Summary

Dairy Farmers of Ontario (DFO) is the marketing group for the largest sector of Ontario agriculture and is proudly owned by the 4,500 Ontario dairy farms.

Dairy Farmers of Ontario represents the voice of all Ontario dairy farmers. We wish to submit written comments on suggested alternative approaches to stray voltage solutions presented by the Ontario Energy Board staff in a report numbered EB-2007-0709: Staff Discussion Paper – Farm Stray Voltage: Issues and Regulatory Options.[1]

Suggestions and alternative solutions were presented by the Ontario Energy Board staff separated into seven elements: distributor remediation action target indicator & threshold; investigation procedures; training and certification; customer response procedures; regulatory reporting requirements; distributor remediation options and the provision of farm stray voltage-related information to farmers.[2] Comments on each one of these issues, representing Dairy Farmers of Ontario's point of view, follow.

[1] See http://www.oeb.gov.on.ca/OEB/_Documents/EB-2007-0709/staff_discussion_paper_20080530.pdf. Ontario Energy Board EB-2007-0709 Staff Discussion Paper. Farm Stray Voltage: Issues and Regulatory Options. May 2008.
[2] Ibid, See section 9.

Introduction

Stray voltage has been studied for many years all across the Western World. It is very well documented that stray voltage affects dairy farm cows the most due to the sensitivity of large animals to current exposure in their environment. Stray voltage can induce stress which in turn reduces the productivity of the cows, increases malnutrition, increases social disorder and may reduce the overall ability of the cows to fight diseases.

In addition, the sizes and average production of Canadian cows have drastically increased over the last 50 years. In 1953, the average milk production of a Canadian cow was approximately 4,000 kg/year[3]. Last year, it was 8,500 kg/year on average for the Ontario dairy cow.[4] One of the largest herds in Eastern Ontario has an average milk production of well over 12,000 kg/cow/year. As milk production gets higher and cow sizes increase, the comfort of the cows gets more and more important. Mattresses for the cows, good and dry bedding, cleanliness, fresh available feed and water are some of the important details that create high milk production on the farm. Any stresses, such as stray voltage, will only reduce production, productive life expectancy and ability for the animals to properly fight diseases. Costs can quickly increase and can become almost immeasurable.

For the Ontario dairy farmer, getting good advice concerning stray voltage is a frustrating exercise in itself. There are very few independent experts that can accurately identify whether or not stray voltage exists on the farm. Distributors themselves have no good reliable experts on staff and have not always been transparent in their approach. Other so-called 'experts' see stray voltage everywhere, mixing it up with static electricity on the farm or with the so-called effects of electric and magnetic fields. Even most electricians have little knowledge to properly identify and find solutions to stray voltage issues on the farm. These situations only add confusion, stress, frustrations and costs to the farmer who no longer knows who to believe and feels helpless on how to approach the issue.

In general, Dairy Farmers of Ontario applauds the Ontario Energy Board's approach to stray voltage issues thus far. It has been an approach based on scientific studies, concrete results, excellent farmer consultations and transparency. It is the hope of Dairy Farmers of Ontario that concrete results will come out of the Ontario Energy Board directives.

[3] Guide pratique – Les tensions parasites à la ferme. 2005. Hydro-Quebec. www.hydroquebec.com
[4] CanWest DHI. 2007 Statistics. 2007. www.canwestdhi.com

1. Distributor Remediation Action Target Indicator & Threshold

Should the following threshold values be accepted:

a) 2.0 V if distribution system Neutral to Earth voltage (NEV) at the primary secondary connection point at the farm is the action threshold.
b) 1 mA Animal Contact Current (ACC) or 0.5 Volt Animal Contact Volt (ACV) if the distributor's contribution to stray voltage is the action threshold.[5]

If there are virtually no animal contact current or animal contact voltages present on the farm (which is the case in the majority of Ontario dairy farms), then there is no real stray voltage issue on the farm. For example, if there is measured NEV of 3 Volts coming into the barn, but the cows do not feel the 'stray' voltage at **any** cow contact points, then where is the issue? Therefore, the 1mA ACC or 0.5 V ACV should be the primary measurable threshold values.

