“Blackout Report”).

<sup>3</sup> Blackout Report, Recommendation 16.

“Transmission Vegetation Management,” which is reflected both in the title of the standard and the fact that there are now results-based performance requirements that require specific actions, rather than just documentation.

The general improvements compared to the previous version of the standard are shown in the table below:

<b>Requirement in Existing FAC-003-1 Standard</b>	<b>Improvements in Proposed FAC-003-2 Standard</b>
Requires a document that includes vegetation management objectives, approved procedures, and work specifications. (R1)	Requires documented vegetation management maintenance strategies, procedures, processes, or specifications that will prevent encroachment into the Minimum Vegetation Clearance Distance (MVCD) (R3)
Requires a document schedule for ROW vegetation inspections. (R1.1)	Requires vegetation inspection of 100% of applicable transmission lines at least once per calendar year. (R6)
Requires documentation of a “Clearance 1” value based on TO assessment of situation and risk. (R1.2 and R1.2.1)	Requires vegetation be managed such that no encroachments into the MVCD (as established by the Gallet Equation) occur, regardless of whether or not they result in a sustained outage. (R3, parts 3.1 and 3.2)
Requires documentation of a “Clearance 2” value based on IEEE standard. (R1.2.2, R1.2.2.1, and R1.2.2.2)	Requires vegetation be managed such that no encroachments into the MVCD (as established by the Gallet Equation) occur, regardless of whether or not they result in a sustained outage. (R1 and R2)
Requires documentation of mitigation measures to address locations on the on the ROW where the TO is restricted from attaining specified clearances. (R1.4)	Requires corrective action to be taken in cases where a TO is constrained from performing vegetation work. (R5)
Requires documentation of a process for communicating imminent threats	Requires TOs, without any intentional time delay, to notify the control center holding

where vegetation conditions could lead to a transmission line outage. (R1.5)	switching authority for the associated applicable line when the TO has confirmed the existence of a vegetation condition that is likely to cause a Fault at any moment. (R4)
Requires the creation and implementation of an annual vegetation management plan, as well as a process for documenting and tracking the execution of the plan. (R2)	Requires the TOs annual vegetation management plan be executed such that no vegetation encroachments occur within the MVCD. (R7)

Accordingly, the proposed FAC-003-2 standard serves the important reliability goal of providing clear, unambiguous standards pertaining to maintenance of safe clearances of transmission lines from obstructions in the lines' right-of-way areas – in this case, specifically with regard to vegetation management.

The proposed FAC-003-2 standard was approved by the NERC Board of Trustees on November 3, 2011.

This Notice consists of the following:

- This transmittal letter;
- A table of contents for the entire Notice;
- A narrative description explaining how the proposed Reliability Standard FAC-003-2 — Transmission Vegetation Management meets reliability requirements;
- Reliability Standard FAC-003-2 — Transmission Vegetation Management (**Exhibit A**);
- Implementation Plan for Reliability Standard FAC-003-2 — Transmission Vegetation Management (**Exhibit B**);
- Proposed Definitions to be Added to the NERC Glossary of Terms Used in NERC Reliability Standards (**Exhibit C**);
- FAC-003-1 Mapping to Proposed NERC Reliability Standard FAC-003-2 summarizing the transition of requirements and related information from FAC-003-1 to FAC-003-2 (“Mapping Document”) (**Exhibit D**)

- Consideration of Comments Reports created during the development of Reliability Standard FAC-003-2 — Transmission Vegetation Management (**Exhibit E**);
- Analysis of how VRFs and VSLs Were Determined Using FERC Guidelines (**Exhibit F**);
- The complete development record of the proposed Reliability Standard (**Exhibit G**);
- The Standard Drafting Team Roster for NERC Standards Development Project 2007-07 Vegetation Management (**Exhibit H**); and
- Transmission Vegetation Management – FAC-003-2 Technical Reference Document (**Exhibit I**).

Respectfully submitted,

*/s/ Holly A. Hawkins*

Holly A. Hawkins

*Assistant General Counsel for North  
American Electric Reliability  
Corporation*



## TABLE OF CONTENTS

I. Introduction	1
II. Executive Summary	3
III. Notices and Communications	9
IV. Background:	9
a. Reliability Standards Development Procedure	9
V. Justification of the Proposed Reliability Standard	10
a. Basis and Purpose of Proposed FAC-003-2 — Transmission Vegetation Management	10
b. Improvements to FAC-003 in this Revision	13
c. Enforceability of the Proposed FAC-003-2 Reliability Standard	31
d. FERC Directives Addressed in the Proposed FAC-003-2 Standard	38
e. Demonstration that the Proposed Reliability Standard is Just, Reasonable, Not Unduly Discriminatory or Preferential and In the Public Interest	42
f. Violation Risk Factors (VRFs) and Violation Severity Levels (VSLs)	47
VI. Summary of the Reliability Standard Development Proceedings	56
a. Development History	56
i. SAR Development	56
ii. Overview of the Standard Drafting Team	56
iii. The First Posting	57
iv. The Second Posting	58
v. Transition to Results-Based Format	58
vi. The Third Posting	59

vii. The Fourth Posting and Initial Ballot	60
viii. The Fifth Posting and Successive Ballot	61
ix. The Sixth Posting and Recirculation Ballot	62
x. Board of Trustees Approval	62

**Exhibit A** — Reliability Standard FAC-003-2 — Transmission Vegetation Management

**Exhibit B** — Implementation Plan for Reliability Standard FAC-003-2 — Transmission Vegetation Management

**Exhibit C** — Proposed Terms to be Added to the NERC Glossary of Terms Used in NERC Reliability Standards

**Exhibit D** — FAC-003-1 Mapping to Proposed NERC Reliability Standard FAC-003-2

**Exhibit E** — Consideration of Comments Reports Created During the Development of Reliability Standard FAC-003-2 — Transmission Vegetation Management

**Exhibit F** — Analysis of how VRFs and VSLs Were Determined Using FERC Guidelines

**Exhibit G** — Record of Development of Proposed FAC-003-2 — Transmission Vegetation Management Reliability Standard

**Exhibit H** — Standard Drafting Team Roster for NERC Standards Development Project 2007-07 Vegetation Management

**Exhibit I** — Transmission Vegetation Management – FAC-003-2 Technical Reference Document



## I. INTRODUCTION

The North American Electric Reliability Corporation (“NERC”) hereby submits notice of the proposed FAC-003-2 — Transmission Vegetation Management Reliability Standard approved by the NERC Board of Trustees on November 3, 2011. The proposed FAC-003-2 Reliability Standard improves reliability by maintaining a reliable electric transmission system by using a defense-in-depth strategy to manage vegetation located on transmission rights of way (“ROW”) and by minimizing encroachments from vegetation located adjacent to the ROW, thus preventing the risk of those vegetation-related outages that could lead to Cascading. Additionally, the FAC-003-2 standard helps to enhance reliability by improving enforceability of FAC-003-2, as compared to FAC-003-1, and by providing greater flexibility to NERC registered entities to address local vegetation management conditions.

By this Notice, NERC is providing notice of the proposed FAC-003-2 Reliability Standard, three proposed NERC Glossary Definitions, Violation Risk Factors (“VRFs”) and Violation Severity Levels (“VSLs”), the corresponding implementation plan, and retirement of one currently-effective Reliability Standard. Specifically, NERC provides notice of the following:

- Reliability Standard FAC-003-2 — Transmission Vegetation Management and the associated Violation Risk Factors and Violation Severity Levels (FAC-003-2), which is included in **Exhibit A**, effective the first day of the first calendar quarter that is twelve months following approval;<sup>4</sup>
- the implementation plan for Reliability Standard FAC-003-2 — Transmission Vegetation Management which is included in **Exhibit B**;

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<sup>4</sup> Because the proposed FAC-003-2 standard has been substantially revised, a redlined version of FAC-003-2 is not included in this filing.

- three proposed Definitions included in **Exhibit C** to be added to the NERC Glossary of Terms Used in NERC Reliability Standards effective the first day of the first calendar quarter that is twelve months following approval:
  - **Right-of-Way (ROW)** – The corridor of land under a transmission line(s) needed to operate the line(s). The width of the corridor is established by engineering or construction standards as documented in either construction documents, pre-2007 vegetation maintenance records, or by the blowout standard in effect when the line was built. The ROW width in no case exceeds the Transmission Owner’s legal rights but may be less based on the aforementioned criteria.
  - **Vegetation Inspection** - The systematic examination of vegetation conditions on a Right-of-Way and those vegetation conditions under the Transmission Owner’s control that are likely to pose a hazard to the line(s) prior to the next planned maintenance or inspection. This may be combined with a general line inspection.
  - **Minimum Vegetation Clearance Distance (MVCD)** - The calculated minimum distance stated in feet (meters) to prevent flash-over between conductors and vegetation, for various altitudes and operating voltages.
- the retirement of Reliability Standard FAC-003-1 — Transmission Vegetation Management Program (FAC-003-1) and the currently effective definitions of “Right-of-Way” and “Vegetation Inspection” effective midnight immediately prior to the first day of the first calendar quarter that is twelve months following approval.

The NERC Board of Trustees approved the proposed FAC-003-2 Reliability Standard on November 3, 2011. **Exhibit A** to this petition sets forth FAC-003-2 . **Exhibit B** contains the Implementation Plan for FAC-003-2 . **Exhibit C** contains three proposed glossary terms to be added to the NERC Glossary of Terms Used in NERC Reliability Standards. **Exhibit D** contains the FAC-003-1 Mapping to Proposed NERC Reliability Standard FAC-003-2 document (“Mapping Document”) summarizing the transition of requirements and related information from FAC-003-1 to FAC-003-2. **Exhibit E** contains the Consideration of Comments Reports created during the development of the FAC-003-2 standard. **Exhibit F** contains an analysis of how VRFs

and VSLs were determined using FERC Guidelines. **Exhibit G** contains the complete record of development for FAC-003-2. **Exhibit H** includes the roster and biographies for the standard drafting team appointed by the NERC Standards Committee to Project 2007-07 - Transmission Vegetation Management, the standard drafting team responsible for developing FAC-003-2. **Exhibit I** includes the Transmission Vegetation Management – FAC-003-2 Technical Reference Document (Appendix 1 to that document discusses the Gallet Equation).

## **II. EXECUTIVE SUMMARY**

The proposed FAC-003-2 Reliability Standard represents an improvement over the currently-effective FAC-003-1 standard because it more clearly defines a defense-in-depth strategy to manage vegetation located on transmission ROW to minimize encroachments from vegetation located adjacent to the ROW, thus reducing the risk of those vegetation-related outages that could lead to Cascading. The proposed FAC-003-2 Reliability Standard presents three themes that all help to improve reliability. First, reliability will be improved with implementation of the new standard. Second, enforceability of FAC-003-2, as compared to FAC-003-1, will be improved and cleaner for NERC and the Regional Entities. And third, NERC registered entities will have greater flexibility to address local vegetation management conditions.

