

UTILITY VEGETATION MANAGEMENT AND BULK ELECTRIC RELIABILITY
REPORT FROM THE FEDERAL ENERGY REGULATORY COMMISSION

SEPTEMBER 7, 2004

Executive Summary

Electric transmission owners and operators conduct vegetation management to prevent physical contact between transmission lines and nearby vegetation that could cause a transmission line to fail. On August 14, 2003, an electric power blackout affected large portions of the Northeast and Midwest United States and Ontario, Canada. President George W. Bush and Prime Minister Jean Chrétien established a joint U.S.-Canada Power System Outage Task Force (Task Force) to investigate the causes of the blackout and how to reduce the possibility of future outages. On April 5, 2004, the Task Force issued a Final Blackout Report¹ stating that one of the four primary causes of the blackout was inadequate vegetation management (tree pruning and removal).

In response to the Final Blackout Report, the Federal Energy Regulatory Commission (Commission) directed all designated transmission owners to file reports with the Commission by June 17, 2004, explaining their vegetation management practices for designated transmission facilities and rights-of-way.² The Commission staff worked with the leadership of the National Association of Regulatory Utility Commissioners' (NARUC) ad-hoc Committee on Critical Infrastructure to analyze these reports to look for significant patterns and potential problems in the vegetation management practices of the electric industry. This report to Congress summarizes the Commission's findings and recommendations. In this report, the Commission also recommends that Congress enact legislation providing for mandatory, enforceable reliability rules.

Key Observations

The transmission owners were asked to report on the results of their most recent transmission line vegetation management inspections, necessary remedial actions identified, and whether such actions had been completed before the summer 2004 peak

¹ U.S.-Canada Power System Outage Task Force, Final Report on the August 14th Blackout in the United States and Canada: Causes and Recommendations (April 2004) (Final Blackout Report).

² Order Requiring Reporting on Vegetation Management Practices Related to Designated Transmission Facilities, 107 FERC ¶ 61,053 (2004) (Vegetation Management Order). "Designated transmission facilities" are defined, for the purposes of the Vegetation Management Order only, as transmission lines with a rating of 230 kV or higher as well as tie-line interconnection facilities between control areas or balancing authority areas (regardless of kV rating) and "critical" lines as designated by the regional reliability council. See NERC, August 14, 2003 Blackout: NERC Actions to Prevent and Mitigate the Impacts of Future Cascading Blackouts at 9 n.3 (Feb. 10, 2004).

load season. Review of the vegetation management filings found that it appears transmission owners and operators have performed extensive vegetation management along the nation's high-voltage transmission network, which should produce better grid reliability during the summer. However, there is a wide range of vegetation management practices and procedures among the reporting transmission owners. There is very little uniformity in regard to right-of-way width,³ vertical line clearance,⁴ inspection frequency,⁵ and vegetation management guidelines⁶ used. The lack of uniformity may be understandable in part, as transmission owners must design their vegetation management practices based on factors such as the demands of the terrain, location, climate, vegetation species, and local laws and regulations.

The Commission recognizes that, while the data filed in response to the Vegetation Management Order reveals each transmission owner's practice, it does not directly address how effective the practice has been in limiting preventable transmission line outages. The Commission did not ask for such data in the April request, because similar data are now being reported to the Western Electricity Coordinating Council and to the North American Electric Reliability Council (NERC). Such a review is beyond the scope of this report.

Transmission owners report that they are not able to acquire all necessary permits to maintain their rights-of-way from various federal and state agencies. However, this problem could be alleviated, at least in part, if the acquisition of these permits is made a higher priority on the part of transmission owners. For instance, transmission owners could allow additional lead time to acquire many needed permits. The agencies responsible for issuing permits, however, should ensure that they have clear rules and procedures for issuing permits in a timely manner.

With respect to any jurisdiction issues that may arise involving vegetation management, it is important that state and federal regulators continue to coordinate so that jurisdictional considerations do not impede effective vegetation management.

³ A right-of-way is a segment of land used for the route of a transmission line. A right-of-way should be devoid of vegetation that can interfere with a transmission line. The right-of-way width is the distance between the outer bounds of a right-of-way.

⁴ The vertical distance between a tree or vegetation and an electric transmission wire.

⁵ The time between complete inspections of a utility's transmission system, *e.g.*, semiannual, annual, etc.

⁶ The guidelines that utilities report they adhere to in regards to the management of vegetation along transmission lines.

The Commission believes that better coordination among federal agencies and between the federal and state governments to develop clear, consistent policies and procedures for timely and effective vegetation management by transmission owners could help to alleviate many real and perceived obstacles to proper vegetation management.

