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July 4, 2008

BY COURIER (10 COPIES) AND EMAIL

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
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Dear Ms. Walli:

Re: Pollution Probe – Written Argument
EB-2007-0050 – Hydro One – Bruce-Milton Transmission Reinforcement Project

Pursuant to Procedural Order No. 11, please find enclosed the written argument on behalf of Pollution Probe for this matter.

Yours truly,

Basil Alexander

BA/ba

Encl.

cc: Applicant and Intervenors per Procedural Order No. 8

EB-2007-0050

ONTARIO ENERGY BOARD

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

AND IN THE MATTER OF an Application by Hydro One Networks Inc. pursuant to section 92 of the Act, for an Order or Orders granting leave to construct a transmission reinforcement Project between the Bruce Power Facility and Milton Switching Station, all in the Province of Ontario (the "Leave to Construct Application").

WRITTEN ARGUMENT

on behalf of

POLLUTION PROBE

July 4, 2008

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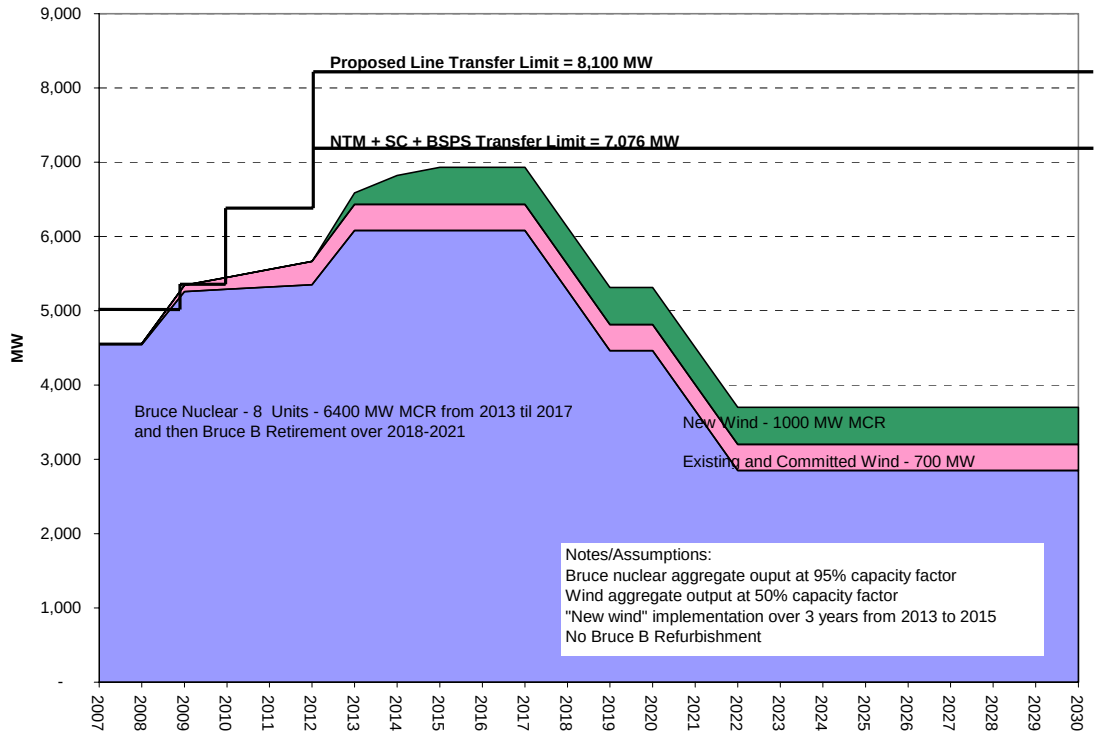
Overview

Given the record of evidence before the Board indicating that the proposed new 500 kV transmission line is not cost-effective from any perspective, and the lack of current certainty and urgency regarding key underlying assumptions, Pollution Probe respectfully submits that it is not in the interests of consumers to now spend $635 million on a new transmission line, and Hydro One's application for leave to construct the proposed new line should be accordingly denied.

Context

In a few years, the nuclear units at Bruce B will come to the end of their life span. The electricity generation output in the Bruce area will drop off sharply, and unless that generation is replaced with new generation, the need for electricity transmission facilities out of the Bruce area will drop as well. The general impact of this decrease is depicted in the graph below.

Figure 4. Bruce Area Operation in the Absence of Refurbishment of the Bruce B Nuclear Station, Using 95% CF (Bruce nuclear) and 50% CF (wind) Assumptions



On the other hand, there is hope that there will be increased development of wind power in the Bruce area. This projected increase in wind power in the Bruce area is part of the justification put forward by Hydro One in this case for the building of the proposed new transmission line.

However, there is no suggestion that the projected increase in wind power at Bruce would come anywhere close to offsetting the drop in nuclear generation as the Bruce B units retire. Thus, even with increased wind power, there would be a large net decline in generation in the Bruce area as shown above. Pollution Probe is a strong supporter of wind power, but not of poor planning, and Pollution Probe would be concerned if wind power plans became a disguised excuse to build a transmission line that was not really needed.

The Proposed Line Does Not Make Economic Sense

Does it make economic sense to spend $635 million of electricity customers' money on a new, larger transmission line to an area where, unless something changes, total power output will decline? Hydro One has argued that the capacity of the old Bruce B units likely will be replaced, either through refurbishment or the construction of new units. Hydro One has further argued that if Bruce B's capacity is replaced, the proposed transmission line will make economic sense. And Hydro One has argued that even if Bruce B's capacity is not replaced, the proposed new line still makes economic sense.

Pollution Probe submits that the evidence does not support any of these positions. In other words, Pollution Probe submits that the proposed new line is not cost-effective or economically worthwhile under any of the reasonable scenarios, given the availability of a lower cost alternative.

In fact, Pollution Probe submits that the evidence in this hearing shows that if Bruce B is *not* replaced, deploying the alternatives (consisting of series capacitors technology and generation rejection techniques) would conservatively save Ontario's electricity customers at least $245 million compared to building the proposed new line. Further, even if Bruce B's existing capacity *is* replaced, the lower cost alternative would save at least $72 million compared to building the new line. In other words, it simply does not make economic sense to build this line.

