Ontario Energy Board

Commission de l'Énergie de l'Ontario

RP-1999-0057
EB-2002-0424

IN THE MATTER OF the *Ontario Energy Board Act, 1998,* S.O. 1998, c. 15, Schedule B;

AND IN THE MATTER OF a proceeding pursuant to sections 2.5 and 2.6 of the Transmission System Code

BEFORE: Paul Sommerville
Presiding Member

Art Birchenough
Member

DECISION AND ORDER

July 25, 2005

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1. THE PROCEEDING

On April 19, 2002 Hydro One Networks Inc. (“Hydro One”) filed with the Board a document entitled “Customer Equipment Compliance Process” in furtherance of section 2.6 of the Transmission System Code ("TSC" or the “Code”). Section 2.6 of the TSC contemplates that transmitters will develop rules and procedures for requiring customer equipment to be brought into compliance with performance standards established in the TSC. The filing of such rules and procedures with the Board for review is a condition precedent to a transmitter requiring certain customer equipment to be brought into compliance.

On May 3, 2002 Hydro One filed with the Board a document entitled “Customer Delivery Point Performance Standards” in furtherance of the obligation of transmitters to develop performance standards at the customer delivery point level. Section 2.5 of the TSC requires transmitters to file these performance standards with the Board for its review and approval.

The Board designated Hydro One as the proponent for the purpose of cost awards, to be administered in accordance with the Board’s guidelines on costs.

The Board issued a Notice of Proceeding on September 3, 2002, and received fourteen interventions. The Board indicated in the Notice of Proceeding that it would issue a procedural order with respect to the review of Hydro One’s filings once Phase 1 of the Board’s TSC review proceeding (RP-2002-0120) had been completed. The Board issued its Policy Decision with Reasons in that proceeding on June 8, 2004.

In a letter dated June 2, 2004, Hydro One indicated that it intended to amend its filing on customer delivery point performance standards (“CDPP Standards”) as a result of stakeholder comments that Hydro One had received after the original filing. Changes to the customer equipment compliance process filing were not proposed.

Given that the CDPP Standards and customer equipment compliance filings raised related questions of fact and policy, the Board decided to consider the two filings in a consolidated proceeding. On June 25, 2004, the Board issued Procedural Order No.1 consolidating the customer equipment compliance and CDPP Standards proceedings into one proceeding. The Board also indicated that the combined proceeding would commence following the submission by Hydro One of its amended CDPP Standards filing.

On September 8, 2004, Hydro One filed with the Board amendments to its CDPP Standards filing.

On October 14, 2004, the Board issued a Supplementary Notice of Proceeding to offer an opportunity for any additional interested parties to participate in this proceeding. One new intervention was received. In its Supplementary Notice, the Board also indicated that it intended to proceed by way of a written process.

On November 26, 2004, the Board issued Procedural Order No. 2 providing for the filing of initial and supplementary interrogatories, and responses thereto, and for the filing of evidence. In light of the omission by an intervenor to serve its interrogatories on the parties as required by Procedural Order No. 2, the Board issued Procedural Order No. 3 on February 7, 2005 to establish a new schedule for the further exchange of documents in this proceeding. The deadline for the final step – the filing of responding submissions by Hydro One – was set for April 18, 2005.

Prior to turning to the substantive issues, the Board wishes at the outset to acknowledge the significant efforts of Hydro One and of all intervenors in this proceeding in working towards the development and refinement of Hydro One's CDPP Standards and customer equipment compliance process.

2. CUSTOMER DELIVERY POINT PERFORMANCE STANDARDS

2.1 The TSC Requirement

Under section 2.5 of the TSC, a transmitter is required to develop performance standards at the customer delivery point level, consistent with system wide standards. The performance standards are required to reflect the following:

a) typical transmission-system configurations that take into account the historical development of the transmission system at the customer delivery point level;

b) historical performance at the customer delivery point level;

c) acceptable bands of performance at the customer delivery point level for the transmission system configurations, geographic area, load and capacity levels; and

d) defined triggers that would initiate technical and financial evaluations by the transmitter and its customers regarding performance standards at the customer delivery point level, exemptions from such standards, and study triggers and results.

These performance standards are required to be filed for the Board's review and approval.

2.2 Evidence of Hydro One – Description of the CDPP Standards and Process

Hydro One's CDPP Standards proposal comprises two components. The first relates the reliability of supply to the size of load being served. The second is designed to maintain historical delivery point performance at the individual customer level. The CDPP Standards and triggers for each component are described below, together with Hydro One's proposal for the sharing of costs incurred in implementing the CDPP Standards.

For convenience, the first component will be referred to as the "Group (Outlier) CDPP Standards" and the second component will be referred to as the "Individual (Inlier) CDPP Standards".

2.2.1 Performance Standards Based on Size of Load Being Served - Group (Outlier) CDPP Standards

In this component, the CDPP Standards and the associated triggers are based on the size of load being served. For this purpose, the load is the delivery point's total average station load as measured in megawatts. The CDPP Standards vary with the size of the load (in bands of 0-15 MW, 15-40 MW, 40-80 MW and >80 MW).

The CDPP Standards for existing transmission load customers (including customers that signed a connection and cost recovery agreement prior to market opening) are based on historical (1991-2000) performance, as measured by the frequency and duration of outages, that covers the impact of all momentary and sustained interruptions caused by forced outages, excluding outages that result from certain force majeure events that are deemed by Hydro One as appropriate to be excluded. Included in this category of excluded events are the 1998 ice storm, the 2003 blackout, tornadoes, earthquakes, other acts of God and any other significant event having "excessive"

impact on performance and which is beyond the reasonable control of, and not a result of the fault or negligence of, Hydro One.

The minimum CDPP Standards of performance, for each of the four load bands, are to be used as triggers by Hydro One to initiate technical and financial evaluations with affected customers. These performance bands are designed to:

- accommodate normal year-to-year delivery point performance variations;
- limit the number of delivery points that are to be considered "performance outliers" (as defined below) to a manageable/affordable level;
- deliver a level of reliability that is commensurate with customer value (i.e., the larger the load, the greater the level of reliability provided); and
- direct and focus efforts for reliability improvements at the "worst" performing delivery points.

For new or expanding customer loads requiring new or modified connection facilities, the CDPP Standards will be specified and paid for by the customer based on the customer's connection needs and will be addressed as part of the connection and cost recovery agreement.

a) Criteria for Minimum Standard Performance

When the three year rolling average of delivery point performance falls below the minimum CDPP Standard for a delivery point (referred to as "performance outliers") or when a delivery point customer indicates that analysis is required, Hydro One will initiate technical and financial evaluations to determine the root cause of the unreliability and any remedial action required to improve reliability.

b) Remedial Costs to Address "Performance Outliers"

To encourage proceeding with only those reliability performance improvements that are

technically and economically practical, and to limit the subsidization of reliability improvement costs by other pool customers, Hydro One's level of incremental investment for improving the performance of a "performance outlier" will be limited to the present value of three years' worth of transformation and/or transmission line connection revenue associated with the delivery point in question.

Hydro One proposes that any funding shortfalls for improving delivery point reliability performance should be made up by affected delivery point customers in the form of a financial or capital contribution. Cost responsibility for these investments is to be developed in a manner that is consistent with the Market Rules and the revised Transmission System Code (the "Revised Code")[1]. Affected delivery point customers will be responsible for all of the costs associated with any new or modified facilities required on lines and stations they own. The financial contribution requirements and cost sharing arrangements are to be detailed in a connection and cost recovery agreement to be signed with the affected customers before any work to improve "performance outlier" delivery point performance begins.

2.2.2 Performance Standards to Maintain Historical Delivery Point Performance - Individual (Inlier) CDPP Standards

In this component, the CDPP Standards are intended to maintain the historical reliability performance levels at each customer delivery point.

