UTILITY T&D
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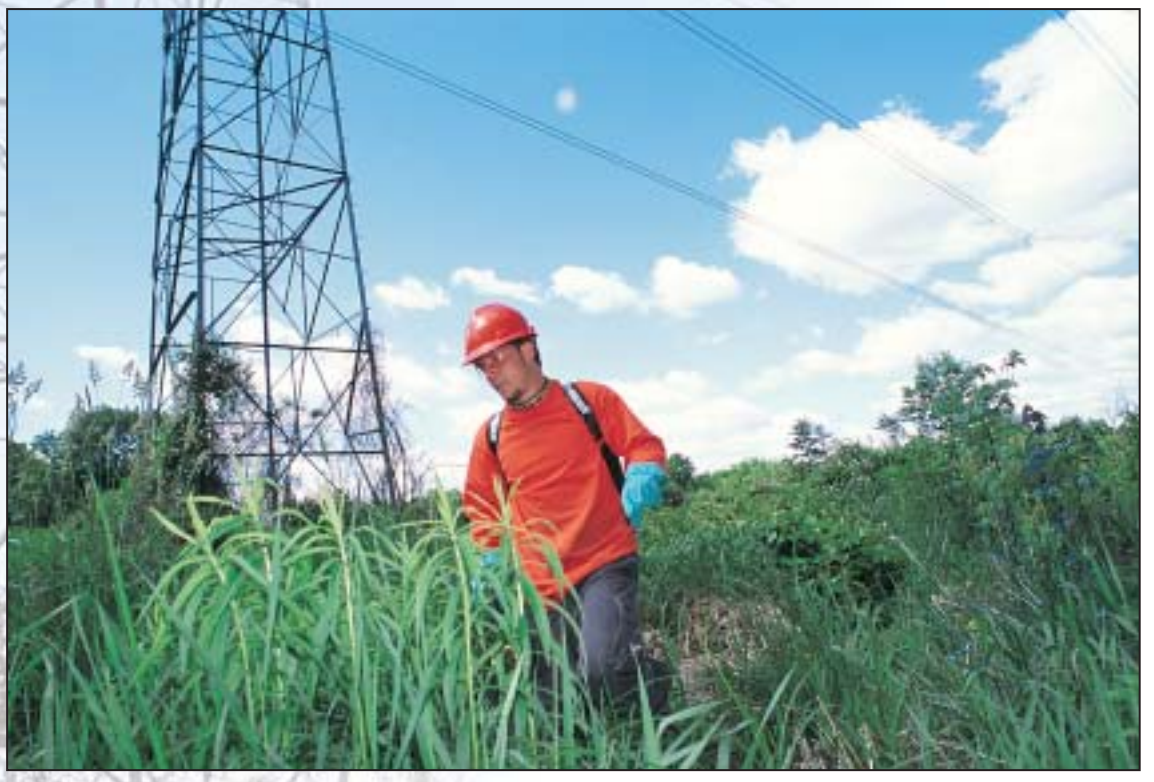

It has become a common practice in recent years for utilities to defer vegetation management plans, figuring that putting off tree pruning and herbicide applications for a few years is a small sacrifice to make to improve the bottom line. But, as reinforced by the August 2003 blackout that left an estimated 50 million people and thousands of businesses and public institutions in the East without power, it only takes one neglected tree to spark havoc on a transmission grid.

Vegetation Management:
Pay Me Now, or Pay Me More Later

By Sam Quattrocchi, Dow AgroSciences

Dollars stopped flowing in when meters stopped turning, and utilities incurred significant costs transferring crews from regular maintenance to hotspotting. But that doesn't even begin to compare to the snowballing costs encountered by customers.

According to the final report issued by the U.S.-Canada Power System Outage Task Force, the estimated total cost from the blackout ranged between $4 billion and $10 billion in the United States, and there was a net loss of 18.9 million work hours in Canada alone.

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Trees were to Blame

CN Utility Consulting Inc., which the Federal Energy Regulation Commission (FERC) contracted to prepare a report identifying vegetation-related faults on four 345-kV circuits that went down last August, came to the following conclusions:

- Overgrown trees, not excessive conductor sag, caused the power outage.
- Had those trees been adequately pruned or removed, the blackout probably wouldn't have occurred.
- The conditions that led up to this event can be found in most states and provinces throughout North America.
- The utilities studied generally conduct their vegetation management operations within the range of current "average" industry standards.
- "Average" standards need to be improved, and although the improvement will cost more money initially, it is believed that a more consistent systematic approach will result in lower costs in the long term.
- While the study was based on transmission vegetation management, many of the recommendations in the report apply equally to distribution vegetation management programs.

The report also lists adherence to maintenance cycles as a responsibility that utilities should make a top priority.

