

Stray Voltage Pulls the Plug on Farm Profits

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By ROBERT IRWIN

For six years, the Marjerrisons of Apple Hill on eastern Ontario's far eastern fringe grappled with an invisible force destroying their dairy herd. They never really noticed when their 40 milking Holsteins began urinating in spurts. Eventually, they would learn that each time an animal's urine hit the cement floor, up to 40 volts of alternating current surged back up through the stream.

More noticeable were the figures on the milk cheque. Before the troubles started, the herd milk production averaged about 15 per cent above the provincial average; at the height of the troubles, it averaged 15 per cent below.

When plummeting milk production was finally sorted out, experts told Glenn Marjerrison the charged environment could have killed him or his elderly parents. The Marjerrisons' costs for lawyers and expert witnesses hit \$70,000 before they eventually settled their \$750,000 power quality claim against Ontario Hydro in October, 1995, for an undisclosed amount.

There are no easy answers to the power quality question, but families such as the Marjerrisons know the devastating results too well. While Ontario Hydro is reluctant to release details, according to documents obtained by Farm & Country through provincial Freedom of Information legislation, the giant Toronto-based utility alleges it received 35 complaints about stray voltage over the five-year period ending Nov. 20, 1995. There were five successful claims totaling \$766,052. Another three claims were unsuccessful.

The terms are all too familiar to livestock farmers - tingle voltage, transient voltage, stray voltage. But it's pinpointing the cause and the culprit that has led to so much heartache and financial losses in barns across the province. The terms describe a condition which may not be felt by farmers but can shock sensitive livestock. Fluctuating voltages may also occur, enough to cause light bulbs and motors to fail prematurely.

The usual cause involves a variation in voltage between an electrical neutral line and the earth. It can originate through Hydro's transmission lines, or faulty farm wiring. A simple loose connection or defective motor is all it takes.

In the Mar-jerrisons' case, the cause was traced to a disconnected primary neutral wire on Hydro's transmission line. But others are not so clear cut; when a farmer guesses that power quality is suspect, he quickly enters a twilight zone where the only certainties are falling milk production and distressed animals.

Even probing the extent of the damages is difficult. In Ontario, power quality is a battleground where settlements are kept secret and victims consider it unusual when experts agree on the time of day. Even in the Marjerrison case, with both government and private sector experts in agreement, and a large but unspecified cash settlement completed, Ontario Hydro has admitted no liability.

The documents obtained by Farm & Country show, however, that the utility is working on a new power quality complaints strategy. Farm & Country has now lodged a Freedom of Information appeal to obtain the many portions deleted from a copy of Hydro's new Power Quality Kit already released through the first request.

The giant public utility, which restricted Farm & Country interviews to written responses, says release of these sections would, "adversely affect Ontario Hydro's competitive and economic position." Documents obtained say "power quality is becoming an increasingly important topic."

Several Hydro employees speaking on condition they wouldn't be named have confirmed there were many more stray voltage complaints than the 35 Hydro admits to in the five-year summary released to Farm & Country. While the documents listing complaints cite the Trent area as the farthest east complaint area, Marjerrison, in Glengarry county, does not appear; nor do a raft of complaints from Prescott county; nor does dairyman Francois Cayer in Russell county.

Hydro's newly developed power quality kit cites unnamed surveys which blame customers for 80 per cent of the mishaps. Across the Canada-U.S. border, however, it's the reverse. The state of Wisconsin's comprehensive database shows 77 per cent of farm stray voltage in recent years originated on the suppliers' distribution system.

Federal researchers at Lennoxville, Quebec, administered between 0.2 and nine volts of both steady and intermittent current to pigs between nine and 21 weeks of age. Rate of gain and feed conversion results were inconclusive.

A 1989 study published in Poultry Science showed that correcting alternating current voltage between waterers and floor of between 0.2 and 2.5 volts eliminated mortality in a turkey flock, which had ranged between 10 and 26 per cent.

When he started seeing fewer eggs each day in his 10,000-bird flock, Marcel Leroux of St. Isidore, about 50 km east of Ottawa, battled Hydro for permission to install transformers on two of his barns.

