Independent Electricity Market Operator

18-Month Outlook:

An Assessment of the Reliability of the Ontario Electricity System from July 2002 to December 2003

Executive Summary

This report presents the IMO's assessment of the reliability of the Ontario electricity system for the 18-month period from July 2002 through December 2003. This assessment is based on the IMO's forecast of electricity demand, the participants' submission of available supply and the latest information on the configuration and capability of the transmission system.

Reference Resource Scenario

The Reference Resource Scenario is the base case for this assessment and assumes:

- forecast Ontario Market Demand based on normal weather;
- the availability of existing generation in Ontario based on information provided by market participants;
- 3,000 MW of additional generation, consisting of new generation resources currently under construction and nuclear units returning to service, commencing production on the dates identified by market participants; and
- outage plans of generators and transmitters based on information provided by market participants as of mid-June 2002.

To assess reliability, the IMO uses this information to determine whether reserve margins, over and above Ontario's anticipated peak demands, are adequate to accommodate circumstances that cannot be accurately predicted - such as weather variations and unforeseen generator outages. Under the reference scenario Ontario's reserves are forecast to be in the range of 2,000 to 3,600 MW during July, August, and from the latter part of October through December 2002. The reserves for these periods are below the IMO's required planning reserve levels, but do not account for additional resources outside Ontario that are expected to be available when required to supplement Ontario supply. Similar conditions exist sporadically during February through June 2003. Outside of these periods, Ontario reserves generally exceed requirements. Higher than forecast peak demands due to extreme weather conditions or higher than forecast forced outages to Ontario generators would increase the importance of external resources.

Tighter demand/supply balances during periods of reduced reserve levels will have several potential market impacts. These include upward pressure on market prices during peak demand periods and limited opportunities for the IMO to approve the release of generators for planned maintenance. Various responses can be anticipated in these circumstances, including: for Ontario generators, maximizing their availability to offer into the Ontario market; for marketers, arranging imports to help meet anticipated Ontario requirements; and for consumers, taking measures to reduce their electricity consumption. The demand/supply balance is expected to improve in 2003 if the planned addition of generation proceeds according to the schedules provided to the IMO by market participants.

Compared to the previous Outlook report dated April 3, 2002, reserve margins for this scenario are lower in August, September, October and December. For the period from January 2003 through September 2003 reserve margins are also lower than the previous outlook, but for the most part exceed required levels. However, combinations of extreme weather and/or lower than

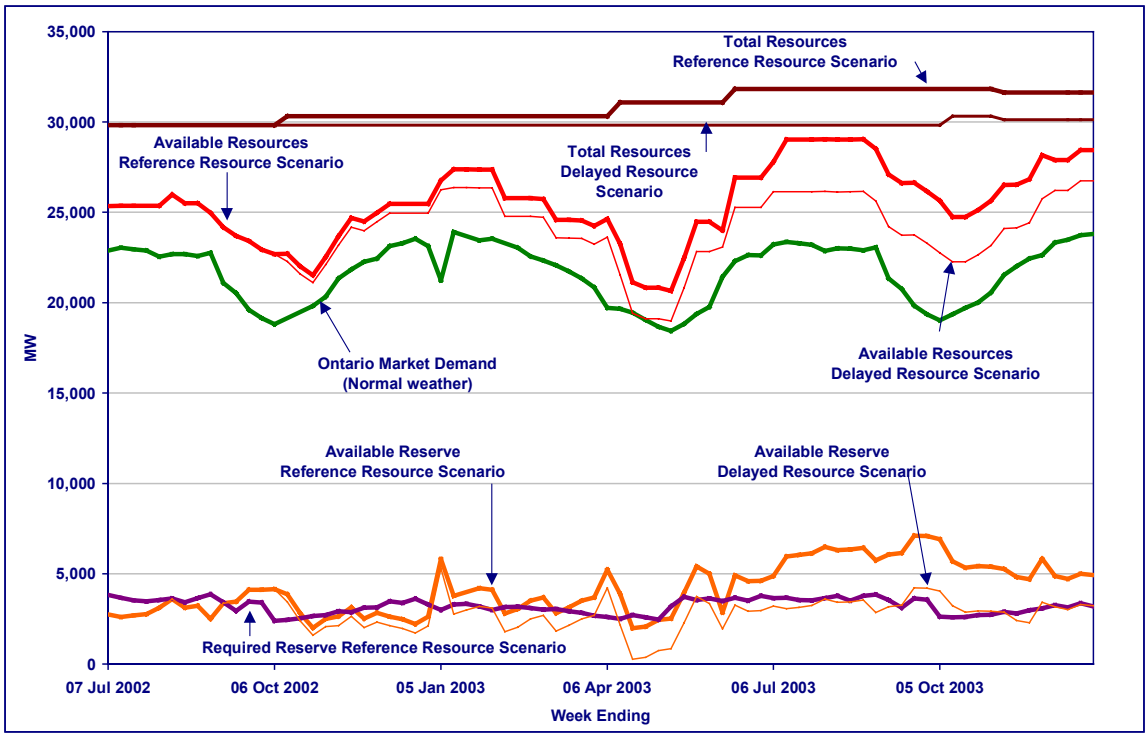
forecast resources could result in lower than required levels of reserve at any time throughout the forecast period.

Over the 18-month period under study, accounting for the availability of regional supply, the Northeast Power Coordinating Council resource adequacy criterion is expected to be met.

Delayed Resource Scenario

The Delayed Resource scenario differs from the Reference Resource scenario only by delaying the in-service dates of additional resources by one year. Under this scenario, reserve margins will further tighten in the latter months of 2002 and will remain tight throughout most of 2003. Once again opportunities for the IMO to approve planned generator outages would be limited.

The following figure illustrates the weekly resource adequacy situation of the Ontario electricity system for the two resource availability scenarios.



Under both scenarios, it is anticipated that market participants will focus on periods of high and low reserve margins as opportunities to optimize their operational and commercial plans.

Ontario Market Demand Forecast

The IMO's resource adequacy assessments take into consideration the range of expected weather conditions on a probabilistic basis. The Ontario Market Demand forecast assumes normal weather with the effect of deviations from normal weather on peak demands being factored into the determination of the required reserve.

Generally, the electricity peak demand forecast is similar to the demand forecast that was prepared for the previous 18-Month Outlook published in April 2002. The information used in

preparing the forecast includes updated economic, demand and weather data up to the end of February 2002. For 2002, the normal weather summer peak is expected to exceed 23,000 MW. This is marginally higher than the previous Outlook.

Transmission Outlook

As in the previous Outlook, the transmission system is expected to be adequate to supply demand under the forecast conditions studied in this Outlook, with some limits on the flexibility for planned outages in the Toronto and Windsor areas. Lakeview, Pickering and Darlington units are required to provide reactive capability to maintain adequate voltage levels during summer peak demand periods.

Energy

The overall monthly energy production capability is forecast to be adequate, however shorter-term energy deficiencies could arise as a result of higher than forecast forced outage situations, extreme demands and other influencing factors. Shorter-term energy studies are undertaken closer to real-time to support more detailed assessments and provide additional information to market participants as appropriate.

Caution and Disclaimer

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1.0 Introduction

The Ontario Electricity Market Rules (Chapter 5) require that the Independent Electricity Market Operator (IMO) provide forecasts and assessments of the reliability of the existing and committed resources and transmission facilities of the Ontario market.

This Outlook covers the 18-Month period from July 1, 2002 to December 31, 2003. It supercedes the report titled "An Assessment of the Adequacy of the Ontario electricity system from April 2002 to September 2003", dated April 03, 2002. Its purpose is to advise market participants of the resource and transmission reliability of the Ontario electricity system, and to assess potentially adverse conditions that might be avoided through adjustment or coordination of maintenance plans for generation and transmission equipment.

Section 2 of this Outlook identifies the resources expected to be available during the study period and Section 3 presents an assessment of the adequacy of these resources under the current generation outage program. An assessment of the reliability of the transmission system is described in Section 4. The overall findings and conclusions related to the resource and transmission reliability assessments are contained in Section 5.

This Outlook presents an assessment of adequacy based on the stated assumptions, and using the described methodology. Readers may envision other possible scenarios, recognizing the uncertainties associated with various input assumptions, and are encouraged to use their own judgement in considering possible future scenarios. This Outlook provides a base upon which changes in assumptions can be considered. The tables contained in the document can be downloaded from the IMO web site in MS Excel format.

The contents of this Outlook document focus on the assessment of resource and transmission adequacy. Other supporting information and forecasts are contained in separate documents. These documents will be updated as required.

- The separate document titled "Ontario Market Demand Forecast from July 2002 to December 2003" (IMO_REP_0073) (found on the IMO web site at www.theimo.com/imoweb/pubs/marketReports/18Month_ODF_2002jul.pdf) describes in detail the 18-month forecast of electricity demand for the Ontario Market used in this Outlook. The demand forecast document also identifies the assumptions used to determine the forecast and identifies the details regarding peak and energy demand forecasts for the Ontario market and parts thereof. It also contains information regarding variations in demand due to weather, economic growth and calendar day types. Data from the demand forecast document can be downloaded in MS Excel format from the IMO web site.
- The separate document titled "Methodology to Perform Long Term Assessments" (IMO_REP_0044) (found on the IMO web site at www.theimo.com/imoweb/pubs/marketReports/Methodology_RTAA_2002jul.pdf) contains information regarding the methodology used to perform the demand forecasts, resource adequacy assessments and transmission reliability assessments in this Outlook.

Readers are invited to provide comments on this Outlook report or to give suggestions as to the content of future reports. To do so, please contact the IMO help centre:

- Toll Free: 1-888-448-7777
- Tel: 905-403-6900
- Fax: 905-403-6921
- E-mail: helpcentre@theIMO.com.

2.0 Resources

This Section describes the generation resources that are considered in this Outlook based on information available to the IMO as of mid-June 2002.

2.1 Existing Generation Resources Included in the Study

The existing installed generation within Ontario as of May 2002 is summarized in Table 2.1. This includes nuclear, coal, oil, gas, hydroelectric, wind-powered, wood and waste-fuelled generation. The installations range in size from less than 1 MW to 881 MW net electrical output, and result in a total capacity of 29,622 MW. Excluded from the table are retired generators and generators owned by Great Lakes Power[1].