In order to identify customer delivery points with deteriorating trends in reliability performance, a performance baseline trigger for the frequency and duration of forced (momentary and sustained) interruptions is to be set at each delivery point. The baseline trigger will be based on the delivery point's 10-year historical average performance, plus one standard deviation. The baseline will include forced outages

[1] The Board has adopted and is issuing today a revised Transmission System Code in proceeding RP-2004-0220.

resulting from force majeure events, but will exclude events that have an “excessive” impact on the transmission system and that, in Hydro One’s assessment, strongly skew the historical trend of the measure (such as the 1998 ice storm and the 2003 blackout). Delivery points with deteriorating trends in reliability performance will be identified regardless of whether they may be satisfactory performers when compared to the group performance of comparable delivery points.

a) Criteria for Minimum Standard Performance

Delivery point performance that is worse than the baseline (for either frequency or duration) in two consecutive years will be a candidate for remedial action. In such cases, Hydro One will initiate technical and financial evaluations with affected customers to determine the root cause of the unreliability and the remedial measures required to restore the historical reliability of the delivery point’s performance.

These CDPP Standards will apply to all transmission load customers. For existing customers with more than 10 years of historical delivery point performance data, the baseline will be fixed based on historical average performance in the period 1994-2003. Customers with fewer than 10 years of historical delivery point performance data are excluded until a minimum of 5 years’ of data is available to establish an initial baseline. The baseline will then be updated each year until 10 years of performance data is available to fix and set the final baseline.

b) Remedial Costs to Maintain Historical Delivery Point Performance

In light of Hydro One’s commitment to maintain historical levels of delivery point performance, Hydro One will cover the remedial costs of restoring and sustaining the inherent reliability performance of the existing assets to what was designed originally. These costs include appropriate asset sustainment costs, on-going maintenance costs and costs associated with asset replacement.

Hydro One's remedial work will not include capital reliability improvements that significantly enhance the reliability of supply relative to the reliability that was inherent in the original system design or configuration of supply.

2.2.3 Implementation

The CDPP Standards define triggers for Hydro One to initiate technical and financial evaluations with affected customers.

Hydro One reviews reliability performance with its customers each year and will identify customer delivery points that are not meeting either the Group (Outlier) CDPP Standards or the Individual (Inlier) CDPP Standards. Where this is the case and the customer wants to proceed with delivery point performance improvements, Hydro One will negotiate with the customer the remedial action required, the timing and cost sharing arrangements associated with the remediation, and any other related matters.

The remediation plan will consider customer impacts, the nature of the remedial measures, equipment deliveries, implementation schedule, Hydro One resource capabilities, other investment priorities, outage requirements and resource availability.

2.3 Analysis and Findings

Listed below are the various issues identified through the two rounds of interrogatories, submissions and reply submissions. For each issue, the position of parties is followed by the Board's findings.

2.3.1 Load Grouping for Group (Outlier) CDPP Standards – General

Hydro One has proposed to apply different performance standards depending on the size of total average station load being served. For this purpose, load would be classified in one of four load bands (0-15 MW, 15-40 MW, 40-80 MW and >80 MW).

Hydro One argued that the use of load bands accommodates normal year-to-year delivery point performance variations, limits the number of delivery points that are to be considered “performance outliers” to a manageable level, is commensurate with customer value (“the bigger the load the greater the level of reliability”), and will allow, or direct, focus on reliability improvements at the “worst” performing delivery points.

As evidence of the reasonableness of the methodology of basing performance standard on load size, Hydro One pointed to the Independent Electricity System Operator’s (“IESO”) Supply Deliverability Guidelines. Those Guidelines, which apply to pre-connection studies for transmission customer connections, contain as a basic premise that the level of reliability of supply should be related to the size of the load being served, i.e., the larger the load, the greater the level of reliability. Similarly, in general the greater the load affected, the shorter the duration of the interruption is desired. The Guidelines also refer to the former Ontario Hydro’s Guide to Planning Regional Supply System Deliverability (also known as the “E2” Guide). That Guide reflects a similar approach by using groupings according to load size for purposes of establishing the maximum acceptable severity of interruption.

Hydro One also submitted a survey of customer interruption costs (“CIC”), which represent the economic value to customers of unsupplied MWh of energy. The survey indicated that, for a given duration of interruption, the CICs increase as the size of the load increases. Hydro One then calculated a “Customer Value of Reliability” based on the number of interruptions that would result in different levels of CICs being achieved, up to a “CIC Ceiling” equal to Hydro One’s annual transformation and line connection costs for a 15 MW load.

The Board considers that the use of a grouping methodology for performance standard purposes strikes the right balance with respect to practical application and accuracy. The Board finds that Hydro One's approach, based on a measure of the customer's value of reliability which varies with the size of the load served, is reasonable. Although Hydro One is not able to estimate the value that one megawatt represents to each customer in terms of some common quality, such as profit or productivity, the Board finds that the CIC concept is not unreasonable as a proxy.

The Board notes that Hydro One has expressed the load bands as 0-15 MW, 15-40 MW, 40-80 MW and >80 MW, which would result in 15 MW or 40 MW loads being subject to classification in two bands. The Board has assumed that a load that is 15 MW would be classified by Hydro One in the first band (such that the second band would be >15-40 MW), and that a load that is 40 MW would be classified in the second band (such that the third band would be >40-80 MW). Hydro One's CDPP Standards should be clarified to ensure that a load of any given size cannot be classified within more than one band.

2.3.2 Load Grouping for Group (Outlier) CDPP Standards - Gross Load versus Net Load

Hydro One has proposed to group each customer within a given load group based on the customer's net load at the delivery point.

Imperial Oil ("Imperial") submitted that the CDPP Standards should be based on the gross load of the delivery point. A facility should be categorized within the appropriate group based on the facility's highest energy requirements rather than on its annual load. In Imperial's view, a facility that has the capacity to self-generate power on an intermittent basis should nonetheless expect to be classified as any other facility of a similar size and nature for the purposes of a reliability standard.

Imperial also submitted that Hydro One's proposal of basing performance standards on net average load results in a reduction in reliability for large volume facilities with self-generation capacity and is therefore at odds with the Government's conservation objectives and with the Board's RP-1999-0044 and RP-2002-0120 decisions.

In its reply submission, Hydro One submitted that basing the level of reliability on the average station load (net total energy) delivered by the system to the customer delivery point provides the basis for how the transmission connection facility is actually being used, and that the reliability and the investment level should be commensurate with the actual use of the facility. This should not be confused with billing policies or other rules related to a connected generation facility.

The Board acknowledges Hydro One's view that the classification of customers into load groups is based on the application of a constant customer interruption cost per unit of load, which leads to an equal risk of annual unsupplied energy to all customers. The implied reference is that the unit of load refers to load drawn from the transmission system which, according to Hydro One, is the net load.

However, the Board considers that different considerations may apply where a transmission customer has the capacity to engage in the generation of electricity at its site. To the extent that the generation facility at a customer's site is interrupted either momentarily or for a period of time when an outage occurs on the transmission system, the total load of that customer is exposed to that interruption. Accordingly, the use of gross load as the basis for load grouping can be justified, and would be consistent with the charge determinants that apply for embedded generation installed after October, 1998 as specified in the relevant transmission rate order.

At this time the Board does not have a sufficiently comprehensive evidentiary basis upon which to definitively assess the full range of implications of the net load grouping proposal on existing customers with generation facilities on their sites. The Board notes, in this regard, that transmission customers that have generation facilities on their

sites may be affected differently by outages. The Board is of the view, however, that relevant data can be obtained from transmission customers on this point. The Board will therefore direct Hydro One to explore this issue with those of its transmission customers that have generation facilities supplying their sites. The purpose of the consultation will be to provide a better understanding of the effects of outages on such customers. The results of such consultation may lead to revised classification criteria that are reflective of the degree to which the total loads of such customers are at risk of interruption when an outage occurs on the transmission system.

The Board has determined that in the interim, and until Hydro One completes and submits the results of its consultation and of any proposed revisions to its CDPP Standards to the Board for review and approval, the Group (Outlier) CDPP Standards are to be based on gross load.

2.3.3 Fixed Ten Year (1991-2000) Reference for Group (Outlier) CDPP Standards

Hydro One has proposed that the CDPP Standards be based on the historical (1991-2000) performance of a group of customers within a load band.

