INTERVENOR ARGUMENT: CHRIS ARISTIDES PAPPAS
EB-2007-0050

FINAL
ARGUMENT

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INTRODUCTION

DEMOCRACY & HISTORY

I must beg the indulgence and forbearance of the Board in the review and consideration of this foreword. It is my respectful submission that the historical consideration offered is invaluable in the appropriate consideration of this application and the responsibilities and obligations of all the public agencies involved.

It is my primary concern, as it is with the Ontario Energy Board "To protect the interests of consumers with respect to prices and the adequacy, reliability and quality of electricity service.

But, first, in summary, my present considerations follow. Firstly, we must remember that Sir Adam Beck and the boys did, in fact, create a transmission and Hydro electric generation system second to none. While all his successors have continued to suggest this achievement continued, the fact is that they simply "rested on their oars", or more appropriately, his oars. The conductors that Ontario's various succeeding avatars of the original provincial electrical utility entity have continued to use on all new builds, up to and including this application, were originally introduced in 1907. I suppose that they felt that what was good enough for their "Pappies" and their "Grandpappies" was, by gum, good enough for them. From 1927 to the present this technology has been surpassed time and again. The first true High Temperature – Low Sag conductor, ACSS, was introduced in 1970. Superior ACSS/TW was introduced circa 1983. Series compensation has been a valuable transmission adjunct for over 50 years. FACTS technology, power electronics and power electronic controlled capacitor technology, have been commercially available for over three decades. Our universities, such as Waterloo and Western, have offered power electronics in their electrical engineering courses since, at least, the 1990's. There is absolutely no excuse for the applicant to have ignored

all this. I might suggest that Sir Adam Beck is spinning in his grave at such a speed that if we slapped a couple of magnets on him and wrapped him in copper wire we could probably power Ontario for the next 100 years.

The application, EB-2007-0050, has some components which may lead to further transmission difficulties, design contingencies and may interfere with and diminish Ontario's energy options within the near future. This "near future" is compromised by the speed with which the applicant and the OPA claim is necessary to prevent certain applicant and OPA perceived calamities. Further, this application may be a matter of precedent that, if established, may lead to further complications and very real calamities that may impinge on reliability, supply and rates. The filing requirements and the Transmission System Code regulations are to insure that any application advanced was not simply the first thing within reach on the shelf. It is for this reason that that this application must undergo the due full scrutiny and all due diligence in its consideration for approval.

This duty and responsibility falls to the Ontario Energy Board and is empowered by their mandate and their legislated powers which are broad within their mandate. Because the approval of this application *could* lead to extremely serious consequences adverse to Ontario's society, to its people, the OEB must exercise their full measure of caution, evaluation and determination, as per their mandate, to ensure the most appropriate decision. That is to say that the OEB must demand that the applicant can show, absolutely, that their application will not even begin to lead to such outcomes within the reasonably near and forecastable future. The onus is on the applicant to provide full disclosure and to make their case beyond a reasonable doubt. There is no onus on the Board, the Board Staff or any intervenors to prove that the application *will* result in such ends. They only have to offer reasonable considerations that it *may*. I respectfully submit that if there is an abundance of reasonable questions and a paucity of reasonable answers, then the Board must deny approval for this application.

If the applicant cannot prove that their application will not even begin to lead to such outcomes within the reasonably near and forecastable future, then I respectfully submit that the OEB must dismiss this application. I respectfully submit that, within the Board's mandate, is the responsibility to not knowingly approve an application which *may* repeat, compound or exacerbate existing system design flaws or "contingencies". I further respectfully submit that within the Board's mandate is the unwritten and unspoken requirement to "first, do no harm".

This decision and, therefore, our energy future, depends entirely upon the public bodies that serve us all. This includes our government and its various ministries and agencies, such as the newly created OPA. This also includes agencies such as the OPG, and HONI, also relatively recent. Most importantly, in this instance, it includes the OEB who will bear the ultimate responsibility in protecting our interests and keeping us from harm. Please consider that the applicant and OPA claim that this undertaking and other projects will enhance our transmission reliability, supply and protect our rates for at least three generations. I respectfully submit that if they are, indeed, incorrect then the corollary may be our fate. If they are wrong then we may be faced with generations of energy difficulties and onerous rates. We cannot simply flip a coin, here.

Thus, I believe that it is of the utmost importance that we take some time to consider the nature of the democratic responsibilities and obligations of our agencies and institutions to fully comprehend what is and what is not appropriate.

The applicant and some of their proponents, the Ministry of Energy and Infrastructure and the OEB are, in fact, *public* entities with obligations and responsibilities to the *people* for which they are answerable. In each case their existence is entirely predicated in terms of service to the public. Political positions as well as administrative, executive placements and careers and even the jobs of all the general workers involved are for this service to the entire public, our society, and are, ultimately, at

the behest of the entire public, regardless of any "realities of politics and human behaviour". In fact, it is to suppress these last that rules and laws have been enacted. In the forum in which this application before the Board is considered, these are the realities.

The fact is that Ontario is, purportedly, a democratic society, albeit a representative democracy. It is true that ignorance and lack of social vigilance leads to erosion of rights or at least to negligence in their application and consideration. Still, as such, our government, all our public entities and the individual members of the public have obligations and responsibilities to the overall public, the "*demos*". It is for this reason that there are guidelines, policies, rules and legislative demands, laws and codes, which exist for the well-being of the "*demos*", the entirety of our society. I offer a brief review of this to better state my case, my argument.

When the Ancient Greeks introduced democracy it was not for considerations of individual rights but for the consideration of the rights and obligation of a society and the individuals of which it is comprised. In fact, the introduction of democracy was to limit or obviate certain individual rights. The purpose was to subordinate the individual to the rights of all the individuals, the demos, the people. First to go was any individual rights that would subordinate the rights of others. No longer did any individual or group of individuals have rights that subsumed the rights of the people, the *demos.* Mon*archies*, Olig*archies* and even An*archies* were not considered appropriate. Anarchy is a sociopathic anti-social arena wherein the individual places their rights above those of all others. Any such anarchaic region would always be swept before an organized society of any kind. Humans are not leopards or bears and cannot survive as such. It is unfortunate that many individuals, now, believe that individual rights and desires are the paramount purpose of democracy. They simply ignore that those derive from the democratic obligations we have, each and every one of us, to each and every

one of us. The suffix "*arche*" refers to rule, position and even office. In demo*cracy*, the suffix "*cracy*" derives from the ancient greek "*kratos*" which refers to power and capacity. The simplest definition and translation of "democracy" is, in fact, "*people power*". However, contrary to popular understanding, democracy does not endorse majority rule as this may not be in the best interests of a society. Again, democracy does not endorse any rule and only endorses power and that only to the *demos*, that is, *all the people*.

No longer did any individual or groups of individuals have any claim to rule, order or govern a society, a demos. Now the state was not an extension of any individual[s]. Now the state was the people. The law and all other rules were now an expression of the people, the state, the demos. The courts, magistrates, court officers, administrative public offices, and administrators were not components of the state. They were all but functions and functionaries secondary to and responsible to the state, that is the people, the *demos*. It is valuable to note that the term *polis* refers to city and to state. However, the Greeks never considered the term "*poliscracy*", which would translate as *state power*, nor "*polisarchy*", "*state rule*", which was not what they had envisioned.

Finally, it is understood that the Ancient Greek Democracies were not perfect. There are many arguments that can be made against them. However, the fact is that at that time the concept was novel and could not be expected to immediately reach its full expectations. That it still has not done so is more than enough reason that any argument raised on that issue would be irrelevant.

The following are not offered as evidence as they do not deal directly with the application, nor do they deal with any of the details of the application or even the details of this process. Thus, I believe that their consideration is entirely appropriate and that if the application is truly appropriate their consideration

cannot bring harm to the applicant. Again, the following are offered in an attempt to clarify the reason for our considerations and to clarify the roles and obligations of the various public bodies involved in this process.

Princeton/Stanford Working Papers in Classics

The original meaning of "democracy":

Capacity to do things, not majority rule.

Version 1.0

September 2007

Josiah Ober

Stanford University

Abstract: That the original meaning of democracy is "capacity to do things" not "majority rule" emerges from a study of the fifth and fourth century B.C. Greek vocabulary for regime-types. Special attention is given to *–kratos* root and *–arche* root terms.

Paper delivered at the American Political Science Association meetings, Philadelphia, 2006.

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" Democracy is a word that has come to mean very different things to different people. In origin it is, of course, Greek, a composite of *demos* and *kratos*. Since *demos* can be translated as "the people" (qua "native adult male residents of a polis") and *kratos* as "power," democracy has a root meaning of "the power of the people."

But just as *kratos* is not synonymous with *arche*, so too in classical Athens *demos* originally meant "the whole of the

citizenry" (qua free native male population of a national territory) – not a sociologically delimited fragment of the citizenry.
From a passage from a court case of the mid-fourth century B.C. (Demosthenes 21: *Against Meidias*)

And what is the power (*ischus*) of the laws? Is it that, if any of you is attacked and gives a shout, they'll come running to your aid? No, they are just inscribed letters and have no ability (*ouchi dunaint'*) to do that. What then is their motive power (*dunamis*)? You are, if you secure them and make them authoritative (*kurioi*) whenever anyone asks for aid. So the laws are powerful (*ischuroi*) through you and you through the laws. You must therefore stand up for them (*toutois boethein*) in just the same way as any individual would stand up for himself if attacked; you must take the view that offenses against the law are public concerns (*koina*)... (21.223-225)."

Now, I will refer to another historical source, that explores other relationships and realities that I believe are also extremely relevant to our considerations and to my argument.
According to British historian *Arnold Toynbee* [1889 - 1975] the decline and fall of civilizations was caused by a number of well defined agents. Among these he cited "*The Intractability of Institutions*" in *A Study of History*, 1934-1961, twelve-volume analysis of the rise and fall of civilizations, one of his many works.
While he recognized the value of institutions in the growth of civilizations, he felt that, over time, institutions complied less and less to the needs of the real social, technological and economic situation. Institutional inertia and the inability to make strategic choices intensified the systemic incoherencies that manifested themselves in escalating conflicts of interest, the particularism of various groups, and the loss of steerability over the system as a whole. He considered that, with time, institutions became more concerned with self interest and self

perpetuation than with their original *raison d'etre*. He found that, over time and without some appropriate intervention to re-affirm their original purpose, they became moribund, counterproductive and, ultimately, inimicable to the very society that they were created to enhance. I offer some pages of his Volume IV, The Breakdowns of Civilizations, for elucidation and guidance. While this may seem, at first blush, to be far removed from the case at hand, I assure you that it is entirely relevant. His admonitions regarding institutional inertia go directly to the heart of this application. While I believe that his words and his analogies are fully pertinant in, and of, themselves I respectfully ask you to also consider some of his analogies in a secondary light. Where he speaks of new wine in old bottles and a new head of steam in an old fashioned engine I ask you to analogize the new wine and new head of steam as our modern [1970s to the present] and large, powerful generation facilities. I further ask you to analogize the old bottles and old fashioned engine as our provincial transmission system, that still installs conductor technology introduced a century ago, and particularly that in Southwestern Ontario and more particularly, the BSPS.

A STUDY OF
HISTORY
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'Except the Lord build the house, their labour is but lost that build it. 'Except the Lord keep the city, the watchman waketh but in vain.'

Ps. cxxvii. 1—2

VOLUME IV

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part of this Study, that a progress towards self-determination is the criterion of growth.' In the rest of this Part we shall examine some of the forms in which this loss of self-determination through loss of harmony is manifested.

(b) THE INTRACTABILITY OF INSTITUTIONS

1. New Wine in Old Bottles

In the last chapter we came to the conclusion that a society breaks down through a loss of harmony between its parts which is paid for by the society as a whole in a loss of self-determination. One source of disharmony between the institutions of which a society is composed is the introduction into the life of the society of new social forces—aptitudes or emotions or ideas which the existing set of institutions was not originally designed to carry.

The destructive effect of this incongruous juxtaposition of 'things new and old' 3 has been pointed out in one of the most famous of the sayings that are attributed to Jesus:

'No man putteth a piece of new cloth unto an old garment, for that which is put in to fill it up taketh from the garment, and the rent is made worse. Neither do men put new wine into old bottles—else the bottles break and the wine runneth out and the bottles perish; but they put new wine into new bottles, and both are preserved.'[4]

In the domestic economy from which this simile is taken the

precept can, of course, be carried out to the letter, because the cloth and the garment and the wine and~ the bottles are material chattels over which the householder has an absolute power of disposal. But in the economy of social life men's power to order their affairs at will on a rational plan is narrowly restricted, since a society is not the chattel of any owner, but is the common ground of many men's fields of action; and for this reason a precept which is common sense in the economy of the household and practical wisdom in the life of the spirit is a counsel of perfection in social affairs.

Ideally, no doubt, the introduction of any new dynamic forces or creative movements into the life of a society ought to be accompanied by a reconstruction of the whole existing set of institutions if a healthy social harmony is to be preserved; and, in the actual history of any growing civilization, there is in fact a constant remodelling or readjustment of the most flagrantly anachronistic institutions *ex hypothesi,* at least to the minimum extent that is necessary in order to save the civilization from breaking down. At

See IIL C (i) *(d),* vol. iii, p. 216, above.
2 See Part II. B, vol. i, p. 291, above..
3 Mart. xiii. 52. 4 Mart. ix. 16—17.

the same time, sheer *vis inertiae* tends at all times to keep most parts of the social structure as they are, in spite of their frequent incongruity with the new social forces that are constantly being brought into action by the creative energies of the growing society as its growth proceeds;' and in this situation the new forces are apt to operate in two diametrically opposite ways simultaneously. On the one hand they perform the creative work which it is their business to perform by finding vent either in new institutions which they have established for themselves or in old institutions which they have successfully adapted to serve their purposes; and, in pouring themselves into these harmonious channels, they promote the welfare of the civilization by giving

fresh impetus to its *élan.* At the same time they also enter, indiscriminately, into any institutions which happen to lie in their path—as some immensely powerful head of steam which had forced its way into an engine-house might rush into the works of any old engine that happened to be installed there. In such an event one or other of two alternative disasters is apt to occur. Either the pressure of the new head of steam is so very much higher than the maximum pressure which the old-fashioned engine was originally built to bear that the works simply explode and are blown to pieces when the steam has entered into them; or else the antique plates and castings do 'stand the racket', and then the disaster takes an even more destructive and a far more monstrous turn. The unprecedentedly powerful 'drive' of the new motive-force then sets the old machinery to work in a way which was never contemplated by its makers. If it was a rather unsatisfactory machine, the tolerably bad results which it originally produced are now magnified to an intolerable degree; and even if it was a fairly satisfactory machine, the tolerably good performance that was originally obtained from it may have amazing and appalling effects now that the machine has been so powerfully 'keyed up'. The dentist's implement which delicately files away the decayed tip of a tooth when it is operated with the proper power may perhaps pierce the palate to the brain, and cause the patient's death instead of giving him a salutary relief, if the strength of the electric

I It was in this aspect, as obstacles to progress, that institutions were envisaged by the eighteenth-century French Encyclopaedists, and in particular by Condorcet (Bury, J. B.: *The Idea of Progress* (London 1924, Macmillan), pp. 210—I ~). The same point is made by Walter Bagehot in his *Physics and Politics,* ioth edition (London 1894, Kegan Paul), p. 149: 'The very institutions which most aid at step number one are precisely those which most impede at step number two.' Bagehot illustrates this thesis by the case of the institution of Caste. After pointing out (op. cit., p. 148) that Casteis of value to primitive societies in helping them to reconcile the two desiderata of social rigidity and social variety, he goes on (op. cit., p. 149) to point out that 'several non-caste nations have continued to progress, but all caste nations have stopped early, though some have lasted long'. In fact, 'progress would not have been the rarity it is if the early food had not been the late poison' (op. cit., p. 74).

current is suddenly increased out of all measure. Similarly, a drug

which acts as a potent stimulant when it is taken in a minute quantity may work with equal potency as a poison if the dose is largely increased.

To translate these parables into terms of social life, the explosions of the old engines which cannot stand the new steam-pressure—or the burstings of the old bottles which cannot stand the fermentation of the new wine—are the révolutions which sometimes overtake institutions that have become anachronisms. ı On the other hand the baneful performances of the old engines which have successfully stood the strain of being 'keyed up' are the social enormities which a 'die-hard' institutional anachronism sometimes engenders. Revolutions may be defined as retarded, and proportionately violent, acts of mimesis. The mimetic element is of their essence; for every revolution always has reference to something that has happened already elsewhere-at an earlier moment and on a different spot from the place and the time at which the revolutionary outbreak of 'violence occurs—and it is always manifest, when the revolution is studied in its historical setting, that this outbreak would never have occurred of itself if it had not been thus evoked by a previous play of external forces.' The element of retardation is likewise of the essence of revolutions; and it is this that accounts for the violence which is their most prominent feature. Revolutions are violent because they are the belated triumphs of powerful new social forces over tenacious old institutions which have been temporarily thwarting and cramping these new expressions of life. The longer the obstruction holds out, the greater becomes the pressure of the force whose outlet is being obstructed;

For this theory of the nature of revolutions see Teggart, F. J.: *The Processes of History* (New Haven 1918, Yale University Press), p. '30, following Walter Bagehot's *Physics and Politics.*~ 2 This external factor in the geneses of revolutions is impossible to ignore in those cases where a revolution in the social structure of one society is evoked by the impact of social forces that emanate from a different society (this class of cases is dealt with in Parts IX and X below). But the operation of the external factor can always be detected, on close inspection, in the history of any revolution, even when the whole movement works itself out within one single society's bosom. For instance, 'the confluence of French theory with American example caused the [French] Revolution to break out' when it did (Lord Acton, quoted by Bury, J. B.: *The Idea of Progress* (London 1924, Macmillan), p. 203). In both these varieties of a substantially identical experience the social structure of the passive party to the encounter is apt to oppose so obstinate a

resistance to the impinging force that, when this force does eventually break through, the resolution of forces takes a revolutionary form. 'The great events of history that strike the eye are generally the sequel to a long process of preparation, and most of them constitute the conclusion and climax of some process that is less conspicuous than they are. It is

only when the Hellenic idea has quietly and silently permeated the East that Alexander—following the direction thereby given to him—goes on the war-path and founds his empire. It is only when the French idea has pushed its way right across Germany and on beyond into Russia that Napoleon goes on the war-path and seeks to extend the realm of French glory by force of arms' (Frobenius, L.: *Paideuma* (Frankfurt 1928, Frankfurter SocietAts-Druckerei), p. 276).

and the greater this pressure, the more violent the explosion in which the imprisoned force ultimately breaks through.' As for the social enormities that are the alternatives to revolutions, these may be defined as the penalties that a society has to pay when the act of mimesis which ought to have brought an old institution into harmony with a new social force has been, not simply retarded, but frustrated altogether.

It will be seen that, whenever some new aptitude or emotion or idea arises in the life of any society, this new force is likely, in proportion to its strength and its range and its importance, to come into collision with a greater or a lesser number of the society's existing institutions, and each of these collisions may have any one of three alternative outcomes. The obstructive institution may either be brought into harmony with the new force promptly and peaceably through some constructive social adjustment; or it may be eliminated tardily and violently through a revolution; or it may succeed in defying both adjustment and elimination, and in this last event some social enormity will result from the unnatural 'drive' which will now be put into the intractable institution automatically by the new force that has failed to master it. It is evident that, whenever the existing institutional structure of a society is challenged by the impact of a new social force, each and all of these three possible alternative outcomes of the collision may actually be realized simultaneously in respect of different parts of the structure; and it is further evident that the ratio in which the three outcomes are represented in the total result of this particular round of Challenge-and-Response will be a matter of momentous importance in the working out of the society's destiny.

If the adjustments predominate over the revolutions and the enormities, then the well-being of the society will be maintained and the continuation of its growth will be assured during the current chapter of its history. If the predominant outcomes are revolutionary, then the fortunes of the society in this chapter will be 'on the razor's edge'. It is possible that the revolutions may save the society's life by blasting away a number of anachronistic institutions which have not proved amenable to pacific adjustment and which wojild have rankled into enormities if they had proved altogether intractable; it is equally possible that the havoc made

1 This explains, for example, the violence of the revolution through which a Catholic France caught up with a Protestant England at the close of the eighteenth century. The reason why there was no explosion of that violence in England at that time was that in England, in contrast to France, the medieval institutional obstructions to the modern social forces had already been partially broken down by stages in previous centuries— in a sixteenth-century religious reformation and in a seventeenth-century political upheaval. On this point see Masaryk, T. G.: *The Spirit of Russia,* English translation (London 1919, Allen & Unwin, a vols.), vol. ii, pp. 495 and 517—**23.**

by the revolutionary outbreaks may be so great (and, in every revolution, there is always a heavy bill of social damages to pay) that no amount of social liberation can compensate for it, and then the society may suffer almost as severely as if the predominant outcomes in this instance had been not revolutions but enormities. Finally, if the perversion of anachronistic institutions into enormities predominates over the elimination of them through violent revolutions or the conversion of them, through pacific and constructive adjustments, into satisfactory vents for the new social forces, then the dislocation of the whole social structure may be so serious that a breakdown may be virtually impossible to avoid.'

In the historic breakdowns of civilizations this working out of the principle of Challenge-and-Response in the medium of institutions has indeed played an important part; and now that we have formulated it a *priori* in the imagery of a parable, we shall perhaps do well to study it in the life by resorting once more to our well tried method of an empirical survey.

GENERAL ARGUMENT

In order to appropriately view this, or any other application, and the process itself, it is valuable to consider the mandate, powers, responsibilities, and, in fact, the entire *raison d'etre* of the OEB. It is my respectful submission that this is not the approval of applications. It is, in fact, the consideration and testing of applications for approval. This is a responsibility of the OEB whether there are any Intervenors or not. It is for this reason that the Board staff enjoys Intervenor status. It is, obviously, an important facet of the Board's mandate that they "keep the lights on" in Ontario, and this may, very well, be their final consideration and test of any application. Therefore, they must judge whether the application is actually necessary for compliance with this.

The application, EB-2007-0050, before us purports that not only is it absolutely necessary to this end but, also, that it is necessary with all possible speed.

It is my respectful submission that this is not so. It is my respectful submission that this application is ill considered and that its approval will ensure further intractable, deleterious and irremediable results. I further respectfully submit that it may force a direction upon us that may, per course, eliminate present and future more appropriate choices and directions.