The capacity of installed generation resources in Table 2.1 does not include Bruce A nuclear units, which are currently in laid-up state. Bruce A units, together with other additions to generating capacity identified to the IMO via the Connection Assessment and Approval (CAA) process, are added to the installed resources as they come in to service, as described in Section 2.4.

Table 2.1 Existing Installed Generation Resources

Fuel Type	Total Capacity (MW)	Number of Stations	Unit Size Range (MW)
Nuclear	10,808	4	515 - 881
Coal	7,553	5	155 - 490
Oil / Gas	3,662	30	0.43 - 525
Hydroelectric	7,522	127	0.04 - 136
Miscellaneous (wind, waste, wood, etc.)	77	7	1 - 40
Total	29,622	173	<1 - 881

Changes from the Previous 18-Month Outlook

There are no changes from the previous 18-Month Outlook.

2.2 External Transactions

A firm purchase of 200 MW is assumed to be delivered to Ontario for the period until October 31, 2003 and is explicitly included in the resource availability scenarios described in Section 2.4. No other firm purchase contracts have been identified for the study period. There are no firm sales identified at any point in the study period.

[1] Great Lakes Power is currently modeled as the net of generation and demand connected to the Ontario electricity system. The next 18-Month Outlook will explicitly model Great Lakes generators and demand.

2.3 Potential New Generation Resources

In accordance with the Market Rules, Chapter 4, Section 6, anyone planning a new or modified connection to the Ontario electricity system must apply to the IMO for approval under the CAA process.

Table 2.2 summarizes the new generation projects, as of the beginning of May 2002, that have been identified to the IMO through the CAA process and are to be in-service within the 18-month study period.

Table 2.2 Potential Generation Projects in Ontario

Project Name	Zone	Fuel Type	Capacity MW	Connection Applicant's Estimated I/S Date
Transalta - SRCP	West	Gas	510	2002 - Q3
AGSTAR Power Inc.	West	Gas	88	2003 - Q1
Bruce Power Inc.	Bruce	Nuclear	1,500	2003 - Q3
Northland (Thorold)	Niagara	Gas	273	2003 - Q3
Total			2,371	

Details regarding the CAA process, the status of all current applicants, including copies of available Preliminary Assessment (PA) and System Impact Assessment (SIA) Reports can be found on the IMO's web site www.theIMO.com under the "Services - Connection Assessments" link.

2.4 Summary of Generation Resource Scenarios

In assessing future resource adequacy, it is necessary to make a number of assumptions regarding the magnitude of supply resources that are expected to be available. Two resource scenarios are considered in this Outlook: a Reference Resource Scenario and a Delayed Resource Scenario. Both resource scenarios are based on the existing installed resources shown in Table 2.1.

Under the **Reference Resource Scenario** existing Ontario Resources are assumed to be in-service for the duration of the study period and 200 MW of purchases are assumed to be available up to the end of October 2003. This resource scenario assumes that Pickering-A units come into service on the dates that the facility owner has indicated to the IMO. It also includes those generation projects listed in the CAA queue where the connection applicant has indicated that construction is in progress or has been completed. For this Outlook, this includes the 510 MW TransAlta gas-fired generation project in Sarnia and an additional 1,500 MW of capacity from the Bruce Power project. Both projects were assumed to be placed in-service on the dates provided by the owner or operator.

Under the **Delayed Resource Scenario** the same assumptions are used as for the Reference Resource Scenario except that the in-service dates of additional resources are delayed by one year. No other new generation facilities are assumed to come into service in this resource scenario.

Table 2.3 shows a snapshot of the available resources assumed in the study, under the two scenarios, at the time of the seasonal peak demands. The installed resources in the table include

the additional resources, which are considered to be in-service for each of the scenarios. Imports include the purchases that are assumed to be delivered to Ontario as described in Section 2.2. The total reduction to resources includes generator deratings, generator outages under each resource scenario, generation limitations due to transmission interface constraints and allowances for non-utility and hydroelectric generation production below rated capacity. These reductions are subtracted from Total Resources to obtain Available Resources.

Table 2.3 Summary of Available Resources

Notes	Description \ Year	Summer Peak 2002		Winter Peak 2003		Summer Peak 2003	
		Reference Resource Scenario	Delayed Resource Scenario	Reference Resource Scenario	Delayed Resource Scenario	Reference Resource Scenario	Delayed Resource Scenario
1	Installed Resources (MW)	29,622	29,622	30,132	29,622	31,632	29,622
2	Imports (MW)	200	200	200	200	200	200
3	Total Resources (MW)	29,822	29,822	30,332	29,822	31,832	29,822
4	Total Reductions in Resources (MW)	4,469	4,469	2,948	3,443	2,802	3,680
5	Available Resources (MW)	25,353	25,353	27,384	26,379	29,030	26,142

Notes to Table 2.3:

1. Installed Resources (MW): This is the total capacity of the generation resources in Ontario assumed to be installed at the time of the summer and winter peaks in the 18-month time span. Initially, this value includes all the generators in Ontario, except Bruce A, retired generators and generation owned by Great Lakes Power. The new generation capacity is progressively included, according to estimated in-service dates assumed for the applicable Resource Scenario.

2. Imports (MW): Represents the amount of external capacity considered to be delivered to Ontario.

3. Total Resources(MW): This is the sum of lines 1 and 2 above.

4. Total Reductions in Resources (MW): These reductions represent, under each of the two scenarios, the sum of generator deratings, planned generator outages, generation limitations due to transmission interface constraints and allowances for non-utility and hydroelectric generation production below rated capacity.

5. Available Resources (MW): This is the difference between lines 3 and 4 above.

3.0 Resource Adequacy Assessment

This Section provides an assessment of the adequacy of the resources described in Section 2 to meet the forecast demand. The purpose of the two resource scenarios described in Section 2.4 is to present a range of possible outcomes, in recognition of the uncertainty which exists regarding the future availability of new generation. The Reference Resource Scenario reflects information provided by generator operators and forms the foundation for assessment purposes. The Delayed Resource Scenario represents a more pessimistic outcome, from the perspective of assessing adequacy. The methodology used to carry out this assessment is described in detail in the document titled "Methodology to Perform Long Term Assessments" (IMO_REP_0044). Results of the adequacy assessment are described in Section 3.1, conclusions are provided in Section 5, and detailed tables of results can be found in Appendix A of this document.

The reader should be aware that System Adequacy Assessments are published on the IMO web site on a weekly and daily basis that progressively supersede information presented in this report.

3.1 Assessment of Resource Adequacy

3.1.1 Weekly Reserve Margins

An overall picture of the 18-month assessment of resource adequacy is provided in Figure 3.1, showing the Total Resources, Available Resources and Available Reserve for the Reference Resource Scenario and the Delayed Resource Scenario. The Required Reserve for the Reference Resource Scenario and the Ontario Market Demand based on normal weather are also shown in Figure 3.1. The total reduction to resources for each week is shown in Figure 3.2. The reserve margin, which is the difference between the available reserve and the required reserve, is shown in Figure 3.3 for both resource scenarios studied. Available reserve is the amount of resources expected to be available in excess of the normal weather demand that is non-dispatchable. The Ontario Market Demand forecast includes 300 MW of dispatchable demand. Further details showing weekly values are provided in Appendix A.

Under the **Reference Resource Scenario**, significant negative reserve margins are forecast during July, August, and from the latter part of October through December 2002. During negative reserve margin periods, opportunities for the IMO to approve planned outages are expected to be limited. For 2003 negative reserve margins exist sporadically during February through June. Outside of these periods, reserve margins are positive indicating potential opportunities for scheduling additional generator outages and/or sales outside of Ontario.

Under the **Delayed Resource Scenario**, the resource picture is identical to the Reference Resource Scenario, for the period from July to October 2002 since there are no plans to add additional generation during this period. With units returning to service one year later than the Reference Resource Scenario, reserve margins are lower than under the Reference Resource Scenario, starting in October 2002. Minimal opportunities for additional generator planned outages exist in the study period without additional alternate supply, as there are relatively few weeks with positive margins. Up to 2,500 MW of additional capacity could potentially be needed to maintain required reserve levels. This would have to be achieved through market participants

offering external capacity into the Ontario market and/or through rescheduling planned generator outages. The reserve shortfalls are the most significant during the spring of 2003. This is due to a large number of planned generator outages. Rescheduling of a large portion of these generator outages, as well as external generating capacity from neighbouring systems, would be needed to maintain reserves.

The IMO will closely monitor the resource situation and implement the necessary control actions, if required, in accordance with the Market Rules. Tighter demand/supply balances during periods of reduced reserve levels will have several potential market impacts. These include upward pressure on market prices and limited opportunities for the IMO to approve the release of generators for planned maintenance. Various responses can be anticipated in these circumstances, including: for Ontario generators, maximizing their availability to offer into the Ontario market; for marketers, arranging imports to help meet anticipated Ontario requirements; and for consumers, taking measures to reduce their electricity consumption.

3.1.2 Loss of Load Expectation

A number of simulations were performed using General Electric's Multi-Area Reliability Simulation (MARS) software, to calculate the Loss of Load Expectation (LOLE) during the study period. The simulations start from the two resource scenarios described in Section 2.4 and use the methodology described in Section 2.3 of the document "Methodology to Perform Long Term Assessments" (IMO_REP_0044). The MARS calculations were performed in two steps. In the first step, the resource availability modeled in MARS was established based on the same levels that were used in the calculations described in the previous section. In the second step, additional resources were assumed to be available to Ontario, with the purpose of reducing the LOLE value such that the target LOLE value is attained. The target LOLE value is equivalent to an annual LOLE of less than or equal to 0.1 days/year. The modeling of additional resources expected to be available is in accordance with the NPCC resource adequacy criterion, which allows for supplemental capacity in the form of interconnection assistance, outage rescheduling and/or operating procedures.

MARS simulation results indicate that the LOLE value for the 18-month period under study is less than the target of 0.1 days/year. Hence, the Ontario electricity system is forecast to meet the NPCC resource adequacy criterion during the study period. The months with the highest LOLE include the months of July, November, and December, for 2002, and April and May, for 2003. In order to achieve the target annual LOLE value in these months, additional capacity to offset the largest margin deficiencies shown in Appendix A, could be required under each of the two resource scenarios.