The general improvements compared to the previous version of the standard are shown in the table below:

<b>Requirement in Existing FAC-003-1 Standard</b>	<b>Improvements in Proposed FAC-003-2 Standard</b>
Requires a document that includes vegetation management objectives, approved procedures, and work specifications. (R1)	Requires documented vegetation management maintenance strategies, procedures, processes, or specifications that will prevent encroachment into the Minimum Vegetation

	Clearance Distance (MVCD) (R3)
Requires a document schedule for ROW vegetation inspections. (R1.1)	Requires vegetation inspection of 100% of applicable transmission lines at least once per calendar year. (R6)
Requires documentation of a “Clearance 1” value based on TO assessment of situation and risk. (R1.2 and R1.2.1)	Requires vegetation be managed such that no encroachments into the MVCD (as established by the Gallet Equation) occur, regardless of whether or not they result in a sustained outage. (R3, parts 3.1 and 3.2)
Requires documentation of a “Clearance 2” value based on IEEE standard. (R1.2.2, R1.2.2.1, and R1.2.2.2)	Requires vegetation be managed such that no encroachments into the MVCD (as established by the Gallet Equation) occur, regardless of whether or not they result in a sustained outage. (R1 and R2)
Requires documentation of mitigation measures to address locations on the on the ROW where the TO is restricted from attaining specified clearances. (R1.4)	Requires corrective action to be taken in cases where a TO is constrained from performing vegetation work. (R5)
Requires documentation of a process for communicating imminent threats where vegetation conditions could lead to a transmission line outage. (R1.5)	Requires TOs, without any intentional time delay, to notify the control center holding switching authority for the associated applicable line when the TO has confirmed the existence of a vegetation condition that is likely to cause a Fault at any moment. (R4)
Requires the creation and implementation of an annual vegetation management plan, as well as a process for documenting and tracking the execution of the plan. (R2)	Requires the TOs annual vegetation management plan be executed such that no vegetation encroachments occur within the MVCD. (R7)

In Order No. 693, the Federal Energy Regulation Commission (“FERC”) identified shortcomings of the currently-effective FAC-003-1 standard, which have been addressed in this proposed version.<sup>5</sup> Additionally, FERC in its Order indicated the IEEE

<sup>5</sup> *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, FERC Stats. & Regs. ¶ 31,242 (2007), *order on reh’g* Order No. 693-A, 120 FERC ¶ 61,053 (2007)(“Order No. 693”) at PP 731 and 732.

Standard 516-2003, upon which the previous standard was based, was “intended for use as a guide by highly-trained maintenance personnel to carry out live-line work using specialized tools under controlled environments and operating conditions, not for those conditions necessary to safely carry out vegetation management practices.”<sup>6</sup> Further, FERC stated “use of IEEE clearance provision as a basis for minimum clearance prior to the next tree trimming as a Requirement in vegetation management is not appropriate for safety and reliability reasons,” and directed NERC to develop a Reliability Standard that defines the minimum clearance needed to avoid sustained vegetation-related outages.<sup>7</sup>

Because of the direction provided by FERC in Order No. 693 relative to the use of IEEE Standard 516-2003, the proposed FAC-003-2 Reliability Standard no longer utilizes the IEEE clearance provisions. The standard now requires minimum clearance distances derived from the Gallet Equation. There were four potential methods considered for use in the standard to derive flash-over distances for various voltages and altitudes. While each of the methods are expected to provide similar results,<sup>8</sup> the Gallet method was selected because Gallet method information to support the development of the standard was readily available in an industry recognized reference. This method allows clearance distance values for a given voltage to be derived for wet conditions at various altitudes. The distances derived using the Gallet Equation result in the probability

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<sup>6</sup> *Id.*

<sup>7</sup> *Id.*

<sup>8</sup> EPRI, at its Lenox facility, is currently growing trees on a high voltage right-of-way test plot that will be ready for testing by the summer of 2013. These will be the first known field tests of energized high voltage conductor flash-over to vegetation. The results of those tests may be useful to the industry for future reviews of this NERC Standard.

of flashover in the range of  $10^{-6}$ . This approach was used to design of some of the first 500 kV and 765 kV lines in North America.<sup>9</sup>

Additionally, this standard continues to provide the Transmission Owner with flexibility when determining the appropriate degree of vegetation removal. Similar to FAC-003-1, in which the Transmission Owner was given the authority to “determine and document appropriate clearance distances to be achieved at the time of transmission vegetation management work based upon local conditions and the expected time frame in which the Transmission Owner plans to return for future vegetation management work,” FAC-003-2 provides the Transmission Owner the necessary discretion to determine how to manage vegetation. FAC-003-2 continues to allow Transmission Owners the ability to exercise their full legal rights without mandating any specific strategy or incorporating an arbitrary margin into the requirements of the standard absent specific knowledge of the actual conditions in the field.

Despite this flexibility, FAC-003-2 is actually more stringent than FAC-003-1. Essentially, with the new Requirements R1 and R2, FAC-003-2 presents a “zero-tolerance” approach to vegetation management, explicitly treating any encroachment into the MVCD (without contact, with a flashover, with a momentary outage, or with a sustained outage) as a violation of the standard. The standard also requires annual inspections (which go beyond what is required in FAC-003-1) and is much more explicit regarding what actions must be taken to support vegetation management and reliability.

FAC-003-2 is also one of the first standards developed using NERC’s new “results- based” approach and format. Each requirement meets one or more specific approaches (performance-based, risk-based, or competency-based) to achieving results,

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<sup>9</sup> Andrew Hileman, *Insulation Coordination for Power System*, Marcel Dekker, New York, NY 1999.

and the measures associated with each requirement have been developed to ensure that compliance with the standard can be verified. In addition to focusing on completing objectives, achieving goals, and meeting needs (three of the hallmarks of a results-based standard), FAC-003-2 identifies clear and objective measures for compliance, so that it can be enforced in a consistent and non-preferential manner. The standard also includes detailed background information and supporting documentation, making the requirements easier to comprehend and providing the rationale used by the drafting team for establishing the requirements.

As a results-based standard, there are some noticeable changes in the manner in which the requirements for the standard are structured. One of the most obvious is the replacement of Requirement R1 from FAC-003-1 with several new requirements in FAC-003-2. Requirement R1 from FAC-003-1 requires the Transmission Owner to have a formal Transmission Vegetation Management Plan (“TVMP”) that includes several specific items. In FAC-003-2, the majority of the specific items have been extracted from the pages of the TVMP and made into explicit, actionable requirements. The requirement for the TVMP itself has been removed from the standard.

The TVMP required by FAC-003-1 was a good vehicle for ensuring that all key elements of vegetation management were considered as part of a Transmission Owner’s overall vegetation management strategy. However, the drafting team that developed FAC-003-2 determined there were equally (or, in some cases more,) effective ways to ensure key vegetation management issues are addressed. Accordingly, the drafting team developed FAC-003-2 using results-based approaches that focused on what actions needed to be taken, as opposed to how documentation supporting vegetation management

should be assembled. This resulted in a standard that ensures requirements are measurable and enforceable while providing significantly more flexibility than the previous standard. A detailed discussion of how the requirements in version one of the standard have been transitioned to version two of the standard is included below.

NERC believes FAC-003-2 will continue to provide the means by which the industry can demonstrate its commitment to reliability and vegetation management excellence. Moreover, by allowing more diverse approaches through the flexibility inherent in the new results-based requirements, FAC-003-2 correctly focuses on providing the industry the latitude it needs to meet the performance objectives important to reliability. The industry as a whole recognizes the importance of vegetation management. Like the previous version of the standard, FAC-003-2 is a channel through which the industry can measurably demonstrate that recognition. As such, NERC expects the current industry performance of vegetation management to continue or improve under FAC-003-2.

Additionally, there are more improvements that have been incorporated into proposed FAC-003-2 standard that are further detailed in the later sections of this petition.



### III. NOTICES AND COMMUNICATIONS

Notices and communications with respect to this filing may be addressed to the following:

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### IV. BACKGROUND

#### a. Reliability Standards Development Procedure

NERC develops Reliability Standards in accordance with Section 300 (Reliability Standards Development) of its Rules of Procedure and the NERC *Standard Processes Manual*.<sup>10</sup> NERC's proposed rules provide for reasonable notice and opportunity for public comment, due process, openness, and a balance of interests in developing Reliability Standards and thus satisfies certain of the criteria for approving Reliability Standards. The development process is open to any person or entity with a legitimate interest in the reliability of the bulk power system. NERC considers the comments of all stakeholders, and a vote of stakeholders and the NERC Board of Trustees is required to

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<sup>10</sup> Both the *Reliability Standards Development Procedure Version 7* and, when it was approved, the *Standard Processes Manual*, were used to develop the proposed FAC-003-2 Reliability Standard.

approve a Reliability Standard before the Reliability Standard is submitted to the applicable governmental authorities for approval. FAC-003-2 was approved by the NERC Board of Trustees on November 3, 2011.

**V. JUSTIFICATION FOR THE PROPOSED RELIABILITY STANDARD**

This section summarizes the development of the proposed FAC-003-2 Reliability Standard, describes the reliability objectives to be achieved by the standard, explains the development history of the standard, and documents how the standard meets the criteria for approval. NERC, in its analysis of the proposed standard, determined that it is just, reasonable, not unduly discriminatory or preferential, and in the public interest.

The final discussion in this section provides the stakeholder ballot results and explains how other key issues were considered and addressed by the Standard Drafting Team.

**a. Basis and Purpose of Reliability Standard FAC-003-2 —  
Transmission Vegetation Management**

The primary purpose of the proposed FAC-003-2 standard is to maintain a reliable electric transmission system by using a defense-in-depth strategy to manage vegetation located within a transmission ROW and minimize encroachments from vegetation not located on a ROW, thus reducing the risk of vegetation-related outages that could lead to Cascading, uncontrolled separation, or instability. Major outages and operational problems have resulted from contact between vegetation and transmission lines located on many types of lands and reflecting many ownership situations. FAC-003-2 is primarily applicable to overhead transmission lines operated at 200 kV or higher, overhead transmission lines operated below 200 kV identified by the Planning Coordinator as an element of an Interconnection Reliability Operating Limit (“IROL”)

under NERC Reliability Standard FAC-014, and overhead transmission lines operated below 200 kV identified as a Major Western Electricity Coordinating Council (“WECC”) Transfer Path in the Bulk Electric System by WECC to prevent those vegetation-related outages that could lead to Cascading. Because vegetation growth is continual and always present, unmanaged vegetation poses an increasing outage risk over time. If vegetation is not properly managed to avoid encroachments, a contact will eventually occur that could result in a sustained outage.

The proposed FAC-003-2 standard includes seven requirements. The requirements are summarized below.

**Requirement R1** requires that the Transmission Owner must manage vegetation to prevent encroachments into the MVCD for all lines associated with IROLs and Major WECC Transfer Paths. It provides specific types of encroachments that must be avoided.

**Requirement R2** requires that the Transmission Owner must manage vegetation to prevent encroachments into the MVCD for all other transmission lines that are applicable under this standard. It also provides specific types of encroachments that must be avoided.

**Requirement R3** requires the Transmission Owner to have documentation describing its chosen approach(es) for managing vegetation. The approach must consider the movement of the conductor, as well as growth rate, control method, and inspection frequency.

**Requirement R4** mandates that when a Transmission Owner has observed a vegetation condition that is likely to produce a Fault, it must notify the control center with switching authority for that transmission line of the condition.

**Requirement R5** specifies that a Transmission Owner constrained from performing vegetation management work must take corrective actions to prevent encroachments that would put the line at risk.

**Requirement R6** states that the Transmission Owner must inspect 100% of its applicable lines at least once per calendar year, with no more than 18 months between inspections.

**Requirement R7** requires that the Transmission Owner must complete 100% of its annual vegetation work plan for applicable lines. It provides for documented modifications to the plan (some of which are listed as examples in the requirement), provided that such modifications do not allow encroachment of vegetation into the MVCD.

The proposed standard presents a comprehensive approach to vegetation management by using three types of requirements to provide a defense-in-depth structure to reduce the likelihood of vegetation-related outages that could lead to Cascading:

- **Performance-based requirements**, which define a particular reliability objective or outcome to be achieved. Requirements R1 and R2 are performance-based requirements.
- **Risk-based requirements**, which are preventive requirements to reduce the risks of failure to acceptable tolerance levels. Requirements R4, R5, R6, and R7 are risk-based requirements.
- **Competency-based requirements**, which define a minimum set of capabilities an entity needs to have to demonstrate it is able to perform its designated reliability functions. Requirement R3 is a competency-based requirement.