Four Key Faulty Assumptions in Hydro One's Case

The justifications put forward for the new line by Hydro One, the OPA, and the IESO depend on a number of assumptions. Four of those assumptions in particular are key to their justification, and simply do not stand up to scrutiny:

1. *The Faulty Assumption that the Bruce Nuclear Station's Output Will Continue at Current or Higher Levels for the Long-term* – Put simply, no decisions have been made regarding Bruce B refurbishment or replacement. If decisions had been made, the provincial government (through the relevant Minister) would have issued a directive to the OPA and/or signed a long-term contract with Bruce Power. These have not happened. Furthermore, while there is a *possibility* that Bruce B will be refurbished or replaced, that will only occur if the Government of Ontario enters into an agreement with Bruce Power which include specific, binding and important price commitments to be paid by Ontario's electricity customers. Approving the line at this stage would seriously weaken the

Government of Ontario's bargaining power with Bruce Power, since the line would already be committed to, with electricity ratepayers already on the financial hook for its cost.

2. *The Flawed Assumption that One Should Simply "Add Up" the Maximum Output Ratings of Various Generation Equipment Units to Determine the Required Transmission Need* – The aggregation of the "nameplate capacities" of generation units as a planning technique seriously overstates the actual amount of electricity that would need to be transmitted from the Bruce Area. It would be analogous to building a highly expensive ten lane highway to ensure that not a single car ever has to slow down, even for the briefest period at the peak moments of rush hour, when a lower cost upgrade to six lanes would be good enough to handle good traffic flow efficiently for all but the densest moments of rush hour. Not all times are rush hour.

   Similarly, it is extremely rare for the wind in a large geographic region to blow such that *all* wind generation locations throughout the area are producing at 100% of capacity all at the same time, due to inevitable wind variations in different specific locations. It is likewise true in the case of nuclear output from a group of individual units that at many times one or several units will be out of service or not performing at 100% of design capacity, so that the aggregate total will usually not be simply the sum of each unit's 100% capacity.

   These realities need to be properly accounted for in deciding how much transmission need is sensible to build for, as it simply does not make sense to plan for 100% generation 100% of the time. The fact that this may have been the general planning assumption in the past does not automatically mean it is a good idea.

3. *The Misinterpretation of the Government Directives* – The OPA continues to misinterpret and misapply key aspects of the directives it has received from the government. First, the OPA has not been given a mandate to plan for an *exact* amount of nuclear; rather, the OPA has been given a *maximum*. Second, while the OPA advocates that the directive is to reduce "congestion" on the electricity grid, the OPA ignores the directive's equally clear requirement that this is to be done in a *cost-effective* manner (which does not appear to be the case here).

4. *The faulty assumption that the credibility of the OPA and the IESO is "overwhelming"* – Hydro One has repeatedly suggested in its argument the idea that this is "a case that concerns the credibility of those who are in fact experts in the field of transmission planning and who have the experience and knowledge applicable in Ontario".[1] By placing the credibility of the OPA and the IESO at the centre of its case, Hydro One highlights issues where the evidence of the OPA and the IESO seems open to serious questioning on common sense or basic economic grounds. For example, the main rationale offered by the OPA and the IESO for planning transmission on the basis of "nameplate capacity" seems to be that that is the way it has always been done. Further, the evidence by the OPA on the relatively new issues of planning for wind capacity

[1] Hydro One Argument, pg. 1.

suggests that the OPA has not adequately dealt with the effect of “spatial diversity”. Finally, the assumption by the OPA that nuclear generation units can be treated as being either “on” or “off” appears, based on the testimony of Mr. Fagan, to be naïve rather than credible.

The Reasonable Alternative – Series Capacitors and the Bruce Special Protection System[2]

Pollution Probe respectfully submits that a combination of series capacitors and the Bruce Special Protection System (the "BSPS") is a reasonable alternative to the proposed new line, an alternative that is both viable and reliable.[3]

The record before the Board is clear that series capacitors are a mature and reliable technology. They have been used extensively in other jurisdictions, and Pollution Probe is frankly surprised that Hydro One has only recently begun to implement this technology in Ontario. The record is also clear that series capacitors can be implemented on the existing Bruce to Milton line by the end of 2011,[4] which is before Hydro One's own current projection that the need for extra capability will truly begin to exist on a going-forward basis.[5] This period is also about when the new Bruce-Milton line would be projected to come into service (i.e. about December 2011) if approved.[6]

The BSPS is a system that has been around for decades that includes generation rejection, which clearly indicates the BSPS's viability and reliability. While it has been armed for a good portion of the time, it is important to remember that events that actually *trigger* the system have been very rare (e.g. the last time was 1985).[7] Even if the new line were approved, the system still needs to be present and would be armed a considerable amount of time. In short, Pollution Probe submits that the BSPS is clearly a viable and reliable system that has served Ontario well for decades, and will likely continue to do so for future decades.

The real question is whether, in conjunction with series capacitors, the BSPS should be armed more often to allow the existing Bruce to Milton transmission line to carry more electricity. Pollution Probe submits that it should, as this would allow for greater optimization of existing infrastructure (which is also inherently more efficient). It would also be in accordance with the true spirit of section 1.6.2 of the *2005 Provincial Policy Statement*, which states:[8]

> The use of existing *infrastructure* and *public service* facilities should be optimized, where feasible, before consideration is given to developing new *infrastructure* and *public service facilities*. [italics in original]

According to Hydro One's own interrogatory responses, the existing line with series capacitors and arming of the BSPS would allow the transmission of 7,076 MW. Pollution Probe notes that

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[2] Although not discussed in detail as part of this argument, Pollution Probe also notes that the Direct Evidence of Mr. Fagan and Mr. Lanzalotta contains another lower cost and reliable alternative involving the construction of a 500 kV circuit from Longwood to Middleport with series compensation (see pgs. 23-25 and 53-55 of the Direct Evidence).
[3] See generally the Direct Evidence of Mr. Fagan and Mr. Lanzalotta, Section IV.
[4] Undertaking J6.1
[5] Exhibit B, Tab 3, Schedule 1, Page 2, Figure 1. See also Figures 3-5 in the Direct Evidence of Mr. Fagan and Mr. Lanzalotta.
[6] Exhibit B, Tab 5, Schedule 2
[7] Exhibit C, Tab 2, Schedule 46, subsection (e) iii
[8] Exhibit B, Tab 6, Schedule 5, Appendix 7

one of the responsible NPCC sub-committees recently approved a BSPS that was significantly beyond what would be needed to allow for a 7,076 MW carrying limit,[9] which reinforces Mr. Lanzalotta's assertion that the NPCC has historically allowed the use of the BSPS to address such contingencies.[10] In addition, Mr. Russell has testified that, with further use of the BSPS in a reliable manner, the existing line could actually carry 7,176 MW or even about 7,400 MW.[11]

Pollution Probe respectfully disagrees with the alleged "screening out" of this alternative on the ground that it supposedly does not meet the required need. Pollution Probe respectfully submits that when one uses a capacity factor that is more realistic than simply adding up "nameplate capacity" (as detailed starting at page 14), and when one takes into account economic cost-effectiveness analysis (as detailed starting at page 8), it becomes clear that this reasonable option is the alternative that should be implemented at this time, not the proposed new line.