The Board notes that, in response to an interrogatory filed by Imperial requesting an examination of other ten-year periods as the reference for analysis, Hydro One indicated that data for the period prior to 1990 is not available.

The Board is satisfied that the fixed ten-year period comprising 1991-2000 should be the applicable reference period for the establishment of Group (Outlier) CDPP Standards.

2.3.4 Fixed Ten Year (1994-2003) Reference for Individual (Inlier) CDPP Standards

Hydro One, in its amended proposal of September 2004, proposed that a separate performance baseline be established based on the ten-year historical average performance of the delivery point, plus one standard deviation. For existing customers with more than 10 years of historical delivery point performance data, the baseline would be fixed based on historical average performance in the period 1994-2003. The trigger for initiating technical and financial evaluations will be performance that is worse than the applicable baseline, for either frequency or duration, in two consecutive years.

Imperial submitted that the proposed Individual (Inlier) CDPP Standards should be amended such that the reference period used is the same as that used for the Group (Outlier) CDPP Standards, and that the relevant period should be 1991-2000. Imperial submitted that this will be of particular importance in instances where the earlier historical data (1991-2000) evidences fewer disruptions than is the case in the later period (1994-2003) proposed by Hydro One. Imperial noted in this regard that its Sarnia facility has experienced more outages in the last five years than it has at any time in the last twenty years.

Hydro One submitted that it is more appropriate to use the most recent 10 year period (1994-2003) for the purpose of establishing the performance baseline trigger for the frequency and duration of forced interruptions at each specific delivery point. In its view, as the transmission system evolves it is appropriate to use a reference period for measuring customer reliability performance that is more reflective of the current or most recent system configuration.

The Board notes that Hydro One had in its first submission proposed a rolling 10 year period (initially, 1994-2003) as the reference point which was the most recent at that time, but changed it in the amended submission to a fixed 10 year period (1994-2003) in

response to customer feedback which favoured a fixed period but not necessarily the most recent 10 year period.

The Board finds that the proposal to use a different fixed 10-year period for the Individual (Inlier) CDPP Standards from that proposed for the Group (Outlier) CDPP Standard is not acceptable. The Board considers that the same reference period, 1991 to 2000, should be used for both the Individual (Inlier) CDPP Standards and the Group (Outlier) CDPP Standards. The Board also finds that, for delivery points that came into service after 1991, the in-service year should be the first year of the 10-year period used to determine the performance baseline.

2.3.5 Expanded Reference Period for Individual (Inlier) CDPP Standards

The Association of Major Power Consumers in Ontario ("AMPCO") submitted that the statistical base used for determining Individual (Inlier) CDPP Standards status should be expanded with accumulating experience, in order that deteriorating trends can be most accurately identified. Further, while some reference base is clearly required for identifying a deteriorating trend, the limitations of the current Hydro One proposal of using 1994-2003 as reference data are such that some customers could become eligible through the Group (Outlier) CDPP Standards process before their problems surface through the Individual (Inlier) CDPP Standards process.

Imperial submitted that the CDPP Standards should be modified to facilitate compliance with the TSC and to increase reliability and accuracy in the Individual (Inlier) CDPP Standards by allowing for the use of up to 10 years of additional relevant historical data where such data exists. Where historical data exists for a decade prior to 1990, it should be incorporated into the development of the Individual (Inlier) CDPP Standards. Imperial argued that the use of the 1991 to 2000 period (which as noted above Imperial argued should also be used for the Individual (Inlier) CDPP Standards) will tend to skew the reliability performance statistics because the system itself has been less efficient as a whole over that period than was the case before 1991. This would result in Hydro

One having to meet a reliability standard that is lower than would be the case if additional data were to be incorporated into the analysis.

The Board finds that there is merit in establishing a fixed reference period for the determination of the Individual (Inlier) CDPP Standards. While parties may wish to "fine tune" the analysis to include additional periods and minimize the impact of others, a single, defined period offers the most consistent approach. The fact that, according to Hydro One, data from the period prior to 1990 is not available is also significant. The Board reiterates that the 10 year period (1991-2000) will be used for both the Individual (Inlier) CDPP Standards and the Group (Outlier) CDPP Standards.

2.3.6 Exclusion of "Excessive Impact" Events

Hydro One, in its amended proposal of September 2004, indicated that in considering the performance baselines for the Individual (Inlier) CDPP Standards it would include forced outages resulting from force majeure events, but would exclude outages resulting from events which have an "excessive" impact on the transmission system and that, in Hydro One's assessment, strongly skew the historical trend of the measure (such as the 1998 ice storm and the 2003 blackout).

In response to an interrogatory, Hydro One indicated that no other events had been excluded from the data.

The Board agrees with Hydro One's proposal of including outages resulting from force majeure events other than events that have excessive impacts on the system, such as the ice storm of 1998 and the blackout of 2003. The Board expects Hydro One to act reasonably in determining whether or not an event has an "excessive" impact on the system such that its inclusion would strongly skew the historical trend of the measure.

2.3.7 Multiple Outage Events

Hydro One has proposed to include multiple outage events with one root cause in determining compliance with the CDPP Standards.

AMPCO noted that Hydro One will include multiple outage events with one root cause in determining compliance with the CDPP Standards, and does not intend to exclude such events except on a case-by-case basis.

Imperial also noted that Hydro One does not intend to apply any principled exclusion to such events, and will make such determinations on a case-by-case basis. Imperial also submitted that this approach does not accurately reflect the performance standard of a customer delivery point and will lead to a dilution of reliability over the system. In Imperial's view, where multiple outages result from one underlying cause, it is the underlying cause that should reflect performance at the delivery point and not the resulting number of outages caused by the same root cause. Counting each outage will result in the creation of a poor performance standard for a customer delivery point where, in the absence of a singular problem, the delivery point may otherwise meet the applicable standard. Accordingly, where there are multiple outage events resulting from the same root cause, compliance with the CDPP Standards should be assessed in light of the root cause of the events.

In its reply submission, Hydro One stated that a forced interruption to a customer's operations is an interruption, howsoever caused. It is therefore reasonable to expect that all forced interruptions be counted and charged to Hydro One's reliability performance, both for the purpose of establishing CDPP Standards baselines and for assessing compliance with CDPP Standards.

The Board notes that tracking the root cause for related events may appear to benefit the tracking process for the Group (Outlier) CDPP Standards as it lowers the number of outages for the various load groups within the 10-year period. However, since the

yardstick and actual performance will be determined on the same basis, the comparative outcome for any delivery point would not be materially different. In the Board's view, the benefit of using root cause as the driver for the frequency of outages is likely marginal, and is likely to be outweighed by the cost and effort involved in performing the root cause analysis to adjust historical data from 1991 to the present. The Board therefore finds Hydro One's proposal acceptable.

2.3.8 Inclusion or Exclusion of Outage Events

For purposes of the CDPP Standards, Hydro One has proposed to classify outages as "all momentary and sustained interruptions caused by forced outages, excluding force majeure events that are deemed appropriate to be excluded". Hydro One indicated that (i) outages due to a fault in a customer's equipment would be recorded but not charged against Hydro One for the customer initiating the interruption, but would be charged against Hydro One's reliability performance for other affected customers; (ii) a sequence of outages due to the fault of Hydro One would be included in the CDPP Standards; and (iii) outages due to an unknown fault would also be included in the CDPP Standards.

Imperial submitted that the definition of outages should be expanded to accommodate the understanding that outage events resulting directly or indirectly from Hydro One's acts or omissions are excluded for the purpose of establishing the CDPP Standards, and included for the purpose of determining compliance with the CDPP Standards.

As noted above, Hydro One submitted that forced interruptions be counted and charged to Hydro One's reliability performance, both for the purpose of establishing the CDPP Standards baselines and for assessing compliance with CDPP Standards.

The Board accepts Hydro One's proposal that the events used in establishing the CDPP Standards baselines should also be included for purposes of assessing compliance with the CDPP Standards. The Board observes that to do otherwise would not be logical, because it would have the effect of requiring the transmitter to uphold a standard

reference which is inconsistent with the ongoing proposed actual performance tracking of the CDPP Standards.

