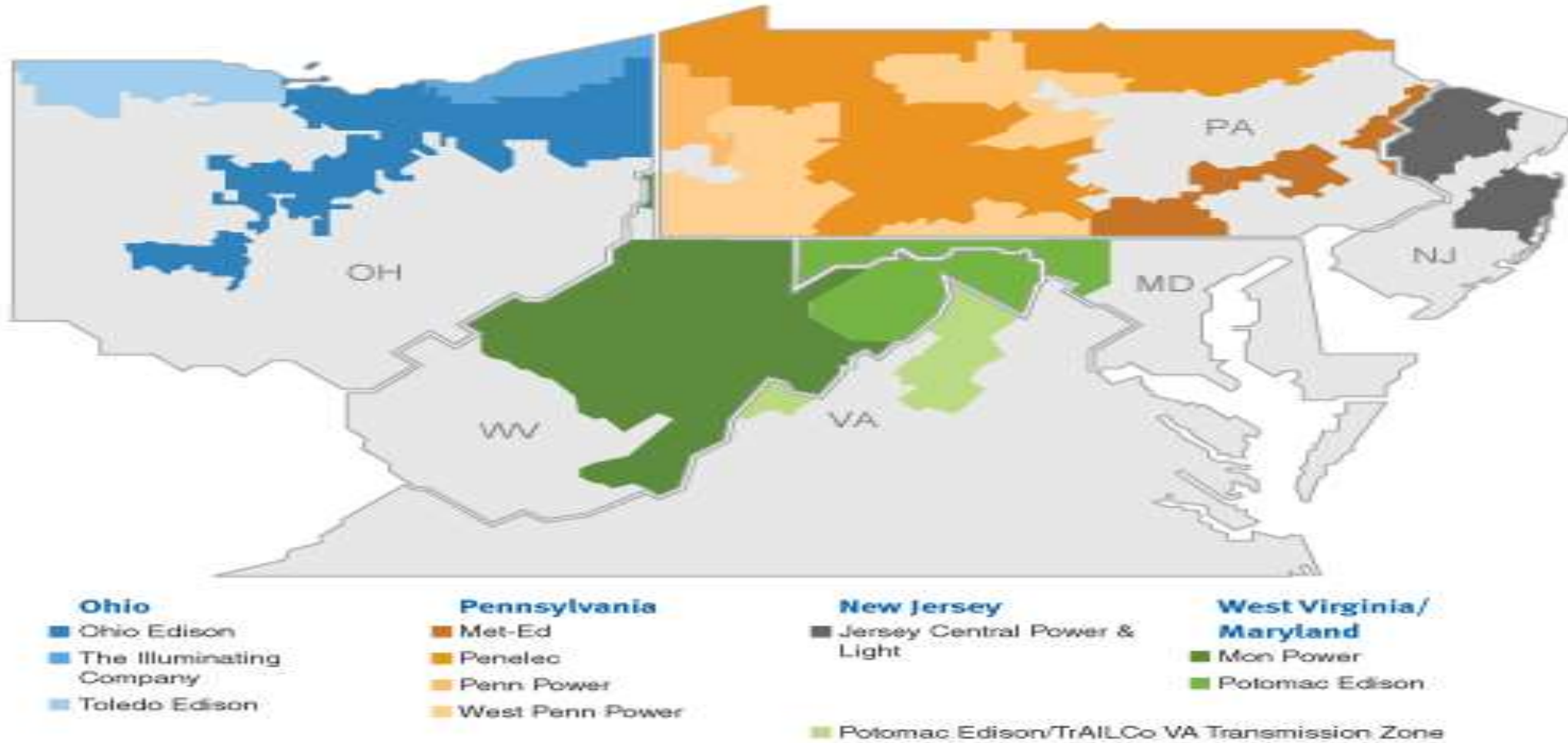


FirstEnergy / Potomac Edison Vegetation Management

Potomac Watershed Partnership Presentation



FirstEnergy Service Territory



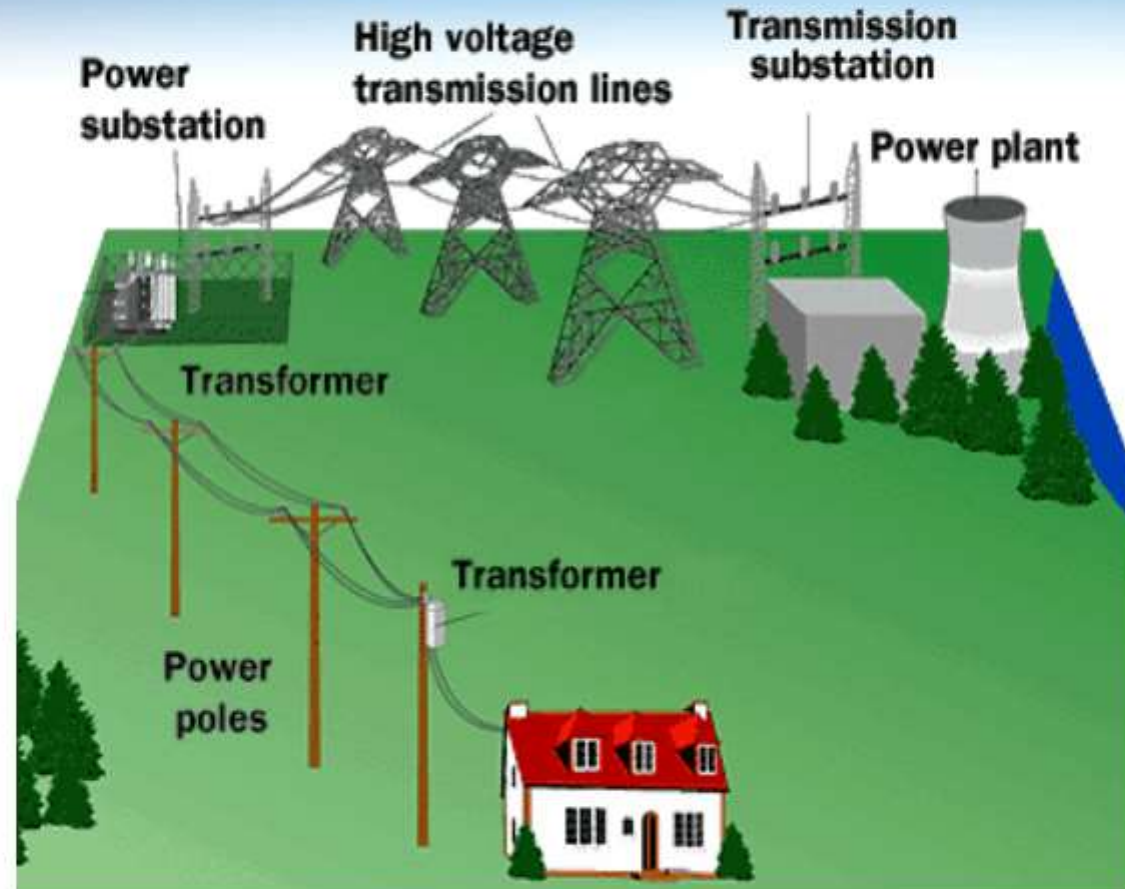
Transmission Forestry Vegetation Management Contact Information and Areas of Responsibility

- **Mark Contat – General Manager Transmission Forestry**
- **Charles Anderson - Manager Transmission Forestry**
- **Charles Brewer - Supervisor Transmission Forestry 717-765-2249**
- **Jake Fisher - Transmission Forestry Specialist 717-765-2255**
 - Frederick, Washington, Carroll, and Montgomery Counties
- **Ron Muir – Transmission Forestry Specialist 304-901-7825**
 - Frederick and Washington Counties
- **Justin Hunt - Transmission Forestry Specialist 724-255-9461**
 - Washington, Allegheny, and Garrett Counties

Distribution Forestry Vegetation Management Contact Information and Areas of Responsibility

- **Glenn McCann - Manager Distribution Forestry**
- **Ron Nichols - Supervisor Distribution Forestry** **304-901-7827**
- **Nolan Walck - Distribution Forestry Specialist** **301-694-4463**
 - Frederick, Washington, Carroll, and Montgomery Counties
- **Neil Wood - Distribution Forestry Specialist** **301-665-2790**
 - Washington County
- **Stephen Bouch – Distribution Forestry Specialist** **301-759-5728**
 - Washington, Allegheny, and Garrett Counties