Leroux is careful not to attribute the improvement which followed solely to the transformers. "We changed a lot of things at the same time," he points out.

Ontario Ministry of Agriculture Food and Rural Affairs dairy adviser Jack Rodenburg estimates 4,000 to 5,000 farmers solved stray voltage with Hammond filters during the 1980s and early 1990s. Installed at the farmer's electrical service, the Hammond Filter was originally developed in conjunction with Ontario Hydro.

Troubleshooting and installation costs used to average well below \$1,000. But that average shot up in the past year. "I think this is a problem that has run its course," Rodenburg says. If he were comfortable speaking English, St. Albert dairyman Francois Cayer would probably be the first person to pick up the phone to enlighten Rodenburg. Cayer, who has been widely featured in the French media for tensions parasites (stray voltage) in his 40-cow milking herd, says

Expert) inject current into the ground at the opposite phase of what the stray voltage is in the barn. That idea makes sense, but whether or not you need the whole system is questionable."

Koolaard's report, due for release later this month, lists available equipment and prices but draws no conclusion on the efficacy of any product. One of the key recommendations in his report is for farmers who can't find an obvious stray voltage cause to take advantage of the four free hours of diagnostic service provided by Ontario Hydro.

Like Farm & Country, Koolaard was unable to obtain accurate Ontario Hydro summaries of stray voltage reports. But he says stray voltage is increasing. **"In areas where the soil is more humid it is easier for current to pass through soil. It has a lot to do with the location on the line, although Ontario Hydro will disagree with that."** (We have underground springs right in this location.)

Koolaard says Hydro's neutral wire will normally have much less resistance than the ground so there can be a slight difference between the neutral and the ground which can be transferred to a barn. "Anything over 10 volts Ontario Hydro has an obligation to correct."

Koolaard's study didn't establish a comfort level for cows because the literature reviewed was contradictory. He says 10 volts is a North American utility commercial standard.

That kind of talk is sure to get a rise out of Wallaceburg, Ont., private consulting engineer Alex Furo, who insists there is no North American standard, as claimed by OMAFRA and Hydro. Furo was the consultant in the Marjerrison case and several other high-profile ones such as the 10-year power quality dispute in which Ontario Hydro turned off Kent county dairyman Lee Montgomery's power for six months last year.

In some U.S. states, there is no 10-volt cushion. Following hearings in June 1995, the State of Connecticut Public Utility Control ordered utilities to conduct testing when farmers complain. The utility is obliged to take action on any readings exceeding 0.5 volts per one milliamper in the cow contact area and one volt between primary neutral and earth. A voluntary stray voltage task force to solve problems and mediate disputes has also been recommended there.

A stray voltage bill was introduced in the Vermont legislature in January 1994. By the fall of that year, state utilities averted tough new regulations by agreeing to a voluntary program, which makes them responsible when neutral-to-earth voltage exceeds 0.5 volts on farms. Only a few small power companies have failed to sign up.

Dr. John Roberts, the veterinary member of Wisconsin's five-year-old Stray Voltage Analysis Team, says utilities in his state must take corrective action "when the cow is the pathway for one milliamp of steady state AC current," a fraction of the Ontario level. Then, if required, devices such as filters are supplied by the power company.

Team staff estimates between 9,000 and 12,000 of Wisconsin's 30,000 dairy herds are affected. However, Roberts concludes there is no clear link to changes in somatic cell counts or production.

"Stray voltage is not a fix-it-once-and-it-is-gone-forever event."

it all started after he built a liquid manure storage behind his barn in 1989.

Almost immediately, Cayer noticed the often-reported stray voltage symptoms such as nervousness and failure to let down milk. Despite the installation of a Hammond filter, his animals still showed signs of stress. Milk production and herd health plunged.

Between 1989 and 1994, he sent 176 cows to slaughter. During 1991 and 1992, veterinary, medicine and artificial insemination costs which had been about \$3,000 per year, rose by an extra \$28,200. Detailed OMAFRA Farm Management Analysis Program records show losses attributable to power quality, totalling \$204,000 over five years.