Almost everyone agrees that the second threshold of 10 Volt NEV limit at the primary/secondary connection points that the electrical distributors currently work with is totally unacceptable. It is simply too high. It should be lowered to 2.0 V NEV at the primary/secondary connections as suggested above by the OEB Board staff report. This would give clear indication that issues must also be solved by the distributors on their own lines. This would also protect the distributor if they can prove that the issues are not from their lines but from other sources.

A few questions remain. Who will be able to help if the stray voltage comes from the ground but not directly from the primary/secondary NEV? Independent expertise from companies such as the Electrical Safety Authority of Ontario would be definitely needed in such cases. A large portion of the stray voltage issues found in Ontario may very well come from the farm itself through armature of motors, poor grounding of electrical panels and even poor installations of fencing equipment as suggested by the Reinemann report. Will the Electrical Safety Authority be able to address such issues? Or will electricians be competent enough to identify, troubleshoot and fix an on-farm stray voltage issue?

In addition, what happens if the stray voltage problem comes from off-farm (from a wind electrical factory near the dairy farm and not from the electrical distributor)? Will the private wind electrical factory be accountable to the same degree as the electrical distributor? The answer must be 'yes'. The Ontario Energy Board must make recommendations that all parties are made equally accountable whether we are talking about electrical distributors or electrical generators. Keep in mind that more and more electricity will be produced on-farm with wind-generated power and manure-digester installations in the near future.

[5] See http://www.oeb.gov.on.ca/OEB/_Documents/EB-2007-0709/staff_discussion_paper_20080530.pdf. Ontario Energy Board EB-007-0709 Staff Discussion Paper. Farm Stray Voltage: Issues and Regulatory Options. May 2008. Section 9.2.3.

2. Investigation Procedures

Should details of the investigation procedure be prescribed?[6]

The short answer is absolutely yes. The investigation procedure must be the same regardless of who performs it and regardless of which Ontario location the farmer lives in.

If the distributors are allowed discretion as to the extent to which the investigation procedure should be applied, there will be a discrepancy between tests from one distributor as compared to the test from the other one. If the investigation procedures are not standardized for the Province, some distributors will take the issue seriously and some others very lightly. And there will be a service issue level for farmers across the Province of Ontario.

Should distributors be responsible for identifying on-farm stray voltage sources? [7]

If the distributor can prove that the NEV primary/secondary neutral is below 2.O Volts AND that the cause of the on-farm stray voltage comes from on-farm sources, then the distributor may offer testing to identify on-farm sources at the request and expense of the farmer. There should also be other parties, such as electrical contractors or ESA, which could have the knowledge in identifying on-farm sources for stray voltage for the farmer on a fee-per-service basis.

In the case that the stray voltage comes from off-farm sources such as a wind-powered distribution company, the rules for such companies should be the same as for the electrical distributor. All companies, including the farm, must do due diligence to solve the problem. The issues need to be well defined to know where everyone stands.

[6] Ibid, Section 9.3.3.
[7] Ibid, Section 9.3.3

3. Training and Certification

Ontario Hydro One Networks used to have some of the top experts on stray voltage on staff. They developed the initial Hammond Filter which eliminated a lot of stray voltage issues on the farm. Unfortunately with time and cutbacks, these experts have either left the company or simply retired. Only recently, since the stray voltage issue resurfaced, has Hydro One put in a training center for its own employees.

Even the Electrical Safety Authority (ESA), which used to be part of Ontario Hydro, has very few experts on stray voltage. Because of the recent interest, some ESA engineers are now getting trained.

In the last few years, we had so-called stray voltage 'experts', some of them armed with specialized instrumentations running around the country making questionable recommendations. Other so-called experts put in special devices on windowsills to supposedly 'chase away' electro magnetic fields and stray voltage on farms. The point is that some of these so-called 'experts' may or may not do a lot of good. It is difficult and frustrating for a farmer with a real stray voltage issue to distinguish what is true and what is false and solid recommendations based on science. Anybody can call himself an expert. But not everyone can show a recognizable document to prove it. A lot of disinformation is out there simply because there are no certified experts that would put their reputation on the line to find and solve stray voltage issues.