The defense-in-depth strategy for reliability standards development recognizes that each requirement in a reliability standard has a role in reducing the risk of system failures, and that these roles are complementary and reinforcing. This standard uses a defense-in-depth approach to maintain the reliability of the electric transmission system by:

- Requiring that vegetation be managed to prevent vegetation encroachment inside the flash-over clearance (MVCD) (Requirements R1 and R2);
- Requiring documentation of the maintenance strategies, procedures, processes and specifications used to manage vegetation to prevent potential flash-over conditions including consideration of 1) conductor movement, and 2) the interrelationships between vegetation growth rates, control methods and the inspection frequency (Requirement R3);
- Requiring timely notification to the appropriate control center of vegetation conditions that could cause a flash-over at any moment (Requirement R4);

- Requiring corrective actions to ensure that flash-over distances will not be violated due to work constraints such as legal injunctions (Requirement R5);
- Requiring inspections of vegetation conditions to be performed annually (Requirement R6); and
- Requiring that the annual work needed to prevent flash-over is completed (Requirement R7).

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

#### **b. Improvements to FAC-003 in this Revision**

The currently-effective FAC-003-1 Reliability Standard includes four requirements. As discussed above, the proposed FAC-003-2 standard includes seven requirements, which together present a comprehensive approach to vegetation management using a defense-in-depth strategy. The following paragraphs explain the changes made and how the new standard improves reliability when compared to the existing standard. A summary of the following paragraphs is contained in the FAC-003-1 Mapping to Proposed NERC Reliability Standard FAC-003-2 document provided in **Exhibit D**.

### **FAC-003-1, Requirement R1**

Requirement R1 of the currently-effective FAC-003-1 reads as follows:

*R1 The Transmission Owner shall prepare, and keep current, a formal transmission vegetation management program (TVMP). The TVMP shall include the Transmission Owner's objectives, practices, approved procedures, and work specifications.*

This requirement has been replaced by requirement R3 in the proposed FAC-003-2 standard, which reads:

*R3 Each Transmission Owner shall have documented maintenance strategies or procedures or processes or specifications it uses to prevent the encroachment of vegetation into the MVCD of its applicable lines that include(s) the following:*

Requirement R3 of FAC-003-2 is functionally equivalent to Requirement R1 of FAC-003-1, but offers several improvements.

Requirement R1 of FAC-003-1 mandates the preparation and maintenance of a TVMP. However, the Measure for Requirement R1 refers to having a “documented TVMP,” which is not consistent with the requirement itself (with the exception of R1.2, which does require the creation of documentation). The sub-requirements of R1 (which are discussed further in later paragraphs) also refer in some cases to having documentation but in other cases as characteristics.

Requirement R3 of FAC-003-2 corrects these inconsistencies by requiring each Transmission Owner to have documented records indicating the way the entity prevents the encroachment of vegetation into the MVCD of its applicable lines. The proposed requirement is clear and unambiguous. The measure is consistent with the requirement, and clearly indicates that documents are required to demonstrate compliance, and that the documents must be sufficiently clear and complete to show that the entity can meet its

obligations when considering the factors specified in the sub-requirements (discussed further in later paragraphs).

Additionally, the new requirement is written in a manner that provides additional flexibility. While the version one requirement mandates the inclusion of “objectives, practices, approved procedures, and work specifications,” the new standard requires “documented maintenance strategies or procedures or processes or specifications.” This new wording using the coordinating conjunction “or” ensures that Transmission Owners are not required to convert their existing approaches into any particular format simply for the sake of meeting a requirement. Rather, the Transmission Owner is given the discretion to determine how best to prevent the encroachment of vegetation into the MVCD. This could be through the use of a specification (*e.g.*, values analogous to the version one concept of “Clearance 1”), or through any of the other approaches (such as an overall strategy to remove all vegetation from within the Right of Way). This modification allows for the use of valid approaches that might have been considered unacceptable under the previous, more prescriptive language in version one of the standard.

#### **FAC-003-1, Sub-requirement R1.1**

Sub-requirement R1.1 of the currently-effective FAC-003-1 reads as follows:

*R1.1 The TVMP shall define a schedule for and the type (aerial, ground) of ROW vegetation inspections. This schedule should be flexible enough to adjust for changing conditions. The inspection schedule shall be based on the anticipated growth of vegetation and any other environmental or operational factors that could impact the relationship of vegetation to the Transmission Owner’s transmission lines.*

This sub-requirement has been replaced by Requirement R6 in the proposed FAC-003-2, which reads:

*R6. Each Transmission Owner shall perform a Vegetation Inspection of 100% of its applicable transmission lines (measured in units of choice - circuit, pole line, line miles or kilometers, etc.) at least once per calendar year and with no more than 18 calendar months between inspections on the same ROW.*

Requirement R6 of FAC-003-2 is similar to sub-requirement R1.1 of FAC-003-1, but offers several improvements.

Sub-requirement R1.1 of FAC-003-1 requires the creation of an inspection schedule, and specifies criteria against which a schedule can be judged for completeness. However, it does not mandate that entities implement the schedule and perform the inspections. The measure for R1.1 indicates that the entity must have performed the inspections.

As an improvement to the standard that reduces risks, Requirement R6 of FAC-003-2 specifically requires the Transmission Owner to inspect 100% of its applicable lines at least once per calendar year. The proposed Requirement R6 is clear and unambiguous. The measure is consistent with the requirement, and clearly indicates that evidence of performance is required to demonstrate compliance. Examples of acceptable evidence are provided, such as completed and dated work orders, dated invoices, or dated inspection records.

#### **FAC-003-1, Sub-requirements R1.2 and R 1.2.1**

Sub-requirements R1.2 and R1.2.1 of the currently-effective FAC-003-1 standard reads as follows:

*R1.2. The Transmission Owner, in the TVMP, shall identify and document clearances between vegetation and any overhead, ungrounded supply conductors, taking into consideration transmission line voltage, the effects of ambient temperature on conductor sag under maximum design loading, and the effects of wind velocities on conductor sway. Specifically, the Transmission Owner shall establish clearances to be achieved at the time of vegetation management work identified herein as Clearance 1, and shall also establish and maintain a set of*



*clearances identified herein as Clearance 2 to prevent flashover between vegetation and overhead ungrounded supply conductors.*

*R1.2.1. Clearance 1 — The Transmission Owner shall determine and document appropriate clearance distances to be achieved at the time of transmission vegetation management work based upon local conditions and the expected time frame in which the Transmission Owner plans to return for future vegetation management work. Local conditions may include, but are not limited to: operating voltage, appropriate vegetation management techniques, fire risk, reasonably anticipated tree and conductor movement, species types and growth rates, species failure characteristics, local climate and rainfall patterns, line terrain and elevation, location of the vegetation within the span, and worker approach distance requirements. Clearance 1 distances shall be greater than those defined by Clearance 2 below.*

Sub-requirements R1.2 and R 1.2.1 of FAC-003-1 have been replaced by

Requirement R3, parts 3.1 and 3.2, in FAC-003-2, which reads:

*R3 Each Transmission Owner shall have documented maintenance strategies or procedures or processes or specifications it uses to prevent the encroachment of vegetation into the MVCD of its applicable lines that accounts for the following*

*R3.1 Movement of applicable line conductors under their Rating and all Rated Electrical Operating Conditions;*

*R3.2 Inter-relationships between vegetation growth rates, vegetation control methods, and inspection frequency.*

The proposed Requirement R3 and parts 3.1 and 3.2 are functionally equivalent to the Version 1 Sub-requirement R1.2 and R1.2.1.

In summary, FAC-003-1, sub –requirements R1.2 and 1.2.1 establish a variable clearance distance (Clearance 1) to which the Transmission Owner must manage in order to avoid encroachments that might occur due to local conditions or time between vegetation management actions. The standard does not mandate an explicit value or mathematical calculation to determine Clearance 1, relying on the judgment of the Transmission Owner to determine this value, with the only criterion for acceptance being

that Clearance 1 must be some undefined amount larger than the minimum flashover distance.

Requirement 3, parts 3.1 and 3.2 of FAC-003-2 provide the same flexibility as the currently-effective standard. While the proposed standard does not explicitly identify a “Clearance 1,” it continues to give the Transmission Owner the responsibility for avoiding encroachments by requiring the Transmission Owner to consider, among other things, conductor movement, vegetation growth rates, vegetation control methods, and inspection frequency in their documented maintenance strategies, procedures, processes, or specifications to prevent the encroachment of vegetation into the MVCD. In effect, the standard still retains the same obligations defined by “Clearance 1,” but does not require the documentation of a specific numerical value. Instead, it offers alternative ways to specify how the reliability objective of this requirement will be met. The standard allows for entities (if they so choose) to retain the concept of a “Clearance 1” as part of the specifications they use to manage vegetation; however, it does not require it. Instead, entities can define their methods for meeting the reliability objective through process, procedures, specifications, or strategy documents (or any combination of those elements).

**FAC-003-1, Sub-requirements R1.2.2, R1.2.2.1, and R.1.2.2.2**

Sub-requirements R1.2.2, R1.2.2.1, and R.1.2.2.2 of FAC-003-1 read as follows:

*R1.2.2. Clearance 2 — The Transmission Owner shall determine and document specific radial clearances to be maintained between vegetation and conductors under all rated electrical operating conditions. These minimum clearance distances are necessary to prevent flashover between vegetation and conductors and will vary due to such factors as altitude and operating voltage.*

*These Transmission Owner-specific minimum clearance distances shall be no less than those set forth in the Institute of Electrical and Electronics Engineers (IEEE)*

*Standard 516-2003 (Guide for Maintenance Methods on Energized Power Lines) and as specified in its Section 4.2.2.3, Minimum Air Insulation Distances without Tools in the Air Gap.*

*R1.2.2.1 Where transmission system transient overvoltage factors are not known, clearances shall be derived from Table 5, IEEE 516-2003, phase-to-ground distances, with appropriate altitude correction factors applied.*

*R1.2.2.2 Where transmission system transient overvoltage factors are known, clearances shall be derived from Table 7, IEEE 516-2003, phase-to-phase voltages, with appropriate altitude correction factors applied.*

Sub-requirements R1.2.2, R1.2.2.1, and R.1.2.2.2 of FAC-003-1 have been replaced by Requirements R1 and R2 of FAC-003-2, which read:

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

*1. An encroachment into the MVCD as shown in FAC-003-Table 2, observed in Real-time, absent a Sustained Outage*

*R2. Each Transmission Owner shall manage vegetation to prevent encroachments into the MVCD of its applicable line(s) which are not either an element of an IROL, or an element of a Major WECC Transfer Path; operating within its Rating and all Rated Electrical Operating Conditions of the types shown below [Violation Risk Factor: Medium] [Time Horizon: Real-time]:*

*1. An encroachment into the MVCD as shown in FAC-003-Table 2, observed in Real-time, absent a Sustained Outage,*

Requirements R1 and R2 of FAC-003-2 are similar to sub-requirements R1.2.2, R1.2.2.1, and R.1.2.2.2 of FAC-003-1, but offer several improvements.

Sub-requirements R1.2.2, R1.2.2.1, and R1.2.2.2 of FAC-003-1 direct the specification of a “Clearance 2,” but do not require entities to ensure that vegetation does not encroach within that clearance, or take any action related to actually manage vegetation, other than specifying the value. The measure for R1.2 is consistent with the

requirement in that it only measures whether the entity documented the establishment of “Clearance 2.” Therefore, the requirement and the measure provide limited value to reliability, as they are primarily designed only to ensure that the entity knows the flashover distance, not take action related to it.

Requirements R1 and R2 of FAC-003-2 significantly expand sub-requirements R1.2.2, R1.2.2.1, and R.1.2.2.2 of FAC-003-1 by requiring Transmission Owners to manage vegetation to prevent encroachments, with a violation occurring upon the observation of an encroachment into the MVCD. This effectively duplicates the concept of “Clearance 2,” but requires actual vegetation management rather than documentation of the clearance. Additionally, the standard replaces the use of IEEE Standard 516-2003 (identified by FERC in Order No. 693 as not appropriate for reliability purposes) with the use of the Gallet Equation to determine the MVCD. The Gallet Equation is an established method for calculating the flashover distance for various voltages, altitudes, and atmospheric conditions. This provides calculated flashover distances between transmission conductors and vegetation that better represent the conditions that occur on the transmission corridor.