Generation and Transmission



Transmission Facilities

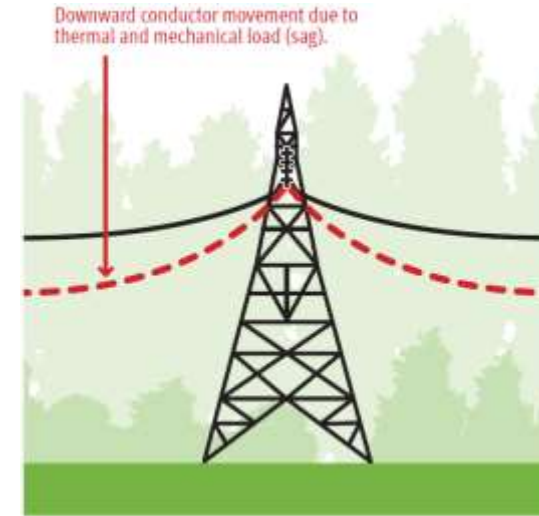
- **Transmission lines bring electricity to distribution substations and large customers like factories.**
- **FirstEnergy's transmission system includes lines ranging in size from 69,000 to 500,000 volts. The width of transmission line rights-of-way (ROW) vary according to the voltage of the lines and the easement rights that were negotiated with the property owner prior to the lines being constructed**
- **The transmission system across the United States is a large interconnected grid system. FirstEnergy/Potomac Edison transmission lines connect with other utilities in Maryland, PEPCO, Dominion, and BG&E.**
- **Transmission lines DO NOT have any “protection” devices along the line. So if a fault occurs anywhere along the line, that entire line may be out of service.**
- **Transmission lines are a “dynamic system” they move! Sag & Sway**

Typical Conductor Sag

- Typical Transmission Conductor Sag**

Summer Emergency Load

Note: Typical conductor movement factors such as transmission line voltage, the effects of ambient temperature on conductor sag under maximum design loading, the effects of wind velocities on conductor blowout, and environmental factors will affect actual conductor sag and sway.



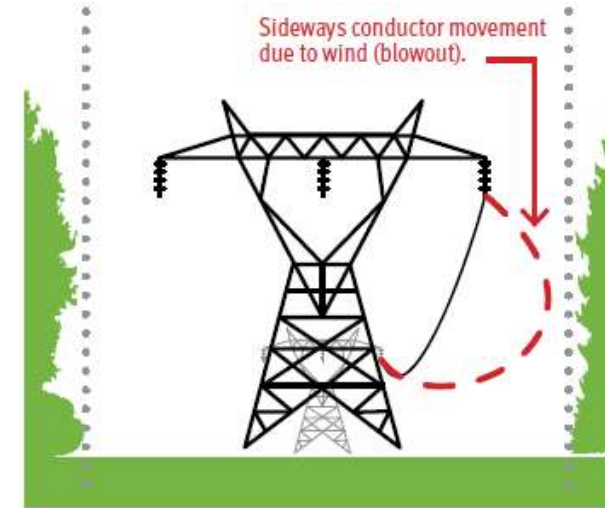
Span Length – Typical Conductor Sag (Difference between Min and Max Operating Conditions)										
Voltage (kV)	Min. NESC Ground Clearance (Feet)	800'	1,000'	1,200'	1,400'	1,600'	1,800'	2,000'	2,200'	2,400'
69	19.2'	8'	9'	10'	10'	10'	10'	10'	10'	10'
115	20.1'	8'	9'	10'	10'	12'	12'	12'	12'	12'
138	20.6'	8'	9'	10'	10'	12'	12'	12'	12'	12'
230	22.5'	8'	9'	11'	12'	12'	12'	12'	12'	12'
345	24.8'	12'	13'	14'	15'	15'	15'	15'	15'	15'
500	27.9'	16'	16'	17'	17'	18'	18'	18'	18'	18'

Typical Conductor Blowout

- Typical Transmission Conductor Sway

Summer Emergency Load

Note: Typical conductor movement factors such as transmission line voltage, the effects of ambient temperature on conductor sag under maximum design loading, the effects of wind velocities on conductor blowout, and environmental factors will affect actual conductor sag and sway.



