Independent Electricity Market Operator

18-Month Outlook:

An Assessment of the Adequacy of the Ontario Electricity System

from April 2002 to September 2003

Executive Summary

This report presents an assessment of the security and adequacy of the Ontario Electricity System for the 18-month period from April 2002 through September 2003. This assessment is based on forecasts of electricity demand and available supply combined with current information on the configuration and capability of the transmission system. Outage plans of generators and transmitters are based on information available as of February 2002.

During the Outlook period, the IMO forecasts show that Ontario's available generation exceeds projected demands. Over this period, approximately 3,000 MW of additional generation resources are expected to either return to service or be placed in service for the first time – thereby enhancing the reliability of the Ontario electricity system. During the first half of the Outlook there are periods when Ontario's available reserves are forecast to be between 2,000 and 2,500 MW. These reserves are below the IMO's required planning reserve levels, but do not account for additional resources from outside Ontario that are expected to be available. Reserves are planning buffers identified to address circumstances that cannot be accurately predicted such as weather variations and unscheduled maintenance. The IMO anticipates that the Ontario market will be effective in attracting additional resources to provide adequate reliability. However, there will likely be restrictions on planned maintenance to maintain reserve levels. Outside of these periods, available reserves are forecast to exceed requirements. Over the 18-month period under study, accounting for the availability of regional supply, the Northeast Power Coordinating Council resource adequacy criteria are met.

Figure 1 illustrates the weekly resource adequacy situation for the Ontario Electricity System for two possible resource availability scenarios: a Reference Resource Scenario, which assumes returning nuclear units and new generation resources currently under construction come into service on the date forecast by market participants, and a Delayed Resource Scenario, which assumes the same additional resources come into service one year later than forecast. Both resource projections in Figure 1 include only available generation in Ontario and external supply that is presently pre-committed to Ontario. They do not include additional resources external to Ontario that are expected to be available.

Periods of high and low reserves represent opportunities for market participants to revise their operational and commercial plans.

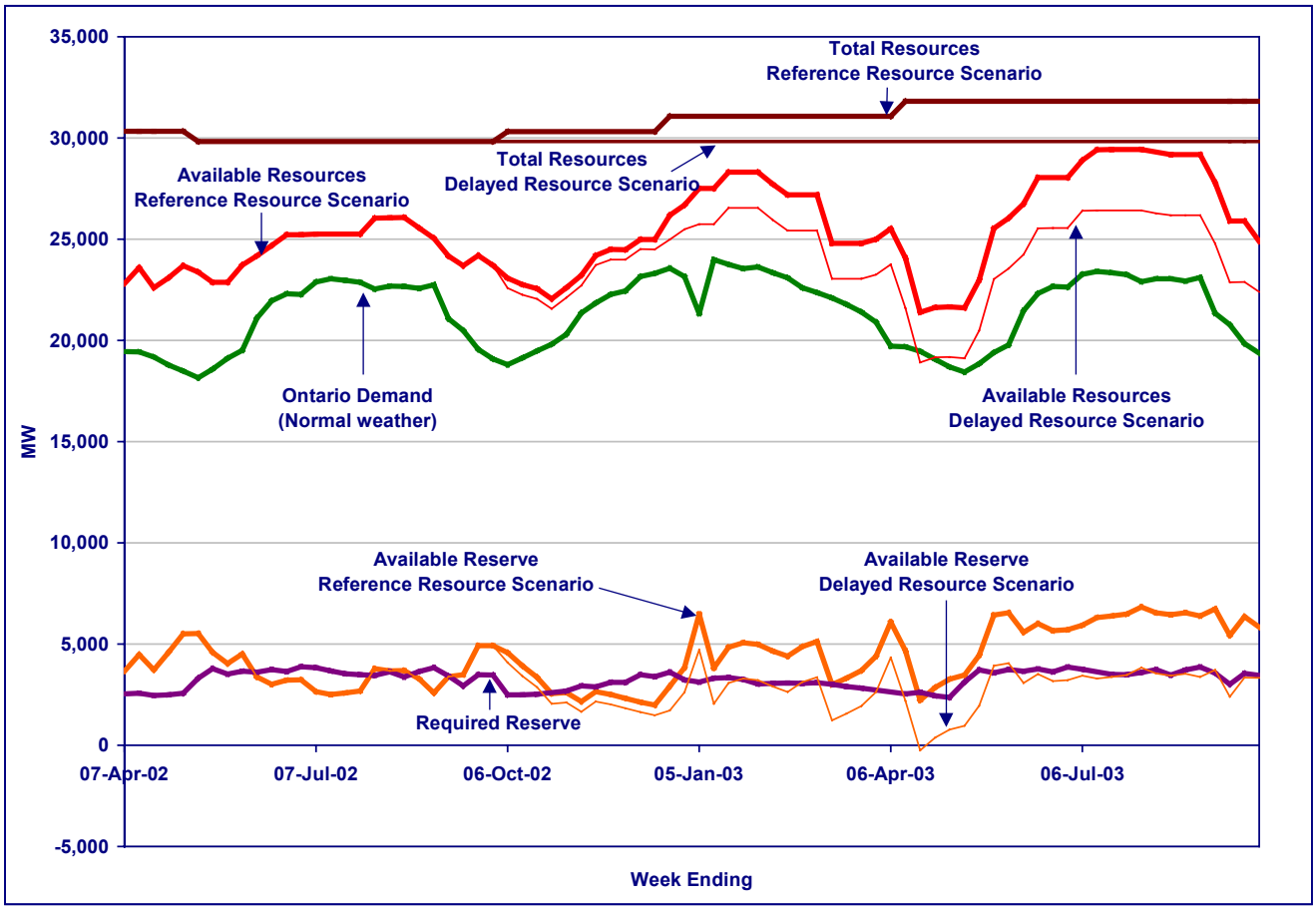
The resource adequacy assessments take into consideration the full range of expected weather conditions on a probabilistic basis. The Ontario demand forecast is presented assuming Normal weather with the effect of deviations from Normal weather on peak demands being factored into the required reserve. As is always the case with forecasts such as these, it should be recognized that certain combinations of extreme weather and/or lower than forecast resources, could result in lower than desired levels of reliability. This resource adequacy assessment and its conclusion also assume that, after market opening, market mechanisms will result in resources being available to Ontario at a comparable level to those that are currently available.