3.1.3 Overall Adequacy of Energy Production Capability

An overall monthly energy adequacy assessment has been performed, based on forecast energy production capabilities of the generating units provided by their operators. Figure 3.5 depicts the energy adequacy situation under the two resource scenarios. The detailed result table can be found in Appendix A. The energy production capability is generally expected to be well above energy demand levels in each month of the Outlook period, under both the Reference Resource Scenario and the Delayed Resource Scenario. No additional energy is expected to be needed to meet the Ontario forecast energy demand. The energy that is assumed to be available is provided

by internal resources and from the purchase quantities assumed to be delivered to Ontario during the Outlook period.

Although the overall monthly energy production capability is forecast to be adequate, shorter-term energy deficiencies could arise as a result of higher than forecast forced outage situations, extreme demands and other influencing factors. Shorter-term energy studies are undertaken closer to real-time, which provide a more detailed assessment.

In addition to the monthly, weekly or other shorter-term energy limits, there are annual limits of energy production capability for certain generating stations, and for certain groups of generating stations. The energy assessment indicates that the annual limitations are not expected to be exceeded.

3.1.4 Uncertainties in Forecast Margins and Loss of Load Expectation

Uncertainties in demands due to weather effects and uncertainties in generator forced outages are taken into account in the calculation of the weekly amount of Required Reserve, as described in Section 2.2 of the document titled "Methodology to Perform Long Term Assessments" (IMO_REP_0044).

Although current economic conditions are reflected in the base demand forecast, uncertainties in the forecast of demand due to unforeseen economic growth or decline are not. Since the demand forecast embodies the economic outlook at the time it is done, changes to the economic landscape will be captured in subsequent Outlooks. Readers may wish to make their own assessments by considering that higher demand growth reduces reserve margins, while lower demand growth increases reserve margins.

Generating unit forced outage rate uncertainties in excess of the allowance already included in the assessment can have negative impacts on reserve margins and LOLE values. These events can be caused by random unit failures or by unplanned extensions to planned maintenance. In the latter case, the IMO has considered that certain outage extension risks exist, as considered in the Delayed Resource Scenario in the present Outlook.

3.1.5 Outage Coordination and External Resources

Management of the Ontario demand and resource situation is a continual process, which responds to numerous factors that can affect the adequacy of the Ontario supply situation. The availability of generating units (i.e. the requirement for unit outages) and imports from other control areas are major factors that significantly impact supply adequacy. Generating unit outage plans are developed by generators to provide the necessary outage time to ensure continued equipment and staff safety, to meet regulatory requirements and to maintain long term equipment reliability. Most outages are scheduled during the fall and spring periods when demands are lower. If, during the course of time, new outages are identified or the duration of scheduled outages change, the outage coordination process established by the Market Rules is intended to maintain acceptable levels of adequacy. These actions are considered normal planning activities and exclude any emergency control actions that are available to the IMO in day to day operations.

Generators, transmitters and other market participants are expected to address the coordination of planned outages of their equipment, with each other. However, the IMO assesses the individual

plans of each market participant from an integrated perspective. The results of the IMO's integrated assessment are intended to provide information to participants to assist in identifying opportunities for further coordination or by suggesting changes in timing to mitigate reliability concerns. Positive reserve margins indicate periods where generators could plan for additional outages or exports. Negative reserve margins indicate a potential role for additional external resources and suggest that generation impactive outages should be rescheduled to another time-period to restore the prescribed reserve levels.

An analysis of historical flows for the last five years on Ontario's interconnections has been carried out. This analysis shows that outside of summer peak demand periods up to 1,800 MW of external generation resources are expected to be available to offer into the Ontario market. During Ontario's summer peak demand periods of July and August opportunities for imports still exist despite the fact that many neighbouring systems are often experiencing their peak demands. This is mainly due to the non-coincidence of the daily peak hours between Ontario and its neighbours and the availability of spare capacity from systems which are not summer peaking. Up to 1,400 MW is expected to be available based on observations during summer peak months in recent years.

Figure 3.1 18-Month Assessment of Resource Adequacy

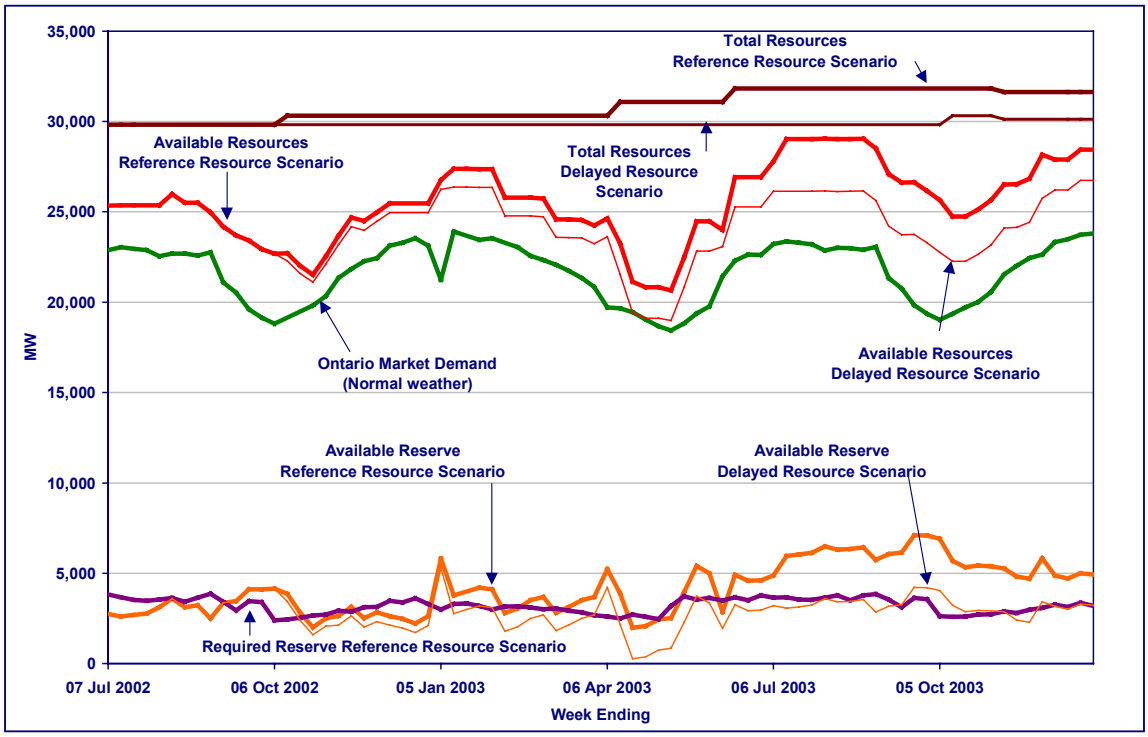


Figure 3.2 Total Reductions in Resources

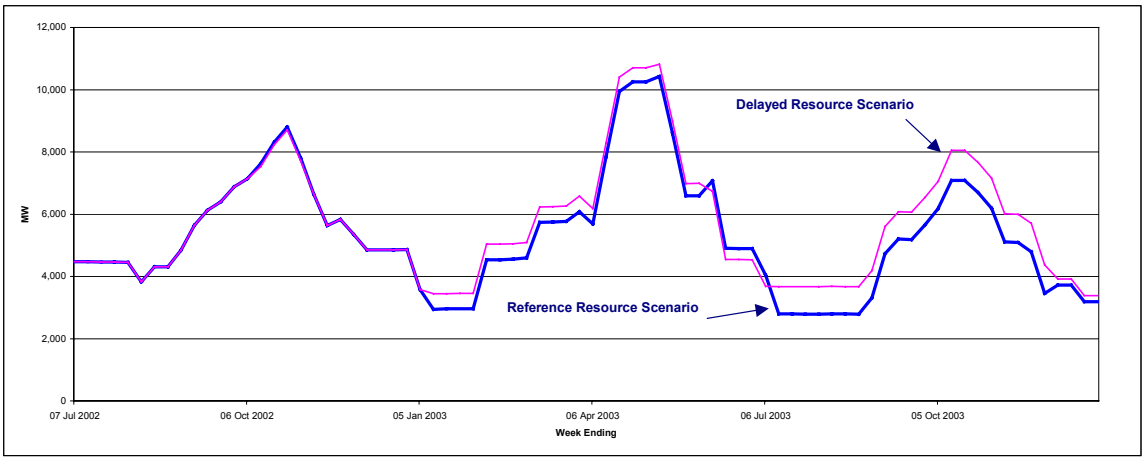


Figure 3.3 Reserve Margin: Reference Resource Scenario and Delayed Resource Scenario

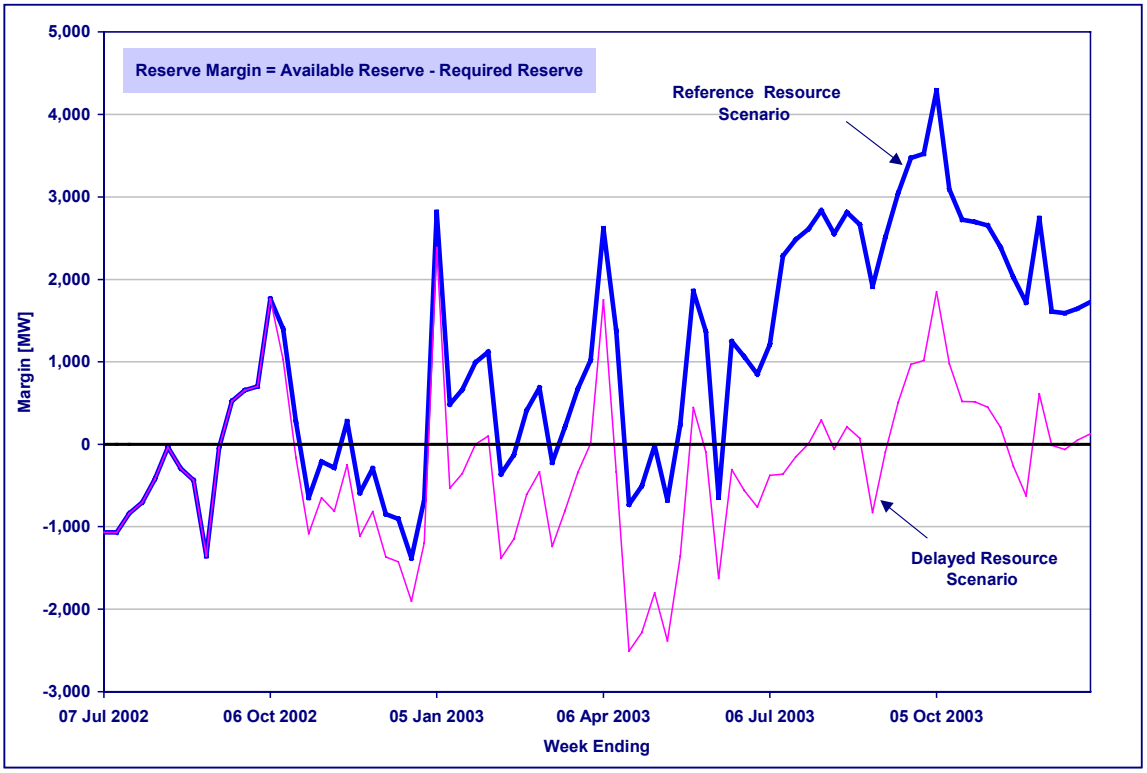


Figure 3.4 Reserve Margin Compared to Previous Outlook (Reference Resource Scenario)