The transmission owners reported that vegetation management approvals on federally managed rights-of-way are particularly problematic in the Western United States. The Council on Environmental Quality (CEQ) coordinates federal environmental efforts and helps resolve inter-agency differences over environmental issues. The Commission believes federal agencies and the CEQ should work together on vegetation management on federal rights-of-way. In addition, the CEQ could facilitate coordination with Native American tribes for vegetation management on Native American tribal lands. We understand that vegetation management practices affect the environment and look forward to working with other agencies to coordinate efforts to assure that neither the environmental quality of federal lands nor regional electric reliability are put at risk.

Summary of Recommendations

- 1) The United States Congress should enact legislation to make reliability standards mandatory and enforceable under federal oversight.
- 2) Effective transmission vegetation management requires clear, unambiguous, enforceable standards that adequately describe actions necessary by each responsible party.
- 3) With respect to any jurisdiction issues that may arise involving vegetation management, it is important that state and federal regulators continue to coordinate so that jurisdictional considerations do not impede effective vegetation management.
- 4) Federal and state regulators should allow reasonable recovery for the costs of vegetation management expenses.
- 5) While permitting and environmental requirements properly protect public lands, the procedures implementing those protections may be inconsistent and time-consuming and have the potential to significantly hinder transmission vegetation management. The Commission should work with the CEQ and land management agencies to better coordinate these requirements.
- 6) Federal, state and local land managers should develop “rush” procedures and emergency exemptions to allow utilities to correct “danger” trees⁷ that threaten transmission lines, from both on and off documented rights-of-way.

⁷ A danger tree is a tree that is dead or dying and has the potential to fall into a

- 7) Five-year vegetation management cycles should be shortened, and the Commission and states should look at the cost-effectiveness of more aggressive vegetation management practices.
- 8) Transmission owners should fully exercise their easement rights for vegetation management and better anticipate and manage the permitting process for scheduled vegetation management.
- 9) Variances in vegetation management practices may be resolved in the NERC vegetation management standard development process; if they are not, the Commission may seek to convene the industry, states and other stakeholders to address the remaining issues.
- 10) State regulators and the utility industry should work through NARUC, the National Conference of State Legislators, and other organizations to help state and local officials better understand and address transmission vegetation management.

Introduction

On August 14, 2003, an electric power blackout occurred over large portions of the Northeast and Midwest United States and Ontario, Canada. The blackout lasted up to two days in some areas of the United States and longer in some areas of Canada. It affected an area with over 50 million people and 61,800 megawatts of electric load. In the wake of the blackout, a joint U.S.-Canada Task Force (Task Force) undertook a study of the causes of that blackout and possible solutions to avoid future such blackouts. The Task Force's Final Report was issued on April 5, 2004.

The Task Force identified FirstEnergy Corporation's (FirstEnergy) failure to adequately prune trees and manage vegetation in its transmission rights-of-way as one of the four primary causes of the August 14, 2003 blackout.⁸ The blackout investigation explained that, during the hour before the cascading blackout occurred, three FirstEnergy 345 kV transmission lines failed as a result of contact between the lines and overgrown vegetation that encroached into the required clearance zone for the lines.⁹ It stated that "because the trees were so tall . . . each of these [three] lines faulted under system conditions well within specified operating parameters."¹⁰

right-of-way close to a line.

⁸ Final Blackout Report at 20.

⁹ *Id.* at 57-67.

¹⁰ *Id.* at 58.

The Final Blackout Report also compared the August 2003 blackout with seven previous major outages and concluded that conductor contact with trees was a common factor among the outages.¹¹ The Task Force emphasized that vegetation management is critical, and that many outages can be prevented by managing vegetation before it becomes a problem.¹² It also noted that investigation reports from previous major outages recommended paying special attention to the condition of vegetation on rights-of-way and the need for preventative maintenance in this area.

In March 2004, the Commission made available to the public a 128-page vegetation management report, prepared to support the blackout investigation.¹³ The report details problems with vegetation management relating to the August 2003 blackout, and the impact of vegetation management on electric reliability. The report concludes that the August 2003 blackout likely would not have occurred had the rights-of-way been maintained for three 345 kV transmission lines that tripped due to tree-line contacts.¹⁴ It also concludes that utilities responsible for the right-of-way maintenance had in place vegetation management programs that were in line with current industry norms. Further, it concludes that current industry “standards” are inadequate and must be improved. The CNUC Final Vegetation Report recommends specific practices that would reduce the likelihood of tree and power line contacts and provides recommendations for the oversight and enforcement of utility vegetation management activities.

