
FAC-003-AB1-1 Transmission Vegetation Management Program

1. Purpose

The purpose of this *reliability standard* is to improve the *reliability* of electric transmission systems by preventing *outages* from vegetation located on a right-of-way, corridor or other route (collectively “ROW”) and minimizing *outages* from vegetation located adjacent to a ROW, maintaining clearances between *transmission facilities* and vegetation on and along a ROW, and reporting vegetation related *outages* of electric transmission systems to the ISO and WECC.

2. Applicability

This *reliability standard* applies to:

- (a) the *legal owner* of a *transmission facility* with *transmission facilities* operated at 200 kV and above and any lower voltage *transmission facilities* designated by the ISO as critical to the *reliability* of the AIES as identified in Appendix A; provided that *transmission facilities* on ROWs that are assessed and identified on an annual basis not to have vegetation capable of growing higher than 2 meters are excluded; and
- (b) the ISO.

3. Definitions

Italicized terms used in this *reliability standard* have the meanings as set out in the *Consolidated Authoritative Document Glossary*.

4. Requirements

R1 Each *legal owner* of a *transmission facility* must prepare a *TVMP*. This program is to be updated at least annually. The *TVMP* must include the objectives, practices, approved procedures, and work specifications ¹ of the *legal owner* of a *transmission facility*.

R1.1 The *TVMP* must define a schedule for and the type (aerial or ground) of ROW vegetation inspections. This schedule must be flexible enough to adjust for changing conditions. The inspection schedule must 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 facilities* of the *legal owner* of a *transmission facility*. The *legal owner* of a *transmission facility* must perform vegetation inspections as identified in the schedule.

R1.2 The *TVMP* must 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

¹ ANSI A300, Tree Care Operations – Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices, while not a requirement of this *reliability standard*, is considered by NERC to be an industry best practice.

sag under maximum design loading, and the effects of wind velocities on conductor sway. Specifically, the *legal owner* of a *transmission facility* must establish clearances to be achieved at the time of vegetation management work identified herein as Clearance 1, and must also establish and maintain a set of clearance requirements identified herein as Clearance 2 to prevent flashover between vegetation and overhead ungrounded supply conductors.

R1.2.1 Clearance 1 — Each *legal owner* of a *transmission facility* must determine and document appropriate clearance distances to be achieved at the time of vegetation management work based upon local conditions and the expected time frame in which the *legal owner* of a *transmission facility* 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 must be greater than those defined in Clearance 2.

R1.2.2 Clearance 2 — Each *legal owner* of a *transmission facility* must determine and document specific minimum radial clearance distances to be maintained between vegetation and conductors under all rated electrical operating conditions. These minimum radial clearance distances are necessary to prevent flashover between vegetation and conductors and will vary due to such factors as altitude and operating voltage. Subject to R1.2.2.1 and R1.2.2.2, the documented specific minimum radial clearance distances must 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 must 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 must be derived from Table 7, IEEE 516-2003, phase-to-phase voltages, with appropriate altitude correction factors applied.

R1.3 All personnel directly involved in the design and implementation of the *TVMP* must hold appropriate qualifications and must have taken appropriate training, as defined by the *legal owner* of a *transmission facility*, to perform their duties.

R1.4 Each *legal owner* of a *transmission facility* must develop mitigation measures to achieve sufficient clearances for the protection of its *transmission facilities* when it identifies locations on the ROW where it is restricted from attaining Clearance 1 distances.

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R1.5 Each *legal owner* of a *transmission facility* must 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.

R2 The *legal owner* of a *transmission facility* must create and implement an annual plan for vegetation management work to ensure the *reliability* of its *transmission facilities*. The plan must describe the methods used, such as manual clearing, mechanical clearing, herbicide treatment, or other actions. The plan must 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 *AIES*. Adjustments to the plan must be documented as they occur. The plan must include the time required to obtain permissions or permits from landowners or regulatory authorities. Each *legal owner* of a *transmission facility* must have systems and procedures for documenting and tracking the planned vegetation management work and ensuring that the vegetation management work was completed according to its work specifications.

R3 Each *legal owner* of a *transmission facility* must report quarterly to the *ISO*, *sustained outages* to its transmission lines determined by the *legal owner* of a *transmission facility* to have been caused by vegetation.

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

R3.2 The *legal owner* of a *transmission facility* is not required to report to the *ISO*, *sustained outages* to its transmission lines caused by either:

- vegetation falling onto a transmission line from outside the ROW caused by a natural disasters are not considered reportable (examples of disasters include, but are not limited to, earthquakes, fires, tornados, hurricanes, landslides, wind shear, ice storms, floods, major storms as defined either by the *legal owner* of a *transmission facility* or an applicable regulatory body); or
- vegetation falling onto a transmission line caused by human or animal activity are not considered reportable (examples of human or animal activity include, but are not limited to, logging, animal severing tree, vehicle contact with tree, arboricultural, horticultural or agricultural activities, or removal/digging of vegetation).

