



The Joint Board
THE CONSOLIDATED
HEARINGS ACT, 1981

REASONS FOR DECISION

ONTARIO HYDRO -
EASTERN ONTARIO TRANSMISSION SYSTEM
EXPANSION

PLAN STAGE

Before: D.S. Colbourne
B.E. Smith
D.H. McRobb

August 6, 1982

JOINT BOARD

THE CONSOLIDATED HEARINGS ACT, 1981

(S.O. 1981, c. 20)

IN THE MATTER OF Sections 2 and 3 of The Consolidated Hearings Act, 1981,

- and -

IN THE MATTER OF Section 12(2) and (3) of The Environmental Assessment Act (R.S.O. 1980, c. 140),

- and -

IN THE MATTER OF Sections 13, 14, 15, 17, 29, 39, 40 and 49 of The Planning Act (R.S.O. 1980, c. 379)

- and -

IN THE MATTER OF Sections 6, 7, and 8 of The Expropriations Act (R.S.O. 1980, c. 148),

- and -

IN THE MATTER OF an undertaking of Ontario Hydro consisting of the planning of, selection of locations for, acquisition of property rights for, and the design, construction, operation and maintenance of additional bulk electricity system facilities in Eastern Ontario consisting of switching and transformer stations, communications and control facilities, transmission lines and related facilities

C O U N S E L:

B. B. Campbell and G. F. Willcocks))	for Ontario Hydro
D. Crocker and and J. Tidball))	for the Minister of the Environment
S. Shrybman and Virginia Adamson))	for the Hydro Consumers Association
J. D. Cameron, Q.C. S. Schwisberg and E. A. Johnston)))	for the Regional Municipality of Ottawa Carleton
J. M. Johnson, Q.C.)	for the Ministry of Energy
J. Wiesenfeld and B. Zarnett))	for the Ontario Municipal Electric Association

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PART I

REASONS FOR PLAN STAGE DECISION

DELIVERED BY THE JOINT BOARD

A. OVERVIEW

Ontario Hydro (Hydro) is a corporation established under the provisions of the Power Corporation Act whose general purposes are set out in Section 56 of that Act and read as follows:-

"The purposes and business of the Corporation include the generation, transmission, distribution, supply, sale and use of power and, except with respect to the exercise of powers requiring the prior authority of the Lieutenant Governor in Council under this Act, the Corporation has power and authority to do all such things as in its opinion are necessary, usual or incidental to the furtherance of such purposes and to the carrying on of its business."

Hydro applied for approval to proceed with the subject undertaking pursuant to the provisions of the Consolidated Hearings Act, 1981. The undertaking is described as an electrical transmission system expansion program for Eastern Ontario. The word program is used specifically, and the program comprises the following:-

"1. A bulk power transmission system plan, including additional transmission line and station facilities, required:-

(a) to supply the forecast electrical load in Eastern Ontario until the year 2000; and

- (b) to provide for additional interconnection capacity with Hydro Quebec for a total interconnection capacity of about 2000 mw.

2. An approximate geographic area, called a route stage study area, within which the precise location of the additional facilities would be determined during the route stage.

3. A general outline of future activities leading to an application by Ontario Hydro for route stage approval under the Environmental Assessment Act." (This undertaking is proceeding under the Consolidated Hearings Act).

This is the first undertaking of a major nature by Hydro under the provisions of the Consolidated Hearings Act, which deals with a number of scheduled Acts. The undertaking requires a number of steps in the planning process before the actual construction of a transmission line in a specific location takes place on any lands.

Following the preliminary hearing, the joint board accepted Hydro's argument to the effect that all matters, except those dealing with the plan stage program, should be deferred. That would leave the final choice of the exact location of a transmission line to a subsequent hearing. The argument in support of deferral was that it was a difficult and impractical task to prepare a detailed analysis and report for all possible alternative transmission system plans for bulk transmission in Eastern Ontario to carry out Hydro's objectives, in one stage. The proposal to stage the program would provide for choices amongst options at various stages, the first being the selection of a study area defined by Hydro within which, if the selected system were placed, would

provide the best opportunity for minimizing impacts on the natural environment. Those opposed to deferral were concerned that the progressive decision making program proposed would circumscribe or preclude any opportunity to take advantage of better alternatives, which may be discovered at the later hearing or, indeed, that a selection based on the general approach would preclude altering decisions made on more detailed evidence provided at a later date.

The joint board issued an order dated November 25, 1981, confirmed by order dated January 25, 1982 as follows:-

"The hearings and decisions by this joint board on those aspects of the undertaking herein, other than hearings and decisions with respect to an Eastern Ontario electrical transmission system expansion program, be and are hereby deferred for hearings before this joint board commencing not less than 30 days following receipt by Ontario Hydro of notice of completion of the government review of the route stage environmental assessment to be made and filed by Ontario Hydro with the Minister of the Environment identifying the preferred locations for the transmission line facilities which would be required to implement any such program which may be approved pursuant to the decision of the joint board."

The joint board continued in that order to indicate:-

"This deferral order is made by the joint board without constraint to the decision to be made by it in respect of the Eastern Ontario electrical transmission system expansion program or without constraint to the decision or decisions to be made by it in respect of the matter or matters deferred herein."

The latter condition, in the opinion of the joint board, adequately addresses the concerns outlined as to precluding opportunities which may be

discovered in later evidence. The joint board, however, reaches a decision at each phase of the hearing based on the evidence then introduced and, at later phases of the hearing, the joint board may find it necessary to modify, alter or revoke conclusions reached at earlier phases.

The plan stage of the hearing is what is now considered by the joint board. Approval is asked for an electrical transmission system plan including transformer and switching facilities, as well as the route stage study area within which the transmission line and appurtenances are to be constructed. Of the five system plans presented and the four route stage study areas for Eastern Ontario, Ontario Hydro prefers plan M3. Common to all of the plans is a proposal for an interconnection which runs between the Quebec border and the St. Lawrence transmission station including, as part of the interconnection proposal, a study area with the type of facility as yet undetermined. The proponent envisions either 500 kv lines, or what has been referred to as a High Voltage Direct Current line as the choices for the facility.

There is some considerable history which applies to the application. Order In Council 2005B/75, as amended by 1999/78, dated July, 1975, established the Royal Commission on Electric Power Planning (R.C.E.P.P.) and called for certain projects bearing on Ontario Hydro to be reported on a priority basis. Order In Council 3489/77 directed R.C.E.P.P. to provide an interim report on issues relating to nuclear power. Order In Council 2065/78 further amended the Orders In Council establishing R.C.E.P.P. with respect to its terms of reference (paragraph 4) and required an interim report on or before October 21, 1979. Order In Council 2000/78 relates to the implementation of Exemption Order OH18 with respect to the "undertakings" - the

matters and decisions arising from the R.C.E.P.P. report. Order In Council 2417/79 dated August 29, 1979, recommended that Hydro should proceed as soon as possible with the preparation of one or more environmental assessments to provide proposals for additional bulk power transmission facilities and, in terms of some views of the requirements of the Environmental Assessment Act, such assessment or assessments should not consider the "do nothing" or "null" alternative.

R.C.E.P.P.'s transmittal of the interim report on the need for additional bulk power facilities in Eastern Ontario (Exhibit 10) was dated July 13, 1979. The final report of R.C.E.P.P. (Volume 1 - Exhibit 11) was transmitted to the Government under date of February 29, 1980. The response of the Government to the final report of R.C.E.P.P. (the decisions by Government with respect to the recommendations of the report) is dated May, 1981, (Exhibit 12).

For a number of years, including all those aforementioned, Hydro was conducting a study of generation and transmission for Eastern Ontario, which is described in the public relations handout "Status Report" dated December, 1977, filed as Exhibit 34. The generation aspects of that study were abandoned in the year 1979, but studies continued for bulk power transmission facilities for Eastern Ontario, which studies ultimately led to the environmental assessment document (Exhibit 4) dated July, 1980, submitted to the Minister of the Environment after brief pre-submission consultations. Such consultations were held with the Approvals Branch of the Ministry of the Environment on February 1, 1980, to discuss alternate layouts. A further meeting was held on May 23, 1980, at which time concerns were raised as to

the constraint methodology employed by Hydro. A final meeting was held following the filing of a draft of the environmental assessment on June 2, 1980. The environmental assessment was submitted to the Minister by letter of transmittal dated July 15, 1980. A further document entitled Quebec-Ontario Interconnection Study (Exhibit 18) dated July, 1980, a support document for the interconnection, developed subsequent and pursuant to the letters filed as Exhibit 30, was filed with the Minister of the Environment on October 21, 1980. The government review pursuant to the provisions of the Environmental Assessment Act was released to the public in April, 1981, (Exhibit 52).

At the time of submission of the environmental assessment document Ontario Hydro requested that the environmental assessment and the undertaking be the subject of a hearing before the Environmental Assessment Board. Subsequently the matter came before the joint board pursuant to the Consolidated Hearings Act, which legislation is designed to streamline the hearing process by providing for the establishment of a joint board to determine, in a consolidated hearing, all of the matters set out in the Act, in those situations where formerly more than one hearing was required before more than one tribunal under all of the listed Acts.

A preliminary hearing commenced November 10, 1981, at which time submissions were made with respect to the listing of parties and participants, the filing of witness statements, any productions required, the matter of interrogatories to be prepared by any party and the provision for exchange of such, and the submissions leading to the decision previously mentioned with respect to deferral. The hearing of the plan stage commenced January 5, 1982, in the Regional Municipality of Ottawa-Carleton, the location agreed

upon by all parties and participants at the preliminary hearing and continued to, and including January 21, was adjourned at that time until May 4, 1982, until its conclusion on June 17, 1982.

The general purpose of the undertaking set out on page 7 of Exhibit 4 is -

"to provide a reliable supply of electric power and energy to the people of Ontario at the lowest feasible cost, consistent with employee and public safety, taking into account the social, environmental and economic aspirations of the people of Ontario."

That was described by Mr. J.M. Johnson of the Ministry of Energy as a motherhood statement but, it was submitted, it flowed directly from the business of Hydro as set out in the Power Corporation Act. As the general purpose applies to Eastern Ontario, two purposes specific to the area are:-

1. to provide for the supply of electric power and energy to meet the load growth now forecast to occur in Eastern Ontario to the year 2000, and
2. to enable Ontario Hydro to deliver to and receive from an interconnection with Hydro-Quebec about 2000 mw of electric power for the mutual benefit of Ontario and Quebec.

Hydro submitted as the transmission system expansion program (the undertaking) five bulk power transmission system plans and associated route stage study areas, all of which would fulfill the purpose of the undertaking. The alternative method selected as the undertaking by Ontario Hydro is plan

M3. Hydro has made an evaluation of each of the plans covering the potential environmental effects, including natural environment costs and technical considerations.

Beyond the technical and economic considerations involving Hydro's assessment of technical requirements and the estimated cost of the work, the main emphasis of Hydro's methodology as to the effect on the natural environment, was to avoid sensitive areas. The desire was to determine areas which would be the least sensitive by the use of constraint maps prepared for the study area which graphically indicated the nature of the sensitivity in 2 km grid cells. The details of the methodology and its effects on the natural environment are set out in Part 2, Appendix A.

With respect to the interconnection, there is one study area common to all of the plans proposed, with the system plan or the facility yet to be determined. As the impact of that facility is through the same area for all plans, that is, the link between the Quebec border and St. Lawrence TS, there is obviously no evaluation of the natural environment. At this plan stage of the hearings the emphasis is more general, without the detail of actual location, and the study was therefore of a regional or district level.

As agreed by counsel for the parties, the joint board determines, on the basis not only of the environmental assessment document, Exhibit 4, but also on the evidence, submissions and documents presented at the hearing, all of which forms the assessment. Then the determination is made, whether, having regard for Section 12(2) of the Environmental Assessment Act, that assessment is acceptable or whether it should be amended and accepted. Then

the subsequent matter is whether or not approval to proceed with the undertaking should or should not be given and if such approval, is given, should the same be subject to terms and conditions and, if so, what those terms and conditions should be.

The Minister of the Environment was represented by counsel to ensure, as stated, that the process set out in the Act, had been complied with, to the desired end that whatever effects might occur, they will be minimal. He suggested the participation of the Minister was to test the assessment. In final argument counsel for the Minister made no recommendation to the joint board in respect of the test so performed.

However, the evidence called by counsel for the Minister with respect to "testing" the assessment was through Mr. David Young, Senior Environmental Planner with the Approvals Branch, who described the branch's interpretation of the requirements of an environmental assessment pursuant to Section 5(3) of the Act, as is used in their work in preparing reviews. Their interpretation has been set out in the form of General Guidelines for the Preparation of Environmental Assessment (Exhibit 55). The evidence of Mr. D. Birnbaum, another Senior Environmental Planner of the Approvals Branch, who acted as the co-ordinator of the review required pursuant to Section 7(1) of the Environmental Assessment Act, provided the joint board with his opinion as to the adequacy of the assessment undertaken by Hydro in light of the Approvals Branch's interpretation of the Act. Mr. Birnbaum's recommendations were as follows:-

That the interconnection aspect of the undertaking should be withdrawn by the proponent for further studies since, in his opinion, the assessment

did not satisfactorily address alternatives to the undertaking in that the undertaking (interconnect) was a means to an end, and not an end in itself in terms of the description of the purpose. Thereby there was no possibility of investigating a real alternative to an interconnect, although alternative locations of interconnecting were considered in the assessment.

As to the supply to the Ottawa area aspect of the undertaking, Mr. Birnbaum was of the opinion that the evaluation of the full scope of the environment had not been adequately addressed with respect to alternatives to, since some were rejected only for technical and financial reasons. Further, in respect of alternatives to, there was no consideration of partial solutions. Subsequent to Mr. Birnbaum's preparation of the review document and his "questions" with respect to the methodology, the Ministry of the Environment retained Dr. Victor to give opinion evidence on the methodology used by Hydro to assess the natural environmental impacts.

Dr. Victor's opinion ranged over the methodology. Perhaps the most significant of the criticisms, developed and presented in his report, Exhibit 54, related to the weighting of objectives or the lack of it in assessing impact.

The recommendation of the Ministry of Energy through counsel in argument was that the environmental assessment be accepted, and that approval be given to the plan stage study area and system plan selected by the proponent, M3, but that, as a condition of approval, the aspect of need be further considered in the route stage study assessment. This arose from the evidence and the review concerns of the Ministry of Energy in respect of the second 500 kv line required in the late 1990's in plan M3, between Cataraqui

Ministry
Energy
Need for 2nd
line not
proven

and Ottawa. It was the opinion of the witnesses called on behalf of the Ministry that the evidence vis-a-vis need (load forecast) presented might not justify the requirement of a second line in the system plan M3. It was argued by Mr. Johnson that, equally, the evidence did not support that it may not be required. This need should be considered again at the route stage. Concerns of the Ministry of Energy with respect to the interconnection with Hydro-Quebec led them to conclude that that aspect of the undertaking should be approved but the recommendation was that a cost benefit analysis be prepared prior to the actual commitment of funds for the interconnection.

*Cost benefit
reg'd. re intercon.*

The Ministry of Natural Resources, through the evidence of Mr. Hiscock, addressed the methodology, and suggested that since the differences in the assessment of the natural environment between plans M3 and M5 appear minimal, both plans should be carried forward to the route stage study. That similar view was shared by Dr. Lois Smith, an entomologist who appeared on her own behalf.

MNR

The major opposition to the application was carried by the Hydro Consumers Association whose membership is predominantly resident in the area of R.R.4 Perth, Ontario. That Association was represented by counsel. Some members were also parties to the proceedings. The Hydro Consumers Association as an entity presented considerable evidence with respect to the soft energy path approach as the solution to the requirements of short and long term need. They acknowledge that a need exists with respect to the Ottawa area. Through their expert witnesses that approach was described and it was submitted that the environmental assessment should not be accepted since that approach (the soft energy path approach) had not been properly investi-

*✓
No!*

gated and evaluated by Ontario Hydro. The burden of their evidence was to the end that the soft energy path approach was the most environmentally acceptable and therefore the alternative which should be accepted by this Board. The soft energy path approach is essentially a combination of technologies and techniques, to effect conservation, demand management, with a mix of alternatives to major transmission facilities, including a variety of small generation facilities. As to the interconnect portion of the undertaking, they supported Mr. Birnbaum's opinion and pressed the joint board to accept his evidence as the most appropriate.