The Board also finds Hydro One's proposal regarding the treatment of customer-caused events to be reasonable. The CDPP Standards are a transmitter responsibility. While it is appropriate that outage events caused by a customer not be counted against the transmitter in relation to the performance of that customer's delivery point, it is also appropriate for the transmitter to bear the burden of such an outage vis-à-vis adjacent customers that might be affected by an outage caused by another customer. The transmitter should bear responsibility for: (a) isolating other customers from the effects of such an outage; and (b) taking action to resolve the problem caused by the offending customer.

2.3.9 Cost Responsibility for Remedies Relating to Group (Outlier) CDPP Standards

Hydro One has proposed that its level of incremental investment in line and transformation connection facilities for improving the performance of a "performance outlier" be limited to the present value of three years' worth of transformation and/or transmission line connection revenue associated with the delivery point in question. Where a delivery point pays only network tariffs, transmission line connection tariffs are to be used as a proxy in the revenue calculation. Any funding shortfalls for improving delivery point reliability performance are to be made up by affected delivery point customers in the form of a financial or capital contribution. Cost responsibility for these investments is to be calculated in a manner consistent with the Market Rules and the Revised Code. Affected delivery point customers will be responsible for all the costs associated with any new or modified facilities required on lines and stations they own. In these cases, the financial contribution requirements and cost sharing arrangements are to be detailed in a connection and cost recovery agreement to be signed with the affected customers, before any work to improve delivery point performance begins.

Through interrogatories, Energy Cost Management Inc. ("ECMI") elicited additional detail with respect to the implications of Hydro One's proposal. Hydro One's responses to ECMI's interrogatories indicated the following:

- When Hydro One completes work to restore delivery point performance to standard, it continues to monitor the delivery point the year after the work is completed. If future performance suggests that the standard has not been met, then Hydro One will review the work that has taken place and will identify corrective action, possibly with the financial participation of the customer. Hydro One will not as a practice wait another 3 years and start a new technical and financial evaluation. Hydro One reviews and identifies customer delivery point performance (Group (Outlier) CDPP Standards) annually, regardless of the investment history.

- Hydro One does not charge for the cost of the initial technical and financial evaluation. The cost to prepare the final estimate is the only portion of the technical and financial evaluation that is included as part of the cost of the remedial work. Typically, the cost to prepare the final estimate is a small fraction of the total remedial effort and represents a declining percentage as the cost of a project increases.

The Board is of the view that the above clarifications offered by Hydro One regarding the approach it uses to implement the Group (Outlier) CDPP Standards should be incorporated into the CDPP Standards document.

The Board wants to clarify that the CDPP Standards process description should state that Hydro One will not attribute the costs associated with network investment to any customer, as specified by the Revised Code. Any variance from that approach requires a determination of the Board further to a request by any party, including Hydro One.

AMPCO proposed that, where lack of maintenance leads to substandard performance, the transmitter should be made responsible for a portion of the cost to restore equipment to original performance standards. AMPCO stated that the contribution formula articulated in section 1 of Hydro One's proposed standard under "Remedial Costs to Address Performance Outliers" should be amended to specifically address those situations where, through age or insufficient maintenance, facilities affecting delivery point performance have deteriorated to the point where they no longer perform to their original design standard. In such cases, the transmitter should contribute an amount equal to that which would be required to restore the facility to its original design standard, plus the proposed formula amount.

Hydro One's response to AMPCO's proposal is that it spends approximately $700M per year on O&M and capital expenditures on the transmission system. About half of this money is spent on sustainment work to ensure that transmission assets are in "good" working order and able to perform as intended. These expenditures are made on an on-going basis consistent with "good utility practices", irrespective of actual delivery point performance or of whether a delivery point is a "performance outlier." No customer contribution formula is required for these normal sustainment expenditures.

The Board is of the view that the above clarifications offered by Hydro One regarding its annual expenditures for O&M and capital expenditures, including the sustainment program, should be added to its documentation for the Group (Outlier) CDPP Standards.

The Board notes that Hydro One's commitment, which is captured in the Individual (Inlier) CDPP Standards documentation, makes it responsible for all remedial costs of restoring and sustaining the inherent reliability performance of the existing assets to what was designed originally. The Board believes that the same requirement; namely, that the remedial work must restore the inherent reliability performance of the existing assets to what was designed originally, must also be included in the Group (Outlier) CDPP Standards documentation.

2.3.10 Cost Responsibility for Remedies relating to Individual (Inlier) CDPP Standards

Hydro One has indicated that it is committed to maintaining customers' historical level of delivery point performance. Hydro One will therefore cover the remedial costs of restoring and sustaining the inherent reliability performance of the existing assets to what was designed originally. These costs include appropriate asset sustainment costs, on-going maintenance costs and costs associated with asset replacement. Hydro One's remedial work will not include capital reliability improvements that significantly enhance the reliability of supply relative to the reliability that was inherent in the original system design or configuration of supply.

The Board notes that no party objected to Hydro One's proposal to maintain customers' historical level of delivery point performance, and finds Hydro One's proposal to be reasonable.

2.3.11 Pre-existing Reliability Level Commitments

Imperial submitted that, at the time of connection of its Nanticoke customer delivery point, Hydro One made representations to Imperial that promised a higher level of reliability than that being proposed in the CDPP Standards. Imperial relied on this representation and therefore Hydro One should not now be permitted to impose the inferior CDPP Standards level of reliability on Imperial.

The Board notes that, according to the evidence filed by Hydro One, the CDPP Standards would apply to all existing transmission load customers, including customers that have signed a connection and cost recovery agreement prior to market opening. For new or expanding customer loads, the CDPP Standards will be specified and paid for by the customer based on the customer's connection needs and will be addressed as part of the connection and cost recovery agreement.

The Board does not have sufficient evidence regarding the status of the representations or commitments made to Imperial to enable the Board to make a determination in relation to Imperial's specific circumstances at this time. For example, the Board does not know whether the representations or commitments were made or reflected in a contract, nor whether the contract may have ceased to have effect under section 26 of the *Electricity Act, 1998*.

However, the Board is of the view that, as a matter of principle, where Hydro One has previously made binding representations or commitments to a customer that provide for a higher level of reliability than that being proposed in the CDPP Standards, Hydro One should continue to honour those representations or commitments. The Board recognizes that there may in a given case be compelling reasons (other than the fact that the CDPP Standards provide for a lower level of reliability) that could justify a different outcome. Where that is the case, the onus will be on Hydro One to clearly demonstrate why it should now be released from its pre-existing reliability representations or commitments.

2.3.12 Sharing of Remedial Costs Amongst Customers - Group (Outlier) CDPP Standards

AMPCO submitted that, where specific transmission facilities are serving two or more customers in common with "performance outlier" performance, the transmitter should approach all affected customers to determine their willingness to contribute jointly. Treating each such customer individually could result in lost opportunities for customers to work together with the transmitter to correct performance situations that affect customers in common. Given that the formula proposed for Hydro One's contributions would in most cases require a much larger contribution by the customers, providing the customers with an opportunity to work together with the transmitter would maximize the chances that overall delivery point reliability could improve over time. The process of

remediation may be constrained by competing priorities or budget items internal to Hydro One.

Hydro One has indicated that it is agreeable to AMPCO's proposal.

The Board finds that AMPCO's proposal is reasonable and workable, and that it should be incorporated into Hydro One's CDPP Standards document.

2.3.13 Contestable Work and Customer Contribution – Group (Outlier) CDPP Standards

Hydro One has proposed that some financial contribution be made by customers who are seeking to improve or expand the transmission system to correct "performance outlier" performance.

AMPCO argued that, where customer contributions are required to improve or expand transmitter facilities to correct "performance outlier" performance, the customer should have the option to require that the work for which it will pay be publicly tendered. This reflects the principle that monopoly functions, such as the operation and management of transmission assets, should not be unnecessarily extended to the construction activity, and that customers should have the right to ensure that the costs incurred are consistent with fair market prices.

In its reply submission, Hydro One stated that, where a customer contribution is required to improve or expand the transmission system to correct "performance outlier" performance, the customer will be given contracting privileges consistent with those applicable to new customer connections in the Revised Code.