Span Length - Typical Conductor Blowout (Difference between Min and Max Operating Conditions)

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69	19.2'	16'	25'	33'	45'	45'	45'	45'	45'	45'
115	20.1'	16'	25'	33'	45'	45'	56'	56'	56'	56'
138	20.6'	16'	25'	33'	45'	45'	56'	56'	56'	56'
230	22.5'	15'	20'	25'	33'	44'	56'	69'	80'	80'
345	24.8'	14'	17'	22'	30'	39'	50'	61'	75'	89'
500	27.9'	12'	12'	14'	20'	27'	34'	43'	53'	64'

Distribution Facilities

- **Potomac Edison distribution system is 34.5kV – 12kV.**
- **The distribution system is the direct feed to your house.**
- **Distribution line's DO have “protection” devices along them. Fuses, Re-closer's and Sectionalizers allow one section of line to be out of service if there is a fault while the rest of the line stays in operation. This can help reduce the number of customers affected during a storm event / outage.**
- **Generally speaking the distribution system is a “static” system. It experiences less conductor movement, limited sag and sway.**



Typical 500kV Structure

Typical 345kV or 500kV structure



2 common styles of 115 kV or 138kV structures

2 common styles of 138kV & 230kV Structures

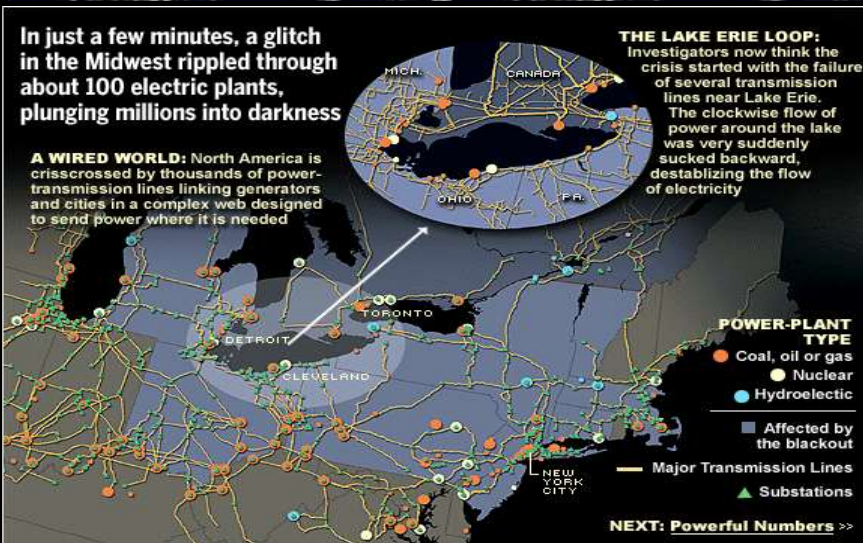
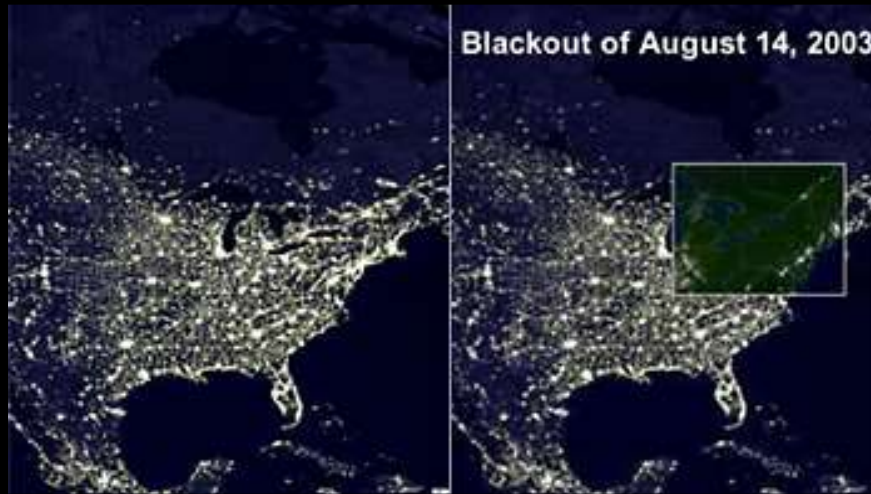
Example of what sub-
transmission 34.5kV may
look like





Typical Distribution Structures

In the Beginning...The Lights Went Out!



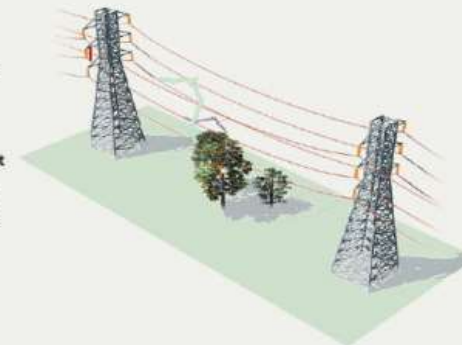
The trouble begins

For an unknown reason, a 345-kilovolt transmission line from the Harding substation in Cuyahoga County to the Chamberlin substation went out at 3:06 p.m. on Thursday, August 14, 2003.