The joint board convened at Perth, Ontario, on June 2, 1982, for the purpose of hearing members of the Hydro Consumers Association and other residents of that area. Those members of the Hydro Consumers Association who gave evidence on that occasion explained their views with respect to the alternatives that were available to Hydro, all the while describing their own particular geographic area and some, their own lack of need for hydro, and their views of environmental problems associated with transmission facilities. They would prefer not to have transmission lines affect their selected life style. Other residents also expressed similar environmental concerns about transmission facilities as were expressed by the members of the Hydro Consumers Association. The county agricultural representatives expressed concern over the preservation of agricultural lands. Local municipal and utility representatives expressed support for the facilities to maintain reliability for present residents and to ensure power supply for new industry.

Four municipal utilities within the Region of Ottawa-Carleton area each gave evidence through their general managers. In summary, their

evidence described the need for the undertaking, that is the transmission system to support supply to the Ottawa area. Each outlined the specific peak and energy factors of their facility, and reviewed the efforts each had made with respect to conservation promotion. The evidence in that respect described that conservation promotion has been and is a prominent feature, but despite this substantial effort, peak and energy demands had continued in each case to increase and were expected to continue.

The submissions of parties and participants is set out in the summary Part 2, Appendix A.

B. HEARING SCOPE:

Early in the proceedings on January 12, 1982, counsel for the Minister of the Environment supported the earlier comments of counsel for the Hydro Consumers Association, and questioned the method of the introduction of certain evidence by Hydro in support of their proposals. The occasion which gave rise to the above-noted concerns was the introduction of the conclusions of the Hydro load forecasters by Hydro's systems planners. Other than the fact that, in our opinion, it is reasonable in the sense of Hydro's planning to use the conclusions, it was the attempt at the introduction of the load forecast evidence as fact by other than load forecasters, which caused concern amongst other counsel.

At this juncture the Board accepted that the systems planners were capable of using the forecasts for system planning purposes, and since, despite

argument on this occasion, and their earlier intention not to introduce load forecasting evidence, Ontario Hydro did call such evidence through Mr. Larry Higgins and Mr. Gordon Paterson, all of this appeared to relegate this specific issue to nothing more than a quandary of order of evidence.

However, on January 13, 1982, argument on the scope of the hearing was addressed by counsel at the request of the Board in the context of the following documents:-

: Order In Council 2005 B/75 and Order In Council 2065/78, both of which established the terms of reference of the Royal Commission on Electric Power Planning. (Porter)

: Order In Council 2000/78, which approved exemption order 0H18 submitted by the Minister of the Environment. That latter document reads in part as follows:-

"I am of the opinion that it is in the public interest to order and do order that these undertakings be exempt from the application of the Act for the following reasons...."

Earlier in that exemption order the following description of undertakings is found:-

"and that government decisions will be made in respect of these matters to be reported on by the Royal Commission on Electric Power Planning (R.C.E.P.P.) pursuant to the Order In Council, following consideration of those reports (which matters and decisions are referred to herein as the undertakings);"

The following question was directed by the Board:-

"...but can we look at all of the other alternatives to the undertaking?"

The reply of Mr. Campbell on behalf of Hydro was,

"no, in my submission the exemption states what the proposals are before this Board and those proposals are stated as being additional bulk power transmission facilities."

Further, Mr. Campbell goes on to state:-

"Mr. Chairman, in my submission, the exemption order eliminates the requirement to look at alternative to except in the context to which those alternatives to affect the specific sizing, nature, and environmental aspects of the bulk power transmission facilities, but it is bulk power transmission facilities and no other type of facilities that are before the Board in this proceeding with respect to its ability in my submission to grant -- to deal with this matter."

Further in the transcript Mr. Campbell states -

"I say the only alternative before this Board by reason of the exemption order is bulk power transmission."

It was not submitted, nor argued, that the Orders In Council override the legislation under which this joint board is constituted or gains its authority. We accept that the exemption order as approved by Order In Council, limits the considerations of this Board in respect of the undertakings so described in the exemption order.

✓ The purpose of the exemption order is quite clear to us when, as one of the reasons it gives as the basis of the exemption order, simply stated is: don't duplicate the process; don't repeat everything that R.C.E.P.P. dealt with in light of their terms of reference - the exact reason for the enactment of the Consolidated Hearings Act, the elimination of duplication of the subject matter in a number of hearings previously required separately, before a number of Commissions or Boards pursuant to the scheduled Acts.

✓ We are of the opinion that this exemption order does not preclude full consideration of the specific facilities in any proposal put forth by Hydro since, in the initial instance, the Royal Commission on Electric Power Planning was precluded from considering the specific nature of additional bulk power facilities which may be required, and of their locational and environmental aspects as set out in the earlier Orders In Council, repeated again in Order In Council 2417/79. The exemption order itself states in its second reason that there will be appropriate opportunity for the public and other government ministries to present their views either to the Royal Commission on Electric Power Planning, or the Environmental Assessment Board, as appropriate - a clear recognition of the division of responsibilities.

✓ In our view the joint board is not limited to a consideration of only the relative environmental aspects as submitted in response to another question of this Board as follows:-

"Is it your submission that this Board is precluded from dismissing the application of Ontario Hydro to build any form of bulk transmission, bulk power transmission facilities on environmental grounds, notwithstanding that there is a need for Hydro to have such facilities, to carry out their responsibilities and their mandate?"

The reply of Mr. Campbell on behalf of Ontario Hydro was as follows:-

"Mr. Smith, the answer to your question from Ontario Hydro is that apart from the legal effect of the operative sections of the Order In Council, Ontario Hydro would not and will not ask for approval of the facilities from this Board unless this Board is satisfied that those facilities do not impose an undue burden on the environment, taking into account the purposes for which they are being constructed."

As earlier stated, the proceedings before the joint board continued with all the evidence originally contemplated by Ontario Hydro, indeed pursuing the wide range of all of the matters required under the provisions of the Environmental Assessment Act. Although it is quite apparent from the documents filed, the two reports of R.C.E.P.P. and the Government response and acceptance, Exhibits 10, 11, and 12, that the Royal Commission did hear a number of submissions covering a considerable variety of bulk power facilities for the area, the strongest conclusion we can arrive at in respect of the report and decisions is that additional generation facilities per se were not required either for the specific area or for the East System.

It appears to the Board in view of Order In Council 2417/79, subsequent to the exemption order, and the Order In Council approving the exemption order, that having regard to the recitals leading up to the recommendations of the Minister of Energy on that occasion, all recognize the wording "bulk power facilities", and only in one recital is there a specific mention of "almost certainly in the form of bulk power transmission". The following

paragraph does then go on further to indicate the recommendation of the Royal Commission in that respect that there should be the next step taken, that is:-

"the preparation of an environmental assessment for any undertaking to be proposed, which environmental assessment should include alternatives to the undertaking."

The recommendations of the government on that occasion through that Order In Council is that, indeed, the next phase should be commenced and that is the preparation and submission of one or more environmental assessments under the Environmental Assessment Act, 1975, for proposals to provide additional bulk power transmission facilities in Eastern Ontario. The recommendation of that Order In Council is also that the assessment prepared need not consider the null alternative. That is the only matter singled out for exclusion. Nothing else. The Board notes that the Order In Council does continue to indicate that the assessment should be expedited to facilitate the addition of needed bulk power transmission facilities commencing in the mid - 1980's.

We agree that one of the terms of reference of the Royal Commission on Electric Power Planning was to investigate the capability of the existing transmission system within Eastern Ontario, and the apparent conclusion was that the transmission system was inadequate. The matters and the government decisions on the recommendations of the Royal Commission on Electric Power Planning, the undertakings exempted, in our view, fall short of saying that having recognized the deficiency in the capability of transmission,

the only solution is transmission, so as to preclude a full and complete hearing of the undertaking under the provisions of the Environmental Assessment Act. ✓

With the exception of the Order In Council necessary to approve the exemption order, we view the Orders In Council as statements of government policy. We have set out our views with respect to government policy in the reasons for decision of this Board in the Southwestern Ontario application of Hydro, included in these reasons for decision, as Part 3, Appendix B. Simply stated, the position is that this tribunal may decide to be bound by the policy statement or conclude that other considerations have a greater influence on the determination of any particular issue. ✓

In this matter, we have considered and given weight to the recommendations of R.C.E.P.P. and the Government Response (Exhibits 10, 11 and 12). We have also had regard for the Orders In Council filed, and the conclusions and policy statements applicable to specific issues in this application, all of which are dealt with in greater particularity as they apply to specific aspects of the reasons.

While we agree that an exemption order may exclude certain aspects of an undertaking from the application of the provisions of the Environmental Assessment Act, the Board notes that this plan stage hearing (predominantly considering matters under the Environmental Assessment Act) is only a part of a total hearing which must consider the undertaking in terms of all of the various scheduled Acts. Care must be taken not to exclude or limit evidence necessary for the deliberations applicable to those other Acts.

C. ENVIRONMENTAL ASSESSMENT PROCESS

The joint board, similarly constituted in the Southwestern Ontario Hydro application, concluded on the environmental assessment process as set out in Part 3, Appendix B. As it was the subject of evidence and argument on that occasion, the evidence and argument directed to the process in the Eastern Ontario hearing covered much the same ground, and the conclusions reached by the joint board with respect to the process generally have not altered. Different emphasis was directed to different aspects of the application. The majority of evidence in Eastern Ontario was with respect to the adequacy of consideration of alternatives to both supply to Ottawa and the interconnect. Alternative methods of carrying out the undertaking are of course different. The five plans, proposed for detailed consideration bear the prefix M indicating they are designed to effect the medium scenario of the load growth forecast.

All five system plans rely mainly on the use of 500 kv lines, singly or in combination. Plans M1, M2 and M3 in the short distance, Merrivale to Hawthorne, use the combination of two 500 kv circuits and four 230 kv circuits in the existing right-of-way. Plan M5 is the only other system plan utilizing 230 kv, and that proposes two of each of those between Merrivale and St. Lawrence and Hawthorne and St. Lawrence. No challenge was taken to the choice as between system plans on technical grounds.

The plan stage study areas common to all five is that area between St. Lawrence and the Quebec border and the area to accommodate lines from Lennox to Cataraqui. Plans M4 and M5 have the same study area which

generally runs from Lennox to St. Lawrence, and then north to Ottawa to encompass the two rights-of-way from St. Lawrence to the two Ottawa area TS's. Plan M3 has two wings - the westerly joining Cataraqui to Ottawa and the easterly, Ottawa to St. Lawrence. Plan M1 study area is composed of the same M3 wings but with a bottom connection between Cataraqui to St. Lawrence. Plan M2 drops the most easterly wing of the above two, but expands into the middle area of the whole study area.

As earlier set out, the concerns as between study areas is as to the methodology used to determine the natural environmental impacts, together with the effect of not fully assessing the use of existing rights-of-way at this stage. Two participants suggested that both plan M3 and M5 should be sent forward to the route stage study. The study areas of those combined would cover all of the study areas of all of the plans.

The position of Hydro with respect to alternatives to and the scope of investigation was set out in argument as:-

"first, that a course of action which does not achieve the purposes of the undertaking is not an alternative within the meaning of Section 5(3)(b) and, therefore, does not require full environmental study pursuant to Sections 5(3)(c) and 5(3)(d); second, that only reasonable alternatives are required to be described in the environmental assessment and, third, the proponent's conclusion as to what constitutes reasonable alternatives is a rebuttable presumption in the proponent's favour".

Our general conclusions as to reasonable alternatives, and the scope of evaluation were set out in our earlier reasons Part 3, Appendix B.

> Since the joint board's ruling (subsequently incorporated in the reasons) with respect to what has been described as the "rebuttable presumption" made in Southwestern Ontario was directed in the argument of counsel for Hydro, and argued as to its appropriateness and application in this matter by counsel for the Hydro Consumers Association, some further elaboration is included. The proposition is, that while Ontario Hydro may have adopted the presumption that an alternative was an unreasonable one on preliminary investigation, once the alternative is raised in more detail and their presumption challenged, they are required to conduct more investigation and expand more fully on the evaluation in terms of the full scope of the environment. In discussing the determination as to what may be a reasonable alternative, the joint board, in its Southwestern Ontario reasons, set out in part as follows:-

"we do not consider this position to be in conflict with that of the Ministry, for while the proponent determines what level of detail is reasonable, it is not an unfettered discretion. It is subject to challenge by any interested person, and the proponent may be called upon to explain more fully the investigation of any alternative or conclusion reached. The pre-submission consultation is the time for discussions of this kind to take place, which then gives sufficient opportunity for the proponent to prepare a response or carry out additional investigation."

We go further in the same reasons to describe as follows:-

"Ontario Hydro may have adopted the presumption that this alternative is unreasonable by the very description of the alternative. Once being provided with more details of the alternative, and the presumption challenged, Hydro was required to conduct a more complete investigation where the full scope of the environment was examined."

and further:-

"Again, the test of reasonableness was applied to limit the level of detail required for the investigation of the full scope of this alternative."

That latter comment applies to the level of detail of evaluation required in rebuttal once the alternative has been raised by interested parties or participants. The joint board does not view simply the raising of an alternative by name as being sufficient to prompt the proponent to rebut in terms of the full scope of evaluation. The test of reasonableness also applies to the sufficiency of detail of the alternative proposed in the evidence adduced by parties or participants. The evidence so raised by parties or participants is open to a conclusion by the joint board that such is insufficient, and the proponent was correct in the original presumption that the alternative was not a reasonable one, and therefore not necessary either of original consideration or further rebuttal.

We do not see that as a shifting of onus from the proponent to other parties as was suggested by counsel for the Hydro Consumers Association. The submission made was that it was unreasonable to expect that parties be required to prove that the proponent had not adequately evaluated the undertaking or that an alternative proposed by a party should be adopted for reasons provided in the evidence solely by the parties. We agree, but suggest that there is a minimum level of substantiation required in an alternative suggested, to conclude that further consideration might be required by the proponent. While it is clear that the proponent prepares the environmental assessment document and thereby the sufficiency of that document initially, we do not see any onus or shifting of it in the hearing. The joint board considers all of the evidence of the proponent as well as that of other parties and participants, and it is all of that evidence and not the positions of the parties that leads to the decision to be made.

In respect of supply to Ottawa it was suggested by a number of witnesses called on behalf of the Hydro Consumers Association that certain renewable energy sources, conservation programs, load management techniques and demand analysis, and thereby different policy direction, were not adequately evaluated as alternatives to the proposal of transmission facilities either singly, in combination, or as a partial solution.

Once another alternative has been sufficiently raised or challenged as to adequacy of evaluation, as was the case by the Hydro Consumers Association panels, then the Board determines the adequacy of the assessment, based on all of the documents submitted, and the evidence of all parties and participants. We have concluded as follows.

Alternatives to the Undertaking - Eastern Ontario Supply

Ontario Hydro examined the alternatives to the undertaking in three categories - providing additional conventional generation, developing supplemental generation sources and purchasing power from neighbouring utilities. Investigation of additional hydraulic, nuclear and thermal conventional generation systems led Hydro to conclude that the potential capacity that could be considered cost effective was insufficient to meet the purpose of the undertaking, or was otherwise impractical. Supplemental generation sources such as solar, wind, municipal waste incineration, combustion turbines, industrial co-generation and district heating were likewise impractical, at least in terms of meeting the needs of Ontario Hydro during the first half of the planning period. Hydro rejected further consideration of power purchases

from neighbouring utilities on grounds relating to economics and reliability of supply.

The Hydro Consumers Association and some participants stressed the alternative of adopting a "soft energy path option" to meet future energy demand. This is a broad energy policy or strategy which encourages a transition from fossil fuel non-renewable sources to economically viable renewable sources. The soft energy path stresses energy conservation in many forms and involves a greater use of energy sources related to wood biomass, hydro, wind, district heating, and solar and photovoltaic cells. Proponents of the soft energy strategy argue that it is socially and environmentally more acceptable than the conventional hard energy policy followed by Ontario Hydro.

The joint board recognized the advantages and desirability of employing some form of soft energy strategy to meet the energy demands of the people of Ontario. It is, however, a strategy which requires the leadership and direction provided by government policy, probably at both the provincial and federal level. Furthermore, the effect of any soft energy path option introduced at this time would not be able to meet the short term needs for additional transmission facilities as described by Ontario Hydro, particularly as those facilities relate to the load supply problem identified in the Ottawa area. The subject undertaking does not close the door to adopting a soft energy path strategy since the proposed facilities are to be staged for construction over the next 20 years. This staging of facilities would allow sufficient flexibility to introduce a change in strategy as the planning period progresses.