Pollution Probe notes that the implementation of series capacitors would not result in "sunk" or "thrown away costs". First, as noted by Mr. Russell, the installation of series capacitors would allow the existing line to carry more power in the event that a contingency occurs (even if the new line was eventually built).[12] Second, Pollution Probe submits that Hydro One should seriously consider implementing series capacitors on other 500 kV lines from Bruce to increase capacity and efficiency on all of the lines in the future if the need continues to grow. The installation of series capacitors on the existing Bruce to Milton line would thus constitute one-third of that network reinforcement. Third, the use of series capacitors now at a much lower price than the cost of an entirely new line would allow scalability over time (that is, increasing transmission as the need actually arises),[13] and would allow time to more accurately analyze and predict the level of energy, especially wind power, that would eventually be generated in the Bruce area.

With respect to the potential implementation of series capacitors, Undertaking J6.1 outlines the steps that would be required in order to implement series capacitors by the fourth quarter of 2011. Hydro One has indicated that Board approval is not required, and thus the key regulatory approval would likely be a focused environmental assessment (which is already included in the schedule) since the series capacitors would be placed around the middle of the line. Pollution Probe notes that Hydro One has already gained some experience with respect to such an environmental assessment in light of the approval process associated with installing series capacitors as part of the Nobel Project.[14]

[9] Exhibits K10.3 and K10.5, which includes NPCC Sub-committee approval for an SPS with *load* and not just generation rejection.
[10] Direct Evidence of Mr. Fagan and Mr. Lanzalotta at page 23.
[11] Transcript, Vol. 10, pgs. 34 and 49-50
[12] Transcript, Vol. 14, pgs. 47-48
[13] Transcript, Vol. 14, pgs. 47-49
[14] See *e.g.* the excerpts from the *Hydro One – Nobel Station – Class Environmental Assessment – Draft Environmental Study* located at pages. 65-68 of Exhibit K3.1

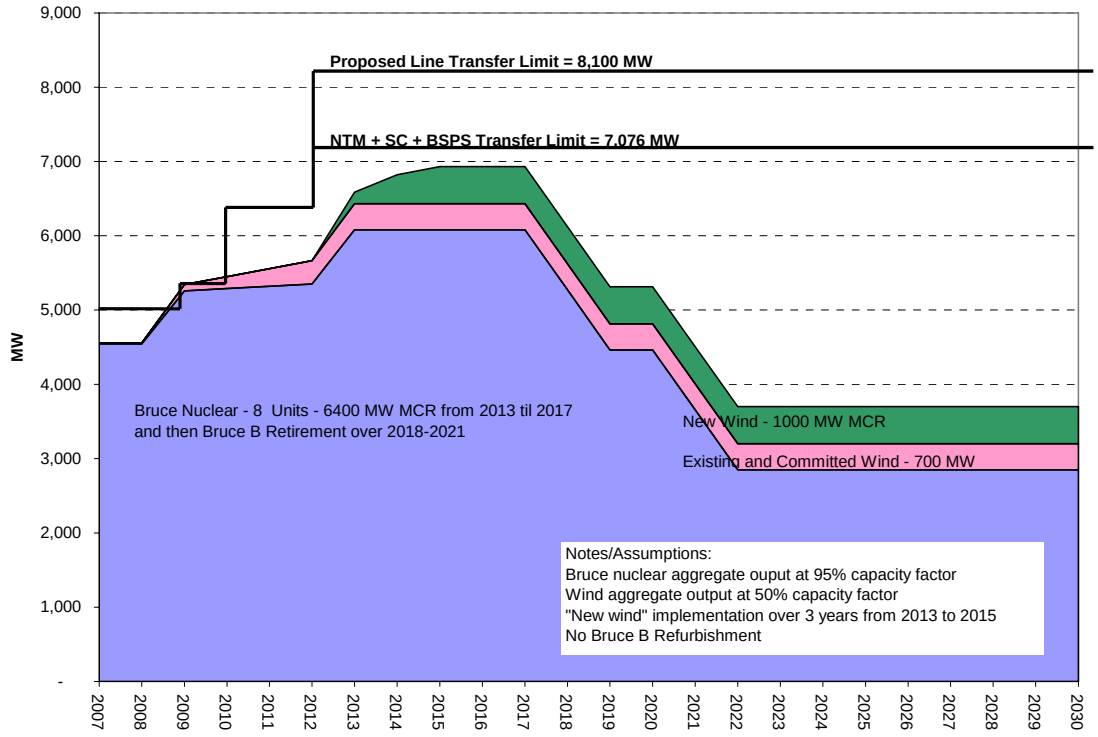
The Proposed Line Does Not Make Economic Sense

For the reasons detailed below, Pollution Probe submits that the proposed new transmission line simply does not does not make economic sense compared to the reasonable alternative of series compensation and methods of generation rejection, regardless of whether Bruce B is refurbished or not.

If Bruce B Is Not Refurbished or Replaced

As shown by Figure 4 below from the Direct Evidence of Mr. Fagan and Mr. Lanzalotta, electricity generation output that would need to be transmitted is currently scheduled to drop off sharply as the Bruce B nuclear units come to the end of their lifespan. In this situation, the new line would thus result in significant excess capacity within just a few years.

