

**Vegetation-Related Transmission Outages
Second Quarter 2007**

September 18, 2007

The NERC Board of Trustees Compliance Committee has reviewed and accepted this Vegetation-Related Transmission Outages Second Quarter 2007 Report. The committee has expressed concern with the frequency of outages caused by vegetation growing into transmission lines. There were four Category 1 outages reported in the second quarter. In addition, there have been approximately six Category 1 outages alleged to have occurred during the third quarter of 2007. Many of these outages occurred at a time when the line loading was very low. This trend is of concern and needs to be carefully evaluated to determine the reasons why so many grow-ins are occurring. Vegetation management programs, and the implementation of such programs, may need to be modified to help eliminate these types of outages. The committee will continue to closely monitor this issue.

Vegetation-related transmission outages that occurred in the second quarter of 2007 are being reported in accordance with standard FAC-003-1.

The standard requires each outage to be categorized as one of the following:

- Category 1 — Grow-ins: Outages caused by vegetation growing into lines from vegetation inside and/or outside of the ROW.
- Category 2 — Fall-ins: Outages caused by vegetation falling into lines from inside the ROW.
- Category 3 — Fall-ins: Outages caused by vegetation falling into lines from outside the ROW.

All Category 1 and 2 outages are considered to be violations of NERC standard FAC-003-1, with corresponding levels of noncompliance defined in the standard. The reporting of these violations is handled separately as part of the NERC performance reporting process. Category 3 outages are not considered to be violations of NERC standard FAC-003-1.

During the second quarter of 2007, there were 12 vegetation-related outages reported for 200 kV and higher transmission lines. There were two 230 kV and two 345 kV transmission outages caused by trees growing into lines from inside the right-of-way zone (Category 1). There were one 230 kV and one 500 kV transmission outages caused by trees falling into lines from inside the right-of-way zone (Category 2). There were also five 230 kV and one 345 kV transmission outages caused by trees falling into lines from outside the right-of-way zone (Category 3).

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

Midwest Reliability Organization

Reported one 345 kV vegetation-related transmission outage from inside the right-of-way.

- The transmission owner reported a 345 kV vegetation-related outage occurred on June 16, 2007, with a duration of 33 minutes. A cottonwood tree grew into the line. As a result, the tree was removed entirely on June 19, 2007. At the time of the outage the line loading was 17 percent of normal rating.

ReliabilityFirst Corporation

Reported one 230 kV and one 345 kV vegetation-related transmission outages from inside the right-of-way:

- The transmission owner reported a 230 kV vegetation-related transmission outage occurred on May 8, 2007, with a duration of 8 hours and 3 minutes. As a result of this grow-in, trees associated with this outage were trimmed within 24 hours and removed within 14 days of the incident. The transmission owner self-reported a potential reliability standard violation and submitted a proposed mitigation plan to the regional entity. At the time of the outage the line loading was 26 percent of normal rating.
- The transmission owner reported a 345 kV vegetation-related transmission outage occurred on May 29, 2007 with a duration of 23 hours and 59 minutes. A butternut hickory tree grew into a conductor between towers. A detailed proposed mitigation plan was submitted to the regional entity. At the time of the outage the line loading was 16 percent of normal rating. Aerial patrols of the geographic area EHV ROWs with an independent observer were completed on June 22. All conditions that were found posing any significant risk have been remedied. An ineffective herbicide treatment was applied to the fault location in 2004. Forestry staffing is being evaluated, and benchmarking with other forestry organizations is being conducted to develop and adopt “best practices.”

SERC Reliability Corporation

Reported one 230 kV vegetation-related transmission outage from inside the right-of-way:

- The transmission owner reported a 230 kV vegetation-related transmission outage occurred on June 4, 2007 with a duration of 45 minutes. As a result of this grow-in, 65 trees were removed from the spans adjacent to the contact. The transmission owner is performing additional surveillance and reprioritizing work. It has also modified the vegetation management program to be more proactive and aggressive over the three-year cycle. This outage was also reported as a potential reliability standard violation. At the time of the outage the line loading was 46 percent of normal rating.

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

Florida Reliability Coordinating Council

Reported one 230 kV vegetation-related transmission outage from inside the right-of-way:

- The transmission owner reported a 230 kV vegetation-related transmission outage occurred on May 6, 2007. A tree fell during high winds and then touched the transmission line, causing three total trips over a 2 hour and 19 minute period. As a

result of this outage the transmission owner inspected vegetation along the right-of-way for this event and addressed the at-risk vegetation.

SERC Reliability Corporation

Reported one 500 kV vegetation-related transmission outage from inside the right-of-way:

- The transmission owner reported a 500 kV vegetation-related transmission outage occurred on April 11, 2007 with a duration of 1 hour and 50 minutes. A tree in the right-of-way had been pushed and caused to lean towards the line by a dead pine snag that fell from farther off the right-of-way. As a result of the outage, the tree was cleared in addition to other vegetation in the area. The entire transmission line was flown with no further problems identified.