I respectfully submit that, within the Board's mandate, is the responsibility to not knowingly approve an application which *may* repeat, compound or exacerbate existing system design flaws or "contingencies".

The combination of load and generation rejection is unique to Ontario Hydro and is not found elsewhere on the continent although some 15 systems in the United States are currently using a system of generation rejection. Not only is it an extremely complicated operation but it imposes severe stresses on turbines and generators, including tortional stresses involved in the sudden transition from the loaded condition (where it can be triggered) to the unloaded condition. Moreover, the fatigue margin of the installation is being whittled away through normal use. There have been some unsuccesful operations of the scheme which have increased the possibility of damage occurrence. Mr. W.G. Morison, Vice-President, Design and Construction at Ontario Hydro, has,

based on the life expectancy of a nuclear unit of 40 years, estimated that there is a 50-50 chance of destruction of a unit during the life of the station. The cost of replacing a turbogenerator, for instance, is about $150,000,000 and it takes some four years to replace the generator during which time the generating capacity at the station is reduced accordingly.

The use of the Load and Generation Rejection scheme has repercussions insofar as the applicant's relations with the states of Michigan and New York are concerned, and further afield as well.

Mr. Julius Bleiweis, Director of Planning of the NPCC, testified to the effect that the design criteria agreed to by the members of the NPCC does not permit the use of the Load and Generation Rejection scheme. This is understandable since the failure of the system to operate properly could cause a condition known as machine mode instability where the rotors in the generators are out of synchronism with the rest of the power system and the system cannot accommodate a surge of energy. This could result in the

The question may be asked as to why is the use of these sophisticated and wholly undesirable devices still being tolerated to address problems that must have been anticipated long before the proponent began to prepare for this hearing? How is it that the Bruce Nuclear Power Development Generating Station was built without the assurance of adequate transmission facilities to transport the power generated there? These and similar questions can be posed but the Board is of the opinion that whatever the answers, they do not affect the Board's decision one way or another. The Joint Board assesses the situation as is and not as might have been or should have been. Given the situation at this time and the factors to be weighed as set out in the applicable Acts, the Board must reach a decision upon the merits of the proposal as presented to it.

I am forced to echo some of the above.

"The question may be asked as to why is the use of these sophisticated and wholly undesirable devices still being tolerated to address problems that must have been anticipated long before the proponent began to prepare for this hearing?"

I must add, and why are we here in 2008 and asking it again?

"How is it that the Bruce Power Generating was built without the assurance of adequate transmission facilities to transport the power generated there?"

Here we are in 2008 and in all that time they have brought us right back to where they stranded us in 1986. *Why have they not been planning since 1986 to be ready for more generation builds*. I cannot believe that no one at Ontario Hydro, HONI and IESO, especially given all their documentation, and after going through

the 1986 hearings, did not see more generation coming and didn't begin to prepare for it. *They knew there was every possibility of new generation either at the Bruce or elsewhere*. There is no reason that, over all that time, there was no serious planning being done. Simply, if there was, then we would not be at this impasse now. I finding it galling to consider that this project might actually be approved and these entities rewarded for what amounts to decades of dithering and navel gazing.

The italics in the following are mine.

EB-2007-0050 – Hydro One Networks' Section 92 Bruce - Milton Transmission Reinforcement

Application – Supplementary filing

SIA Report

Bruce Special Protection System: Proposed Enhancements

1.0

CAA ID No. 2007 - EX349

Transmission Assessments & Performance Department

FINAL DRAFT Version

Date: 27th March 2008

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***NPCC Approvals*Until the necessary approvals have been obtained from NPCC, the additional features of the *enhanced SPS cannot be deployed*. Since this is the responsibility of the IESO, the IESO undertakes *to initiate this process well in advance* of the scheduled in-service date for the new facilities.**

4. Schedule

***Although the proposed enhancements to the Bruce SPS should ideally have been completed before the remaining two generating units at the Bruce complex are scheduled to be returned to service in 2009*, Hydro One has notified the IESO that**

due to resource constraints, the completion of this work will be delayed until May-2010.

5. Future Expansion of the Bruce SPS

Subject to the receipt of the required approvals for the construction of the new 500kV double-circuit line between the Bruce Complex and Milton TS, ***the Bruce SPS will need to be further enhanced to recognise contingencies involving the circuits of the new line***, as well as any new breaker-failure conditions at the terminal stations of the new line that could be expected to have an adverse effect on the post-contingency operation of the system.

Because the ***Bruce SPS is now over 20 years old and much of the technology employed in the Scheme is obsolete***, Hydro One has commenced a review of the expected requirements once the new line is in-service and additional generation capacity has been installed to take advantage of the increased transfer capability out of the Bruce area. This review is also examining the potential requirements for additional features in the Bruce SPS during the interim period until the new line can be completed. During this period it is expected that immediate post-contingency switching of further reactive compensation at Nanticoke SS and Detweiler TS will need to be initiated via the Bruce SPS.

Depending on the outcome of this review, ***it could be decided to replace the existing SPS***. Consequently, the proposed enhancements that are the subject of this Assessment have been limited to only those that are required for the return to service of the remaining two units at the Bruce Complex.

I respectfully submit that without absolute proof and evidence to the contrary, the Board does not absolutely require proof that the application ***will*** be responsible for detrimental results but

only that it *reasonably may*. The onus of proof and evidence is on the applicant not the Board, Board Staff or any Intervenors. It is the Applicant that must, in this forum, make their case beyond a reasonable doubt. It is not for the Board, Board staff nor any Intervenors to make a case against the application, beyond a reasonable doubt. They need only show that there are, in fact, reasonable doubts.

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"MR. PAPPAS: Okay. So, finally, I will go to this. In what way does the new line actually make the SPS less complex and not more so?

MR. FALVO: Well, because it's not—it wouldn't be required to withstand contingencies when all of the transmission is in service, and even when some transmission is out of service, the responses that might be required under those circumstances are likely to be much less complicated than the responses that we are contemplating now.

That means less complexity, that means less risk and consequence in failure, and just less overall complication in day-to-day use and scheduling of maintenance work.

MR. PAPPAS: Do you not think it is also equally possible, but with all of that extra transmission line, extra devices, extra load and extra generation that is proposed and further proposed, that it is just simply going to add to the complexity?

MR. FALVO: The transmission line is going to make things much better and much less complicated. Clearly, it will do that.

MR. SABISTON: Mr. Chow's plan with the new transmission line will reduce the frequency of arming, so that it's—so that it's not armed nearly as frequently.That will make the system less complex. That will obviate the NPCC concerns about complexity and frequency of arming."

Clearly, both Mr. Falvo and Mr. Sabiston were making comments that were in complete contradiction of their own evidence.

Ontario Energy Board

Filing Requirements for

Transmission and Distribution Applications

November 14, 2006

5.3 Project Justification

Project justification delineates the responsibilities and necessary evidentiary components required for the project review. The responsibility for the provision of all evidence for the entire case rests with the Applicant.

Again, I respectfully submit that within the Board's mandate is the unwritten and unspoken requirement to "first, do no harm". I respectfully submit that the various reasonable alternatives and any combination of those will not only serve to "keep the lights on" in Ontario, but that they most certainly will not cause those lights to go out. I further respectfully submit that these alternatives will in no way limit our future choices nor propel us to some course from which we cannot easily return. They will most certainly give us time to more appropriately review our needs, choices and direction. Notably, they do not exclude the possibility of this application's transmission build being reconsidered and even approved at some future time after more fulsome investigation and review. It may be that the application of these alternatives may even remedy and obviate the various "design contingencies" that presently limit our system and burden it with the BSPS. Perhaps the application of FACTS, such as thyristor controlled devices, that control power flows and loop flows, will allow for a design contingency free build from Bruce to Milton in the future. However, this would require the appropriate studies. But, if appropriate solutions are applied across the grid

in the interim, we may not have to consider future major builds in SWO. Also, in consideration of my assertion that we not interfere with the ability to approach future options and the consideration that the Board "first do no harm", I submit the following consideration.

There was further evidence that I had wished to submit but failed to do so, mostly due to time constraints. Simply, I had to ensure that all evidence regarding what is now, and has been, available as proven, acceptable and conventional transmission technology was presented in a thorough manner. Therefore, I cannot employ them in my argument nor refer to any details of these. These dealt with other alternatives and past, present and future considerations. I will, however, deal with this in the abstract, for what it is worth. Also, there is the entire possibility that some, or all, of the Board members are, in actuality, conversant with some or all of these realities as well as any developments as have been reported in such papers as the Toronto Star. In this case, their independent knowledge of any of this allows them to consider all this in their decision, totally independent of any input from myself.

There are technologies that have been extant for a century, half of a century and a quarter of a century that have been and are presently employed in commercial \and industrial applications. These are all capable of being employed to address our energy needs. Additionally, further technologies and advances have arisen, steadily, since then.

The fact is that much of this has been considered and research and development in this regard has been underway for decades. The reality is that some of these are already in operation, some are approved and going forward, some are approaching approvability and some are close on the horizon. There are actually such forward technologies extant, as well as approved and underway, elsewhere in Canada as well as globally. Our federal government has sponsored a number of these. The federal government of the United States and many of their state

governments have undertaken a great number of studies, projects and initiatives, going back to the 1970s in an attempt to initiate their realization.

However, it appears that the greatest obstacle is that large initiatives rely on the commercial interest of large private entities. Certainly, the United States considers free enterprise first and relies on private enterprise to carry the ball. Here in Ontario we have seen this policy and attitude progress as is evidenced by the move to privatization of provincial highways and electrical generation and the regulation of the electrical industry, in general. However, I think that I can reasonably say, without malice, that large corporate entities are not in the business of putting themselves out of business. In general, they have no intention of shooting themselves in the foot and they will not initiate technologies that may, simply, ensure their corporate demise. This is in their favour, but not in the public favour, nor in the favour of our energy future.

The applicant has cautioned against placing all our eggs in one basket. Yet this is exactly what the applicant is proposing. I prefer to echo Mr. Klippenstein and not spend good money after bad.

The BSPS is the only incidence of such an endeavour throughout North America. It is unique. However, this is not a matter for pride. It exists because of poor generation and transmission planning in the past. If the location placement of the Bruce Generation and the original Bruce to Milton transmission build were truly appropriate, there would be, simply, no need for such a complex SPS. This is why no such other exists elsewhere in Ontario or in the rest of this continent.

Consider that while there is an IESO stated issue of conflict between the retirement of Nanticoke and generation from the Bruce generating facility, no such conflict exists between the retirement of Nanticoke and power from Pickering GS or Darlington GS. Refurbishment of Pickering B would not have been an issue in the retirement of Nanticoke. Yet, apparently, the

OPA recommended the refurbishment of Bruce A 1 & 2, instead.The IESO offered a 2 part remedy for the mutual exclusivity of Nanticoke GS retirement and Bruce GS generation. The IESO solution was for new generation distributed throughout and around the GTA, Golden Horseshoe and the other demand centres of Southwestern Ontario. The remedy also included the the installation of various FACTS devices and conventional series capacitors throughout Southwestern Ontario to support transmission from the Bruce GS.

Exhibit C Tab 4 Schedule 1 Attachment 1

Fortunately, the same types of system developments required to eliminate the need for Nanticoke generation described earlier this section are the same enhancements needed to accommodate additional generation at the Bruce site. These developments include the following:
Installation of generation in proximity to the large GTA demand. Location of generation close to the load facilitates the installation of additional generation at Bruce in two ways; first, less energy needs to be transported long distances to the GTA reducing competition for transmission capability between Nanticoke and Bruce, and second, reactive power needs of the system are met by the local generation in the GTA;

Installation of series compensation in the 500 kV lines serving Bruce and Nanticoke. This form of compensation reduces the need for reactive power to support the large power flows to support the GTA, and reduces the need for post - contingency voltage support; and Installation of shunt capacitors in southwestern Ontario. This form of compensation provides voltage support to the steady state power system, freeing up dynamic voltage control capability of generating units.

While the OPA has paid lip service to government policy for the generation near demand concept, they still support more generation out of the Bruce GS and did not direct the applicant to seriously consider FACTS/conventional series capacitors as an alternative option.

The IESO position was clear. Any reduction of power from Nanticoke GS would require a reduction of power from Bruce GS. Any attempt to retire Nanticoke GS would seriously jeopardize the return to service of the Bruce A 1 & 2 units and, therefore, the possibility of any future generation builds at the Bruce GS site.

Exhibit C Tab 4 Schedule 1 Attachment 1

Under peak load conditions, a minimum of six Nanticoke units are currently required to be in service to ensure reliable system operation. Without these units in service, reductions in the output of the Bruce nuclear generating station would be necessary. In the event that all units at Nanticoke are shut down, and equivalent replacement voltage support is not available, the allowable output from the Bruce generating station would be significantly restricted and the feasibility of returning Units 1 and 2 to service would be jeopardized. This is described in more detail in Section 5.1.6.

Still, neither HONI nor the OPA will consider the FACTS option, or reconductoring. Even though far superior High Temperature – Low Sag conductors have been available since the 1970s, HONI still persists in using the same thermally limited conductor technology that was introduced in 1907 and which they even expect to install on the current project. The appropriate consideration that leaps to mind is to ask why.

6 MR. SABISTON: No, not exactly.

7 A normal conductor, in order to avoid annealing, has

8 to stay at a temperature of less than 93 degrees. That is

9 called the continuous operating temperature.

10 MR. PAPPAS: Okay.

11 MR. SABISTON: If everything -- if the system is

12 completely normal, i.e., every -- all of the transmission

13 circuits are in service, we will attempt -- we will operate

14 our circuits up to a temperature of 93 degrees.

K14.2

Evidence Book 1 Chris Pappas June 4, 2008

Tab 1 pg 48 # 22

Advanced Components ACSS/TW, ACCR, and ACCC

Pappas Evidentiary Set 2

ES-2-6

Sargent & Lundy :: Power Delivery :: Engineering & Design

Technical Overview:

Uprating transmission circuits is accomplished by either increasing the current or converting the circuit to a higher voltage. A complete analysis of the benefits and costs associated with each option is required to achieve the desired project objectives as cost effectively as possible.
Sargent & Lundy projects currently underway involve a variety of approaches to line upgrading. As indicated in the description of

our current projects (See Services & Projects below), some options for transmission line uprating being implemented include:

Real-time conductor monitoring devices - units that measure tension and systems that measure sag are both used as a means to determine if the conductor is within the allowable thermal range and the prescribed maximum sag so as not to cause any clearance infractions.

_ *Conductor types that provide increased ampacity with little or no increased structural loads* - trapezoidal wire used in bare transmission conductors provide additional current carrying capacity with the same overall diameter as standard conductors. *ACSS* (aluminum conductor, steel-supported) *uses annealed aluminum wires, allowing for higher operating temperatures without any loss of strength*.

All aspects of transmission line design, including electrical and structural issues that are relevant to uprating projects, are covered in detail in the Sargent & Lundy Transmission Line Engineering Course. Course outline and upcoming dates.

In addition, the following technical papers provide a historical perspective of this topic spanning almost 30 years:

_ Repower Your Right-of-Way S. Cluts, *December 1974*

_ Uprating Double-Circuit Transmission Lines 115 kV to 230 kV T. M. Sekili & G. U. Martinez, *November 1982*

_ Uprating Transmission Lines K. Simpson, *November 1990*

Call on Sargent & Lundy to help you jump-start the projects that will get the most out of your existing right-of-ways.

_ Transmission Line Uprating Services and Current Projects

Evidentiary Set #2
ES-2-1
"High-Temperature, Low-Sag Transmission Conductors
May 2006

The majority of overhead transmission lines currently use steel-reinforced aluminum conductors (ACSR). ACSR can be operated at temperatures up to 100oC and, during emergencies, at temperatures as high as 150oC with some reduction in conductor strength. Today, however, power industry deregulation is placing new demands on the delivery system and altering high-voltage transmission network power flow patterns. As a result, networks are increasingly being forced to support power flows for which they were never designed.

One approach to addressing this dilemma would involve upgrading the transfer capacity through reconductoring of selected network lines. In recent years, conductor manufacturers have produced new, nontraditional conductors capable of operating at temperatures as high as 250 oC without violating present electrical clearances to ground and other objects, and without losing conductor strength. This project will evaluate the performance of selected "high-temperature, low-sag" conductors that are capable of significantly increasing the current carrying capacity of thermally constrained transmission lines without the need for extensive tower modifications. Examples include a few composite reinforced conductors, gapped conductors, and commercial forms of ACSS (Aluminum Conductor Steel Supported) such as ACSS-TW (Trapezoidal shaped Wire strands) using either aluminum alloy or pre-annealed aluminum."

While ACCR and ACCC conductors are relatively new, the ACSS/TW has been commercially available since Circa 1983.

EB-2007-0050 Technical Conference October 15, 2007

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Questions by Mr. Ross

MR. ROSS: I need some clarification on the prefiled

evidence, because I don't have the benefit of an expert. I need to understand exactly what we're talking about.

Mr. Pappas actually asked a question that I found quite intriguing, but I didn't understand the answer, necessarily. There are thermal limits on lines for transmission, I understand you to have said. There is a newish 500 kV line that came about in the 1990s.

Is it utilizing the most current and up-to-date technology as regards thermal resistance and thermal capability?

MR. CHOW: *My understanding is it is the standard new design at that time for Ontario Hydro*.

MR. ROSS: I appreciate that. Is there anything that has advanced beyond that today that has a greater thermal capacity?

MR. CHOW: It is a very big line even for those days. It will carry up to 4000 megawatts, which is very large capacity.

MR. ROSS: Is there anything available that can carry greater capacity in terms of a line?

MR. SCHNEIDER: We don't have it with us, but I imagine if you are going to larger and larger conductor sizes, you may have to change towers, as well, because of the weight being carried by the tower. So you're not just talking about the line, you're talking about all of the structures and everything associated with it,

if that's what you're getting at.

MR. ROSS: It is. You don't know for sure whether there is maybe a higher gauge line that could carry more juice without running into the thermal-capacity issues?

MR. SCHNEIDER: The information I have, and I don't have the information to fully answer your question, but if you went to a

higher conductor size, a difference in megawatt capability isn't material, in terms of the need that we're up against here.

Please recall Mr. Chow's comment regarding their 1990's circuits, "My understanding is it is the standard new design at that time for Ontario Hydro." The applicant's own evidence [Exhibit C Tab 4 Schedule 12 Page 4 of 5] shows that Ontario Hydro used the same ACSR conductor technology. This was originally introduced in 1907. Superior conductors have been available since 1927 with further advances over time.

The FACTS solution alone will provide additional transmission capacity equal to that expected from their proposed transmission build, and this at a fraction of the cost of the transmission build. As well, there would be no disturbance to the environment, landowners, farmers, woodlots or the Niagara Escarpment. Reconductoring, alone, can double the capacity of the existing circuits. With the extra transmission capacity and the varied control benefits of the FACTS technology, Nanticoke GS can be retired, all the power from the existing 8 Bruce generating units and Bruce wind units can be made available and there would be no need for a complex SPS.

Interestingly, the SPS itself is a matter of further investment. If this application is approved, then the SPS must be extended. But, it has been stated by the IESO that this existing SPS is 20 years old and *has aging and obsolete* components. The IESO has stated that this SPS will not only have to be extended, but must be replaced, and certainly at some great cost.

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MR. PAPPAS: I would like to jump ahead to page 28 of this document, the top of the page, please. Thank you.

It is C, interconnection of power systems with weak grids: "Not all interconnections take place between power systems in

top technical condition. In the developing world, *many power systems bear the mark of age, poor repair and insufficient investment*, ranging from corroded conductors and deteriorating insulation to leaking transformers, worn-out switch gear and a variety of inoperable equipment. *Equipment is often obsolete*, and operations that are automated elsewhere may be carried out manually."

I won't bother to go further there.

MS. NOWINA: What's your question, Mr. Pappas?

MR. PAPPAS: That certainly describes a system that is not robust; would you agree?

MR. FALVO: That's not a good system, I would agree.

MR. SABISTON: It in no way describes the Hydro One system. I fail to see the relevance with this and the Hydro One system.

I quote from the applicant's own evidence, "*this existing SPS is 20 years old and has aging and obsolete components. The IESO has stated that this SPS will not only have to be extended, but must be replaced, and certainly at some great cost*."

I respectfully submit that I certainly see the relevance with this and the Hydro One/Ontario Hydro system.

From my Issues List submissions, I offer this now. This possibility has concerned me from the very beginning a year ago, April 2007.

FROM: ISSUES LIST CONSIDERATIONS

1.4 Is the project suitably chosen and sufficiently scalable so as to meet all reasonably foreseeable future needs of significantly increased or significantly reduced generation in the Bruce area?

I respectfully submit that:

i. if the project, as proposed, cannot within a reasonable timeframe accommodate the future proposed generation

builds and refurbishments at Bruce GS [eg. Wind power generation, Bruce B refurbishment and the proposed "Bruce C" build], associated with those *non-committed* expectations, *without additional transmission builds and/or the application of reconductoring and/or FACTS [including TCSC and/or conventional series capacitors] technology, especially if only after the fact of the approval of this present application*, then NO.

Oral Hearing VOLUME: 9 May 13, 2008

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16 MR. FALLIS: So it said, number 3:
17 "But Cancilla says it won't be enough to handle
18 the energy from the potential Bruce C build."
19 MS. CANCILLA: I did say that. That is correct.
20 MR. FALLIS: Hmm-hmm. So the Bruce C build, what is
21 your understanding of what energy will be generated out of
22 the Bruce generating stations after Bruce C is built?
23 MS. CANCILLA: I don't have a specific number in mind.
24 I mean, clearly we have, in our communications throughout
25 this project, indicated that the Bruce-to-Milton line was
26 not for Bruce C. So at this point, that was the statement
27 I had made.
28 MR. FALLIS: I see. But it would be sufficient --

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would it be sufficient to handle all of
1 the power that's
2 produced at Bruce units A and B, plus the committed wind?
3 MR. NETTLETON: Madam Chair, this line of questioning
4 is most inappropriate for this panel. This panel is here
5 to talk about issues 5 and 6.
6 Mr. Fallis is intending to effectively seek prior
7 inconsistent statements from the panel that has been
8 assigned, has been dealt with, and has -- is in the best
9 position to explore the need for the line and what its
10 design is intended for.