Therefore, requiring 'Stray Voltage Expert Certification' in Ontario is a must[8]. Properly trained experts will take away all the uncertainty of what is presently in the marketplace. They will be recognized by all parties if they identify a stray voltage issue and the source of it. This will make the solution so much easier to solve. Some independent stray voltage experts must be part of the group, to allow farmers to choose, at their own expense, independent experts not affiliated with any electrical distributor.

In the end, Ontario will not need that many certified stray voltage experts. Fewer than fifty engineers and top electricians are most likely needed to cover the whole province of Ontario.

However, training is also required for electricians and distributor technicians in finding stray voltage issues and installing stray voltage device remedy equipment. Training is required for these electricians to monitor or identify possible stray voltage issues. Cow contact point stray voltage measurements, equipotential gridding, proper grounding techniques, leakage verification, etc., could be part of the course at a practical level. But certification for these electricians and technicians may not be needed. Only a very short one-day course may be required.

[8] Ibid. Section 9.4.3.

Short course training may also be required for the milking and cooling equipment technicians, the nutritionists, the veterinarians, the building contractors, the milk inspectors and the milk quality specialists. Training could consist of taking cow contact point voltages and a simple NEV remote ground reading to simply identify potential stray voltage issues on farm. Principles of stray voltage theory would be explained. Effects of stray voltage on the farm would be presented. Farmers may also be invited to these meetings if they wished. No certification would be needed here. Only a solid basic course based on science to demystify stray voltage is needed. Dairy Farmers of Ontario would be happy to assist in creating such a course.

4.&5. Customer Response Procedures & Regulatory Reporting Requirements

Regarding the customer response procedures, the Ontario Board of Energy should require that distributors have a customer response procedure specifically for dealing with farm stray voltage requests[9].

Regarding the regulatory report requirements, the Ontario Board of Energy should simply specify the types of information distributors must keep on file regarding farm customer stray voltage requests, investigations, remediation efforts and outcomes so that the Board can obtain them by request.

Stray voltage may be a 'hot' issue for the next few years but will eventually die down with time as long as the main stray voltage cases are being solved. There is a need for distributors to keep track of the who, what, when and where but not to spend an overwhelming amount of resources doing so.

In the end, all the farmer wants to have is an easy and quick way to report a stray voltage issue. Using the 1-800 line and waiting half an hour to get anywhere can make anyone frustrated. After the initial call, a follow-up call or visit from the distributor within a reasonable amount of time would be required. A plan of action, with a transparent final, could help quickly identify the issues if they are found.

Should there be a dispute between the farmer and the distributor, then a certified stray voltage expert could be brought in for an independent evaluation and report. Fees for the expert could be shared between the parties. The report would hopefully be recognized by all parties.

[9] Ibid, section 9.5.3.

6. Distributor Remediation Options

There were a number of practical solutions that were basically overlooked from the Ontario Energy Board staff and the Kinetrics Inc. reports that need to be added.

One of the clear and more permanent solutions would be to put back on the market the Hammond filter that Ontario Hydro originally designed. There are very few refurbished and second-hand Hammond filters on the market and a new and improved filter would be welcomed. Hammond Manufacturing may still be interested in manufacturing the filters but a large minimum order is required. In any case, this may be an excellent solution that would fix up the majority of stray voltage cases in Ontario today and be an inexpensive solution for tomorrow. Since the past experience with the filters have been very good, why not use them in the future?

Another solution that was basically overlooked or misunderstood in the Ontario Staff Discussion and the Kinetrics Inc. reports[10] is Quebec-based equipment installed in hundreds of farms in Ontario to reduce stray voltage. It should be added as an effective but sometimes expensive way to reduce off-farm NEV stray voltage. The system is basically a filter that actively 'cancels' NEV voltage by the application of an opposing 'negative' voltage instantly. One of the Quebec-based companies that installs such equipment is called Nuvolt Corporation Inc.(www.agrivolt.com). The equipment is NOT connected to the primary and secondary neutrals of the transformer. It is connected between the neutral and the ground at the customer's electrical entrance.

