TORONTO ELECTRIC VOLTAGE UPGRADE[1]

by Blair H. Peberdy

For years, everybody has accepted the fact that utilities put their distribution system in certain places, and that's just the way it is. If we're questioned, we say this is the only way, the best way, the cheapest way to do the job. And most people accept this. In fairness to ourselves, we are right. We can build solid, durable, workmanlike distribution systems that are relatively inexpensive and will last 30, 40, or 50 years.

But in Tronto, we've found that, all of a sudden, some citizens don't happen to like the distribution systems we are building. They don't like them because they are changing the way their streets look. All of a sudden the Hydro poles stick out like a sore thumb, and the street trees are being cut back to make room for the wires. To a growing number of people, this is an issue worth hollering about. Toronto Hydro found this out the hard way.

Can modern, 13,000 volt or 27,000 volt systems co-exist with fifty year-old Norway maples, lindens and honeylocusts? The answer is no, not in older cities with narrow streets, not if we want to continue to enjoy full shade tree canopies over our streets during the summer. While the city of Toronto is beautifully treed, out trees are old, and I don't believe that Toronto residents will accept smaller trees under Hydro wires. Not when they're used to large shade trees like we have today.

We are now coming to grips with the problem of preserving our green urban environment in the face of mounting stress on our street trees. All of a sudden arborists and utilities are faced with conflicting priorities in a common crisis. Our trees are dying, our lights are about to go out because our distribution system is obsolete, and to fix one, you've got to sacrifice the other. Toronto has to choose. The city has so far chosen trees over Hydro poles.

This has been a rude and difficult awakening for Toronto Hydro. Now that we're over the initial shock, our utility is better off and it *thinks* that 10 years from now we'll be a model for other cities, but the cost is going to be very high.

We utility employees are not islands unto ourselves. The distribution systems that we build represent just part of the infrastructure of services to the community. Not only do we have a responsibility to distribute power to our customers with the maximum reliability possible, consistent with operating our utilities on a sound financial basis, we also have a responsibility to be good citizens in the community. We have a responsibility to gauge the public, or seek out others such as our city councils, whose responsibility it is to serve the public will. We have a responsibility to work harmoniously within the political processes in our community. Finally, we have a responsibility to carry out our business so well, so decisively, and so expertly, and to communicate our expertise to our community in such a way that we will engender the respect and the trust of that community.

Background

The area served by Toronto Hydro comprises the city of Toronto, an area of 39 square miles with a population of approximately 650,000 people. The 1989 peak load of the Toronto Hydro system was approximately 1600 megawatts. The city of Toronto has a large downtown urban core which comprises approximately 20% of the area of the city, but about 80% of the peak load. The surrounding area is largely residential and is served by a 4 KV overhead distribution system.

Toronto Hydro does not generate any power, rather, power is purchased from Ontario Hydro at 13,800 volts, and received at 16 terminal stations throughout the city. The downtown core and other medium to high load density commercial, industrial and residential areas are supplied from an underground 13.8 KV distribution system which

1. Presented at the annual conference of the International Society of Arboriculture in Toronto in August 1990

feeds secondary network systems, radial supply systems, and customers who take power directly at this primary voltage.

Thirty-three 4 Kv substations supply the overhead 4 Kv distribution system which serves the outlying residential areas of the city. To convert the existing 4 Kv load to the 13.8 Kv system, we initially considered underground construction, but the underground options were felt to be too costly. As a result, a comprehensive engineering report was prepared to consider the feasibility of conversion to a 13.8 Kv overhead system.

Toronto Hydro's concerns, and the strategy for dealing with them, were communicated to city council in 1983 in a report titled "Toronto Hydro Residential Load Growth Study, 1983". No adverse reaction was received. Subsequently, our first conversion project using 13.8 Kv armless construction on cedar poles commenced and was completed in 1985 at a cost of approximately $2,000,000.

Prior to commencing this project, a public meeting was held in co-operation with the city's planning and development department, the local businessmen's associations and ratepayers association. No complaints were received. In the period from 1984 to 1987, a total of 15 projects were completed at a total cost of approximately $16,000,000. Prior to beginning each project, the respective elected representatives were briefed by the vice-chairman of Toronto Hydro, the public relations officer and the engineer in charge of the project. In some cases, the elected officials advised that notification to the neighbourhood would not be necessary. During this period there were no serious complaints from the public or from city officials.

In July 1986 a particular homeowner complained about taller poles being installed on his street. This was an area where the local politician had decided that we did not need to notify the residents, nor did anyone else do it. A series of meetings were held with local residents and the local elected officials. After delaying the project for several months, in December 1986 the residents agreed with a compromised proposal by Toronto Hydro which involved installing shorter 40 foot poles, and the project was successfully completed. We received no further complaints from any area residents.

The disgruntled citizen was not content with the compromise and continued to work to change Toronto Hydro's conversion program. He succeeded in having his elected representative introduce through the city committee process an item which requested the local city public works department to report on the conversion program. This committee deferred the public works department report, which supported Toronto Hydro's program, and called for deputations from the public. At the same time, this committee formed a working committee on Hydro installations which included ratepayer association representatives in support of stopping the conversion. Toronto Hydro representatives met with this working committee on many occasions throughout 1987 in an effort to answer all of their questions with respect to our conversion program. It became evident that our current conversion program was totally unacceptable to this group.

The working committee established an agenda to look in detail at all aspects of our conversion program design and to look at alternative system designs to solve some of their concerns. The working committee added to its membership the forestry manager for the city parks and recreation department. This forestry manager felt very strongly that our conversion program and the pruning required was destroying the city's street tree population. In November of 1987, the commissioner of parks and recreation requested Toronto Hydro to suspend construction until a suitable solution to the tree trimming concerns was found. Toronto Hydro agreed to suspend the program and study the problems with the parks and recreation department.