Finally, in order to eliminate commingling of higher risk reliability objectives and lesser risk reliability objectives (as discussed in the FERC May 18, 2007 Order on Violation Risk Factors<sup>11</sup>) the proposed standard separates the concept and objective selected in the “Clearance 2” value into two distinct requirements – those that are related to lines that are either an element of an IROL or an element of a Major WECC Transfer Path (Requirement R1), and those that are not (Requirement R2). This expands the

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<sup>11</sup> *North American Electric Reliability Corporation, Order on Violation Risk Factors*, 119 FERC ¶ 61,145 (2007).

coverage of the standard to those facilities essential to the reliable operation of the bulk electric system and helps ensure that entities properly manage the risk to reliability associated with specific actions.

It is important to note that there are conditions or scenarios that may lead to encroachments outside the Transmission Owner's control. Accordingly, the requirements include a footnote that clarifies such conditions or scenarios. This footnote does not exempt the Transmission Owner from responsibility for encroachments caused by activities performed by their own employees or contractors, but it does exempt them from responsibility when other human activities, animal activities, or other environmental conditions outside their control lead to an encroachment that otherwise would not have occurred.

### **FAC-003-1, Sub-requirement R1.3**

Sub-requirement R1.3 of FAC-003-1 reads as follows:

*R1.3 All personnel directly involved in the design and implementation of the TVMP shall hold appropriate qualifications and training, as defined by the Transmission Owner, to perform their duties.*

The concepts from this sub-requirement have been eliminated from the proposed standard because it is unclear what “appropriate” qualifications are or how an entity would determine them to be “appropriate.” More importantly, as the definition of “appropriate” is established entirely by the entity that is subject to compliance with the standards, the requirement is effectively meaningless – a conceptually equivalent translation of the requirement is “the entity shall do what the entity decides to do.” Given the shortcomings in the current language, and the difficulty in establishing objective but

non-prescriptive criteria relative to training for this particular requirement, the concepts were not carried forward to the proposed standard. This elimination has no impact on the level of reliability under the proposed standard relative to the current standard.

**FAC-003-1, Sub-requirement R1.4**

Sub-requirement R1.4 of FAC-003-1 reads as follows:

*R1.4 Each Transmission Owner shall develop mitigation measures to achieve sufficient clearances for the protection of the transmission facilities when it identifies locations on the ROW where the Transmission Owner is restricted from attaining the clearances specified in Requirement 1.2.1.*

Sub-requirement R1.4 of FAC-003-1 has been replaced by Requirement R5 of FAC-003-2, which reads:

*R5. When a Transmission Owner is constrained from performing vegetation work on applicable transmission lines operating within their Rating and all Rated Electrical Operating Conditions, and the constraint may lead to a vegetation encroachment into the MVCD prior to the implementation of the next annual work plan, then the Transmission Owner shall take corrective action to ensure continued vegetation management to prevent encroachments*

Requirement R5 of FAC-003-2 is similar to the sub-requirement R1.4 of FAC-003-1, but offers several improvements.

Sub-requirement R1.4 of FAC-003-1 requires the creation of mitigation measures to address locations on the Right-of-Way where the Transmission Owner is restricted from attaining the specified clearances. However, it does not mandate that entities implement mitigation measures. The measure for R1.4 indicates that the entity must have documented the locations identified on the Right-of-Way where the Transmission Owner was restricted from attaining the specified clearances. The measure also requires the documentation of the mitigation measures taken, which is inconsistent with the requirement.

Requirement R5 of FAC-003-2 specifically requires corrective action to be taken in cases where a Transmission Owner is constrained from performing vegetation work such that the constraint may lead to a vegetation encroachment into the MVCD prior to the implementation of the next annual work plan. The proposed requirement is clear and unambiguous. The measure is consistent with the requirement, and clearly indicates that evidence of performance is required to demonstrate compliance. Examples of acceptable evidence are provided, such as initially-planned work orders, documentation of constraints from landowners, court orders, inspection records of increased monitoring, documentation of the de-rating of lines, revised work orders, invoices, or evidence that the line was de-energized.

#### **FAC-003-1, Sub-requirement R1.5**

Sub-requirement R1.5 of FAC-003-1 reads as follows:

*R1.5. Each Transmission Owner shall establish and document a process for the immediate communication of vegetation conditions that present an imminent threat of a transmission line outage. This is so that action (temporary reduction in line rating, switching line out of service, etc.) may be taken until the threat is relieved.*

Sub-requirement R1.5 of FAC-003-1 has been replaced by requirement R4 of FAC-003-2, which reads:

*R4. Each Transmission Owner, without any intentional time delay, shall notify the control center holding switching authority for the associated applicable line when the Transmission Owner has confirmed the existence of a vegetation condition that is likely to cause a Fault at any moment.*

Requirement R4 of FAC-003-2 is similar to sub-requirement R1.5 of FAC-003-1, but offers several improvements.

Sub-requirement R1.5 of FAC-003-1 requires the creation of a process for communicating imminent threats where vegetation conditions could lead to a

transmission line outage. However, it does not mandate that entities implement the process and communicate the threat. The measure for R1.5 indicates that the entity must have documentation of their process. This is consistent with the requirement; however, the requirement and the measure only provide limited value to reliability, as they are primarily designed only to ensure that the entity has a process, not take action related to the process.

Requirement R4 of FAC-003-2 requires Transmission Owners, without any intentional time delay, to notify the control center holding switching authority for the associated applicable line when the Transmission Owner has confirmed the existence of a vegetation condition that is likely to cause a Fault at any moment. The proposed requirement is clear and unambiguous. The measure is consistent with the requirement, and clearly indicates that evidence of performance is required to demonstrate compliance. Examples of acceptable evidence are provided, such as control center logs, voice recordings, switching orders, clearance orders, and subsequent work orders.

The proposed requirement is clear and unambiguous. The proposed standard replaces the term “immediate,” which is impractical at best, with the phrase “without any intentional time delay.” The use of “without any intentional time delay” still requires timely notification, but addresses situations where “immediate” communication is impossible or impractical (for example, when an observer is in a remote area without cell phone service). The new language correctly focuses on the desire to communicate in a timely fashion, without attempting to draw any arbitrary deadlines or include impractical absolutes.

#### **FAC-003-1, Requirement R2**



Requirement R2 of FAC-003-1 reads as follows:

*R2. The Transmission Owner shall create and implement an annual plan for vegetation management work to ensure the reliability of the system. The plan shall describe the methods used, such as manual clearing, mechanical clearing, herbicide treatment, or other actions. The plan should be flexible enough to adjust to changing conditions, taking into consideration anticipated growth of vegetation and all other environmental factors that may have an impact on the reliability of the transmission systems. Adjustments to the plan shall be documented as they occur. The plan should take into consideration the time required to obtain permissions or permits from landowners or regulatory authorities. Each Transmission Owner shall have systems and procedures for documenting and tracking the planned vegetation management work and ensuring that the vegetation management work was completed according to work specifications.*

Requirement R2 of FAC-003-1 has been replaced by requirement R7 of FAC-003-2, which reads:

*R7. Each Transmission Owner shall complete 100% of its annual vegetation work plan of applicable lines to ensure no vegetation encroachments occur within the MVCD. Modifications to the work plan in response to changing conditions or to findings from vegetation inspections may be made (provided they do not allow encroachment of vegetation into the MVCD) and must be documented. The percent completed calculation is based on the number of units actually completed divided by the number of units in the final amended plan (measured in units of choice - circuit, pole line, line miles or kilometers, etc.) Examples of reasons for modification to annual plan may include*

- *Change in expected growth rate/ environmental factors*
- *Circumstances that are beyond the control of a Transmission 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*

Requirement R7 of FAC-003-2 is similar to Requirement R2 of FAC-003-1.

Requirement R2 of the existing FAC-003-1 standard requires the creation and implementation of an annual vegetation management plan and a process for documenting and tracking the execution of the plan. However, it does not mandate that entities plan to

prevent encroachments into the MVCD, but simply that they implement whatever is included in the plan. The measure is focused on demonstrating that the plan has been executed.

Requirement R7 of the new FAC-003-2 requires the plan be executed such that no vegetations encroachments occur within the MVCD. There are practical exceptions, however (for example, where land ownership changes may have resulted in the utility not possessing the property rights needed). In these cases, the entity may modify its plan; however, at no point can it modify its plan such that it would allow encroachment of vegetation into the MVCD. This new requirement raises the required level of performance by requiring 100% of the plan be completed, and provides an explicit method for determining the percentage that was completed. The proposed requirement is clear and unambiguous. The measure is consistent with the requirement, and clearly indicates that evidence of performance is required to demonstrate compliance. Examples of acceptable evidence are provided, such as a copy of the completed annual work plan (as finally modified), dated work orders, dated invoices, or dated inspection records.

**FAC-003-1, Requirements R3, R4, and associated sub-requirements**

Requirements R3, R4, and associated sub-requirements of FAC-003-1 read as follows:

*R3. The Transmission Owner shall report quarterly to its RRO, or the RRO's designee, sustained transmission line outages determined by the Transmission Owner to have been caused by vegetation.*

*R3.1. Multiple sustained outages on an individual line, if caused by the same vegetation, shall be reported as one outage regardless of the actual number of outages within a 24-hour period.*

*R3.2. The Transmission Owner is not required to report to the RRO, or the RRO's designee, certain sustained transmission line outages caused by*

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

*R3.3. The outage information provided by the Transmission Owner to the RRO, or the RRO's designee, shall include at a minimum: the name of the circuit(s) outaged, 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.*

*R3.4. An outage shall be categorized as one of the following:*

*R3.4.1. Category 1 — Grow-ins: Outages caused by vegetation growing into lines from vegetation inside and/or outside of the ROW;*

*R3.4.2. Category 2 — Fall-ins: Outages caused by vegetation falling into lines from inside the ROW;*

*R3.4.3. Category 3 — Fall-ins: Outages caused by vegetation falling into lines from outside the ROW.*

*R4. The RRO shall report the outage information provided to it by Transmission Owner's, as required by Requirement 3, quarterly to NERC, as well as any actions taken by the RRO as a result of any of the reported outages.*

Requirements R3, R4, and associated sub-requirements of FAC-003-1 are associated with monitoring and compliance. Accordingly, they have been moved to the compliance section of the proposed standard:

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

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

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

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

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

This transfer of a reporting requirement to the Compliance portion of the standards remains enforceable under NERC's Rules of Procedure. NERC's authority to require such data is described in Section 400.3 of the Rules of Procedure:

*Data Access — All bulk power system owners, operators, and users shall provide to NERC and the applicable regional entity such information as is necessary to monitor compliance with the reliability standards. NERC and the applicable regional entity will define the data retention and reporting requirements in the reliability standards and compliance reporting procedures.*

An entity that is not in compliance with this rule must take specific actions, and NERC has certain courses of action it may undertake as necessary to ensure the entity complies with the Rules, as specified in Section 100 of the NERC Rule of Procedure:

*Any entity that is unable to comply or that is not in compliance with a NERC rule of procedure shall immediately notify NERC in writing, stating the rule of concern and the reason for not being able to comply with the rule.*

*NERC shall evaluate each case and inform the entity of the results of the evaluation. If NERC determines that a rule has been violated, or cannot practically be complied with, NERC shall notify the applicable governmental authorities and take such other actions as NERC deems appropriate to address the situation.*

Accordingly, NERC believes it has sufficient authority and recourse to ensure such data continues to be submitted. Additionally, if necessary, NERC can compel entities to provide such data separately as part of a Section 1600 data request, pursuant to Section 1600 of the NERC Rules of Procedure, which has similar provisions.