Pay Me Now, or Pay Me More Later

Performing preventative maintenance as opposed to reactive maintenance is like an old TV commercial that promoted a major brand of motor oil using the phrase "Pay me now, or pay me more later." Car owners can spend $20 to change their oil every 3,000 to 4,000 miles, or they can never change it and pay thousands of dollars to have the engine overhauled once the car breaks down.

Likewise, utilities can spend $1 million to perform regularly scheduled right-of-way maintenance, or defer maintaining the same area and pay $20 million to get the same results 10 years later. But not only do utilities roll the dice over whether or not the vegetation will cause an outage during that time, they also put themselves in a position where there probably won't be enough money available to do all the work.

A study conducted by Environmental Consultants Inc., which was funded by the International Society of Arboriculture, shows that the cost of pruning a tree and underline vegetation management rises significantly when it grows closer to and beyond the conductor.

For example, the average tree costs $30 to maintain when it reaches the conductor, but if maintenance is deferred for only a year, the average cost rises to $36.90 because trimming and herbicide application time, as well as the amount of biomass to dispose of, multiplies. That's an increase of 23 percent (see figure).

Vegetation managers will face a much more optimal scenario, however, if they do not defer maintenance.

By managing to a stable plant community and sticking to the schedule, maintenance costs on a four- to six-year cycle will decline over time and then flatten out to a true maintenance cost.

For example, if the first four-year maintenance cycle costs $1.5 million, it might cost only $1 million to manage that area four years later, and $700,000 four years after that. This is because the reinfestation of undesirable woody plants and conifers is being prevented by reintroducing native forbs and grasses, which pose little threat to reliability.

Utilities Take Action

Several utilities that have developed consistent right-of-way maintenance cycles in recent years credit the measure for drastically reducing outages. Other utilities achieve the same results by loosely following a cycle to monitor the status of a right-of-way and perform maintenance when necessary. Either method can be quite effective, as exhibited by Bonneville Power, headquartered in Portland, Ore., and Allegheny Power Systems (APS), headquartered in Greensburg, Penn. It's just a matter of developing a strategy that fits best with a utility's rights-of-way.

Bonneville decreased brush-induced outages by 70 percent since going to a three-year, cut-and-treat cycle. By using herbicides, it has gained the

Projected Impact of Deferred Maintenance on Pruning and Underline Vegetation Management Costs for One Utility – 5 Year Cycle

Relative Cost of Pruning 50,000 Trees**

	Cost Per Tree	Total Cost
*At the Conductor**	$30.00	$1,500,000
One Year Past	$36.90	$1,845,000
Two Years Past	$42.90	$2,145,000
Three Years Past	$47.70	$2,385,000
Four Years Past	$50.70	$2,535,000

**Optimum time for maintenance is when trees have just reached the conductor. Reference in this figure as "at the conductor."*
***Excludes an adjustment for inflation.*

upper-hand on noxious weeds like Scotch broom and blackberry, and tall-growth species such as cottonwood, big leaf maple, conifers and alders.

"If maintenance was deferred for one year, or the cut-and-treat cycle was delayed in any way, the result would be a substantial increase in cost, particularly in the Pacific Northwest Region," said Clint Bostwick, Bonneville Power right-of-way specialist stationed in the Snohomish Regional Office in Covington, Wash.

"We would most likely experience a sharp increase in labor hours during the peak access months, and as productivity slows due to severe weather, there would be a higher-than-usual potential for unexpected line outages. That's why it is imperative that we stick to our schedule."

Rex Bartlett, forestry support manager with APS, has seen his territory evolve from one that was laden with thick, impenetrable vegetation, to easily accessible rights-of-way. But it didn't happen overnight.

"We were in a recovery mode for several years. We were trimming trees and clearing brush in and around power line corridors that possibly hadn't been worked on for eight, 10, 15 years, and it was very costly," Bartlett says. "However, we finally got these areas on a more manageable cycle, and by 2001, we got on to a truly preventative maintenance schedule that allows us to utilize integrated vegetation management across our entire service area."

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Now that APS performs strictly preventative maintenance, mechanical maintenance is still utilized, but herbicides play a major role in APS' vegetation management program. Work is performed on a maintenance cycle that is timed to take advantage of the numerous benefits offered by herbicides. The utility annually treats 15,000 acres with herbicides.

"Without the proper use of herbicides, there is no doubt in my mind that the cost to maintain undesirable species on our right-of-way corridors would be much greater than it is now," Bartlett adds.