The Board is satisfied that the Revised Code is a satisfactory basis upon which to determine contestability in cases where a customer contribution is required for correcting "performance outlier" performance. The Board also considers that Hydro

One's documentation for the Group (Outlier) CDPP Standards should expressly cover this aspect.

2.3.14 Time Limits for Remediation – Group Outlier CDPP Standards

AMPCO submitted that Hydro One's CDPP Standards document should include time limits within which the transmitter must complete the investigation and analysis processes. Similarly, constraints should be included in relation to the timing of execution of the remediation work once the customer has agreed to the technical solution and the quantum of the customer contribution. AMPCO suggested an initial limit of six months after the end of the reporting year for investigation and analysis. Execution of the remediation work should not be permitted to be delayed for any reason other than the time required to complete the necessary engineering and to tender the work.

Hydro One did not outline the process by which it would address remediation in relation to the Group Outlier CDPP Standards. In a response to an interrogatory, however, Hydro One did outline such a process in relation to the Individual (Inlier) CDPP Standards. The process suggests an approximate time of 8 months following the end of the reporting year to develop the solution. The process consists of seven steps depicted in a flow chart, and accompanied by a clarifying description for the various steps.

The Board finds that AMPCO's proposal is reasonable, and that it can be accommodated by requiring that Hydro One develop a process for the Group (Outlier) CDPP Standards that is similar to that proposed to be used for the Individual (Inlier) CDPP Standards. The process should show the various steps involved and the duration for each step. The Board expects that the total duration of the investigation and analysis process should be between six to eight months. The Board therefore expects that Hydro One will develop for its Group (Outlier) CDPP Standards an

implementation process as described above, and that Hydro One will include in its CDPP Standards documentation a detailed description of the two processes.

2.3.15 Power Quality

The Board is aware that customers experience power quality ("PQ") events when there is a variation of a parameter which is not measured in the standard specifications of power line supply. For example, the supply might include superimposed high frequency harmonics as a result of switching elsewhere on the system, but the basic line power frequency remains within its 60 Hz specification.

Hydro One's proposal does not include any performance standard for PQ issues. In a document entitled "Stakeholder/Customer Consultations", Hydro One indicated that PQ issues are still not fully understood and that measures or standards are still not generally accepted in the industry. Hydro One proposed to work with its customers to address PQ complaints and issues, using the equipment compliance process that was filed with the Board in April, 2002 and that is discussed in section 3 below.

AMPCO argued that the definition of customer delivery point performance should include outages that occur on the customer side of the connection, when the outage is brought about by an "out-of-limit" condition in supply by the transmitter. "Out-of-limit" conditions should be defined as events when the transmitter's supply at the connection point falls outside the voltage and/or frequency standards set by the IESO as defined in Appendix 4.1 of Chapter 4 of the Market Rules.

In its reply submission, Hydro One stated that it is committed to working jointly with customers to address PQ issues. In addition to retaining PQ monitors already installed at a number of delivery points, Hydro One is establishing a plan to install additional monitors to improve coverage beyond the existing locations. Hydro One also submitted that PQ monitoring equipment is not installed throughout the Province and so it cannot readily determine whether a customer outage is brought about by an "out-of-limit"

condition. Thus, Hydro One may not be aware of power quality impacts on customer processes unless the customer informs Hydro One. Once the customer informs Hydro One of a PQ event, a review is initiated to determine the cause and to develop an action plan for Hydro One and the customer. This may also involve installing power quality monitors.

Hydro One also submitted that the quality of electricity supply is usually consistent with industry PQ standards and those identified in Appendix 2 of the TSC. However, from time to time PQ problems arise that adversely impact the transmission system and customer operations. In these cases, customer specific PQ issues are best addressed on a case-by-case basis. Hydro One provided a reference to its procedure on its website in this regard.

The Board agrees with Hydro One that the PQ issue is a complex one and is satisfied that the parties are making sincere attempts to resolve outstanding issues. The Board accepts that Hydro One's current method of consulting with customers and seeking resolution should be continued. Once Hydro One completes its consultation, it should develop and present to the Board a comprehensive process to deal with PQ issues which will eventually be part of the CDPP Standards. This should include Hydro One's plan for coverage of the transmission system with an adequate placement of monitors, a process for accepting and recording complaints and initiating investigations, and a recommendation for standards and a definition of the scope of the process.

2.3.16 IESO's Local Area Performance and Harmonization with the Individual (Inlier) CDPP Standards

The IESO submitted that it finds the criteria for initiating technical and financial evaluations and triggering remedial actions to be generally acceptable, and it expects that the aggregate historical delivery point performance will not be allowed to deteriorate beyond the corresponding local area performance level established by the IMO (as it then was) in conjunction with Hydro One.

The Board agrees that this expectation on the part of the IESO is reasonable. The Board notes that local area performance represents a commitment made by Hydro One to the system operator, and is further assurance that appropriate performance will be maintained. The parameters measured by the IESO in its monitoring of local area performance are somewhat different than those used in Hydro One's CDPP Standards proposal, but do not conflict with or duplicate what is included in Hydro One's proposal.

The Board therefore considers that this issue need not be expressly included in Hydro One's CDPP Standards process.

2.3.17 Trigger Levels for Individual (Inlier) CDPP Standards

Hydro One's Individual (Inlier) CDPP Standards specify a performance baseline trigger for the frequency and duration of forced interruptions to be set at each delivery point based on that delivery point's fixed 10–year average historical performance, plus one standard deviation.

As noted earlier, AMPCO has expressed the concern that some customers could become "performance outliers" before their problems surface through the Individual (Inlier) CDPP Standards process. The nature of the process through which a reliability problem is identified is relevant from the perspective of the different cost responsibility regimes applicable to the two processes.

The Board shares AMPCO's concern, but does not have any evidence on the basis of which to gauge whether the proposed trigger level is reasonable in terms of balancing the interests of individual customers, on the one hand, and the amount of expenditures to be incurred by Hydro One, on the other.

The Board is of the view that Hydro One should explore the implications of using tighter standards than it currently proposes. The Board will therefore require that Hydro One track the implications of using a performance baseline trigger for the frequency and

duration of forced interruptions under two scenarios: the first scenario to be based on each delivery point's fixed 1991-2000 historical average performance, plus ½ standard deviation (0.5 sigma); and the second scenario to be based on each delivery point's fixed 1991-2000 historical average performance, plus 3/4 standard deviation (0.75 sigma). The implications should cover the number of delivery points that would have triggered a review, without divulging the identity of the delivery points and/or the customers supplied from them. The review should also estimate the amount of expenditures that Hydro One would have incurred or the funds that Hydro One would have had to invest under each of the two scenarios.

2.3.18 Lack of Performance Standards for Generation Connection Points

Ontario Power Generation Inc. ("OPG") has submitted that delivery point performance standards should be developed for generator connections as well as for loads.

OPG submitted that performance standards for generators would enhance the economic efficiency of the Ontario market by improving, over time, the connection of generators to the transmission system. OPG also submitted that the Board should be involved in the establishment of reliability performance requirements for non-nuclear generators and recommended that the Board establish a timeline for a stakeholder process and require that proposed performance standards be filed with the Board for review.

In its response to OPG's interrogatory, Hydro One submitted that the CDPP Standards are applicable to transmission load customers for which there is a net delivery of energy from the system. Hydro One is not planning to develop any performance standard for generator connections because: (a) Hydro One does not maintain historical performance information associated with generator connections; and (b) Hydro One has, based on the terms of its rate order, interpreted the term "customer delivery point" to mean a load customer connection.

Hydro One noted however, that it is currently reporting and managing equipment reliability performance at nuclear switchyards consistent with their specific requirements, and that Hydro One is willing to work with generators to address any reliability issues or concerns or to meet specific generator supply reliability performance requirements.

The Board considers that Hydro One should be required to develop, and submit to the Board for review and approval, revisions to its CDPP Standards documentation that contain a process to track reliability performance for injection points on the transmission system. The proposed addition to the CDPP Standards should be developed in consultation with applicable generation customers.