On April 19, 2004, the Commission issued the Vegetation Management Order requiring all entities that own, control or operate designated electric transmission facilities in the lower 48 states to provide information on their vegetation management practices. This order was issued pursuant to section 311 of the Federal Power Act, 16 U.S.C. § 825j (2000) which authorizes the Commission to conduct investigations in order to secure information necessary or appropriate as a basis for recommending legislation.

The Commission ordered that designated transmission owners describe in detail the practices and standards that the transmission owner uses for control of vegetation near designated transmission facilities, and indicate the source of any standard utilized (*e.g.* state law or regulation, historical practice). In addition, transmission owners were asked

¹¹ *Id.* at 107.

¹² *Id.* at 59.

¹³ CN Utility Consulting, Utility Vegetation Management Final Report, (March 2004) (CNUC Final Vegetation Report). The CNUC Final Vegetation Report is available on the Internet at www.ferc.gov/cust-protect/moi/blackout.asp.

¹⁴ *Id.* at 26-27.

to describe the clearance assumptions or definition used for the appropriate distance between vegetation and the facilities, how often the transmission provider inspects that facility for vegetation management purposes, whether identified remediation has been completed as of June 14, 2004, and any factors that the respondent believes prevents, or unduly delays, the performance of adequate vegetation management.¹⁵

This report analyzes the information gathered pursuant to the Vegetation Management Order, provides relevant additional information regarding the current status of vegetation management practices, and offers a recommendation for Congressional consideration.

Review and Analysis Method

The Commission received 161 responses from transmission owners.¹⁶ On June 21-22, 2004, Commission staff, along with three state commissioners, Connie Hughes of New Jersey, Don Mason of Ohio, and Judith Ripley of Indiana, representing the leadership of the NARUC ad-hoc Committee on Critical Infrastructure, performed an initial review of the vegetation management responses.¹⁷ This initial two-day review was intended to identify any immediate issues that could potentially impact electric grid reliability requiring rapid follow up by state or federal regulators. In addition, it looked for progress made since the blackout of the previous year, fact patterns suggesting additional inquiry is required, and a general overview of current vegetation management practices. The initial review was followed up by a more intensive Commission staff data analysis. This analysis included the creation of a database that tracked:

- all respondents' right-of-way width maintained in feet by voltage,
- vertical line clearance in feet by voltage,
- ground and aerial inspection frequency,
- vegetation management cycle,¹⁸ and
- vegetation management guidelines utilized, if any.

¹⁵ Vegetation Management Order at P 12.

¹⁶ Some respondents provided responses on behalf of multiple operating companies or multiple transmission owners.

¹⁷ Edison Electric Institute (EEI) prepared templates for its members to use in filing the requested data. Many EEI members used these templates. The templates made it easier for Commission staff to review the filings.

¹⁸ The period of time required for a utility to perform maintenance including the pruning of all vegetation and the removal of all vegetation of concern on its entire transmission system.

Commission staff reviewed the data in the five categories above and looked for patterns in vegetation management practices.¹⁹

Findings

The majority of respondents have completed necessary vegetation management remediation measures identified during the most recent inspection of their transmission lines. While this does not guarantee that there will not be adverse impact to grid reliability caused by vegetation interfering with transmission lines, it is a positive indication of reduced risk to reliability. However, 29 percent of respondents identified some line vegetation management remediation that was not completed by the June 17 filing date and may not be performed this summer.²⁰ A list of these respondents is provided in Attachment A. The results suggest that a significant amount of the remediation occurred between April 19, 2004 and June 14, 2004.

Utility vegetation management practices vary significantly. While some variation is expected because vegetation management practices are affected by climate, terrain, vegetation species, local laws, and regulations, other variations are unexplained. Below is a discussion of reported data on right-of-way width, vertical clearances, inspection frequency, vegetation management cycles, and vegetation management guidelines followed. Some of these variations may be resolved in the NERC vegetation management standard development process;²¹ if they are not, the Commission may seek to convene the industry, states and other stakeholders to address the remaining issues.

1. Right-of-way Width

¹⁹ In their filings, certain respondents asked for and were granted protection regarding specific transmission line information under the Commission's Critical Energy Infrastructure Information (CEII) policy. CEII is information concerning proposed or existing critical infrastructure (physical or virtual) that relates to the production, generation, transmission or distribution of energy. While this report does not disclose any specific CEII data, the Commission's conclusions reflect its review of such data.