11 This idea that the public communications manager is in
12 the best position to address those sorts of questions is
13 most inappropriate.
14 MS. NOWINA: Mr. Fallis, I believe that the first
15 panel answered all of these questions, in terms of what
16 Hydro One's expectation was that the line would carry.
17 MR. FALLIS: That's true, the first panel did answer
18 questions. They didn't answer questions about what Ms.
19 Cancilla said, because she is here. It is the first time
20 we have had an opportunity and we have something in writing
21 that says that. She has answered two of them very
22 adequately. I am just asking about the third.
23 I just want to understand what the -- why the
24 statement was made. The first two I accept. The follow-up
25 question, I don't think it is an unfair question. I
26 couldn't ask the other panel about what Ms. Cancilla said,
27 because it was hearsay to them. She is the author of the
28 statement. She is a panellist, and I am entitled to ask

her the
1 question, I think.
2 It may be wrong what is reported here. I'm just
3 asking --
4 MS. NOWINA: She can tell you what she said, Mr.
5 Fallis, but in terms of the evidence regarding the lines,
6 we can take that from the evidence from the first panel.
7 MR. FALLIS: Well, I am entitled to ask the question.
8 I think it is a proper question.
9 MS. NOWINA: What is your question?
10 MR. FALLIS: Well, the question was -- it was a
11 follow-up on the question, because she has given an answer.
12 She did say:
13 "But Cancilla says there won't be enough to
14 handle the energy produced from Bruce C build."
15 She says said she agreed to that. I just asked her
16 why. She said that. That's all I –

17 MR. NETTLETON: She answered that.
18 MR. FALLIS: And the question I had was that was a
19 follow-up: Was it her understanding that it would be –
20 the energy that would be produced would be the energy from
21 Bruce A and B, plus 1,700 wind power? That was my
22 question.
23 MS. NOWINA: The witness is free to say that that may
24 be beyond her level of expertise.
25 MS. CANCILLA: That's my understanding. I would agree
26 with Mr. Fallis's statement regarding the restart of the
27 Bruce units and the 1,700 megs of wind.
28 MR. FALLIS: Just the last question with respect to

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the -- when you speak of Bruce C, you are 1 speaking of Bruce
2 C being on top of the power that would be produced by A and
3 B and the 1,700, then? Is that what you referred to in
4 that statement, additional power beyond the refurbishments
5 and the 1,700?
6 MS. CANCILLA: That's my understanding.

The Bruce A 1 & 2 refurbishment is for 1500 MW, The projected Bruce C project [now on long term hold] was to be for 4800 MW. If the Bruce to Milton line will only accommodate the refurbished units, simple math assures us that Bruce C will require an additional 3 HONI style double circuit 500 kV lines. With the provincial land use policy regarding infrastructure placements the landowners along the route can expect yet another three hits from HONI after this build.

Notably, the applicant has not ruled out some future application of series capacitors. They just refuse to consider them now. It is more than reasonable to consider why. Consider that, for whatever reason, some entities require the approval of this line to affect a precedent for another three lines. At a future time it could be *suddenly* realized that FACTS technology is essential for further transmission capacity on those lines, for

whatever reason other than domestic demand.

MR. McKAY: On that basis, I guess one criteria, you discounted the series capacitors as a long-term solution; that and the fact that it doesn't have the capacity?

MR. CHOW: Mainly that it doesn't have the capacity. It is capable of seven units versus 700 megawatts of wind.

MR. McKAY: When you did that analysis, were you including generation rejection?

MR. CHOW: No, because we are looking at this set as a long-term solution.

MR. McKAY: That is an isolated analysis on simply the series capacitors?

MR. CHOW: Yes.

MR. McKAY: So you rejected the series capacitors on a long-term basis, and then from the green-line graph that we have seen today, you have made it quite clear that you don't need it on an interim basis with the near-term and the interim measures you want to put in place.

So the question I have is: Why are you continuing with the study? You don't need it in the long term, and it's pretty clear that you don't need it to meet the interim requirements.

MR. CHOW: The answer is on the next slide after that, on the interim. The decision on series compensation will be made in consideration of the line-in-service date. In other words, will it be late, the effectiveness of the other measures.

We believe that the GR, in combination with the other measures, will provide us the necessary capability. When we

actually end that phase there, we want to see how close we are, and also the progress of generation additions on the system.

MR. McKAY: *That's a change in the evidence; right*?

MR. CHOW: At that time, series compensation is a possibility. I am indicating here it is still a possibility, with those considerations. So it is always looked at as a back-pocket solution that we would put in if certain conditions are met.

MR. McKAY: As a final question, a lot of talk today about this study that's being done. *I'm assuming that there were some form of terms of reference or something that put some bounds around what this study is*, what it is supposed to produce, what you expect. Is that available if we ask that in an interrogatory?

MR. CHOW: This is related to the due-diligence study on series compensation?

MR. McKAY: Yes.

MR. CHOW: *Yes. Its terms of reference were developed for the consultant*. It would be a part of the attachment of the report, and, yes, on request in an interrogatory.

MR. McKAY: Can we get it now or get it within a couple of weeks?

Normally, when an entity retains a consultant, the entity sets the study parameters. The applicant panel, under cross examination, have stated that their consultants had set the study parameters. However, here we have Mr. Chow stating that the terms of reference were, in fact, developed for the consultant, in this case Mr. Woodward.

MR. CHOW: This is related to the due-diligence study on series compensation?

MR. McKAY: Yes.

MR. CHOW: *Yes. Its terms of reference were developed for the consultant*.

Clearly, however, none of the foregoing will go to satisfy or honour the Liberal Party's promise and Government Policy of coal replacement and the retirement of our coal burning facilities at any time in the near future, contrary to the Liberal Party's stated timeline for this.

Since their inception in 2005, the OPA has been the real author of government energy policy. Regardless of where the OPA derives their recommendations, it is the responsibility of the OPA to review and consider such. It is the OPA which then forwards their recommendations to the Energy Minister. He must rely on the OPA for this. The creation of Government policy and Ministry directives relies directly upon OPA recommendations.

I find it hard to accept that the Liberals would have endorsed the Bruce Refurbishment Agreement if the issue of the Bruce/Nanticoke exclusivity had been properly explained to them.

Recall that the Nanticoke Retirement became Government Policy in 2003 and the OPA did not exist until 2005. *Perhaps the OPA is just too new to be entrusted with such onerous responsibilities*.

INTRODUCTION

This application before the Board is not a single isolated project, as the applicant has professed, with no association or impact upon the the rest of our transmission grid, our neighbouring grids, our distribution systems or, in fact, generation. These are all integrated. Yet, throughout, the applicant has maintained that we could not consider such things in our intervention before this Board. They maintained that we could not associate nor relate any of their other transmission projects – completed, under construction or approved but not yet initiated – to this project. They maintained that whatever technology they had employed, or will employ, on these other, approved, projects was not a matter for consideration on this project.

This application before the Board may also be a matter of precedent, for good or bad. The decision here may impact severely and negatively on our energy future and, thus, on the present and future reliability, supply and rates. The decision may put all our eggs in one basket and deny us future choices. Paths taken cannot always be easily, or inexpensively, re-tread, if at all.

I respectfully submit that Leave to Construct applications before this board have two components, one primary and the other, secondary. Firstly, there is the absolute requirement for justification for the application itself, not the details, thereof. This is the purpose of Filing Requirements. If the applicant has failed to satisfy these, then the details of the application's project are of no consequence and are not to be considered. Although the Minimum Filing Requirements are not law, the Board can still view their absence as a deficit, especially if reasonable doubts have been raised. The broad power of the Board, within their mandate, allows this.

Previously, during this process, I had referred to building permits in analogy to the filing requirements. I wish to return to and extend that analogy, now. I will, here, consider rural building permit applications as they have additional concerns. These permits have filing requirements that must be fulfilled before the project details are even considered. These requirements include distances from the project such as: distances from buildings, septic and wells from lot lines; distances of buildings from septic and wells; distances of wells from septic. If these are not satisfied, then the application is denied and the applicant must try again. Regardless of whether or not the project includes the required lumber sizes for joists, studs and rafters and whether, or not, they are at the required spacing is immaterial if those primary filing requirements are ignored, or otherwise unsatisfied. Obviously, there is a very good reason for this. I respectfully submit that the Minimum Filing Requirements and the OEB Transmission System Code also have a similar very good reason to be. Otherwise, I submit that either they simply would not be or they might, instead, be Minimum Filing Recommendations and Transmission System Recommendations.

The filing requirements have an absolute purpose and are not present just to confound an applicant or to interfere with an applicant's desires for rapid approval. The filing requirements exist to ensure appropriate due diligence, appropriate application of expertise, appropriate risk assessment, and an assurance against impropriety, oversight, risk to ratepayers, risk to neighbouring grids and lack of expertise, knowledgeableness or experience. While the applicant can overlook these, it is really in their best interests to satisfy these. By properly investigating alternatives, they may arrive at a superior solution and then go forward with an application more likely to meet Ontario's requirements and more likely of being approved.

Throughout the oral hearing we have heard about "floors", "ceilings", the "setting of bars" and "bars to reach for". The Minimum Filing Requirements are derived from the

recommendations of various regulatory bodies. They are not a "ceiling" or even a "floor" but, in fact they are a basement, a foundation to support the structure of the entire North American electrical system.

Yet Mr. Sabiston argued that they are not.

FROM: ORAL HEARING TRANSCRIPT
Wednesday, May 28, 2008,
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8 MR. SABISTON: It's a balance of reliability and cost
9 effectiveness.
10 NERC has set the bar. We will design up to that bar,
11 but not exceeding that bar. That is the goal of the cost
12 effectiveness of reliability and the design of the power
13 system.

Minimum Filing Requirements are not a "bar that is set to reach for", that is, a "ceiling". "Minimum" means minimum. It is a "floor". It is a level which must be attained. It is not a level merely to be reached for. It is analogous to a high jump bar. Beneath the level of the bar is a failure, clearing the bar is a success. Clearing the bar easily and well above it is a goal. It is here that we must consider the OEB Transmission System Code and its' "good utility practice" requirements.
Various "local" jurisdictions, such as Ontario, have yet other requirements such as transmission codes and "good utility practice" requirements that "set the bar" higher. This is because, here, the NPCC minimum requirements are those which determine whether we meet the minimum standards for continued admission to the NPCC grid. Any jurisdiction that cannot meet those requirements is a threat to the other member

grids of the NPCC and other connected grid associations. Any such unaddressed threat can endanger continued membership in and attachment to the NPCC grid [eg. inappropriate, obsolete and/or overly complex Special Protection Systems]. The simple fact is that any system which is a threat to its neighbours is at risk of being excluded from interconnection.

However, for other reasons, we may not have to worry about that overlong. Ontario is in the process of involvement with new interconnection projects with Michigan, Manitoba, Quebec and New York State. These interties are composed of HVDC and FACTS devices. Not only do they safely and efficiently transmit large amounts of power but they have a second, and possibly more important, feature. While they will transmit power between grids, they will not transmit electrical disturbances. They are firewalls. Once these are completed, our neighbours will no longer have to concern themselves with our technological disabilities, our technological backwardness or our technological intransigence in this field. If we choose to continue to stew in our own mess, it will be of no further consequence to them. Our blackouts and cascades will be confined behind these interties and will not endanger any other system. Simply, they can then ignore our inherent electrical system troubles

However, it is only reasonable that "local" jurisdictions should attempt to reach a higher level than this simply to attempt to reach higher levels of reliability, supply, efficiency and the most reasonable rates for their domestic consumers. This is the very purpose of the OEB Transmission System Code and its "good utility practices" provisions.

Mr. Sabiston saw fit to dispute this, as well.

FROM: ORAL HEARING TRANSCRIPT

VOLUME 12

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22 MR. PAPPAS: So given that, you do agree, however,

23 that our Transmission Code has a requirement level above
24 that of NERC and NPCC? Do you agree with that?
25 MR. SABISTON: No.

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10 MR. SABISTON: Okay. So you're asking me if I believe
11 that this is a further level above NERC and NPCC?
12 MR. PAPPAS: Yes.
13 MR. SABISTON: My answer is, no, I do not agree.
14 I believe that part of good utility practice is
15 adhering to the NERC reliability criterion. It is
16 consistent with. It is not above. It is consistent with.

However, unlike the Minimum Filing requirements and even the NERC and NPCC regulatory requirements, the OEB Transmission System Code is a product of provincial legislation. It is, in fact, law.

Ontario Energy Board Act, 1998, S.O. 1998, c. 15, Sch. B

Ontario Energy Board Act, 1998 **Page 42 of 86**

Codes that may be incorporated as licence conditions

70.1 (1) The Board may issue codes that, with such modifications or exemptions as may be specified by the Board under section 70, may be incorporated by reference as conditions of a licence under that section. 2003, c. 3, s. 48.

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Transition

(7) The following documents issued by the Board, as they read immediately before this section came into force, shall be deemed to be codes issued under this section and the Board may change

or amend the codes in accordance with this section and sections 70.2 and 70.3:

1. The Affiliate Relationships Code for Electricity Transmitters and Distributors.

2. The Distribution System Code.
3. The Electricity Retailer Code of Conduct.
4. The Retail Settlement Code.
5. The Transmission System Code.
6. Such other documents as are prescribed by the regulations. 2003, c. 3, s. 48.

Undertaking K10.1

HYDRO ONE NETWORKS INC. CROSS EXAMINATION MATERIALS

May 14,2008

INDEX

18. Transmission System Code

8.2˘ PROTECTION AND CONTROL

8.2.1˘ A transmitter shall install and maintain protection systems that are capable of minimizing the severity and extent of disturbances to the transmission system while themselves experiencing a first order single contingency such as the failure of a relay protection system to operate or the failure of a breaker to trip. In particular:

(a)˘ the facilities designated by the transmitter or the IESO as essential to system reliability and security shall be protected by two protection systems. Each system shall be independently capable of detecting and isolating all faults on those facilities. Those facilities shall also have breaker failure protection, but breaker failure protection need not be duplicated. Both protection systems shall initiate breaker failure protection;
(b)˘ to reduce the risk of both protection systems being disabled

simultaneously by a single contingency, the two protection systems shall not use common components;
the use of two identical protection systems should be avoided to reduce the risk of simultaneous failure of both systems due to design deficiencies or facilities problems;
(d)˘ the protection systems shall be designed to isolate only the faulted facilities. For faults outside the protected zone, each protection system

It is interesting that they failed to include item *(g)* and its reference to "*good utility practice*". Again the Transmission System Code is a product of legislation and "*good utility practice*" is not merely cited in its definitions but is cited repeatedly throughout the TSC regulatory sections.

(g) *the components and software used in all protection systems shall be of proven quality for effective utility application and follow good utility practice*;

The problem is that if the very individuals and bodies that are responsible for appropriate planning and provision of our energy present and future are either ignoring or simply ignorant of such filing requirements, their meanings and appropriate application, then how can we possibly entrust our energy present and future to such? How can we even be expected to have any faith or trust in any application that they advance? If the applicant, their drivers and proponents are all either ignoring or ignorant of these requirements, then we have an extremely improper condition here that requires immediate consideration and remedy. It is certainly within the mandate of the Board to consider and remedy this regarding this particular application. Clearly, the minimum requirements are in fact requirements that should be met, regardless of the nature of the project applied for. However, the very existence of this situation may require investigation and Ministerial intervention to correct this to ensure that all following applications have achieved all reasonable and required due

diligence prior to being filed. As it is, if the applicant has not undertaken their due diligence requirements, then the ratepayers have been subjected to the cost of this process and the various hearings for no good reason and without remedy, regardless of the decision to approve or dismiss this application. At the end of the day, the applicant and some of their drivers and proponents are, in fact, paid by the taxpayers/ratepayers of Ontario. Thus, even the cost awards for the opposing Intervenors are derived from the Intervenors own pockets as well as those of all the other taxpayers/ratepayers of Ontario. The Applicant suffers no penalty or deserved harm from this, only the ratepayers suffer harm. This certainly does not give the applicant, et al, any incentive to correct this situation or their actions, behavior or attitude.

The applicant must be constrained to fulfill their responsibilities. The filing requirements precede the actual details of the application as well as, certainly, any procedural matters. It is understood that procedural errors cannot be considered as grounds for dismissal of an application. But the filing requirements are not procedural matters and are, in fact, hierarchical to the project details and, most certainly, to the procedural matters.

Only if the filing requirements have been fulfilled should the subject of the application even begin to be considered. Only then can the matter of approval based on the appropriateness of the application, itself, be considered. Again, regardless of the nature and details of a particular application, it is irrelevant if the filing requirements have not been fulfilled.

Throughout, Mr. Nettleton admonished the Intervenors that it was only their place to consider this application as presented by the applicant. He further admonished the intervenors that it was not their place to attempt to re-design this project or the Ontario electrical system.

19 But it is not a proceeding intended to be one where
20 third parties are designing the transmission system.
21 That's well beyond the scope of this proceeding.

I respectfully submit that this is disingenuous and rather patronizing. I submit that this was not the purpose or intention of the intervenors. I submit that their purpose and intention was to hold the applicant responsible to their requirements and obligations regarding project design and application submission.

The onus is on the applicant to present an appropriately considered and provably legitimate project for consideration. The onus is entirely upon the applicant to provide all the relevant evidence pertaining to their application and project and include it in their pre-filed evidence, as is required by the filing requirements and demanded by the Transmission System Code. There is no required onus for the intervenors to provide such. Intervenors have only a personal requirement to do so and that arises from a need of self-protection and the protection of others if the applicant is remiss in observing and acting on the demands, onus and reasonable requirements that are incumbent upon them.

Reasonable Alternatives

Re: Filing requirements

The OEB minimum filing requirements and the further requirements of the OEB Transmission Code "good utilities practice" make certain demands upon the Applicant, in this case Hydro One. This is regardless of the particular project. They are required to consider all reasonable and relevant alternatives, in use in North America, and to produce both technical and financial, cost comparative studies, including manufacturers' estimates, for these alternatives. This is due diligence and it is absolutely required by the OEB in order to make an informed

decision. As well, these are all required to be submitted in the original application, in the pre-filed evidence.

Firstly, actual completed studies on some alternatives were not included in the pre-filed evidence and had to be extracted during a later Interrogatory process. Obviously, this interfered with the Intervenors' ability to consider these issues prior to the Interrogatory phase or to address them in the Interrogatory phase. Inappropriately, the Intervenors were only given enough time to consider these issues for the almost immediately following Oral Hearing. Also if these studies had not been discovered, the Intervenors would not have been armed with them in the Oral Hearing. I submit that this must be considered as harm to the Intervenors, arising directly from the intransigence and/or neglect of the Applicant.

Secondly, other highly relevant alternatives were completely ignored and no technical or financial studies, including manufacturers' estimates, were submitted. I cite the following for support. The *italics* in this following section are mine and not from the original cited material.

EB-2006-0170

Ontario Energy Board

Filing Requirements for

Transmission and Distribution Applications

November 14, 2006

Ontario Energy Board **November 2006**

Chapter 5 Prior to the approval of an Integrated Power System

Plan: Filing requirements for the approval of a capital budget for a transmission project in a rate application or for the approval of projects under section 92 of the OEB Act

5.1 Introduction

Chapter 5 outlines the filing requirements for applications by rate regulated transmitters for:

leave of the Board for the construction, expansion or reinforcement of electricity transmission lines under section 92 of the Act. It should be noted that the filing requirements in this chapter are required in addition to the filing requirements set out in section 4.3 in Chapter 4.

Rate regulated distributors applying for connection projects such as a transformation connection should follow the filing requirements set out in this Chapter. Additional requirements as set out in the TSC must also be included in the submission to the Board.

5.3.2 Options and Cost Benefit Analyses

In addition to the evidence regarding the need for the project, the Applicant must address how it proposes to accomplish the project *including the identification of relevant options*. This section outlines the required evidence for that aspect of the application. *The basic form for such evidence should be cost benefit analyses of various options*. The Board expects that Applicants will present a preferred option (i.e., the proposed project) and alternative options. It should be recognized, however, that the Board will either approve or not approve the proposed project (i.e. the preferred option). It will not choose a solution from among the alternative options. *The Applicant should present the smallest number of alternatives consistent with conveying to the Board the major solution concepts available to meet the same objectives that the preferred option meets*. The applicant is expected *to also compare the alternatives versus the preferred option along various risk factors including, but not limited to*, financial risk to the applicant, inherent technical risks, estimation accuracy risks, and any other critical risk that may impact the business case supporting the proposed project.

For connection projects, in addition to the cost benefit analysis, the Applicant must supply specific information on the nature and magnitude of the network impacts.
"The Applicant should present the smallest number of alternatives consistent with conveying to the Board the major solution concepts available to meet the same objectives that the preferred option meets."

The requirement, here, is not for the smallest number of alternatives but the smallest number of alternatives consistent with conveying to the Board the major solution concepts available to meet the same objectives that the preferred option meets.

There are various types of projects that require a leave to construct. These various types of projects may have alternatives not relevant to the other types of projects. The demand here is for the alternatives relevant to the particular application.

Ontario Energy Board
Filing Requirements for
Transmission and Distribution Applications
November 14, 2006

"4.3 Minimum Filing Requirements for Projects under Section 92

The analysis of public interest implications may vary depending on the Applicant (rate regulated or non-rate regulated) and type of transmission project being reviewed. The following minimum filing requirements apply to projects, which are considered in a leave to construct proceeding."

The smallest number of *relevant* alternatives is what is required, *not*, simply, the smallest number of alternatives. Alternatives relevant to this application include reconductoring, application of conventional series conductors, application of

thyristor controlled series capacitors [TCSC], application of any of a number of other FACTS [Flexible Alternating Current Transmission Systems] devices, including SVCs [Static VAR Compensators].

Also, the OPA and Government supported IESO recommendation for more generation builds around and throughout the GTA, Golden Horseshoe and other demand centres of Southwestern Ontario [IESO 10 Year Outlook 2006 – 2015] if undertaken prior to any other generation builds or refurbishments at Bruce GS, nuclear or wind, would have obviated the need for this line and would have hastened the retirement of Nanticoke. As it is, this project and the current expectations of both Wind and Nuclear at the Bruce site are the very obstacles preventing the successful resolution of Nanticoke retirement and are responsible for postponing that. This should have been considered in an appropriate application, at least as a risk. In fact, prior to the Bruce Refurbishment Agreement, both Bruce A and Pickering B refurbishment were on the table. I have been given to understand that it was the OPA's recommendation that led to the success of the Bruce A option over that of Pickering B. However, due to the nature of provincial power flows and other considerations, refurbishment of Pickering B would not have interfered with Nanticoke retirement as does the Bruce A refurbishment. Notable is that Pickering has no SPS.