Figure 4. Bruce Area Operation in the Absence of Refurbishment of the Bruce B Nuclear Station, Using 95% CF (Bruce nuclear) and 50% CF (wind) Assumptions



From an economic perspective, one must consider whether not building the new line might also create some costs of its own, which would partially offset the savings from not building. One such potential cost is the net present value of energy which might not be transmissible from the Bruce area at certain times of peak generation because of lack of transmission capacity (the so-called “locked-in energy”). Another such potential cost could be additional electricity losses from power lines due to being operated closer to capacity (“line losses”). Would these factors

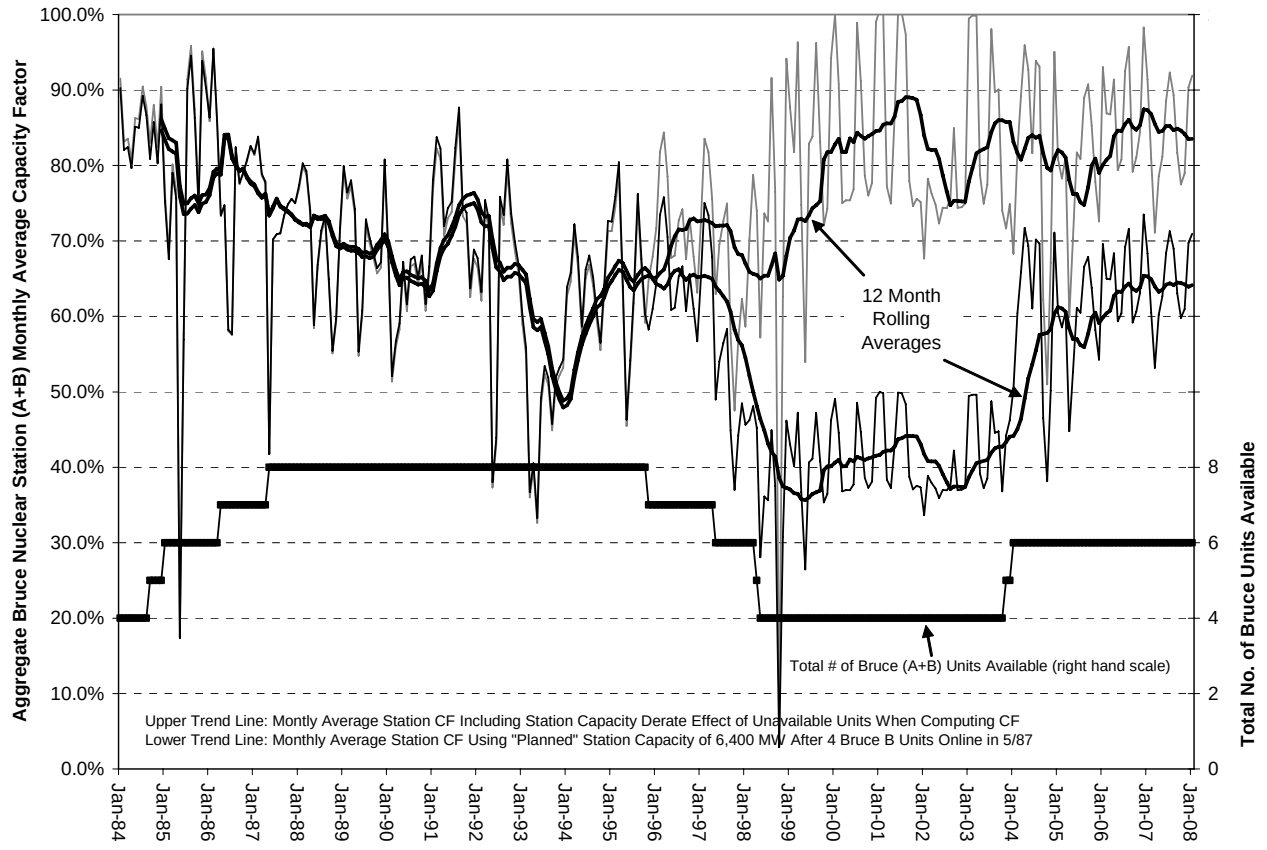
make it economically worthwhile to build the line anyway? Pollution Probe submits that the answer is no, and that the evidence of Pollution Probe's experts should be accepted on this issue.

According to Mr. Fagan and Mr. Lanzalotta, their conservative analysis shows that at least $245 million would be saved by employing the reasonable alternative instead of building the line.[15] This value is considerably higher than the value advanced by Hydro One (which says that only about $12 million would be saved). Pollution Probe submits that the analysis of Mr. Fagan and Mr. Lanzalotta withstood rigourous cross-examination by Hydro One[16], and should be accepted.

In addition, Pollution Probe submits that the savings to be expected would be actually substantially *more* than $245 million given the inherently conservative values used by Mr. Fagan and Mr. Lanzalotta in their analysis. For example, their analysis assumes that:

- Nuclear capacity factors for the summer and winter seasons would be a constant aggregate of 95%, which is significantly higher than the historical capacity factors associated with the Bruce Nuclear Station (i.e. about 60-80%) as shown by the figure below.[17]

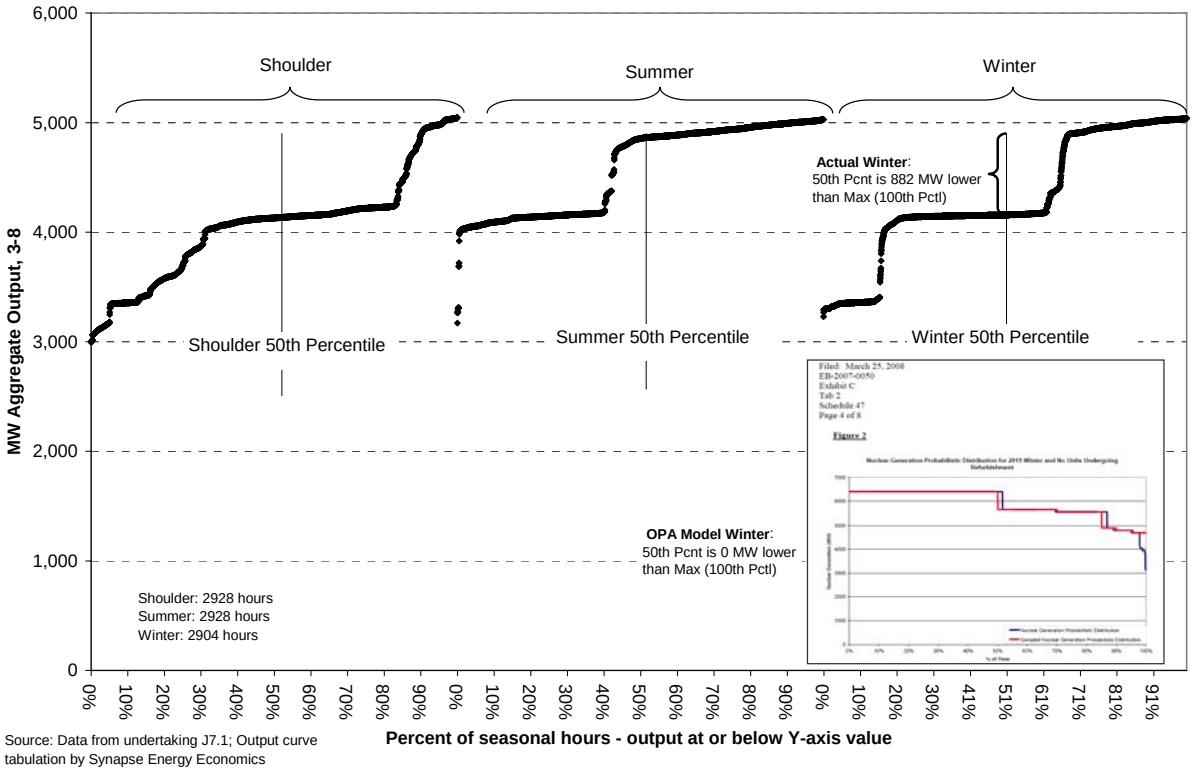
Figure 8. 24-Year History of Bruce Nuclear Station (A+B) Actual Monthly Average Capacity Factor, 1984 - 2008



