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**REPORT PREPARED BY
DUKE POWER**

Report to the Town of Chapel Hill

Duke Power Right of Way Maintenance Program

October 15, 2002

Electric Transmission and Distribution Overview

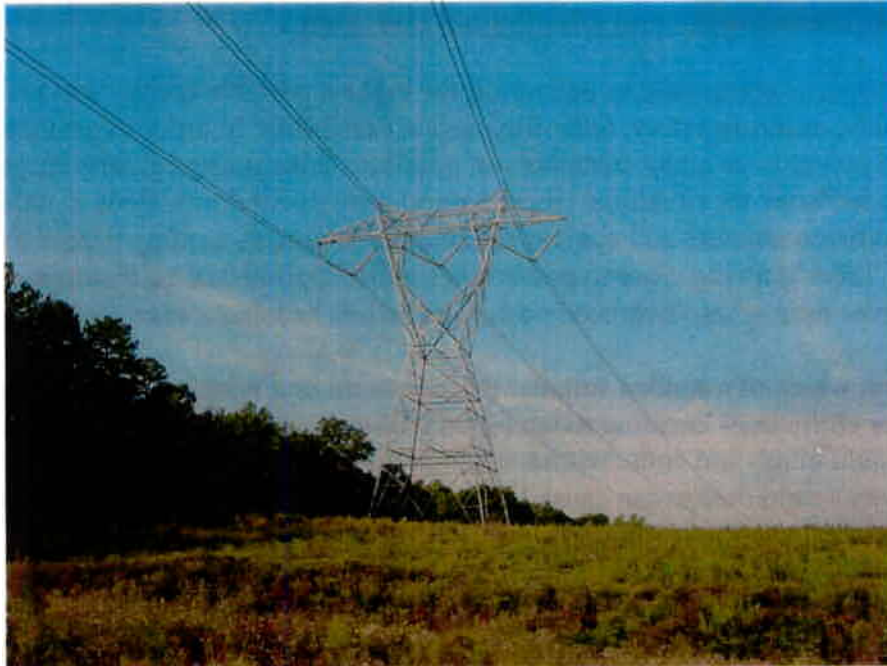
Duke Power is committed to delivering the highest possible quality service to customers, ensuring safety, reliability, and accessibility. In order to provide safe, reliable power to as many customers as possible, Duke must regularly inspect electric facilities for situations where natural growth either threatens to damage the electric conductors and associated facilities or creates a safety hazard to the public. Trees growing close to power lines must be pruned or taken down. When trees grow near or into overhead power lines, they become a source of danger.

The high winds of a sudden summer thunderstorm or a winter ice storm can send limbs or entire trees crashing to the ground, bringing power lines with them. A child could climb and come within reach of a power line, risking injury or death. And even a mild breeze can cause limbs to brush power lines, possibly disrupting electric service to the community.

Duke Electric Transmission has over 12,500 miles of high voltage lines in its transmission system. These transmission lines carry large amounts of electricity over long distances from generating stations to substations. Voltages on these lines range from 44,000 to 525,000 volts. These lines are mounted on tall wooden poles or metal transmission towers. Transmission easements can range from 68 to 200 feet wide - 34 to 100 feet on either side of the centerline.



100,000 Volt Transmission Tower



525,000 Volt Transmission Tower

Duke Electric Distribution has over 50,000 miles of “primary voltage” power lines which distribute electricity from substations to the customer. Voltages generally range from 12,000 to 24,000 volts and are almost always mounted on wooden poles. At the transformer, the voltage is lowered to 120/240 volts for use by the customer. Some commercial and industrial applications require slightly higher voltages, but no more than 450 volts. Distribution easements are typically 30 to 50 feet wide – 15 to 25 feet on either side of the pole line.



Single Phase Distribution Line



Three Phase Distribution Line

Disruption of service from these lines can have serious consequences to many customers. One of the most effective methods of protecting these lines is through right of way agreements or easements which are legal documents that specify Duke's rights to perform maintenance of its facilities inside and outside of the right of way corridors. These agreements establish the terms and conditions under which Duke performs maintenance activities.