There is a secondary requirement, I believe, regarding the concept of the smallest *relevant* number of alternatives. I do believe that once we consider the *relevant* options available, it follows, here, that the applicant can choose the least number of options for each alternative. For example, if one alternative is reconductoring, it is reasonable that that the applicant only consider two or three candidates and not ten, twenty or thirty. However, the applicant only chose two relevant alternatives. Firstly, they offered a transmission build alternative. From this they offered four different options. Secondly, they offered an

HVDC line alternative. This had only the single option of DC instead of AC for the Bruce to Milton build.
Again, however, they must consider all relevant and applicable alternatives to their project. They only get to short list the different types of a particular alternative and not the alternatives, themselves.
As there is not only the $635 million projected cost of this project but, also, the further costs to the domestic consumers, the ratepayers, if this project turns out to be an ill advised bad call, then this avoidance of due diligence is absolutely unconscionable and inappropriate. In fact, considering the foregoing, this should be considered a frivolous and vexatious application and should be dismissed as such. Hydro One should be told to come back again after they have actually done their required homework. Hydro One's intransigence in this has cost the ratepayers too much money already, in the cost of these hearings. Further, I respectfully submit that the cost of the following EA and NEC processes will, ultimately, impact on the provincial ratepayers/taxpayers. Thus, I respectfully submit that if the Board has reservations about the appropriateness of this application they should deny approval and not compound the financial cost of this process with those that would follow. I believe this is reasonable because of the Boards mandate regarding rates and ratepayers.

Electricity Act, 1998, S.O. 1998, c. 15, Sched. A
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PART I
GENERAL
Purposes
1. The purposes of this Act are,
(f) to protect the interests of consumers with respect to prices and the adequacy, reliability and quality of electricity service;

Ontario Energy Board Act, 1998 **Page 5 of 86**

PART I

GENERAL

Board objectives, electricity

1. (1) The Board, in carrying out its responsibilities under this or any other Act in relation to electricity, shall be guided by the following objectives:

1. To protect the interests of consumers with respect to prices and the adequacy, reliability and quality of electricity service.

As this project requires a connection to the Milton TS I have to wonder if the following must apply as a component of this transmission Application and why this was not a consideration of this Application. Certainly the technical and cost issues of connection, which requires a "Leave to Construct" in, and of, itself must also be an issue in this Application. Thus, we have both a transmission project and a connection project, with different filing requirements, but no consideration of this, nor consideration of the cost allocations regarding each of these. Again, the *italics* are mine.

EB-2006-0170 Ontario Energy Board
Filing Requirements for Transmission and Distribution Applications
November 14, 2006

Ontario Energy Board November 2006

"Rate regulated distributors applying for connection projects such as a transformation connection should follow the filing requirements set out in this Chapter. *Additional requirements as set out in the TSC must also be included in the submission to the Board."*

24

Further, again, the TSC requirements, including, therefore, "*good utility practice*" are set out as essential requirements.

Here, I cite the following:

Oral Hearing Wednesday, May 28, 2008,
VOLUME 12

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"MR. SABISTON: Okay. So you're asking me if I believe that this is a further level above NERC and NPCC?
MR. PAPPAS: Yes.
MR. SABISTON: My answer is, no, I do not agree. I believe that part of good utility practice is adhering to the NERC reliability criterion.
It is consistent with. It is not above. It is consistent with."

I now cite the following:

ONTARIO ENERGY BOARD

Transmission System Code
July 25, 2005

2.0.33 "good utility practice" means any of the practices, methods and acts engaged in or approved by a significant portion of the electrical utility industry in North America during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good utility practice is not intended to be limited to optimum practices, methods or acts to the exclusion of all others, but rather to include all practices, methods or acts generally accepted in North America;

5. REQUIREMENTS FOR OPERATIONS AND MAINTENANCE

5.1.2
A transmitter shall operate and maintain its transmission facilities in compliance with this Code, its licence, its operating

agreement with the IESO, the Market Rules, all connection agreements, *good utility practice*, the standards of all applicable reliability organizations and any applicable law.

19

6.3 COST RESPONSIBILITY FOR NEW AND MODIFIED CONNECTIONS

6.3.7
A transmitter shall provide connection facilities that have a capacity sufficient to meet the needs of the applicable customer, subject to facilities standards and *good utility practice*.

33

A transmitter shall establish in its connection procedures referred to in section 6.1.4 and implement a contestability procedure. The contestability procedure shall establish:

(h) where the transmitter pays a transfer price for a connection facility constructed by a load customer, the obligation of the transmitter to make any adjustment required to reflect that transfer price in any capital contribution that is to be paid by the load customer.

The transmitter shall prepare all estimates required by this section 6.6.2 in accordance with *good utility practice* and industry standards.

45

8.2 PROTECTION AND CONTROL

(g) the components and software used in all protection systems shall be of proven quality for effective utility application and follow *good utility practice*;

Leave to construct, etc., electricity transmission or distribution line

92. (1) No person shall construct, expand or reinforce an electricity transmission line or an electricity

distribution line or make an *interconnection* without first obtaining from the Board an order granting leave to construct, expand or reinforce such line or interconnection. 1998, c. 15, Sched. B, s. 92 (1).

Exception

(2) Subsection (1) does not apply to the relocation or reconstruction of an existing electricity transmission line or electricity distribution line or interconnection where no expansion or reinforcement is involved unless the acquisition of additional land or authority to use additional land is necessary. 1998, c. 15, Sched. B, s. 92 (2).

[Note: C.A.Pappas - Reconductoring and application of conventional series capacitors and FACTS are all a matter of this exception. Only if the substations for the series capacitors or FACTS installations cannot be located directly on the existing Right of Ways would there be any consideration of a Leave to Construct or an EA. However, these would be minor because of the relatively insignificant amount of land required for a substation as compared to an entire transmission build.]

Applications under s. 92

(2) In an application under section 92, the Board shall only consider the interests of consumers with respect to prices and the reliability and quality of electricity service when, under subsection (1), it considers whether the construction, expansion or reinforcement of the electricity transmission line or electricity distribution line, or the

making of the interconnection, *is in the public interest*. 2003, c. 3, s. 66.

PART VI

TRANSMISSION AND DISTRIBUTION LINES

Definitions, Part VI

89. In this Part,
"interconnection" means the plant, equipment and apparatus linking adjacent transmission or distribution systems as defined in Part V; ("interconnexion")

4.3 Minimum Filing Requirements for Projects under Section 92

The analysis of public interest implications may vary depending on the Applicant (rate regulated or non-rate regulated) and type of transmission project being reviewed. The following minimum filing requirements apply to projects, which are considered in a leave to construct proceeding.
The minimum filing requirements set out in this document are not intended to limit applicants in terms of what information they may want to present. Nor do these minimum filing requirements limit the discretion of the Board in terms of what information and evidence it may wish to see.

From the above, I offer the following consideration:
Minimum Filing Requirements are not a "bar that is set to reach for", that is, a "ceiling". "Minimum" means minimum. It is a "floor". It is a level which must be attained. It is not a level merely to be reached for. It is analogous to a high jump bar. Beneath the level of the bar is a failure, clearing the bar is a success. Easily clearing the bar is a goal. Thus it is with the Minimum Filing Requirements.
Various "local" jurisdictions, such as Ontario, have yet other requirements such as transmission codes and "good utility practice" requirements that "set the bar" higher. This is because, here, the NPCC minimum requirements are those which

determine whether we meet the minimum standards for continued admission to the NPCC grid. Any jurisdiction that cannot meet those requirements is a threat to the other member grids of the NPCC. Any such unaddressed threat can endanger continued membership in and attachment to the NPCC grid [eg. inappropriate, obsolete and/or overly complex Special Protection Systems].

However, it is only reasonable that "local" jurisdictions should attempt to reach a higher level than this simply to attempt to reach higher levels of reliability, supply, efficiency and the most reasonable rates for their domestic consumers. *This is the very purpose of the OEB Transmission System Code "good utility practices" provisions* and why this not policy but law.

The problem is that if the very individuals and bodies that are responsible for appropriate planning and provision of our energy present and future are either ignoring or simply ignorant of such filing requirements, their meanings and appropriate application, then how can we possibly entrust our energy present and future to such? How can we even be expected to have any faith or trust in any application that they advance? If the applicant, their drivers and proponents are all either ignoring or ignorant of these requirements, then we have an extremely improper condition here that requires immediate consideration and remedy. It is certainly within the mandate of the Board to consider and remedy this regarding this particular application. Clearly, the minimum requirements are in fact requirements that should be met, regardless of the nature of the project applied for. However, the very existence of this situation may require investigation and Ministerial intervention to correct this to ensure that all following applications have achieved all reasonable and required due diligence prior to being filed. As it is, if the applicant has not undertaken their due diligence requirements, then the ratepayers have been subjected to the cost of this process and the various hearings for no good reason and without remedy, regardless of

the decision to approve or dismiss this application. At the end of the day, the applicant and some of their drivers and proponents are, in fact, paid by the taxpayers/ratepayers of Ontario. Thus, even the cost awards for the opposing Intervenors are derived from those Intervenors own pockets as well as those of all the other taxpayers/ratepayers of Ontario. The Applicant suffers no penalty or deserved harm from this, only the ratepayers suffer harm. This certainly does not give the applicant, et al, any incentive to correct this situation or their actions, behavior or attitude.

The applicant must be constrained to fulfill their responsibilities. The TSC and the filing requirements precede the actual details of the application as well as, certainly, any procedural matters. It is understood that procedural errors cannot be considered as grounds for dismissal of an application. But the filing requirements are not procedural matters and are, in fact, hierarchical to the project details and, most certainly, to the procedural matters.

Only if the filing requirements have been fulfilled should the subject of the application even begin to be considered. Only then can the matter of approval based on the appropriateness of the application, itself, be considered. Again, regardless of the nature and details of a particular application, it is irrelevant if the filing requirements have not been satisfied. The following includes TSC references and TSC regulations involving "good utility practice".

MINIMUM FILING REQUIREMENTS & TSC

Ontario Energy Board
Filing Requirements for
Transmission and Distribution Applications
November 14, 2006

Chapter 1 Overview

"This document provides information about the filing requirements for electricity transmission and distribution

applications. It is designed to provide direction to applicants, and it is expected that applicants will comply with the filing requirements unless such compliance is not practical or in the public's interest. It is not a statutory regulation or a rule or code issued under the Board's authority. It does not preempt the Board's discretion to make any order or directive as it determines necessary concerning any of the matters raised by the applications filed."

I translate the preceding in the following manner. Firstly, the Board is endowed with far ranging powers and great latitude. I believe these are to enable the foremost efficiency, reasonable expediency as well as to allow for the appropriate employment of natural justice.

My understanding is that the Board, itself, is not bound by the filing requirements and can ignore them where appropriate. However, there is no declaration here that the applicant has a right to do so. If the applicant does ignore "directions" but the Board finds that the application is of such value and more than reasonably answers all desired needs then the Board can chose to overlook the applicant's negligence in this matter. However, the Board can still rule otherwise and dismiss the application simply based on the applicant's negligence in this matter, if the application can be suggested to be wanting.

Ontario Energy Board **November 2006**

QUALITATIVE

5.3.2 Options and Cost Benefit Analyses

If the proposed project or alternatives are expected to have significant *qualitative* benefits that cannot reasonably be quantified, evidence about these qualitative benefits should be provided. These benefits may be taken into account in ranking the projects. *Incorporating qualitative criteria may result in a*

***different ranking of projects compared to the ranking based on quantitative benefits and costs alone*.**

35

Chapter 4 Filing requirements for electricity transmission projects under Section 92 of the OEB Act

4.1 Introduction

***The filing requirements differ depending on the type of applicant and project*. Applicants can be rate regulated, such as licensed transmitters that provide transmission services to third parties at Board approved rates, or non-rate regulated, such as an owner of a large industrial plant or a generation facility that do not provide transmission services to third parties. For rate regulated entities whose revenues are derived from ratepayers, there is an onus to justify before the Board all expenditures on transmission facilities.**

23

4.1.1 Legislation

Section 92 of the Act requires leave of the Board for the construction, expansion, or reinforcement of an electricity transmission line or an electricity distribution line, as well as for the making of a connection to the power system. Under Ontario Regulation 161/99 however, many projects captured under s. 92 of the Act are exempt from the need for leave to construct. This includes all distribution projects, most connections and projects involving electricity transmission lines that are 2 kilometres or less in length.

24

4.1.2 Regulatory Framework

In leave to construct applications, the Board considers the *interests of consumers with respect to prices and the reliability*

***and quality of electricity service*.**

For a project that was granted leave under section 92 of the Act, and if subsequently or concurrently other approvals such as the Environmental Assessment (EA)

25

approval materially alter or affect the specific routing of a transmission line, the original application and the Board order stemming from it would no longer be valid.

4.2 Applicant and Project Types

***Filing requirements differ depending on the type of applicant and project*. Applicants can be rate regulated or non-rate regulated, depending on whether they propose to provide transmission service to third parties at Board approved rates. For rate**

regulated entities whose revenues are derived from ratepayers, there is an onus to justify before the Board all expenditures on transmission facilities.

Transmitters and distributors applying for connection projects *must also include additional requirements as set out in the TSC in their submissions to the Board*.

26

4.3 Filing Requirements for Projects under Section 92

The analysis of public interest implications may vary depending on the Applicant (rate regulated or non-rate regulated) and type of transmission project being reviewed. The following filing requirements apply to projects, which are considered in a leave to construct proceeding.

4.3.3 Need for the Project (for Rate Regulated Transmitters)

The applicant must provide a description of the need for the

project. Any projects forming part of an approved IPSP or rate order should provide a detailed reference to those approvals and the reasons given for their inclusion in those proceedings. For projects without IPSP or rate approval, the applicant must describe the purpose of the facilities and public interest benefits expected from their construction as outlined in Chapter 5.

4.3.4 Design Specifications and Operational Details

The application must provide a description of the physical design, operational details, and lifecycle activities of the proposed project, identifying project design features and procedures that will ensure the safe and reliable operation of the

27

proposed facilities. ***These design specifications should demonstrate compliance with the technical requirements as specified in the TSC.***

28

4.3.9 Customer Impact Assessment

29

A transmitter would provide each affected customer with a new available fault current level at its delivery point(s). This in order to allow each customer to take, at its own expense, action to upgrade its facilities as may be required to accommodate the new available fault current level up to the maximum allowable fault levels set out in Appendix 2 of the ***TSC***.

4.3.10 Connection Project Impacts on Transmission System

Certain connection projects may require network reinforcement in order to proceed. A description of the requirements is provided in Appendix 4-A to this Chapter. Where an applicant attributes to a proposed project market efficiency benefits such as lower

energy market prices, congestion reduction, or transmission loss reduction, the evidence submitted must include quantification of each of the market efficiency benefits listed for that proposed project.

4.3.11 Other Matters

***The application must provide description of any other applicable codes, standards, and regulations*. It must also provide engineering details with respect to any special design features, which may influence the construction and in-service schedule and to demonstrate that the proposed transmission facilities will be safe and reliable.**

Chapter 5

Prior to the approval of an Integrated Power System Plan: Filing requirements for the approval of a capital budget for a transmission project in a rate application or for the approval of projects under section 92 of the OEB Act

5.1 Introduction

Chapter 5 outlines the filing requirements for applications by rate regulated transmitters for:

leave of the Board for the construction, expansion or reinforcement of electricity transmission lines under section 92 of the Act. It should be noted that the filing requirements in this chapter are required in addition to the filing requirements set out in section 4.3 in Chapter 4.

Rate regulated distributors applying for connection projects such as a transformation connection should follow the filing requirements set out in this Chapter. *Additional requirements as set out in the TSC must also be included in the submission to the Board*.

5.1.1 Legislation

The Board's authority to review transmitter's capital budgets and set rates is established in subsection 78(1) of the Act, which states, "No transmitter shall charge for the transmission of electricity except in accordance with an order of the Board, which is not bound by the terms of any contract."
***Section 92 of the Act requires leave of the Board for the construction, expansion, or reinforcement of an electricity transmission line or an electricity distribution line, as well as for the making of a connection to the power system*. Under Ontario Regulation 161/99, however, many projects captured under section 92 of the Act are exempt from the need for leave to construct. This includes all distribution projects, most connections and projects involving electricity transmission lines that are 2 kilometres or less in length.**

5.1.2 Regulatory Framework

A transmission project may be subject to a leave to construct application or a capital budget review in rate hearings. Avoiding duplication of regulatory review is therefore

critical. The conclusions of the Board specific to a project that are made in one regulatory setting will not be re-evaluated in another setting. The reasonableness of incurred costs for a project may be reviewed in the transmitter's rate case. In this case the need and rate impact of that project would not be addressed in the leave to construct proceeding. *The review would be limited to issues not addressed in the other forums such as the System Impact Assessment (SIA) carried out by the Independent Electricity System Operator (IESO) and the Customer Impact Assessment (CIA) carried out by the relevant licensed transmitter as specified by the Transmission System Code*.

In leave to construct applications, the Board considers the

***interests of consumers with respect to prices and the reliability and quality of electricity service*.**

5.2 Project Categorization

Project categorization consists of two stages.

The first categorization stage is the classification of a project into one of three project classes:

Development; or

Connection; or

Sustainment.

The second categorization stage is identifying the project need as:

Non-discretionary – a "must do" project, the need for which is determined beyond the control of the Applicant ("Non-discretionary"), or

Discretionary – the need is determined at the discretion of the Applicant ("Discretionary").

The following table captures these two dimensions of the project categorization and the subsequent sections of this Chapter provide further clarification.

PROJECT NEED	
Non-discretionary	**Discretionary**
PROJECT CLASS	**Development**
	Connection
	Sustainment

5.2.1 Project Classification (Development, Connection, Sustainment)

The first stage of project categorization is the classification of a project as development, connection, or sustainment. Development projects are those for providing: an adequate supply capacity and/or maintaining an acceptable or prescribed level of customer or system reliability for load growth meeting increased stresses on the system; or enhancing system efficiency such as minimizing congestion on the transmission system and reducing system losses.

Connection projects are those for providing connection of a load or generation customer or group of customers to the transmission system.

Sustainment projects are those for maintaining the performance of the transmission network at its current standard or replacing end-of-life facilities on a "like for like" basis.

It is acknowledged that projects can have elements of development, connection, or sustainment. In these cases, the applicant should identify the proportional make-up of the project, and then classify the project based on the predominant driver. An investment in the Network may be required in any of these three project classifications. Network facilities are comprised of network stations and the transmission lines joining them.

5.2.2 Project Need

The second stage of project categorization is to distinguish whether the project need is determined beyond the control of the Applicant ("Non-discretionary") or determined at the discretion of the Applicant ("Discretionary").

Non-discretionary projects may be triggered or determined by such things as:

Mandatory requirement to satisfy obligations specified by

Regulatory Organizations including NPCC/NERC (the designated

ERO in the future) or by the Independent Electricity Market Operator (IESO);

A need to accommodate new load (of a distributor or large user) or new generation (connection);

A need to address equipment loading or voltage/short circuit stresses when their rated capacities are exceeded;

Projects identified in an approved IPSP;

Projects that are required to achieve Government objectives that are prescribed in governmental directives or regulations;

A need to comply with direction from the Ontario Energy Board in the event it is determined that the transmission system's reliability is at risk.

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Ontario Energy Board November 2006 Discretionary projects are proposed by the Applicant to enhance the transmission system performance benefiting its users. Projects in this category may include:

Projects to reduce transmission system losses;

Projects to reduce congestion;

Projects to build a new or enhance an existing interconnection to increase generation reserve margin within the IESO-controlled grid, beyond the minimum level required;

Projects to enhance reliability beyond a minimum standard;

Projects which add flexibility to the operation and maintenance of the transmission system.

Reconductoring, conventional series capacitors and FACTS all qualify as non-discretionary projects as they fulfill all the above requirements.

5.3 Project Justification

Project justification delineates the responsibilities and necessary evidentiary components required for the project review. *The responsibility for the provision of all evidence for the entire case rests with the Applicant*.

5.3.1 Evidence in Support of Need

The Applicant's evidence in support of the need for the project is required and can be supported by evidence of the IESO and/or the Ontario Power Authority:

where a proposed project is best compared to other viable transmission alternatives, including "doing nothing"; and

where the Applicant lists benefits of avoiding non-transmission alternatives such as a peaking generation facility or a "must run" generation requirement, it is helpful for the Applicant to include corroborative evidence from the IESO or the OPA regarding the

Applicant's quantitative evaluation of such a benefit. In any event, this evidence is required to support the need for the project.

It is therefore expected that the applicant will provide a list identifying the key driving factors of the evidence justifying the project need, and the party (e.g. the applicant, the IESO, or the OPA) which has prepared the evidence to justify a given key driving factor.

In some cases, the need for a discretionary or non-discretionary project is driven by factors external to the Applicant, such as the need to satisfy an IESO requirement or to serve an incremental customer load. The factors driving the project must be identified, *but the burden remains on the Applicant to support the claim of need*. If the Applicant identifies a customer or agency as the driver behind a project, it is the Applicant's responsibility to include evidence from that customer or agency as part of the evidence on the application. The Board expects the Applicant to

work with that external party in the development of the required evidence. In many cases the external party will be the IESO and/or the OPA, although the additional evidentiary requirement would apply to any external party on whom the Applicant has relied for the justification of the need for the project. The evidence will likely consist of written material prepared by the customer or agency specifically addressing the proposed

Ontario Energy Board November 2006 project, and the customer or agency must be prepared to provide witnesses to support the filed evidence if an oral hearing is held. ***It is not sufficient for the applicant to state that the customer or agency has established the need for the project; the Board must be able to test that assertion.***

5.3.2 Options and Cost Benefit Analyses

In addition to the evidence regarding the need for the project, the Applicant must address how it proposes to accomplish the project including the identification of relevant options. This section outlines the required evidence for that aspect of the application. ***The basic form for such evidence should be cost benefit analyses of various options. The Board expects that Applicants will present a preferred option (i.e., the proposed project) and alternative options. It should be recognized, however, that the Board will either approve or not approve the proposed project (i.e. the preferred option).*** It will not choose a solution from among the alternative options. ***The Applicant should present the smallest number of alternatives consistent with conveying to the Board the major solution concepts available to meet the same objectives that the preferred option meets. The applicant is expected to also compare the alternatives versus the preferred option along various risk factors including, but not limited to, financial risk to the applicant, inherent technical risks, estimation accuracy risks,***

***and any other critical risk that may impact the business case supporting the proposed project*.**

[NOTE: C. A. Pappas: ***The above requires that the applicant actually presents any reasonable alternatives*.]**

For connection projects, in addition to the cost benefit analysis, the Applicant must supply specific information on the nature and magnitude of the network impacts.