Generally, the electricity peak demand forecast is similar to the demand forecast that was prepared for the previous 18-Month Outlook published in December 2001. The updated forecast includes actual weather, and economic and demand data up to the end of 2001. For 2002, the

Normal weather summer peak is expected to be about 23,000 MW, which is about 100 MW higher than the previous Outlook. The energy demand forecast for 2002 is lower than the previous forecast due to a weaker economic outlook in 2002.

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

Figure 1: 18-Month Assessment of Resource Adequacy



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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 adequacy of the existing and committed resources and transmission facilities after market opening. A condition of the Transitional License for the IMO (Section 18.1) requires the IMO to monitor the state of electricity demand and available supply in Ontario and to report its findings to the Minister of Energy, Science and Technology and to the Ontario Energy Board (OEB).

This Outlook covers the 18-Month period from April 1, 2002 to September 30, 2003. It supercedes the report titled "An Assessment of the Adequacy of the Ontario Electricity System from January 2002 to June 2003", dated December 17, 2001. Its purpose is to advise the Minister of Energy Science and Technology, the Ontario Energy Board and Market Participants of the resource and transmission adequacy 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 adequacy of the transmission system is described in Section 4. The overall findings and conclusions related to the resource and transmission adequacy 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 contents of this Outlook document focus on the assessment of resource and transmission adequacy. Other supporting information, forecasts and assessments are contained in separate documents. These documents will be updated as required.

- The separate document titled "Ontario Demand Forecast from April 2002 to September 2003" (IMO_REP_0052) (found on the IMO Web site at www.theimo.com/imoweb/pubs/marketReports/18Month_ODF_2002apr.pdf) describes in detail the 18-month forecast of electricity demand for Ontario used in this Outlook. This document also identifies the assumptions used to determine the forecast, and identifies the details regarding peak and energy demand forecasts for Ontario and parts thereof. It also contains information regarding variations in demand due to weather, economic growth and calendar day types.
- The separate document titled "Methodology to Perform Demand Forecasts, Resource Adequacy Assessments and Transmission Adequacy Assessments" (IMO_REP_0044) (found on the IMO Web site at www.theimo.com/imoweb/pubs/marketReports/Methodology_RTAA_2002apr.pdf) contains information regarding the methodology used to perform the demand forecasts, resource and transmission adequacy 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 call the IMO Help Centre at 905-403-6900 or 1-888-448-7777, or send an email to forecasts.assessments@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 the first half of February 2002.