To clarify this obligation, the Board may propose to amend the Revised Code accordingly.

2.3.19 Review of CDPP Standards

AMPCO has submitted that Hydro One's proposed CDPP Standards should be recognized as a good first attempt and should be scheduled for a review two years after acceptance by the Board. To support such a review, Hydro One should identify those "performance outliers" whose situations have improved during the first two years, as well as trends in individual "inlier" performance and delivery point performance overall.

The Board accepts that a future review of Hydro One's CDPP Standards is appropriate. Among other things, a review process will allow the parties to identify the need for modifications to the CDPP Standards based on experience and feedback. However, the Board considers that the review should occur after three years, since the Individual (Inlier) CDPP Standards are based on two years of performance.

3. COMPLIANCE OF EQUIPMENT WITH STANDARDS

3.1 The TSC Requirement

Under section 2.6.1 of the TSC, equipment that was placed into operation, procured or ordered before the TSC came into force (i.e., at market opening on May 1, 2002) is deemed to be in compliance with the performance standards set out in Appendix 2 of the TSC. Under section 2.6.2 of the TSC, a transmitter may require that equipment that has been deemed compliant under section 2.6.1 be brought into actual compliance with the performance standards within a specified time where the transmitter has identified that:

a) there is a material deterioration of transmission system reliability resulting from the performance of the deemed compliant equipment;

b) there are material negative impacts on an existing or a new customer's power quality resulting from the performance of the deemed compliant equipment; or

c) there is a material increase in capacity or load at the site where the equipment deemed compliant is located.

Section 2.6.3 of the TSC makes it clear that a transmitter may not require that deemed compliant equipment be brought into actual compliance until such time as the transmitter has developed rules and procedures for this purpose, and has filed them with the Board for review.

3.2 Evidence of Hydro One - Description of the Equipment Compliance Process

The process proposed by Hydro One is made up of three phases: Problem Identification, Self-Assessment and Compliance Plan Development, and Compliance Plan Implementation.

Phase 1 – Problem Identification

In the Problem Identification phase, a problem is identified by any party (e.g. a customer, the IESO or Hydro One) and is brought to Hydro One's attention. Hydro One then conducts an assessment of the problem to determine if any of the three TSC criteria (a material impact on transmission system reliability or customer power quality, or a material increase in capacity or load at a customer's site – each a "Compliance Trigger Event") is met.

If a material impact is identified, Hydro One will contact the customer whose equipment is thought to be the source of the problem and provide the customer with the results of its findings.

If Hydro One and the customer agree that the customer's equipment is creating a Compliance Trigger Event, they proceed to Phase 2 of the process.

If Hydro One and the customer agree that the customer's equipment is not creating a Compliance Trigger Event, the process ends.

If Hydro One and the customer disagree as to whether the customer's equipment is creating a Compliance Trigger Event, the parties call upon an impartial third party to assess the issue and to help resolve the disagreement. If the parties cannot resolve the matter with such assistance, the issue will proceed to dispute resolution (binding arbitration) under the TSC. The outcome of the third party-assisted process or the TSC

dispute resolution process (as applicable) then determines whether or not Hydro One and the customer proceed to Phase 2 of the process.

Once Hydro One is made aware of a potential problem, Phase 1 can be completed in about one to three months if there is agreement as to the existence of a Compliance Trigger Event. If Hydro One and the customer resolve the issue with the assistance of an impartial third party, Phase 1 can take up to about six months to complete. If the disagreement proceeds to dispute resolution under the TSC, Phase 1 can take substantially longer to complete.

Phase 2 - Self-Assessment and Compliance Plan Development

In the Self-Assessment and Compliance Plan Development phase, the customer conducts a self-assessment to identify the specific equipment associated with the Compliance Trigger Event. Based on the self-assessment, the customer develops a compliance plan for implementation over a specific time period to bring its deemed compliant equipment into actual compliance with the TSC. The plan is presented to Hydro One for schedule review.

Phase 2 should be completed within 90 days following the determination that the customer's equipment is creating a Compliance Trigger Event. The timeline may, with the consent of all parties involved, be extended based on the complexity of the situation.

Phase 3 - Compliance Plan Implementation

Finally, in the Compliance Plan Implementation phase, the customer implements the compliance plan in accordance with the schedule, which is monitored by Hydro One as required. Upon implementation, the customer provides written confirmation to Hydro One that the plan has been fully implemented. Hydro One documents the results of the plan and notifies the appropriate parties. If the plan does not solve the problem, the

customer is requested to create another compliance plan or to reassess the problem. The process continues until the issue is resolved.

The duration of Phase 3 is dependent on the specific customer compliance plan developed in each case.

3.3 Analysis and Findings

Listed below are the various issues identified through the two rounds of interrogatories, submissions and reply submissions. For each issue, the position of parties is followed by the Board's findings.

3.3.1 Customer Liability for Non-compliance

AMPCO objected to the unlimited liability imposed on customers for bringing equipment into compliance. In its view, this is particularly objectionable when Hydro One has limited its liability with respect to bringing customer delivery point performance up to standard in its CDPP Standards proposal.

In the Board's view, it is appropriate that a customer whose non-compliant equipment has been demonstrated to have a materially adverse impact on the transmission system or on other transmission customers bear the burden of coming into compliance. It is noted that the purpose of deeming equipment to be compliant was to avoid the need for investment in equipment upgrades in anticipation of market opening in circumstances where the upgrades were not needed to maintain reliability of a transmitter's transmission system. It is also noted that the CDPP Standards proposal should not be seen simply as the reverse side of the equipment compliance procedure, as each protocol is designed to respond to specific circumstances.

3.3.2 Urgency for Equipment Compliance Process Implementation

AMPCO submitted that it may appear from one of Hydro One's responses to interrogatories that non-compliance is widespread. That response indicated that an informal pre-market opening survey showed that about 75% of customers may have equipment that is deficient in one or more of protection, control, telemetering or communications parameters. However, further probing by AMPCO revealed that in only one of four recorded non-compliance instances was a problem identified. AMPCO also noted that there have been nine instances since the issuance of the TSC in 2000 where parties have alleged that the performance standards contained in Appendix 2 of the TSC have not been met. In all such cases the problems were identified by customers, and relate to switching surges, voltage variation or unbalance.

In light of the fact that the continued existence of deemed compliant equipment has not been a substantial cause for concern to date, AMPCO recommended that additional time should be given to enable the parties to "get the procedure right".

While the Board acknowledges AMPCO's submission that concerns in relation to non-compliant equipment have not to date been prevalent, the Board does not consider that further delays in review and implementation of Hydro One's equipment compliance process are warranted. The Board recognizes the value in the cooperative development of protocols such as the CDPP Standards and the equipment compliance process, and urges interested parties to continue to work together to identify the need for and propose improvements as required from time to time.

3.3.3 Dispute Resolution Process

Hydro One's proposal provided for dispute resolution only in relation to Phase 1 of the equipment compliance process.

OPG submitted that a dispute resolution process should be available to customers at all stages of the equipment compliance process, as the timely resolution of disputes can be of critical importance to a generator planning to return a plant to service. OPG recommended that the dispute resolution process outlined in the customer's Connection Agreement with Hydro One, which is Appendix 1 to the TSC, be adopted for any disputes that arise under the equipment compliance process.

The Board finds that OPG's proposal, which was ultimately endorsed by Hydro One, is reasonable and should be adopted. Hydro One should make it clear in its customer equipment compliance process that customers will have access to the dispute resolution process at any point in the process. With respect to Phase 1 of the equipment compliance process, this means that a customer may move directly to the dispute resolution process without the need to first use the third party facilitation process if the customer so wishes.

3.3.4 Materiality Test for Customer Equipment Compliance

OPG submitted that there is confusion on the record in relation to how Hydro One will actually use the Compliance Trigger Events. Specifically, OPG noted that Hydro One's response to interrogatories stated that, if an increase in capacity or load does not have any adverse impact on safety, the transmission system or other connected customers, then the customer would not be required to bring its transformer into actual compliance. However, the response went on to say that, under certain circumstances and when it is reasonable and cost effective to do so, the customer may be required to bring other equipment at the plant into actual compliance, apparently notwithstanding the absence of a material impact on the reliability of the transmission system or material adverse impacts on another customer's power quality.