In the case of a non-discretionary project, the preferred option should establish that it is a better project than the alternatives. The Applicant need not include "doing nothing" as an alternative since this alternative would not meet the need. One way for an Applicant to demonstrate that that a preferred option is the best option is to show that it has the highest net present value as compared to the other viable alternatives. However, this net present value need not be shown to be greater than zero. In the case of an internally set project, "doing nothing" would count as a viable option.

***If the proposed project or alternatives are expected to have significant qualitative benefits that cannot reasonably be quantified, evidence about these qualitative benefits should be provided*. These benefits may be taken into account in ranking the projects. *Incorporating qualitative criteria may result in a different ranking of projects compared to the ranking based on quantitative benefits and costs alone*.**

5.3.3 Project Summary

The evidence supporting the application must contain a project summary. This should provide:
a concise description of the location of the project;

description of all project components, activities, and related

undertakings;
the purpose or need for the project;
the rationale for selecting the proposed project, *and how the project is in the public interest*;
and the project schedule.

5.3.5 Transmission Rate Impact Assessment

The Board requires information relating to the rate impacts anticipated from transmission investments. Information should cover the short-term impacts as well as long-term impacts of the proposed project.

Appendix 4-A

Connection Projects Requiring Network Reinforcement

Reviewing connection projects require submission of evidence to cover various aspects including:

Transmission System Impact and Network Reinforcement

Cost Responsibility for Network Reinforcement

Implementation of Required Network Upgrades

Transmission System Impact and Network Reinforcement

***The applicant must supply information on the nature and magnitude of any impact of the proposed connection facility on the transmission system*. Normally the IESO addresses and provide high level assessment of such impacts in the System Impact Assessment report performed by the IESO as set out in the IESO's Connection Assessment and Approval process.**

This information will not be determinative of the decision on leave to construct in these cases as the cost responsibility of line connection investments are *addressed fully in the Transmission System Code (TSC*) and *the applicant is responsible for demonstrating compliance with the TSC*.

However, the Board may wish to determine whether a transmitter(s) needs to apply for a leave to construct to make the required network upgrades triggered by the proposed connection project. If a leave to construct is necessary, the Board may wish to invite the transmitter(s) to make the needed applications at the same time, or immediately following, the application of the connecting customer.

The nature and magnitude of other network impacts resulting from the proposed investment must be identified (e.g., changes in generation dispatch and transmission line losses).

Cost Responsibility for Network Reinforcement

Section 6.3.5 of the TSC **states that "A transmitter shall not require any customer to make a capital contribution for the construction of or modifications to the transmitter's network facilities that may be required to accommodate a new or modified connection.**

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The nature and magnitude of other network impacts resulting from the proposed investment must be identified (e.g., changes in generation dispatch and transmission line losses).

Cost Responsibility for Network Reinforcement

Section 6.3.5 of the TSC **states that "A transmitter shall not require any customer to make a capital contribution for the construction of or modifications to the transmitter's network facilities that may be required to accommodate a new or modified connection."**

45

Implementation of Required Network Upgrades

When the proposed investment requires network upgrades to comply with the TSC and other industry standards and codes, the nature and magnitude of the necessary upgrades must be identified.

The nature and magnitude of other network impacts resulting from the proposed investment must be identified (e.g., changes in generation dispatch and transmission line losses).

A key objective of the OEB in these contexts is early identification of the magnitude of any upstream network impacts resulting from a connection investment. This early identification will enable the OEB to determine if relevant rate regulated transmitters should be invited to pursue leave to construct applications. A related objective is to enable any person to make application to the Board under *section 6.3.5 of the TSC* for a

finding that exceptional circumstances apply, and that the connection proponent should therefore bear some portion of the cost responsibility for the resulting network upgrades that are required.

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Appendix 5-A

Connection Projects Requiring Network Reinforcement

Reviewing connection projects require submission of evidence to cover various aspects including:

Transmission System Impact and Network Reinforcement

Cost Responsibility for Network Reinforcement

Implementation of Required Network Upgrades

Transmission System Impact and Network Reinforcement

The applicant must supply information on the nature and magnitude of any impact of the proposed connection facility on the transmission system. Normally the IESO addresses and provide high level assessment of such impacts in the System Impact Assessment report performed by the IESO as set out in the IESO's Connection Assessment and Approval process.

This information will not be determinative of the decision on leave to construct in these cases as the cost responsibility of line connection investments are addressed fully in the ***Transmission System Code (TSC) and the applicant is responsible for demonstrating compliance with the TSC***.

Cost Responsibility for Network Reinforcement

Section 6.3.5 of the ***TSC*** states that "A transmitter shall not require any customer to make a capital contribution for the construction of or modifications to the transmitter's network

facilities that may be required to accommodate a new or modified connection. If exceptional circumstances exist so as to reasonably require a customer to make a capital contribution for network construction or modifications, the transmitter or any other interested person may apply to the Board for direction." Transmitters and other interested parties may apply to the Board for direction on the existence of "exceptional circumstances" requiring the connecting customer to make

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a capital contribution for network investments triggered by their proposed line connection. *The onus is on the transmitter and other interested parties to establish to the Board's satisfaction that "exceptional circumstances" exist*.

Implementation of Required Network Upgrades

When the proposed investment requires network upgrades to comply with the TSC and other industry standards and codes, the nature and magnitude of the necessary upgrades must be identified.

The nature and magnitude of other network impacts resulting from the proposed investment must be identified (e.g., changes in generation dispatch and transmission line losses).

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Summary of Transmission Investment Classifications and Filing Requirements of Rate Regulated Transmitters

Project Class	Information Requirements	Alternatives
Sustainment	***Reasonableness of costs and compliance with any relevant standards, codes, norms, for good utility practice***	**Alternatives not relevant unless scope of project significantly exceeds previous requirements**

Connection	***1. Demonstrate compliance with relevant standards, codes, norms for good utility practice (e.g., TSC, NPCC, NERC).***	**Alternatives not relevant**
Development	**1. Applicant's responsibility to complete transmission rate impact assessment.** **2. IESO's and/or the OPA's (or other need-justifying party) responsibility to provide evidence for any non-discretionary project:** **• File cost-benefit analysis where proposed project is best compared to other viable transmission or non-transmission alternatives. For non-transmission alternatives their**	***1. Alternatives where feasible to be presented.*** ***2. Number of alternatives provided: - smallest number consistent with conveying the major solution concepts.***

	corresponding benefits need to be quantified and incorporated in the evaluation of the preferred transmission alternative on avoided cost basis; **3. Applicant's responsibility to justify cost effectiveness for any discretionary project:** **• File cost-benefit analysis where proposed project is best compared to other viable transmission alternatives and non-transmission alternatives**	

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Project Class Information Requirements Alternatives

Exhibit B Tab 1 Schedule 3 Page 1 of 2

1 NEED FOR PROPOSED FACILITIES

3 1.0 BACKGROUND

5 As set out in its Transmission Licence, Hydro One must comply with the requirements of
6 the Transmission System Code ("TSC") and various regulatory bodies. The need for the
7 proposed facilities is based on these requirements including maintenance of acceptable
8 voltages, keeping equipment operating within established ratings, and maintaining system
9 stability, during both normal operation and under recognized contingency conditions on
10 the transmission system. *These requirements of government and industry regulatory*
11 authorities include those of NPCC, NERC, and the Ontario Energy Board ("OEB").

ISSUES LIST CONSIDERATIONS

I have reviewed and considered the EB-2007-0050 Issues List and have arrived at certain conclusions which I offer as my respectful submissions in reply to the Issues List's issues and inquiries.

APPENDIX A
to
Procedural Order No. 5
IN THE MATTER OF
Leave to Construct Application by Hydro One Networks
EB-2007-0050
DATED February 25, 2008
Issues List

1.0 Project Need and Justification

1.1 Has the need for the proposed project been established?

I respectfully submit that:

i. if the existing circuits can still transmit the expected committed and *non-committed* power from Bruce GS, and grid related committed and *non-committed* wind power generation, then NO.

ii. if the existing circuits, suitably enhanced by near and interim measures, can still transmit the expected committed and *non-committed* power from Bruce GS, and grid related committed and *non-committed* wind power generation, then NO.

iii. if the existing circuits, suitably enhanced by any reasonable, relevant and appropriate technology, as required by the Minimum Filing Requirements and/or considered as "good utility practice" as defined by the

iv. OEB's Transmission Code, can still transmit the expected committed and ***non-committed*** power from Bruce GS, and grid related committed and ***non-committed*** wind power generation, then NO.

v. if the generation expectations from Bruce GS and wind generation, as considered by the HONI application are not, in fact, committed or approved especially regarding the, as yet, unapproved IPSP, then NO.

vi. if the existing circuits can still transmit the ***currently*** committed power from Bruce GS [eg. full extant generation capacity plus the Bruce A units 1 & 2 refurbishment] and ***currently*** committed wind power generation, then NO.

vii. if the existing circuits, suitably enhanced by near and interim measures, can still transmit the ***currently*** committed power from Bruce GS [eg. full extant generation capacity plus the Bruce A units 1 & 2 refurbishment] and ***currently*** committed wind power generation, then NO.

viii. if the existing circuits, suitably enhanced by any reasonable, relevant and appropriate technologies, as required by the Minimum Filing Requirements and/or considered as "good utility practice" as defined by the OEB's Transmission Code, can still transmit the ***currently*** committed power from Bruce GS [eg. full extant generation capacity plus the Bruce A units 1 & 2 refurbishment] and ***currently*** committed wind power generation, then NO.

Oral Hearing Thursday, May 1, 2008,
VOLUME 1

MR. PAPPAS: It is ES3.9, and it is ACCR in the media 14 published by 3M. It is a list of all of the present

15 installations and approved installations going in now from
16 2005.
17 Now, if you look at the document, I noticed that a
18 number of the initial lines that were being used, just to
19 be sure, if you will, are not very long.
20 So, therefore, I have to ask: Why was it the
21 understanding of the panel that to put this in you would
22 have to automatically restring everything in the province?
23 MR. SABISTON: You don't have to automatically. It's
24 not our understanding that you would have to restring
25 everything in the province.

ix. if any reasonable, relevant and appropriate technology, as required by the Minimum Filing Requirements and/or considered as "good utility practice" as defined by the OEB's Transmission Code has not been identified and considered in the application and pre-filed evidence, then NO.

Oral Hearing Thursday, May 1, 2008,
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[MR. FALVO:]
6 Our study that we provided in our response showed that
7 above 30 percent series compensation, there will be thermal
8 overloads expected on certain circuits. So for that
9 reason, we would recommend that you don't use anything more
10 than 30 percent on that Bruce-Longwood to Nanticoke path.
11 MR. PAPPAS: Could you tell me what the source of
12 these thermal overloads are?
13 MR. FALVO: The source is that, following a
14 contingency on the Bruce-to-Milton line, the power gets
15 diverted to Bruce-Longwood and Longwood-Nanticoke, and
16 overloads those circuits.
17 One of the sources of that is that the series

compensation would be essentially allowing more power on those circuits. So as you increase it, it would allow even more power on those circuits and would overload them.
MR. PAPPAS: Just to be clear, I am going to ask you this. We're not necessarily talking about circuits. What we are talking about is conductors; is that correct? That the power going on those conductors would push them over their thermal limits?
MR. FALVO: Yes.
MR. PAPPAS: And that series capacitors are not effective if the conductors are already at their thermal

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limits?
MR. FALVO: Yes.
MR. PAPPAS: Then I must ask you again: Why did you not consider reconductoring as the very first option to look into in this application?
[Witness panel confers]

The total cost of that would be $1.8 billion. It would take 15 years to implement. The logistics of doing such a massive construction project in southwestern Ontario would be incredible. There would be virtually no other work could be done in the entire transmission system while that massive project was in place. At the end of the day, you would end up with an inferior, overstressed system. So if you were a reasonable person, would you spend three times the amount of money, five times -- well 15 years to do, and end up with an inferior product? So for that reason, we do not consider this to be a reasonable option and we give it no more air time.

MR. PAPPAS: Well, my concern would be, I would want to know, I wouldn't want to take it by word of mouth. So

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again I have to ask you, did you, in fact,

1 do any official
2 studies to derive that information?
3 If so, why weren't they in this application?

7 MR. SABISTON: *We didn't need to do any formal studies*
8 because from our overview look at it, it was not
9 reasonable. So we didn't see a need to expend more
10 resources looking at something that was not reasonable.

11 MR. PAPPAS: One quick question?
12 MS. NOWINA: If it is directly related with that.
13 MR. PAPPAS: Directly with that.
14 Again, I go back to the Transmission Code. The
15 transmission code has definite requirements as does the
16 filing requirements.
17 *I have to ask you, how can you determine that whatever*
18 you feel about it, that that is relevant to the
***19 requirements. The requirements ask specific things*.**

x. if reasonable, relevant and appropriate alternatives were excluded from review and consideration by study parameters either set by the applicant or by the consultant, but still at the discretion of the applicant, then NO.

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MR. PAPPAS: Madam Chair, my concern
1 is simply this,
2 is that consultants have to do -- they have to go by the
3 parameters set by the hiring body. I can't see that a
4 consultant would choose to look at and not look at things
5 without the direction of the hiring body.
6 If they say, We're not going to look at something,
7 they're certainly not paid to not look at things. They're
8 paid to look at things. *They're only told not to look at*
***9 things at the direction of the hiring body*.**
10 MS. NOWINA: I think that is a fair assessment of the

work of a consultant normally, Mr. Pappas. However, I also think it would be fair for you to ask the consultant themselves about the direction they received, if that's what you want to ascertain.
MR. PAPPAS: Well, perhaps I could at least advance it and if the words of it are unacceptable and there is no answer, I mean, that's fine, too. But I think at least if it is heard, the Board itself can say, Well, that's reasonable or it is not reasonable. Then it dies there. But I think it should at least be presented.
MS. NOWINA: Go ahead.
MR. PAPPAS:
"The scope of this document covers the technical aspects for three fixed series capacitor bank installations using overvoltage protection based on metal oxide varistors with or without a protective gap. The scope does not include the use of power electronic devices for the

insertion, bypassing, protection or control of the capacitor bank."
MS. NOWINA: Your question is?
MR. PAPPAS: My question is: Why would -- especially as you said -- well, do you support the -- as you say, it was a consultant's choice. Do you support that choice? Does that seem reasonable to you?
MR. CHOW: Well, I just want to clarify on the record the scope that we asked the consultant was filed as part of the application. It's Exhibit C, tab 4, schedule 9, attachment 1. That is our scope of work to the consultant. It does not specify, for the purpose of specifying the high-level specification of the series capacitors, not to use certain type of methods.
It was open to the consultant and, again, the time to ask that question is to Mr. Woodford. But I just want to

be very sure that our scope of work is part of that record, is part of the record of this proceeding, and it said what it said. It did not specify to the consultant any specific methodology to avoid in the specification
MS. NOWINA: Thank you, Mr. Chow. But Mr. Pappas' final question was whether or not you support the scope as identified by the consultant.
MR. PAPPAS: Thank you.
MR. CHOW: I think one has to understand the purpose of the high-level specification that we requested. What we asked the consultant was: Take a look at series compensation as a technology to be used in

southwestern Ontario.
They did that.
Then we asked them: Are there any concerns with the equipment, knowing the issue with service in Ontario, that you should build into your specification?
We didn't ask the consultant to do the final design specification, and saying: If his advice to Hydro One happened to be the final builder, what would one put into the specification to ensure some of the issue the consultant highlight in their -- in their assessment of the use of the technology in service in southwestern Ontario should be part of the specification.
I don't want to get into too much detail into the report, because there is a time and place for that. One of the comments I remember from the report is at the 30 percent level series compensation being proposed, it was not expected that the risk to control is required for the purpose of mitigating subsequent investments.
So, therefore, I believe for the purpose, then, of that high-level specification, they did not need to include in it that mitigation measure.
Again, I think it is a question better answered by the consultant.

8

MR. NETTLETON: And, sir, did you make any conclusions or recommendations in your report regarding any need for additional study on the subsynchronous resonance issue?
MR. WOODFORD: Yes.
MR. NETTLETON: And what were those conclusions, sir?
MR. WOODFORD: That extensive subsynchronous resonance studies must be repeated under the conditions that will be applied for this possible application.

7

MR. NETTLETON: Now, Mr. Woodford, one of the purposes set out in the terms of reference related to a review of a consultation study that had been conducted on *subsynchronous resonance* completed for Hydro One Networks.
Did you carry out that review?
MR. WOODFORD: As part of our undertaking, we did review that study. It was a comprehensive study, ***but it was outdated, according to our terms of reference***.

8

For example, it looked at 50 percent 1 or more series compensation. ***Our terms of reference were to 30 percent***. Although the procedures and techniques were correct, they still -- they did not apply to the terms of -- to the conditions we were looking at.
MR. NETTLETON: And, sir, as part of that high-level preliminary planning specification, did you consider the time required to implement series capacitors in southwestern Ontario?

9

MR. WOODFORD: We did. Yes, we did. We looked at the time required to implement series capacitors. And that is

3 shown on page 14 of our report.
4 MR. NETTLETON: And, sir, can you summarize the amount
5 of time that, in your opinion, is required to implement,
6 from that diagram, the time to implement the series
7 capacitor technology?
8 MR. WOODFORD: Starting from the writing of the
9 technical specification, through to its commercial
10 operation, ***it's about two-and-a-half years***.
11 MR. NETTLETON: And Mr. Woodford, can you confirm that
12 that chart, that time period, ***does or does not take into***
13 account the requirement of further study?
14 MR. WOODFORD: ***It does not take into account***
15 requirement for studies that are needed ahead of time
16 before you commence the -- writing the technical
17 specification.

That is in direct contradiction of the assertions of all of the manufacturers who are, in fact, the absolute authority in matters of transmission technology. Also, this again speaks to the fact the OPA and HONI were responsible for the study parameters and not the consultants as claimed by the OA and HONI throughout this entire process.

Chris Aristides Pappas – Evidentiary material set #1

efficiency_ABB.pdf
Joint World Bank / ABB Power Systems Paper
Improving the efficiency and quality of AC transmission systems
2000-03-24

All this takes time, of course, a fact which should be taken into consideration very early in the customer´s planning procedure. To give a rough idea, the time it takes to supply for example an SVC for power transmission purposes will typically amount to some ***14-16 months*** from the signing of contract till the end of testing and commissioning. A Series Capacitor can as a rule be put into operation in ***12-14 months*** or thereabouts.

facts_siemens[1].pdf
FACTS – Flexible Alternating Current Transmission Systems
For Cost Effective and Reliable Transmission of Electrical Energy

Typically the construction period for a facts device is *12 to 18* months from contract signing through commissioning.

xi. if any reasonable, relevant and appropriate technology, as required by the Minimum Filing Requirements and/or considered as "good utility practice' as defined by the OEB's Transmission Code, has been only considered in a supporting role, as near or interim measures, but not as a reasonable alternative to the project and not identified and considered in the application and pre-filed evidence as such, then NO

xii. if reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements and/or considered "good utility practice" as defined by the OEB's Transmission Code, whether identified and considered in the Application and pre-filed evidence [re-conductoring and/or application of FACTS (including TCSC) devices and/or conventional series capacitors, to existing circuits], or not, would accommodate equal or greater transmission capacity and equal or superior reliability than the preferred choice, then NO.

xiii. if the proposed project interferes with appropriate power flows, and/or more appropriate transmission and generation placement and/or pre-existing government policy objectives, such as coal replacement and Nanticoke GS retirement and the clean air initiatives, then NO.

xiv. if the proposed project requires more complexity of the

BSPS and/or further extensive reliance on generation rejection, then NO.

xv. **if the applicant has not, or cannot, show that the need for such an extreme SPS as at the Bruce GS and the attendant over-reliance on generation rejection does not arise from the siting of the Bruce generation and/or the two kitty-corner Bruce to Milton lines, then NO.**

xvi. **if reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements and/or considered "good utility practice" as defined by the OEB's Transmission Code, to the proposed project will obviate the need for further complexity of the BSPS and reduce the reliance on generation rejection, then NO.**

xvii. **if the proposed project *will not diminish or may, in fact, increase consumer rates* due to the following conditions and events – deemed generation, load rejection, generation rejection, black start, the BSPS and transmission congestion – then NO.**

xviii. **if reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements and/or considered "good utility practice" as defined by the OEB's Transmission Code, to the proposed project *will diminish consumer rates or diminish the increase of those rates* due to the minimization of the following conditions and events – deemed generation, load rejection, generation rejection, black start, the BSPS and transmission congestion – then NO.**

xix. **if the project, as proposed, cannot within a reasonable time frame accommodate the future proposed generation builds**

and refurbishments at Bruce GS [eg. Wind power generation, Bruce B refurbishment and the proposed "Bruce

xx. C" build], associated with those *non-committed* expectations, without additional transmission builds and /or the application of reconductoring and/or FACTS [including TCSC and/or conventional series capacitors] technology, especially if only after the fact of the approval of this present application, then NO.

1.2 Does the project qualify as a non-discretionary project as per the OEB's Filing Requirements for Transmission and Distribution Applications and if so what categories of need as referred to in Section 5.2.2 of these Filing Requirements are relevant?

Please refer to #s i to xvii from Issue 1.1 as they are constituent components of my respectful submissions regarding this Issue 1.2
Further, I respectfully submit the following.
FROM: 5.2.2

Non-discretionary projects may be triggered or determined by such things as:

•Mandatory requirement to satisfy obligations specified by Regulatory Organizations including NPCC/NERC (the designated ERO in the future) or by the Independent Electricity Market Operator (IESO);

1. **The proposed project is actually contrary to NPCC/NERC expectations as it creates further complexity of the BPSP of which the NPCC has been critical of for years. IESO arguments that this line is unnecessary (IESO 10 Year Outlook 2006 – 2015) have never been officially refuted and**

merely overlooked and ignored in later documents.