### **Additional Requirements**

In addition to the disposition and transfer of requirements from the previous standard as described above, Requirements R1 and R2 of FAC-003-2 are additional requirements that were added to the standard:

*R1. Each Transmission Owner shall manage vegetation to prevent encroachments into the MVCD of its applicable line(s) which are either an element of an IROL, or an element of a Major WECC Transfer Path; operating within their Rating and all Rated Electrical Operating Conditions of the types shown below:*

- 1. An encroachment into the MVCD as shown in FAC-003-Table 2, observed -time, absent a Sustained Outage ,*
- 2. An encroachment due to a fall-in from inside the ROW that caused a vegetation-related Sustained Outage,*
- 3. An encroachment due to the blowing together of applicable lines and vegetation located inside the ROW that caused a vegetation-related Sustained Outage,*
- 4. An encroachment due to vegetation growth into the MVCD that caused a vegetation-related Sustained Outage.*

*R2. Each Transmission Owner shall manage vegetation to prevent encroachments into the MVCD of its applicable line(s) which are not either an element of an IROL, or an element of a Major WECC Transfer Path; operating within its Rating and all Rated Electrical Operating Conditions of the types shown below:*

- 1. An encroachment into the MVCD, observed in Real-time, absent a Sustained Outage,*
- 2. An encroachment due to a fall-in from inside the ROW that caused a vegetation-related Sustained Outage,*
- 3. An encroachment due to blowing together of applicable lines and vegetation located inside the ROW that caused a vegetation-related Sustained Outage,*
- 4. An encroachment due to vegetation growth into the MVCD that caused a vegetation-related Sustained Outage*

Requirements R1 and R2 of FAC-003-2 are significant improvements not included in FAC-003-1. These requirements are focused on the results of managing vegetation and ensuring that 1) encroachments do not occur, and 2) sustained outages do not occur. The proposed requirements are clear and unambiguous. The measure is consistent with the requirement, and clearly indicates that evidence of performance is

required to demonstrate compliance. Examples of acceptable evidence are provided. These include completed and dated work orders, dated invoices, or dated inspection records.

As discussed previously with regard to “Clearance 2,” these new requirements provide that the Transmission Owner must manage vegetation to prevent encroachments, rather than simply document the clearance. The standard replaces the use of IEEE Standard 516-2003 with the use of the Gallet Equation to determine the MVCD. Additionally, in order to eliminate commingling of higher-risk reliability objectives and lesser-risk reliability objectives, the standard has separated the concept of “Clearance 2” into two distinct requirements – those that are related to line(s) that are either an element of an IROL or an element of a Major WECC Transfer Path, and those that are not. This helps ensure that entities properly understand the risk to reliability associated with specific actions, and aligns the standard and associated VRFs with FERC guidelines.

**c. Enforceability of the Proposed FAC-003-2 Reliability Standard**

The proposed Reliability Standard contains measures that support each standard requirement by clearly identifying what is required and how the requirement will be enforced. The VSLs also provide further guidance on the way that NERC will enforce the requirements of the standard. A component of enforceability of this proposed standard is the use of appropriate compliance monitoring tools and the discovery methods as laid out in the Compliance Monitoring and Enforcement Program (“CMEP”).

Requirements R1 and R2 require the Transmission Owner manage vegetation to prevent encroachments into the MVCD. The measures for these requirements are identical:

*Each Transmission Owner has evidence that it managed vegetation to prevent encroachment into the MVCD as described in (the requirement). Examples of acceptable forms of evidence may include dated attestations, dated reports containing no Sustained Outages associated with encroachment types 2 through 4 above, or records confirming no Real-time observations of any MVCD encroachments.*

In other words, the burden of proof to show records indicating the requirements were not violated is held by the Transmission Owner. The VSLs recommended for Requirements R1 and R2 are “pass or fail” evaluations; if an entity does not manage vegetation to prevent encroachments, then it fails the requirement (R1 or R2, as applicable to the given scenario). Such failures would be identified using NERC’s normal Compliance Monitoring and Enforcement processes – primarily through periodic data submittals, self-certification and self-reporting, but also through audits, spot-checking, compliance violation investigations, and complaints as appropriate.

Requirements R1 and R2 include a general footnote that describes some cases where an entity might not be held to the standard (for example, during natural disasters). However, these limitations only apply to those circumstances that are beyond the control of the Transmission Owner or the other duly delegated registered entities, affiliates or contractors that fulfill reliability responsibilities on behalf of the Transmission Owner. Transmission Owners have options as to how to appropriately delegate reliability tasks to ensure accountability with other registered entities. For example, the use of Joint Registration Organization, Coordinated Functional Registration agreements, or other duly executed legal agreements clearly delineate reliability task responsibility. Transmission Owners are further responsible for any contract work associated with maintaining their system and facilities.



Requirement R3 requires the Transmission Owner to have documentation describing its chosen approach(es) for managing vegetation. The approach must consider the movement of the conductor, as well as growth rate, control method, and inspection frequency. The measure for this requirement is as follows:

*The maintenance strategies or procedures or processes or specifications provided demonstrate that the Transmission Owner can prevent encroachment into the MVCD considering the factors identified in the requirement.*

In this case, the Transmission Owner is obligated to show documentation, and that documentation must be sufficient to satisfy the auditor that the information contained in that documentation is sufficient that the Transmission Owner can use it to prevent encroachment into the MVCD. The difference in sizes of applicable entities, the nature of vegetation, and the number of techniques available to applicable entities to manage it require that the measure allow for sufficient flexibility in approach. For example, vegetation management in Arizona is likely to be much different from that in West Virginia. Similarly, the approach used to manage a small system may be described in a few short sentences, while the approach used on a much larger system might require several volumes to describe. Auditors will have to use judgment to evaluate the appropriateness of the documentation provided given the particular circumstances of the entity being audited. To guide them in this, the Violation Severity Levels provided for Requirement R3 gradate the severity of a violation based on the completeness of the information provided. In this case, failures of the requirement would likely be identified during review of the document(s) as submitted in response to a data request to support an audit, spot-check, or a self-certification. The document(s) the requirement describes can generally be understood to encompass the broad strategy, direction and goals supported

by analysis and information peculiar to the geographical area of the Transmission Owner and the characteristics of its system. This document generally should be the foundation for the detail and supporting evidence required in requirements 4 through 7. As a competency based requirement, this is the cornerstone of the Transmission Owner's program to ensure vegetation management is implemented to ensure no encroachment.

Requirement R4 states that when a Transmission Owner observes a vegetation condition that is likely to produce a fault, it must notify the control center with switching authority for that transmission line of the condition. The measure for this requirement is:

*Each Transmission Owner that has a confirmed vegetation condition likely to cause a Fault at any moment will have evidence that it notified the control center holding switching authority for the associated transmission line without any intentional time delay. Examples of evidence may include control center logs, voice recordings, switching orders, clearance orders and subsequent work orders.*

As with R1 and R2, the burden of proof to show records indicating the requirement was not violated is held by the Transmission Owner. The VSLs provided for Requirement R4 gradate the severity of a violation based on whether or not any delay in communicating the information was intentional or not. Auditors will have to use judgment to evaluate the manner in which the requirement was met given the particular circumstances of the entity being audited, but it is expected that an entity that does not make this reporting a top priority would be in violation of the standard. Generally speaking the requirement to notify without intentional delay can be understood to include an immediate (within 1 hour of the observation) communication notwithstanding a safety issue to the personnel, other immediate priority maintenance functions to ensure reliability or system stability, or communications equipment failure that precludes immediate communication. Such violations would be identified using NERC's normal

Compliance Monitoring and Enforcement processes – primarily through self-certification and self-reporting, but also through audits, compliance violation investigations, and complaints as appropriate.

Requirement R5 states that a Transmission Owner prevented from performing vegetation management work must take corrective actions to prevent encroachments that would put the line at risk. The measure for this requirement is

*Each Transmission Owner has evidence of the corrective action taken for each constraint where an applicable transmission line was put at potential risk. Examples of acceptable forms of evidence may include initially-planned work orders, documentation of constraints from landowners, court orders, inspection records of increased monitoring, documentation of the de-rating of lines, revised work orders, invoices, or evidence that the line was de-energized.*

In this case, the Transmission Owner must show proof that it took corrective action when necessary. In the event that a Transmission Owner is unable, for whatever reason, to prevent or clear encroachments in the MVCD, it must de-energize or de-rate the line to reduce the MVCD to preclude an encroachment, or will be found in violation of this requirement as well as requirement #1 or #2 as applicable. The VSL recommended for Requirement R5 is a “pass or fail” evaluation; if an entity does not take corrective action, then it fails the requirement. Such failures would be identified using NERC’s normal Compliance Monitoring and Enforcement processes – primarily through self-certification and self-reporting, but also through audits, spot-checking, and compliance violation investigations and complaints as appropriate.

Requirement R6 mandates the Transmission Owner to inspect 100% of its applicable lines at least once per calendar year, with no more than 18 months between inspections. The measure for this requirement is

*Each Transmission Owner has evidence that it conducted Vegetation Inspections of the transmission line ROW for all applicable lines at least once per calendar year but with no more than 18 calendar months between inspections on the same ROW. Examples of acceptable forms of evidence may include completed and dated work orders, dated invoices, or dated inspection records.*

In this case, the Transmission Owner must show proof it inspected all of its lines within the calendar year as described. This requirement can be understood to require a document to account for the inspection of the lines over the period of the time specified and status reports to demonstrate the progress of work performed to meet the requirement. The VSLs recommended for Requirement R6 are graded based on the percentage of lines not inspected. Such failures would be identified using NERC's normal Compliance Monitoring and Enforcement processes – primarily through self-certification and self-reporting, but also through audits, spot-checking, compliance violation investigations, and complaints as appropriate.

Requirement R7 states the Transmission Owner must complete 100% of its annual vegetation work plan for applicable lines, and provides for modifications to the plan for a number of reasons (some of which are listed as examples in the requirement), but indicates that such modifications must not allow encroachment of vegetation into the MVCD. The requirement essentially allows a Transmission Owner to have a dynamic vegetation work plan, as long as the Transmission Owner meets the obligations in its plan and the plan serves its primary function of avoiding encroachments. The measure for this requirement is

*Each Transmission Owner has evidence that it completed its annual vegetation work plan for its applicable lines. Examples of acceptable forms of evidence may include a copy of the completed annual work plan (as finally modified), dated work orders, dated invoices, or dated inspection records.*

In this case, the Transmission Owner must show proof that it completed its plan. An entity unable to produce a plan will be unable to demonstrate compliance with the standard, resulting in a violation of the requirement. Although the standard does not explicitly require the creation of a plan, entities will not be able to comply with the requirement without having a documented plan. It should be noted that the documented plan is not necessarily a single binder that includes all aspect of vegetation management; it may be a collection of documents. Entities may meet this requirement through several methods including on-line manuals, paper documents, handbooks, guidelines, work orders, or pieces of information, provided the information clearly demonstrates the requirement has been met.

Because of the dynamic nature of vegetation, the plan must also be dynamic. While in theory this might allow an entity to modify its plan to avoid compliance risk, such modification would not eliminate the obligation that the modified plan be executed to avoid encroachment of vegetation into the MVCD. Any such encroachment would be a violation of R1 or R2, and any changes to the plan that resulted in such encroachment would be a violation of R7. The VSLs recommended for Requirement R7 are graded based on the percentage of the final plan not completed. Such failures would be identified using NERC's normal Compliance Monitoring and Enforcement processes – primarily through self-certification and self-reporting, but also through audits, spot-checking, compliance violation investigations, and complaints as appropriate. In order for auditors to make appropriate judgments as to the completed plan and any modifications, the initial work plan may be requested via a self certification or data

submittal prior to its initiation and then compared to the completed plan at the end of the time period.

As discussed above, the measures and VSLs provide clarity regarding how the requirements will be enforced, and ensure that the requirements will be enforced in a clear, consistent, and non-preferential manner and without prejudice to any party.