[15] Table 1A of the Supplemental Direct Evidence of Mr. Fagan and Mr. Lanzalotta.
[16] Transcript, Vol. 13, pgs. 136-168 (and see generally Transcript, Vol. 13, pgs. 39-168).
[17] Table 8 of the Evidence of Mr. Fagan and Mr. Lanzalotta.

- The conservative use of a constant aggregate nuclear capacity factor of 95% for summer and winter is also higher that the actual hourly data for 2007 for the Bruce Nuclear Station as shown by Figure 2 below.[18]

Figure 2, Undertaking J13.1 – Bruce Nuclear Units 3-8 (Aggregate) Output – 2007 Hourly Duration Curves – By Season



Source: Data from undertaking J7.1; Output curve tabulation by Synapse Energy Economics

- The analysis assumes a line limit of only 7,076 MW as stated by Hydro One, yet Mr. Russell has put evidence before the Board that the line limit for the reasonable alternative could actually be as high as 7,176 MW or 7,400 MW.[19]

As a result, Pollution Probe submits that the minimum $245 million savings projected by Mr. Fagan and Mr. Lanzalotta is thus very conservative, and the actual savings are significantly more. Pollution Probe submits that the $91 million cost of series capacitors should not be included as part of the analysis given the other long-term benefits that series capacitors bring to the network (e.g. the line being able to transmit significantly more electricity in the event of a

[18] Undertaking J13.1

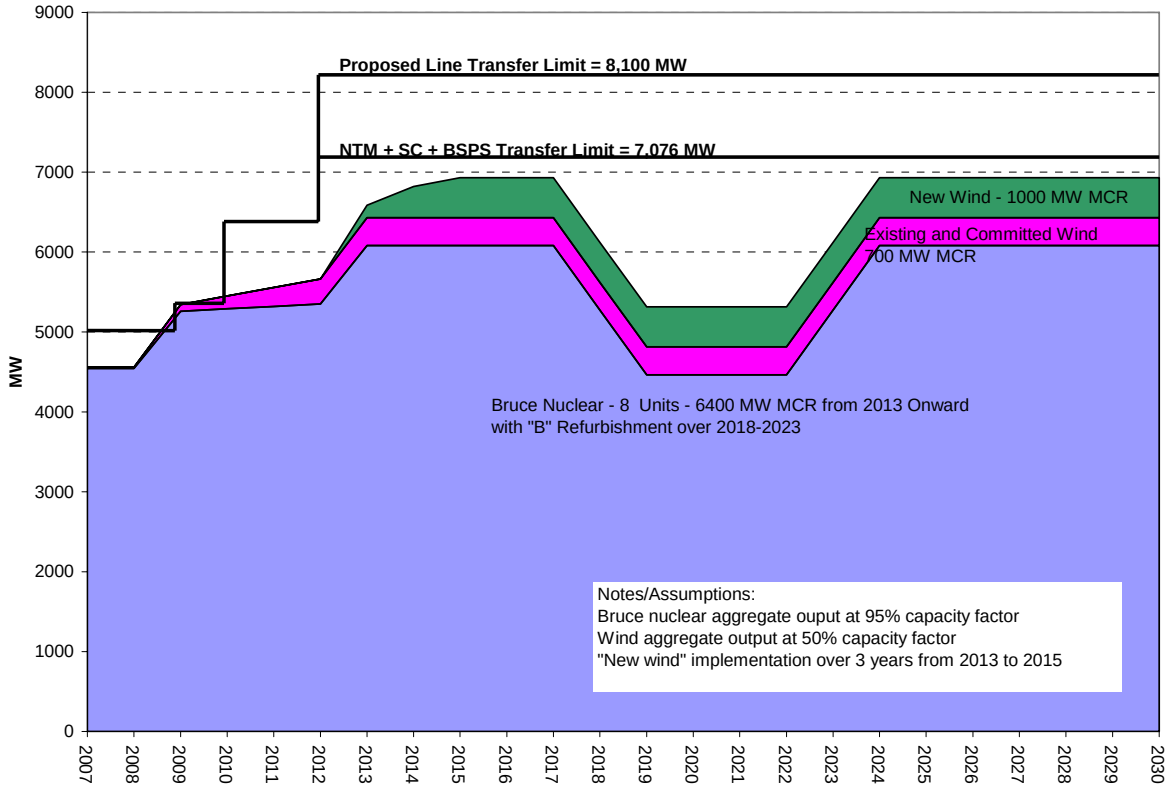
[19] Transcript, Vol. 14, pgs. 34 and 49-50. Pollution Probe further notes that Hydro One's arguments contain some comments about derating at page 32, but Mr. Fagan noted that he used a different approach than Hydro One or the OPA. For further information, please refer to the Supplemental Direct Evidence of Mr. Fagan and Mr Lanzalotta at pg. 7 and the Transcript, Vol. 13, pgs. 160-166.

contingency).[20] However, even if these costs were included, it is clear that savings outweigh the cost of the line.

If Bruce B Is Refurbished or Replaced

As shown by Figure 3 below from the Direct Evidence of Mr. Fagan and Mr. Lanzalotta, the aggregate electricity generation output of the Bruce area would likely be able to be transmitted almost all of the time even if Bruce B were to be refurbished or replaced.