2. **IESO recommendations for the application of FACTS technology [SVCs], conventional series capacitors and the installation of generation distributed throughout and around the GTA, Golden Horseshoe and demand centres of Southwestern Ontario (IESO 10 Year Outlook 2006 – 2015) were, in fact, not considered together as an alternative to this application.**

• A need to accommodate new load (of a distributor or large user) or new generation (connection);

1. **Reconductoring and/or the application of conventional series capacitors and/or FACTS devices to existing circuits would much more appropriately address these concerns than an additional, un-enhanced transmission build.**

• A need to address equipment loading or voltage/short circuit stresses when their rated capacities are exceeded;

1. Reconductoring and/or the application of conventional series capacitors and/or FACTS devices to existing circuits would much more appropriately address these concerns than an additional, un-enhanced transmission build.

• Projects identified in an approved IPSP;

1. There is no such completed IPSP, nor was the Applicant willing to wait for the IPSP before advancing their application.

• Projects that are required to achieve Government objectives that are prescribed in governmental directives or regulations;

The IESO 10 Year Outlook 2006 – 2015, qv, states clearly that, without certain clearly defined actions, the retirement of

Nanticoke and power from the Bruce are mutually exclusive. The Liberals prime energy policy, instituted almost immediately after their election in 2003, was for the replacement of coal and the retirement of our coal burning power plants, with primary focus on Nanticoke GS, as it is the largest. Therefore, whatever Government Policy and Ministerial Directives that have arisen since the inception of the OPA in 2005, and the OPA's subsequent recommendations that have led to those directives and policies, are in direct contravention of the Liberal's prime energy policy. Thus, these later contrary OPA derived policies and directives cannot be considered drivers of this application and its' proposed project. The coal replacement policy must be considered foremost as it is still in place and has not been superseded by any other policy or directive. The first part of the IESO solution for coal replacement and Nanticoke retirement, which is endorsed by the OPA, is for generation distributed throughout and around the GTA, Golden Horseshoe and the demand centres of Southwestern Ontario. The second part of the IESO solution was for the installation of conventional series capacitors and/or various FACTS devices to the lines in Southwestern Ontario, energized by the Bruce GS. Yet HONI chose not to consider this second part as an alternative to the proposed project. Therefore the OPA and HONI appear to be purposely proposing to ignore this primary policy and to delay and interfere with the appropriate implementation of this primary policy. Also, as the OPA has put the refurbishment of reactors and new nuclear builds foremost, the cost of these interferes with the ability to implement the first part of the IESO solution. As a result, this further interferes with the implementation of the Liberal Government's prime energy policy.

• A need to comply with direction from the Ontario Energy Board in the event it is determined that the transmission system's reliability is at risk.

1. There has been no such OEB direction.

1.3 Have all appropriate project risk factors pertaining to the need and justification (including but not limited to forecasting, technical and financial risks) been taken into consideration in planning this project?

I respectfully submit that:

i. **if reasonably detailed technical and forecasting studies, *including manufacturers' estimates*, of the time for implementing this project have not been produced, then NO.**

ii. **if reasonably detailed technical and forecasting studies, *including manufacturers' estimates*, of the time for implementing the near term and interim measures, have not been produced, then NO.**

iii. **if reasonable, relevant and appropriate alternatives were excluded from review and consideration by study parameters either set by the applicant, the OPA, or by the consultant[s], but still at the discretion of the OPA and/or the applicant, then NO.**

iv. **if any reasonable, relevant and appropriate technology, as required by the Minimum Filing Requirements and/or considered as "good utility practice" as defined by the OEB's Transmission Code, has not been identified and considered in the application and pre-filed evidence, then NO.**

v. **if any reasonable, relevant and appropriate technology, as**

required by the Minimum Filing Requirements and/or considered as "good utility practice" as defined by the OEB's Transmission Code, has been only considered in a supporting role, as near or interim measures, but not as a reasonable alternative to the project and not identified and considered in the application and pre-filed evidence as such, then NO.

vi. if reasonably detailed technical and forecasting studies, *including manufacturers' estimates inclusive of manufacture, additional studies and installation*, of the time for implementing the alternative options, as required by the Minimum Filing Requirements and/or considered as "good utility practice" as defined by the OEB's Transmission Code, whether identified and considered [re-conductoring and/or conventional series capacitors and/or application of FACTS (including TCSC) devices, to existing circuits], or not, have not been produced, then NO.

vii. if the OPA, the IESO and/or HONI are shown to be already considering, for the "reasonably foreseeable future", the evaluation and installation of "good utility practice", or

viii. even "innovative but acceptable" technological, monitoring and control technology considered as "Smart Grid" or "Intelligent Grid" , which inherently requires existing FACTS installation on the grid, then NO.

ix. if this project may interfere or actually does interfere with appropriate power flows, and/or more appropriate transmission and generation placement and and/or pre-existing government policy objectives, such as coal replacement and Nanticoke GS retirement and the clean air initiatives, then NO.

x. **if reasonably detailed technical and forecasting studies, *including manufacturers' estimates*, of the time for implementing the additional SPS enhancements required by this project have not been produced, then NO.**

xi. **if reasonably detailed technical and forecasting studies, *including manufacturers' estimates*, of the time for implementing the suggested complete renovation of the BSPS, which would certainly be a major consideration and expense and, therefore, an important consideration regarding this project, have not been produced, then NO.**

xii. **if reasonably detailed financial studies, *including manufacturers' estimates*, of the costs of implementing this project have not been produced, then NO.**

xiii. **if reasonably detailed financial studies, *including manufacturers' estimates*, of the costs of implementing the near term and interim measures, have not been produced, then NO.**

xiv. **if reasonably detailed financial studies, *including manufacturers' estimates*, of the costs of implementing the alternative options, as required by the Minimum Filing Requirements and/or considered as "good utility practice" as defined by the OEB's Transmission Code, whether identified and considered [re-conductoring and/or conventional series capacitors and/or application of FACTS (including TCSC) devices, to existing circuits], or not, have not been produced, then NO.**

xv. **if reasonably detailed financial studies, *including manufacturers' estimates*, of the costs of implementing the additional SPS enhancements required by this project have not been produced, then NO.**

xvi. **if reasonably detailed financial studies, *including manufacturers' estimates*, of the costs of implementing the suggested complete renovation of the BSPS, which would certainly be a major consideration and expense and, therefore, an important consideration regarding this project, have not been produced, then NO.**

xvii. **if the proposed project *will not diminish or may, in fact, increase consumer rates* due to the following conditions and events – deemed generation, load rejection, generation rejection, black start, the BSPS and transmission congestion – then NO.**

xviii. **if reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements and/or considered "good utility practice" as defined by the OEB's Transmission Code, to the proposed project *may diminish consumer rates or diminish the increase of those rates* due to the minimization of the following conditions and events – deemed generation, load rejection, generation rejection, black start, the BSPS and transmission congestion, then NO.**

xix. **If the reliability, supply and financial risks to the ratepayers may be exacerbated by this project and its SPS requirements, and there have been no studies to explore this, then NO.**

1.4 Is the project suitably chosen and sufficiently scalable so as to meet all reasonably foreseeable future needs of significantly increased or significantly reduced generation in the Bruce area?

I respectfully submit that:

i. **if the project, as proposed, cannot within a reasonable time frame accommodate the future proposed generation builds and refurbishments at Bruce GS [eg. Wind power generation, Bruce B refurbishment and the proposed "Bruce C" build], associated with those *non-committed* expectations, without additional transmission builds and /or the application of reconductoring and/or FACTS [including TCSC and/or conventional series capacitors] technology, especially if only after the fact of the approval of this present application, then NO.**

ii. **if the project, as proposed, is found to be unnecessary, after all, within the considered timeline of the "reasonably foreseeable future" from the production of this application, and cannot be easily undone [deconstruction, cost of deconstruction, remediation re: land issues and environmental effects and the cost of these as well, if even possible], then NO.**

2.0 Project Alternatives

2.1 Have all reasonable alternatives to the project been identified and considered?

I respectfully submit that:

i. **if any reasonable, relevant and appropriate technology, as required by the Minimum Filing Requirements and/or considered as "good utility practice" as defined by the OEB's Transmission Code, has not been identified and considered in the application and pre-filed evidence as an alternate option, then NO.**

ii. **if any reasonable, relevant and appropriate technology, as**

required by the Minimum Filing Requirements, has been only considered in a supporting role, as near term or interim measures, but not as a reasonable alternative to the preferred project and not identified and considered in the application and pre-filed evidence as such, then NO.

iii. **if any reasonable, relevant and appropriate technology, as required by the Minimum Filing Requirements and considered as "good utility practice" as defined by the OEB's Transmission Code, has been only considered in a supporting role, as near term or interim measures, but not as a reasonable alternative to the preferred project and not identified and considered in the application and pre-filed evidence as such, then NO.**

iv. **if the OPA, the IESO and/or HONI are shown to be already considering, for the "reasonably foreseeable future", the evaluation and installation of "good utility practice", or even "innovative but acceptable" technological, monitoring and control technology considered as "Smart Grid" or "Intelligent Grid" , which inherently requires existing FACTS installation on the grid, then NO.**

v. **if reasonably detailed technical studies, *including manufacturers' estimates*, of the costs of implementing alternative options to this project have not been produced, then NO.**

2.2 Has an appropriate evaluation methodology been applied to all the alternatives considered?

I respectfully submit that:

i. **if all reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements and/or considered "good utility practice" as defined by the OEB's Transmission Code, were not identified and considered in the application and pre-filed evidence, then NO.**

ii. **if all reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements, were not identified and considered in the application and pre-filed evidence, then NO.**

iii. **if any reasonable, relevant and appropriate technology, as required by the Minimum Filing Requirements and/or considered as "good utility practice' as defined by the OEB's Transmission Code, has been only considered in a supporting role, as near or interim measures, but not as a reasonable alternative to the project and not identified and considered as such, then NO.**

iv. **if reasonably detailed financial studies, *including manufacturers' estimates*, of the costs of implementing alternative options as well as near term and interim measures, have not been produced, then NO.**

J1.1 Page 1 of 1 1 *UNDERTAKING*

WORKING PAPER RE:
CONCEPTUAL ALTERNATIVES TO A NEW 500 KV BRUCE TRANSMISSION LINE

Reinforcing the Path Through Longwood using HTLS, SC & SVC's
Description of Conceptual Alternative

Note: Cost estimates are based on past similar projects and/or engineering judgement.

April 24, 2008

This "study" or "working paper", was produced by Mr. Sabiston very late in this process. Any such study should have been available in the pre-filed evidence, over a year earlier. Even so, it

includes no relevant data. There are no manufacturers' estimates. There is no third party [Electrical Engineering "trade" or professional journal] supportive technological or costs comparative data. So we are back at the start where HONI, OPA and any of their representatives expect us to take them at their unsupported word.

The same rational applies to Mr. Woodward's undertaking regarding the time it would take for proceeding with series capacitors. While his own study had relied heavily on information from the manufacturers, ABB, Siemens, and GE, he did not refer to them for this important information about their products that they would have readily supplied him with. *Instead, as with Mr. Sabiston, we are expected to accept his unsupported assertions*.

Manufacturers' estimates, however, assert a timeline, including accessory studies, to range from *12 to 18 months* for most FACTS installations and from *12 to 14 months* for conventional series compensation.

Chris Aristides Pappas – Evidentiary material set #1

efficiency_ABB.pdf
Joint World Bank / ABB Power Systems Paper
Improving the efficiency and quality of AC transmission systems
2000-03-24

All this takes time, of course, a fact which should be taken into consideration very early in the customer´s planning procedure. To give a rough idea, the time it takes to supply for example an SVC for power transmission purposes will typically amount to some *14-16 months* from the signing of contract till the end of testing and commissioning. A Series Capacitor can as a rule be put into operation in *12-14 months* or thereabouts.

7

facts_siemens[1].pdf
FACTS – Flexible Alternating Current Transmission Systems
For Cost Effective and Reliable Transmission of Electrical Energy

Typically the construction period for a facts device is *12 to 18* months from contract signing through commissioning.

1

v. **if reasonably detailed technical studies, *including manufacturers' estimates*, of the time for implementing alternative options, inclusive of manufacture, additional studies and installation, as well as for near term and interim measures, have not been produced, then NO.**

vi. **if the proposed project *will not diminish or may, in fact, increase consumer rates* due to the following conditions and events – deemed generation, load rejection, generation rejection, black start, the BSPS and transmission congestion – then NO.**

2.3 For all of the considered alternatives, does the evaluation methodology utilized include a cost benefit comparison as well as a comparison of all quantitative and qualitative benefits?

I respectfully submit that:

i. **if reasonably detailed financial studies, *including manufacturers' estimates*, of the costs of implementing alternative options, as well as near term and interim measures, have not been produced, then NO.**

ii. **if reasonably detailed technical studies, *including manufacturers' estimates*, of the time for implementing alternative options, inclusive of manufacture, additional studies and installation, as well as for near term and interim measures, have not been produced, then NO.**

iii. **if it is shown that the proposed project *will not diminish or may, in fact, increase consumer rates* due to the following conditions and events – deemed generation, load rejection, generation rejection, black start, the BSPS and transmission congestion – then NO.**

2.4

a) Have appropriate evaluation criteria and criteria weightings been utilized in the evaluation process for the alternatives and the proposed project and what additional criteria/weightings could be considered?

I respectfully submit that:

i. **if all reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements and/or considered "good utility practice" as defined by the OEB's Transmission Code, were not identified and considered in the application and pre-filed evidence, then NO.**

ii. **if any reasonable, relevant and appropriate technology, as required by the Minimum Filing Requirements and/or considered as "good utility practice' as defined by the OEB's Transmission Code, has been only considered in a supporting role, as near or interim measures, but not as a reasonable alternative to the project and not identified and considered in the application and pre-filed evidence as such, then NO.**

iii. **if reasonably detailed financial studies, *including manufacturers' estimates*, of the costs of implementing alternative options, as well as near term and interim measures, have not been produced, then NO.**

iv. if the proposed project ***will not diminish or may, in fact, increase consumer rates*** due to the following conditions and events – deemed generation, load rejection, generation rejection, black start, the BSPS and transmission congestion – then **NO.**

b) Have appropriate comparisons been carried out on all reasonable alternatives with respect to reliability and quality of electricity service, including stability and transient stability levels, voltage performance and Loss of Load Expectation projections under normal and post-contingency conditions?

I respectfully submit that:

i. if all reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements, were not identified and considered in the application and pre-filed evidence, then **NO.**

ii. if all reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements and considered "good utility practice" as defined by the OEB's Transmission Code, were not identified and considered in the application and pre-filed evidence, then **NO.**

iii. if any reasonable, relevant and appropriate technology, as required by the Minimum Filing Requirements, has been only considered in a supporting role, as near or interim measures, but not as a reasonable alternative to the project and not identified and considered in the application and pre-filed evidence as such, then **NO.**

iv. if any reasonable, relevant and appropriate technology, as required by the Minimum Filing Requirements and considered as "good utility practice' as defined by the OEB's Transmission Code has been only considered in a supporting role, as near or interim measures, but not as a reasonable alternative to the project and not identified and considered as such, then **NO.**

c) Do the alternatives meet the applicable standards for reliability and quality of electricity service?

I respectfully submit that:

i. if reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements and/or considered "good utility practice" as defined by OEB's Transmission Code, whether identified and considered in the Application and pre-filed evidence the [re-c onductoring and/or application of FACTS (including TCSC) devices and/or conventional series capacitors, to existing circuits], or not, would accommodate equal or greater transmission capacity and equal or superior reliability than the preferred choice, then **YES.**

2.5 Is the proposal a better project than the reasonable alternatives?

I respectfully submit that:

i. if reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements and/or considered "good utility practice" as defined by the OEB's Transmission Code, can provide equal or superior reliability and power conservation, as well as increased transmission capacity, then **NO.**

ii. **if any reasonable, relevant and appropriate technology, as required by the Minimum Filing Requirements and/or considered as "good utility practice' as defined by the OEB's Transmission Code, has been only considered in a supporting role, as near or interim measures, but not as a reasonable alternative to the project and not identified and considered in the application and pre-filed evidence as such, then NO.**

iii. **if reasonably detailed financial studies, *including manufacturers' estimates*, of the costs of implementing alternative options, as well as near term and interim measures, have not been produced, then NO.**

iv. **if reasonably detailed technical studies, *including manufacturers' estimates*, of the time for implementing alternative options, inclusive of manufacture, additional studies and installation, as well as for near term and interim measures, have not been produced, then NO.**

v. **if the proposed project *will not diminish or may, in fact, increase consumer rates* due to the following conditions and events – deemed generation, load rejection, generation rejection, black start, the BSPS and transmission congestion – then NO.**

vi. **if the applicant has not, or cannot, show that the need for such an extreme SPS as at the Bruce GS and the attendant over-reliance on generation rejection does not arise from the siting of the Bruce generation and/or the two kitty-corner Bruce to Milton lines, then NO.**

2.6 Are the project's rate impacts and costs reasonable for:

- **the transmission line;**

- **the station modifications; and**
- **the Operating, Maintenance and Administration requirements.**

I respectfully submit that:

i. **if reasonably detailed financial studies, *including manufacturers' estimates*, of the costs of implementing the proposed project or the alternative options, whether identified and considered [reconductoring and/or application of FACTS (including TCSC) devices and/or conventional series capacitors, to existing circuits], or not, as well as near term and interim measures, have not been produced, then NO.**

ii. **if the proposed project *will not diminish or may, in fact, increase consumer rates* due to the following conditions and events – deemed generation, load rejection, generation rejection, black start, the BSPS and transmission congestion – then NO.**

3.0 Near Term and Interim Measures

3.1 Are the proposed near term and interim measures as outlined in the application appropriate?

I respectfully submit that:

i. **if the proposed near term and interim measures can accommodate equal or greater transmission capacity and equal or superior reliability than the preferred choice, then YES.**

ii. **if the proposed near term and interim measures, considered "good utility practice" as defined by the OEB's Transmission Code, would accommodate equal or greater transmission capacity and equal or superior reliability, then YES.**

3.2 Can the proposed near term and interim measures be utilized longer than the suggested two to three year time frame?

I respectfully submit that:

i. **if the proposed near term and interim measures can accommodate equal or greater transmission capacity and equal or superior reliability than the preferred choice, then YES.**

ii. **if the proposed near term and interim measures, considered "good utility practice" as defined by the OEB's Transmission Code, would accommodate equal or greater transmission capacity and equal or superior reliability, then YES.**

3.3 If these proposed near term and interim measures could be utilized for a longer period than proposed, could they (or some combination of similar measures) be considered an alternative to the double circuit 500 kV transmission line for which Hydro One has applied?

I respectfully submit that:

i. **if proposed near term and interim measures should have been considered as reasonable alternatives, as per the Minimum Filing Requirements and/or considered "good utility practice" as defined by the OEB's Transmission Code, and**

were not identified and considered in the application and pre-filed evidence as such and would accommodate equal or greater transmission capacity and equal or superior reliability, then **YES.**

ii. If reconductoring with ACSS, ACSS/TW conductors or the more expensive ACCR conductors is applied to the appropriate existing transmission lines and FACTS technology and/or conventional series capacitors are installed to support transmission from the Bruce GS, control voltage, reactive power and power flows and diminish the necessity for BSPS complexity and reduce the reliance on generation rejection, then **YES**, this combination is a far superior alternative to the double circuit 500 kV transmission line for which Hydro One has applied.

iii. If any combination of reconductoring and/or FACTS devices and/or conventional series capacitors and the building of more generation in around the GTA, Golden Horseshoe and the demand centres of Southwestern Ontario , as per the OPA's and IESO's stated commitment to this additional generation, will supply the reactive power necessary to retire Nanticoke, support transmission from Bruce GS, control voltage, reactive power, and power flows and diminish the necessity for BSPS complexity and reduce the reliance on generation rejection then **YES**, this combination is a far superior alternative to the double circuit 500 kV transmission line . 98

for which Hydro One has applied.

4.0 Reliability and Quality of Electricity Service

4.1 For the preferred option, does the project meet all the requirements as identified in the System Impact Assessment and the Customer Impact Assessment?

I respectfully submit that:

i. **As the System Impact Assessment and the Customer Impact Assessment appear to arise from only minimum acceptable requirements, and not to the "higher bar" of the regulatory Transmission Systems Code and its "good utility practices" provisions, I consider this Issue as not applicable.**

4.2 Does the project meet applicable standards for reliability and quality of electricity service?

I respectfully submit that:

i. **As the applicable standards for reliability and quality of electricity service appear to arise from only minimum acceptable requirements, and not to the "higher bar" of the regulatory Transmission Systems Code and its "good utility practices" provisions, I consider this Issue as not applicable.**

4.3 Have all appropriate project risk factors pertaining to system reliability and quality of electricity service been taken into consideration in planning this project?

I respectfully submit that:

i. **if all reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements, and/or considered "good utility practice" as defined by the OEB's Transmission Code, whether identified and considered in the Application and pre-filed evidence [re-conductoring and/or application of FACTS (including TCSC) devices and/or conventional series capacitors, to**

existing circuits], or not, would accommodate equal or greater transmission capacity and equal or superior reliability than the preferred choice, then NO.

ii. **if any reasonable, relevant and appropriate technology, as required by the Minimum Filing Requirements and/or considered as "good utility practice" as defined by the OEB's Transmission Code has not been identified and considered in the application and pre-filed evidence, then NO.**

iii. **if any reasonable, relevant and appropriate technology, as required by the Minimum Filing Requirements and/or considered as "good utility practice' as defined by the OEB's Transmission Code has been only considered in a supporting role, as near or interim measures, but not as a reasonable alternative to the project and not identified and considered in the application and pre-filed evidence as such, then NO.**

iv. **if the proposed project interferes with appropriate power flows, and/or more appropriate transmission and generation placement and/or pre-existing government policy objectives, such as coal replacement and Nanticoke GS retirement and the clean air initiatives, then NO.**

v. **if the proposed project requires more complexity of the BSPS and/or further permanent reliance on generation rejection, then NO.**

vi. **if reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements and/or considered "good utility practice" as defined by the OEB's Transmission Code, to the proposed project will**

obviate the need for further complexity of the BSPS and reduce the reliance on generation rejection, then NO.

vii. **if the proposed project *will not diminish or may, in fact, increase risks* due to the following conditions and events – deemed generation, load rejection, generation rejection, black start, the BSPS and transmission congestion – then NO.**

viii. **if reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements, to the proposed project *will diminish risks* due to the minimization of the following conditions and events – deemed generation, load rejection, generation rejection, black start, the BSPS and transmission congestion – then NO.**

ix. **if reasonable, relevant and appropriate alternatives, as required by the Minimum Filing Requirements and considered "good utility practice" as defined by the OEB's Transmission Code, may *diminish risks* due to the minimization of the following conditions and events – deemed generation, load rejection, generation rejection, black start, the BSPS and transmission congestion – then NO.**

x. **if the applicant has not, or cannot, show that the need for such an extreme SPS as at the Bruce GS and the attendant over-reliance on generation rejection does not arise from the siting of the Bruce generation and/or the two kitty-corner Bruce to Milton lines, then NO.**

5.0 Land Matters

5. Are the forms of land agreements to be offered to affected landowners reasonable?

I respectfully submit that:

i. **I am unable to comment on this matter.**

5.2 What is the status and process for Hydro One's acquisition of permanent and temporary land rights required for the project?

