Vegetation Management Program and Controls (FAC-003-4)

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FPL serves more than half of the state of Florida

**Company Overview**

- **FPL is a regulated energy company**
  - 4.8 million customers
  - 8,800 Employees
  - 25,254 MW of generating capacity
  - Overhead miles (T&D): 42,301
  - Transmission Line Miles: 6,806
  - NERC Line Miles: 4,303

- **Centrally Organized and Supervised**

- **Vegetation Management team includes 12 Qualified Arborists**
  - Degree in Forestry or equivalent
  - International Society of Arboriculture (ISA-certified)
  - FPL Transmission training certification
  - Continuing education
FPL Transmission Vegetation Management

- **Frequent Inspections**
  - 2 times per year minimum

- **Vegetation Encroachment Limit (VEL)**
  - MVCD + Sag/Sway Potential + Safety factor
  - Program target is to keep vegetation outside of VEL

- **Technology (GIS based, inventory software)**
  - Inventory vegetation able to grow into VEL
  - Variable work types and trim cycles based on:
    - Knowledge of growth rates
    - Observation of changing environmental factors

- **Integrated Vegetation Management (IVM)**
  - Promote and conserve compatible plants
  - Discourage incompatible plants that pose risk

The FPL program is conservative and embraces technology
GIS based Inventory Software

Software Highlights

• **Documents**
  – NERC inspection plan
  – NERC work plan
  – Work completion by user name and date

• **Inventory based tracking via work prescriptions**
  – Updated with every inspection
  – Cycles and auto-regeneration
  – GPS location

• **Periodic Reporting of work completion and forecasted workload**

• **Easy access to historical information**
GIS based Inventory Software

Keep all ROW information one place

Sensitive customers

Access

Due dates

Location of work
Vegetation Program Applicability

FAC-003-4

• **4.1. Functional Entities:**
  – 4.1.1. Applicable Transmission Owners
    – 4.1.1.1 Transmission Owners that own Transmission Facilities defined in 4.2.

• **4.2. Transmission Facilities:** Defined below (referred to as “applicable lines”), including but not limited to those that cross lands owned by federal, state, provincial, public, private, or tribal entities:
  – 4.2.1 Each overhead transmission line operated at 200kV or higher.
  – 4.2.2 Each overhead transmission line operated below 200kV identified as an element of an IROL under NERC Standard FAC-014 by the Planning Coordinator.
FAC-003-4 R1 and R2

• Requirement (IROL, WECC transfer path or other)
  – Manage vegetation to prevent encroachments into the MVCD under normal conditions (observed, inside ROW fall-in, blowing together or grow-in)

• Measure
  – Evidence that vegetation managed to prevent encroachment into the MVCD (records, reports, attestations)

• Compliance Approach
  – Defined vegetation management program
    – Inspect, document, prescribe and execute work
    – Designed to manage vegetation from encroaching MVCD
    – Vegetation Encroachment Limit (VEL) concept
  – GIS based platform allows for tracking vegetation over time
FAC-003-3 R3

- **Requirement**
  - Shall have maintenance strategies to manage vegetation to prevent encroachments into the MVCD taking into consideration operating conditions, growth rates, control methods and inspection frequency

- **Measure**
  - Maintenance strategies provided to demonstrate ability

- **Compliance Approach**
  - Describe FPL VM Program in more detail
    - Designed to manage vegetation from encroaching MVCD
    - Program goal is Vegetation Encroachment Limit (VEL), beyond MVCD
    - Inspect, document, prescribe work and execute work (process)
FAC-003-3 R4

• **Requirement**
  - Notify control center when a confirmed vegetation condition is likely to cause a fault at any moment without any intentional time delay

• **Measure**
  - Have evidence that it notified the control center without any intentional time delay such as control center logs, voice recordings, switching orders, clearance orders and subsequent work orders

• **Approach**
  - Reference VM Program Manual and process flow chart
  - Document any such conditions
Compliance and Controls