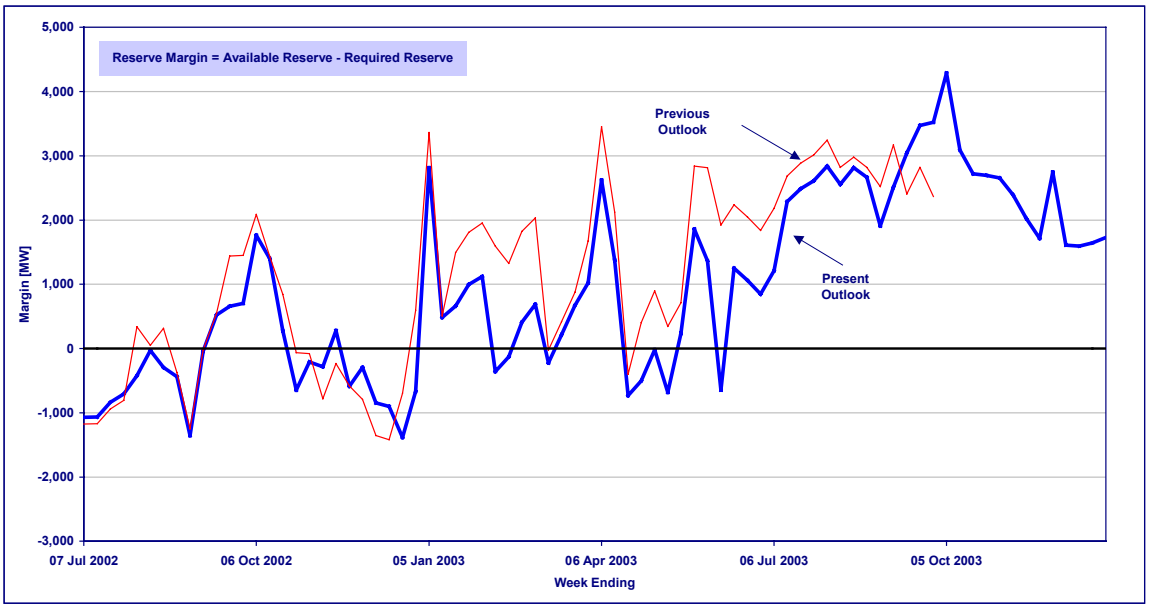
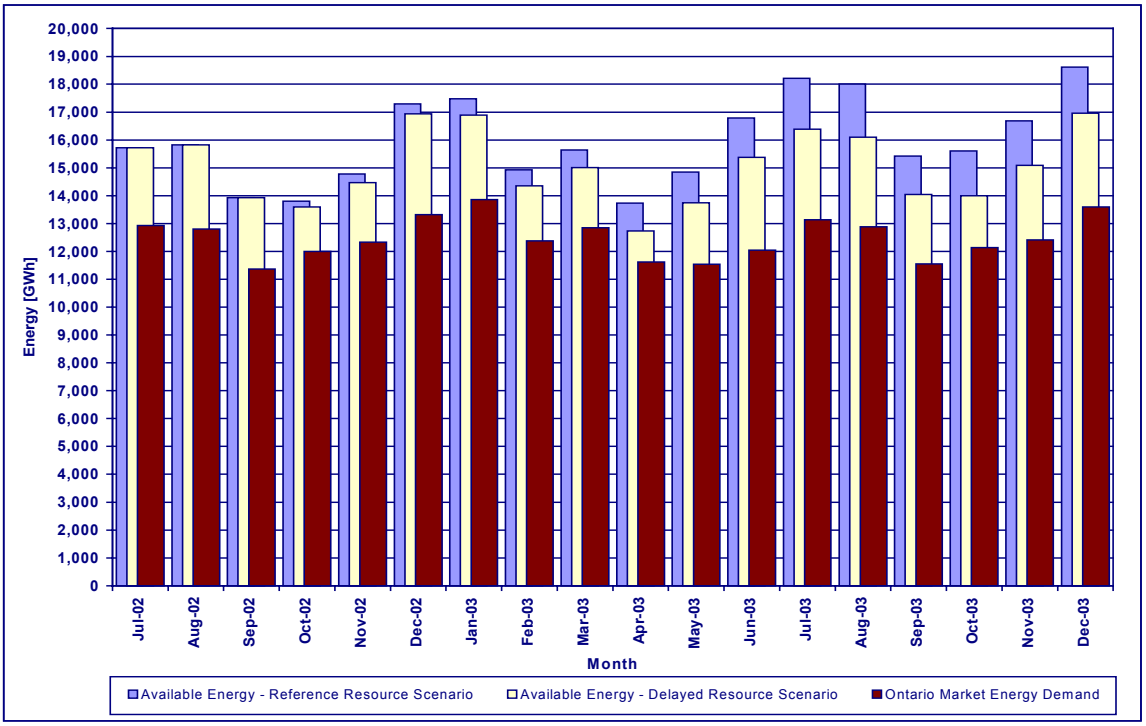


Figure 3.5 18-Month Forecast of Energy Production Capability



4.0 Transmission Reliability Assessment

This Section provides an assessment of the reliability of the Ontario transmission system.

4.1 Changes from the Previous 18-Month Outlook

Committed transmission projects summarized in Appendix B by transmission zone represent a subset of the transmission projects in the Connection Assessment and Approval (CAA) queue. Only those projects with the estimated in-service date within the 18-month period under study were listed.

Installation of the phase angle regulators (PAR) on the Ontario-Michigan tie lines L51D and B3N has been completed. The B3N PAR is by-passed, while the L51D PAR is on neutral tap. By January 2003, it is expected that a new 845 MVA PAR for 230 kV circuit L4D will be in-service. Full PAR control of the Ontario – Michigan interconnection can only be utilized when all PARs are in-service. This is expected around January 2003.

4.2 Assessment of Transmission Outage Plan

The principal purpose of the transmission reliability assessment is to forecast any reduction in transmission capacity brought about by specific transmission outages. For a major transmission interface or interconnection, the reduction in transmission capacity due to an outage condition can be expressed as a change in the base flow limit associated with the interface or interconnection. Another purpose of the transmission reliability is to identify the possibility of any security-related events on the IMO controlled grid that could require contingency planning by market participants or by the IMO. As a result, the transmission outages are reviewed to identify transmission system reliability concerns and to highlight those outages that could be rescheduled.

Transmitters and generators are expected to have a mutual interest in developing an ongoing arrangement to coordinate their outage planning activities. Transmission outages that may affect generation access to the Ontario electricity system should be coordinated with the generator operators involved, especially at times when reserve margins are below required levels. Under the Market Rules, where the scheduling of planned outages by different market participants conflicts such that both or all outages cannot be approved by the IMO, the IMO will inform the affected market participants and request that they resolve the conflict. If the conflict remains unresolved, the IMO shall determine which of the planned outages can be approved according to the precedence of each planned outage as determined by the Market Rules detailed in Chapter 5, Sections 6.4.13 to 6.4.18.

For this Outlook, transmission outage plans as of the beginning of May 2002 were used.

The IMO's assessment of the impact of the transmission outage plans is shown in Appendix C, Tables C1 to C10. In these tables, each element is assessed individually by indicating the possible impacts and the reduction in transmission interface and/or interconnection limits. The methodology used to assess the transmission outage plans is described in the IMO document titled "Methodology to Perform Long Term Assessments" (IMO_REP_0044).

In summary, only a few of the planned outages will potentially impact transmission system reliability. The outages with the highest potential impact are listed below:

Bruce Zone

The Bruce A TS T4A outage from August 12, 2002 to September 13, 2002 may restrict Negative Buchanan Longwood Input to 500 or 1,000 MW depending on the availability of Bruce and Longwood reactors (for reactor arming). The outage may limit the operation of the generating units located in the West zone, as well as potential capacity imports from Michigan. Therefore, it will require reconsideration in the operating timeframe, pending the demand-supply situation.

East Zone

The 115 kV W6MC circuit outage from July 2, 2002 to July 26, 2002 will limit the amount of hydroelectric generation from Barrett Chute GS, Stewartville GS, and Chat Falls GS by about 150 MW. The impact of this outage will be reassessed in the operating timeframe, in conjunction with the demand-supply situation, and the approval will be granted only if the reliable supply of the Ontario Market Demand can be maintained without the 150 MW of generation capacity that would be constrained off.

The 230 kV St. Lawrence TS AL31, L31L33, D Bus, and 49-B31L outages from July 15, 2002 to July 21, 2002 would reduce the Flow Into Ottawa interface limit by up to 300 MW, and the Ontario – Quebec interconnection transfer capability by approximately 400 MW in both directions. While the impact on the Flow Into Ottawa interface is not expected to be limiting, the impact on the Ontario – Quebec interconnection will require reconsideration in the operating timeframe, pending the demand-supply situation.

Northeast Zone

The 230 kV W71D circuit outage from September 17, 2002 to October 4, 2002 affects the Quebec North interconnection. The outage is not expected to be limiting.

Northwest Zone

The 230 kV K21W and K22W circuit outages from September 23, 2002 to October 11, 2002 and from October 15, 2002 to October 25, 2002, respectively, will reduce the transfer capability between Ontario and Manitoba. However, these outages are not expected to affect the contracted purchase from Manitoba. These outages will reduce the East-West Transfer East capability, in the order of 50 MW, further reducing dispatching flexibility in the Northwest zone and requiring more coordination in the planning of transmission and generation outages.