I respectfully submit that:

i. **I am unable to comment on this matter.**

6. Aboriginal Peoples Consultations

Have all Aboriginal Peoples whose existing or asserted Aboriginal or treaty rights are affected by this project been identified, have appropriate consultations been conducted with these groups and if necessary, have appropriate accommodations been made with these groups?

I respectfully submit that:

i. **The reasonable concern, here, is that the treaties between the British Crown and the various Aboriginal Peoples were treaties between sovereign nations. Neither Confederation nor our Constitution had any inherent legality to alter treaties between Britain and their Aboriginal Allies. The duty of administration of Aboriginal lands was originally intended for the benefit and protection of Britain's Aboriginal Allies, firstly by colonial Canada and later by Britain's Dominion of Canada. These are the complex issues that must be considered and form the basis of appropriate consultation on these matters. Therefore, if any of the Aboriginal groups and their representatives advance concerns that this project will unduly abbreviate**

legitimate consultation and interfere with Treaty issues and negotiations, then this must be considered as a most serious concern. This alone is a powerful argument against approving this application.

7. Conditions of Approval

If Leave to Construct is approved, what conditions, if any, should be attached to the Board's order?

I respectfully submit that:

i. **EB-2006-0170 Ontario Energy Board**
Filing Requirements for Transmission and Distribution Applications November 14, 2006
From: 5.2.2
Non-discretionary projects may be triggered or determined by such things as:
• A need to comply with direction from the Ontario Energy Board in the event it is determined that the transmission system's reliability is at risk.

ii. **With the preceding for guidance, I believe the following two conditions can be reasonably considered.**

iii. **The Board should instruct the applicant to undertake to install either ACSS or ACSS/TW conductors instead of the century old, thermally challenged ACSR which they are prepared to put on this brand new transmission build. Reconductoring of the other lines aside, there is no good reason for not using better, proven and available technology. These High Temperature – Low Sag conductors have been commercially available for decades. Their material cost is in the same range as the**

ACSR, unlike the more recent ACCR and ACCC conductors also commercially available and in use elsewhere. Also, their superior sag performance allows great savings on the actual new tower builds. The towers can be much shorter and therefore cost much less. Their superior properties also allow for more than one circuit per tower, which would realize even more savings in construction.

iv. The Board should instruct the applicant and the OPA to immediately undertake more fulsome studies regarding FACTS and conventional series compensation as well as reconductoring for the SWO existing circuits. They should be instructed that these studies must include manufacturers' estimates regarding both costs and timelines. This way, perhaps, we may have sufficient transmission capacity in place before any other generation builds approvals and contracts slide by without first considering the transmission issues.

Under section 81 of the Act, any generator or an affiliate of a generator planning to construct transmission facilities must give notice to the Board per guidelines available on the Board's website www.oeb.gov.on.ca/documents/cases/Maad/guidelines.pdf. The Board upon examining the relevant facts may choose to formally review the application by holding a hearing, and in that event will advise the applicant within 60 days of receiving the application of its intention to formally review that application. Construction of new transmission facilities may require amendment of a transmitter license issued by the Board.

***The Board's role is to ensure that these transmission investments are in the public interest*. Subsection 96(2) specifies that, for section 92 purposes, "*the Board shall only consider the interests of consumers with respect to prices and the reliability and quality of electricity service*."**

BSPS, Bruce to Milton & Design Contingencies
PAST MISTAKES

The Board's mandate deals with the present and extends to the near and reasonably foreseeable future. It is understood that the Board's mandate cannot reach into the past. The Board cannot "disapprove" a much earlier undertaking regardless of what evidence has arisen since, regarding such. An earlier undertaking may be found to have been inappropriate by facts that have come to light only slowly over time or suddenly at some later date. That is to say that there may have even been facts that were simply not in evidence nor easily available. The earlier undertaking may have been considered appropriate at the time because the limit of technological information or even, simply the limit of the expertise and knowledgeableness of the engineers and/or planners involved, at the time.

Also, a cynic might suggest that some earlier initiatives, instead of being driven by engineering and planning considerations may, instead, have been more driven by political issues and expediencies, involving several tiers, and that the interests of private entities may also have been involved.

Regardless, the Board cannot cause any such thing to be undone or remedied. The Board's mandate to work with today and tomorrow can only accommodate relief of such past mistakes by approving applications that will work around or in spite of them. However, it is certainly a matter of the Board's mandate that they ensure that past mistakes are not repeated, compounded or exacerbated. This certainly speaks to risk, reliability and rates and the Board's responsibility to the public as ratepayers and taxpayers.

Any suspect condition of the system or any of its components deserves appropriate consideration. If facts are in evidence that support such a concern then that concern must be addressed. The BSPS is such a concern. Firstly, there has been no

appropriate explanation for the necessity for its very existence. Yes, it is employed to deal with conditions that appear specific to Bruce GS and the associated SWO transmission. However, there has been no clear explanation for these deleterious conditions that require such an extreme protection system. No other such exists in this province or across the entire continent. Again, I refer to the following:

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10 MR. PAPPAS: Okay, thank you. Now, we have been
11 discussing the Bruce special protection system. Could
12 either of you advise me as to what the status of, perhaps,
13 the Pickering special protection system is?
14 MR. NETTLETON: Madam Chair --
15 MS. NOWINA: How is that relevant, Mr. Pappas?
16 MR. PAPPAS: It gets very relevant, Madam Chair.
17 MS. NOWINA: Well, you will have to do that quite
18 quickly, Mr. Pappas.
19 MR. PAPPAS: It can be done very quickly, I believe.
20 MR. SABISTON: There is no special protection system
21 called the Pickering special protection system.
22 MR. PAPPAS: Thank you. Is there a Darlington special
23 protection system?
24 MR. SABISTON: There is a special protection system
25 that can involve Darlington, but it's much, much, much,
26 much smaller in scope than the Bruce special protection
27 system.
28 MR. PAPPAS: And is there any other special protection

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systems, Nanticoke, Lennox? Any other generating
1 facility,
2 large generating facility, in Ontario that has special
3 protection units?
4 MR. SABISTON: Hydro One owns approximately 40 special
5 protection systems of various sizes and shapes and
6 magnitudes that involve either load facilities,

7 transmission facilities and, in some instances, generation
8 facilities.
9 MR. PAPPAS: *So would it be fair to say that the*
10 magnitude of the Bruce special protection system is far
11 greater than the rest of the existing special protection
12 systems in the province?
13 MR. SABISTON: *Yes, that would be a fair statement*.
CAA ID No. 2007 - EX349
Transmission Assessments & Performance Department
FINAL DRAFT Version
Date: 27th March 2008

"5. Future Expansion of the Bruce SPS

Subject to the receipt of the required approvals for the construction of the new 500kV double-circuit line between the Bruce Complex and Milton TS, the Bruce SPS will need to be further enhanced to recognise contingencies involving the circuits of the new line, as well as any new breaker-failure conditions at the terminal stations of the new line that could be expected to have an adverse effect on the post-contingency operation of the system.

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"MR. PAPPAS: Okay. So, finally, I will go to this. In what way does the new line actually make the SPS less complex and not more so?

MR. FALVO: Well, because it's not—it wouldn't be required to withstand contingencies when all of the transmission is in service, and even when some transmission is out of service, the responses that might be required under those circumstances are likely to be much less complicated than the responses that we are contemplating now.

That means less complexity, that means less risk and consequence in failure, and just less overall complication in day-to-day use and scheduling of maintenance work.

MR. PAPPAS: Do you not think it is also equally possible, but with all of that extra transmission line, extra devices, extra load and extra generation that is proposed and further proposed, that it is just simply going to add to the complexity?

MR. FALVO: The transmission line is going to make things much better and much less complicated. Clearly, it will do that.

MR. SABISTON: Mr. Chow's plan with the new transmission line will reduce the frequency of arming, so that it's—so that it's not armed nearly as frequently.

That will make the system less complex. That will obviate the NPCC concerns about complexity and frequency of arming."

Of course this is a direct contradiction of their own SIA Report evidence.

[As an aside, I direct you attention to this conclusion related in the following reference.

" Public opposition to these circuits ultimately prevented this construction." **I respectfully submit that this is an entirely inappropriate conclusion. The Joint Board's decision was not motivated by any such thing, but on the realities of the application. This sounds like arrogance and sour grapes from poor losers. It may be that this is one of the attributes that Ontario Hydro did pass on to their inheritors.]**

Exhibit C Tab 4 Schedule 1 Attachment 1

5.1.7 System Requirements Associated with the Incorporation of Bruce Units

The transmission additions constructed to incorporate the station into the Ontario network were not as desired by Ontario Hydro. The preferred implementation included a double circuit

500 kV line from Bruce to Essa in the Barrie area. Public opposition to these circuits ultimately prevented this construction. The Bruce to Longwood 500kV circuits were installed as a somewhat less capable alternative. As a result of this change, the full output of the Bruce complex could not be accommodated by the transmission system. In order to increase the capability of the transmission system to the level required, an automated "Special Protection Scheme" (SPS) was installed. In taking this step, the reliability of both the Bruce generation and many customers in Ontario was reduced to achieve increased economic benefits of the Bruce complex. In essence, the SPS allows for detection of certain power system events and immediately disconnects generators at Bruce and a large amount of customer load throughout southern Ontario to prevent a system disturbance such as that experienced in August 2003.

Certainly there has to be an understandable reason for this. Can we consider the unlikely circumstance that some unforeseeable, anomalous, physical, electrical or magnetic properties unique to the area interfere with and disturb the transmission? Certainly, it cannot be attributed to anything metaphysical. We can doubt that it is haunted or cursed. Yet, even though this system has existed for decades, we are not given an adequate answer for why. We are told about abnormal conditions and various contingencies and other concerns that require the BSPS, but we are given no fulsome explanation as to why these conditions are so extensive and why they exist and persist.

A vague attempt in this direction involved the assertion that the power flows had changed circa 1985, but we have be given no clear indication of why. We are told that this involves consideration of west to east flows and that these are problematical. Is it possible that no other transmission system on this continent has experienced changes in power flows over the last 35 years?

[MR. CHOW:]

In 1985, the system at that time was designed to be adequate for eight units at Bruce for the condition of the study at that time. So why is today's system only adequate for six units?

Mike's presentation indicated the variability in the condition and the operation of the system in southwestern Ontario. A key aspect of the changes that occurred from 1985 to now is the changes in the reference system power flow patterns. Back in 1985, much of the concern was an east-to-west flow. This is a power flow from the GTA and Bruce into London and flowing from London toward the Sarnia and Windsor area.

Now the system is changed to consider a west-to-east flow. This is from the Sarnia and Windsor area into London and toward the GTA. The reason for that? There is a lot of additional gas generation added in the Sarnia and the Windsor area. There is quite a large amount of renewable generation added also in that part of the system, as well as co-gen standard offer. Also, in many locations, Ontario is dependent on the import from the US for capacity support. All these factors increase the transfer from west to east.

With that change, it changed the dynamic of the system very significantly. When the study was done, it was for an east-to-west flow. The dominating failure mode at that time was a plant's instability at the Bruce

It also was subsequently identified to be also area-mode stability issues, both related to Bruce and the interconnected system.

Based on IESO's analysis of the system, the dominating failure mode for today's system in southwestern Ontario and the Bruce is voltage instability event, which is very different in characteristic than a machine or plant mode instability.

One, the reactive situation in the rest of the system,

11 especially in the receiving end in the GTA, in the
12 Kitchener area, impacts on the transfer limit of Bruce.
13 Also, the many factors, such the as number of generators in
14 service in southwestern Ontario, such as Nanticoke, such as
15 Lambton, also impacts on the ability to support the voltage
16 on heavy transfers.
17 So all of that changed the capability of the system to
18 deliver power out of Bruce down by two units, more or less.
19 So now, the system is adequate for six, not for eight
20 units.

I respectfully submit that it is absolutely essential to come to a proper understanding of this phenomenon and, thereby, an intelligent resolution of the difficulty. I further submit that until that is accomplished no further transmission builds associated with the Bruce GS and no further Bruce GS refurbishments or builds should be considered. It is clear that the need for such a complex special protection system is an indication of high risk. How can one intelligently plan when there is such a considerable unknown? It is clear that every addition will require further complexity of the BSPS, as per the applicant's own evidence. I submit that ignoring this will only continue to put our entire transmission system at increasing risk.

One cannot plan, predict, forecast or make decisions in the face of such a gap in understanding and evidence. In this situation, one can only plan for disaster. Again, I respectfully submit that it is in the Board's mandate to not knowingly compound a bad situation. Mr. Klippenstein spoke of throwing good money after bad. His reference should be adopted by the applicant as a guiding principle in this and other applications. Certainly the OPA should keep this in mind in their generation placement and transmission considerations. I believe that we must look to Occam's Razor, here, for guidance. This is the principle of *lex parsimoniae* or, colloquially, "All other things being equal, the simplest solution is usually the best." It is equally appropriate to quote Mr. Barlow here. " It talks like a duck, walks like a duck and it speaks like a duck. It must be a duck."

Therefore, I respectfully submit the following occurrences and considerations as a guide in contemplating the need for caution and careful deliberation in any matters associated with the BSPS.

1. **There may have been no actual, relevant generation or transmission precedent for locating the commercial nuclear power units in Bruce County. It is reasonable to consider that Douglas Point experimental, pilot commercial reactor was originally placed there, away from the major population centres, for reasons of security and public safety, at that time. Thus the pre-existing Douglas Point reactor may not have constituted a matter of precedent for the siting of the later commercial power station.**

2. **There are situations where generation is far from demand and there is no alternate consideration to long transmission lines. Waterfalls cannot be relocated. Otherwise, everything else being equal, it is best to situate generation as close as possible to demand.**

3. **The longer the lines > the greater the resistance, reactance and impedance effects > the greater the line [heat] losses > the greater the conductor temperature> the greater the transmission congestion > the greater the risk and the greater the cost to the ratepayer.....**

4. **Please consider the following timeline for consideration of events and situations that may have contributed to the power flow problem that developed and required the implementation of the BSPS.**

5. **Pickering A (Ontario Power Generation)**
   Unit 1 515MW Operational Jul 29, 1971
   Unit 2 515MW Operational Dec 30, 1971
   Unit 3 515MW. Operational Jun 1, 1972
   Unit 4 515MW Operational Jun 17, 1973
   2060 MW Total

6. Nanticoke – units 1 - 8 from 1972-1978.
   At 8 x 500 MW = 4000MW

7. Bruce A (Bruce Power)
   Unit 1 750MW Operational Sep 1, 1977
   Unit 2 750MW Operational Sep 1, 1977
   Unit 3 750MW Operational Feb 1, 1978
   Unit 4 750MW Operational Jan 18, 1979
   3000 MW Total, 1640 MW of which
   was locked-in until Apr 1983.
   There was only 1360 MW available 1979.

8. Pickering B (Ontario Power Generation)
   Unit 5 516MW Operational May 10, 1983
   Unit 6 516MW Operational Feb 1, 1984
   Unit 7 516MW Operational Jan 1, 1985
   1548MW Sub-Total 1985
   Unit 8 516MW Operational Feb 28, 1986
   2064MW Total 1986

9. 1st Bruce to Milton Transmission Build
   In Service Date 1- Apr - 1983

10. Bruce B (Bruce Power)
    Unit 5 806MW Operating Mar 1, 1985
    Unit 6 822MW Operating Sep 14, 1984
    1628MW Sub-Total 1985
    Unit 7 806MW Operating Apr 10, 1986
    Unit 8 790MW Operating May 22, 1986
    3224MW Total

11. 1985 – change in power flows

	Firm Capacity MW*	Capability (MW) **
Bruce x Hanover - B4V &	423	284

B5V 26-Nov-63 Hanover x Orangeville - B4V &	412	287
B5V 10-Dec-61 Bruce x Owen Sound - B27S &	357	273
B28S 31-Oct-77 Bruce x Seaforth - B22D &	412	278
B23D 11-Oct-75 Seaforth x Detweiler - B22D &	357	274
002Ddn/ B23D 20-Nov-70 Bruce x Milton - B561M 1-Apr-83	2442	[1400?]
1st 6 -	1961	1396

2442 MW – 1961 MW = 481 MW
Bruce x Milton - B561M – 481 MW greater Firm Capacity than the other 6 pre-existing lines listed, combined.

Exhibit C Tab 4 Schedule 12 Page 4 of 5

"A portion of the Bruce x Milton line was initially placed into service in 1979 and operated at 230 kV in order to provide some additional transmission capacity before the construction of the line at the Milton end was completed. The portion that was so connected went from Bruce to Belwood Junction where it was connected to the 230 kV circuits D6V & D7V, Detweiler x Orangeville."

That [unnamed] 230 kV line could not have carried much. It connected to the 230 kV circuits D6V & D7V, Detweiler x Orangeville. Review shows that these lines were already [obviously] carrying power and were significantly limited in how much more they could carry.

I submit that this 230 kV line was merely an attempt at precedent for the following application for the Bruce to Milton line. What this makes clear is that they had no intention to consider alternatives. Yet, the 1987 Decision regarding the various lines proposed found for the Bruce to London to

Nanticoke. The reasons given in that decision indicate that these were considerations that should have been applied to the earlier Bruce to Milton application. They found that the Bruce to London to Nanticoke route better facilitated transmission back and forth between Ontario and Michigan and overcame the problems associated with the Buchanan Interface. Basically this means that this route did not interfere with the provincial power flow pattern. This is a further indication that the Bruce to Milton line primarily, and the thermal constraints on it and the other lines are probably the culprits responsible for the need of the BSPS and its degree of complexity. If you review the following you will see that the line mentioned could not have carried any significant amount of power and could not have appreciatively relieved the locked in power because of the limitations of the Detweiler line. Please note that they only indicate "some additional transmission capacity" without actually referencing any actual amount.

230 KV TRANSMISSION LINE BRUCE TO DETWEILER

In Service Date	Firm Capacity *		Capability (MW)**	Avg Loading (2007) *****	Max Loading (2007) *****
	Amps	MW			
.			Total of both circuits		
.					
Bruce x Seaforth - B22D & B23D					
11-Oct-75	991	412	278	374	355 (B22D) & 355(B23D)
.					
Seaforth x Detweiler					[710]

- B22D & B23D 20-Nov-70 .	860	357	274	135	163 (B22D) & 156 (B23D) [319]

* Firm Capacity means the capacity available on that line assuming that one of the two circuits is out of service.

A portion of the Bruce x Milton line was initially placed into service in 1979 and operated at 230 kV in order to provide some additional transmission capacity before the construction of the line at the Milton end was completed. The portion that was so connected went from Bruce to Belwood Junction where it was connected to the 230 kV circuits D6V & D7V, Detweiler x Orangeville.

All the above raise reasonable concerns that large generation, and its associated transmission, located in Bruce County, far from the demand centres, and/or the location and direction of the Bruce to Milton Line are compromised. It is entirely possible and reasonable that all the previous generation and transmission builds throughout the 1960s, 1970s and early 1980s created the pre-eminent power flow pattern that dominates our transmission system.

Although Bruce A GS Units 1 to 4 were all completed and operational by 1979, with a total generation capacity of 3000 MW, it is clear that this was locked in. Prior to the Bruce to Milton line coming into service, the pre-existing lines did not have the capacity or capability to deal with all that generation. Their combined Firm Capacity was only 1961 MW. Their combined Capability was only 1396 MW. It is the Capability that is concerned with “average” transmission. Firm Capacity is the limit relied on for peak transmission conditions and N-1 and N-2 contingencies. Clearly, this resulted in a ***planned*** shortfall, locked in energy, of 3000MW – 1396MW = 1604 MW. Also, clearly, this power was not available for transmission until 1983.

The Bruce to Milton line runs kitty-corner from Bruce to the GTA. It intersected the established transmission and power flow pattern from Nanticoke in the south and Pickering in the east. It is entirely possible that a Bruce to London to Nanticoke line, instead, would have been consistent with the pre-existing pattern of power flow. Also, power from Bruce to Owen Sound and extended to Essa would also probably be consistent with the power flow pattern and could allow transmission to the north as well as the south.

A Bruce to Milton line may have been considered as a savings of materials costs. However, there would still be a necessity for lines to London and south. These would still involve materials costs, regardless of their generation source. Basically, this would require power for London and the south to have to come from Bruce via Milton and then Nanticoke, and you may very well have a more serious interference with the power flow.

The Bruce to Milton "shortcut", however, is not really a shortcut in terms of electrical transmission. Electrical power is an electromagnetic phenomenon that travels close to the speed of light. There are physical considerations that somewhat limit the speed of electricity along a conductor. Even if we allow for an extreme difference of a factor of 100, we still have a speed of 2.99792458 x 10 to the 6th power meters per second. Even if 2 transmission routes had a difference in length of as much as 300 km, this is only a matter of 4 ten-thousands of a second, or 0.4 milliseconds, difference in electricity travel time. This is hardly a reliability or supply concern.

The purpose of this treatment was not to prove the case of Bruce generation and/or Bruce to Milton transmission as the cause of the requirement of the BSPS. The purpose was to make a case for the possibility. HONI has not offered any evidence to prove this is not so. HONI has not offered any clear explanation for the conditions that require the BSPS. HONI has not shown that they have ever conducted any studies on this issue. Both HONI and Ontario Hydro, before them, did not even consider this possibility.