²⁰ In some instances, the transmission owner/operator reported that remediation before the summer was not needed and would be completed as part of the regular vegetation management cycles later in the year. In other instances, the respondent states that there is no immediate threat to the line. Some stated that the work would be completed shortly after June 17 or as soon as possible. In at least one case, the required work was pending reaching agreement with a landowner.

²¹ NERC recently initiated a vegetation management standard development process. See ftp://www.nerc.com/pub/sys/all_updl/docs/bot/Agenda-Items-0604/Item12e.pdf.

Right-of-way widths vary significantly among the reporting transmission owners. Generally, right-of-way width increases as line voltage increases. Higher voltage lines require wider rights-of-way because greater separation is needed between conductors. Wider right-of-way widths are also necessary to accommodate multiple lines and in some cases more than one tower. Since right-of-way width depends on many factors, and since some respondents provided ranges that depend on such factors as the number of circuits on a right-of-way, no pattern was identified from the data on the range of right-of-way widths. Table 1 shows the range of responses by voltage class.

Table 1. Right-of-Way Width

Right-of-Way Width							
500 kV		345 kV		230 kV		Less than 230 kV	
Minimum Width (ft)	# of Companies	Minimum Width (ft)	# of Companies	Minimum Width (ft)	# of Companies	Minimum Width (ft)	# of Companies
Less than 125	4	Less than 75	6	Less than 75	40	Less than 50	51
126-175	21	76-125	36	76-125	36	51-125	41
176 >	13	126 >	30	126 >	30	126 >	7

In general, if a utility has a wider right-of-way, well documented right-of-way easement rights, and exercises those rights fully, it will be more successful in avoiding vegetation-line contact than a utility that maintains narrower rights-of-way. A narrow right-of-way increases the risk of contact with vegetation that is outside of the right-of-way and adjacent to the transmission line. Expert commentary included in the CNUC Final Vegetation Report stated, “[m]ost tree/power line contacts occur when trees fall onto lines from outside the rights-of-ways or corridors. Many utilities are slow to act to address this issue due to the perception of increased costs and the pressure from landowners etc. to leave trees standing.”²²

2. Inspection Frequency

Vegetation management inspections are performed to inspect the status of vegetation and the rights-of-way surrounding electric transmission facilities. During these inspections, vegetation of concern is noted and scheduled for remediation. Typically, a utility will utilize a combination of aerial and ground inspections. Ground inspections are performed by walking or driving the length of transmission lines to inspect the condition of vegetation. While slow, ground inspections may be more effective because they enable an inspector to more thoroughly view vegetation conditions and the relationship between vegetation and the wire. Aerial inspections are performed using aircraft (a helicopter or a small plane flying at low altitude) to visually inspect the

²² CNUC Final Vegetation Report at 115.

condition of vegetation. Given the greater distance from the vegetation and the speed of aerial inspection, it is considered to be less reliable and thorough than ground inspection.

Annual, semi-annual, or more frequent aerial patrols are part of the transmission inspection practice of 105 utilities, twenty-five of which conduct aerial inspections more frequently than twice a year. Table 2 summarizes the responses.

Table 2. Aerial Inspection Frequency

Aerial Inspection	
Frequency	# of Companies
More than twice a year	25
Semi-annual	34
Annual	46
Biennial	6
Every 3 years	1
> than 3 Years	3
As Needed	8
Did Not Report	38

Most transmission owners use aerial patrols to identify areas that need remediation or areas that will need remediation soon. Aerial inspections are followed by additional ground inspection or remediation.

Over 100 respondents indicate that they conduct annual or more frequent ground inspections of their entire system. Ground patrols are more effective in identifying vegetation-related problems.²³ Table 3 summarizes the responses.

²³ CNUC Final Vegetation Report at 49.

Table 3. Ground Inspection Frequency

Ground Inspection	
Frequency	# of Companies
More than twice a year	7
Semi-annual	22
Annual	76
Biennial	6
Every 3 years	6
> than 3 Years	25
As Needed	12
Did Not Report	7

As with right-of-way width, patrol frequency and method varies significantly among reporting utilities. This could be due to the variation in the number of transmission circuit miles owned or operated by the utility, terrain, and vegetation characteristics.