In summary, therefore, we have concluded that sufficient information on the alternatives has been provided to us and none of the alternatives presented was so clearly superior for us to interfere in the choice which has been made by Hydro to plan for the construction of additional bulk transmission facilities.

Alternatives to the Undertaking - Interconnection

The summary of evidence with respect to the interconnection is set out in Part 2, Appendix A. No evidence was brought by parties or participants opposed, to challenge this part of the undertaking in the nature of suggesting alternative facilities to, but they state there was a lack of consideration of such alternatives to, by virtue of the limitation in the purpose of the words, "interconnect with Hydro-Quebec", that being the means to an end rather than an end in itself.

Another aspect was the challenge as to the substance of the economic advantages of the interconnection outlined in the evidence of Hydro. With respect to that aspect, it is clear that the economic benefits are difficult to quantify except based on history. The estimates, however, produced by Hydro suggest that such would not be immediate benefits. However, in view of the lengthy lead time required for planning such facilities requiring not only Provincial, but inter-Provincial agreement, it was necessary now to proceed to gain stage by stage approval for the facility. It is obvious that many further studies must be undertaken by both Hydro-Quebec and Hydro before the final facility is ultimately selected which will then lead to the determination of

where it should be placed on the ground for the route stage study part of the hearing.

The Ministry of Energy suggests that a cost benefit analysis be made later in the planning for the interconnection before the ultimate commitment is made to finance it.

As to the criticism of the narrowing of the description of the purpose thereby limiting full evaluation of all possible alternatives to the undertaking, that suggestion does not seem to the Board to be realistic. The specific purpose does outline in part, "as being for the mutual benefit of" and, as counsel for the Hydro Consumers Association indicated, it may have been more beneficial to outline in that description all of the advantages in detail. The Board accepts that the description indicating mutual benefits, supported by all of the detail in Exhibit 4, and all of the evidence, and all other documents, does appropriately address the requirements of the Act for the description of purpose. We accept that the description in its finality was developed as part of the whole iterative process.

definition of purpose

It is the evidence of Hydro, which we accept, that there is no single alternative to achieve the benefits of interconnection. They considered alternatives to the undertaking and not necessarily to the individual component. For example, generation facilities could be a partial alternative to the combined components of the undertaking but wouldn't provide all of the benefits of the proposed interconnection.

The joint board accepts that the only alternatives to the mutual benefit of both utilities would be an interconnect in this case, one significantly improved, and that all of the other aspects of the alternatives considered to the supply side of the undertaking, while possibly being partial alternatives to were not full alternatives to this part of the undertaking. Some considerable argument was made as to the joining and severing of the evidence with respect to both specific purposes. The joint board had no concerns in that respect and does not indeed separate the evidence in an adversarial fashion.

For purposes of the plan stage part of the hearing, since the specific facility type has not been determined, and no different area was proposed in any of the plans to develop relative environmental impacts, the level of evaluation is, in our opinion, adequate for this stage. Therefore, we conclude, with respect to the interconnection, that all aspects of the requirements of Section 5(3) of the Environmental Assessment Act have been adequately outlined to enable this joint board to accept the assessment on this part of the undertaking.

As we have concluded, as set out in the earlier reasons for decision on the Southwestern Ontario Hydro application, the "null" or "no action alternative" is a decision making abstraction and not a true alternative, since it does not fulfill the purpose of the undertaking. We indicated therein that this is still a part of the assessment process, as a benchmark against which the undertaking and the alternatives are examined. The null alternative - "do nothing at all" with respect to supply to Eastern Ontario was not pursued except in the context of "no transmission facilities" as contemplated in the soft path energy approach.

Another aspect of the rebuttable presumption proposition raised by the proponent as to what is reasonable, and mentioned in our conclusions on supply alternatives to, is that the joint board must take into account the capabilities of the proponent. The statement in argument is as follows:-

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"It is also clear, in my submission, that Ontario Hydro is not charged with changing energy policy objectives in this Province, and any proposals which presume such policy changes cannot be used to rebut the presumption operating in Ontario Hydro's favour as to what constitutes a reasonable alternative."

The joint board has earlier set out the business or purpose of Hydro, as set out in the Power Corporation Act. The joint board views that section as clearly setting the role of the proponent as one of reacting to or fulfilling the demands of its customers by generating, distributing and selling power. While the words "use of power", together with the most recent inclusion in the statute requiring the provision by the proponent of energy conservation programs as one of its purposes, certainly gives another aspect or emphasis to the business or purposes of the proponent, we do not see that the proponent has the responsibility to set energy policy per se. The various levels of government have that role and, in this Province, specifically, the Minister of Energy. In the context of the demands of all forms of energy, we agree that it is desirable that a sector by sector analysis of demand, through an end-use forecasting model, be done as part of the determination of that sector of energy use for purposes of policy decisions. The evidence of the Ministry of Energy is that their end-use model is developing that information and it is being used in their approach to determine and set energy policy.

The evidence of those Federal employees called on behalf of the Hydro Consumers Association makes it apparent that, at the Federal level, conservation and energy source programs are not as completely co-ordinated as desirable, and there certainly appears to be little co-ordination between different levels of government. It is our opinion that it is not the role or responsibility of this proponent to set either Provincial or Federal policy nor indeed attempt to co-ordinate whatever policies are promulgated as between governments. We do agree that Ontario Hydro and local utilities now have the responsibility for the promotion of conservation programs in all aspects. Hydro set out the extent of their promotion of programs, internally and externally, through the evidence of Mr. Paterson and in the documents, Exhibits 41 and 42. The evidence led by the Ottawa area municipal utilities indicates their promotion of and commitment to conservation programs. That same evidence also indicates their assessment of the impact of the programs on their requirements. That evidence also indicates that the Federal Off Oil Program, insofar as it affects the Ottawa area, is towards electricity, and that further impacts local load and the forecasts. For the foregoing reasons, we accept that the development and promulgation of energy policy and any changes not being within the capacity of the proponent cannot become the alternative selected by the proponent. However, once government has decided policy and effected legislation as, for example, Section 56(a) of the Power Corporation Act, then, as in that case, implementation of energy conservation policy is the mandate of Hydro, and could become the undertaking.

We do not see that Ontario Hydro has the option of limiting the amount of electricity it supplies to its customers as a means of effecting changes in demand or in their habits. In the short term, if the joint board were

to give support to further study of the soft path energy alternative as it might supplant the transmission proposed by Hydro, the evidence clearly discloses severe shortage problems, which cannot be addressed by further upgrading.

We note, of course, that some of the alternatives raised by the parties, proposed as being their sufficient alternatives to the undertaking were also recommendations of R.C.E.P.P., and they have been accepted by the government. We have previously stated and we are convinced that these alternative technologies and programs will have input and impacts upon energy use in the future. From the analysis provided in the evidence of Hydro and by those called on behalf of the Hydro Consumers Association, we have considered that the analysis in terms of scope is sufficient to arrive at the conclusion already stated, that these alternatives do not individually or collectively, nor in partial solution, represent reasonable alternatives to the undertaking at this time.

Three other matters with respect to the process (covered in the Southwestern Ontario decision), in view of the evidence in Eastern Ontario, require further emphasis and clarification. The evidence is clear that what we view as a significant part of the process, the pre-submission consultation, undertaken in this matter, had certain time constraints placed on it of both the proponent and the Ministry of the Environment. The record of the brief meetings which took place is sketchy, and the evidence seems to confirm that the concerns raised by the Ministry in terms of the document, Exhibit 4, were sketchy and perhaps not fully developed for reason of those time constraints. While we recognize that this is the first major application of this proponent

and the Ministry, to be the subject of hearings by the joint board, it is our view that the pre-submission consultation should always be sufficient so as not to leave questions of either the proponent or the Ministry's Approvals Branch to find their way into the review document simply for reasons of a lack of understanding. In these proceedings it is clear to us that the concerns raised during the proceedings as to the adequacy of the assessment document, in part at least, should have been afforded more time for some reasonable level of discussion between the proponent and the review co-ordinator.

As to what should be in the review document we offer the following as further emphasis on the role of the review co-ordinator. We do not view the Approvals Branch of the Ministry of the Environment as the guardians of the Act, in terms of the proceedings before this joint board. Once the Minister has referred the assessment and review to the Environmental Assessment Board, (or the joint board as in the instant case), the responsibility is the Board's to interpret the Act, and in arriving at a decision on the evidence to determine compliance with the provisions of the Act.

To reiterate our view, set out in the Southwestern Reasons, the following is quoted:-

"the review co-ordinator should organize all the comments received and present them in an orderly, understandable fashion, but his duties fall short of including in the review final conclusions and recommendations with respect to the acceptance of the environmental assessment or for the approval to proceed with the undertaking."

We appreciate the Branch's views, the evidence of Mr. Young, in terms of the interpretation of the Act which that Branch feels should apply to

the Act, especially in light of the new process, and indeed for the reason that this is the first major application to the Ministry of the Environment by Hydro.

Dr. Victor, retained by the Ministry of the Environment to undertake an assessment of the methodology, (though one may question the need for retention of such a consultant with other individuals in the Branch employment being familiar with methodology), is qualified in his field and developed an opinion on the methodology. We view that evidence properly as a "test".

The review document, Exhibit 52, contains the co-ordinator's interpretation of other Ministries' submissions. We understand he did not feel obliged, in so doing, to carry out further discussion with the Ministries on what he considered were their significant and controversial comments.

We have already stated that the review document should not contain conclusions and recommendations of the review co-ordinator. He may, as we suggested, when requested, offer that opinion to the Minister, where no hearing is required. We take no objection to his appearance as a witness before the Board but his evidence should not include opinions on the interpretation of other Ministries' submissions included in the review nor in areas outside his own expertise. Any evidence presented at the hearing should be updated to involve a proper consideration of all of the evidence and submissions subsequent to and including the environmental assessment document and review.

We do not see that the co-ordinator should necessarily be the odd man out in that, by "provocation" he invites comments or response from a

proponent. That description and approval suggested, in argument, may not lead to a proper process nor a reasoned review by Government.

There should be no surprises for the proponent from Government sources at the hearing stage. The positions should not be partisan, but rather a rational and impartial assessment.

We agree as counsel on behalf of the Ministry of Energy set out:-

"our perception of our role as the Ministry of Energy is that we are here as part of the government review process and we think the integrity and the value of that process requires that each Ministry as it were, play it straight and let the chips fall where they may. I would like to think we have done that. I know we are not here for the purpose of supporting Ontario Hydro. We are not here in a partisan capacity."

Mr. Johnson added to that,

"I would not expect that Environment, for example, was here for the purpose of opposing the proponent."

D. CONSTRAINT METHODOLOGY

A detailed description of Hydro's constraint methodology is contained in Part 2, Appendix A. The summary also contains the evidence of Dr. Victor as to concerns over the methodology developed for the Ministry of the Environment.

The joint board generally accepts the Hydro methodology used to assess the impacts of new transmission facilities. The methodology seeks to

identify areas of minimal natural environmental impact, as determined with public input, for the siting of new electrical facilities. This is an initial application of the methodology, and as such, is likely to require refinements as experience is gained with the application of procedures. The joint board does not, however, consider that any presently perceived modifications will invalidate the basic philosophy of the methodology. The joint board notes especially its comments in the Appendix with respect to the assessment of existing rights-of-way in the determination of the most appropriate study area for further consideration. As set out in the Appendix, the methodology used by Hydro is not capable of ingesting as a positive feature the seeking of a path. However, the positive seeking of the potential use of existing rights-of-way in light of Hydro's objective by objective assessment as between two plans could have been made at an earlier point in the process.

E. LOAD FORECASTING

Ontario Hydro employs a macro-economic or "top-down" approach to forecast future peak loads for the design of its electrical transmission facilities. By this method, Hydro determined that the peak load in Eastern Ontario would increase over the planning period to the year 2001 at an average annual rate of 3.1 per cent; specifically the actual peak load recorded in January 1982 of 2061 mw would increase to about 3600 mw by the year 2001. With respect to the Ottawa area, it is expected that the actual peak load of 1242 mw, which is at or near the maximum capacity of the existing transmission system, will increase to approximately 2200 mw over the planning period.

From the load forecasting reports, Hydro system planners developed three growth scenarios - low, medium and high and selected the medium growth scenario for the purpose of system design on the basis that it reflects the projected load growth; it provides flexibility in system planning and development, and it responds to the anticipated increased electrical load as a result of two government programs for providing financial incentives to convert to electrical energy sources, the Canadian Oil Substitution Program (COSP) and the Residential Energy Advisory Program (REAP).

The Hydro Consumers Association presented panel evidence which was critical of the Hydro method of load forecasting and suggested that the "end-use" approach for predicting future energy consumption would produce the most reliable results for electrical system planning. The end-use model which predicts energy consumption as compared to Hydro's method of forecasting power requirements, provides an opportunity to implement policies for energy conservation and renewable energy sources. The Consumers Association concludes that the long term energy demand using the end-use model would be significantly less than the load forecasts presented by Hydro.

The joint board concludes that the load forecasting methodology employed by Hydro is acceptable for this undertaking and the decision to use the medium growth scenario, which also relied upon the input from the Ministry of Energy end-use forecasting model, provides an appropriate range of peak load growth for the design of the proposed transmission facilities.

F. ACCEPTANCE OF THE ENVIRONMENTAL ASSESSMENT

All parties agreed that the joint board is not restricted to the environmental assessment document, Exhibit 4, in reaching a conclusion as to whether the environmental assessment is satisfactory to enable a decision to be made on whether approval to proceed with the undertaking should or should not be given, and on any condition to be attached to any such approval. Evidence and submissions presented at the hearing may be considered as well. If significant changes are made or additional information is obtained, it may be necessary for the joint board to cause another review and/or notice in the manner set out in the Environmental Assessment Act.

The undertaking or the issues with respect thereto have not changed to require us to initiate additional review or notice proceedings. Some errors in the written document, Exhibit 4, were discovered and the evidence resulted in further emphasis and some shifting of emphasis from that contained in the written document. For example, load forecasting evidence was given in greater detail than that documented in Exhibit 4. There was also a significantly increased evaluation of the alternatives to the undertaking, through cross-examination, and in the evidence of witnesses for the Hydro Consumers Association. There was further elaboration of the constraint methodology. This evidence is part of the assessment process, transcribed, and forms the written record in these proceedings. In our view, it is unnecessary to modify the assessment document to reflect the changes or corrections made at the hearing. Taking the evidence and exhibits in total, it is our opinion that the environmental assessment as presented at the hearing is satisfactory to enable us to make a decision.

G. APPROVAL TO PROCEED WITH THE UNDERTAKING

The issue at this stage of the hearing, was as to the scope of the evaluation of alternatives to. With respect to the supply to Eastern Ontario, we have concluded that such evaluation is adequate. As to the load forecasting we have concluded the medium growth scenario as being the most appropriate range. Similarly, with respect to the constraint methodology, we consider it as a reasonable approach to determining the relative impacts as between study areas.

The challenge to the interconnection aspect of the undertaking again as to the scope of the evaluation of alternatives to has been met in all of the evidence. As to the challenge that not sufficient evaluation was made of the alternative methods of carrying out the interconnection aspect of the undertaking, it appears to the joint board that sufficient evaluation has been made to eliminate at least the 230 kv lines as a potential type of interconnection facility, and we are satisfied on the brief evidence, unchallenged, that the difference between the 500 kv and H.V.D.C. as to impacts on the natural environment are minimal.

As to alternative routes for the interconnection, evaluation was made in the evidence of alternative locations, in our opinion in sufficient detail, noting also that we must accept on the face of the documents before us from Hydro-Quebec, that the connection must be at Beauharnois. We also accept the rejection of the possible Ottawa-Hull connection on the basis of insufficient transmission facilities on the Quebec side and the present lack of generation on both sides.

The joint board notes the evidence of Mr. McClymont wherein he states:-

"what we are really asking the Board to do is to permit us to continue with our planning for this project, to go ahead to the next stage of planning."

That quotation is on page 2458 in the cross-examination of that Hydro panel by Mr. Shrybman.

At this stage of the hearing process, it is essentially an evaluation of the environmental impacts. With respect to the interconnection part of the undertaking, the route stage study will assess the facility type selected and its impact on the routes possible within the study area, and we envision a consideration of all of those aspects of the interconnection to be addressed in greater detail, including costs and benefits, which is a condition to any approval given. In those circumstances, therefore, the plan stage of the undertaking is approved.