"I often thought about quitting," recalls Cayer, whose cash flow was especially precarious because he had bought the farm from his father three years before the problem began. Several times during his ordeal Ontario Hydro testing blamed Cayer's own electrical system.

Cayer has meticulous records, including a detailed chronology highlighting countless meetings with experts. He tried repeatedly to convince Ontario Hydro and OMAFRA staff that a Quebec company, Filter Expert, might be able to help. He eventually won Hydro approval and on July 15, 1993, became the first Ontario producer to install the NCV 1000, sometimes called an electronic grounding system or active suppression device. His records show labour, materials and equipment cost \$18,036.

Production rose by an average of 1,218 kg; 1994 Breed Class Average went from 173 to 204. "Now I can rebuild the lost genetic potential of my herd for my two sons," Cayer says. "Today, the future looks bright."

Filter Expert dealer Serge Quesnel, of Quench Electric in nearby Embrun, is a stray voltage specialist. His tests show Cayer's cows were being shocked by the approximate energy equivalent of a flashlight battery. Actual readings showed 100 milliamps of alternating current at less than two volts.

Quesnel speculates the unwelcome electricity could be escaping from a neighbouring farm or an Ontario Hydro transmission line. His equipment and theories are widely accepted in Quebec where lucrative grant and research funds only recently dried up.

More than a dozen farms across Ontario credit Filter Expert with improved milk production. Quesnel suggests every farm should at a minimum install a stray voltage meter to monitor levels around the barn. "At the least it might prevent some fires by warning you about electrical problems."

These producers don't show up anywhere in the list of 35 complaints Hydro released to Farm & Country, and the utility insists no other records exist. But a number of Prescott county farmers have reported stray voltage to Ontario Hydro in recent years. Many are curious about Filter Expert's theories and equipment. Last year, the Prescott Federation of Agriculture, aided by funding from several other counties, commissioned a \$5,500 research project at Alfred College. Alfred research engineer William Koolaard, who conducted the research, agrees. "They(Filter

KENT DAIRYMAN IN THE DARK

"I'm not a big fan of going after Hydro. You might lose your farm over that," says Prescott Federation of Agriculture past-president Germain Mallette. He spearheaded the soon-to-be-released Alfred College stray voltage study after watching a number of Prescott farmers grapple with financial losses caused by stray voltage.

Both the Alfred study and Mallette conclude farmers should take advantage of the free diagnostic services Hydro offers. Eventually, though, many who have been hit by stray voltage wonder who should pay for losses.

Allan O'Brien, a former farm boy and senior counsel at the prestigious Ottawa law firm, Nelligan Power, won a recent stray voltage claim for the Marjerrison family of Apple Hill, Glengarry county. He says "if you're taking on an institution like Ontario Hydro, in a sense they're funded by consumer dollars but also by taxpayer dollars. They have this huge operation with in-house experts and in-house lawyers. If you're the little David it's a daunting task."

He also warns Hydro is covered by the Public Authorities Protection Act which bars claims made more than six months after a problem is discovered.

"If you've lost about \$20,000, a lawyer would be foolish to suggest you take on Ontario Hydro. I would tell the individual to lick your wounds and get on with it," says O'Brien. He suggests one exception might be a group of affected farmers who could share costs of a class proceedings action.

O'Brien and other experts who worked on the Marjerrisons' \$750,000 claim say solid evidence of improper line work by Ontario Hydro and the Marjerrisons' good management and records were crucial to the family's success.

There's another case simmering in southwestern Ontario. This month, Ontario Federation of Agriculture (OFA) president Tony Morris and vice-president Ed Segsworth were trying to schedule a meeting with Hydro officials to obtain some compensation for Kent County dairyman Lee Montgomery, who says his operation was ruined by a decade of poor power.

In 1994, Hydro pulled the plug on Montgomery's electricity when he refused to pay for power he said was unfit. In April, 1995, after six months in the dark, Montgomery had his power switched back on, after then-OFA president Roger George convinced the utility to accept \$3,500 on his bill, which totalled nearly \$7,500.