3. Vertical Clearance

Vertical clearance is the distance between a wire and the vegetation directly below it.²⁴ The minimum vertical clearance requirement increases by line voltage (although some transmission owners reported the same vertical clearance for all voltage classes). The maintenance of sufficient vertical distance between the conductor and vegetation is essential because direct physical contact is not necessary for a line outage to occur. An electric arc can occur between a part of a tree and a nearby high-voltage conductor without sufficient clearance.²⁵ These electric arcs can cause fires and line outages. Vegetation management practices should maintain a minimum vertical clearance between a line and a tree. The pruning should create clearances with a healthy safety margin beyond the minimum required clearance that will last until the next scheduled pruning or treatment. Table 4 shows vertical clearances used by reporting utilities.

²⁴ Vegetation can interfere with power lines from below, sides, and above and appropriate clearance must be maintained all around the wire. This section discusses vertical line clearance as an example of the variation among utilities in maintaining line clearances.

²⁵ In effect, electricity on a transmission wire can “jump” a very short distance from the wire to tree limbs without direct contact, creating a short circuit that can lead to a line outage.

Table 4. Vertical Clearances Reported

Vertical Clearance Table							
500 kV		345 kV		230 kV		Less than 230 kV	
Clearance (ft)	# of Companies	Clearance (ft)	# of Companies	Clearance (ft)	# of Companies	Clearance (ft)	# of Companies
0-15	11	0-15	17	0-10	23	0-10	16
16-20	11	16-20	17	11-15	17	11-15	20
21-25	9	21-25	12	16-20	24	16-20	14
26>	8	26 >	14	21-25	16	21-25	3
				26 >	13	26 >	5

There is no apparent rationale for the wide variance in vertical clearance requirements.²⁶ The current industry effort through NERC to develop a vegetation management standard should resolve this issue.

4. Vegetation Management Cycle

A vegetation management cycle is loosely defined as the time it takes to complete the pruning and removal of trees or other vegetation on a utility's entire transmission system. In most cases, a utility prunes or treats a portion of its total circuit-miles of right-of-way in each year; once the circuit is completed, the company starts the cycle over. The Vegetation Management Order did not formally request this information, but the CNUC Final Vegetation Report found that a five-year cycle is the industry norm. Furthermore, the report found that the five-year cycle is insufficient to maintain reliability.

Of the 70 respondents that volunteered their vegetation management cycles, many indicate that they prune and remove vegetation along their lines within a five-year or longer interval.²⁷ Table 5 summarizes the responses.

²⁶ There could have been varying interpretations of the reporting requirement (*e.g.*, clearance achieved at the time of pruning vs. minimum clearance maintained). However, the EEI templates used by a large number of respondents instructed that "minimum clearance maintained between conductor and vegetation" be reported.

²⁷ A five-year cycle is consistent with the industry practice; however, common or average industry practices need improvement. Final Blackout Report at 59.

Table 5. Pruning Cycle

Pruning Cycle	
Frequency	# of Companies
0-2 years	11
3-4 years	35
5 or More years	24

In the future, the Commission and the industry should work to identify the correlation between vegetation management practices and actual vegetation-caused transmission line outages.

When managing vegetation, 93 companies employ herbicides to limit vegetation growth; others use mechanical techniques to cut vegetation on rights-of-way; and some use a combination of both.²⁸

5. Current Vegetation Management Guidelines

Establishing clear, unambiguous standards pertaining to maintenance of safe clearances of transmission lines from obstructions in rights-of-way was one of the recommendations of the Final Blackout Report.²⁹ The vast majority of transmission owners report that they follow the National Electrical Safety Code (NESC) rules or American National Standards Institute (ANSI) guidelines, or both when managing vegetation around transmission lines. The NESC deals with electric safety rules, including transmission wire clearance standards, while the applicable ANSI code deals with the practice of pruning and removal of vegetation. However, these rules and guidelines are not specific with regard to clearances between transmission lines and vegetation and are subject to interpretation. Nor do these rules provide a performance target for keeping vegetation from conflicting with transmission lines. Furthermore, these standards are not enforceable upon transmission owners, but have been adopted by NESC and ANSI as guidelines for appropriate practice.

- 104 utilities indicate that they adhere to NESC standards for transmission system maintenance.
- 92 of these specifically adhere to NESC Rule 218, which only provides that

²⁸ Mechanical and chemical techniques are not mutually exclusive in general. Rather, mechanically clearing, *e.g.* with a bushhog, might take place followed by treatment with herbicide to retard regrowth.

²⁹ Final Blackout Report at 154.

trees that may interfere with conductors should be trimmed or removed. NESC Rule 218 does not prescribe clearances.

