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BY COURIER

July 11, 2008

Ms. Kirsten Walli
Secretary
Ontario Energy Board
Suite 2700, 2300 Yonge Street
P.O. Box 2319
Toronto, ON.
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Dear Ms. Walli:

EB-2007-0709 – Staff Discussion Paper on Farm Stray Voltage Issues and Regulatory Options - Hydro One Networks' Comments

Hydro One Networks Inc. ("Hydro One") welcomes the opportunity to provide comments and responses to questions posed by Board Staff in its May 30, 2008 Staff Discussion Paper on Farm Stray Voltage Issues and Regulatory Options.

Please find enclosed two paper copies of our filing. Should you have further questions please do not hesitate to contact Oded Hubert at 416-345-5240.

Sincerely yours,

ORIGINAL SIGNED BY SUSAN FRANK

Susan Frank

Attachment

Hydro One Comments on Board Staff Discussion Paper
Farm Stray Voltage Consultation - (EB-2007-0709)

Hydro One Networks Inc. ("Hydro One") is pleased to provide comments in response to the Discussion Paper "Farm Stray Voltage: Issues and Regulatory Options" issued by the Board on May 30, 2008.

As the report states, Hydro One has been very active in the Board's consultation on stray voltage. As a rural distributor, Hydro One, and its predecessor company, Ontario Hydro, is well-acquainted with the issue of stray voltage and with approaches to identifying, analyzing and addressing its impacts on farm customers. Hydro One continues to revisit its approach and procedures for handling of stray voltage complaints from customers to improve our ability to diagnose and address problems more expeditiously. Guidelines are being developed to expand the use of neutral voltage isolation devices on our system to help resolve specific customer concerns. Hydro One is working with manufacturers to enhance existing test equipment, and exploring the benefits, suitability and accuracy of new test equipment for incorporation into field procedures. This work will be the basis for training materials and programs for Hydro One field staff.

Our comments on the Board's paper are divided into two sections:
1.0 Overall Observations from the Discussion Paper
2.0 Specific comments on the 12 issues and options identified in the paper

1.0 Overall Observations from the Discussion Paper

Hydro One commends the Board and Board Staff on their efforts to address this complex and customer-sensitive issue. As the distributor with the majority of Ontario's farm customers, Hydro One (and formerly Ontario Hydro) has a long history of dealing with farm stray voltage. For example, in the 1980's, Ontario Hydro invented the Tingle Voltage Filter, and at that time, also developed stray voltage test/measurement procedures. While most of our solutions have proven effective and stood the "test of time", Hydro One acknowledges that a more comprehensive approach and regulatory awareness and involvement can only benefit Ontario farmers.

As a first observation, we note that **the discussion paper takes a very broad and comprehensive view of regulating Stray Voltage.** This is beneficial for providing stakeholders with a compendium of information about the issue. In Hydro One's view, the key issues in the paper are the technical and customer response thresholds that the Board is contemplating for distributors. The debate should focus on these important issues, recognizing that this is a new area of regulation, especially in Ontario, and that it may therefore be premature to establish firm requirements.

Secondly, the report explores a range of **regulatory responses to stray voltage,** and questions the extent to which regulation of stray voltage should be light-handed or prescriptive. Hydro One is, of course, keenly interested in this discussion, and encourages the Board and stakeholders to consider this question not only from a philosophical

perspective, but also with costs and benefits in mind, as heavier regulation comes with a cost to the customer, and this cost must be offset by the benefits. It should also be recognized that, while achieving more consistent treatment of customers and their issues, increased regulation also reduces the degree of flexibility that distributors have in responding to different types of issues that emerge.

Thirdly, the paper explores various **service quality indices and thresholds** that the Board could use to guide and monitor distributors' response to stray voltage issues. In Hydro One's view it is critical that such measures be designed to closely align to the actual problem being addressed – that is, behaviours manifested by cows in response to stray voltage that in turn affect farm operations. Other indicators and thresholds may be easier to develop or implement, but may offer little to assure customers that appropriate actions are being taken.

Hydro One recognizes that Board Staff are taking guidance from the Wisconsin model in setting some of the thresholds for distributor action and mitigation. However, the technical basis for implementing these in Ontario has not been demonstrated. As noted below, we are concerned that the numerical values suggested in the discussion paper may not have been substantiated and may not be applicable to Ontario without significant cost to ratepayers, if at all.

Customer Response Timelines and Service Quality Indicators.