AMPCO raised the same concern. Both OPG and AMPCO recommended that Hydro One should be directed to modify its tests for assessing materiality to limit the

requirement to come into compliance only if there is a material adverse effect on transmission system reliability or on a customer's power quality.

The Board agrees with OPG's and AMPCO's position that an increase in capacity or load in the absence of any adverse impact on transmission system reliability or on the power quality of another connected customer is not a sufficient basis to require a customer to bring its deemed compliant equipment into actual compliance. The key consideration is the actual impact of the non-compliant customer's equipment on the transmission system or on other customers.

The Board acknowledges that section 2.6 of the TSC, and its successor section in the Revised Code (section 4.6.2), allow a transmitter to require deemed compliant equipment to be brought into actual compliance where there is a material increase in capacity or load at the customer's site. The Board intends to propose an amendment to the Revised Code that would, if adopted, eliminate this as an independent ground for requiring equipment to be brought into actual compliance. In the interim, the Board notes that under both the TSC and the Revised Code, a transmitter retains discretion in relation to requiring equipment to come into compliance and is not required to do so in every instance where a Compliance Trigger Event occurs.

Accordingly, the Board will not mandate, through Hydro One's equipment compliance process, that equipment be brought into compliance unless there is a material adverse effect on transmission system reliability or on the power quality of other transmission customers.

3.3.5 Trade-Off (Cost of Correcting Non-Compliance and Customer Impacts)

AMPCO submitted that, in assessing materiality, there should be explicit consideration of the trade-off between the cost of correcting the non-compliance and the impact of the non-compliance on other customers. This trade-off would apply in all circumstances

other than those where the non-compliance compromises accepted standards for employee and public safety.

AMPCO further submitted that Hydro One's position on this point is inconsistent. Specifically, although the proposed equipment compliance process makes no mention of economics affecting the determination of materiality, Hydro One's responses to interrogatories on this issue seem to suggest otherwise. In answer to AMPCO, Hydro One indicated that costs would not be a primary parameter in assessing materiality. However, in answer to another interrogatory Hydro One stated that "an economic evaluation would be part of the evaluation to assess benefit/cost to each participant. However, the trade-off will depend on the nature of the adverse impacts, degree of non-compliance and acceptable tolerance of each of the stakeholders that are being adversely impacted".

AMPCO recommended that Hydro One's equipment compliance process should include explicit language to the effect that an economic evaluation would be part of the evaluation to assess the benefit and cost to each participant. The trade-off would depend on the nature of the adverse impacts, the degree of non-compliance and the acceptable tolerance of each of the customers that are being adversely affected. AMPCO further recommended that reliability considerations be part of the economic trade-off. AMPCO also submitted that, where a third party is assisting to resolve a disagreement in Phase 1 of the process (where the parties cannot agree on whether the customer's equipment is creating a Compliance Trigger Event), the third party should expressly be permitted to consider the economic trade-off between the cost of bringing deemed compliant equipment into compliance and the impact on other customers of continued non-compliance. The only exception would be where the non-compliance compromises accepted standards for employee or public safety.

The Board is of the view that, in most circumstances, an economic evaluation should be part of the evaluation of the need for the replacement or upgrade of non-compliant equipment in order to assess the benefit or cost to each participant. Similarly, a third

party or arbitrator resolving a dispute in Phase 1 of the process should be expressly authorized to conduct or consider an economic evaluation and to recommend a remedial approach that takes the economic evaluation into account so that an appropriate balance is found that preserves transmission system integrity and avoids unreasonable adverse effects on other customers without unreasonably burdening the non-compliant customer. Such an economic evaluation cannot, however, operate so as to compromise employee or public safety.

3.3.6 General Cost Responsibility

Hydro One has proposed that the costs of bringing equipment into actual compliance should be borne by the customer(s) whose equipment is causing the problem.

AMPCO submitted that the following rules should apply to determine the allocation of costs associated with bringing equipment into actual compliance:

- Where a customer's deemed compliant equipment is non-compliant because the customer did not meet the specifications of the transmitter at the time of connection, the customer should be responsible for all of the costs of bringing the equipment into compliance.
- Where the customer met the specifications of the transmitter at the time of connection and the non-compliance has resulted from (i) changed specifications by the transmitter; (ii) changed standards; or (iii) former guidelines being applied as mandatory standards, the cost of correcting the non-compliance should be equally borne by the transmitter and the customer. AMPCO also indicated that some standards in the past were "voluntary unless mandated by the regulator" and that in recent years the application of newer technologies making equipment more susceptible to power quality variations has led to the mandating of new, more demanding standards. Although there was a reasonable measure of flexibility in the past, there is now more reliance on unyielding mandatory standards.

Hydro One submitted that:

- the whole purpose of the equipment compliance process is to deem all equipment compliant as of market opening to avoid unnecessary investment in equipment upgrades that were not needed to maintain transmission reliability and customer power quality. This is irrespective of any standards, specifications, guidelines etc. that were in place at the time of connection;
- the approach should be consistent with the principles and overarching objectives of the TSC, and that the cost of correcting the non-compliance should be based on "cost-causality" and accordingly should be borne by the customer(s) responsible for causing the problem (subject to the exception noted in section 3.3.7 below); and
- should the participating customer(s) not agree with the materiality assessment or the cost implications of possible solutions, they have at their discretion the option of invoking the dispute resolution process. Hydro One also submitted that, where more than one customer is causing the problem, an economic evaluation should be carried out by the customers to assess the benefit or cost to each of a given solution.

The Board accepts Hydro One's general approach to cost allocation in relation to bringing equipment into compliance, subject to the findings made by the Board in sections 3.3.7 and 3.3.8 below. The Board is of the view that Hydro One's customer equipment compliance process should expressly indicate that, where more than one customer is causing the problem, an economic evaluation should be carried out by the customers to assess the benefit or cost to each of a given solution.

The Board is of the view that any standards that a licensed transmitter is obliged to adopt or follow form an integral part of its obligation to maintain a reliable transmission system. The fact that guidelines may have evolved into mandatory standards, or that standards once thought adequate have now been amended to be more demanding, is a normal development process of a growing system. All participants need to accept the

proposition that the transmission system creates important interdependencies, and all participants must accept their respective roles in maintaining it. The Board considers that there are adequate safeguards in Hydro One's equipment compliance process to provide customers with reasonable protection from arbitrary and unreasonable obligations to upgrade their non-compliant equipment.

3.3.7 Cooperating in Complex Situations, Approving the Compliance Plan and Associated Cost Responsibility Issues

With respect to the issue of complex situations, AMPCO noted that the evidence indicates that Hydro One confirmed that there are many situations where a material non-compliant situation is the result of interaction between the characteristics of the customer's equipment and the characteristics of the transmission system. AMPCO acknowledged that it is not possible in a procedure to define the cost responsibility for all such situations, which by their nature are diverse. The proper solution for one such situation may not be appropriate for another.

AMPCO therefore recommended that the compliance equipment process should recognize that such situations exist and that they should be addressed on a case-by-case basis. Consideration should be given to whether the solution requires changes to the customer's equipment, the transmission system or both, and to the appropriate allocation of costs of whatever remedial action may be taken. According to AMPCO, Hydro One's equipment compliance process should be amended to indicate that, in such situations, the customer and the transmitter must co-operate to determine the most economic manner in which to eliminate the material impact of non-compliance with an appropriate sharing of costs.

With respect to the compliance plan, AMPCO noted that the evidence indicates that Hydro One will only review the schedule for implementation of a customer's compliance plan and will not review the merits of the solution proposed in the customer's compliance plan. In AMPCO's view, this is unacceptable, and the transmitter must be

involved in a technical review at the plan evaluation stage to determine whether the proposed solution will be effective. Otherwise, there is no point in having the solution implemented. In many instances, the customer alone may not be able to assess whether a given solution will be effective. AMPCO noted in this regard that Hydro One has agreed that many of the problems are the result of complex interactions between the customer's equipment and the transmission system. Further, Hydro One has also acknowledged that the most economical solution to a compliance problem may be an upgrade to the transmitter's facilities.