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H. ALTERNATIVE METHODS OF CARRYING OUT THE UNDERTAKING

We were asked by the proponent to select one of the five basic alternative system plans and its route stage study area to enable Hydro to conduct studies to determine the exact route and construction details for the proposed transmission facilities. Under the joint board's power to attach conditions, we may specify the method of carrying out the undertaking and thereby make the selection requested of us. We emphasize that approval of the plan stage of the undertaking and the selection of one of the system plans is without constraint on future decisions by this joint board.

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No issue was raised nor, indeed, was new evidence adduced with respect to problems of a technical or cost nature of the alternative plans. We have developed the following evaluation table covering all comparative aspects of the five plans.

EVALUATION TABLE

	<u>M1</u>	<u>M2</u>	<u>M3</u>	<u>M4</u>	<u>M5</u>
<u>Line Length</u>					
- 230 KV (km)	13	13	13	13	160
- 500 KV (km)	710	762	507	701	451
Total (km)	723	775	520	714	611
Ranked	4	5	1	3	2
<u>Right-of-Way</u>					
Length (km)	484	569	314	421	408
Ranked	4	5	1	3	2
Area (ha)	3861	4413	2640	3736	2764
Ranked	4	5	1	3	2
<u>Costs (1980 Present value \$M)</u>					
1) 3.2% ALG					
Capital	242	265	202	246	187
Power Losses	131	143	134	138	160
Operating & mtce.	12	12	11	12	9
Total	385	420	347	396	356
Ranked	3	5	1	4	2
2) 4.7% ALG					
Capital	256	277	210	262	198
Power Losses	207	220	215	227	264
Operating & mtce.	14	14	12	14	11
Total	477	511	437	503	473
Ranked	3	5	1	4	2
<u>Estimated Number of Towers</u>					
1) in 1987 and 1993					
Ranked	1290	1674	1290	1333	1333
	1	5	1	3	3
2) in 1994					
Ranked	2125	2466	1290	1700	1333
	4	5	1	3	2
3) in 1998					
Ranked	2125	2466	1290	1700	1676
	4	5	1	3	2
4) in 2001					
Ranked	2917	3128	2082	2878	2511
	4	5	1	3	2

Environmental Impact

1) Objectives	1-10 (ha)	2259	2411	1522	2734	1840
Ranked		3	4	1	5	2
	1-20 (ha)	4695	5319	3261	4452	3285
Ranked		4	5	1	3	2
	1-30 (ha)	6510	7573	4468	6110	4537
Ranked		4	5	1	3	2
	1-43 (ha)	14176	16563	9379	13838	10420
Ranked		4	5	1	3	2
2) Factors						
	Human Settlement (ha)	636	710	454	742	460
Ranked		3	4	1	5	2
	Agricultural Productions (ha)	1415	1384	926	2028	1312
Ranked		4	3	1	5	2
	Timber Production (ha)	2242	2743	1417	1985	1641
Ranked		4	5	1	3	2
	Mineral Resources (ha)	1557	1845	1060	1594	1204
Ranked		3	5	1	4	2
	Recreation (ha)	1059	1303	749	691	599
Ranked		4	5	3	2	1
	Appearance of Landscape (ha)	2327	2708	1446	2737	1935
Ranked		3	4	1	5	2
	Terrestrial Communities (ha)	2688	3305	1751	2171	1825
Ranked		4	5	1	3	2
	Aquatic Communities (ha)	1557	1750	1137	1335	970
Ranked		4	5	2	3	1
	Wildlife Resources (ha)	695	815	439	555	474
Ranked		4	5	1	3	2
	Total (ha)	14176	16563	9379	13838	10420
Ranked		4	5	1	3	2

I. FINAL SELECTION

Plan M3 has the least effect on the natural environment, has the shortest line length, shortest right-of-way, occupies the least area and has the least number of towers. It is the lowest cost plan, both at the 3.2 per cent and 4.7 per cent average load growths.

All plans are technically adequate, although plans M1 and M2 are technically superior, as more transmission lines are required to be built earlier in the planning period. Plan M3 is superior to plan M5 as it has 500 kv lines

going directly into the Ottawa area, which provides better voltage control. Power losses for plan M3 are 20 per cent less than for plan M5, which not only represents an economic saving, but also conservation of energy. Plan M3 provides a slightly better reserve in the event of a loss of a right-of-way than does plan M5. If loads grow beyond the year 2000, extensions to M3 can be made with fewer cost and environmental penalties than for plan M5. In fact, if load grows beyond 4.7 per cent, plan M5 becomes the highest cost plan and plan M3 continues to be the lowest cost plan. Only at the low end of the growth rate is plan M5 slightly lower in cost (Page 28, Exhibit 47).

Some suggestions were made to carry both plans M3 and M5 to the route stage because both plans displayed low impacts on the natural environment. The joint board rejects this suggestion based on the detailed analysis made by Hydro of the relative effects on the environment of the two plans. The joint board agrees with Hydro's selection of plan M3.

J. OTHER ACTS

The emphasis of the first phase of the hearing was clearly on the "environmental concerns" as that matter is regulated by the provisions of the Environmental Assessment Act. This is a logical progression when consideration is given to the purpose of the legislation to promote the involvement of all interested parties at the commencement of the planning process. This point is further emphasized in section 6 of the Act which creates a prohibition against issuing any licences, permits, approvals or consents until the environmental assessment has been accepted and permission granted to proceed.

Several matters have been consolidated in one hearing and all matters pertaining to the Planning Act and Expropriation Act are before the joint board. In arriving at a decision on the plan stage, some consideration has been given to the evidence and submissions which are relevant to the issues relating to these other statutes.

K. SUMMARY

The proponent shall prepare a draft decision on the plan stage, in accordance with these reasons, and the decision to approve the plan stage of the undertaking is subject to the conditions described herein and to the further condition that no approval is given to the general outline of future activities as set out in clause 3 of Hydro's description of the program. The draft decision shall be circulated to all parties for their concurrence that it is in accord with these reasons.

L. COSTS

Only Hydro Consumers Association asked for costs in final argument. The Association, represented by Mr. Shrybman, made a contribution to the hearing and further consideration will be given to its request after the application for costs has been received.

The costs of reporting these proceedings shall be apportioned with Ontario Hydro paying 50 per cent of the cost, the Ministry of the Environment

paying 25 per cent and the joint board absorbing the balance of the cost.

DATED at TORONTO this 6th day of August, 1982.

D. S. COLBOURNE
Chairman

B. E. SMITH
Vice-Chairman

D. H. McROBB
Member

PART 2

SUMMARY OF THE EVIDENCE

ONTARIO HYDRO METHODOLOGY OF ENVIRONMENTAL CONSTRAINT

Ontario Hydro, with considerable public input, has developed a methodology for assessing the impact on the natural environment of proposed transmission and generation facilities. The process is designed to select areas in which to site new facilities in order to minimize the impact of such facilities on those elements of the environment considered to be the most sensitive.

A study area was identified in which the proposed transmission facilities in Eastern Ontario would be located. The boundaries of the study area are the Ottawa River on the north, the Quebec boundary on the east, the St. Lawrence River on the south and, on the west, a line from the Lennox generating station egress to the intersection of the Lennox and Addington and Hastings County lines and then generally along the Renfrew County line north to the Ottawa River.

An environmental inventory of the area was produced by Hydro. Data was collected from a number of sources including Canada Inventory maps, census information, aerial photographs, field inspections, published and unpublished maps and documents of various organizations and input from

persons with knowledge of the area. The data relates to nine environmental factors - human settlement, agricultural production, timber production, mineral resources, recreation, appearance of the landscape, terrestrial communities, aquatic communities, wildlife resources. The data were mapped at a scale of 1:250,000 and computer stored on the basis of 2 km square cells.

During late 1975 and early 1976 Ontario Hydro canvassed over 150 organizations and individuals to establish working groups interested in participating in the study of the environment and selection of transmission and generation facilities. The Transmission Working Committee met in early 1976 to discuss the environmental methodology. It was agreed that the nine environmental factors would be accepted as a starting point for the Eastern Ontario study. Four sub-committees were formed. The first was responsible for agricultural production, the second for terrestrial and aquatic communities and wildlife, the third, recreation and appearance of the landscape and the fourth, human settlement, mineral extraction and timber production. The purpose of these committees was to identify environmental concerns with each factor, to review the base data maps for the factors and to develop and rank objectives related to each factor. An objective is a statement expressing a directive to avoid a particular environmental situation or concern. In all, forty-six objectives were identified although only forty-three are found in Eastern Ontario. Representatives of each sub-committee then met to rank all the objectives.

Ontario Hydro then identified in each 2 km square grid the numbers of the objectives appearing in each cell. The resulting data base could then produce a constraint map which printed out the highest ranked objective in

each cell. In addition, a map indicating the number of objectives in each cell can be produced.

The resulting constraint maps are used to identify broad paths or bands at least three cells wide, which represent links between terminal points in a system plan. The objective is to find the band or bands in a given system which avoid, to the greatest extent possible, the highest ranked objectives. Several bands may be drawn between the terminal points. In order to determine a preferred band a derived area, which is the potential area to be affected by a transmission line, is calculated by multiplying the right-of-way width times the length of the band and calculating the area of each objective in the derived area to be affected by applying the percentage occurrence of each objective in the band to the total derived area to be affected. This information is then compared to an average expected area to be affected which is calculated by applying the percentage occurrence of each objective in the study area to the average total derived areas to be affected, that is, the average right-of-way area for all bands. A preferred band is one that performs better than any other band linking the terminal points and better than would an average band randomly placed in the study area. In order to make this selection the percentage difference between the derived area to be affected for each band and the expected area affected is calculated for each objective and the result is plotted on a bar chart in descending order of ranking. A line is then fitted to the bar chart to illustrate the distribution of effects on the objectives. A line below the base line generally illustrates a band that has less environmental effect than a band above the base line. However, the slope of the line is also considered, with a negative slope generally indicating a band that impacts more on the higher ranked objectives

and, conversely, a positive slope indicating lesser impacts on the higher ranked objectives.

Once a preferred band is selected for each link in the transmission system it is then necessary to compare the alternative systems. This is done by adding the derived areas affected for the preferred bands in the system and comparing the result to the average total expected area affected for all systems. The differences for each objective are then similarly plotted on bar charts and lines fitted to illustrate the distribution of effects on the objectives. While the bar charts and lines of best fit assist in band and system selection, it is the underlying figures that are compared in order to select preferred bands and systems. The graphs are mainly designed to illustrate the relative comparisons between bands and systems.

The methodology described was used to evaluate five system plans developed by the system planning people in Hydro, all systems which will, according to the evidence, fulfill the purposes of the undertaking. The results of the evaluation using the methodology exclusively, resulted in plans M3 and M5 impacting on the overall environment the least, but the difference between the two plans was marginal and further analysis of the two plans was necessary. The impact of each plan on each objective was studied and a judgment made as to the preferred plan as it related to each objective. The result of this analysis indicates a preference for plan M3.

A route stage study area is identified for each system plan. This is basically a broad area surrounding the bands and is determined by a review of the constraint map, consideration of physical constraints, municipal boundaries

and the location of existing rights-of-way for transmission lines, railways and highways. It is this larger area that will be studied in detail to determine the precise transmission route.

Concerns With Respect To The Methodology

1. The methodology does not take into account positive features which should be included in a route stage study area such as existing rights-of-way. Although these may be included in drawing the boundaries of a route stage study area they are not included when determining preferred bands or plans, thus a system might be discarded based on the environmental analysis when in fact it should have been preferred because of the possibility of utilizing existing rights-of-way. In response, Hydro representatives indicated that in some cases existing rights-of-way may not be environmentally better than new rights-of-way. They also cited certain difficulties which might be encountered in rebuilding existing facilities and the necessity of widening existing rights-of-way to accommodate new facilities. The Board finds it difficult to understand Hydro's different approaches to rights-of-way. On the one hand, every effort seems to be made to include them in route stage study areas so that they will be evaluated in detail at the route stage, yet on the other hand, when it is suggested that they be included as an element in selecting a plan, Hydro submits numerous reasons that might make their use in the new system difficult. It seems to the Board that Hydro should review its position and the methodology.

If rights-of-way were included as an objective to be sought, it is likely that it would place far down the list of objectives, as the top ranked objectives are those to be avoided. Thus it is unlikely that the inclusion of

rights-of-way as an objective to be sought would alter the results of the plan selection, given the existing methodology. The joint board therefore does not consider this concern to be significant enough to invalidate the analysis.

2. Mr. Birnbaum, the Review Co-ordinator for the Minister of the Environment, expressed some concerns with the methodology. They generally seemed to relate to his difficulty in understanding the relationship between the evaluation of bands and plans in terms of graphs and lines of best fit with the visual perception of the same bands and plans on the constraint map. He, however, did not present any concrete evidence that could be assessed to determine whether in fact any problems exist. His concerns were really more questions, which might better have been raised perhaps during pre-submission consultations or on an informal basis with Hydro personnel or even with colleagues within his own Ministry. Some of these colleagues have had experience with the methodology as it was used in Hydro's Environmental Assessment for Southwestern Ontario. Other colleagues who submitted comments for the Review of Hydro's Eastern Ontario Environmental Assessment generally indicated their concurrence with the methodology. In the circumstances the Board cannot give any consideration to Mr. Birnbaum's testimony concerning the methodology.

3. Dr. Victor, a consultant giving evidence for the Ministry of the Environment, indicated five weaknesses with the methodology.

(a) The objectives should be weighted. In order to be able to assess the relative importance of one objective over another it was his view that a numerical value should be assigned to each objective

and that this should be done by the working group. In fact there is an implicit weighting which was assigned to the objectives by Hydro, and that is that there is an equal difference in priority between two adjacent objectives. The assumption that adjacent objectives differ by the same amount in terms of importance is introduced by Hydro without any input from the public. Apparently Hydro recognized that this assumption may not be valid as indicated in response to a working committee member question (Exhibit 28, Appendix VII, Page 11) where it is indicated that -

"One of the false assumptions of the assessment process is that the relative scale of difference between the factors expressed along the "x" axis of Figure 2 is linear. The rate of potential effects may change somewhere along the line. However, some preliminary tests of varying scales on the "x" axis, have not influenced the results of the comparison."

It was the evidence of Hydro representatives that in previous studies weighting had been employed but found wanting. The comments of hearing officials ranged from interesting to not very helpful. Ontario Hydro also tested weighting methods during a seminar held in 1975 and found that persons involved in three weightings of similar factors could be influenced to change their weightings after discussions between the three weighting exercises. Hydro concluded from these experiences that the use of weightings should not be pursued, and rather selected a ranking which they believed would be more understandable for public input. In their opinion the ranking permits the selection of priorities among objectives without requiring the quantification of the differences which, in their experience, is unworkable. Hydro has discussed this matter with various members of the Ministry of the Environment working on reviews of Environmental Assess-

ments and no concerns were expressed as to the omission of weighting. Further, the system of ranking was used in the Southwestern Ontario Environmental Assessment and the methodology found acceptable by the Ministry reviewer. The joint board concludes from the evidence that the ranking employed by Hydro is an acceptable tool in indicating community preferences.

(b) The theoretical base does not represent a realistic alternative to the bands under consideration. This base represents a random band with a percentage occurrence of objectives derived from the average occurrence of each objective in the entire study area. This can result in a comparison of bands between terminal points with a theoretical band which may have objectives which do not occur in the band area. It was Dr. Victor's opinion that the theoretical base for evaluating bands between two terminal points should be derived from a random band in the area between these points. Hydro has recognized this deficiency in its study in Southwestern Ontario and in that case has employed Dr. Victor's suggestion. The Board does not consider that this weakness should invalidate the conclusions, as Hydro representatives indicated that in addition to the analytical procedures employed, they carefully looked at the bands, and in the exercise of drawing the bands on the constraint map they could pretty well determine which one would be the preferred band.

(c) The assumption of a uniform right-of-way width may bias the results. The use of a 67 metre right-of-way for the links may understate the derived areas as the rights-of-way widths range from

68 metres to 89 metres. Dr. Victor does not consider this weakness too important as it will not affect the comparison of percentage deviations. He does, however, consider that the information could be misleading. It is suggested that Hydro review this procedure.