In January 1988 the city parks and recreation commissioner asked city council to request Toronto Hydro to place a moratorium on the conversion program, and he agreed to prepare a report to city council in cooperation with Toronto Hydro.

The reports produced as a result of this process took approximately 5 months to complete. The engineering report included a survey of other utilities which indicated that Toronto Hydro's program was not at all inconsistent with what other

cities were doing. Also included was an exhaustive study of detailed plans and costs for five alternative solutions. These costs confirmed what Toronto Hydro had been saying all along, that underground construction is 6 times more expensive that overhead.

In spite of these exhaustive studies and independent expertise, city council decided to establish a task force to study Toronto Hydro's reports. The task force decided upon an option which consisted of total underground on commercial streets and partial undergrounding on residential streets. The total cost of this option was estimated by Toronto Hydro to be approximately $1.25 billion. The task force further recommended that Toronto Hydro could fund this program totally out of rates.

Micro Tunnelling

With the engineering matter settled we proceeded to search for new technologies that would make the project feasible. For the first time in Toronto we used micro-tunnelling to install cable conduit. Traditionally, open trenching construction has been used to bury Hydro cables. We sent staff to a trenchless technology seminar in Europe and we learned about micro-tunnelling from the Flow-Mole Corporation, out of New Jersey.

Flow-Mole enables us to tunnel beneath sidewalks, gardens, landscaping and trees with little or no damage to the surroundings. This minimizes the impact on residential neighbourhoods and tree roots. The cost of micro-tunnelling is similar to open trenching, although, as more contractors become interested in the work, we expect competition to drive prices down.

Transformer vaults are required in our new system. We've designed special mini-vaults which are placed in the sidewalks. Transformer switching is done from the surface using hot sticks.

Financial Issues

The task force insisted that Toronto Hydro could fund the new option at a reasonable cost to customers, with debenturing and spreading the cost over all customers in the city. This, of course, is not consistent with good rate-making policy in that approximately 80% of the costs would be borne by the larger commercial customers in the city who from a distribution standpoint were receiving no benefit, in that the new distribution lines would supply residential areas.

City council decided that, since the issue now seemed to be a financial one, that the city finance department should provide input to the financial and rate-making issues and consult with Toronto Hydro's regulatory authority, Ontario Hydro, to explore the rate issues involved. The city finance department report was issued to the city council committee in February 1989, and, in essence, its conclusions largely supported Toronto Hydro. The report was dismissed in committee and subsequently at city council.

Toronto Hydro was directed to produce an implementation plan including a detailed fiscal and staging plan for the entire project. The financing options are to be reported in conjunction with the city of Toronto commissioner of planning and development.

Looking Back

Why did a program which was proceeding smoothly for five years with a total investment of $16,000,000 already sunk into it go off the rails due to a lack of "public" support? Toronto Hydro has definitely made some mistakes as we went along, The significant mistakes are as follows:

1) Due to a lack of resources, we did not undertake exhaustive engineering and arborist studies and enlist public relations and communications help at the beginning. It did turn out that our process of studies and consultation with city hall were appropriate and did get the program underway. However, once the program ran into obstruction, Toronto Hydro was on the defensive.

2) When the opposition came, we were too arrogant, telling the people that we knew what we were doing and we were the experts and that attitude only increased opposition, even though we bent over backwards to consult with those objectors and explain our reasoning.

3) We did not build allies with the various city departments and politicians. As a utility, we did not have a city hall presence, which is so necessary to function in the municipal community in Toronto today.

Conclusion

Toronto Hydro is currently completing a detailed implementation plan including a street-by-street schedule for the immense 25-year project. This plan will also present a discussion on financing strategies and our recommended approach. It will be completed and presented to city council this fall. It is anticipated that when that process is completed, we will be proceeding with the revitalizing of Toronto Hydro's distribution system hand in hand with the community. Problems will arise, and they will be solved cooperatively with the community.

If we knew everything that we did wrong, and knew everything to do right, we would have our program smoothly underway today. Obviously, we did not. The municipal political environment is a complex one. Hence everything we do as a utility today, which has visibility, is very much subject to public scrutiny. We must be constantly aware of this and try to work with politicians and community groups to make alliances which will engender trust. But most of all, we must do our work in an extremely professional way, and document all of our actions so as to give the public the true impression that we really do know what we are doing.

But we have to make way for environmental priorities, and we are banking on the hope that the citizens of Toronto will accept the cost of minimizing the impact of a modern utility, providing a service, electricity, that is essential to our safety and welfare.

Toronto Hydro
14 Carleton Street
Toronto, Ontario M5B 1K5

ABSTRACT

CRANSHAW, W. S. and R. J. ZIMMERMAN. 1990. **Parasitic pals**. Am. Nurseryman 172(10): 65-71.

Although researchers have studied insect parasitic nematodes as potential biocontrols for over 50 years, the recent increased interest in these organisms reflects better availability, as well as public demand for alternatives to insecticides. Also, insect parasitic nematodes have been exempt from federal and state registration requirements. Though these nematodes must still be considered experimental, promising developments indicate they may assume a long-term role in the pest management arsenal. Insect parasitic nematodes in the genera *Neoaplectana* and *Heterorhabditis* kill their hosts (various arthropods) by releasing specific bacteria (strains of *Xenorhabdus* species). The bacterium develops in the body cavity of the susceptible host, killing the host by blood poisoning within a few days. The dead host insect generally maintains its original shape and does not decay in a typical manner because these specialized bacteria fill its body. The nematode develops by feeding on the bacteria and degraded host tissues. Thousand of nematodes may by produced following a single infection. Ultimately, the dead host insect's body walls rupture, releasing the nematodes to potentially affect new hosts.