Finally, there is a need to communicate to all stakeholders about the benefits of equipotential planes on the farm. Equipotential planes are included in the Ontario Electrical Codes for some parts of the farm building, such as parlour reinforcement floors. But there needs to be more education for electricians, ESA inspectors, electrical distributors and farm producers when new additions or new barns are being built. Equipotential planes reduce both off and on-farm animal contact stray voltage. "While the first priority for minimizing stray voltage is to reduce the neutral voltage source, equipotential planes provide substantial exposure reductions and also provide 'insurance' in the event of a fault that could produce a substantial neutral voltage source".[11]

[10] Kinetrics Inc.: Stray Voltage Mitigation; Report No.: K-014283-001-RA-0001-R00; April 2008. See http://www.oeb.gov.on.ca/OEB/_Documents/EB-2007-0709/report_Kinectrics_20080530.pdf

[11] Discussion paper by Dr. D. J. Reinemann. 2008. Literature Review and Synthesis of Research Findings on the Impact of Stray Voltage on Farm Operations. http://www.oeb.gov.on.ca/OEB/_Documents/EB-2007-0709/report_Reinemann_20080530.pdf

Ontario distributors will be the key players in finding solutions and remediation options to the stray voltage issues in Ontario. The Ontario Energy Board should require that distributors determine the safest, most cost-effective remedy (or remedies) to a given stray voltage case, specifying, where applicable, which costs are eligible for recovery in rates.[12] There must be flexibility in finding solutions. Future equipment may appear on the market which may be excellent devices to limit stray voltage on the farm. If stringent stipulation controlling the use of such equipment is already in force, it is very possible that this equipment may not be available for installation in Ontario.

On the other hand, if no restrictions are given about remediation options, inexperienced and small distributors in Ontario may not have all the facts when implementing solutions to stray voltage on farms. This will be especially true in areas where distributors only have a few farms as customers.

[12] See http://www.oeb.gov.on.ca/OEB/_Documents/EB-2007-0709/staff_discussion_paper_20080530.pdf. Ontario Energy Board EB-007-0709 Staff Discussion Paper. Farm Stray Voltage: Issues and Regulatory Options. May 2008. Section 9.5.3.

7. Provision of Farm Stray Voltage-Related Information to Farmers

One of the most important factors of this whole project will be the actual communication to all farmers in Ontario. Information such as what is stray voltage and how it might affect their livestock; what conditions on the farm, including the customer's electrical system, can contribute to the stray voltage problems; and the remediation options available to address these; sources of experienced help and expert advice; the process whereby stray voltage concerns are dealt with by their distributor, including how disputes are to be solved, are to be addressed.

The Ontario Board of Energy should specify the content, form and frequency of transmittal of information on farm stray voltage and related customer response and dispute resolution procedures to be made available by distributors to livestock farm customers where applicable.[13] There do not need to be individual distributor reports to their own customers. There easily could be one provincial report for all farmers to be distributed either directly from distributors to their own clients or through farm organizations to their respective members. The number of stray voltage complaints, resolved and outstanding by each distributor must also be published at least once a year. Transparency here from all stakeholders is the key.

At the beginning, there must be a book sent to farmers explaining the basics of stray voltage. Hydro Quebec in cooperation with the Union des producteurs agricoles and with the Ministères de l'alimentation, des pêcheries et de l'agriculture du Québec published a book in French and English called Guide pratique – Les tensions parasites à la ferme. [14] This is a good example to follow.

Dairy Farmers of Ontario would be pleased in providing help to distribute and/or publish stray voltage articles and information in its own publication 'The Milk Producer'.[15] Separate mailings can easily accompany the magazine. There could also be links to their own Web site on www.milk.org . This would at least cover the agricultural sector the most affected by stray voltage, the dairy farmers of Ontario.

[13] Ibid, section 9.8.3.
[14] Guide pratique – Les tensions parasites à la ferme. 2005. Hydro-Quebec. http://www.hydroquebec.com/publications/fr/autres/pdf/tension_parasite.pdf
[15] www.milk.org. http://www.milk.org/Corporate/View.aspx?Content=Farmers/Publications