2.1 Existing Generation Resources Included in the Study

The existing installed generation within Ontario 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 study are retired generators, embedded generators that are not managed by Ontario Electricity Financial Corporation (OEFC) or generation not directly connected to the IMO-controlled grid.

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

Resource Type	Total, MW	# of Stations	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

The previous 18-Month Outlook reported installed generation resources totaling 29,523 MW. Differences are due to reallocation among resource types and minor changes in the rating for some generating units.

2.2 External Transactions Outside the Province

An amount of 700 MW for April 2002, and 200 MW for the remainder of the 18-month interval, are assumed as purchases delivered to Ontario and are 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.

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 IMO-controlled grid must apply to the IMO for approval under the CAA process.

Table 2.2 summarizes the new generation projects with estimated in-service dates that occur in the 18-month period studied. They have been identified to the IMO through the CAA process, as of the first week of February 2002. In Table 2.2, the information regarding resource type, capacity, and estimated in-service date is provided by the proponents.

Table 2.2 Potential Generation Projects in Ontario

Project Name	System Zone	Resource Type	Capacity MW	Proponent's Estimated I/S Date
Transalta - SRCP	West	Gas	490	2002 - Q3
Northland (Kirkland)	Northeast	Gas	48	2002 - Q4
AGSTAR	West	Gas	88	2003 - Q1
Sithe Goreway	Toronto	Gas	932	2003 - Q2
Northland (Thorold)	Niagara	Gas	273	2003 - Q3
Total			1831	

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. Purchase amounts that are assumed to be available to Ontario include 700 MW for the month of April 2002 and 200 MW thereafter. Pickering A units and Bruce A units are assumed to come into service on the dates that the facility owners or operators have indicated. This resource scenario includes only those generation projects listed in the CAA queue where the connection applicant has indicated that construction is in progress or has been completed. Such resources are assumed to come into service on the date indicated by the connection applicant. For this Outlook, this includes the proposed 490 MW TransAlta gas-fired generation project in Sarnia which has an estimated in-service date for this project of Q3-2002. For assessment purposes, it is assumed that the new project will be in-service as of October 1, 2002.

Under the **Delayed Resource Scenario** existing Ontario resources are assumed to be in-service for the duration of the study period. Purchase amounts that are assumed to be available to Ontario include 700 MW for the month of April 2002 and 200 MW thereafter. This resource

scenario assumes that Pickering A units, Bruce A units and projects in the CAA queue that are under construction, or that have completed construction are delayed from coming into service by one year from the date that the facility owner, operator or connection applicant has indicated. 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 summer 2002, winter 2003 and summer 2003 peak demands. The resource pictures are developed starting from the existing installed generation resources shown in Table 2.1. External transactions, described in Section 2.2, are added to obtain Total Resources. Generation additions are included as mentioned above. 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 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	29,622	29,622	30,862	29,622	31,612	29,622
2	Firm Imports	200	200	200	200	200	200
3	Total Resources	29,822	29,822	31,062	29,822	31,812	29,822
4	Total Reductions in Resources	4,579	4,579	3,556	4,076	2,393	3,418
5	Available Resources	25,243	25,243	27,506	25,746	29,419	26,404

Notes to Table 2.3:

1. Installed Resources: This is the total capacity of the existing installed generation resources in Ontario assumed to be available over the summer and winter peaks in the 18-month time span, as described in Section 2.1. Initially, this value includes all the generators in Ontario, except Bruce A, retired generators, embedded generators not managed by OEFC or generators not directly connected to the IMO-controlled grid. The new generation capacity is progressively included, according to estimated in-service dates in Table 2.2 or according to the assumed dates under the Delayed Resource Scenario.

2. Imports: Represents the amount of external capacity considered to be reliably committed to Ontario under existing contracts/agreements.