Ottawa Zone

The 500 kV X523A circuit outage from September 16, 2002 to October 18, 2002, will reduce the Flow Into Ottawa (FIO) interface limit by 400 MW. This outage is not expected to be limiting.

Southwest Zone

The 115 kV S1H circuit outage from July 3, 2002 to August 30, 2002 will reduce the Flow Away From the Bruce Complex (FABC) interface limit by up to 200 MW. The outage is not expected to be limiting.

West Zone

The Keith TS outages from September 20, 2002 to September 29, 2002, affecting the 230 kV J5D circuit, will reduce the Ontario – Michigan interconnection transfer capability by approximately 350 MW in both directions, as well as the FABC interface limit by approximately 100 MW. However, the outages are not considered to be of concern.

This Outlook has limited the assessment of transmission outages, to those transmission outages with a scheduled duration of six days or more. The IMO recognizes that there are expected to be additional outage requirements and/or changes as time approaches the Outlook study period and that transmission capacity will be impacted by outages with a scheduled duration of five days or less. Prior to approving and releasing an outage, the IMO will, as required, reassess the outage for potential system impacts, taking into account all current and forecasted conditions.

4.3 System Voltage and Thermal Limits

As in previous Outlooks, low system voltage concerns in certain sub-areas of the province will limit the generation and transmission outages that can be planned during summer peak demand periods. The various system voltage concerns are described below.

In the Windsor area, load growth will continue to stress the capability of the existing system under extreme-weather, summer peak conditions, such that voltages are expected to be near the low end of the acceptable range even with most static reactive sources in-service. In addition, maintaining acceptable voltage levels may require restrictions on the use of the J5D PAR interconnection with Michigan, particularly during summer peak periods. This requirement was experienced during August 2001 when peak demands exceeded 25,000 MW. Avoiding planned outages to generating units or transmission circuits in the Windsor and Sarnia area during the summer may be required to alleviate this concern.

When peak demands exceeded 25,000 MW in August 2001, pre-contingency voltage levels in the Toronto zone were acceptable but with little margin for contingencies. The reactive requirement to maintain voltage levels at or above the minimum required levels was very high. Most static reactive resources and transmission elements were required in-service and the Lakeview, Pickering and Darlington units had to supply higher than normal amounts of reactive power. The high demand for reactive power left significantly lower than normal reactive margin for contingencies. The performance of these units in providing reactive power to maintain acceptable voltage levels in the Toronto zone during summer peak periods is extremely important. Planned outages and restrictions on the use of the reactive capability of the Lakeview, Pickering and Darlington units should be avoided during summer peak periods. High transmission facility thermal loadings were also observed during the August 2001 hot weather conditions. With some local generating facilities operating at less than full output, the 500/230 kV autotransformers located at the Cherrywood Transmission Station in the Toronto zone were operated at power levels near, but below their continuous ratings.

In the Northwest zone at least one of the two generators at Thunder Bay is required to be in-service, most of the time, to maintain minimum voltages in the area, at times of normal industrial demand.

4.4 Forced Outages

There are currently no long-term forced outages with significant impact on the transmission system reliability that is expected to extend into the 18-month period studied.

5.0 Overall Observations, Findings and Conclusions

The following findings and conclusions are based on the results of the assessment carried out for this Outlook.

- Under the Reference Resource Scenario Available Reserve levels during July, August, and for most weeks from the latter part of October through December, are forecast to be lower than required. Similar conditions are expected to exist sporadically during February through June 2003. For the remainder of 2003, reserve levels exceed requirements.
- Under the Delayed Resource Scenario, one year delays in additional resources coming into service will cause reserve levels to tighten further in the latter months of 2002 and remain tight throughout most of 2003.
- Tight demand/supply balances during periods of reduced reserve levels will have several potential market impacts. These include upward pressure on market prices and limited opportunities for the IMO to approve the release of generators for planned maintenance. Various responses can be anticipated in these circumstances, including: for Ontario generators, maximizing their availability to offer into the Ontario market; for marketers, arranging imports to help meet anticipated Ontario requirements; and for consumers, taking measures to reduce their electricity consumption.
- External resources are expected to be available to offer into the Ontario market during the periods for which negative reserve margins are forecast. During most of these periods, one or more neighbouring systems are outside their seasonal peak demand.
- Higher than forecast demands due to extreme weather or higher than forecast generator forced outages, would increase the importance of external resources. If sufficient external resources are not available, control actions in the operating timeframe are expected to be effective in managing a wide range of uncertainties in demand or resource levels.
- The Loss of Load Expectation (LOLE) is expected to be within the NPCC resource adequacy criterion.
- The planned transmission outages are not expected to significantly reduce transmission capacity during the study period.
- Avoiding planned outages and maximizing the reactive capability of the Lakeview, Pickering and Darlington units is required to maintain voltage levels above the minimum required levels in the Toronto zone during summer peak conditions.
- Restricting planned outages to transmission facilities in the Windsor area will assist in maintaining adequate voltage levels during summer peak periods
- Rotating reactive resources in the Thunder Bay area will continue to be required to address local voltage concerns.

Appendix A Resource Adequacy Assessment Details

Table A1 Assessment of Resource Adequacy (Reference Resource Scenario)

Week Ending Day	Ontario Market Demand MW	Total Resources MW	Total Reductions in Resources MW	Available Resources MW	Available Reserve %	Available Reserve MW	Required Reserve %	Required Reserve MW	Reserve Margin MW
07-Jul-02	22,892	29,822	4,472	25,350	12.2	2,758	16.9	3,828	-1,070
14-Jul-02	23,046	29,822	4,469	25,353	11.5	2,607	16.2	3,674	-1,067
21-Jul-02	22,966	29,822	4,465	25,357	11.9	2,691	15.6	3,529	-838
28-Jul-02	22,878	29,822	4,464	25,358	12.3	2,780	15.4	3,484	-704
04-Aug-02	22,548	29,822	4,459	25,363	14.0	3,115	15.9	3,539	-424
11-Aug-02	22,691	29,822	3,829	25,993	16.1	3,602	16.2	3,635	-33
18-Aug-02	22,686	29,822	4,312	25,510	14.0	3,124	15.3	3,418	-294
25-Aug-02	22,590	29,822	4,307	25,515	14.5	3,225	16.4	3,660	-435
01-Sep-02	22,765	29,822	4,850	24,972	11.2	2,507	17.2	3,863	-1,356
08-Sep-02	21,099	29,822	5,647	24,175	16.2	3,376	16.4	3,415	-39
15-Sep-02	20,531	29,822	6,127	23,695	17.1	3,464	14.5	2,941	523
22-Sep-02	19,610	29,822	6,401	23,421	21.3	4,111	17.9	3,456	655
29-Sep-02	19,138	29,822	6,877	22,945	21.8	4,107	18.1	3,407	700
06-Oct-02	18,825	29,822	7,139	22,683	22.5	4,158	12.9	2,394	1,764
13-Oct-02	19,152	30,332	7,620	22,712	20.5	3,860	13.1	2,460	1,400
20-Oct-02	19,495	30,332	8,313	22,019	14.7	2,824	13.3	2,548	276
27-Oct-02	19,814	30,332	8,805	21,527	10.3	2,013	13.6	2,660	-647
03-Nov-02	20,334	30,332	7,801	22,531	12.5	2,497	13.5	2,709	-212
10-Nov-02	21,350	30,332	6,641	23,691	12.6	2,641	13.9	2,925	-284
17-Nov-02	21,839	30,332	5,640	24,692	14.6	3,153	13.4	2,875	278
24-Nov-02	22,269	30,332	5,838	24,494	11.5	2,525	14.2	3,115	-590
01-Dec-02	22,444	30,332	5,347	24,985	12.8	2,841	14.2	3,134	-293
08-Dec-02	23,145	30,332	4,857	25,475	11.5	2,630	15.2	3,475	-845
15-Dec-02	23,286	30,332	4,859	25,473	10.8	2,487	14.8	3,390	-903
22-Dec-02	23,545	30,332	4,857	25,475	9.6	2,230	15.5	3,612	-1,382
29-Dec-02	23,140	30,332	4,865	25,467	11.5	2,627	14.4	3,297	-670
05-Jan-03	21,239	30,332	3,577	26,755	27.8	5,816	14.3	3,001	2,815
12-Jan-03	23,904	30,332	2,948	27,384	16.0	3,780	14.0	3,294	486
19-Jan-03	23,676	30,332	2,958	27,374	17.1	3,998	14.3	3,336	662
26-Jan-03	23,465	30,332	2,967	27,365	18.1	4,200	13.8	3,205	995
02-Feb-03	23,549	30,332	2,968	27,364	17.7	4,115	12.9	2,994	1,121
09-Feb-03	23,290	30,332	4,542	25,790	12.2	2,800	13.8	3,161	-361
16-Feb-03	23,046	30,332	4,544	25,788	13.4	3,042	13.9	3,171	-129
23-Feb-03	22,563	30,332	4,554	25,778	15.8	3,515	14.0	3,106	409
02-Mar-03	22,334	30,332	4,598	25,734	16.8	3,700	13.7	3,014	686
09-Mar-03	22,067	30,332	5,738	24,594	13.0	2,827	14.0	3,051	-224
16-Mar-03	21,731	30,332	5,751	24,581	14.7	3,150	13.7	2,936	214
23-Mar-03	21,350	30,332	5,773	24,559	16.7	3,509	13.5	2,834	675
30-Mar-03	20,847	30,332	6,084	24,248	18.0	3,701	13.1	2,681	1,020

Note: The reader should be aware that System Adequacy Assessments are published on the IMO web site on a weekly and daily basis that progressively supersede information presented in this report.