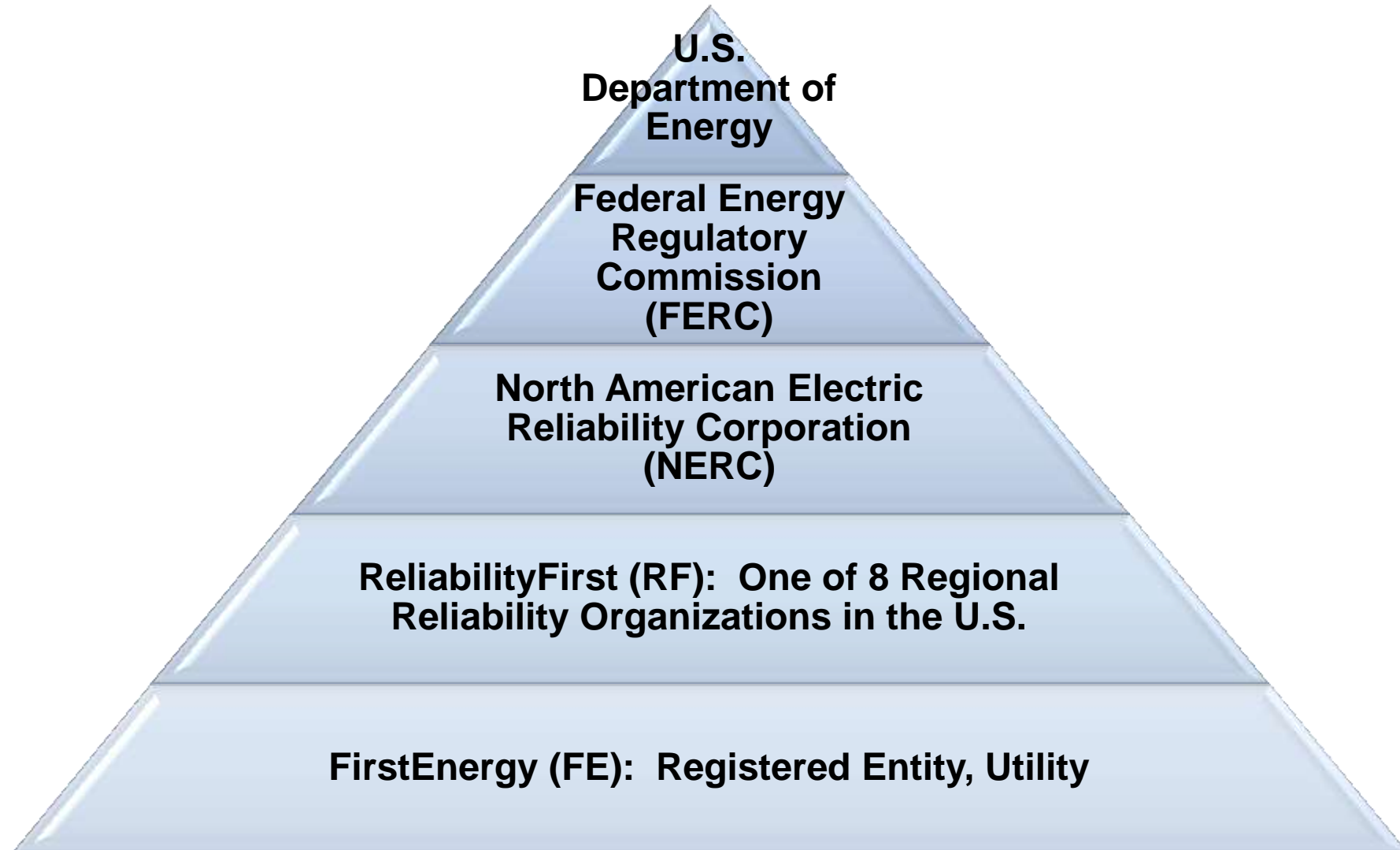


Cascading problems

Next, a 345-kilovolt transmission line from the Juniper substation to the Hanna substation sagged near a tree, arced and shorted out at 3:32 p.m. These failures set in motion a chain of events that led to the historic blackout.