- 12 reported that they specifically follow NESC Rule 232, 233 or 234 which prescribes clearances of wires from ground, structures, and other installations.
- 34 respondents follow ANSI A300, which deals with proper tree pruning techniques to maintain the health of the tree, and does not contain any clearance requirements.
- ANSI Z133, used by 22 transmission owners, provides guidelines for utilities related to worker and public safety during tree pruning and removal operations.
- A large number of respondents adhere to NESC standards in conjunction with ANSI standards such as A300.
- 96 transmission owners report that they use internally-developed, state, or other guidelines.

Respondents did not explain why they follow a particular standard. As stated earlier, NERC is in the process of developing a vegetation management standard that may resolve the current lack of a clear, unambiguous standard.

Good Practices

The CNUC Final Vegetation Report identified a number of good utility vegetation management practices. Among these good practices for existing rights-of-way are:

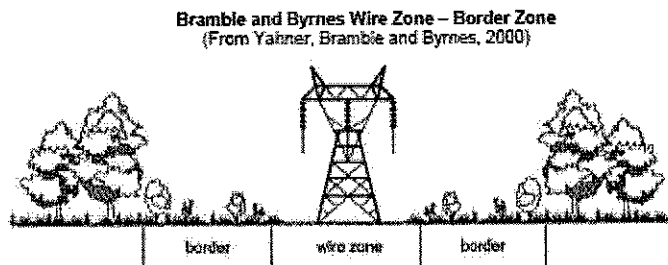
- Application of wire zone – border zone concepts (described below)
- Proper consideration of line sag and sway
- Frequent field inspection of vegetation conditions
- Comprehensive public education programs

In reviewing the filings, Commission identified a number of utilities that report practices consistent with the best practices identified in the CNUC Final Vegetation Report. Some examples follow.

One good practice relates to customer education. For example, some utilities have public outreach programs that educate the public about tree types and line clearances so that citizens will have the knowledge to report vegetation that is dangerous to transmission wires.

Several transmission owners employ a wire zone – border zone approach which is both environmentally friendly and effective in ensuring reliability. This method involves creating a low-growing vegetation environment directly under transmission lines, which physically prevents dangerous vegetation from encroaching into energized transmission facilities. The CNUC Final Vegetation Report stated that the wire zone-border zone has

“been proven to be effective in reducing and/or eliminating outages related to vegetation on transmission ROW [rights of way].”³⁰ The wire zone-border zone concept is depicted in the graphic below.



Several companies have taken measures to improve vegetation management-related reliability. Certain utilities, for example, conduct frequent ground and aerial patrols, as well as an inspection of all of its power lines after every major storm.

Reported Obstacles to Effective Vegetation Management

In trying to understand the state of the industry’s vegetation management programs, the Vegetation Management Order sought information on factors that the utilities believe prevent or unduly delay their performance of adequate vegetation management. Sixty-six utilities report that their efforts to properly maintain their transmission lines are impeded by a variety of federal and state regulations that legally or practically prevent them from performing effective vegetation management. While such ordinances can be problematic and hinder the vegetation management process, proper planning and foresight on the part of the utilities, including allowances for additional lead time, would likely reduce the threat to vegetation management caused by some ordinances.

³⁰ CNUC Final Vegetation Report at 21.

List of Reported Obstacles	
Reported Obstacles	Responses
U.S. Forest Service	22
U.S. Fish and Wildlife Service	12
National Park Service	6
Departments of Transportation	6
Other Federal/State/Local Governments	35
Private Landowners	20
Other	10

No transmission owners complained of the financial costs of vegetation management.

In many instances, a situation may arise in which a transmission owner is not able to plan for vegetation management. For example, trees can become hazardous to a line suddenly, as when a tree is dead or dying and has the potential to fall into a right-of-way and impact a line. These are a risk to reliability as long as the situation is not corrected, and so must be dealt with on a priority basis. Many transmission owners reported that the permitting processes can impede action necessary to properly manage situations such as this.

The conflicting goals and requirements for environmental protection and electric reliability create practical problems for vegetation management. Transmission owners cite federal regulations and their enforcement programs most frequently as impeding their ability to properly manage the vegetation within transmission line rights-of-way.³¹ Twenty-two transmission owners cited U.S. Forest Service (Forest Service) restrictions on transmission owners across the country. They state that the Forest Service requires impact studies on wildlife and habitat impacts, requires environmental impact assessments, and limits the use of access roads to transmission rights-of-way and has inconsistent permitting procedures across the National Forests. In addition, twelve utilities claim that the U.S. Fish and Wildlife Service restricts the times at which trees can be pruned and limits herbicide use in order to maintain endangered species habitats. If

³¹ Some of the land management agencies have already begun streamlining their permitting processes. For example, the Forest Service began overhauling its permitting and environmental review process over a year ago. These changes should reduce the impact of permitting on vegetation management.

herbicide use is limited, many manually or mechanically removed trees can re-sprout and quickly grow back into power lines. Utilities also report that the various state Departments of Transportation had restricted tree pruning and removal in the name of “beautification” efforts. Otter Tail Power reports that the U.S. Department of Transportation, the U.S. Fish and Wildlife Service, and the Department of Natural Resources have repeatedly planted trees in its rights-of-way.