Figure 3. Alternative Assumptions: Depiction of Need for Bruce Area Line Using Bruce Nuclear Station Aggregate CF = 95% and Wind Aggregate CF = 50%



From an economic perspective, one must again consider the net present value of any locked-in energy and line losses in this scenario. Pollution Probe again submits that the calculation does not justify the building of the proposed line, and that the evidence of Pollution Probe's experts again should be preferred to Hydro One's in this regard.

According to Mr. Fagan and Mr. Lanzalotta, their conservative analysis shows that at least $72 million would be saved by employing the reasonable alternative instead of building the line.[21] This value is considerably higher than the value advanced by Hydro One (which projects a negative saving, that is, additional cost, of about $219 million), and Pollution Probe submits that

[20] Transcript, Vol. 14, pgs. 47-48
[21] Table 1B of the Supplemental Direct Evidence of Mr. Fagan and Mr. Lanzalotta.

the analysis of Pollution Probe's experts should be accepted instead as the analysis of Mr. Fagan and Mr. Lanzalotta again withstood rigourous cross-examination by Hydro One.[22]

In addition, Pollution Probe again submits that the savings are actually substantially *more* than $72 million referred to, given the inherently conservative values used by Mr. Fagan and Mr. Lanzalotta in their analysis. For example, as detailed above, their analysis assumes that:

- Nuclear capacity factors for the summer and winter seasons would be a constant aggregate of 95%, which is significantly higher than the historical capacity factors associated with the Bruce Nuclear Station (i.e. about 60-80%)[23] and the actual hourly data for 2007.[24]

- The analysis assumes a line limit of only 7,076 MW as stated by Hydro One, yet Mr. Russell has put evidence before the Board that the line limit for the reasonable alternative could actually be as high as 7,176 MW or 7,400 MW.[25]

As a result, Pollution Probe submits that the minimum $72 million savings level in this scenario is thus very conservative, and the actual savings are significantly more. Pollution Probe again submits that the $91 million cost of series capacitors should not be included as part of the analysis given the other long-term benefits that series capacitors bring to the network (e.g. the line being able to transmit significantly more electricity in the event of a contingency).[26] However, even if these costs were included, it is clear that savings would likely outweigh the cost of the line given the inherently conservative assumptions used by Mr. Fagan and Mr. Lanzalotta.

[22] See generally Transcript, Vol. 13, pgs. 39-168
[23] Table 8 of the Evidence of Mr. Fagan and Mr. Lanzalotta.
[24] Undertaking J13.1
[25] See *e.g.* Transcript, Vol. 14, pgs. 34 and 49-50
[26] Transcript, Vol. 14, pgs. 47-48

The Faulty Assumption that the Bruce Nuclear Station's Output Will Continue at Current or Higher Levels for the Long-term

As part of their justification for the proposed new line, Hydro One and the OPA assert that nuclear generation will likely continue at current or higher levels for the long-term. With respect, this narrow view ignores the currently speculative status of future nuclear generation in the Bruce area.

Although the Bruce B reactors are currently scheduled to reach the end of their lifespan starting in about 2018, the OPA submits that nuclear generation will likely continue at current levels over the long-term. However, unlike the case of Bruce A refurbishment, there is no specific government directive or contract in place that would support the refurbishment of Bruce B.[27] In addition, as discussed elsewhere, other ministerial directives related to the IPSP only provide for a *maximum* amount, not an exact amount, of potential nuclear generation.[28] There is simply nothing in the evidence that provides any degree of certainty about whether nuclear generation in the Bruce area will be maintained at current or higher levels. This is essentially speculation.

While a recent government press release states that generation will continue at the current level of 6,300 MW, Pollution Probe submits that the Board can only give very limited weight (if any) to the statement. It is after all contained only in a press release, which is neither binding in any way in itself nor refers to anything else that is or might be binding. Pollution Probe submits that the statement reflects at best an intent of the government to *negotiate* with Bruce Power regarding future nuclear generation at Bruce, and many things may intervene with respect to those negotiations (including disagreements about price).

In short, Pollution Probe submits that only a binding directive or contract that will clearly result in the refurbishment or replacement of Bruce B would justify an analysis of the proposed line that ignores the otherwise certain reduction of nuclear generation resulting the retirement of Bruce B, as contemplated by Issue 1.4 of the approved Issues List for this proceeding.

[27] See e.g. Minister's Directive to the OPA dated October 14, 2005 and available online at http://www.powerauthority.on.ca/Storage/14/943_2005-10-17_MOE_Bruce.pdf.
[28] See pg. 18 and Exhibit B, Tab 6, Schedule 5, Appendix 7.

Over-Estimating Network Need By Using "Nameplate" Capacities

Pollution Probe respectfully submits that the Application significantly over-estimates the need for transmission from the Bruce area because it simply adds up the maximum capacity ratings (i.e. "nameplate capacity") for the various individual generator units in the Bruce area to arrive at a total figure to be used as projected need. Pollution Probe submits that this simplistic methodology is almost guaranteed to not be cost-effective, since the result will be that expensive transmission capacity is built to cover the very limited number of times when *all* generating units are each operating *at their absolute full capacity – all at the same time*.

For clarity, Pollution Probe is not suggesting that such adding together of the individual maximum capacity ratings of multiple generating units might not be suitable for radial or feeder lines which deliver electricity to the major transmission line. Rather, Pollution Probe's (and this Application's) focus is on a major *network* transmission line that transmits the *aggregate* of all of the Bruce area's generation at any particular time. Since such a major line "collects" the generation output of a large number of individual units, the general real world fact to be taken account of is that there will be relatively few times when such a large number of units will all be at their maximum production at the same point in time.

With respect to wind, the use of nameplate capacity is not realistic for a few reasons. First, given the large geographic area within the Bruce area, it is unlikely that *all* of the wind generation units will be running at 100% of capacity at the same time because of different wind intensity at different geographic locations (i.e. "spatial diversity").[29] Second, for the Bruce area, wind tends to blow more in the winter and at night rather than during summer days when electricity demand is highest.[30] The result is that many of the times when aggregate wind production is highest will occur at times when the electricity is not needed (and therefore neither the transmission capacity). Third, as detailed starting at page 8, it may be more efficient from a societal perspective to simply pay for any locked-in energy during those odd times when the transmission system is running at full capacity than to build an expensive transmission line that would not be needed most of the time.