Hydro One submits that response/ assessment/ remediation timelines for distributors should not be established and codified until we gain some operating experience in this area. The situation is not unlike the generation connections area, whose regulation faces challenges stemming from unanticipated customer response and from its technically maturing state. Timelines should be tracked before they are entrenched in any regulatory requirements. This is especially true in the early stages, when there could be a large wave of requests for assessment.

Response to stray voltage requests would have to be prioritized based on their urgency to customers, and would therefore be viewed as a lower priority to emergency response, storm response, outage restoration and power-out calls, and cable locates. Regulation needs to acknowledge that staff availability to deal with stray voltage can be limited when there are competing higher-priority demands.

Hydro One believes that distributor response to stray voltage issues must also address dispute resolution. Dispute resolution processes that distributors currently employ for other customer service areas should be leveraged for this area as well, with a similar option for customers to escalate any concerns to the Board at any time.

Thresholds

The threshold measure should be the one that best addresses the actual problem – in this case behavioural problems of livestock on dairy farms. The discussion paper refers to a

1.0 V ACV as the threshold that experts have identified as the voltage at which the most sensitive cows would exhibit a mild behavioural response. Hydro One uses this same assumption in its current processes and believes that while it may be more difficult for distributors to measure and control, it most closely aligns with the problems affecting farm operations.

Economic considerations in setting thresholds and mitigation measures

There needs to be some common understanding among the regulator, customers and distributors of what is an appropriate level of investment to address stray voltage issues and an indication that (if prudently incurred) it is recoverable.

Benchmarking efforts may suggest low baseline values, but the cost to reach these levels will be high. Specifically, the discussion paper appears to have significant basis on the Wisconsin model. Much of our province will likely have worse soil/grounding conditions than most of Wisconsin; so the low NEV levels achievable there may be unachievable here. It is our understanding that over $1 billion was spent on grounding improvements in Wisconsin; and that the system is one quarter of the size of ours. Maintaining a low level of NEV does not necessarily guarantee a low animal contact voltage.

Setting very low limits on the utility system may result in extremely high costs in some situations where more cost effective alternatives are available. For example, using the cost estimates in the discussion paper, the cost to convert from single phase to three phase lines is around $160,000 for 5 km, or $32,000 per km. About 50% of the Hydro One distribution system (approximately 120,000 circuit–kilometres) is single-phase. In many cases long, "skinny", unbalanced, rural single-phase feeders accentuate farm Stray Voltage issues. The cost to convert to these lines to a higher voltage is around $25,000 per km. These conversions may not necessarily lower the NEV below 2V. By comparison, if a rural feeder has one farm per km, then the cost to install a tingle voltage filter at each farm is only around $1,000 per km.

The need for an industry-wide solution

Cases of farm stray voltage can be difficult to resolve quickly. There is no standard solution, and the remediation process involves a systematic procedure of measurements to determine where the problem lies (i.e. inside the farm, at the LDC interface or in the distributor's system). Depending on the problem location, the nature of the solution and the service providers will be different as well. Since not all farm stray voltage issues are caused by distributors, the distributor may not always be the first contact for resolution.

The solution thus requires a coordinated response involving the regulator, government bodies (including OMAFRA), distributors and the ESA.

Education of the construction/service industry that build/service farms could be a key part of the solution to stray voltage issues. While the Ontario Electrical Safety Authority (ESA) specifies mitigative measures, it is not clear whether the Ontario Building Code

recognizes this and whether the building inspectors check against these measures. Another aspect is whether the electricians who service the farm sector are adequately trained to detect Farm Stray voltage and specify solutions to the farm owners. For example, it is not uncommon to find "ground grid mesh" on the cattle barn floor either absent or badly corroded. New farms should have equipotential grids. This requirement has been in the Ontario Electrical Safety code for many years now. A properly installed equipotential grid should eliminate any problems from a high NEV. Technical solutions and devices that offer mitigation against such problems need to be readily available in the market to the farming community.

2.0 Specific comments on the 12 issues and options identified in the paper

SQIs and Thresholds:

Issue 1: Where ACC/ACV is found to be above 2mA/1 V, what electricity service quality indicator should serve as the trigger for distributor action?

Options:

a. Distributors target primary NEV;
b. Distributors target the contribution of the distribution system to ACC/ACV on the farm.

Hydro One's current and proposed approach is that it is a customer enquiry or complaint, not an SQI that should form the basis for action by the distributor. The basic measurement Hydro One supports is ACC/ACV as it is directly related to the cause of animal behaviour problems. The contribution of the distribution system to ACC/ACV will need to be calculated.