Several companies stated that state government organizations had taken action that they believed hindered their reliability programs as well. For instance, PacifiCorp reports that the Utah Department of Transportation had planted trees directly under several of its 345 kV transmission lines and would not allow them to be pruned. The New York State Department of Environmental Conservation requires transmission owners to file “Temporary Revocable Permits” that take up to two years to process for transmission owners to get access to trees that need to be managed.

Respondents also claim that a variety of local regulations and property owners prevent effective vegetation management. One of the most frequent claims is local and private entities limit the use of herbicides and the removal of trees. Some local park restrictions hinder trucks from accessing power lines. Native American tribes are sovereign and can restrict transmission owners in numerous ways when transmission rights-of-way pass through tribal land. For many utilities, attempting to manage numerous local and private restrictions can be extremely burdensome and can result in failure to conduct effective vegetation management. For example, the outage that occurred on Cinergy’s 345 kV Columbus – Bedford line on August 14, 2003 was due to a property owner’s refusal to allow Cinergy to complete the required work.³² Cinergy had documented rights at the location but work was halted due to a court-granted temporary injunction obtained by the property owner.

Need For Legislation

Ineffective vegetation management was a major cause of the August 14, 2003 blackout and a contributing factor to other large-scale blackouts. The U.S.-Canada Task Force found that clear, unambiguous, and enforceable standards are needed to reduce the potential for reoccurrence of vegetation related transmission line outages and recommended that NERC, in cooperation with the industry and the appropriate governmental agencies, develop such a standard.³³ The Commission’s review of the responses submitted confirms a lack of common standards and significant variations among utilities in their vegetation management practices.

³² CNUC Final Vegetation Report at 36.

³³ Final Blackout Report at 154.

NERC recently initiated a vegetation management standard development process. The Commission supports NERC's initiative to develop a clear, unambiguous vegetation management standard. However, adherence to NERC standards will be voluntary unless Congress enacts legislation with a clear federal framework for mandating development and enforcement of this and other reliability rules.

Recommendations

The following recommendations are based on the information received in response to the Vegetation Management Order. The Commission has also drawn from the Blackout Report and the CNUC Final Vegetation Report. These recommendations were developed in collaborative discussions between the Commission staff and the state commissioners who participated in the initial review.

- 1) The United States Congress should enact legislation to establish an Electric Reliability Organization and make its standards mandatory and enforceable, under federal oversight. Under such legislation, if the Commission were to approve a NERC standard, then it would be mandatory and enforceable for all transmission owners and operators. Mandatory, enforceable standards will result in greater compliance and, therefore reduce the likelihood of individual transmission line outages due to tree contacts, electric arcing, and fires, and thus improve local and regional grid reliability.
- 2) Effective transmission vegetation management requires clear, unambiguous, enforceable standards that adequately describe the actions necessary by each responsible party. The NERC standard now being developed should serve this purpose. We recognize that the details of such standards must respect differing vegetative, climate, terrain, and other considerations, and thus may need to balance between results required and detailed prescriptions for how to manage vegetation, so it will be challenging to develop a clear, effective standard. But it must be done, and done as quickly as possible to assure that the nation's customers and economy do not remain at risk to this known reliability threat.
- 3) With respect to any jurisdiction issues that may arise involving vegetation management, it is important that state and federal regulators continue to coordinate so that jurisdictional considerations do not impede effective vegetation management.
- 4) As noted above, no reporting utility suggests that lack of financial resources or recovery of vegetation management expenses is an obstacle to the achievement of vegetation management goals. Nevertheless, both federal and state regulators should be sensitive to requests for rate adjustments in order to recover reasonable reliability and security related expenses such as those for vegetation management.³⁴

³⁴ See, e.g., Policy Statement on Matters Related to Bulk System Reliability, 107

5) The Commission should work with the CEQ and the federal land management agencies to streamline and better coordinate permitting and environmental requirements to facilitate better vegetation management without compromising environmental quality. While it is entirely appropriate that federal and state land managers protect the lands for which they have responsibility, the costs and consequences of vegetation-caused outages or blackouts are so high that agencies should reexamine these processes and requirements to see whether they need to be reformed. The Commission commits to work with the CEQ and other federal land management agencies on such an effort. Additionally, the CEQ could facilitate coordination with Native American Tribes for vegetation management on Native American tribal lands.