Reporting Hierarchy



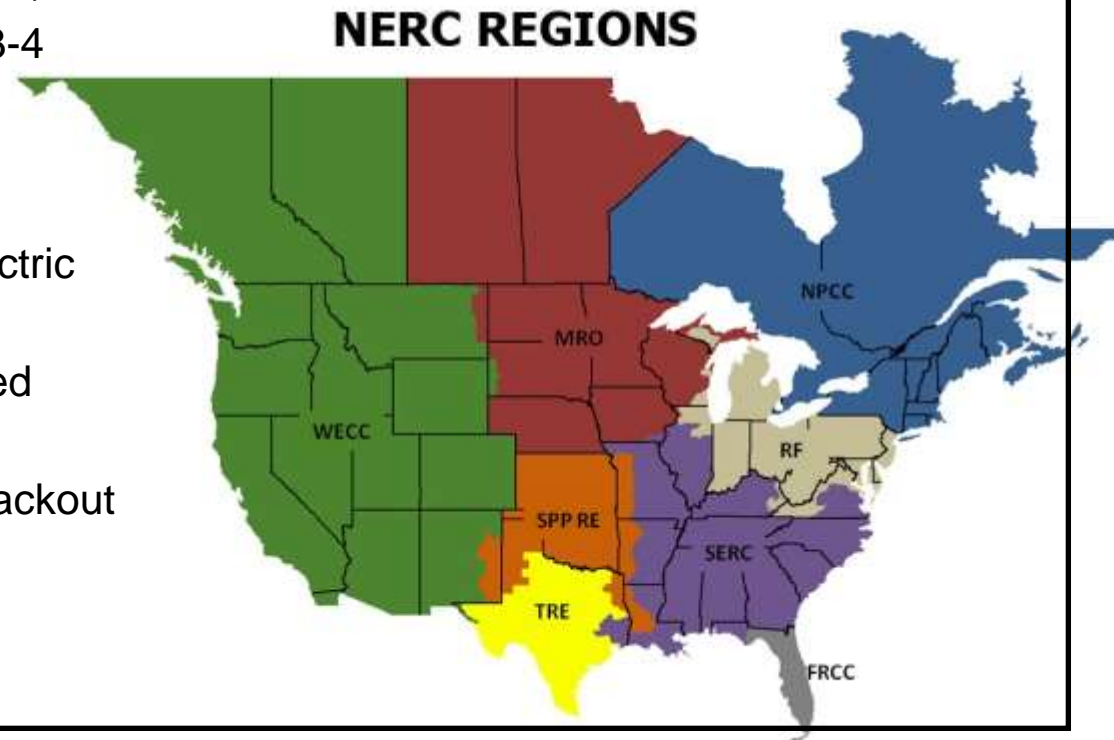
NERC Vegetation Management Standard

- **NERC Developed an Industry Vegetation Standard**

- Vegetation Maintenance falls under the FAC (Facilities Design, Connections and Maintenance)
- Current Standard is FAC-003-4

- **Purpose of the Standard**

- Improve Reliability of the Electric Systems
- Preventing Vegetation Related Outages
- Safeguard Against Future Blackout Events



FirstEnergy Experience

2010 Metropolitan Edison Self Report Vegetation Management Encroachment – No Outage

- 18 Months
- 1,600 pages Program Documents
- \$650,000 Fine
- Largest Sum Imposed to Date



COMAR 205012

- **It is the intent of the Commission that a utility engage in vegetation management programs that are necessary and appropriate to maintain safety and electric system reliability**
 - The standards set forth in this regulation shall constitute minimum vegetation management requirements applicable to utilities in the state, and are not intended to supercede or prohibit a utility's implementation of more aggressive vegetation management standards and practices.
 - This regulation applies to any electric transmission plant not regulated by the Federal Energy Regulatory Commission (FERC)

COMAR 205012

- **Each utility's vegetation management program shall address, at a minimum, all of the following activities:**
 - Tree pruning and removal
 - Manual, mechanical, or chemical vegetation management
 - Inspections of areas where vegetation management was performed
 - Cultural control practices
 - Public education regarding vegetation management practices
 - Public and customer notification
 - The voltage of the affected energized conductor, with higher voltages requiring larger clearances
 - The likely growth rate for each species of vegetation at the site
 - The potential movement of energized conductors and vegetation during various weather conditions

How these regulations have transformed our vegetation maintenance

■ **Increased staffing**

- Until 2008 Charlie Brewer was in charge of maintaining all transmission lines across MD, WV, PA and VA.