Appropriate use of compliance monitoring tools will be utilized and specified in the Annual Compliance Monitoring and Enforcement Program Implementation Plan and Actively Monitored List.

#### **d. FERC Directives Addressed in the Proposed FAC-003-2 Standard**

The drafting team responsible for the development of FAC-003-2 addressed seven directives issued by FERC in Order No. 693<sup>12</sup> as part of NERC Project 2007-07 Vegetation Management. These directives are presented below with the resolutions proposed by the drafting team. The text of the complete proposed standard FAC-003-2 is included in Exhibit A.

*Paragraph 706 of Order 693, sentences 1, 2 and 3 (directive reference number 10098<sup>13</sup>) - We will not direct NERC to submit a modification to the general limitation on applicability as proposed in the NOPR. However, we will require the ERO to address the proposed modification through its Reliability Standards development process. As explained in the NOPR, the Commission is concerned that the bright-line applicability threshold of 200 kV will exclude a significant number of transmission lines that could impact Bulk-Power System reliability.*

Proposed FAC-003-2, and the resolution of the issue of applicability in particular, was developed through the Reliability Standards development process. The first draft of

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<sup>12</sup> See, Order No. 693 at PP 706 to 735.

<sup>13</sup> The “directive reference number” refers to the number assigned to a particular regulatory directive in the NERC Standards Issues Database. The reference number is identified in the summary section for each regulatory directive. Each reference number is unique and provides an easy reference for each regulatory directive.

the standard proposed to assign the selection of sub-200kV lines to the Reliability Coordinator (rather than the Regional Reliability Organization, as was specified in version 1 of the standard). With the third draft, specific criteria based on the importance of sub-200kV lines were proposed to replace the discretion of the Reliability Coordinator, effectively creating a “bright line” for those facilities operated below 200kV. In the final proposed standard submitted with this petition, these proposed bright-line criteria are substantively unchanged from the third draft. Industry was asked to comment on these proposals through the standard development process, and balloting indicates support for this approach.

NERC believes this to be a superior approach to the previous standard, as it has eliminated the previous “fill-in-the-blank” discretion of the Regional Reliability Organization and now focuses instead on specific criteria to determine the applicability to sub-200kV facilities.

*Paragraph 706 of Order 693, sentences 7 and 8 (directive reference number 10099) – We support the suggestions by Progress Energy, SERC and MISO to limit applicability to lower voltage lines associated with IROL and these suggestions should be part of the input to the Reliability Standards development process. Similarly, the ERO should evaluate the suggestions proposed by LPPC, APPA and Avista.*

FAC-003-2 adopts the suggestions of Progress Energy, SERC, and MISO, and extends the applicability to address issues specific to the Western Interconnection. The applicability of lines operated below 200kV has been limited to specific cases where lines are critical to reliability by virtue of their being elements included in the determination of an Interconnection Reliability Operating Limit (“IROL”) or a part of a Major WECC Transfer Path. In response to the concerns expressed by Avista, the standard does not create a new minimum bright-line threshold of 100kV. By virtue of relying on IROL and

Major WECC Transfer Path identification as a proxy for reliability importance, the proposed standard uses an impact-based approach for determining applicability as suggested by LPPC. The suggestion made by APPA and Avista to grant authority to the Regional Entity to determine applicability was considered, conceptually implemented in the first draft of the standard through delegation to the Reliability Coordinator), then ultimately rejected in favor of the use of the IROL and Major WECC Transfer Path identification criteria.

*Paragraph 708 of Order 693, sentence 3 (directive reference number 10102) - We recognize that many commenters would like a more precise definition for the applicability of this Reliability Standard, and we direct the ERO to develop an acceptable definition that covers facilities that impact reliability but balances extending the applicability of this standard against unreasonably increasing the burden on transmission owners.*

Proposed FAC-003-2 includes a detailed and specific description of the applicability relative to facilities. Criteria used in the applicability focus on the criticality of lines to reliability by virtue of their being elements included in the determination of an IROL or a part of a Major WECC Transfer Path.

*Paragraph 709 of Order 693, sentences 1 and 2 (directive reference number 10103) - FirstEnergy and Xcel suggest that if the applicability of this Reliability Standard is expanded, the Commission should allow flexibility in complying with this Reliability Standard for lower-voltage facilities, or allow lower-voltage facilities one year before the Reliability Standard is implemented. The ERO should consider these comments when determining when it would request that the modification of this Reliability Standard to go into effect.*

The Implementation Plan for the proposed standard adopts the suggestion of First Energy and Xcel. The standard becomes effective on the first calendar day of the first calendar quarter one year after the date of the order approving the standard.

*Paragraph 721 of Order 693, sentences 1 and 2 (directive reference number Ref 10104) - The Commission continues to be concerned with leaving complete discretion to the transmission owners in determining inspection cycles, which*



*limits the effectiveness of the Reliability Standard. Accordingly, the Commission directs the ERO to develop compliance audit procedures, using relevant industry experts, which would identify appropriate inspection cycles based on local factors.*

Proposed FAC-003-2 now requires the Transmission Owner to perform a Vegetation Inspection of 100% of its applicable transmission lines (measured in units of choice - circuit, pole line, line miles or kilometers, *etc.*) at least once per calendar year, with no more than 18 calendar months between inspections. Transmission Owners may inspect more frequently should they need to do so in order to meet the other requirements in the standard, but they may not inspect less frequently.

*Paragraph 732 of Order 693, sentence 1 (directive reference number 10100) - Accordingly, the Commission directs the ERO to develop a Reliability Standard that defines the minimum clearance needed to avoid sustained vegetation-related outages that would apply to transmission lines crossing both federal land and non-federal land.*

As directed, proposed FAC-003-2 applies to facilities that meet specific criteria, including (but not limited to) those that cross lands owned by federal, state, provincial, public, private, or tribal entities, and specifies the minimum clearance needed to avoid sustained vegetation-related outages. The proposed standard defines MVCD based on the Gallet Equation, a well-known method for specifically calculating the flashover distance for proper insulation coordination. This calculation accounts for wet conditions at various altitudes.

*Paragraph 734 of Order 693, sentences 1 and 3 (directive reference number 10105) - FirstEnergy suggests that rights-of-way be defined to encompass the required clearance areas instead of the corresponding legal rights, and that the standards should not require clearing the entire right-of-way when the required clearance for an existing line does not take up the entire right-of-way. ...Accordingly, the Commission directs the ERO to address this suggestion in the Reliability Standards development process.*

Proposed FAC-003-2 includes a modified definition of “Right-of-Way” to include the statement “[t]he ROW width in no case exceeds the Transmission Owner’s legal rights but may be less based on the aforementioned criteria.” Similar to FAC-003-1, FAC-003-2 does not require clearing the entire legal limits for a particular parcel of land to ensure reliability. Rather, the standard requires vegetation maintenance to adequately prevent outages from vegetation and requires the Transmission Owner to prevent encroachment within the MVCD in the operational corridor established under the modified ROW definition. This provides the Transmission Owner with flexibility in determining its approach to vegetation management and gives owners the authority to act in the best interest of reliability without mandating any specific strategy (such as clearing the entire width of the ROW).

**e. Demonstration that the proposed Reliability Standard is just, reasonable, not unduly discriminatory or preferential and in the public interest**

**1. Proposed Reliability Standard is designed to achieve a specified reliability goal and contains a technically sound method to achieve that goal.**

The proposed FAC-003-2 standard achieves the specific reliability goal of maintaining a reliable electric transmission system by using a defense-in-depth strategy to manage vegetation located on transmission 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.

The proposed Reliability Standard contains a technically sound method to achieve that goal by:

- requiring that vegetation be managed to prevent vegetation encroaching into the flash-over distance;

- requiring consideration of conductor movement, vegetation growth rates, vegetation control methods, and inspection frequency when establishing strategies for vegetation management;
- requiring intervention when risks of vegetation contact are identified;
- requiring corrective actions to ensure that flash-over distances will not be violated due to work constraints (such as legal injunctions);
- requiring annual inspections of vegetation conditions to be performed annually; and
- requiring completion of the annual work needed to prevent encroachments.

**2. Proposed Reliability Standard is applicable only to users, owners and operators of the bulk power system, and is clear and unambiguous as to what is required and who is required to comply.**

The proposed Reliability Standard is applicable only to users, owners and operators of the North American bulk-power system, and not others. As identified in the applicability section of the proposed standard, the requirements apply only to Transmission Owners. No other registered entities are required to comply.

**3. Proposed Reliability Standard includes clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation.**

The proposed Reliability Standard includes a VRF and VSL for each main requirement, which is explained in more detail in Section IV. c, below. Upon approval, the range of penalties for violations will be based on the applicable VRF and VSL and will be administered based on the sanctions table and supporting penalty determination process described in NERC Sanction Guidelines, Appendix 4B in NERC's Rules of

Procedure. Therefore, responsible entities understand the potential impacts of non-compliance with the proposed requirements.

**4. Proposed Reliability Standard identifies clear and objective criterion or measure for compliance, so that it can be enforced in a consistent and non-preferential manner.**

The proposed Reliability Standard contains measures that support each requirement by clearly identifying what is required and how the requirement will be enforced. These measures, included below, help provide clarity regarding how the requirements will be enforced, and ensure that the requirements will be enforced in a clear, consistent, and non-preferential manner and without prejudice to any party.

**M1.** Each Transmission Owner has evidence that it managed vegetation to prevent encroachment into the MVCD as described in R1. Examples of acceptable forms of evidence may include dated attestations, dated reports containing no Sustained Outages associated with encroachment types 2 through 4 above, or records confirming no Real-time observations of any MVCD encroachments. (R1)

**M2.** Each Transmission Owner has evidence that it managed vegetation to prevent encroachment into the MVCD as described in R2. Examples of acceptable forms of evidence may include dated attestations, dated reports containing no Sustained Outages associated with encroachment types 2 through 4 above, or records confirming no Real-time observations of any MVCD encroachments. (R2)

**M3.** The maintenance strategies or procedures or processes or specifications provided demonstrate that the Transmission Owner can prevent encroachment into the MVCD considering the factors identified in the requirement. (R3)

**M4.** Each Transmission Owner that has a confirmed vegetation condition likely to cause a Fault at any moment will have evidence that it notified the control center holding switching authority for the associated transmission line without any intentional time delay. Examples of evidence may include control center logs, voice recordings, switching orders, clearance orders and subsequent work orders. (R4)

**M5.** Each Transmission Owner has evidence of the corrective action taken for each constraint where an applicable transmission line was put at potential risk. Examples of acceptable forms of evidence may include initially-planned work orders, documentation of constraints from landowners, court orders, inspection records of increased monitoring, documentation of the de-rating of lines, revised work orders, invoices, or evidence that the line was de-energized. (R5)

**M6.** Each Transmission Owner has evidence that it conducted Vegetation Inspections of the transmission line ROW for all applicable lines at least once per calendar year but with no more than 18 calendar months between inspections on the same ROW.

Examples of acceptable forms of evidence may include completed and dated work orders, dated invoices, or dated inspection records. (R6)

**M7.** Each Transmission Owner has evidence that it completed its annual vegetation work plan for its applicable lines. Examples of acceptable forms of evidence may include a copy of the completed annual work plan (as finally modified), dated work orders, dated invoices, or dated inspection records. (R7)

**5. Proposed Reliability Standard achieves a reliability goal effectively and efficiently — but does not necessarily reflect “best practices” without regard to implementation cost.**

The proposed Reliability Standard achieves its reliability goal effectively and efficiently. Crafting the requirements to address the societal need for reliable service and meet the overall reliability goal for the standard was carefully undertaken using NERC’s results-based standards development techniques, and the proposed standard was structured to identify specific objectives to achieve the goal without unduly burdening applicable entities. The standard avoids mandates for specific practices, and instead focuses on the “what” as opposed to the “how.” For example, this standard provides the Transmission Owner significant discretion in determining how to manage vegetation, focusing on results rather than process. This approach allows for diverse approaches to vegetation management, through which lessons learned and best practices can be identified and implemented, and overall reliability is buttressed and enhanced.