Once a customer enquiry is received, the distributor should initiate a technical investigation. Once the distributor responds to the enquiry or complaint, the most helpful approach would be to target the ACC/ACV. While the distributor's primary NEV is a much easier value for the Distributor to determine, and it does not require the Distributor to perform testing on the customer's property, it is the ACC/ACV that is actually causing the behavioural problems on the farm.

Setting a target for, and measuring the distributor's contribution to the ACC/ACV is not particularly helpful to the farm customer, whose goal is not the attribution of responsibility, but rather the solution of the problem.

For this reason, Hydro One's current practice targets the ACC/ACV, which may be influenced by both on-farm and off-farm sources; and choosing the most cost-effective method of remediation on a case-by-case basis. If the ACC/ACV is found to be unacceptable, Hydro One takes mitigative actions (reduction of NEV and/or the installation of filters). If the mitigative actions do not serve to reduce the ACC/ACV, then it is reasonable to assume that the problem is not attributable to the distribution

system, and in that case the customer is owed an explanation of what next steps can be taken to reduce the ACC/ACV to acceptable levels.

Issue 2: What should the numerical threshold value be?

Options:

a. 2.0 V if distribution system NEV at the primary/secondary connection point at the farm is the action threshold;
b. 1 mA ACC or 0.5 V ACV if the distributor's contribution to stray voltage is the action threshold.

Both options may be unachievable in many instances and where achievable would involve very significant investment.

Hydro One believes that the target, from the customer's vantage point, should be 1.0 V ACC/ACV (without regard to the distributor's contribution to that level), as this is the voltage that is believed to start affecting animal behaviour.

Hydro One is not supportive of any mandated changes to the required NEV. Hydro One's distribution system was developed to operate with a NEV of less than 10V, but it is a considerable challenge in certain locations to operate even to that level.

The 2 Volt NEV would be very difficult to achieve in general and may not be possible in some locations. To achieve 2V NEV at the most common farm feeder supply voltage of 4.8 kV, the corresponding system ground resistance would have to be 0.2 Ohms. By comparison, the CSA Overhead Systems standard (C22.3 No. 1) calls for a resistance of a multi-grounded neutral system to be no more than 6 Ohms *where practicable*. This is roughly thirty times higher than the value required above for our most common supply voltage system! Forcing an unrealistically low value in some locations would result in significant costs to the ratepayers. Further, if applied to all distribution circuits, such a requirement would cost billions of dollars to achieve, given Hydro One's mostly rural territory, where we have long single-phase lines. In many locations, the soil resistivity is very poor which makes low levels of NEV even more difficult to maintain.

Issue 3: Should cow-based thresholds be applicable to all types of livestock farms?

Options:

a. Apply the numerical threshold to all livestock farms regardless of species;
b. Apply the numerical threshold to dairy and cattle farms only and adopt an alternative threshold(s) where other species are involved.

The critical need is only for dairy and cattle farms. Hydro One has received little to no complaints regarding other types of livestock. This may support the statement that other livestock are affected at higher exposure levels, but it is just as likely that this is due to the way that other livestock are housed. Hogs are commonly housed in facilities with metal floor grates, and poultry are in metal cages. If equipotential bonding with feeders

and waterers is present, then no ACV will exist (regardless of NEV levels). It would not be economical to enforce the same voltage threshold for other livestock. Thresholds for other livestock should be based on research, similar to that done for dairy cows, and should not be set prematurely.

Investigation Procedure

Issue 4: Should details of the investigation procedure be prescribed?

Options:

a. Outline the goals and objectives of the procedures (e.g. measurements relevant to thresholds) and require that distributors design procedures that meet these goals and objectives;
b. Require that all distributors use a specific Board-approved procedure.

While Hydro One recognizes the benefits of standard approaches and consistent treatment of customers, Hydro One remains unconvinced that these benefits outweigh the costs of establishing Board-approved testing procedures where utilities may have already established and implemented appropriate procedures. Any deviations from procedures that are in place today may require reinvesting in relatively expensive equipment, procedures, and training.

Testing procedures, and other distributor processes and procedures must be flexible to respond to various types of situations and to changes over time. Board oversight at this level could limit such flexibility.

As an alternative, and to assure itself that customers are treated fairly and consistently, the Board can request that distributors file or post certain procedures, similar to the approach taken for Connection Procedures for transmitters.

Issue 5: Should distributors be responsible for identifying on-farm sources of stray voltage?

Options

a. Distributors are responsible only for investigating whether stray voltage exists and if so, the distribution system contribution thereto. However, distributors may conduct testing to identify on-farm sources at the request and expense of the farm customer;
b. Distributors are responsible for identifying sources of farm stray voltage including the distribution system and on-farm sources.