■ **Increased funding from our MGT / Company**

- Leads to more detailed work planning
- Completing all scheduled maintenance on a corridor

■ **Inspections:**

- 100% of all work performed is inspected annually. Both for Herbicide work and manual work
- Annual aerial patrols of all transmission voltages
- LiDAR
- Mid-cycle patrols
- Mitigation inspections

How these regulations have transformed our vegetation maintenance

- **Development of computer based software**
 - Assists in tracking completed and un-complete work
 - Provides detailed work planning information for crews in the field
 - Ability to highlight sensitive areas. i.e. state parks, property owners, etc
- **Training**
 - All employees and contractors are required to attend annual trainings
- **Herbicide program**
 - Closed Chain of Custody for herbicides
- **Enforcement of our easements**
 - Many times this involves the removal of trees via pruning.

Mission:

Ensure vegetation with the potential to interfere with electric transmission lines is managed to **prevent** outages from vegetation located on the transmission corridor and **minimize** outages from vegetation located adjacent to the transmission corridor to maintain safe and reliable operation of the electric transmission system.

Managing for a low growth plant community



Integrated Vegetation Management (IVM): Tools we use



IVM: Manual Tree Removals



IVM: Herbicide Application. HVF, LVF, LVB, Cut-stubble, and Aerial Applications



IVM: Mechanical Mowing



PA SGL 33 research and the wire zone / border zone concept

- **The PA SGL 33 research project began in 1953 in response to public concern-particularly from hunters-about the impact of vegetation MGT practices on wildlife habitat within electric transmission ROW's.**
- **Results of over 60 years of ecological research on these ROW's demonstrate that plant communities can be selectively managed to support reliable electric service and a diverse plant community for wildlife habitat.**
- **Wire Zone / Border Zone Concept: Where ROW conditions are suited, including ROW width, this is an approach that has been used on FirstEnergy ROW's.**
 - The zone located directly under transmission lines is managed for a plant community of grasses and forbs.
 - The zone located 15' from the outside conductor and extending to the ROW edge can consist of low growing shrubs.
 - There are times where border zone species must be selectively removed.

Example of Wire Zone/Border Zone



2007 SHS Line 230 kV

“Right Tree Right Place”

- **Does this apply to the electric system?**

- Depends on voltages, location, ROW conditions
- When in doubt contact us and we would be more than happy to work with you
- In Urban setting’s this can create concerns with the public. “why can they have a tree and I can not.”

- **I prefer the term “Right low growing shrub in the right place”**

- This helps to eliminate the potential for removal in the future.
- Also allows us to deliver a clear and consistent message when managing our ROW’s with the public.
- Again this is still going to be site specific. i.e. 99% of the time Forsythia would not be an issue. However I did have to remove a Forsythia hedge due to the voltage and poor clearance.

Managed Pollinator Protection Plans MP3's and our ROW's

- **The President has directed the EPA to engage state agencies in developing MP3's to mitigate risk to honey bees and other managed pollinators.**
- **FirstEnergy vegetation maintenance is very well suited to aid in pollinator habitat.**
 - Herbicide program is a key benefit to providing habitat.
 - Using herbicides to target specific vegetation result in power lines that are clear of tall, fast-growing vegetation, which will promote a low-growth plant community.



Transmission VS. Distribution Vegetation Maintenance

- **Both programs operate under the same principles “managing for a low growth plant community.”**
- **Transmission ROW’s are usually much larger / wider than distribution ROW’s.**
- **Incompatible vegetation located on the ROW is removed on transmission ROW’s. While on Distribution if removal can not be achieved then pruning will occur.**
- **Access paths are required on both, however Distribution access is of greater importance due to the amount of time linemen and crews are on the facilities.**
 - In instances where an access path is required low growing vegetation may need to be removed.