It is clear that the employment of reconductoring and/or conventional series compensation and/or FACTS devices will not

only provide us with the presently needed transmission capacity but it will give us time to consider this SPS problem and to, also, consider other generation and transmission options and to not make choices that may not only prove to be inappropriate but may also limit our future choices. These are certainly matters of reliability, supply and rates. As such it is entirely within the Board's mandate to dismiss this application if there are any unresolved issues that can now, or in the future, seriously impinge upon these matters. Here, we need to consider the acceleration of technological advancement over the last century.

More particularly we must consider the rapid advancement since the commercial introduction of transistors in the 1960's and consider the advancement of electronics and computers since then. Every decade saw at least a magnitude of advancement and even more as we approached the present. I submit that at this rate of technological advancement our ability to forecast is limited to no more than five years because we cannot afford to make irrevocable choices that will limit or obviate a more appropriate future. It is bad enough that Hydro One is still intent on installing conductor technology that was introduced in 1907 and repeatedly surpassed since 1927. At least, if we install conductors with far greater thermal limits, that have been available for three decades now, we can be assured of greater reliability until 2108 when Ontario will get around to upgrading to even more superior technology from 2008 and 2083.

the generator or the impact on the generator
1 being tripped.
2 MR. PAPPAS: No, but it does involve -- it's not just
3 on the transmission side. There is an involvement between
4 transmission and generation.
5 It isn't -- the two go together. You can't drop the
6 line and not drop the generator, more or less. Would that

be fair to say?
MR. SABISTON: I don't think so. Any connection with generation would be tertiary, at best.
MR. PAPPAS: Okay, thank you. Now, we have been discussing the Bruce special protection system. Could either of you advise me as to what the status of, perhaps, the Pickering special protection system is?
MR. NETTLETON: Madam Chair --
MS. NOWINA: How is that relevant, Mr. Pappas?
MR. PAPPAS: It gets very relevant, Madam Chair.
MS. NOWINA: Well, you will have to do that quite quickly, Mr. Pappas.
MR. PAPPAS: It can be done very quickly, I believe.
MR. SABISTON: There is no special protection system called the Pickering special protection system.
MR. PAPPAS: Thank you. Is there a Darlington special protection system?
MR. SABISTON: There is a special protection system that can involve Darlington, but it's much, much, much, much smaller in scope than the Bruce special protection system.
MR. PAPPAS: And is there any other special protection

systems, Nanticoke, Lennox? Any other generating facility,
large generating facility, in Ontario that has special protection units?
MR. SABISTON: Hydro One owns approximately 40 special protection systems of various sizes and shapes and magnitudes that involve either load facilities, transmission facilities and, in some instances, generation facilities.
MR. PAPPAS: So would it be fair to say that the magnitude of the Bruce special protection system is far greater than the rest of the existing special protection systems in the province?
MR. SABISTON: Yes, that would be a fair statement.

MR. PAPPAS: You stated that there is one for Darlington, but it is very small?
MR. NETTLETON: Madam Chair, I am sorry, I must interrupt. We are here to talk about Exhibit K12.4 and the documents that were circulated, Exhibits K10.3, 4 and 5. I am not sure how my friend can relate those questions to those specific exhibits.
If I am missing something, please -- I am wondering if my friend could help. I am not seeing how Darlington special protection systems relate to the information that was filed late on May 21st.
MS. NOWINA: Mr. Pappas, I thought I made it clear what we're talking about here is the new material, because you have already had an opportunity to cross-examine. So this is just on the new material.

MR. PAPPAS: Yes, ma'am. My direction here is simply that we have to address the fact of a large and complicated special protection system. We have to address the fact of whether or not this line is necessary to accommodate these things.
I just merely want to point out that not only in North America and on the NPCC itself, even in our province there is only one complicated special protection system, which is what this is all about, is this special protection system.

[SUBMISSIONS BY MR. NETTLETON]

Either the application that Hydro One has filed, based upon the forecast that is presented to you, is accepted and the application is approved, or if the generation forecast is found to be weak, frail, unreasonable, based upon irresponsible design criteria, then there is significant

17 doubt as to whether or not this Board can approve the
18 application as filed.

Technical Conference Monday, October 15, 2007

[MR. FALVO:]

11

14 NPCC takes a design-based approach to ensuring that
15 the power system is designed and operated reliably. Their
16 view of reliability is such that a loss of a major portion
17 of the system or unintentional separation of a major
18 portion of the system will not result for many design
19 contingencies. NPCC's technique is to assess and assure
20 that the system is reliable and withstands some
21 representative contingencies. So in the NPCC criteria,
22 there is a specific list of contingencies that must be
23 assessed and must be demonstrated as being reliable.
24 So when we analysed those contingencies, we're looking
25 for the potential for widespread, cascading outages, and
26 that is by looking at the potential for overloads, the
27 potential for instability or for voltages that are outside
28 acceptable bounds.

Again, what exactly are these “many design contingencies”? The very name implies that these are contingencies that arise from design. The obvious implication that arises from this is that these are contingencies based on poor design.

13

8 The existing transmission must exhibit acceptable
9 performance following contingencies and under that varying
10 mode of operation that I showed in the earlier slide. To
11 ensure that the system will withstand the design
12 contingencies, in some cases the transmission capability or
13 the power flowing over it must be restricted.
14 In the case of the Bruce, the worst or most limiting
15 contingency is the failure of that existing Bruce-to-Milton
16 line.

Document A-7
NPCC Glossary of Terms
Adopted by the Members of the Northeast Power Coordinating Council on July 17, 2007 based on recommendation by the Reliability Coordinating Committee

Basic Minimum Power System — Consists of one or more generating stations, transmission lines, and substations operating in the form of an **island**. Such a system can be restarted independently and later **synchronized** to other **islands** or the main grid. The transmission **elements** included in the basic minimum power system connect the units which have **blackstart capability** to those units without **blackstart capability** which have been designated in the restoration plan to be restarted in the first stages of the restoration process. Also included are selected tie lines and corresponding substations, which are considered essential to the formation of a larger power system. The intent is to focus on the ability to create smaller electrical systems or islands, which can be expanded and synchronized to other such islands and the main grid.

Blackstart Capability — The ability of a generating unit or station to go from a shutdown condition to an operating condition and start delivering **power** without assistance from the electric system.

3

Special Protection System (SPS) – A protection system designed to detect abnormal system conditions, and take corrective action other than the isolation of faulted elements. Such action may include changes in load, generation, or system configuration to maintain system stability, acceptable voltages or power flows. Automatic underfrequency load shedding as defined in the *Emergency Operation Criteria* A-3, is not considered an SPS. Conventionally switched, locally controlled shunt devices are not SPSs.

21

Static Var Compensator (SVC) — A combination of controlled shunt reactors and switched capacitor banks, used to affect the reactive power flow of the system or to regulate the system voltage.

SWO TRANSMISSION LINES & The "Hidden 946 MW of Transmission Capacity

First, I will deal with the fact that there is a "hidden" 946 MW transmission capacity not accounted for by HONI's stated needs for more transmission, but is easily discovered upon reviewing Exhibit C Tab 4 Schedule 12 Page 4 of 5
Please review this excerpt and the actual evidence from HONI.

Line	Firm Capacity (MW)	Capability (MW) **	Avg Loading (2007) (MW)	Max Loading (2007) (MW)
		Total of both circuits		
Bruce x Milton - B561M	2442	2040	2051	1655 (B561M)
Bruce x Milton/ Claireville - B560V	2442			1525 (B560V)
Bruce x Longwood - B562L	2442	2038	1103	995 (B562L)
Bruce x Longwood - B563L	2442			1020 (B563L)

While these two sets of circuits have all the same ratings, the Bruce to Longwood circuits appear to have had under-utilized Avg. loading capacity for 2007.

1) **Capability (MW) 2040 MW – 2038 MW = 2 MW (to be fair)**
2) **Avg. Loading (MW) 2051 MW – 2 MW = 2049 MW**
3) **BxL discrepancy 2049 MW – 1103 MW = 946 MW**

There is also a large discrepancy between their Max. Loading

capacities.

Now, a cynic might suggest that this is no more than a sly accounting trick to make the Bruce to Milton circuits appear to be labouring beneath a greater load than they should as an argument for supporting them with yet another, adjacent transmission build.

However, it is possible that there were some relevant difficulties imposing upon the grid that, up until now, had to be considered acceptable. However, if these difficulties arise from transmission congestion and the BSPS and can be alleviated by the appropriate alternatives, then that 946 MW would be accessible.

It appears that we have locked in transmission as well as locked in generation. Reasonably, they should be integrated for our benefit.

Without an acceptable explanation, it appears that HONI already has 946 MW of transmission capacity that can be deducted from their estimated transmission capacity requirements.

Certainly, if this is the case, then this further supports the argument for reconductoring and/or conventional series capacitors and/or FACTS.

This is further bolstered by the fact that the applicant did not consider the Portland GS in the GTA in their estimations. This lowers the outside generation and transmission requirements for the GTA. Already capable of 350 MW, when the high performance heat capture additions are completed it will be capable of 500 MW. 946 MW + 500 MW = 1446 MW. This is another factor that puts the necessity of refurbishment of Bruce B in doubt and certainly supports the greater likelihood that if more nuclear is considered as required it will be from a refurbishment at Pickering B which will not impede the retirement of Nanticoke, unlike additions at the Bruce.

Consider the following treatment.

I am not attempting to play the role of an expert here. The following only require simple mathematics and a calculator,

certainly for one calculation. [Here, one can access the Scientific calculator by clicking on the calculator "view" button on the Windows calculator accessory. For this one calculation you need the "*x* ^ *y*" button. This is *x* to the *y* power. This is required for what is a simple amortization formula.] The arguments are straightforward as well.

	Existing Lines Total	With new line	Only BxM and BxL
1.) Capability MW [total of both circuits]	5474	7514	4078
2.) Avg. Loading MW 2007	4668		3154
3.) Max. Loading MW 2007	6796		5195

Existing / BxM&BxL **BxM&BxL as % of Total**

1.) 5474/4078 = 1.34232 (134.232 %) 1/x = 0.74498 (74.498 %)
2.) 4668/3154 = 1.48 (148 %) 1/x = 0.67568 (67.568 %)
3.) 6796/5195 = 1.3082 (130.82 %) 1/x = 0.76441 (76.441 %)

From this we note that the Bruce to Milton and Bruce to London circuits constitute 74.5 % of the transmission capability of all the circuits.
Yet the Bruce to Milton and Bruce to London circuits only constitute 67.6 % of the Avg. loading for 2007.
However they did provide 76.5 % of the Max. loading for 2007.

Note: Series compensation provides 1.4 to 2 X the Pre-existing transmission capacity of a line, dependant on the degree of compensation, i.e. from 30 % to 70 % compensation. This cannot be argued against by the applicant. Their own evidence supports this. Consider the following, which is a footnote from the same evidence exhibit and table cited previously.

" ** Capability means the power that can be transmitted along the line without requiring additional voltage support from other sources. This number is also known as the Surge Impedance Loading (SIL). The SIL can be increased by adding shunt or series compensation. A shunt capacitor bank is an example of shunt compensation.
Although it is possible to reliability transmit power along the line in excess of the SIL, the voltage performance suffers. For a transmission path of about the length of the circuits in the Bruce area, exceeding SIL by more than 50% is not realistic unless a large amount of compensation is provided."

An increase of 50 % = 1.5 x the pre-existing capability.
I will stick with the, lesser, 1.4 multiplier for reasons of argument.

CAPACITY & LOADING with SCAP @ 1.4 X

	Existing Lines Total	With new line	Only BxM and BxL
Capability MW [total of both circuits]	7663.6	10 519.6	5709.2
Avg. Loading MW 2007	6535.2		4415.6

Max. Loading MW 2007	**9473.8**	**7273**

CAPACITY & LOADING @ 1.4 X with SCAP OF BxM and BxL and others without SCAP

	BxM and BxL WITH SCAP X1.4	Others Without SCAP	TOTAL
Capability MW [total of both circuits]	**7663.6**	**1396**	**9059.6**
Avg. Loading MW @1.4 x 2007 demand *	**6535.2**	**1514**	**8049.2**
Max. Loading MW 2007	**9473.8**	**1601**	**11074.8**

*** Please note: I arbitrarily chose 1.4 as the variable for a future Avg. loading in terms of a future demand and to be coincidental with the increase in transmission capacity through the enhancement. Obviously, the AVG. Loading is solely dependant on demand.**
However, HONI and the OPA actually predict annual increases of demand @ 1%/annum.
[The arbitrary 1.4 x actually takes us to 2041 and not the 2036 date that I use below to be in line with the limit of the OPA's predictions.]

Therefore if you apply the following formula, you can predict demand at some future time.

$$(1.01)^{N} \times \text{demand} = \text{demand after N years from the base year.}$$

Where N and the exponent N are the number of years from the base date and the demand, before the equal sign, is the demand from the base date.
For example:
If the absolute extreme weather peak demand for 2007 was 27 500 MW, and you wished to extrapolate for 2036, then proceed as follows.

(1.01 to the 29th power)] x 27 500 = *x*

$$(1.01)^{29} = 1.334502$$

and
27 500 MW x 1.334502 = 36698.85 MW , which would be the predicted absolute extreme peak demand for 2036. Daily peaks and average demand would, of course, be much less. One should also remember that it is also more than possible that our annual rate of increase may actually become less than the 1% predictor value.

Thus if 36699 MW is the worst case scenario for 2036, then this requires the addition of a maximum of 9199 MW by 2036.

This would require an average of approximately 317.21 MW of generation to be brought on line each year from now to 2036. Certainly, both wind power and gas burning generation, proximal to demand, should be the major initiatives, here. Also, the latter would decrease our transmission capacity needs as proximal generation primarily services distribution without a transmission intermediary.

Again, however, there is no actual support for the 1% increase rate to continue, for any number of good reasons. The conditions

of the 1980s and 1990s were probably quite different from those now and to come. One of those conditions is conservation which is now more seriously regarded than earlier.

One serious matter of conservation regards transmission line losses. For Ontario, losses as high as 13% have been stated. However, 9% is reasonable for calculations, for now.

Consider the line losses on the 27 500 MW extreme weather peak demand.

9% of 27500 MW = .09 x 27 500 MW = 2475 MW

2475/3 = 825 MW

9 % is the equivalent of 3 Bruce reactors running at nameplate 24/7.

Series Capacitors and FACTS devices diminish heat losses on transmission lines. They increase the transmission capacity by enhancing the transmission efficiency. Less power to heat loss, more power to the customer, in more than one way.

HTLS conductors, available for over 30 years, greatly diminish transmission congestion because of their far greater heat tolerance than the ACSR conductors that Ontario's various electrical agencies, over the years, have persisted in using despite the many improvements over the last 100 years since their introduction. ACSS, ACSS/TW and the more recent ACCR and ACCC conductors all operate without jeopardy at temperatures from 200^{o} C to 245 ^{o} C and some will run as high as 345^{o} C without permanent damage. The ACSR conductor is recommended to run at no higher than 75^{o} C. on a continual basis. Over 93^{o} C to 100^{o} C, depending on sources, ACSR begins to anneal and permanently deforms and loses strength. At the emergency temperature ratings listed in HONI's table, the annealing and permanent deformation and loss of strength progress more rapidly. The more current that you attempt to

transmit the hotter the conductors become. Obviously these old ACSR conductors have serious design limitations and are a major cause of our transmission capacity difficulties. In fact, I submit that it is these ACSR conductors and their inherent thermal limitations that not only limit our transmission capacity but are the primary "design contingency" responsible for the complexity of the BSPS, SPS system arming and the over-reliance on generation rejection.

Consider the effect of a program to upgrade our provincial transmission lines with reconductoring and/or conventional series capacitors and/or FACTS devices over that same time period.

FACTS/SCAPS can enhance transmission capacity by 1.4 to 2 x the pre-existing transmission capacity of the line.
Reconductoring can enhance transmission capacity 1.5 to 2 x with long proven HTLS conductors, 2 to 3x with the more recent ACCR [3M] and expectations of far more, in the relatively near future, with new conductor technology presently under investigation

However if we set a low expectation of 2 x the capacity from a combination of enhancements we can make a reasonable prediction of the effect.
Presently we have a total of approximately 31 000 MW of generating capacity in Ontario.
Presumably, we have at least the same amount of transmission capacity, since we could still supply the most extreme peak demand of 27 500 MW that was reached in 2007.

Let us set a goal of the enhancement of 10 000 MW of the existing transmission capacity by 2036.
10,000 MW x 2 = 20 000 MW
30 000 MW – 10 000 MW = 20 000 MW
20 000 MW + 20 000 MW = 40 000 MW

This is a gain of 10 000 MW capacity by 2036 without one new transmission build. Further, consider the previous treatment where we considered the enhancement of the 4078 MW of BxM & BxL Capability @ 1.4 times for an upgrade to 5709.2 MW of transmission capability. This gives us 1631.2 MW increased capability, a good start towards the additional 10 000 MW. [If, instead, if we make this calculation @ 2 times, to be in line with this treatment, then 4078 MW x 2 = 8156 MW for an increase of 4078 MW. Now we need only an additional 10 000 – 4078 = 5922 MW by 2036. The average over 29 years would now be only about 204 MW per year.]

This partial grid enhancement would increase the efficiency of the entire transmission grid by 33 %, that is 1.333 x the pre-existing capacity.

Transmission losses / efficiency = reduced transmission losses.

2475 MW / 1.333333 = 1856.25 MW

2475 MW – 1856.25 MW = 618.75 MW delivered to the consumers instead of lost as heat from the transmission lines. This, in itself, is the equivalent of one of our smaller nuclear units.
It can been seen from the above that enhancing transmission capacity in this way not only diminishes the need for new transmission builds but it also diminishes the need for new generation.
The savings here, and the time span involved would also allow the opportunity for the installation of far more wind power and the decommissioning of aged nuclear plants over time.
Finally the enhancement of the BxM and BxL lines, now, will give this province the time necessary to make more appropriate considerations regarding our energy future rather than having to accept rash judgments and ill considered projects that may limit and even obviate better choices.

LATE BREAKING EVIDENCE OF EXTREME IMPORTANCE RELATED TO WIND GENERATION LOCATING IN ONTARIO

Company blown away by Ontario German firm that makes turbines sees province as central hub to supply windpower projects

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TYLER HAMILTON
ENERGY REPORTER

A German maker of offshore wind turbines that sees huge potential for wind development on the Great Lakes has targeted southern Ontario as the location for its first North American manufacturing plant, an initiative that would inject hundreds of millions into the province's struggling economy.
Multibrid GmbH signalled at a press event in Toronto yesterday that it's ready to enter discussions with the provincial and federal governments about setting up shop in Ontario.
"Ontario is well positioned," said Multibrid's Canadian director, Jean-François Beland.
He said there are 22 offshore wind projects proposed in North America, many of them in the Great Lakes region, and Ontario has the highways, railways, waterways, steel-making capacity and skilled workforce required to be a manufacturing hub for those projects. "The supply chain is already there," Beland added.
***Donna Cansfield, minister of natural resources, said the lifting earlier this year of a moratorium on offshore wind development signalled the province's commitment to such projects*. The government, she added, is prepared to sit down and have discussions with Multibrid.**
"We are open for business on offshore wind," Cansfield said in an

interview. "Without a doubt, I would be very supportive of the government looking at how we could establish the manufacturing of these turbines here in Ontario."

A decision by Multibrid to lay roots in Ontario would be welcome relief to a province that has been hammered by the loss of manufacturing jobs, particularly in the automotive and forestry sectors.

But industry proponents cautioned that landing such a plant is no sure thing. They said it's now up to Queen's Park to seize the opportunity or watch thousands of potential green-collar jobs go to Michigan, New York state, or some other neighbouring jurisdiction.

"The jobs are there and the opportunity is there, but if we don't move on this it will go elsewhere," said John Kourtoff, president and chief executive of Trillium Power Wind Corp., which has plans to build a massive $2.5 billion wind farm in Lake Ontario, about 15 kilometres offshore from Prince Edward County.

Kourtoff, with Multibrid's Beland by his side, announced yesterday the creation of a wind-turbine buying consortium called Tai Wind that is committed to placing orders with a manufacturer that chooses to locate in Ontario. Members so far include Trillium and Fishermen's Energy of New Jersey, together representing potential orders for more than 300 offshore wind turbines. *Six other offshore developers have expressed interest in joining.* "Ontario is perfectly placed to supply North America and even the world with offshore turbines, components, barges and cranes needed to harness the resource wherever it may be," said Kourtoff, who after two years of negotiations with Multibrid convinced it to give Ontario a serious look.

"That's the objective of Tai Wind. We want to build a solid economic foundation to make Ontario a world leader in renewable energy manufacturing and innovation." Hundreds of megawatts of onshore wind farms have been built around Ontario, but job creation has been limited because the turbines are manufactured from plants in Europe or the United States.

Observers say Queen's Park has focused on green energy development but not on building an industry around it.

"It's very important that Ontario and the federal government create the conditions for these industries to flourish, and at the moment those conditions are not in place," said José Etcheverry from the David Suzuki Foundation. Buzz Hargrove, president of the Canadian Auto Workers, whose members have suffered from a series of automotive plant closures, fully backs the Tai Wind initiative. He sent a union representative to yesterday's announcement to express his support. Offshore wind is gaining momentum globally. Such projects require special engineering and underwater transmission, making them more expensive to build than onshore projects. But this added cost is largely offset by the stronger, more reliable and energy-packed winds blowing offshore.

In North America there are numerous ocean-based offshore projects. But the Great Lakes represent a unique opportunity – they have strong winds, but unlike ocean projects, the lakebeds are shallower and the water is less turbulent, making for easier construction. Helimax Energy Inc., in a report recently prepared for the Ontario Power Authority, estimated there are 64 offshore wind sites on the Ontario side of the Great Lakes representing *35,000 megawatts* – enough to power all businesses, homes and industry in the province when the wind blows. If developed, this amount of power would be "equivalent to 10 Niagara Falls," said Kourtoff. Trillium aims to be first to develop on the Great Lakes. Cansfield said the Trillium project needs serious consideration. "The location is perfect, the timing is perfect, and it fits our renewable agenda," she said, adding it's a matter of working with the power authority to develop a plan.