AMPCO also recommended that, where a customer's compliance plan has been reviewed and accepted by the transmitter as a satisfactory solution to the non-compliance issue and the accepted solution has been implemented but the problem has not been corrected, the customer and the transmitter must be equally liable for the costs associated with any further measures deemed necessary to correct the problem.

Hydro One agreed that there may be complex situations where a problem is the result of a combination of customer equipment initiating a problem interacting with the characteristics of the transmission system. In these cases, Hydro One submitted that it will cooperate and work with the participating customer(s) to find an appropriate solution to the problem. These situations will be addressed on a case-by-case basis to determine causality and appropriate allocation of costs between Hydro One and the participating customer(s).

Hydro One submitted that it should only be responsible for reviewing the schedule for implementation of a customer's compliance plan since the customer is responsible for developing and implementing a solution to bring non-compliant equipment into compliance. It is therefore inappropriate for Hydro One to assume the risk or accountability for the solution or work required at a customer's facility. However, Hydro One will provide any system information (e.g. fault levels) required for the customer and its consultants to carry out the requisite studies.

The Board notes that both AMPCO and Hydro One acknowledge that there are situations where a material non-compliant situation is the result of interaction between the characteristics of the customer's equipment and the characteristics of the transmission system.

The Board also recognizes that it is not possible in a procedure to define the cost responsibility for all such situations of interactions between the transmission system and the customer's equipment.

The Board finds that Hydro One's equipment compliance process should explicitly recognize that such situations can occur and that they require case-by-case consideration of whether the solution lies in making changes to the customer's equipment, the transmission system, or both, and of the appropriate allocation of costs. The equipment compliance process should also indicate that, in such situations, the customer and transmitter must co-operate to determine the most economic manner to address the problem, with an appropriate sharing of costs.

The Board further finds that, where it has been established by mutual agreement of the parties (or by a third party facilitator or arbitrator) that the cause of the problem is attributable to the interaction between the transmission system characteristics and the customer's equipment, the transmitter must participate in the development of the compliance plan and the transmitter and the customer must share the financial consequences if the adopted solution is not effective. This should be reflected in Hydro One's equipment compliance process.

3.3.8 Fault Current Levels: Interpretation and Cost Responsibility

AMPCO submitted that it appears that some of the provisions of the Revised Code and the terms of the Connection Agreement (Appendix 1 to the Revised Code) may be subject to inconsistent interpretation regarding the requirements associated with the fault interrupting capability of circuit breakers. This has implications for what is

considered deemed compliant equipment and for the application of the process to bring deemed compliant equipment into compliance

AMPCO submitted that:

- for new connections (i.e., those that were made after the TSC came into force), the situation where the customer is required to pay should not arise since the equipment will be compliant as a condition of connection and the new connection should be designed to handle the fault levels represented in Appendix 2;
- the transmitter is required to manage the system so that these fault levels are not exceeded. In the event that the fault level rises above the levels provided in Appendix 2 then, by implication, the transmitter pays for the upgrade;
- therefore, the only situation in which there would be an obligation on the customer to pay is with respect to connections that were made before the TSC came into effect. Those installations are deemed compliant and can be handled through the process for bringing deemed compliant equipment into compliance; and
- a customer cannot be held fully responsible for correcting situations that arise from the actions of the transmitter or other customers that are totally outside the control of the customer. To the extent that external actions lead to increased fault levels, the possibility exists that initially compliant circuit breakers may become non-compliant.

In AMPCO's view, the inclusion of additional parallel provisions in the Revised Code and the Connection Agreement regarding cost responsibility for upgrades to meet a change in fault current levels creates the possibility of conflicting requirements and inconsistent findings.

AMPCO submitted further that these provisions of the Revised Code and the Connection Agreement should be modified so as to eliminate any overlap with the process for bringing deemed compliant equipment into compliance. In particular, when

the customer has met all of the specifications of the transmitter or its predecessor, including the specifications for fault interrupting capability, and an upgrade is required to meet the fault levels reflected in Appendix 2, the customer and the transmitter should share equally in the cost of that upgrade.

The Board clarifies that the short circuit level depicted in Appendix 2 of the Revised Code is a threshold level only. Customer equipment is initially only required to meet the available short circuit levels at the time of connection. However, each customer is responsible under the Revised Code to upgrade its equipment capability, at its own cost, to withstand the available short circuit levels at its connection point with the transmission system whenever the short circuit levels increase, regardless of the reason for the increase, so long as the increased short circuit levels do not exceed the level specified in Appendix 2. Upgrades to equipment capability to meet increased short circuit levels beyond the level specified in Appendix 2 require a financial contribution from the transmitter. These specific provisions of the Revised Code regarding the requirement to upgrade equipment to withstand new available fault current levels would govern in this regard.

3.3.9 Inclusion of Technical Requirements in the Equipment Compliance Process

The Board has adopted and is issuing today its Revised Code. One of the changes included in the Revised Code relative to its predecessor relates to the requirements with which equipment is deemed to be compliant. Specifically, under section 4.6.1 of the Revised Code equipment is deemed to be compliant not only with the standards set out in Appendix 2, but also with the other technical requirements of the Revised Code.

Hydro One must therefore review its equipment compliance process in light of this change, and propose such revisions as may be required to accommodate the additional element of deemed compliance.

THE BOARD THEREFORE ORDERS THAT:

1. Hydro One Networks Inc. shall revise its “Customer Delivery Point Standards” and its “Customer Equipment Compliance Process” documentation in accordance with the findings of the Board as set out in this Decision and Order. Revised versions of that documentation shall be filed with the Board for review and approval, and delivered to all intervenors in this proceeding, by a date to be determined by the Board and communicated to the parties.

2. Hydro One Networks Inc. shall consult with transmission customers that have generation facilities supplying their sites, as described in section 2.3.2 of this Decision and Order, and prepare a report describing the results of that consultation, including the salient comments of consulted parties. A copy of the report shall be filed with the Board, and delivered to all intervenors in this proceeding and to all other parties involved in the consultation, by a date to be determined by the Board and communicated to the parties. The report shall include any proposals for revisions to Hydro One Networks Inc.’s “Customer Delivery Point Standards” documentation.

3. Hydro One Networks Inc. shall continue to consult with appropriate customers to develop a comprehensive process to deal with power quality issues, as described in section 2.3.15 of this Decision and Order, and shall revise its “Customer Delivery Point Standards” documentation to reflect the results of that consultation. A copy of the revised “Customer Delivery Point Standards” documentation shall be filed with the Board for review and approval, and delivered to all intervenors in this proceeding and to all other parties involved in the consultation, by a date to be determined by the Board and communicated to the parties.

4. Hydro One Networks Inc. shall prepare a report that explores the implications of using a performance baseline trigger for the frequency and duration of forced

interruptions under two scenarios, as described in section 2.3.17 of this Decision and Order. A copy of the report shall be filed with the Board, and delivered to all intervenors in this proceeding, by a date to be determined by the Board and communicated to the parties.

5. Hydro One Networks Inc. shall consult with applicable generator customers to develop a process to track reliability performance for injection points on its transmission system as described in section 2.3.18 of this Decision and Order, and shall revise its "Customer Delivery Point Standards" to reflect the results of that consultation. A copy of the revised "Customer Delivery Point Standards" documentation shall be filed with the Board, and delivered to all intervenors in this proceeding and to all other parties involved in the consultation, by a date to be determined by the Board and communicated to the parties.

6. Hydro One Networks Inc. shall contact Board staff by September 12, 2005 to develop a schedule for the filing of revisions to its "Customer Delivery Point Standards" and its "Customer Equipment Compliance Process" documentation and of the report referred to in paragraph 4. The Board is prepared to accept filing of the revisions to Hydro One Networks Inc.'s "Customer Delivery Point Standards" and its "Customer Equipment Compliance Process" documentation in stages.

ISSUED at Toronto, July 25, 2005.

ONTARIO ENERGY BOARD

John Zych
Board Secretary