6) Outages are often caused by trees that become hazardous to a line, as when a tree is dead or dying and has the potential to fall into a right-of-way and impact a line. These are a risk to reliability as long as the situation is not corrected, and so must be dealt with on a priority basis. State, local and federal land managers should recognize the importance of this situation and should develop priority or rush procedures to allow the utility to take prompt corrective action to mitigate these “danger” trees.

7) Since numerous recent major blackouts have been caused by tree contacts with transmission lines, and the August 14, 2003 blackout was caused by trees that were managed on a five-year vegetation management cycle, the CNUC Final Vegetation Report concluded that a five-year cycle, while the industry norm, is not effective nor adequate for assuring transmission reliability across much of North America. For that reason, a shorter cycle should be used. While this and other enhanced vegetation management requirements suggested herein may increase utility costs, given the substantial and perhaps growing costs of reliability failures of the modern grid, the Commission and the states should encourage cost-benefit studies to examine the relative costs and benefits of current and more aggressive vegetation management practices.

8) Transmission owners should work to remove the obstacles to effective vegetation management along transmission rights-of-way. This should include, at minimum:

- Whenever possible, renegotiation of easement provisions where they do not grant adequate clearance and vegetation management rights.
- Full exercise of all existing easement provisions and rights to assure adequate tree-pruning and clearing.
- Where landowners or land managers have established lengthy permitting requirements or time-limited vegetation management operational windows, planning ahead to assure that the transmission owner or operator secures the

needed permissions in a timely and predictable fashion.

9) Variances in vegetation management practices may be resolved in the North American Electric Reliability Council (NERC) vegetation management standard development process; if they are not, the Commission may seek to convene the industry, states and other stakeholders to address the remaining.

10) State regulators and the utility industry should approach NARUC, National Conference of State Legislators, and similar organizations to develop model guidelines and educational materials that can be used to help state and local officials understand the importance of this issue and how to manage it more effectively, through measures such as tree-pruning and tree-planting ordinances. If state legislation or changed agency rules are needed, utilities and state utility regulators should take the lead within each state to initiate the communications and cooperative discussions required. The Commission would support this effort, if requested.

Attachment A

Companies that did not perform all identified vegetation management remediation by the June 14, 2004 reporting date

- American Transmission Co.
- Aquila, Inc.
- Austin Energy
- Basin Electric Power Cooperative
- Black Hills Power, Inc.
- Carolina Power and Light Co.
- Central Hudson Gas and Electric Corp.
- Central Louisiana Electric Company, Inc.
- City of Tallahassee Electric Utility
- Consolidated Edison Company of New York, Inc.
- Dairyland Power Cooperative
- Entergy Corp.
- Georgia Transmission Corp.
- Indiana-Kentucky Electric Corporation
- International Transmission Co.
- Lakeland Electric
- Louisville Gas & Electric Co.
- Lower Colorado River Authority Transmission Services Corp.
- Montana-Dakota Utilities Co.
- Municipal Electric Authority of Georgia
- Nebraska Public Power District
- New York Power Authority
- NorthWestern Energy
- Nstar Electric and Gas Corp.
- Ohio Valley Electric Corp.
- Oklahoma Gas & Electric Co.
- PacifiCorp
- PPL Electric Utility Corp.
- Public Utility District No.1 of Chelan County
- Puget Sound Energy, Inc.
- Rappahannock Electric Cooperative
- Santee Cooper Power
- Seattle City Light
- Sierra Pacific Power Co.
- South Carolina Gas & Electric Co.
- South Texas Electric Cooperative, Inc.
- Texas Municipal Power Agency
- Tucson Electric Power Co.
- TXU Electric Delivery
- Western Area Power Administration
- Xcel Energy

In some instances, the transmission owner/operator reported that remediation before the summer was not needed and would be completed as part of the regular vegetation management cycles later in the year. In other instances, the respondent states that there is no immediate threat to the line. Some stated that the work would be completed shortly after June 17 or as soon as possible. In at least one case, the required work was pending reaching agreement with a landowner. On August 26, 2004, Dairyland Power Cooperative filed an update with the Commission stating that all remediation has been completed.

Attachment B

Primary Contributors

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