Starting at the Beginning – Planting for the long term

A frequent mistake property owners make when landscaping is planting trees that will mature to a large size along a property line or public right of way. These areas are also frequently where power lines are located. Years later, when the trees mature, they have to be pruned to ensure safe, reliable electric service. Duke recommends the generally accepted industry standard of utilizing a low, medium, and tall zone along utility lines. The low zone reflects the area within the right of way (it should be noted that transmission easements may be 200 feet wide) and provides for plant species which have a low maximum height at maturity (15 feet for transmission and 25 feet for distribution). The medium zone reflects the area from the edge of the right of way to forty feet from the center line and provides for plant species which have a maximum height at maturity of twenty five to forty feet. The tall zone reflects the area over forty feet from the center line and provides for any tree that will grow over 40 feet in height. More information can be found in Duke's "Kindest Cut of All", Duke's approved plant lists for distribution and transmission easements, the International Society of Arboriculture's "Avoiding Tree and Utility Conflicts", and the May/June Issue of Arbor Day, pages 4 & 5 (all attached).

Integrated Vegetation Management Program

Duke manages the vegetation on its rights of way through an Integrated Vegetation Management Program. This program encompasses environmental stewardship and utilizes various right of way management tools—pruning (not utilized in transmission rights of way), mowing, hand cutting, cutting down dead trees or other trees that pose a danger to facilities and equipment (which, when located outside of the right of way, are known as "danger trees"), and the use of environmentally safe herbicides. The use of such herbicides **promotes the growth of native grasses and wildflowers while removing non-compatible woody species**. Herbicide use keeps vegetation from posing a threat to the electric lines and equipment while promoting greenways within the right of way corridor.

The Integrated Vegetation Management Program applies to two areas of maintenance: 1) inside the specified right of way corridor and 2) outside the specified right of way corridor.

Inside the Right of Way Corridors

Inside the right of way corridors Duke manages vegetation in a manner so as to establish growth that will not exceed 15-ft in height at maturity for transmission and 25-ft height for distribution, and to prevent encroachments that will hamper routine and emergency work on company equipment, structures and apparatus. These activities serve to maintain the safety and reliable operations of Duke's system.

Duke will use herbicides where it is the safe and environmentally sound option in order to **eliminate undesirable woody species** from the rights of way while **promoting lower growing native vegetation** that does not create a danger to utility lines and apparatus. Duke will communicate to each residential customer through a bill insert once a year informing them of our vegetation management program, including the use of herbicides. If the property owner chooses to deem his/her property as "no spray", the property owner will need to post and maintain "no spray" signs to identify these areas on the rights of way. Duke will provide a way for the property owner to order these "no spray" signs.

Herbicide Program

Duke has utilized stump treatments for years. We gained interest in foliar herbicide utilization in late 1980's. "Pilot plot" evaluation work was done in the beginning mainly to test effectiveness and customer acceptance. After overall favorable results, we started utilizing pre-mix service in 1993. This has now evolved into a fully integrated low volume herbicide program. The herbicide comes pre-mixed from a state-of-the-art facility in Cloverdale, Virginia in 15 gallon returnable, refillable, bar-coded containers. Environmental stewardship is demonstrated as no herbicide containers are disposed of in the landfill.

The solution used is a computer blended mixture of 0.5% Imazapyr (Arsenal), 3.2% Glyphosate (Accord) with 1% Aquafact (a surfactant which aids in bonding the solution to the plant leaves) and 95.3% water. This mixture is most effective at inhibiting the process of photosynthesis by disrupting amino acids that are found only in plant life. Thus, it is essentially nontoxic to animal life.

The program begins with a three part process. Part 1 - In year one, all hardwoods are removed and floor vegetation is removed with a bush hog. Incidentally, these actions constituted our right of way clearing practices before we began our herbicide program.



Hardwoods removed – Year 1



Floor vegetation removed – Year 1

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Part 2 - In year two and after allowing approximately one year of regrowth, a low pressure, low volume herbicide application is applied via backpack by a three man team led by a licensed herbicide applicator.



Low pressure, low volume herbicide application – Year 2



**Right side - later in year 2 after low volume herbicide applied
Left side - remains untreated and will require mechanical maintenance**

Part 3 - In year three, a follow-up treatment, "spot spray", is applied for misses in year two and after for those few situations where hardwood growth may sprout.



"Spot spray" – Year 3 and beyond

Year three and beyond yields a grassy, brushy easement which oftentimes leads to the reintroduction of wildflowers and leads to the protection of wildlife.