FAC-003-3 R4 (continued)

**Process Name:** Mitigation of Emergent Vegetation Condition

**Process Description:** Communicate, coordinate response and remediate vegetation condition

**Process Objective:** Communication for situational awareness and coordination to remediate the condition

**Process Owner:** Vegetation Management (Transmission)

**Customers:** Transmission System Operations and Transmission Substation Field Operations

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1. Use VM measurement process

2. Minimum Approach Distance by Vegetation Management
   - 69kV: 3 Feet, 9 inches
   - 115kV: 4 Feet, 6 inches
   - 138kV: 5 Feet, 3 inches
   - 230kV: 7 Feet, 11 inches
   - 500kV: 19 feet

20. A vegetation condition was identified (provide location including conduct structure and line section) that is too close for VM to work and may need an outage upon review by TS Field Operations. Notify the System Operator of the condition and the need to determine if the line can be taken out of service. TS Field Operations will contact you shortly to begin coordination of the work plan.

2b. Provide location and description of vegetation condition. Advise that the Dispatcher (CO) has been notified and that TSFO needs to call the Dispatcher (CO) to coordinate response. Also, coordinate VM resources that may be needed to remediate the condition with TSFO.

2c. Purpose of these communications is for CO to understand timing of TSFO support of vegetation condition (when TSFO will arrive at location of the condition, complete ROW/clearance request, support compete vegetation work and return line to CO).

2d. Conference call to ensure parties are aware of the condition and the remediation plan (including timing and resources). Call should include CO Manager, Line Dispatch Manager, TSFO Area Manager, Vegetation Manager, Vegetation Management Leader and PDDC Manager (if a double circuit line is in question).

3. Follow safe practices. Re-confirm distance immediately prior to trimming or determination of clearance type. It is acceptable to contact TSFO and/or CO for special circumstances such as tree fall in danger, etc.

4. If double circuit, confirm the line in question with the Power Delivery Diagnostic Center (PDDC). Call the PDDC and provide the location of the condition including the conduct structure. VM should made confirmation prior to calling the Dispatcher (CO).

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Rev 3: 3/25/16
Rev 4: Rev 5: Rev 6:
Compliance and Controls

FAC-003-3 R6

• Requirement
  – Inspect applicable lines at least once per calendar year and with no more than 18 calendar months between inspections

• Measure
  – Have evidence of inspections such as completed and dated work orders, dated invoices or dated inspection records

• Approach
  – Reference VM Program Manual and identify best practice
    ▪ 2 inspections per year minimum
    ▪ 1 inspection by an independent patroller
  – Provide inspection reports

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Compliance and Controls

FAC-003-3 R7

• Requirement
  – Complete 100% of the annual vegetation work plan and Modifications to the work plan in response to changing conditions or to findings from vegetation inspections may be made and must be documented

• Measure
  – Have evidence of the completed work plan such as a copy of the completed annual work plan (as finally modified), dated work orders, dated invoices, or dated inspection records

• Approach
  – Annual review of the completed work plan

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Compliance and Controls

Future state of controls

- **LiDAR**
  - Currently piloting a LiDAR survey using a side scanning LiDAR camera

- **Photo Documentation**
  - Use photo evidence for completed work with GPS location, work ticket, day and time
Partnership with Compliance Department

Standardized Compliance Platform

- **Compliance Activity Tracker**
  - Mandatory and Internal Compliance activities with look ahead
  - Automatic reminders and escalation emails

- **Periodic Self-assessments**
  - Standardized templates including narrative, evidence, and execution reviews (not just at audit time)
  - Independent reviews by business unit and Corporate Compliance

- **Compliance Platform**
  - Workspace management and automation
  - Disposition of applicable Lessons Learned
  - New/Revised Compliance Requirements Process

- **Industry participation**
  - NERC Webinars / Workshops
  - North American Transmission Forum (NATF)