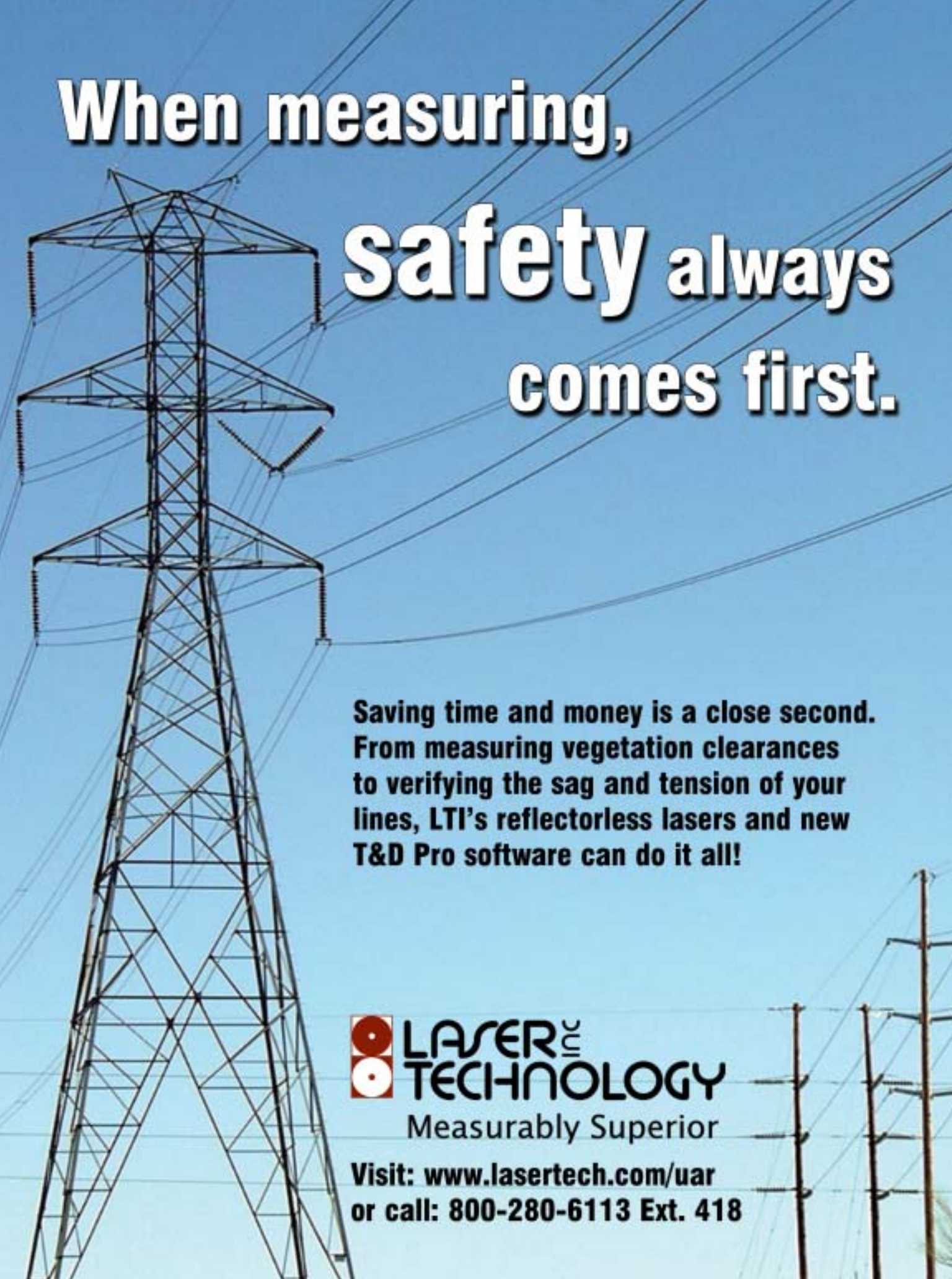
Acquiring the Resources

No matter how good all of this sounds, convincing upper managers of the need for a stable vegetation management budget can still be a challenge. But Bostwick and Bartlett say that proving overgrown vegetation is directly affecting reliability will likely grab the attention of those allocating the funding.

"First we proved that the lack of vegetation management on distribution circuits caused an unacceptable number of service interruptions and outages. We followed that up by proving that by revisiting these circuits at a regular interval, the cost to do the work would decrease," Bartlett said. "Initial costs to recover overgrown corridors may be high. But with proper application of integrated vegetation management principles on proper cycles, subsequent cost will decline. When looking at improved reliability vs. the decrease in cost, we convinced not only our management, but also some commissions we were working with that it was to everyone's advantage to provide the level of funding needed to do this work."

With the creation of laws and regulations enforcing best vegetation management practices imminent, there is no time like the present for utilities to analyze the state of their vegetation management program and make improvements. Such action could very well be preventing a blackout similar to that of August 2003 from occurring again. ‹‹

Sam Quattrocchi is a vegetation management specialist with Dow AgroSciences.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