(Table A1 continued)

Week Ending Day	Ontario Market Demand MW	Total Resources MW	Total Reductions in Resources MW	Available Resources MW	Available Reserve %	Available Reserve MW	Required Reserve %	Required Reserve MW	Reserve Margin MW
06-Apr-03	19,716	30,332	5,686	24,646	26.9	5,230	13.5	2,613	2,617
13-Apr-03	19,670	31,082	7,832	23,250	20.0	3,880	12.9	2,504	1,376
20-Apr-03	19,440	31,082	9,950	21,132	10.4	1,992	14.2	2,723	-731
27-Apr-03	19,044	31,082	10,253	20,829	11.1	2,085	13.8	2,589	-504
04-May-03	18,669	31,082	10,254	20,828	13.4	2,459	13.5	2,477	-18
11-May-03	18,433	31,082	10,431	20,651	13.9	2,518	17.6	3,199	-681
18-May-03	18,828	31,082	8,601	22,481	21.3	3,953	20.1	3,717	236
25-May-03	19,380	31,082	6,596	24,486	28.3	5,406	18.6	3,550	1,856
01-Jun-03	19,774	31,082	6,601	24,481	25.7	5,007	18.7	3,640	1,367
08-Jun-03	21,440	31,082	7,083	23,999	13.5	2,859	16.6	3,505	-646
15-Jun-03	22,302	31,832	4,906	26,926	22.4	4,924	16.7	3,676	1,248
22-Jun-03	22,645	31,832	4,902	26,930	20.5	4,585	15.8	3,523	1,062
29-Jun-03	22,608	31,832	4,901	26,931	20.7	4,623	16.9	3,774	849
06-Jul-03	23,225	31,832	4,038	27,794	21.2	4,869	16.0	3,660	1,209
13-Jul-03	23,371	31,832	2,802	29,030	25.8	5,959	15.9	3,674	2,285
20-Jul-03	23,300	31,832	2,796	29,036	26.2	6,036	15.5	3,553	2,483
27-Jul-03	23,202	31,832	2,794	29,038	26.8	6,136	15.4	3,527	2,609
03-Aug-03	22,861	31,832	2,791	29,041	28.7	6,480	16.2	3,643	2,837
10-Aug-03	23,005	31,832	2,805	29,027	27.8	6,322	16.6	3,767	2,555
17-Aug-03	23,000	31,832	2,797	29,035	27.9	6,335	15.5	3,521	2,814
24-Aug-03	22,904	31,832	2,792	29,040	28.5	6,436	16.7	3,772	2,664
31-Aug-03	23,069	31,832	3,312	28,520	25.3	5,751	16.9	3,841	1,910
07-Sep-03	21,338	31,832	4,729	27,103	28.8	6,065	16.9	3,555	2,510
14-Sep-03	20,768	31,832	5,207	26,625	30.1	6,157	15.2	3,113	3,044
21-Sep-03	19,845	31,832	5,186	26,646	36.3	7,101	18.6	3,631	3,470
28-Sep-03	19,374	31,832	5,663	26,169	37.2	7,095	18.7	3,572	3,523
05-Oct-03	19,024	31,832	6,184	25,648	37.0	6,924	14.1	2,636	4,288
12-Oct-03	19,357	31,832	7,088	24,744	29.8	5,687	13.6	2,597	3,090
19-Oct-03	19,707	31,832	7,088	24,744	27.5	5,337	13.5	2,615	2,722
26-Oct-03	20,013	31,832	6,697	25,135	27.5	5,422	13.8	2,728	2,694
02-Nov-03	20,559	31,832	6,188	25,644	26.6	5,385	13.5	2,733	2,652
09-Nov-03	21,542	31,632	5,113	26,519	24.8	5,277	13.6	2,888	2,389
16-Nov-03	22,011	31,632	5,090	26,542	22.3	4,831	12.9	2,806	2,025
23-Nov-03	22,441	31,632	4,796	26,836	21.2	4,695	13.5	2,979	1,716
30-Nov-03	22,636	31,632	3,464	28,168	26.1	5,832	13.8	3,088	2,744
07-Dec-03	23,338	31,632	3,727	27,905	21.1	4,867	14.1	3,258	1,609
14-Dec-03	23,479	31,632	3,727	27,905	20.4	4,726	13.5	3,134	1,592
21-Dec-03	23,738	31,632	3,188	28,444	21.4	5,006	14.3	3,362	1,644
28-Dec-03	23,818	31,632	3,188	28,444	21.0	4,926	13.6	3,199	1,727
04-Jan-04	22,036	31,632	3,255	28,377	30.6	6,641	14.6	3,168	3,473

Table A2 Assessment of Resource Adequacy (Delayed Resource Scenario)

Week Ending Day	Ontario Market Demand MW	Total Resources MW	Total Reductions in Resources MW	Available Resources MW	Available Reserve %	Available Reserve MW	Required Reserve %	Required Reserve MW	Reserve Margin MW
07-Jul-02	22,892	29,822	4,472	25,350	12.2	2,758	16.9	3,828	-1,070
14-Jul-02	23,046	29,822	4,469	25,353	11.5	2,607	16.2	3,674	-1,067
21-Jul-02	22,966	29,822	4,465	25,357	11.9	2,691	15.6	3,529	-838
28-Jul-02	22,878	29,822	4,464	25,358	12.3	2,780	15.4	3,484	-704
04-Aug-02	22,548	29,822	4,459	25,363	14.0	3,115	15.9	3,539	-424
11-Aug-02	22,691	29,822	3,829	25,993	16.1	3,602	16.2	3,635	-33
18-Aug-02	22,686	29,822	4,312	25,510	14.0	3,124	15.3	3,418	-294
25-Aug-02	22,590	29,822	4,307	25,515	14.5	3,225	16.4	3,660	-435
01-Sep-02	22,765	29,822	4,850	24,972	11.2	2,507	17.2	3,863	-1,356
08-Sep-02	21,099	29,822	5,647	24,175	16.2	3,376	16.4	3,415	-39
15-Sep-02	20,531	29,822	6,127	23,695	17.1	3,464	14.5	2,941	523
22-Sep-02	19,610	29,822	6,401	23,421	21.3	4,111	17.9	3,456	655
29-Sep-02	19,138	29,822	6,877	22,945	21.8	4,107	18.1	3,407	700
06-Oct-02	18,825	29,822	7,139	22,683	22.5	4,158	12.9	2,394	1,764
13-Oct-02	19,152	29,822	7,530	22,292	18.3	3,440	12.8	2,411	1,029
20-Oct-02	19,495	29,822	8,223	21,599	12.5	2,404	13.4	2,563	-159
27-Oct-02	19,814	29,822	8,715	21,107	8.2	1,593	13.7	2,677	-1,084
03-Nov-02	20,334	29,822	7,711	22,111	10.4	2,077	13.6	2,725	-648
10-Nov-02	21,350	29,822	6,641	23,181	10.1	2,131	14.0	2,942	-811
17-Nov-02	21,839	29,822	5,640	24,182	12.3	2,643	13.4	2,893	-250
24-Nov-02	22,269	29,822	5,838	23,984	9.2	2,015	14.2	3,129	-1,114
01-Dec-02	22,444	29,822	5,347	24,475	10.5	2,331	14.2	3,148	-817
08-Dec-02	23,145	29,822	4,857	24,965	9.3	2,120	15.3	3,485	-1,365
15-Dec-02	23,286	29,822	4,859	24,963	8.6	1,977	14.8	3,403	-1,426
22-Dec-02	23,545	29,822	4,857	24,965	7.4	1,720	15.6	3,622	-1,902
29-Dec-02	23,140	29,822	4,865	24,957	9.3	2,117	14.5	3,314	-1,197
05-Jan-03	21,239	29,822	3,577	26,245	25.3	5,306	14.0	2,921	2,385
12-Jan-03	23,904	29,822	3,443	26,379	11.8	2,775	14.0	3,308	-533
19-Jan-03	23,676	29,822	3,452	26,370	12.8	2,994	14.3	3,350	-356
26-Jan-03	23,465	29,822	3,461	26,361	13.8	3,196	13.8	3,197	-1
02-Feb-03	23,549	29,822	3,462	26,360	13.4	3,111	12.9	3,009	102
09-Feb-03	23,290	29,822	5,036	24,786	7.8	1,796	13.8	3,177	-1,381
16-Feb-03	23,046	29,822	5,038	24,784	9.0	2,038	14.0	3,186	-1,148
23-Feb-03	22,563	29,822	5,048	24,774	11.3	2,511	14.0	3,120	-609
02-Mar-03	22,334	29,822	5,093	24,729	12.2	2,695	13.8	3,030	-335
09-Mar-03	22,067	29,822	6,232	23,590	8.4	1,823	14.1	3,062	-1,239
16-Mar-03	21,731	29,822	6,245	23,577	10.0	2,146	13.8	2,951	-805
23-Mar-03	21,350	29,822	6,268	23,554	11.9	2,504	13.5	2,846	-342
30-Mar-03	20,847	29,822	6,579	23,243	13.1	2,696	13.1	2,685	11

(Table A2 continued)