R3.3 The *outage* information provided by the *legal owner* of a *transmission facility* to the *ISO* must include at a minimum:

- number or name of the transmission line(s) forced out of service;
- date and time;
- duration of the *outage*;
- description of the cause of the *outage*;
- other pertinent comments; and

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- remedial action taken by the *legal owner* of a *transmission facility*.
- R3.4** An *outage* must be categorized by the *legal owner* of a *transmission facility* as one of the following:
- R3.4.1** Category 1 — Grow-ins: *Outages* caused by vegetation growing into transmission lines from vegetation inside and/or outside of the ROW;
- R3.4.2** Category 2 — Fall-ins: *Outages* caused by vegetation falling into transmission lines from inside the ROW; or
- R3.4.3** Category 3 — Fall-ins: *Outages* caused by vegetation falling into transmission lines from outside the ROW.
- R4** The *ISO* must report quarterly to *WECC*, *sustained outages* to transmission lines determined by the *legal owner* of a *transmission facility* to have been caused by vegetation.
- R4.1** Multiple *sustained outages* within a 24-hour period on an individual transmission line, if caused by the same vegetation, must be reported as one *outage* regardless of the actual number of *outages*.
- R4.2** The *ISO* is not required to report to *WECC*, *sustained outages* to transmission lines caused by either:
- *outages* from vegetation falling onto transmission lines from outside the ROW caused by natural disasters are not reportable (examples of disasters include, but are not limited to, earthquakes, fires, tornados, hurricanes, landslides, wind shear, ice storms, floods, major storms as defined either by the *legal owner* of a *transmission facility*, or an applicable regulatory body); or
 - *outages* from vegetation caused by human or animal activity are not considered reportable (examples of human or animal activity include, but are not limited to, logging, animal severing tree, vehicle contact with tree, arboricultural, horticultural or agricultural activities, or removal/digging of vegetation).
- R4.3** The *outage* information provided by the *ISO* to *WECC* must include at a minimum:
- number or name of the transmission line(s) forced out of service;
 - date and time;
 - duration of the *outage*;
 - description of the cause of the *outage*;
 - other pertinent comments; and
 - remedial action taken by the *legal owner* of a *transmission facility*.
- R4.4** An *outage* must be categorized by the *legal owner* of a *transmission facility* as one of the following:
- R4.4.1** Category 1 — Grow-ins: *Outages* caused by vegetation growing into transmission lines from vegetation inside and/or outside of the ROW;

R4.4.2 Category 2 — Fall-ins: *Outages* caused by vegetation falling into transmission lines from inside the ROW; or

R4.4.3 Category 3 — Fall-ins: *Outages* caused by vegetation falling into transmission lines from outside the ROW.

5. Procedures

No procedures have been defined for this *reliability standard*.

6. Measures

The following measures correspond to the requirements identified in Section 4 of this *reliability standard*. For example, MR1 is the measure for R1.

These measures will be used by the *ISO* in carrying out its compliance monitoring duties in accordance with *ISO rule 12*. The *ISO* may consider other data and information, including any provided by a *market participant*.

MR1 A revision history of the *TVMP* is provided annually to the *ISO*. A *TVMP* exists and is provided in the format specified in the *ISO TVMP* template. The *TVMP* is provided within 30 *days* of request. The *TVMP* is complete and includes the required component sections specified in the template.

MR1.1 A vegetation inspection schedule exists in the *TVMP*. The schedule is completed in accordance with the *ISO TVMP* template. The schedule includes all applicable transmission lines. Documentation exists to show that the vegetation inspections have been performed.

MR1.2 Clearance 1 and Clearance 2 values exist in the *TVMP*

MR1.2.1 Clearance 1 values exist for every transmission line. Clearance 1 values specified are greater than those of Clearance 2.

MR1.2.2 Clearance 2 values exist for every transmission line. Clearance 2 values specified are greater than the minimum clearances set in IEEE standards for the applicable scenarios.

MR1.3 Requirements, training, and qualifications for positions responsible for preparing and implementing the *TVMP* exist. Documentation exists to confirm that personnel meet the requirements, training, and qualifications of the position. Acceptable documentation includes training records, licenses, certificates, and resumes.

MR1.4 A list exists and specifies locations on the ROW where Clearance 1 is not attainable. Mitigation measures exist where there are restrictions. Mitigating measures are appropriate and meet the intent of this *reliability standard*.

MR1.5 A documented process or procedure for communication exists. The process is appropriate and of sufficient detail to meet the intent of the requirement.

MR2 A work plan exists in the form of the *ISO* vegetation management work plan template. The work plan is complete. The work plan is submitted annually and within 30 *days* of being requested.

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Evidence exists to show that the work plan is implemented. Evidence may include status and inspection reports, work orders, and/or contracts. The work plan is being followed in accordance to the schedule. The work is completed in accordance with the work plan. Revision documentation exists where the plan has been revised. Evidence is provided to the *ISO* within 30 *days* of a request.

MR3 to 3.4.3 Quarterly reports are submitted to the *ISO* by the dates specified by the *ISO*. Quarterly reports contain all sustained outages caused by vegetation for that reporting period. Quarterly reports contain the specific information in the requirement.

MR4 to 4.4.3 Quarterly reports are submitted to the *WECC* by dates specified by *WECC*.

Quarterly reports contain all sustained *outages* caused by vegetation received by the *ISO* for that reporting period. Quarterly reports contain the specific information in the requirement.

7. Appendices

Appendix A - Transmission Facilities Designated as Critical to the AIES

The following facilities have been identified as critical to the *AIES* and require the application of this *reliability standard*:

- 887L (Pocaterra T48S - Alberta / BC border);
- 777L (Pocaterra T48S - Seebe T245S);
- 786L (Coleman T799S - Alberta / BC border); and
- 170L (Coleman T799S - Pincher Creek T396S).

8. Guidelines

No guidelines have been defined for this *reliability standard*.

Revision History

Effective	Description
2012-12-17	Administrative update – “ <i>TFO</i> ” replaced with the “ <i>legal owner of a transmission facility</i> ”; and other minor cleanup items.
2010-01-26	R1 and R2
2009-03-27	New Issue