**6. Proposed Reliability Standard is not “lowest common denominator,” *i.e.*, does not reflect a compromise that does not adequately protect bulk power system reliability. Proposed Reliability Standards can consider costs to implement for smaller entities, but not at consequences of less than excellence in operating system reliability.**

The proposed Reliability Standard does not reflect a “lowest common denominator” approach. To the contrary, the proposed standard represents a significant improvement over the previous version as described herein. The Standard Drafting Team

took measured steps to ensure that the reliability objective of developing and implementing technically sound Transmission Vegetation Management was met and that each requirement provides detail of what is necessary to be addressed in the applicable documentation or methodology.

Additionally, the proposed Reliability Standard was not developed or adopted to protect against the imposition of reasonable expenses. The drafting team considered and evaluated the effect this standard would impose on the impacted entities and determined that no entities would be unduly burdened by the cost to implement its requirements. No special accommodation was made for smaller entities, and the proposed standard will apply equally to all applicable entities in a consistent manner.

**7. Proposed Reliability Standard is designed to apply throughout North America to the maximum extent achievable with a single Reliability Standard while not favoring one area or approach.**

The proposed Reliability Standard applies throughout North America and does not favor one area or approach.

**8. Proposed Reliability Standard causes no undue negative effect on competition or restriction of the grid.**

The proposed Reliability Standard does not restrict the available transmission capability or limit use of the bulk-power system in a preferential manner.

**9. The implementation time for the proposed Reliability Standard is reasonable.**

The proposed effective date for the FAC-003-2 is the first day of the first calendar quarter that occurs twelve months following approval. This will allow applicable entities adequate time to ensure compliance with the requirements. Additionally, the proposed standard provides several transition cases and associated timelines to address situations

where line classification or asset ownership changes. These transition cases are explained in the proposed Implementation Plan, attached as **Exhibit B**.

**10. The Reliability Standard development process was open and fair.**

The proposed Reliability Standard was developed in accordance with NERC's ANSI- accredited processes for developing and approving Reliability Standards. Section V, *Summary of the Reliability Standard Development Proceedings*, below, details the processes followed to develop the FAC-003-2 standard (for a more thorough review, please see the complete development history included as **Exhibit G**).

These processes included, among other things, multiple comment periods, pre-ballot review periods, and balloting periods. Additionally, all drafting team meetings were properly noticed and open to the public. The initial and recirculation ballots both achieved a quorum and exceeded the required ballot pool approval levels.

**11. Proposed Reliability Standard balances with other vital public interests.**

NERC has identified no competing public interests regarding the request for approval of this proposed Reliability Standard. No comments were received that indicated the proposed standard conflicts with other vital public interests.

**12. Proposed Reliability Standard considers any other relevant factors.**

No other negative factors relevant to whether the proposed Reliability Standard is just and reasonable were identified.

**f. Violation Risk Factors and Violation Severity Levels**

The VRFs and VSLs for the proposed standard comport with NERC and FERC guidelines related to their assignment. Discussion of each of these items is included

below. For a detailed review of the VRFs, the VSLs, and the analysis of how the VRFs and VSLs were determined using these guidelines, please see **Attachment F**.

The following discussion summarizes the manner in which the VRFs align with FERC's VRF Guidelines 2 through 5. The standard does not address Guideline 1 directly because of an apparent conflict between Guidelines 1 and 4. Whereas Guideline 1 identifies a list of topics that encompass nearly all topics within NERC's Reliability Standards and implies that these requirements should be assigned a "High" VRF, Guideline 4 directs assignment of VRFs based on the impact of a specific requirement to the reliability of the system. NERC believes that Guideline 4 is reflective of the intent of VRFs in the first instance and therefore concentrated its attention on the reliability impact of the requirements.

Requirement R1 of the standard was assigned a VRF of High. The Requirement states Transmission Owners must manage vegetation for lines that represent a significant risk of cascading, instability, or separation. The VRF is only applied at the Requirement level and each Requirement Part is treated equally. The requirement mandates measurable performance with regard to vegetation management to ensure that the risk of cascading, separation, and instability is minimized. Other requirements with similar performance based outcomes that could lead to cascading carry a High VRF. IROLs and Major WECC Transfer Paths by definition have an increased potential for leading to cascading, separation, or instability. Therefore this requirement was assigned a High VRF. The requirement contains only one objective (which is to manage vegetation of lines that carry increased risk of instability, cascading, or separation) and only one VRF was assigned.



Requirement R2 of the standard was assigned a VRF of Medium. The Requirement states Transmission Owners must manage vegetation for lines that do not represent a significant risk of cascading, instability, or separation. The VRF is only applied at the Requirement level, and each Requirement Part is treated equally. The requirement mandates measurable performance with regard to vegetation management to ensure the risk of equipment damage is minimized. Other requirements with similar performance based outcomes that could lead to equipment damage carry a Medium VRF. Lines that are not IROLs and are not Major WECC Transfer Paths by definition have less potential for leading to cascading, separation, or instability. Therefore this requirement was assigned a Medium VRF. The requirement contains only one objective (which is to manage vegetation of lines that carry minimal risk instability, cascading, or separation) and only one VRF was assigned. While this assignment is lower than the current VRF assigned to R1 of FAC-003-1, NERC believes this to be appropriate, as it aligns with the definitions for VRFs and complies with FERC's guidelines regarding the establishment of these values. Additionally, in order to eliminate commingling of higher risk reliability objectives and lesser risk reliability objectives, this requirement and its associated VRF has been split from Requirement R1. While R1 addresses those violations related to line(s) that are either an element of an IROL or an element of a Major WECC Transfer Path, R2 addresses those that are not. This separation helps ensure entities properly understand the risk to reliability associated with specific actions, as well as aligns the standard and associated VRFs with FERC guidelines.

Requirement R3 of the standard was assigned a VRF of Lower. The Requirement mandates the Transmission Owner to have documented strategies, procedures, processes,

or specifications. The VRF is only applied at the Requirement level and each Requirement Part is treated equally. This requirement calls for an entity to have documented strategies, procedures, processes, or specifications. This requirement is administrative in nature, and is consistent with other standards requiring documentation. Failure to have a document is not likely to directly affect the electrical state or the capability of the bulk electric system, or the ability to effectively monitor and control the bulk electric system. Development of documents is a requirement that is administrative in nature and is in a planning time-frame that, if violated, would not, under emergency, abnormal, or restorative conditions anticipated by the preparations, be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. Therefore this requirement was assigned a Lower VRF. R3 contains only one objective (which is to have documents), and only one VRF was assigned. While this assignment is lower than the current VRF assigned to R1 of FAC-003-1, NERC believes this to be appropriate, as it aligns with the definitions for VRFs and complies with FERC's guidelines regarding the establishment of these values.

Requirement R4 of the standard was assigned a VRF of Medium. The Requirement specifies that transmission owners must report vegetation conditions that are likely to cause a Fault to the control center holding switching authority for the associated line. The VRFs are only applied at the Requirement level and there are no Requirement Parts for separate consideration. The requirement mandates notifications that could hinder the ability to effectively monitor and control the bulk electric system. Other requirements with similar outcomes are also assigned Medium VRFs. Failure to report

vegetation conditions may affect the ability to effectively monitor and control the Bulk Electric System. Therefore this requirement was assigned a Medium VRF. The requirement contains only one objective (which is to report), and only one VRF was assigned. While this assignment is lower than the current VRF assigned to R1 of FAC-003-1, NERC believes this to be appropriate, as it aligns with the definitions for VRFs and complies with FERC's guidelines regarding the establishment of these values.

Requirement R5 of the standard was assigned a VRF of Medium. The Requirement mandates that a Transmission Owner, when constrained from performing vegetation work that may lead to a vegetation encroachment into the MVCD prior to the implementation of the next annual work plan, must take corrective action to ensure continued vegetation management to prevent encroachments. The VRF is only applied at the Requirement level and there are no Requirement Parts for separate consideration. The requirement mandates corrective action that, if not taken, could directly affect the electrical state or the capability of the bulk electric system. Other requirements with similar outcomes are also assigned Medium VRFs. Failure to take corrective action could directly affect the electrical state or the capability of the Bulk Electric System, or the ability to effectively monitor and control the Bulk Electric System. Therefore this requirement was assigned a Medium VRF. The requirement contains only one objective (which is to take corrective action), and only one VRF was assigned. While this assignment is lower than the current VRF assigned to R1 of FAC-003-1, NERC believes this to be appropriate, as it aligns with the definitions for VRFs and complies with FERC's guidelines regarding the establishment of these values.

Requirement R6 of the standard was assigned a VRF of Medium. The Requirement specifies that the Transmission Owner must perform a Vegetation Inspection of 100% of its lines at least once per calendar year. The VRFs are only applied at the Requirement level and there are no Requirement Parts for separate consideration. The requirement mandates inspections that, if not performed, could affect the ability to effectively monitor and control the Bulk Electric System. Other requirements with similar outcomes are also assigned Medium VRFs. Failure to perform an inspection could affect the ability to effectively monitor and control the Bulk Electric System. Therefore this requirement was assigned a Medium VRF. The requirement contains only one objective (which is to perform a vegetation inspection), and only one VRF was assigned. While this assignment is lower than the current VRF assigned to R1 of FAC-003-1, NERC believes this to be appropriate, as it aligns with the definitions for VRFs and complies with FERC's guidelines regarding the establishment of these values.

Requirement R7 of the standard was assigned a VRF of Medium. The Requirement specifies that the Transmission Owner must complete 100% of its annual vegetation work plan. The VRFs are only applied at the Requirement level and there are no Requirement Parts for separate consideration. The requirement mandates completion of work that, if not completed, could affect the electrical state or the capability of the bulk electric system. Other requirements with similar outcomes are also assigned Medium VRFs. Failure to complete the annual vegetation work plan could affect the electrical state or the capability of the bulk electric system. Therefore this requirement was assigned a Medium VRF. The Requirement contains only one objective (which is to complete 100% of the annual vegetation work plan), and only one VRF was assigned.

While this assignment is lower than the current VRF assigned to R2 of FAC-003-1, NERC believes this to be appropriate, as it aligns with the definitions for VRFs and complies with FERC's guidelines regarding the establishment of these values.

Regarding the VSLs, they have been developed based on the situations an auditor may find during a typical compliance audit. The following discussions summarize the manner in which the VSLs meet both NERC and FERC guidelines for VSLs.

For Requirement R1, there is an incremental aspect to the violation, and the VSLs follow the guidelines for incremental violations. The standard incorporates a High VSL for failure to prevent encroachment into the MVCD that does not lead to a sustained outage and a Severe VSL for failure to manage vegetation that leads to any of the identified vegetation-related sustained outages. This is a new requirement, and accordingly, it cannot lower the current level of compliance. The proposed VSL does not use any ambiguous terminology, thereby supporting uniformity and consistency in the determination of similar penalties for similar violations. Consistent with the requirement, the proposed VSL uses the same terminology as used in the associated requirement and is based on a single violation and not cumulative violations.

For Requirement R2, there is an incremental aspect to the violation, and the VSLs follow the guidelines for incremental violations. The standard incorporates a High VSL for failure to prevent encroachment into the MVCD that does not lead to a sustained outage and a Severe VSL for failure to manage vegetation that leads to any of the identified vegetation-related sustained outages. This is a new requirement, and accordingly, it cannot lower the current level of compliance. The proposed VSL does not use any ambiguous terminology, thereby supporting uniformity and consistency in the

determination of similar penalties for similar violations. Consistent with the requirement, the proposed VSL uses the same terminology as used in the associated requirement and is based on a single violation and not cumulative violations.