Week Ending Day	Ontario Market Demand MW	Total Resources MW	Total Reductions in Resources MW	Available Resources MW	Available Reserve %	Available Reserve MW	Required Reserve %	Required Reserve MW	Reserve Margin MW
06-Apr-03	19,716	29,822	6,181	23,641	21.8	4,225	12.8	2,476	1,749
13-Apr-03	19,670	29,822	8,286	21,536	11.2	2,166	12.9	2,502	-336
20-Apr-03	19,440	29,822	10,405	19,417	1.5	277	14.6	2,786	-2,509
27-Apr-03	19,044	29,822	10,708	19,114	2.0	370	14.1	2,651	-2,281
04-May-03	18,669	29,822	10,708	19,114	4.1	745	13.9	2,547	-1,802
11-May-03	18,433	29,822	10,825	18,997	4.8	864	17.9	3,246	-2,382
18-May-03	18,828	29,822	8,995	20,827	12.4	2,299	19.7	3,658	-1,359
25-May-03	19,380	29,822	6,990	22,832	19.7	3,752	17.3	3,309	443
01-Jun-03	19,774	29,822	6,996	22,826	17.2	3,352	17.7	3,446	-94
08-Jun-03	21,440	29,822	6,737	23,085	9.2	1,945	16.9	3,571	-1,626
15-Jun-03	22,302	29,822	4,550	25,272	14.9	3,270	16.3	3,579	-309
22-Jun-03	22,645	29,822	4,546	25,276	13.1	2,931	15.6	3,489	-558
29-Jun-03	22,608	29,822	4,545	25,277	13.3	2,969	16.7	3,730	-761
06-Jul-03	23,225	29,822	3,682	26,140	14.0	3,215	15.7	3,593	-378
13-Jul-03	23,371	29,822	3,680	26,142	13.3	3,071	14.9	3,432	-361
20-Jul-03	23,300	29,822	3,675	26,147	13.7	3,147	14.3	3,297	-150
27-Jul-03	23,202	29,822	3,673	26,149	14.2	3,247	14.2	3,241	6
03-Aug-03	22,861	29,822	3,670	26,152	15.9	3,591	14.6	3,297	294
10-Aug-03	23,005	29,822	3,684	26,138	15.1	3,433	15.4	3,493	-60
17-Aug-03	23,000	29,822	3,676	26,146	15.2	3,446	14.3	3,234	212
24-Aug-03	22,904	29,822	3,671	26,151	15.7	3,547	15.4	3,477	70
31-Aug-03	23,069	29,822	4,191	25,631	12.6	2,862	16.2	3,692	-830
07-Sep-03	21,338	29,822	5,608	24,214	15.1	3,176	15.5	3,269	-93
14-Sep-03	20,768	29,822	6,086	23,736	16.0	3,268	13.5	2,761	507
21-Sep-03	19,845	29,822	6,065	23,757	21.6	4,212	16.6	3,240	972
28-Sep-03	19,374	29,822	6,542	23,280	22.1	4,206	16.7	3,191	1,015
05-Oct-03	19,024	29,822	7,063	22,759	21.6	4,035	11.7	2,185	1,850
12-Oct-03	19,357	30,332	8,057	22,275	16.9	3,218	11.8	2,242	976
19-Oct-03	19,707	30,332	8,057	22,275	14.8	2,868	12.1	2,347	521
26-Oct-03	20,013	30,332	7,665	22,667	15.0	2,954	12.4	2,440	514
02-Nov-03	20,559	30,332	7,156	23,176	14.4	2,917	12.2	2,469	448
09-Nov-03	21,542	30,132	6,021	24,111	13.5	2,869	12.5	2,663	206
16-Nov-03	22,011	30,132	5,999	24,133	11.2	2,422	12.4	2,687	-265
23-Nov-03	22,441	30,132	5,705	24,427	10.3	2,286	13.2	2,912	-626
30-Nov-03	22,636	30,132	4,373	25,759	15.3	3,423	12.6	2,812	611
07-Dec-03	23,338	30,132	3,925	26,207	13.8	3,169	13.8	3,180	-11
14-Dec-03	23,479	30,132	3,925	26,207	13.1	3,028	13.3	3,090	-62
21-Dec-03	23,738	30,132	3,387	26,745	14.1	3,307	13.9	3,257	50
28-Dec-03	23,818	30,132	3,387	26,745	13.7	3,227	13.2	3,100	127
04-Jan-04	22,036	30,132	3,454	26,678	22.7	4,942	13.6	2,951	1,991

Table A3 Energy Production Capability Adequacy

Month	Ontario Market Energy Demand (GWh)	Available Energy Reference Resource Scenario (GWh)	Available Energy Delayed Resource Scenario (GWh)	Energy Margin Reference Resource Scenario (GWh)	Energy Margin Delayed Resource Scenario (GWh)
Jul 2002	12,933	15,721	15,721	2,788	2,788
Aug 2002	12,798	15,821	15,821	3,023	3,023
Sep 2002	11,369	13,932	13,932	2,563	2,563
Oct 2002	12,004	13,806	13,591	1,802	1,587
Nov 2002	12,337	14,773	14,467	2,436	2,130
Dec 2002	13,315	17,292	16,939	3,977	3,624
Jan 2003	13,862	17,478	16,893	3,616	3,031
Feb 2003	12,374	14,922	14,351	2,548	1,977
Mar 2003	12,848	15,639	15,006	2,791	2,158
Apr 2003	11,619	13,736	12,730	2,117	1,111
May 2003	11,537	14,848	13,747	3,311	2,210
Jun 2003	12,046	16,783	15,376	4,737	3,330
Jul 2003	13,138	18,217	16,383	5,079	3,245
Aug 2003	12,888	18,004	16,098	5,116	3,210
Sep 2003	11,555	15,419	14,043	3,864	2,488
Oct 2003	12,132	15,606	13,993	3,474	1,861
Nov 2003	12,407	16,684	15,087	4,277	2,680
Dec 2003	13,596	18,611	16,960	5,015	3,364

Appendix B Transmission Projects

East Zone - Transmission Projects	Projected I/S Date
Cobden TS: Split existing two branch feeder into two separate feeders. Add one load interrupter.	2002 - Q3
Port Hope TS and Sidney TS: Install auto "switch off" capability on five low voltage shunt capacitor banks.	2002 - Q3
Milltown Jct.: Replace bolted openers with in line switches on Q6S.	2002 - Q4
National Research TS: New 13.2 kV feeder on T3 at National Research TS.	2002 - Q4
Cyrville Jct.: Replace overhead lines H2AR/A4K with underground cable.	2003 - Q2

Northeast Zone - Transmission Projects	Projected I/S Date
Martindale TS: Replace two 230 kV breakers.	2002 - Q3/Q4
Chenaux TS: Add 2x230 kV breakers. Reconnect the transformers.	2002 - Q4

Niagara Zone - Transmission Projects	Projected I/S Date
Decew GS: Replacement of T4 & 23T3 transformers with a single unit.	2003 - Q1
Winona TS: New DESN connected to 115 kV circuit Q2AH.	2003 - Q2

Northwest Zone - Transmission Projects	Projected I/S Date
Kenora TS: Upgrade/replace existing PLC facilities on circuits K21W & K22W.	2002 - Q3
NW Ontario: New 115 kV line, connected to the 115 kV circuit between Crow River TS and Musselwhite Mine CTS, to supply the First Nations community.	2003 - Q2

Southwest Zone - Transmission Projects	Projected I/S Date
Centralia TS: Install low voltage capacitor – 10.8 MVar.	2002 - Q4
Galt TS: Install 230 kV metering and associated facilities.	2002 - Q4
Strathroy TS: Install low voltage capacitor – 10.8 MVar.	2002 - Q4
Wanstead TS: Install low voltage capacitor – 10.8 MVar.	2002 - Q4
Dundas TS: New DESN connected to 115 kV double circuit B3/B4.	2003 - Q2
Nanticoke GS: Exciter replacement on Units 1-8.	2003 - Q4

Toronto Zone - Transmission Projects	Projected I/S Date
Sheppard TS: Add two 27.6 kV feeder positions at Sheppard TS on T1 and T2 for existing load transfer.	2002 - Q3
Oakville TS: Install low voltage capacitor - 21.6 MVar.	2002 - Q4
Hearn TGS: Install 125 MVAR 115 kV Capacitor Bank.	2003 - Q2

West Zone - Transmission Projects	Projected I/S Date
Windsor: New 115/13.8 kV substation at Pellette Rd. assembly plant.	2002 - Q3
Clarke TS: Install low voltage capacitor – 21.6 MVar.	2002 - Q4

Appendix C Planned Transmission Outages

The following tables list the planned transmission outages by transmission zone, for transmission outages with an expected duration of six days or greater.

Table C1 Bruce Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall Time	Impact	Reduction in Limit
Mon 12-Aug-02 07:00	Fri 13-Sep-02 18:00	Bruce A TS.T4A	CNW	5 Days	NBLIP	500 to 1000 MW.
Mon 19-Aug-02 05:00	Mon 07-Oct-02 18:00	Bruce A TS.R27 Bruce A TS.T27	CNW	2 Hours	FABC	Up to 200 MW.
Mon 30-Sep-02 07:00	Fri 01-Nov-02 18:00	Bruce A TS.T3E	CNW	5 Days	FABC	Up to 50 MW.

Table C2 East Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall Time	Impact	Reduction in Limit
Mon 24-Jun-02 08:00	Fri 05-Jul-02 16:00	St.Lawrence TS.L22H_Terminal	CNW	8 Hours		
Tue 02-Jul-02 08:00	Fri 26-Jul-02 16:00	W6MC_Chats Falls	CWW	2 Hours		Barrett Chute, Stewartville, and 50 MW generation capacity from Chat Falls (total of ~400MW) limited to 260 MW.
Sat 06-Jul-02 19:00	Sat 20-Jul-02 19:00	Ivaco TS.T1 Ivaco TS.T2 Ivaco TS.T1_230 Ivaco TS.T2_230	CNW	65 Hours		
Mon 15-Jul-02 07:00	Sun 21-Jul-02 15:00	St.Lawrence TS.AL31 St.Lawrence TS.L31L33 St.Lawrence TS.D_BUS St.Lawrence TS.49-B31L	CNW	4 Hours	FIO, Ontario - Quebec South Interconnection	FIO - 100MW to 300MW. Ontario-Quebec South Interconnection, in and out of Ontario - approximately 400MW.
Tue 06-Aug-02 07:00	Sat 17-Aug-02 15:00	Crosby TS.T1	CNW	4 Hours		
Sat 10-Aug-02 19:00	Sat 17-Aug-02 19:00	Ivaco TS.T3 Ivaco TS.T3_230	CNW	48 Hours		
Sun 18-Aug-02 07:00	Thu 29-Aug-02 15:00	Crosby TS.T2	CNW	4 Hours		
Tue 27-Aug-02 23:00	Mon 09-Sep-02 07:00	AES CGS.GB001 AES CGS.H1T1	CNW	8 Hours		
Fri 11-Jul-03 22:00	Mon 21-Jul-03 21:59	Cardinal Power CGS.T1 Cardinal Power CGS.T2	CNW	4 Hours		

Table C3 Essa Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall Time	Impact	Reduction in Limit
Fri 12-Apr-02 11:00	Fri 30-Aug-02 16:00	Deep River DS.T1	CNW	24 Hours		

Table C4 Niagara Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall Time	Impact	Reduction in Limit
Mon 08-Apr-02 04:01	Mon 15-Jul-02 14:59	Beck #2 TS.T11	CNW	5 Days		

Table C5 Northeast Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall Time	Impact	Reduction in Limit
Tue 10-Jul-01 08:00	Thu 08-Aug-02 10:00	Inco #4 CTS.T1	CNW	None		
Mon 15-Apr-02 08:00	Thu 08-Aug-02 16:00	Inco Frood Stobie CTS.T2	CNW	None		
Tue 14-May-02 16:30	Fri 15-Nov-02 16:30	Coniston TS.T2 Coniston TS.T2-P1 Coniston TS.T2-PIBC	CNW	1 Week		
Sun 30-Jun-02 06:00	Sun 14-Jul-02 06:00	Neelon Steel CTS.T1	CNW	None		
Mon 08-Jul-02 08:30	Fri 02-Aug-02 15:00	Martindale TS.L24L26	CNW	None		
Mon 12-Aug-02 08:30	Fri 30-Aug-02 15:00	Martindale TS.PL24	CNW	None		
Tue 17-Sep-02 06:00	Fri 04-Oct-02 16:00	W71D_Widdifield x Lower Notch	CNW	12 Hours	Ontario - Quebec transfer	D4Z Mode 2 - 55 to 120 MW D4Z Mode 3 - 25 to 120 MW
Mon 07-Oct-02 09:00	Fri 25-Oct-02 15:00	Martindale TS.KT22	CNW	None		
Sun 15-Dec-02 07:00	Thu 02-Jan-03 07:00	Neelon Steel CTS.T1	CNW	None		