(d) Percentage deviations in the theoretical base bear no relationship to the areas likely to be affected by transmission lines constructed in the alternative bands. They are therefore a poor indication of the severity of expected impacts. Equal percentage deviations do not result in equal area environmental impact. He also criticizes the associated use of lines of best fit and the significant role that they play in evaluating alternatives. Hydro, however, suggests that the lines of best fit were used more for illustrative purposes and that the selection of a preferred alternative was based primarily on a review of the underlying data and a comparison of plans based on the areas affected by each environmental factor. It is this type of comparison which Dr. Victor considers more straightforward and understandable. As can be seen from this information, plan M3 continues to be the preferred plan based on the areas affected for each environmental factor. (Exhibit 47, pages 16, 17 and 18).

(e) Existing rights-of-way have not been treated systematically. This is the same concern as dealt with under Item 1.

SUMMARY OF THE EVIDENCE OF PARTICIPANTS

1. The joint board held a day's hearing in Perth to hear the concerns of

area residents and organizations.

The Lanark County Federation of Agriculture, while not opposed to the first phase of the new transmission facilities proposed in plan M3, did express concern for the preservation of agricultural land.

A number of residents indicated their support of the position of the Hydro Consumers Association. They would prefer to see the demand for electricity in the Ottawa area reduced through conservation methods or supplied via local generation sources or purchases from Quebec. The need for new transmission facilities could then be avoided. They cited a number of concerns with transmission lines including the possible effects on tourism because of the reduced aesthetics of the area, the possible effects of herbicides used in spraying rights-of-way, on water tables, wells, soil, trees and vegetation, and the possible effects on health of magnetic fields. Several people also expressed concern with nuclear generation.

An area farmer indicated that he had used chemical sprays on his farm all his life and that neither he nor his family had ever been sick. It was his opinion that, properly used, chemicals were not dangerous.

Representatives of local public utilities commissions and the mayor of Perth and the Council of the Township of Bathurst expressed support for the Hydro proposal as they are concerned that the supply of electricity continue to be reliable.

2. Mr. Edward Murphy, General Manager and Chief Engineer, and Carl Kropp, Planning Engineer of Ottawa Hydro Electric Commission, gave evidence in support of Hydro's proposal. The need to augment supply to the Ottawa area was identified several years ago by R.C.E.P.P. and since that time demand has increased. Many conversions to electricity have taken place in the Ottawa area encouraged by Federal and Provincial programs. They are concerned that security of reliable electrical supply be maintained. Even if approval of the undertaking is received and facilities installed in the late 1980's or early 1990's they are concerned that the utility may not be able to meet the projected load growth in the interval. They urge all possible speed in securing approvals and construction of the proposed facilities. They indicated that the utility is actively promoting conservation but that new loads are expected to outstrip loads saved through conservation.

They explained certain technical problems that the utility is presently experiencing because of the necessity to enhance the capacity of transmission lines through the use of many large capacitors. Even more capacitors will likely be required until new transmission facilities are available. This could lead to more severe operational problems, including power surges which can damage customer equipment, and increased danger to employees. Outages are also a possibility and the utility has no way of segregating critical loads such as hospitals.

The cost of line losses because of the operation of the present transmission system in an overload condition is estimated to be \$18 million per year. These officials estimate that line losses to the year 2000 will be \$256 million and could be reduced to \$134 million by the installation of plan M3.

3. Mr. William Moulton, Operations Engineer for Gloucester Hydro, gave evidence in support of Hydro's proposal. The Commission is of the opinion that new transmission facilities should be built without delay. The utility estimates that peak load growth will be close to 7 per cent annually in the 1983 to 1988 period. During the 1976 to 1979 period customer base grew faster than peak which was likely due to conservation measures. In 1980 and 1981 the peak exceeded the increase in customers. It was Mr. Moulton's view that major conservation measures were taken prior to 1980 and now any conservation measures will not have the same impact on peak load. The anticipated growth in demand is due to a number of new housing developments as well as electrical conversions.

The utility is concerned with reliability of supply, particularly with respect to the stop-gap measures that will be necessary until new facilities are constructed. It urges that these new transmission facilities be put in place as soon as possible.

4. Mr. Donald Farmer, General Manager of Kanata Hydro, gave evidence in support of Hydro's proposal. The utility experienced a peak load growth of 30.6 per cent between April 1981 and April 1982 and are forecasting load to increase in excess of 10 per cent annually for the foreseeable future. Industrial load is forecast to grow by 450 per cent to 1995 as new high-technology industries move in and existing ones expand. Housing units are expected to increase by 500 per year for at least the next ten years. In addition to load growth due to new development the utility is experiencing significant load growth due to electrical conversions.

The utility is concerned about possible transmission failures which would necessitate voltage reduction and consequent detrimental effects on customers. This could be serious to high-technology customers using sensitive equipment.

5. Mr. Martin Montague, Chairman of the Nepean Hydro Commission, gave evidence in support of Hydro's proposal. The peak demand for the utility in January 1982 was 8 per cent higher than the previous year. Nepean Hydro has had two full-time employees for several years working on promoting customer conservation. In spite of this effort the utility expects peak load growth to be between four and five per cent. The present system is operating at the limit of existing technology and at the same time demand is increasing. Nepean Hydro therefore gives Hydro unqualified support for its plan to increase transmission to the Ottawa area and urges that construction commence as soon as possible.

6. Mr. William Hiscock of the Ministry of Natural Resources expressed the view that because the environmental impacts on plans M3 and M5 are similar, and unless plan M3 can be shown to be significantly better in other ways, both plans should be carried forward to the route stage. He recognized that such a procedure would involve additional time and money but considered that this would be acceptable since the impacts to the new facilities would last into the foreseeable future.

7. Mr. Frank Hughes presented a paper (Exhibit 107) written by Larry Hughes outlining his views with regard to the Hydro proposal. However, because Mr. Larry Hughes was not available for questioning, the joint board

can give little weight to the submission. Hydro did reply to Mr. Larry Hughes, which reply is filed as Exhibit 108.

8. Mr. Gerald Walsh, Commissioner of Development of the City of Cornwall, informed the joint board that the City of Cornwall, Township of Cornwall and the United Counties of Stormont, Dundas and Glengarry have completed a study for a municipal airport near Bonville. They just want to make sure that the transmission lines will not interfere with the proposed airport.

9. Mr. Charles Jefferson, representing the Ottawa Valley Branch of the Institute of Agrologists, indicated that the Institute accepts that Eastern Ontario needs more electricity. Their concern is that regard be had to the preservation of foodland. They will be particularly interested in assisting at the route stage to ensure that impacts on foodland are minimal.

10. Dr. Lois Smith, a resident of Beckwith Township, addressed the Board. Dr. Smith has a B.A. in agriculture and a Ph.D in entomology. She expressed the view that, because the differences between plans M3 and M5 do not, in her opinion, appear significant, both plans should be brought forward to the route stage. She requested that a swampland known as "Mer Bleu" located near the Hawthorne transformer station be excluded from the route stage study area. Counsel for Hydro informed Dr. Smith and the Board that in fact this area was not in any route stage study area. She wished to make sure that no transmission lines would interfere with Uplands Airport. The joint board noted that Federal regulations would likely prevail to ensure airport safety. Dr. Smith also expressed concern for the preservation of nature

preserves and eagles' nests. She suggested that some Hydro towers are more pleasing than others and that careful tower selection could influence public acceptance. She suggested that when actual rights-of-way are laid out due consideration should be given to minimizing biological impacts and preserving natural beauty.

LOAD FORECASTING

In planning an electrical transmission system, peak loads are used as a basis for design since the system must be able to supply the demand load under the most severe conditions in order to maintain an acceptable standard of reliability and stability. While energy requirements are considered, it is the peak load which is used in Hydro's load forecast reports. In recent years, the system peak load has occurred on the coldest working day during the winter months and usually it is one day in the month of January.

Electrical system planners examine more than one range of load growth to ensure the future needs of the system are satisfied. This is necessary because any load forecasting is carried out on the basis of assumptions and making assumptions inevitably leads to forecasting errors. A load forecast, therefore, is presented as a range and the probability of the actual load falling within this range is specified in some manner, usually as a percentage.

Ontario Hydro employs a macro-economic or "top-down" approach to load forecasting which attempts to predict what people will do in the future rather than what people ought to be doing. Hydro's method of load forecasting

differs from the 'end-use' or bottom-up approach, which method relies on a detailed analysis of the specific elements which determine energy demand, and involves a disaggregated, rather than an aggregated, approach to energy demand forecasts. It is this end-use approach which is preferred by several witnesses who testified in opposition to the load forecasting evidence given by Hydro and was the basis upon which the Hydro Consumers Association concluded that the hydro forecasts of load demand are inaccurate and the need for the proposed facilities unjustified.

The Hydro methodology of load forecasting as described herein repeats the summary of evidence with appropriate changes given by the joint board on this topic on Hydro's undertaking for approval of additional transmission facilities in Southwestern Ontario.

Ontario Hydro Methodology

The evidence of the load forecasting panel of Ontario Hydro set out that the forecasting exercise was an attempt to forecast what people will do, not what they ought to do. The annual forecasting carried out by Ontario Hydro is a forecast of the primary demand peak and energy at system and network levels of aggregation. The long term forecast, described as a macro-economic or top-down approach, utilizes a forecast of several economic factors, such as output per employee, employment, electricity and oil and gas prices. The long term forecast is supplemented by a short term (5-6 year) forecast which is compiled from a comparison of the build-up of individual customer loads from public utility commissions' forecasts and those of larger industrial users, to mathematical model productions. The short term is the

period which has the changes in demand to which it is able to respond by altering the system capacity. The important variables there are the climatic and economic conditions. For long term forecasting, depending upon the capacity being considered, the length of time between a decision being made to do something and implementation is the period at which the long term starts.

The long term forecast for purposes of this undertaking, of concern to the year 2000, was prepared studying different scenarios based on different combinations of the forecast of the basic economic factors as described in the environmental assessment document (Exhibit 4). Incompatible combinations of the various factors were eliminated and then a selection of the scenarios was analyzed to give a range of possibilities, to provide a range of the average annual load growth rates for the system, for the East System, and for each region. In the preparation of the annual forecast, the starting point is the previous year's forecast. All of the assumptions that went into that previous forecast are examined and changed, if necessary, to reflect current outlook. The changes in forecast or current outlook are assessed as to their impact, using an econometric model. Those results are compared to the output of new models which have been developed and then an assessment is made as to the impact of events which are not captured by the econometric models.

For example, the document (Exhibit 37) entitled Load Forecast -1981, describes in some detail the changes in the forecast as between the years 1980, forecast number 800211, and the document number 810209 for 1981. It sets out the changes in economic outlook as to productivity or gross output per employees and the changes as between the forecast in 1980 and 1981 prepared

by the economics division; it sets out the changes in outlook for employment in the province; it considered a revised outlook for inflation and a revised outlook for the prices of electricity. The impact as between years of those changed assumptions was developed using the econometric model developed for the previous year's forecast. Overall response of demand to the changed economic conditions is estimated by combining all the separate impacts of the economy, as previously described, to derive a total effect and to thereby develop the revised annual growth rate of load for 5-year periods for the 20 years.

As far as is possible the outputs of different models are compared. As described in the 1981 load forecast document, comparisons are made with the EDEM model and with the Economic Zone model One currently under development (as described in the 1981 forecast document). Comparisons are also made with the Ministry of Energy model insofar as output and employment are concerned.

In addition, judgmental assessments are made of events which cannot be put into an econometric model. In the 1981 document, some of the factors considered to lead to the possibility of a demand increase were the Federal Off Oil policy, incentives announced in the Federal budget, potential for interruption of the supply of oil, possible better economic recovery, altered marketing policy with respect to electricity and the possible new types of application of electricity. Some of the factors considered to have the potential to decrease the demand were the major change in economic output of the forecast of output per employee, the suspension of the major western Canadian energy projects, such as the tar sands and heavy oil projects, and the possibility of changes in price assumptions in the forecast due to the impact of

additional expenditures, such as pollution abatement equipment and fossil fuel thermal stations.

Ontario Hydro Load Forecast

Hydro prepares annual forecasts of its short term and long term needs. The short term needs reflect the ability of the system capacity to meet the load demand for the period until new facilities can be put into operation in order to satisfy the long term demand. This short term forecast is based on a survey of the individual customer outlooks over the planning period in conjunction with a survey outlook of the system as a whole. Any imbalance between the aggregate system load forecast and the sum of the customer surveys is corrected by an unallocated load which may be either positive or negative in quality. The short term forecast contains whatever element of the business cycle which is possible to forecast, whereas the long term forecast assumes a neutral business cycle or economic climate and represents neither a "bloom" business cycle nor a recession.

In preparing the environmental assessment document, Exhibit 4, the 1980 load forecasts were used to determine the future load demand for the Eastern region of the East System. After this document was prepared, the 1981 load forecast was completed (Report No. 81-02-09, Exhibit 37) and updated by the 1982 forecast (Exhibit 38) and these more recent forecasts supersede the earlier projections and represent the most current indication of the future load growth for the East System.

Hydro predicts that the average annual load growth rate over the planning period, namely, 1983 to the year 2001, will be 3.0 per cent for its total system. (The comparable figure for Eastern Ontario derived from the 1981 forecast is 3.1 per cent). This means that there is a 50-50 chance that the annual growth rate will be above or below the 3.0 per cent growth curve. Attaching numerical values to this projection means that in Eastern Ontario the load will increase from the actual 1982 load of 2061 mw to 3673 mw in the year 2001. For the Ottawa area, the actual January peak load was recorded as 1241 mw and this is projected to increase to approximately 2200 mw at the end of the planning period. The Ottawa area poses a significant problem in meeting its projected load. Under normal operations and maintaining standard system reliability the Ottawa area maximum capacity is 1300 mw with the maximum use of system capacitors.

Since any long term projection is subject to error and is really a function of the assumptions which go into the forecasting model, a load forecast is normally expressed in terms of a range. Hydro stated the growth rate range to vary between 1.2 per cent and 4.8 per cent which, expressed in terms of probabilities, means that there is a 21.5 per cent chance that the growth rate will be below 1.2 per cent, a 21.5 per cent chance that the growth rate will exceed 4.8 per cent and the probability that the growth rate will be within the range predicted of 57 per cent.

Load forecasts are used to develop a number of growth scenarios for the design of future electrical facilities. These growth scenarios are obtained by changing the assumptions made and projecting the load growth rate. This approach recognizes the inherent error in any forecasting technique. For this

undertaking, three growth scenarios were prepared and identified as the low growth scenario L with an annual peak load growth rate between 2.2 per cent and 3.2 per cent, medium growth scenario M ranging from 3.2 per cent to 4.7 per cent and the high growth scenario H ranging between 4.7 per cent and 6.4 per cent.

Hydro selected the medium growth scenario M for two basic reasons. First, planning flexibility is needed to respond to actual load growth changes over the planning period. While Hydro recognizes that the growth rate has been declining in recent years, they justify the medium growth scenario since the 3.1 per cent average annual growth rate for Eastern Ontario is within the transition zone between the low and medium growth scenarios. Hydro's witness panel stated that the 3.1 per cent figure is an average growth rate spread over the planning period. It is anticipated that in the early years the load growth will be considerably higher than the average rate and towards the end of the planning period the growth rate will be lower.

Hydro argues that if the actual load falls below that which has been projected it causes less difficulties in the operations of the utility than if the growth rate exceeds their projections and cannot be met by existing and approved facilities. In support of this proposition Hydro suggested that excessive system capacity is dominated by fixed costs and shows up in terms of financial concerns. Deficient capacity, on the other hand, is characterized by variable costs and, while it is not a financial problem, it results in service deterioration and interruption, an alternative Hydro believes should be avoided.

The second basic reason concerns two government programs which have been introduced and will have an impact on the electrical load growth. The Canadian Oil Substitution Program (COSP) provides grants for the conversion from oil fuel to other fuels and the Residential Energy Advisory Program (REAP) provides loans at Hydro's short term borrowing rate for the conversion to electrical energy in residential units. Hydro studies predict that 360 mw of new load will be added to the Eastern Region by 1988 as a result of these government programs.