Working with the public our notification process

- **We make every attempt to notify customers of scheduled work on their property**
 - Certified mailing's
 - Personal notification
 - Newspaper ad's
- **Also we operate on various state and federal land which requires additional notification**
 - MD DNR properties
 - C&O Canal
 - PA state game lands
 - US fish and wildlife service

Safety Message: Potential results of Non Proactive approach



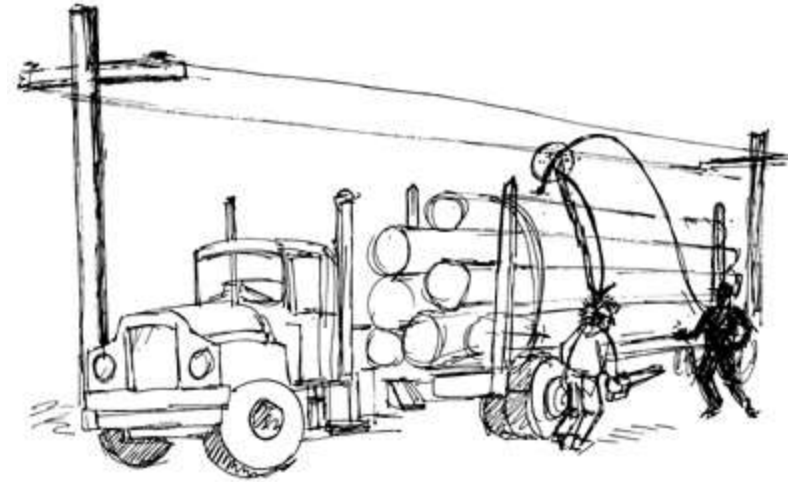
Safety Alerts

Online

LOGGER ELECTROCUTED
WHILE TRIMMING LOAD



©2005 National Timber
Harvesting and
Transportation Safety
Foundation



BACKGROUND: A logger was trimming knots from pine plylogs loaded on a log trailer one autumn afternoon in the South. The trailer was parked underneath a live 115,000-volt electric power line. The power line was 18 feet above the ground.

PERSONAL CHARACTERISTICS: The logger was a trained, experienced sawhand. The log truck driver was also trained and experienced.

UNSAFE ACT OR CONDITION: Despite specific instructions to the entire crew from the logging contractor to avoid parking log trucks under the power line, the truck driver parked his loaded log truck under the power line to secure the load with binders. The sawhand began trimming the logs while the driver started to bind the load with the combination chain and cable binding secured to a hand reel on the side of the trailer. While the sawhand was trimming, the driver threw the binder chains and cable over the power line.

ACCIDENT: Seeing that the metal binding was going to contact the power line, the driver shouted a warning to the sawhand. The chain saw noise prevented the sawhand from hearing the warning. The metal binding swung over the power line and contacted the metal trailer. The electric current arced from the trailer to the sawhand.

INJURY: The sawhand was killed instantly. The truck burst into flames, consuming the truck, trailer, and logs.

RECOMMENDATIONS FOR CORRECTION: Maintain all operations a safe operating distance (at least 50 feet) from power lines. Do not park any vehicle or machine underneath live power lines. Contact the power company if hazardous situations cannot be eliminated.

Crew members and truck drivers should not swing load binders over a load until they have confirmed nobody is on or near the trailer. Loggers and drivers should not trim logs on a trailer while another crew member is slinging binders over the log load. Crew members must communicate with each other at all times.



Equipment damage



Take Home Safety Message

- **Safety is everyone's responsibility**
- **Having a plan is not enough, you have to implement the plan as well**
- **Do not take chances, do not put yourself in a situation where you or someone else could get hurt. Ask the utility for help if you cannot do something safely**

What to do if there is contact or an outage

Contact 911

- **Immediately move away from area and keep others away**
- **Do not touch any structure, wire or anything in contact with structure or wire**
- **NEVER cut a tree off of the line!!!**
- **Know where you are in relation to roads, towns or property address**
- **If possible, identify which utility has been affected**
- **Locate a structure number**
- **If some one does come in contact with a live conductor do not try to rescue them, leave the rescue to trained professionals**

A few projects we have been involved with

- **Cunningham Falls State Park Pollinator Habitat Restoration**
- **Wormans Mill Development**
 - Removed over 500 landscape trees from this development. It was very emotional and difficult at first but now have developed a working relationship and are working together to ensure our needs and their needs are met.
- **South Mt. State Park / Appalachian Trail**
 - Wire Zone / Border Zone and hand cutting and stump treating near the trail.
- **Washington Monument cherry tree planting**
 - Worked with MD DNR and planted flowering cherry trees near Washington's Monument.
- **CREP Program**
 - Outreach, notification, and cooperation

Questions?