Table C6 Northwest Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall Time	Impact	Reduction in Limit
Thu 17-Jan-02 12:00	Fri 02-Aug-02 18:00	Fort Frances TS.R2	CNW	None		
Mon 27-May-02 10:00	Tue 27-Aug-02 15:00	K6F_Nestor Falls JCT.	CNW	4 Hours		
Mon 24-Jun-02 07:00	Sun 07-Jul-02 17:00	M24L (Including All Terminals)	CNW	2 Hours	EWTW, OMTE & OMTW	EWTW - 100 MW OMTE - 0 MW OMTW - 50 MW
Mon 24-Jun-02 07:30	Fri 26-Jul-02 16:00	K3D_Rabbit Lake	CNW	4 Hours		
Tue 02-Jul-02 07:00	Fri 30-Aug-02 17:00	T1M_Marathon	CNW	6 Days		
Mon 08-Jul-02 07:00	Sat 13-Jul-02 16:00	R1LB	CNW	2 Hours		
Mon 15-Jul-02 08:00	Fri 26-Jul-02 15:00	Lakehead TS.C7	CNW	2 Days		
Mon 15-Jul-02 08:30	Fri 26-Jul-02 16:30	A6P	CNW	2 Hours		
Mon 12-Aug-02 07:00	Sun 25-Aug-02 17:00	A8L (Including All Terminals)	CNW	2 Hours		
Mon 19-Aug-02 09:00	Fri 30-Aug-02 16:00	Lakehead TS.KL3	CNW	2 Hours		
Tue 03-Sep-02 07:00	Sun 15-Sep-02 17:00	R9A (Including All Terminals)	CNW	2 Hours		
Mon 23-Sep-02 07:00	Sun 06-Oct-02 17:00	Aguasabon SS.K2_BUS Schreiber JCT.A5A-2 Schreiber JCT.A5A-4 Aguasabon x Schreiber	CNW	2 Hours		
Mon 23-Sep-02 07:00	Fri 11-Oct-02 17:00	K21W (Including All Terminals)	CNW	24 Hours	OMTE, OMTW, MPFN, MPFS, EWTW & EWTE	OMTE - 100 MW OMTW - 100 MW MPFN - 0 MW MPFS - 0 MW EWTE - 50 MW EWTW - 0 MW
Mon 07-Oct-02 07:00	Sun 20-Oct-02 17:00	Alexander SS.A5A_Terminal A5A_Alex	CNW	2 Hours		
Tue 15-Oct-02 07:00	Fri 25-Oct-02 17:00	K22W (Including All Terminals)	CNW	2 Hours	OMTE, OMTW, MPFN, MPFS, EWTW & EWTE	OMTE - 100 MW OMTW - 100 MW MPFN - 0 MW MPFS - 0 MW EWTE - 50 MW EWTW - 0 MW
Mon 21-Oct-02 07:00	Sun 03-Nov-02 17:00	A7L (Including All Terminals)	CNW	2 Hours		

Table C7 Ottawa Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall Time	Impact	Reduction in Limit
Mon 19-Aug-02 07:00	Sat 14-Sep-02 15:00	Overbrook TS.T3	CNW	24 Hours		
Thu 22-Aug-02 16:00	Fri 30-Aug-02 15:00	Overbrook TS.A2_BUS	CNW	2 Hours		
Mon 16-Sep-02 07:00	Fri 18-Oct-02 16:00	X523A	CWW	4 Hours	FIO	400 MW

Table C8 Southwest Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall Time	Impact	Reduction in Limit
Tue 21-May-02 06:00	Thu 04-Jul-02 20:00	B13	CNW	4 Hours		
Wed 19-Jun-02 08:00	Tue 02-Jul-02 16:00	Nebo TS.T2	CNW	8 Hours		
Wed 03-Jul-02 06:00	Fri 30-Aug-02 18:00	S1H	CNW	3 Hours	FABC	Up to 200 MW.
Mon 12-Aug-02 07:30	Fri 23-Aug-02 16:00	Burlington TS.B4_Terminal	CNW	5 Days		
Mon 26-Aug-02 07:30	Fri 06-Sep-02 16:00	Burlington TS.B6G_Terminal	CNW	5 Days		

Table C9 West Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall Time	Impact	Reduction in Limit
Mon 18-Mar-02 16:00	Sat 30-Nov-02 16:00	Imperial Oil CTS.T2	CNW	None		
Tue 03-Sep-02 08:00	Fri 18-Oct-02 16:00	Buchanan TS.DL5	CNW	2 Weeks		
Mon 16-Sep-02 08:00	Fri 27-Sep-02 16:00	Buchanan TS.L2K	CNW	24 Hours		
Fri 20-Sep-02 05:00	Sun 29-Sep-02 18:00	J5D	CNW	24 Hours	FABC, Ontario-Michigan Interconnection	FABC - Up to 100 MW. Ontario-Michigan Interconnection, in and out of Ontario - approximately 350MW.
Fri 20-Sep-02 07:00	Sun 29-Sep-02 15:00	Keith TS.PSR5_230 J5D Keith TS.J5D_Terminal	CNW	2 Days	FABC, Ontario-Michigan Interconnection	FABC - Up to 100 MW. Ontario-Michigan Interconnection, in and out of Ontario - approximately 350MW.
Sun 29-Sep-02 05:00	Wed 09-Oct-02 18:00	Keith TS.23-C21J	CNW	3 Days	FABC, Ontario-Michigan Interconnection	FABC - Up to 100 MW. Ontario-Michigan Interconnection, in and out of Ontario - approximately 50MW.
Mon 30-Sep-02 08:00	Fri 11-Oct-02 16:00	Buchanan TS.L6K	CNW	24 Hours		
Tue 15-Oct-02 05:00	Fri 01-Nov-02 18:00	Keith TS.T12K Keith TS.T12P Keith TS.T12	CNW	None	Ontario-Michigan Interconnection	Ontario-Michigan Interconnection, in and out of Ontario - approximately 50MW.
Tue 15-Oct-02 08:00	Fri 25-Oct-02 16:00	Keith TS.T12K	CNW	8 Hours		
Thu 31-Oct-02 05:00	Mon 18-Nov-02 18:00	Keith TS.T11K	CNW	None		
Sat 02-Nov-02 05:00	Sun 17-Nov-02 18:00	Keith TS.T11P	CNW	None		
Sun 17-Nov-02 05:00	Sat 14-Dec-02 18:00	Keith TS.L4P	CNW	None		
Mon 18-Nov-02 05:00	Fri 13-Dec-02 18:00	Keith TS.L4K	CNW	None		
Sat 14-Dec-02 05:00	Sun 26-Jan-03 18:00	Keith TS.L3P Keith TS.T1K Keith TS.T1L3 Keith TS.T1	CNW	None		

Table C10 Toronto Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall Time	Impact	Reduction in Limit
Tue 21-May-02 05:00	Fri 12-Jul-02 15:00	Claireville TS.T14L71	CNW	4 Hours		
Mon 24-Jun-02 05:00	Fri 26-Jul-02 18:00	C5E_Esplanade C7E_Esplanade	CNW	6 Hours		
Mon 24-Jun-02 06:00	Fri 19-Jul-02 18:00	H6LC_Hearn	CNW	3 Hours		
Mon 24-Jun-02 06:00	Fri 19-Jul-02 18:30	H8LC_Hearn	CNW	3 Hours		
Sat 29-Jun-02 05:00	Mon 15-Jul-02 18:00	G.M.Oshawa CTS.T1 G.M.Oshawa CTS.T2	CNW	2 Hours		
Mon 05-Aug-02 06:00	Fri 06-Sep-02 18:00	H6LC_Hearn	CNW	3 Hours		
Mon 05-Aug-02 06:30	Fri 06-Sep-02 18:30	H8LC_Hearn	CNW	3 Hours		
Mon 19-Aug-02 07:30	Mon 26-Aug-02 15:00	Bowmanville SS.A2_BUS	CNW	15 Minutes		
Tue 03-Sep-02 05:00	Mon 30-Sep-02 18:00	Glengrove TS.T2 Glengrove TS.T1_115	CNW	5 Hours		
Tue 03-Sep-02 07:00	Fri 04-Oct-02 16:00	H2JK_Manby West	CNW	None		
Mon 16-Sep-02 05:00	Tue 05-Nov-02 15:30	Cecil TS.T3	CNW	3 Days		
Mon 30-Sep-02 05:00	Fri 25-Oct-02 18:00	L21K	CNW	4 Hours		
Tue 01-Oct-02 05:00	Wed 30-Oct-02 18:00	Glengrove TS.T3A1A2 Glengrove TS.T3 Glengrove TS.T3_115	CNW	5 Hours		
Mon 07-Oct-02 06:00	Fri 22-Nov-02 15:00	K6J_Manby West	CNW	2 Hours		
Tue 15-Oct-02 05:00	Sun 15-Dec-02 18:00	H11L_Hearn H7L_Hearn	CNW	6 Hours		
Tue 15-Oct-02 05:30	Fri 08-Nov-02 18:00	H5E H7E	CNW	3 Hours		
Tue 12-Nov-02 05:00	Mon 06-Jan-03 15:30	Cecil TS.T4	CNW	3 Days		
Tue 12-Nov-02 08:00	Fri 13-Dec-02 14:00	Cecil TS.HL7	CNW	72 Hours		
Fri 24-Jan-03 05:00	Tue 04-Feb-03 18:00	Glengrove TS.T1 Glengrove TS.T2 Glengrove TS.T1_115	CNW	5 Hours		
Fri 07-Feb-03 05:00	Wed 19-Feb-03 18:00	Glengrove TS.T3A1A2 Glengrove TS.T3 Glengrove TS.T3_115	CNW	5 Hours		