NEA
level forecast

The evidence presented on behalf of the Hydro Consumers Association was critical of the macro-economic approach to load forecasting used by Hydro for planning its transmission facilities. A witness panel comprising C. J. Conway and Dr. J. B. Robinson, both qualified in matters relating to energy management, described the end-use method of forecasting future energy demand. This method is based on the proposition that energy is consumed by capital stock such as buildings, appliances, vehicles and other equipment and therefore the model for analysis should be programmed to examine the consumption characteristics of the energy consuming stock. According to this witness panel the preference for an end-use model stems from a concern about the reliability of the forecasts using an economic approach and the opportunity which an end model provides to implement policies for energy conservation and the development of renewable energy sources. This method of energy demand forecasting is designed not so much to reveal future needs but to indicate areas where positive action may be taken to control energy demand. The end-use approach respects the broader energy picture and is not restricted to any one fuel source.

Mr. Conway was frank to point out the limitations of the end-use approach, which relate to the information obtained and choices made with respect to the data base used, the specification of the relationship existing between the deriving variables such as population and economic activity and the ownership and utilization of the energy consuming stock, the utilization of fuel sources, and the manner in which energy demand estimates are regionally disaggregated. He concluded that these concerns may be readily overcome and the end-use method is more reliable and provides a better opportunity to implement policy decisions regarding energy conservation and fuel source management.

Both witnesses acknowledged that in order to achieve the major advantage of energy conservation opportunities, government policy is needed to provide the appropriate direction and leadership. To some extent this position coincides with the evidence of Mr. Higgins on behalf of Hydro who stated that Hydro uses the Ministry of Energy end-use model as a useful means of analyzing and arriving at policy decisions but not as a load forecasting tool.

The evidence on load forecasting and the issues raised in connection therewith are not significantly different from those issues discussed in the reasons for decision issued by the joint board in the Southwestern Ontario undertaking. We have not been persuaded to depart from our observations and conclusions made in connection with that particular matter for it still remains our view that Hydro should be allowed some autonomy and flexibility for the design of its electrical system plan. The medium growth scenario provides that flexibility by allowing Hydro to meet the projected loads over the planning period and to respond if necessary to some extent to lower projected

load growths because the construction of the proposed facilities are staged over the planning period. The installation of some facilities may be cancelled if the load growth falls short of the current projections. The modest financial burden is to be preferred over an unreliable electrical system.

In summary, therefore, we concluded that the load forecasting methodology employed by Hydro is acceptable for this undertaking, and the medium growth scenario provides an appropriate range of load growth for the design of the proposed transmission system facilities.

Alternatives To The Undertaking

In the administration of the provincial integrated power system, the proponent does not consider conservation and load management as generation resources but their effects are taken into account in arriving at the net load projected for any particular period. Since a number of parties and participants stressed the importance of conservation and load management in presenting their objection to the subject undertaking, and these were considered by them as alternatives to the undertaking, we are dealing with these two particular topics under this section.

The reasonable alternatives to the undertaking which would meet all the purposes of the undertaking were considered by the proponent and described in the environmental assessment document, Exhibit 4. A variety of alternative electrical generation technologies was considered for installation in Eastern Ontario such as hydraulic major and small; thermal coal-fired and nuclear; solar; wind; municipal waste burning; combustion turbines; industrial

co-generation; district heating and co-generation and wood fire generation. The evidence indicated that at the present time the main electrical load for Ontario is supplied by conventional generation consisting of hydraulic, nuclear and coal-fired generation with some supplemental generation in the form of co-generation and combustion turbines, particularly related to commercial use. Although some use is made by Ontario Hydro of wind power, solar energy and oxidation of municipal waste, these are of minor importance at the present time, and are considered more experimental in nature.

1. Additional Conventional Generation

Additional conventional generation, including hydraulic nuclear and thermal, was investigated by Ontario Hydro. The greatest hydraulic potential relates to the extensions to Otto Holden, Des Joachims, Cheneux and Chats Falls generating stations along the Ottawa River. While extensions to these facilities would add a significant peak power component to the system, very little additional energy would be provided. It was Hydro's evidence that there is already sufficient peaking capacity for the next 10 to 15 years and therefore hydraulic development should be concentrated on those plant installations that can produce significant quantities of energy to replace the more expensive coal-fired generation sources. Hydro also pointed out that the Otto Holden and Des Joachims plants are located 280 and 200 kms respectively from Ottawa requiring additional transmission facilities at some considerable expense.

Hydro is pursuing a long term hydraulic generation expansion program into the mid-1990's and is planning for a development of 2000 additional

megawatts of power. However, this development is proposed for Northern Ontario locations and none of the additional hydraulic generation planned includes hydraulic generation sites in the Eastern Ontario Region. Hydro rejected hydraulic generation as an alternative since its impact was small, in the order of 53 mw, resulting from the possible expansion of Chats Falls and Chaudiere Falls.

Hydro examined the possibility of additional thermal generation in the form of a nuclear plant to be installed at Chats Falls. This site has technical problems due to seismic levels in the area and an inadequate volume of cooling water during low flow periods in the Ottawa River. The long lead time needed, approximately 14 to 15 years for a new site on any nuclear generation plans, was also a factor in rejecting this as an alternative. In any event, none of the parties or participants opposing this undertaking presented nuclear thermal generation seriously as an alternative. It is also noted that the comparison of costs between generation and transmission is split 80 per cent for generation and 20 per cent for transmission, making the transmission alternative more attractive in most situations.

2. Supplemental Generating Sources

Other supplemental generation sources were investigated by Hydro witnesses called on their behalf who described the technology for solar, wind, burning municipal waste, combustion turbines, industrial co-generation, district heating and wood fire generation.

From the evidence, it was indicated that solar generated electricity would not make a significant contribution to electrical supply before the year 2000. The two most common solar technologies utilize reflecting mirrors and photovoltaic cells. These systems are not cost effective. The most promising future applications for solar energy are hot water systems and passive space heating. These systems could reduce the electric load in the system but on the other hand they could increase the demand if the back-up to these systems is electric heating.

Large scale wind power is also considered by Hydro to be impractical and not cost effective at this time. Most development and experimental installations are located in areas where the wind speed is 15 miles per hour or greater. In Southern Ontario, the average wind speed is in the order of 10 miles per hour. There is a 50 kw wind generator installed by Ontario Hydro as a test model at Sudbury, where higher speeds are experienced.

Municipal waste can be burned to generate heat in the production of steam for industrial use or for the generation of electricity. This process is limited by the quantity of waste available. In Eastern Ontario, the major potential source of waste for electrical generation is located in the Ottawa area where a 15 mw capacity is possible. The other communities in the area are too small and are considered uneconomical for this type of generation.

Ontario Hydro examined the possibility of using wood as a fuel for generating stations. Two sources of wood were considered - wood waste from existing lumber and pulp operations and wood from plantations of fast growing trees. It was concluded that the pulp and paper mills at present already burn a

substantial amount of their waste wood biomass to meet part of their energy needs. There is negligible potential for additional use of those wood wastes. Although unused wood wastes are generated at saw mills, the amount is much smaller than that at pulp and paper mills. If all the wood wastes from the saw mills in the study area were collected and used for generating electricity, a 5 mw output would be achieved. With regard to growing wood, transportation costs and building a wood-burning generator, such a system was considered to be more costly than building a major coal-fired generating plant. A wood-burning plant would be small, which would result in a high cost per kilowatt.

Another supplemental source of generation considered was industrial co-generation. Co-generation is the simultaneous production of steam and electricity from the same fuel input. At present Ontario Hydro has 450 mw of industrial co-generation connected to the East System, of which only 6 mw is located in the Eastern Ontario study area. The potential for additional industrial co-generation is limited by the size of the heat loads that exist in the industrial plants in Eastern Ontario. Based on existing heat loads, there is a total technical potential of 110 mw for new co-generation in Eastern Ontario. Since only 70 per cent of the technical potential is economically available, the economic potential is 77 mw, based on existing heating loads. However, if steam loads grow at the rate of 2 per cent per year, the economic potential by the year 2000 would be 115 mw. Back pressure and extraction steam turbines are the two most common types of steam turbines used for co-generation in Ontario. Co-generation is viable for industries that have a large steam demand and therefore require a large steam plant. With respect to the use of combustion turbines, other than steam, since they require expensive fuels such as natural gas or fairly light distilled oils, they are not likely to be economical.

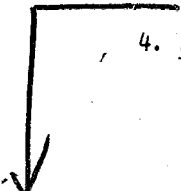
District heating is a means by which there is large scale heating of residential or commercial buildings by piping steam or hot water from a central heating plant. If the scheme is relatively large, it may be economical to add an electrical co-generation facility to the central steam unit. District heating permits the use of cheaper fuels. It is also conducive to high density areas and is not likely economical in a community of less than 50,000 persons. The total potential for district heating and co-generation in Eastern Ontario is estimated at 130 to 260 mw. To achieve this capacity would require such systems to be installed in all of the high density areas of Eastern Ontario. Ontario Hydro believes that only about 50 mw or about 25 per cent of the above technical potential would be realized by the year 2000. There are at present two district heating systems in Eastern Ontario, one at Queen's University in Kingston and the other in Ottawa serving some Federal government buildings as well as some commercial buildings - the National Arts Centre and the Chateau Laurier. There is also a proposal being studied to develop a garbage-burning (with additional fuel) district heating and co-generation plant in the Ottawa area with a 30 mw electrical capacity.

In total the amount of hydraulic generation (50 mw) and supplemental sources of generation such as municipal waste burning (15 mw), co-generation (115 mw) and district heating (50 mw) that might be conceivably installed in Eastern Ontario by the end of the century adds up to about 250 mw.

Hydro, in examining these possibilities, came to the final conclusion that the potential for this type of supplemental generation has limited capacity over the planning period and does not afford a reasonable alternative to the construction of additional bulk power transmission facilities.

3. Purchase Of Firm Power From Neighbouring Utilities

One of the purposes of this undertaking is to construct an interconnection with Hydro-Quebec. This installation and the purchase of power by contract from Hydro-Quebec or any other neighbouring utility was considered as an alternative to the undertaking. The interconnection details and its potential are reviewed under the particular section dealing with interconnections. However, Hydro did reject the purchase of power as a reasonable alternative due to unreliability of the supply source, the fact that Hydro does not wish to be put in the position of relying on another jurisdiction for such a valuable service, and economic and pricing factors.



4. Soft Energy Systems

Evidence was presented by Dr. J. Robertson, Dr. D. Brooks and Mr. R. Torrie, on behalf of the Hydro Consumers Association, with respect to the soft energy systems as an alternative to the undertaking. Soft energy path was described as a broad energy policy or strategy which encourages a transition from a fossil fuel based, non-renewable resource to a renewable resource that is economically attractive and is environmentally and socially more acceptable. An effective soft energy strategy which encourages energy conservation must fulfill five criteria, namely:-

- : it must be renewable;
- : it must be diverse and resilient;
- : it must be flexible and convenient;
- : it must be economic in terms of need;
- : there must be a match of the quality of energy with the quality of the need.

Components of the soft energy path system would include the greater use of wood biomass, hydro, wind, district heating, solar and photovoltaic cells. This would be balanced with energy conservation measures, emphasizing better insulation of homes and offices, retrofitting of existing structures, improved industrial design and marginal cost pricing for all energy sources. The combination of these energy technologies and economic policies, if implemented with a commitment, would, over the long term, affect electrical load demand by reducing and replacing the consumers' demand for electricity.

Dr. Robinson and Mr. Torrie presented results of on-going studies commissioned by the Federal government. The purpose of these studies was to compare a hard energy path scenario with a soft energy path scenario, specifically to analyze the economic and technical potential for conservation of non-renewable energy resources to the year 2025. All techniques used in these studies were based on technologies that exist today and the assumption that there will be a commitment for the effective deployment of these technologies. Based on the assumption that there will be continued efforts in the field of energy conservation and that energy costs would increase to their real levels, the total Provincial energy demand for the year 2025 will be similar to the energy demand for 1978. This trend in future energy demand was attributed to significant penetration into the market of new renewable energy resources, particularly wood biomass, and the inefficiency of some hard energy options, particularly the economics of nuclear power and the environmental impacts of the continued use of coal.

A soft energy path, if it is to be effective, must result in a massive reorientation of the provincial electrical supply and demand system. The

planning approaches presently employed by Ontario Hydro, which determines what the demand for energy will be and then ensures through major capital construction projects that adequate supply is available to meet the demand, must change, in the view of this panel.

The proponents of the soft energy path believe that there is a need for Ontario Hydro to re-assess its planning approach and they suggest that end-use need or demand be met as efficiently as possible. The meeting of energy demand for a specific user could include any one or any combination of the components of the soft energy path. One of the major premises of the soft energy path option is that electricity is not needed to meet all energy demand. Consideration should be given to other mechanisms, whether they be any one of the various forms of energy conservation or the use of renewable resources to meet the consumers' need. The witnesses stressed that the soft energy path option is worthy of further study as an alternative to the undertaking and such studies should be undertaken to ensure that there is a complete evaluation of the advantages and disadvantages of the hard and soft energy paths.

Mr. Torrie provided the methodology that he employed in his studies to determine energy levels for various end-use sectors to the year 2025. The formula used by Mr. Torrie included the end-use sector activity multiplied by the relative decline and the energy intensity for the particular sector (residential, new residential, commercial and industrial) multiplied by the base rate in 1978. The data presented was for Ontario as a whole and not specifically for Eastern Ontario. In summary, Mr. Torrie's studies point toward substituting electricity with other forms of energy to produce overall energy efficiency. Total electricity use which was approximately 15.4 per

cent of end-use demand in 1978 will increase to between 19.6 and 20.3 per cent total end-use demand by the year 2000. This increase suggests, in the event Mr. Torrie's assumptions are correct, that the future will produce an energy-efficient economy, but there will also be a very intensive electricity sector. The maximum projected demand for electricity suggests a system peak demand of between 17,000 and 22,000 megawatts which, in Mr. Torrie's estimation, is about 1.42 times the base year peak of 1978. Assuming a high growth scenario, the average peak demand grows from 1978 to 2000 at about 1.6 per cent per annum. Mr. Torrie suggests that this increase in demand can be met through the proper implementation of energy conservation measures and the use of renewable energy resources. It was his opinion that this approach was a more acceptable alternative than committing large amounts of capital to ensure supply side expansion. By making the efficiency improvements first, supply expansion can proceed, if necessary, with a greater level of confidence and more benefit per dollar expended.

With respect to the Ottawa area load, Mr. Torrie suggested that if Ontario Hydro were committed to minimizing the uneconomic electricity supply expansion and attempt to move towards energy conservation and the implementation of renewable resources, there is a need for only 200 or 300 additional megawatts in the Ottawa area. Mr. Torrie views the undertaking as really being a question of system reliability, and it was his opinion that the construction of three 500 kv bulk transmission lines as a response to this very small security of supply problem could be easily resolved by much smaller scale alternatives. He suggested that there would be a need to do a detailed energy end-use demand for the Ottawa area in order to set priorities for efficiency investments that could forego the need for additional electricity

capacity. The upgrading of energy efficiency standards on new buildings would be one such priority investment. If the soft energy path alternatives are implemented, Mr. Torrie estimated that the Ottawa area demand in the year 2000 would be no higher than 1,500 megawatts, a situation which could be readily satisfied by modest capital expansion.

5. Load Management

Load management is an action taken by a utility to control electrical load requirements as opposed to the control of supply. This action involves the shifting of the times of customer use of electricity to off-peak periods in order to reduce the peak demand on the bulk power system. This is usually achieved through rate incentives to the electricity consumer.

The evidence of Mr. Snelson indicates that studies as to the exact amount of controllable load are not yet complete, but it appears likely that the amount of controllable load for Eastern Ontario will be in the order of 200 mw by the year 2000. This is a small amount compared to the forecast load of about 4000 mw in Eastern Ontario and does not represent an alternative to bulk power transmission.

INTERCONNECTION

There are two grids in Canada and the United States, one in the east and one in the west, with a direct current link between the two grids. All of Canada and the U.S. are connected to one of these two grids, except Texas. Hydro-Quebec is not connected synchronously to the grid, which necessitates

special operating modes to allow power exchanges with Quebec. A generating facility can be disconnected from one system and connected to the other or part of a load on one system can be disconnected and connected to the other system. Both these methods have serious disadvantages. Generation that can be delivered is limited to a few plants, and load that can be isolated is limited in size and is subject to unreliability and the necessity of interrupting service during the changeover between systems.

Alternatively a 'high voltage direct current' (H.V.D.C.) interconnect can be used which permits almost instantaneous change in the level and direction of the power exchange.