Category 3 — Outages Caused by Vegetation Falling Into Lines from Outside the Right-Of-Way

Florida Reliability Coordinating Council

Reported one 230 kV vegetation-related transmission outage from outside the right-of-way:

- The transmission owner reported a 230 kV vegetation-related transmission outage occurred on June 13, 2007 with a duration of 2 hours and 4 minutes. A tree from outside the right-of-way fell into the line. As a result, the transmission owner inspected vegetation along the right-of-way for this event.

ReliabilityFirst Corporation

Reported one 230 kV and one 345 kV vegetation-related transmission outage from outside the right-of-way:

- The transmission owner reported a 230 kV vegetation-related transmission outage occurred on June 4, 2007 with a duration of 17 hours and 4 minutes. A weakened hickory tree located 50 feet off the edge of the right-of-way fell into a tulip poplar tree, approximately 80–90 feet in height, which then uprooted and fell into the outside phase of the transmission line. The tree was 30 feet outside the transmission owner's defined right-of-way width of 150 feet. According to the transmission owner, all offending vegetation associated with this outage within the ROW was removed. The TO did not have any additional information on the action taken.
- The transmission owner reported a 345 kV vegetation-related transmission outage occurred on May 24, 2007. During a planned line outage, high winds caused a dead elm tree outside the right-of-way to fall into a healthy off the right-of-way tree. The healthy tree was bent over in close proximity to the transmission line conductor and the breaker tripped during planned re-energization of the line. Both trees were removed on May 26, 2007 and the "domino-effect" was documented for a lessons-learned review scheduled for an upcoming meeting and to be passed on to the line patrollers.

SERC Reliability Corporation

Reported three 230 kV vegetation-related transmission outages from outside the right-of-way:

- The transmission owner reported a 230 kV vegetation-related transmission outage occurred on June 25, 2007 with a duration of 6 hours and 44 minutes. A 70 foot tall sound sweet gum tree located off the right-of-way fell during a thunderstorm with wind. As a result, the transmission owner cleared the tree.

- The transmission owner reported a 230 kV vegetation-related transmission outage occurred on April 15, 2007 with a duration of 3 hours and 56.9 minutes. A green oak tree approximately 96 feet tall located 85.5 feet from the center line (the right of way width on this line is 62.5 feet) was uprooted by wind in a thunderstorm and fell into the line. The transmission line had been patrolled by the danger tree crew weeks before and the tree was not cut due to the apparent good health of the tree. As a result of the outage, the tree was cleared.
- The transmission owner reported a 230 kV vegetation-related transmission outage occurred on June 4, 2007 with a duration of 2 minutes. The line patrol found a green pine tree off the right-of-way that had fallen through the line without damaging the structures. As a result, aerial patrol was performed to determine the cause of the outage and crews removed the pine tree and inspected trees in the area for other risk.

In addition to the 12 total vegetation-related outages reported for 200 kV and higher transmission lines, SPP reported one vegetation-related transmission outage caused by vegetation growing into lines from inside the right-of-way for RRC designated critical lines <200 kV. As a result of this Category 1 outage, the transmission owner removed the tree from the right-of-way and is reviewing all lower voltage critical facilities to reduce the possibility of future events. At the time of the outage, the line loading was 27 percent of normal rating.

Table 1 summarizes the number of transmission outages by voltage level and category.

Table 1 - 2007 Vegetation-Related Transmission Outages

Region	First Quarter			Second Quarter			Third Quarter			Fourth Quarter		
	Category 1 GROW-INS (inside/ outside ROW)	Category 2 FALL-INS (inside ROW)	Category 3 FALL-INS (outside ROW)	Category 1 GROW-INS (inside/ outside ROW)	Category 2 FALL-INS (inside ROW)	Category 3 FALL-INS (outside ROW)	Category 1 GROW-INS (inside/ outside ROW)	Category 2 FALL-INS (inside ROW)	Category 3 FALL-INS (outside ROW)	Category 1 GROW-INS (inside/ outside ROW)	Category 2 FALL-INS (inside ROW)	Category 3 FALL-INS (outside ROW)
FRCC					1-230 kV	1-230 kV						
MRO			1 - 230 kV	1-345 kV								
NPCC												
RFC				1-230 kV 1-345 kV		1-230 kV 1-345 kV						
SERC				1-230 kV	1-500 kV	3-230 kV						
SPP				1-<200 kV								
TRE												
WECC			1-<200 kV 3-230 kV 1-500 kV									
Subtotal			1-<200 kV 4-230 kV 1-500 kV	1-<200 kV 2-230 kV 2-345 kV	1-230 kV 1-500 kV	5-230 kV 1-345 kV						