With respect to nuclear generation, the use of nameplate capacity for transmission planning is again not realistic for a several reasons. First, contrary to the OPA's assertion, nuclear units cannot be considered to operate in either "on" or "off" modes, *when they are being considered as a group*, such as for purposes of predicting the aggregate output of the group.[31] Second, the Bruce nuclear facility has historically operated in the range of 60-80% of capacity (i.e. it has rarely, if ever, operated at

[29] See *e.g.* Transcript, Vol. 13, pg. 19
[30] See *e.g.* the Direct Evidence of Mr. Fagan and Mr. Lanzalotta; Transcript, Vol. 13, pgs. 18-19
[31] Undertaking J13.1, Figures 1 and 2

100%).[32] Third, it is important to note that there are times during the "shoulder" season when capacity drops to about 70% due to required maintenance. Pollution Probe therefore submits that it is seriously mistaken to assume for transmission planning purposes that a group of nuclear generation units will operate at their aggregate nameplate capacity.

Hydro One's witnesses essentially advance the justification that, since nameplate capacity has always been used in the past, it should continue to be used in this case. Pollution Probe respectfully submits that just because a practice has been used before does not necessarily mean that it is right, particularly since this is one of first major instances of including wind generation as part of *network* transmission planning. Proper planning should instead be realistic and efficient, and thus more realistic capacity factors should be used in planning for *aggregate* network transmission.

The extremely shaky ground on which this fundamental premise for the entire Application rests is illustrated by the responses of Mr. Falvo of the IESO when questioned closely by Pollution Probe lawyer Mr. Klippenstein.[33] Mr. Klippenstein asked Mr. Falvo for the basis of the so-called nameplate standard. Mr. Falvo referred to a NPCC design criterion which states that "Transfer capability studies shall be based on the load and generation conditions expected to exist for the period under study." When asked whether he interpreted that wording to mean "that one is obliged to design to the single windiest day", Mr. Falvo gave a vague answer, but when repeatedly asked "is the NPCC requirement that in fact you must plan to deliver the highest single day…?" (and when finally urged by the Chair of the Board to answer "yes" or "no"), Mr. Falvo answered "yes". In other words, it appears that the IESO is relying on the reference to "generation conditions expected to exist for the period" as justifying nameplate capacity planning.

Pollution Probe submits that the NPCC wording referring to "generation conditions expected to exist for the period under study" is far too broad and general to be interpreted as requiring or even providing justification for the specific concept of "nameplate capacity". Indeed, since generation at full "nameplate capacity" seems to occur fairly infrequent in the real world, it seems an odd meaning to assign to "conditions expected to exist for the period". This is even more so in view of that fact that a major transmission line aggregates the actual output of various individual generator units, and that that aggregation is even less likely to equal the theoretical sum of the individual nameplate capacities than the likelihood of an individual unit producing at its nameplate capacity.

In other words, the NPCC criterion seems at best a very dubious basis for a transmission planning principle which seems almost certain to lead to expensive capacity that will be unused most of the time. It is troubling that the IESO is committed to such a principle on such slim justification.

[32] Direct Evidence of Mr. Fagan and Mr. Lanzalotta, Figure 8
[33] Transcript, Vol. 3, pgs. 139-144

It must be emphasized that rejecting the nameplate capacity principle does not automatically force one into "planning for averages", as was sometimes suggested by Hydro One witnesses. It is quite possible that the most cost-effective design level to plan for lies somewhere between the "average" and the "nameplate capacity", and making that decision may require knowledge of the characteristics of the generation units and their aggregation in a particular situation, combined with judgment. Planning transmission by simply adding up various nameplate capacities may be simple, but it is almost sure to be wasteful.

If more realistic capacity factors of a maximum of 95% for nuclear and a maximum of 50% for wind are used for calculation (figures which Pollution Probe submits are rather conservative), it becomes clear that a new transmission line would provide substantial additional capacity that would not be needed if the reasonable alternative of series capacitors and the BSPS was used instead. Figures 3 and 4 from Mr. Fagan's and Mr. Lanzalotta's Direct Evidence (included below) illustrate this change, using the alternate assumptions that 1) Bruce B is refurbished or replaced and 2) Bruce B is retired and not replaced.

Figure 3. Alternative Assumptions: Depiction of Need for Bruce Area Line Using Bruce Nuclear Station Aggregate CF = 95% and Wind Aggregate CF = 50%