There are presently several interconnections between Ontario and Quebec. There are two 25 hertz interconnects in the Kirkland Lake area. All the rest are 60 hertz; one in the New Liskeard area, one east of North Bay at Otto Holden generating station, one at the Cheneux generating station, one at the Chats Falls station, two in the Ottawa area, one at Masson and one between the Beauharnois generating station in Quebec and the Cornwall area.

The interconnect to Beauharnois is a double circuit 230 kv line from Beauharnois to the interprovincial boundary which there splits into two single circuit lines, one running to Hawthorne transformer station in the Ottawa area and the other to the St. Lawrence transformer station. These lines presently serve two functions - local supply to Ottawa and St. Isidore areas, and as an interconnection.

By 1987 or 1988 it is anticipated that present transfer capacity on all interconnections except Quyon-Chat Falls and Pagan-Chat Falls will be zero in the winter peak. In the case of the two Ottawa area connections they are to be removed from service in 1984 in accordance with an agreement between Hydro-Quebec and the National Capital Commission. In most other cases there is limited generation that can be isolated as generation is required for local supply, particularly as area load growths increase.

The advantages of interconnections outlined included emergency assistance, reserve sharing, surplus energy, night time energy storage, coordinated development, national energy self-reliance, conservation of scarce resources, development of large scale energy projects, reduction in transmission losses, stable frequency, seasonal diversity, and the facility for firm power purchases. Disadvantages include a loss of autonomy, and policies of several governments affecting the various utilities. The loss of autonomy aspect includes other concerns such as the cascading of power from one system to the other and interconnection facilities must be expanded as the neighbouring system grows.

The R.C.E.P.P. was supportive of interconnections and recommended that "the studies aimed at strengthening the electricity interchange capability with Quebec should be expedited, and in particular they should be extended to ensure close collaboration between Ontario Hydro and Hydro-Quebec in the future planning of their respective systems for the mutual benefit of both provinces" (Exhibit 11, Page 105, recommendation 7.3). This recommendation was accepted by the Government of Ontario.

An initial study was undertaken by the two utilities and the results of the study (Quebec-Ontario-Interconnection Study) was filed as Exhibit 18. This outlined the committee's review of present and proposed interconnect facilities, potential locations and an outline of the benefits possible for each, given the present and proposed different system plans.

Because the present transfer capabilities are not expected to be adequate in the future, Ontario Hydro is recommending, in this undertaking, an interconnection with a capacity of 2000 mw with Hydro-Quebec.

The interconnection should terminate near a large generating source or load centre. An interconnection in the Abitibi area was eliminated because it is 450 km from the bulk power system in Quebec to the bulk power system in Ontario. An interconnection in the Ottawa-Hull area was considered but rejected because of the absence of adequate internal transmission on the Quebec side and the absence of generation on both the Ottawa and Hull sides that could be isolated to provide the transfer capability. The Montreal-Cornwall area was selected as the preferred location because Montreal is the major load centre in the Quebec system and Cornwall is the location of the closest major terminal station in the Ontario system. An interconnection in the Cornwall area would make better use of the existing 230 kv system in Ontario, and complement the existing two 230 kv interconnections at Cornwall with New York, and complement possible future interconnections with New York, although none are presently planned. There is major generation at Beauharnois GS and Saunders GS which can be isolated to provide transfer capability.

Three alternative types of facilities were considered for the inter-connection. A 230 kv alternative was eliminated as it does not provide adequate strength to accommodate an H.V.D.C. back-to-back installation. The other two, a 500 kv and an H.V.D.C. interconnection were considered but as yet a final selection has not been made. Ontario Hydro and Hydro-Quebec propose to carry out more detailed engineering studies on these two alternatives. The estimated costs in 1987 dollars for these two alternatives range from approximately \$400 Million to \$600 Million in total, which costs would be shared between Ontario and Quebec.

The very brief evidence of this Ministry of Energy panel outlined the "clear government support favouring strengthening of interconnections." They outlined the Ministry support for the expanded interconnection of 2000 mw to connect at St. Lawrence TS, but suggested that, prior to the financial commitment being made for the interconnect, a cost benefit analysis should be made.

*Where is the
position of the
second stage
mentioned*

PART 3

EXCERPT FROM REASONS FOR DECISION
OF SOUTHWESTERN ONTARIO

"
C. ENVIRONMENTAL ASSESSMENT PROCESS

The Minister of the Environment was represented at these proceedings for the purpose of presenting submissions on the environmental assessment process under the provisions of the Environmental Assessment Act. David R. Young, senior environmental planner with the Environmental Approvals Branch of the Ministry of the Environment, was instrumental in the preparation of the General Guidelines For The Preparation Of Environmental Assessments (Exhibit 35), hereinafter referred to as the "Guidelines", to assist proponents and others in understanding and in carrying out the requirements of the Act.

In his evidence, Mr. Young reviewed the guidelines and described the procedures which are followed by his branch. His evidence highlighted the fundamental philosophy of the Environmental Assessment Act, as interpreted by his branch. In his view, the legislation is designed to promote an involvement of a wide variety of interests at an early stage of planning and development of an undertaking for the wise management of the environment. All information relevant to the undertaking and its alternatives must be

gathered and analyzed at a time in the process when options are still open to the proponent.

In preparing an environmental assessment, guidance is given to the proponent by the provisions set out in Section 5(3) of the Act. A detailed review of this section and the position taken by the Approvals Branch of the Ministry are set out in the guidelines.

Mr. Young described his view of the assessment process as multi-directional in nature, requiring constant feedback, review and re-evaluation at each step along the way. Conclusions which have been reached, or positions taken, may have to be altered and repeated many times as new information is obtained. For example, a statement of the purpose of the undertaking may have to be changed or modified several times as the examination and analysis of the undertaking proceeds through the steps of evaluation of the alternatives, identification of the effects on the environment, mitigation measures which are available, preparation of a statement of the advantages and disadvantages of the undertaking and its alternatives, and the determination of the rationale for the undertaking, its alternatives and alternative methods of carrying out the undertaking.

Each step of the assessment process must be considered in terms of the full scope of the environment as it is broadly defined, but the level of detail of the analysis may vary according to the information obtained or the nature of the alternative and what is reasonable under the circumstance. In the end, the environmental assessment must be satisfactory to enable a decision to be made as to whether or not approval should be given to proceed with the undertaking, and whether terms or conditions should be imposed.

Ontario Hydro interprets the requirements of Section 5(3) of the Environmental Assessment Act in a different manner. In Hydro's view, the proponent describes the purpose of the undertaking and only those alternatives and alternative methods which fulfill the purpose need to be examined in the assessment process. The concept of 'reasonableness' which has been implied in this section of the Act is accepted by Hydro, but it is suggested that the proponent maintains the sole discretion to determine what is reasonable under the circumstance. Ontario Hydro argues also that the "null" or "do nothing" alternative is a contradiction in terms and is not really an alternative at all, but is to be considered only in the context of the decision as to whether or not approval should be given to proceed with the undertaking.

Because of the relatively recent introduction of environmental assessment legislation in this province, particularly as it relates to the consolidated hearing process, the joint board considers the issue of interpretation of Section 5(3) of the Environmental Assessment Act to be of significant importance. A close examination of the positions taken by the Minister of the Environment and Ontario Hydro reveals surprisingly few areas of serious disagreement.

The joint board has concluded that, with some minor exceptions, Parts I and II of the guidelines comply with the Act and are appropriate procedures to follow for the preparation of an environmental assessment for this undertaking. The exceptions really refer more to emphasis rather than a rejection of some of the procedures outlined in the guidelines and in our view, do not affect the achievement of the overall objective of the assessment process.

Let us begin by stressing that guidelines of this kind are not only beneficial but are necessary to assist all interested parties to reach a better understanding of the legislation; but it is equally important to remember that slavish adherence to a guideline without regard to special situations or features is wrong. Guidelines tailored to deal with a particular undertaking or special situation may be necessary. This point is noted in the guidelines, and is a matter which is particularly stressed at the pre-submission consultation but, in our view, is worthy of additional emphasis.

Considerable debate took place at the hearing between the Ministry of the Environment and Ontario Hydro with respect to the scope of the enquiry into the alternatives to the undertaking and alternative methods of carrying out the undertaking. The Ministry suggests that all alternatives and alternative methods must be fully examined in terms of the scope of the environment as it is broadly defined, although the level of the detail of that examination may vary, depending upon a number of factors.

We have concluded that the position of the Ministry on this issue represents the proper interpretation of the Act.

Nothing in the wording of Section 5(3) restricts the meaning of environment nor the scope of the enquiry. What appears to be Hydro's concern is that while the full scope of the environment must be considered in reviewing the undertaking and its alternatives, the proponent maintains a discretion to settle the question of reasonableness in determining the level of detail necessary to achieve an evaluation of any item.

We do not consider this position to be in conflict with that of the Ministry, for while the proponent determines what level of detail is reasonable, it is not an unfettered discretion; it is subject to challenge by any interested person, and the proponent may be called upon to explain more fully the investigation of any alternative or conclusion reached. The pre-submission consultation is the time for discussions of this kind to take place, which then gives sufficient opportunity for the proponent to prepare a response or carry out additional investigation.

To give an example of the level of detail necessary and the reasonableness test, an alternative was raised at the hearing which featured the construction of a submarine cable along the bottom of Lake Huron connecting the Bruce NPD to transmission facilities in the State of Michigan. The joint board was not able to learn who initiated this suggestion nor when it was first presented to Hydro. Two opportunities arise for the application of the test of reasonableness. Ontario Hydro may have adopted the presumption that this alternative is unreasonable by the very description of the alternative. Once being provided with more details of the alternative, and the presumption challenged, Hydro was required to conduct a more complete investigation where the full scope of the environment was examined. In so doing, the matter of cost of construction of the submarine cable was determined to be in excess of two billion dollars, which is considerably greater than the approximately 800 million dollars required to construct the undertaking. Cost is not the only consideration, and the full scope of the environment was examined in a summary fashion by noting that with the submarine cable alternative, additional transmission lines would still have to be built in Ontario. Again, the test of reasonableness was applied to limit the level of detail required for the investigation of the full scope of this alternative.

Ontario Hydro placed considerable importance on the interpretation of the Environmental Assessment Act which would limit the alternatives to those which would fulfill the purpose of the undertaking. The Ministry, on the other hand, was concerned that the description of the purpose should evolve with the assessment process and should not be used as a means to curtail the full investigation of all appropriate alternatives. The two positions are not significantly different, since Hydro admitted that it would be improper or contrary to the intention of the Act to specify a purpose which would unduly limit the examination of alternatives.

In our view, the Act is to be interpreted to maintain a fluid or dynamic environmental assessment process which includes the public hearing by the joint board. The process commences with an idea of the proponent and is continued by a description of the purpose of the proposed undertaking. The purpose may change as the assessment process proceeds through the various steps, but it is not a matter left solely to the discretion of the proponent. We have observed this evolution of purpose with the subject undertaking.

First, the general purpose of providing efficient electrical energy to the people of this province was described; then, more specific purposes were developed. The purpose could have been stated to provide an efficient energy source to the people of the province rather than limit the source to electrical energy. A different purpose may expand or contract the scope of the assessment process, for all reasonable alternatives which fulfill the purpose must be examined. A purpose to provide efficient energy increases the range of alternatives to include facilities using natural gas or petroleum as a fuel source - such an alternative may include the construction of a natural gas

pipeline to the London area, for it is not necessary that every alternative be either within the mandate of the proponent or an option intended to be pursued by the proponent. The undertaking, being the alternative selected by the proponent, must of course, be within the capabilities of the proponent. In deciding whether approval to proceed with the undertaking should be granted, the tribunal gives consideration to the particular interest of the proponent. The assessment process, therefore, must have the control of the purpose of the undertaking otherwise the scope of the investigation may be unduly restricted or unnecessarily expanded.

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 The question now raised is: over what matter does the proponent have exclusive control? It is not clear whether the answer to that question is given in the guidelines. On page 19, thereof, this statement appears:-

"It should be borne in mind that the undertaking is simply that alternative which the proponent considers the most acceptable, and is not determined until after the evaluation stage of planning".

If the statement intends to allow the proponent the absolute discretion to describe the undertaking for which approval is sought and merely indicate that the choice may be made at any time in the assessment process, then we agree. The 'undertaking' is really equated to the proponent's choice from among the alternatives. The Environmental Assessment Act is clear that approval may be given to proceed with the undertaking, but the wording does not state that approval may be given to any one of the alternatives to the undertaking. Terms or conditions may be imposed, but these must relate to the undertaking. A proponent has the right to know whether the undertaking of the proponent's choosing is to be allowed to go forward.

We have, however, agreed that the undertaking may change as the assessment process continues and, since the hearing is part of the process, the undertaking may be amended up until the time the decision is rendered. Any change in the undertaking must come from the proponent since, by definition, the undertaking is the proponent's preference from among the alternatives.

With any amendment to the undertaking, the rules of natural justice apply to determine the extent to which the assessment process would have to be repeated. Amendments which result in an undertaking of an entirely different nature may require starting the process from the beginning, whereas minor changes to the undertaking may be made without giving any further notice or repeating any procedures.

It is arguable that a proponent may define an extremely narrow undertaking and this is a possibility. Ontario Hydro could have described the undertaking to mean the transmission system plan represented by plan M1. Caution should be exercised, however, before adopting this practice for the identification of a more suitable alternative may lead to a refusal to proceed with the undertaking. It is Hydro's right, however, to receive an answer on any particular undertaking.

We are further persuaded to accept the proponent's choice of undertaking by the broad definition of "undertaking" set out in the Environmental Assessment Act and adopted in a simplified form in the Consolidated Hearings Act. It gives the proponent a wide latitude in preparing the statement of the undertaking which means a 'plan', 'program', 'activity' or 'proposal'. How the undertaking is settled by the proponent will have a bearing

on what constitutes an alternative to the undertaking and an alternative method of carrying out the undertaking, matters which affect the scope of the environmental assessment process.

The statement of the subject undertaking is broad enough to include all six basic alternative system plans which have been presented by Ontario Hydro, but each plan represents an alternative method of carrying out the undertaking. The joint board, under its power to attach conditions, may specify the method to be used to carry out the undertaking and, thereby, restrict the work to one of the system plans.

The conclusion reached by us on the jurisdiction of the joint board with respect to alternatives to the undertaking, in effect, settles another issue raised by Ontario Hydro and that related to the "null" or "no action" alternative. We agree that this is a decision-making abstraction and not a true alternative, since it does not fulfill the purpose of the undertaking. The "null" or "no action" is still part of the assessment process for it is a bench mark against which the undertaking and the alternatives are examined. We fail to understand any practical difference in the position taken by Ontario Hydro and the Ministry on this issue.

One other point deserves comment. This concerns the role of the review co-ordinator in the environmental assessment process.

The Ministry is responsible for the administration of the Environmental Assessment Act and, although the Act does not specifically refer to a review co-ordinator, Section 7 requires the Minister to cause the preparation

of a review of the environmental assessment and to make the review available to the public and other interested persons for inspection.

It is anticipated that comments from a wide variety of interests involving, in many instances, technical and complex matters, will be received and incorporated into the review. Staff members at the Ministry will assume a major responsibility in providing comments on the proposed undertaking, but only within the area of their own expertise. The review co-ordinator should organize all of the comments received and present them in an orderly, understandable fashion, but his duties fall short of including in the review final conclusions and recommendations with respect to the acceptance of the environmental assessment or to the approval to proceed with the undertaking. For matters requiring a public hearing, that responsibility rests with the administrative tribunal and in situations where a public hearing is not required, it rests with the Minister.

The Minister may, however, call upon the review co-ordinator for some assistance who, in such situations, may prepare conclusions and recommendations for the approval and final decision of the Minister. This additional function should be kept separate and apart from the review itself. "

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K6H 3G2.
17. Natalie Morisset,
3-322 Lyon Street N.,
OTTAWA, Ontario.
18. Meredith van Beek,
33 Charles Street,
Apt. #2,
OTTAWA, Ontario,
K1M 1R3.
19. Penny Sanger,
299 First Avenue,
OTTAWA, Ontario,
K1S 2G7.
20. K. E. Brooks,
47 Argyle Avenue,
OTTAWA, Ontario,
K2P 1B3.