Both options require distributor testing on-farm. Even in option (a), for the distributor to identify if stray voltage exists, and determine its own contribution to it, the distributor must make on-farm measurements.

However, Hydro One maintains that, if and when the distributor determines that the problem is not related to the distributor's system, it is the customer's electrician, not the distributor who should perform testing to find on-farm sources. This transfer of accountabilities, though, must be performed in a cooperative and seamless manner, to ensure that customers are made aware of the status of the investigation, the options available to them, and the next steps.

Typically the Distributor is not responsible for assets and electrical equipment beyond the customer's meter. However, the initial measurement of animal contact voltage must be taken on the customer's system. Often the problem exists on the customer's system; and one of the most feasible mitigation solutions (Tingle Voltage Filter) must be installed on the customer's system. It would be inappropriate for the distributor to perform 'forensic tests' to determine on-farm sources of stray voltage, working on the customer's premises, and this might even contravene distributors' licences.

Also of concern are the implications of having a distributor's staff working in an environment that is outside of the distributor's control (eg barns), which could put employee safety at risk due to an unknown or possibly even undesirable working environment. Similarly, there is the issue of liabilities in the event of an incident.

Distributors cannot and must not be held responsible for determining on-farm sources.

Training and Certification

Issue 6: Should stray voltage investigators be specially trained?

Issue 7: Should minimum training standards be specified?

Issue 8: Should investigators be certified?

Hydro One's view is that investigators should use the proper test equipment, and that they should be appropriately trained to use such equipment and correctly interpret the results. A formalized training program, with certification, would ensure consistent results. Standardized procedures and training would provide the utilities with assurance that test results are reliable and can be used for further investigations and action. Hydro One has set up stray voltage investigation training at our Kleinberg facility. Several staff have already received this training, and further training will be taking place this fall. Another alternative that isn't mentioned in the discussion paper is the possibility of third-party testing (e.g. the ESA).

Customer Response Procedure

Issue 9: Should a special farm stray voltage customer response procedure be used?

Options

a. Require that distributors have a customer response procedure specifically for dealing with farm stray voltage requests;
b. Prescribe a customer response procedure that must be used by distributors when dealing with farm stray voltage requests.

Hydro One does agree that a customer response procedure is required. However Hydro One has concerns about mandating requirements for something where the scope of work, customer demand, and ability to implement are not yet known. Given the large number of farms in our territory, a potentially high initial volume of requests could create an unachievable situation. Hydro One currently has response procedures in place and would be pleased to file these with the Board.

Regulatory Record-keeping and Reporting

Issue 10: What should distributors be required to do regarding farm stray voltage record-keeping and information reporting?

Options

a. Specify the types of information distributors must keep on file regarding farm stray voltage requests, investigations, remediation efforts and outcomes so that the Board can obtain them by request;
b. Stipulate the information and analyses (e.g. summaries, analyses or copies of the detailed records) to be maintained by distributors and submitted to the Board in annual filings.

It is certainly in the distributor's interest to maintain good records on farm stray voltage investigations and Hydro One recognizes the benefit of good record-keeping.

Hydro One believes that the Board should specify, in advance, the minimum information requirements it expects distributors to meet in record keeping, so that this expectation is not left open to interpretation. However, given the early stages of regulation in this area, it is not desirable to over-prescribe requirements, as this will delay responsiveness and increase administrative costs. The best way to deal with unresolved issues is via requests for records.

LDC Remediation Options

Issue 11: Should distributor discretion over the choice of remediation method be subject to restrictions?

Options

a. 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;
b. Stipulate any restrictions on the use of certain remedies and the conditions under which they may be employed, specifying where applicable which costs are eligible for recovery in rates.

The first option is preferred, as it leaves the accountability with the distributor, as in other areas of its operations, where recovery of prudently-incurred expenses, once demonstrated, can be expected. The second option involves regulatory restrictions that could be problematic, costly, and fail to recognize specific circumstances that distributors will encounter as they gain experience in this area. Each situation of stray voltage needs to be evaluated on its own merits.

Informing Farm Customers

12. What are distributors' responsibilities to farm customers in terms of providing information?

a. Require distributors with livestock farm customers to provide access to information on farm stray voltage and customer response and dispute resolution procedures;
b. Specify the content and 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.

Option a) is appropriate. Distributors should be expected to post and share helpful information with customers. The implementation of these requirements is best left with distributors, to ensure that they address the specific situations that customers encounter, and to allow distributors to execute this task in the most cost-effective manner.