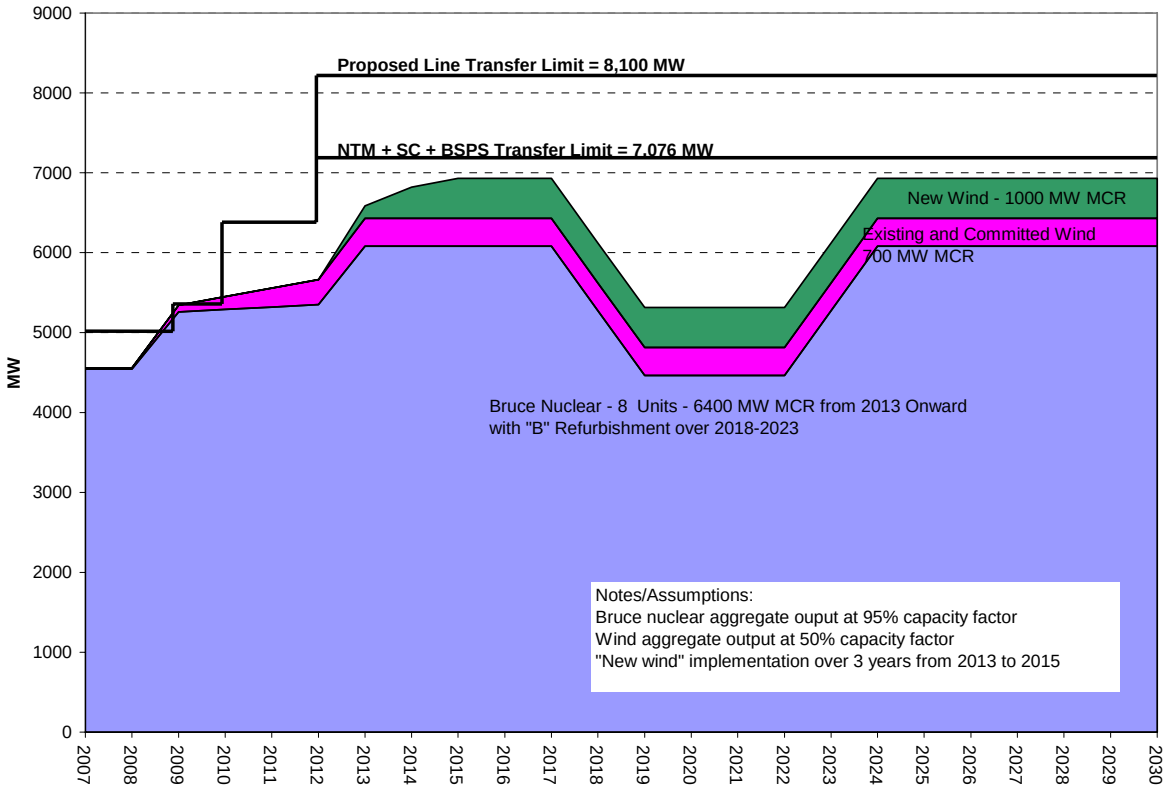
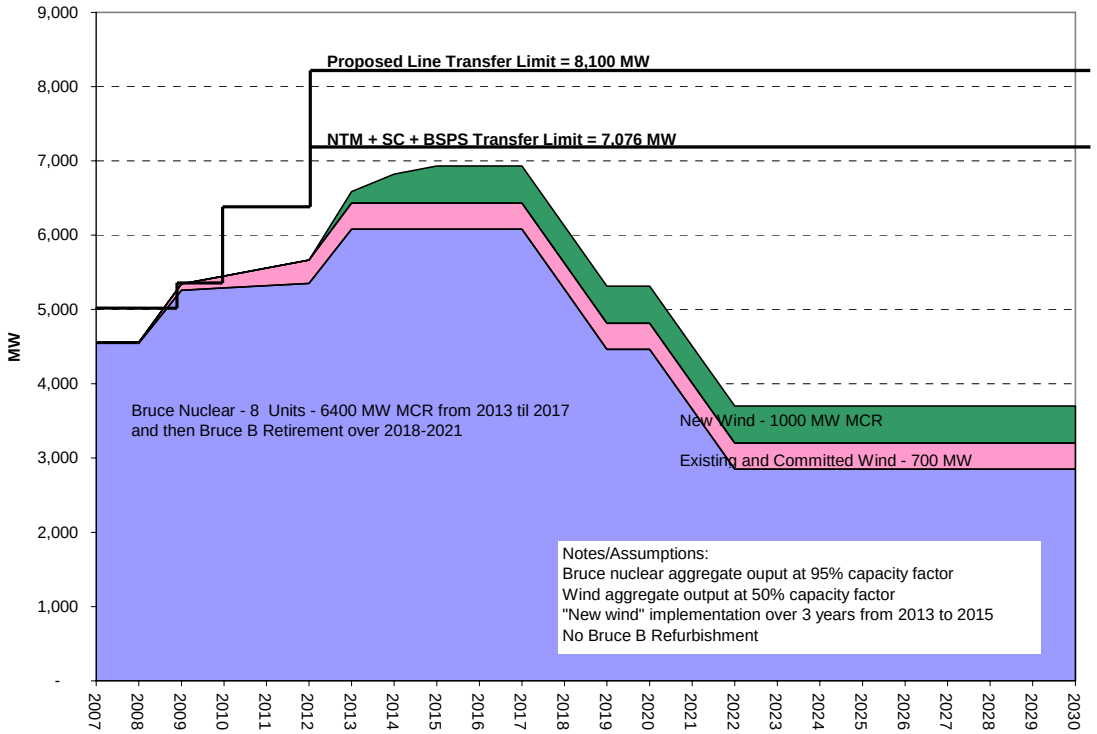


Figure 4. Bruce Area Operation in the Absence of Refurbishment of the Bruce B Nuclear Station, Using 95% CF (Bruce nuclear) and 50% CF (wind) Assumptions



The Misinterpretation of the Government Directives

With respect, Hydro One and the OPA continue to misinterpret key aspects of certain directives from the Minister in order to supposedly justify building the proposed line. Two of these aspects are discussed in detail below.

First, Hydro One and the OPA have advanced the interpretation that the Directive from the Minister *mandates* 14,000 MW of nuclear capacity. However, it is important to look at the words of the relevant directive carefully:[34]

> 3. Plan for nuclear capacity to meet baseload electricity requirements but *limit* the installed in-service capacity of nuclear power over the life of the plan to 14,000 MW. [emphasis added]

Pollution Probe submits that it is clear that the directive is an upper limit, not a requirement for an exact amount of nuclear capacity. If the latter was true, much of the clause would be superfluous as the clause could have been simply and clearly restated as "[p]lan for 14,000 MW of nuclear capacity." The obvious interpretation that allows for flexibility also makes sense since this directive was issued in the context of providing the OPA direction for the preparation of the Integrated System Power Plan (which is currently pending before the Board).

Second, Hydro One and the OPA have suggested that "congestion reduction" as referred to in the directive is part of the justification for constructing the proposed new line, but their interpretation and presentation has been selective. It is again important to look at the words of the same directive carefully:[35]

> 6. Strengthen the transmission system to:
> …
> - Promote system efficiency and congestion reduction and facilitate the integration of new supply, *all in a manner consistent with the need to cost effectively maintain system reliability*. [emphasis added]

Pollution Probe submits that cost-effectiveness is a key part of the meaning of the directive (as it is in relation to s. 96(2) of the *Ontario Energy Board Act, 1998*), and the reduction of the congestion is not to occur at all costs (particularly given what is likely to be diminishing returns). Further, the directive refers to specifically "*maintain[ing]* system reliability", which Pollution Probe submits would in fact occur if the reasonable alternative was implemented instead of the proposed new line. Given that the reasonable alternative to the line would "maintain system reliability" at a lower cost, it is the option that is most consistent with the directive and in the best interests of electricity ratepayers.

[34] June 13, 2006 Directive (Exhibit B, Tab 6, Schedule 5, Appendix 7)
[35] June 13, 2006 Directive (Exhibit B, Tab 6, Schedule 5, Appendix 7)

Conclusion

Pollution Probe submits that the Application for leave to construct a new transmission line from Bruce to Milton should be rejected by this Board. Pollution Probe submits that the proposed line is not cost-effective, that it would cost Ontario customers much more than its benefits, and that reasonable alternatives exist to cost-effectively and reliably increase transmission capacity from the Bruce area to the extent needed.

ALL OF WHICH IS RESPECTFULLY SUBMITTED

July 4, 2008

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