21. Martin Adeldar,
P. O. Box 4317,
Station "E",
OTTAWA, Ontario.
22. Emily Finn,
Leeds County Conserver Society,
R. R. #1,
MALLORYTOWN, Ontario,
KOE 1RO.
23. Peter Dundas,
Leeds County Federation
of Agriculture,
R. R. #4,
ATHENS, Ontario,
KOE 1BO.
24. Charles Gobeil,
Renewable Energy Ltd.,
ATHENS, Ontario,
KOE 1BO.
25. Peter Onstein,
Leyon Sheet Metal,
BROCKVILLE, Ontario.
26. Bill Borger,
R. R. #1,
BROCKVILLE, Ontario,
K6V 5T1.
27. Ormond Lee,
R. R. #3,
LANARK, Ontario,
KOG 1KO.
28. Nancy McDermott,
R. R. #3,
LANARK, Ontario,
KOG 1KO.

29. Wendy Laut,
132 Gore Street E.,
Apt. #1,
PERTH, Ontario,
K7H 1J5.
30. Tom Clark,
R. R. #4,
PERTH, Ontario,
K7H 3C6.
31. Jane Olson,
Box 384,
PERTH, Ontario,
K7H 3G1.
32. Jim Deacove,
R. R. #4,
PERTH, Ontario,
K7H 3C6.
33. Gary Glover,
R. R. #4,
PERTH, Ontario,
K7H 3C6.
34. Susan Green,
R. R. #2,
MABERLY, Ontario,
KOH 2B0.
35. John MacNeil,
R. R. #7,
PERTH, Ontario,
K7H 3C9.
36. Mrs. Dawn King,
R. R. #4,
PERTH, Ontario,
K7H 3C6.

37. Penelope Dexter,
R. R. #4,
PERTH, Ontario,
K7H 3C6.
38. Eric Scheuneman,
18 Morris Street,
OTTAWA, Ontario,
K1S 4A7.
39. J. M. Hubicki,
Totten, Sims, Hubicki
Associates Limited,
1A King Street East,
P. O. Box 398,
COBOURG, Ontario,
K9A 4L1.
40. South Leeds Planning Board,
P. O. Box 606,
R. R. #1,
MALLORYTOWN, Ontario,
KOE 1R0.
41. Neil Orser,
Clerk,
Township of Loughborough,
Box 100,
SYDENHAM, Ontario,
KOH 2T0.
42. Bakavi Design for Living Inc.,
c/o Jake Brooke,
P. O. Box 2011,
Station "D",
OTTAWA, Ontario,
K1P 5W3.
43. Sharon Donnelly,
Township of Oso,
SHARBOT LAKE, Ontario,
KOH 2P0.

44. Ralph Willsey,
Whig Standard,
13 Argyle Drive,
PERTH, Ontario,
K7H 3G8.
45. Mrs. M. Slade,
Leeds & Grenville County
Board of Education,
Central Avenue & Stewart Blvd.,
BROCKVILLE, Ontario,
K6V 5X1.
46. John McNinch,
Frontenac Federation of Agriculture,
R. R. #2,
KINGSTON, Ontario,
K7L 5R6.
47. Ms. Angela Vuchnich,
126 Garfield Avenue,
TORONTO, Ontario,
M4T 1G1.
48. Mr. Wayne Shepherd,
Association of Major Power
Consumers of Ontario,
c/o Thornton B. Lounsbury,
15 Toronto Street,
Suite 201,
TORONTO, Ontario,
M5C 2E3.
49. Land Use Committee of the
Ottawa Valley Board of the
Institute of Agrologists,
c/o Mr. R. K. Matthie,
Room 2106, Journal Towers South,
365 Laurier Avenue West,
OTTAWA, Ontario.
50. Ministry of Natural Resources,
Mr. William W. Hiscock,
KEMPTVILLE, Ontario,
K1G 1J0.

51. Ralph Torrie,
1386 Fischer Avenue,
OTTAWA, Ontario.

52. Judy Smith,
Pollution Probe,
55 Queen Street,
OTTAWA, Ontario.

53. Miss Lois K. Smith, Ph.D.,
Box 3395,
Postal Station "C",
OTTAWA, Ontario.

54. Mr. F. L. G. Askwith, P.Eng.,
1374 Dowler Avenue,
OTTAWA, Ontario,
K1H 7S1.

LIST OF EXHIBITS

<u>Exhibit #</u>	<u>Description</u>
1	Affidavit of Service of Ontario Hydro of Notice of Public Hearing
2	Supplementary Affidavit of Service of Notice of Public Hearings
3	Notice to Hearings Registrar (re Planning Act Site Plan Approvals)
4	Document entitled "Eastern Ontario Plan Stage Environmental Assessment" - July 1980
5	Document entitled "Environmental Assessment Summary for Eastern Ontario Plan Stage Environmental Assessment"
6	Witness Statement of Ontario Hydro
7	Four copies of Illustrations of Panel I
8	Ontario Hydro Submission to the Royal Commission on Electric Power Planning entitled, "Bulk Power Facilities, Eastern Ontario", December 1978
9	Ontario Hydro Submission to the Royal Commission on Electric Power Planning entitled, "Bulk Power Facilities, Eastern Ontario Supplementary Information", March 1979
10	RCEPP Report on the Need for Additional Bulk Power Facilities in Eastern Ontario, July 1979
11	RCEPP - Final Report - Volume 1, Concepts, Conclusions and Recommendations

<u>Exhibit #</u>	<u>Description</u>
12	Response of Government of Ontario to the Final Report of RCEPP, May, 1981
13	Copies of Illustrations for Panel 2 (7 pages)
14	Table entitled Eastern Ontario - Actual, Forecast and Projected Sum of Customer January Peak Loads by operating areas
15	Order-In-Council exempting undertaking from the application of the Environmental Assessment Act OC/2000/78 and OH-18 attached as Appendices
16	Affidavit of J.A.R. Service dated January 13, 1982, and attached News Release from the Ministry of Energy, dated September 11, 1979
17	Copies of Illustrations for Panel 3 (31 pages)
18	Document entitled Quebec-Ontario Interconnection Study, dated July 1980
18a	Update of Hydro Quebec Load Forecast, 1980
19	Report to Interprovincial Advisory Council on Energy on An Evaluation of Strengthened Interprovincial Interconnections of Electric Power Systems
20	Table of Main Hydraulic Stations - January Dependable Capability
21	Copies of Illustrations for Panel 4 (22 sheets)
22	Copies of Illustrations for Panel 5 (6 sheets)
23	Notice of Motion for an Advance Award of Costs by the Hydro Consumers' Association

<u>Exhibit #</u>	<u>Description</u>
24	Copies of Illustrations for Panel 6 (2 pages)
25	Ontario Hydro Submission to RCEPP Public Information Hearings dated March 1976 and entitled "Transmission - Technical"
26	List of Slides exhibited by W. B. Cormack with Prints attached
27	Copies of Illustrations for Panel 7 Direct Evidence (21 pages)
28	Eastern Ontario Plan Stage Environmental Assessment - Public Involvement and Environmental Process Support Document
29	Ontario Hydro Program Environmental Assessment Document dated March 1978 (Revision 1 April 1979) pursuant to the Environmental Assessment Act and Exemption Orders OHE-5, OH6-7 and OHL-12
30	Series of Nine Letters, Correspondence from Hydro-Quebec to Ontario Hydro
31	Filing Memorandum re: Undeveloped Hydroelectric Potential in Eastern Ontario, April 3, 1980
32	Report ERP8114/ECD81-3 - The Potential for Economic Contribution of Industrial Co-generation to the Ontario Bulk Electricity System
33	Minutes of Working Committee Meetings 1 to 5 - Eastern Ontario Study
34	Dec. 1977 Status Report for the Eastern Ontario Transmission and Generation Study

<u>Exhibit #</u>	<u>Description</u>
35	Ontario Hydro Submission to the RCEPP Public Information Hearings entitled "Transmission Environmental"
36	Excerpts from the report entitled "Planning of the Ontario Hydro East System" Vol. 1, Part 1, Showing Conceptual East System Arrangements for the mid-1990's.
37	Document entitled Load Forecasts Report - No. 810209 - System Demands Document
38	Document entitled - Background Material for the 1982 Planning Load Forecast dated November, 1981
39	Copies of Illustrations exhibited by L. Higgins on Load Forecasting
40	Copies of Illustrations exhibited by J. K. Snelson on Load Management
41	Report entitled "Energy Conservation and Utilization Programs - 1982"
42	Document entitled Ontario Hydro 1981 Alternative Energy Program Catalogue
43	Correspondence on Load Management - from December 10/79 to April 7/81 <ul style="list-style-type: none"> - Memo dated Dec. 10/79 from G. F. McIntyre to T. H. Bennett - Memo dated Dec. 31/79 from T. H. Bennett to G. F. McIntyre - Memo dated Feb. 19/80 from T. H. Bennett to G. E. Patterson - Memo dated Jan. 13/81 from T. H. Bennett to E. A. Marriage - Memo dated Apr. 7/81 from T. H. Bennett to L. T. Higgins

<u>Exhibit #</u>	<u>Description</u>
44	Ontario Hydro Report #ECD 78-6 dated July 1978 and entitled "Role for Load Management in Ontario"
45	Three Tables re: New Potential prepared in conjunction with S. Shrybman
46	Report dated March 1981, entitled "Ontario Energy Review", 2nd Edition
47	Copies of Illustrations for Panel 8 (42 pages)
48	Topographic map with acetate overlay showing preferred bands
49	List of Approximate Right-of-Way Widths of Existing Ontario Hydro Lines in Eastern Ontario
50	Witness Statement of David R. Young, Senior Environmental Planner, M.O.E., dated May 10, 1982
51	Witness Statement of David J. Birnbaum, Senior Environmental Planner, M.O.E., dated January, 1982
52	Review under the Environmental Assessment Act of the Eastern Ontario Plan Stage Environmental Assessment, Province of Ontario, April, 1981
53	Resume of Peter A. Victor, Ph.D.
54	A Review of Ontario Hydro's Evaluation Methodology used in the Eastern Ontario Plan Stage Environmental Assessment Act July 1980 - Peter A. Victor
55	General Guidelines for the Preparation of Environmental Assessments - Ministry of the Environment
56	Copies of Slides used by Peter Victor

<u>Exhibit #</u>	<u>Description</u>
57	Submission to the RCEPP (by M.O.E.) - Debate Stage Hearing Parts I-VI, May 1977 - March 1979
58	Chapter V (pages 84-96) of a book entitled "Energy and the Quality of Life" co-authored by Dr. Victor
59	Two pages (p. 4/3 and 4/4) of excerpts from the "Review Coordinators Handbook"
60	One page (p. 4/8) excerpt from the "Review Coordinators Handbook"
61	Ministry of Energy Statement of Direct Evidence by John M. Johnson, Q.C.
62	Witness Statement of Dr. John B. Robinson (Panel 1) on "Soft Energy Paths" including curriculum vitae and a one-page summary of a study entitled "2025: Soft Energy Futures for Canada"
63	Report dated October 1980 and entitled "Conservation Energy - Potential and Practice in Canada" by G. T. Armstrong
64	Submission by David Brooks to the Select Committee on Hydro Affairs entitled "Energy for Canada - the Soft Path"
65	Curriculum Vitae of Christopher Conway
66	Report by J. B. Robinson dated August 1981 and entitled "Bottom-up Methods and Low-down Results: Changes in the Estimation of Future Energy Demands"
67	Summary and Testimony of Mr. John B. Robinson (Panel 2) on Load Forecasting
68	Witness Statement of Christopher J. Conway (Panel 2) on Energy Demand Analysis

<u>Exhibit #</u>	<u>Description</u>
69	Witness statement of the Workgroup on Canadian Energy Policy entitled "Alternatives and Ontario Hydro's Eastern Ontario Plan Stage"
70	Curriculum Vitae of Charles Albert Ficner
71	Document entitled An Overview of Residential/Commercial Energy Consumption and Conservation in the IEA Countries by Charles Ficner
72	Curriculum Vitae of Roger Peters
73	Document entitled Evaluating the Potential of Solar Energy as an Indirect Supplier of Conventional Energy by Roger Peters
74	Curriculum Vitae of Carl Griffith
75	Witness Statement of Carl Griffith
76	Curriculum Vitae of Jack O. Gibbons
77	Document entitled Marginal Cost Pricing for Ontario Hydro by Jack O. Gibbons
78	Document entitled Electric Heating: Does it make sense for Ontario? by Jack O. Gibbons
79	Statement by Dr. Richard G. Lipsey - Remove the Electricity Subsidy
80	Curriculum Vitae of Ralph D. Torrie
81	Document entitled Electricity Demand in an Energy Efficient Ontario by Ralph D. Torrie for the Hydro Consumers Association
82	Witness Statement of Lanark County Federation of Agriculture
83	Witness Statement of John Lianga

<u>Exhibit #</u>	<u>Description</u>
84	Witness Statement of Mr. Green
85	Witness Statements of Elaine P. Nelson and Peter Nelson
86	Witness Statement of Don Caldwell
87	Witness Statement of Terry Henderson
88	Curriculum Vitae of John Frederick Coombs
89	Witness Statement of John F. Coombs re: Herbicide Usage on the Proposed Ontario Hydro Transmission Lines
90	Resume of Charles Figueiredo
91	Witness Statement of Charles Figueiredo - The Potential for the conservation of Electricity in the Industrial Sector
92	Excerpts from the Minutes of Proceedings and Evidence of the Special Committee on Alternative Energy and Oil Substitution
93	Preliminary Position Paper of the Regional Municipality of Ottawa-Carleton
94	Report No. 37 of the Planning Committee of the Regional Municipality of Ottawa-Carleton
95	Resume of Barry James
96	Resolution No. 81-2 of the O.M.E.A. and supporting documents
97	Curriculum Vitae of George F. Matheson
98	Witness Statement of George Matheson
99	Statement to the Joint Board - Eastern Ontario Plan Stage by Ottawa Hydro
100	Curriculum Vitae of Edward J. Murphy

<u>Exhibit #</u>	<u>Description</u>
101	Curriculum Vitae of Carl Kropp
102	Document entitled Electric Heat Survey - Preliminary Overview - 7100 Responses by C. Kropp
103	Statement by William H. Moulton of Gloucester Hydro
104	Brief by Gloucester Hydro
105	Submission by Kanata Hydro
106	Submission by Nepean Hydro Commission
107	Submission by Larry Hughes - An Alternative Proposal to HVAC Transmission Lines
108	Responses to submission by Larry Hughes
109	Curriculum Vitae of Dr. David Brooks
110	Plan and documents re: City of Cornwall airport
111	Table - Approximate widths of Existing Rights-of-Way
112	Table - M Scenario - Estimated Number of Towers in 1987 and 1993 at 3.2% Annual Load Growth
113	Copies of Illustrations - Alternative plans L1 to L5 and H1 to H5
114	Answer to a request of Ontario Hydro by Lois K. Smith - Information on the effect of ground conditions on transmission tower line costs
115	Question #4 re: Existing interconnections
116	19 slides illustrating part of the Hinchinbrooke TS to St. Lawrence Right-of-Way

<u>Exhibit #</u>	<u>Description</u>
117	Table - Evaluation of Existing Lines - Catarauqui TS x St. Lawrence TS
118	Six pages of maps submitted by Dr. Smith
119	Curriculum Vitae of D. R. Fraser and C.A.M. Bancroft-Wilson
120	Ranking of Variables
121	Table 2 - Example of calculations used to establish ratings of categories of concern on basis of questionnaire responses. Table 3 - Order of priority among categories of concern as reflected by overall ratings obtained from responses to questionnaire
122	Factor Weighting
123	Basis for calculation of 1113 MW Hydraulic Potential of Exhibit 89
124	Two graphs re: load forecast
125	Large copy of Fig. 11.7-2 submitted by Dr. Smith
126	Large copy of Fig. 11.7-1 submitted by Dr. Smith
127	Six aerial photographs - Hawthorne Transfer Station and bog - Mer Bleue bog
128	Journal of Ecology article - November 1976 re: Minimizing Windfall around Clear Cuttings in Spruce-Fir Forests
129	Journal of Ecology article - November 1976 - The Wave-Regeneration Pattern
130	Excerpt from the Lineman's and Cableman's Handbook

<u>Exhibit #</u>	<u>Description</u>
131	Excerpt from the Environmental Planning Resourcebook - Selected Activities - Energy Projects
132	Statistics 1980 - A statistical supplement to the Annual Report of the Minister of Natural Resources for the year ending March 31, 1980
133	Ontario/Canada Traveller's Encyclopaedia
134	Periodical entitled "The Review - Number 2, 1981"