For Requirement R3, there is an incremental aspect to the violation, and the VSLs follow the guidelines for incremental violations. The previous standard graded the VSLs based on the completeness of the TVMP. The new VSL is structured similarly, but has omitted the “Low” level - effectively raising the minimum level of compliance. The proposed VSLs do not use any ambiguous terminology, thereby supporting uniformity and consistency in the determination of similar penalties for similar violations.

Consistent with the requirement, the proposed VSL uses the same terminology as used in the associated requirement, and is based on a single violation and not cumulative violations.

For Requirement R4, there is an incremental aspect to the violation, and the VSLs follow the guidelines for incremental violations. The previous standard does not require actual communication, while the new standard does. Accordingly, this should be treated as a new requirement, and therefore cannot lower the current level of compliance. The proposed VSLs do not use any ambiguous terminology, thereby supporting uniformity and consistency in the determination of similar penalties for similar violations.

Consistent with the requirement, the proposed VSL uses the same terminology as used in the associated requirement and is based on a single violation and not cumulative violations.

For Requirement R5, the VSL is “binary” (pass/fail). If a Transmission Owner did not take corrective action when it was constrained from performing planned

vegetation work where an applicable line was put at potential risk, then a violation had occurred. The only VSL is Severe, and therefore, the VSL cannot result in a lower level of compliance. The proposed VSLs do not use any ambiguous terminology, thereby supporting uniformity and consistency in the determination of similar penalties for similar violations. Consistent with the requirement, the proposed VSL uses the same terminology as used in the associated requirement and is based on a single violation and not cumulative violations.

For Requirement R6, there is an incremental aspect to the violation, and the VSLs follow the guidelines for incremental violations. The previous standard does not require actual inspections, while the new standard does. Accordingly, this should be treated as a new requirement, and therefore cannot lower the current level of compliance. The proposed VSLs do not use any ambiguous terminology, thereby supporting uniformity and consistency in the determination of similar penalties for similar violations. Consistent with the requirement, the proposed VSL uses the same terminology as used in the associated requirement and is based on a single violation and not cumulative violations.

For Requirement R7, there is an incremental aspect to the violation, and the VSLs follow the guidelines for incremental violations. The VSLs in the previous standard were focused on completeness of the document with the “Severe” VSL only reserved for entities that did not have or implement their plan. The proposed VSLs are graded based on the amount of the plan completed, giving a clear indication that partial completion is still a violation. This provides a level of compliance in excess of what was established by the previous version of the standard. The proposed VSLs do not use any ambiguous

terminology, thereby supporting uniformity and consistency in the determination of similar penalties for similar violations. Consistent with the requirement, the proposed VSL uses the same terminology as used in the associated requirement and is based on a single violation and not cumulative violations.

## **VI. SUMMARY OF THE RELIABILITY STANDARD DEVELOPMENT PROCEEDINGS**

### **a. Development History**

The development record for FAC-003-2 is summarized below. **Exhibit E** contains the Consideration of Comments Reports created during the development FAC-003-2. **Exhibit G** contains the complete record of development for FAC-003-2.

#### **i. SAR Development**

Project 2007-07 Vegetation Management was initiated on January 9, 2007 for the purpose of reviewing and modifying FAC-003-1. The first draft of the Standards Authorization Request (“SAR”) was posted for industry comment from January 15, 2007 to February 14, 2007. Commenters suggested additional enhancements to the SAR, including a request for a reference document to aid in the implementation of the standard. An updated SAR was posted from April 10, 2007 to May 9, 2007. Following minor corrections, the SAR was finalized and posted, a drafting team was assembled, and development of the standard commenced.

#### **ii. Overview of the Standard Drafting Team**

The technical expertise of the ERO is derived from the SDT. For this project, the SDT consisted of 17 industry experts with over 500 years collective experience. The SDT included experts in vegetation management, several registered professional engineers, and industry thought leaders that generously lent their expertise to NERC and



other professional organizations such as the Institute of Electrical and Electronics Engineers (“IEEE”). Each individual is considered to be an expert in his field. Members of this standard drafting team provided a diversity of vegetation management experience, ranging across North America, including both the continental United States and Canada. A detailed set of biographical information for each of the team members is included along with the SDT roster in **Exhibit H**.

### **iii. The First Posting**

The first draft of FAC-003-2 was posted for formal comment from October 27, 2008 to November 25, 2008. A mapping document was provided to industry to assist in the review of the standard. Sixty sets of comments were received, representing each of the 10 Industry Segments within NERC’s stakeholder structure. Based on the comments received, modifications were made to the standard, including:

- Replacing the Critical Clearance Zone concept found in R4 with a practical field measurement to address commenter’s concerns.
- Eliminating the Critical Clearance Zone as the trigger of imminent threat in R2 to address commenter’s concerns.
- Adding a sub part to the Transmission Vegetation Management Plan requirement (1.6) in order to address commenter’s concerns regarding the elimination of Clearance 1. This change required that the TO account for anticipated conductor movement.
- Creating a second grow-in outage requirement to allow for different VRF levels based on the actual criticality of the line.

There were 3 strong minority views not resolved:

- Some commenters disagreed with the “zero tolerance” nature in the previous version of the standard
- Some commenters disagreed with the proposed minimum Vegetation Inspection frequency of one year.
- Some commenters wanted to retain Clearance 1 from the previous version of the standard.

#### **iv. The Second Posting**

The second draft of FAC-003-2 was posted for formal comment from September 10, 2009, to October 24, 2009. A mapping document was again provided to industry to assist in the review of the standard, as well as a new technical reference document. Violation Risk Factors and Violation Severity levels were added to the standard, as well as several other improvements and modifications. Sixty-six sets of comments were received, representing each of the 10 Industry Segments within NERC’s stakeholder structure.

#### **v. Transition to Results Based Format**

On January 14, 2010, the NERC Standards Committee endorsed the use of Project 2007-07 Vegetation Management as the prototype for the proof-of-concept for using the results-based criteria for developing a Reliability Standard. The results-based initiative is intended to focus the collective effort of NERC and industry participants on improving the clarity and quality of NERC Reliability Standards by developing performance, risk and competency-based requirements that accomplish a reliability objective through a defense-in-depth strategy, while eliminating documentation-driven requirements that do not have an impact on bulk-power system reliability.

The Standards Committee directed the Vegetation Management SDT to stop work refining its second draft of the Vegetation Management standard. Instead, it asked them to inform stakeholders how the team used stakeholder comments to refine the technical requirements carried into the results-based draft of the standard. In response, the drafting team did not develop individual responses to the comments submitted by stakeholders on the second draft of FAC-003-2. Instead, the drafting team produced a summary report that showed all the questions asked and provided a summary indicating how the drafting team used stakeholder comments submitted in response to that question.

#### **vi. The Third Posting**

The third draft of FAC-003-2 was posted for informal comment from March 1, 2010 to March 31, 2010. Once again, a mapping document was provided to industry to assist in the review of the standard, as well as a technical reference document. The new standard included an implementation plan, and had been redrafted using the new results-based format. Fifty-five sets of comments were received, representing 8 of the 10 Industry Segments within NERC's stakeholder structure. Based on the comments received, modifications were made to the standard, including:

- Dividing requirement R1 into separate requirements, with separate VRFs
- Removing the phrase "Bulk Power System" from the standard
- Requirement R3 was modified to more explicitly indicate what information needed to be included to be considered a valid procedure, process, or specification.
- Modifying VRFs to align with NERC guidelines.

Some commenters expressed concern regarding the standards use of the Gallet Equation. The drafting team provided an extensive response, explaining its technical justification for the choice. For a detailed discussion of the Gallet Equation and its use, please see Appendix 1 of the Transmission Vegetation Management – FAC-003-2 Technical Reference Document included as **Exhibit I**.

Additionally, a large number of comments were received and considered regarding the new “results-based” format of the standard at this time.

#### **vii. The Fourth Posting and Initial Ballot**

A fourth draft of FAC-003-2 was posted for formal comment from June 17, 2010 to July 17, 2010. A mapping document and a technical reference document were provided to industry to assist in the review of the standard. Forty-five sets of comments were received, representing 7 of the 10 Industry Segments within NERC’s stakeholder structure. An initial ballot of the standard was conducted from July 9, 2010 to July 19, 2010. The ballot achieved a quorum of 86.18%, and an approval of 65.93%. Based on the comments received, modifications were made to the standard, including:

- Redefining the Glossary term for ROW to address Paragraph 734 of FERC Order 693 and the width of ROW to be maintained;
- Redefining the Glossary term for Vegetation Inspection to include identifying hazards to the line inside the ROW;
- Removing Section 4.4 and footnote 2 addressing “force majeure” and addressing the issue in new footnotes 2, 3 and 4;
- Changing “qualified personnel” to “Transmission Owner” in R4;
- Adding the phrase “but no more than 18 months between inspections” in R6;

- Deleting Table 3 from the Guidelines and Technical Basis section.

Additional changes to the standard were made based on recommendations from members of the standard's "Quality Review" team. Quality Review teams are ad-hoc teams that provide focused compliance and legal feedback on standards and associated documents related to wording, enforceability, structure, grammar, and similar subject areas.

#### **viii. The Fifth Posting and Successive Ballot**

The fifth draft of FAC-003-2 was posted for formal comment from January 27, 2011 to February 28, 2011. A mapping document and a technical reference document were provided to industry to assist in the review of the standard. Forty-one sets of comments were received, representing 9 of the 10 Industry Segments within NERC's stakeholder structure. A successive ballot of the standard was conducted from February 18, 2011 to February 28, 2011. The ballot achieved a quorum of 79.28%, and an approval of 79.34%. A non-binding poll was conducted for the VRFs and VSLs. Of those who registered to participate, 77% provided an opinion; and 79% of those who provided an opinion indicated support for the VRFs and VSLs that were proposed.

Around the time of the fifth posting and successive ballot, the Standards Committee approved the 2011-2013 Reliability Standards Development Plan, which lowered the priority of this project relative to other work and moved this project into informal development. With this move, NERC resources supporting this project were reassigned to higher-priority projects. The standards drafting team worked independently to respond to comments and finalize the standard. Based on comments received during the comment and ballot, the definition of MVCD was added. A number of clarifications to the standard language were also undertaken during this time.

Additionally, during this period, the chair of the Standards Committee identified some potential concerns with the standard and requested that the team answer several focused questions. The team developed responses to these questions (included in the Project 2007-07 Vegetation Management Consideration of Issues and Directives document included in the Complete Development History attached as **Exhibit G**), as well as several other supporting documents used during the recirculation ballot.

**ix. The Sixth Posting and Recirculation Ballot**

The sixth and final draft of FAC-003-2 was posted for recirculation ballot from October 4, 2011, to October 13, 2011. An updated mapping document and technical reference document were provided to industry to assist in the review of the standard. Other supporting documents were prepared to further assist in the review, including a document demonstrating the manner in which FERC directives (as well as other issues) were addressed, an analysis of how the VSLs and VRFs complied with NERC and FERC guidelines, an updated implementation plan, and responses to the questions asked by the Chair of the Standards Committee. The ballot achieved a quorum of 87.17%, and an approval of 86.25%.

**x. Board of Trustees Approval**

The final draft of FAC-003 was presented to NERC's Board of Trustees for approval on November 3, 2011. NERC staff provided a summary of the improvements made to the standard, as well as a summary of minority issues and associated drafting team responses. NERC staff also proposed an alternative set of VSLs for requirements R1 and R2, because they believed the VSLs proposed by the drafting team did not meet NERC guidelines. The Board of Trustees approved the standard, and the NERC staff

recommended VSLs for Requirements R1 and R2 and directed that it be filed with applicable regulatory authorities.

Respectfully submitted,

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## **Exhibits A – I**

(Available on the NERC Website at

[http://www.nerc.com/fileUploads/File/Filings/Attachments\\_FAC-003.pdf](http://www.nerc.com/fileUploads/File/Filings/Attachments_FAC-003.pdf))