Grassy, brushy easement – Year 3



Reintroduction of native wildflowers – Year 3



Reintroduction and protection of wildlife – Year 3

Inside the Right of Way Corridors - Transmission

Where herbicides are not used for any reason in a transmission easement, Duke will utilize bush hog mowing or hand cutting. This alternate form of right of way maintenance will also be performed generally on a three to six year cycle.

Tree pruning is not an accepted practice for right of way maintenance along transmission lines. Topping a tree is unhealthy for the tree and is an unsound aboricultural practice. Topping weakens the tree and makes it more susceptible to diseases.

Within the right of way corridor, we do not allow any vegetation which will mature at a height of greater than 15 feet. When cutting down trees or brush from within the corridor by hand cutting, all stumps will be treated with herbicide to prevent sprouts from these plants. Duke provides an approved plant list for property owners who chose to landscape or plant vegetation on a transmission right of way.

Inside the Right of Way Corridors – Distribution

Since distribution rights of way are narrower, trees pose a far greater likelihood for contacting power lines. For this reason, tree pruning is employed on distribution rights of way. When our professional tree crews prune near power lines, they use a combination of **natural and directional pruning** to minimize potential damage to the tree and prune enough to ensure reliable electric service to the customer for several years.

Natural pruning refers to the removal of limbs from the trunk or parent limb without damaging the trunk or leaving a protruding stub. Natural height reduction pruning is used most often when a tree is growing directly under a power line. The upper crown of the tree is cut back to the desired clearance sometimes through a technique known as a “V-cut”. Natural side pruning involves removing side limbs near power lines. Limbs overhanging power lines are also removed. A tree limb properly pruned will form a “doughnut” at the point of the cut about a year after pruning. A “doughnut” is a callous formation of wood that develops around proper tree cuts and will eventually grow over the entire surface where the limb was removed.

Directional pruning means cutting to lateral limbs that are growing away from power lines.

Outside the Right of way Corridors

Maintenance outside the right of way corridor is called “danger tree” maintenance. A “danger tree” is any tree outside the specified right of way strip tall enough to contact conductors, structures or equipment should the tree fall, or be cut or blown toward the lines. Danger trees will normally be cut down, subject to the provisions of the specific right of way agreement, which is the controlling guideline for the appropriate handling of such trees.

Where property owners object to cutting danger trees outside the right of way corridor, they may be given the option to continuously maintain the subject trees to Duke standards at their own expense. However, the “topping” of trees is not encouraged as it is aboriculturally unsound and may lead to diseased or hazardous trees.

Clean up

In landscaped and maintained areas all brush will be chipped and left in an area designated by the property owner or removed from the site and disposed of in the most environmentally and economically sound manner. Wood will be cut into manageable lengths and stacked at edge of right of way. In non-maintained areas trees will be dropped into wooded areas or felled lengthwise along the edge of the right of way.

Communication

In landscaped and residential areas, for tree maintenance only, contact is made with the property owner or present tenant at least three days prior to the anticipated day for the work to begin. The standard method of notifying customers of upcoming right of way maintenance activities is through contact by the contract crew lead person.

If a personal contact is made, the Duke representative (could be a Duke contractor) will explain the nature and extent of the work to the property owner. Also the property owner will receive information regarding our right of way process including an approved plant list. Meeting with customers personally facilitates Duke's ability to clearly establish its intent while at the same time understanding the property owner's expectations.

If personal contact cannot be made, the door hanger with the above mentioned materials will be left informing the property owner of Duke's intent to perform right of way maintenance to ensure the safety and reliability of the electric lines.

Helicopter Inspection for Vegetation - Transmission

All Duke Electric Transmission rights of way and lines will be aerially inspected approximately every six months to ensure the safety and reliability of the transmission system. During this inspection the helicopter patrol will report any vegetation that could endanger the safe and reliable operation of that line. Maintenance on any areas identified should be completed before the next patrol.

Encroachments

It is the policy of Duke to have removed all encroachments (as defined in the appropriate right of way agreements). Right of way Specialists will work with property owners to have them remove the identified encroachment from the right of way as soon as possible in as cost effective manner as can be found. Should the customer object, Duke management will take such steps as are required to assure that the encroachment is removed. Duke has the right (in the case of transmission, purchased rights), responsibility, and obligation to secure and maintain proper line clearance.