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

4. Total Reductions in Resources: 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: 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 pessimistic outcome. It should also be noted that the assessment of Ontario generation resource adequacy assumes that after market opening, market mechanisms will result in resources being available to Ontario at a comparable level to those which are currently available. The methodology used to carry out this assessment is described in detail in the document titled "Methodology to Perform Demand Forecasts, Resource Adequacy Assessments and Transmission Adequacy Assessments" (IMO_REP_0044). Results of the adequacy assessment are described in Section 3.1, conclusions are provided in Section 5, and detailed result numbers and tables can be found in Appendix A.

3.1 Assessment of Generation Resources Adequacy

3.1.1 Weekly Margins – Load & Capacity (L&C) Program Calculations

Reserve margins for each week, for both resource scenarios studied, under normal weather conditions, are shown in Figure 3.1. The total reductions to resources are shown in Figure 3.2. Further details and explicit values are provided in Appendix A. Analysis of forecast reserve margins indicates the following:

Under the **Reference Resource Scenario**, most of the forecast reserve margins are positive in the period covered by this Outlook. Reserve levels in June, July, and toward the end of 2002 are forecast to be lower than the required planning reserve levels, while levels in May, the fall of 2002, and beyond the end of 2002 are more than adequate. During June and July, up to 1,200 MW of additional capacity could be required to maintain reserve levels, and in November, and December 2002, up to 1,400 MW of additional capacity could be required. Periods of high and low available resources represent opportunities for market participants to revise their operational and commercial plans in a manner that would further enhance the reliability of the Ontario electricity system. Additional reserves could be made available from external resources, from Ontario-based demand response or from the rescheduling of planned generator outages. For the remainder of the 18-month period, reserves are generally well above requirements, 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 first six months of 2002. The lack of generation resource additions and one year delay in return to service of the refurbished nuclear generating units would result in lower reserve margins 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 indicated by the sparse occurrence of large positive margins. For the period of November through December 2002, up to 1,900 MW of additional generating

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. In the spring of 2003, a potential resource shortfall is shown, in which case up to 3,000 MW of additional generating capacity would need to be made available to maintain adequate reserve levels. 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, especially during the end of 2002 and spring of 2003, and implement the necessary control actions if required, in accordance with the Market Rules.

3.1.2 Loss of Load Expectation (LOLE)

A number of simulations were performed using General Electric's Multi-Area Reliability Simulation (MARS) software, to calculate the Loss of Load Expectation 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 Demand Forecasts, Resource Adequacy Assessments and Transmission Adequacy Assessments" (IMO_REP_0044). The MARS calculations were performed in two steps. In the first step, the same resources as in the L&C calculations were modeled in MARS. In the second step, additional resources were made available to the program, on a monthly basis, with the purpose of reducing the highest monthly LOLE values such that the annual LOLE becomes less or equal to 0.1 days/year. The second step was repeated, with increasing amounts of additional resources, until all annual LOLE values became less or equal to 0.1 days/year. The modeling of additional resources 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 the following:

The Loss of Load Expectation (LOLE) value for 2002 is 0.091 days/year, and for 2003 is 0.089 days/year. When compared to the target values of 0.1 days/year, these values indicate that the Ontario electricity system meets the NPCC resource adequacy criterion during the study period. The largest contribution to each of the two risk levels is made during the months of June, July, November, and December, for 2002, and March, April, and May, for 2003. In these months, in order to achieve the target annual LOLE value, additional capacity up to approximately the largest margin deficiencies shown in Appendix A, under each of the two resource scenarios, could be required.

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 3.3 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 and Delayed Resource Scenarios. No additional energy is expected to be needed to meet the Ontario forecast energy demand, other than provided by internal resources and through energy-backed firm purchase contracts identified for the Outlook period. Although the overall monthly energy

production capability is forecast to be adequate, shorter-term energy deficiencies can arise as a result of 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.

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 have been taken into account in assessment studies, as described in Section 2.2 of the document titled "Methodology to Perform Demand Forecasts, Resource Adequacy Assessments and Transmission Adequacy Assessments" (IMO_REP_0044). The Required Reserve Margin and Loss of Load Expectation (LOLE) calculations both reflect the effect of such uncertainties.

Although current economic conditions are reflected in the base demand forecast, uncertainties in the forecast demand due to unforeseen economic growth or decline are not reflected. Changes to economic conditions that may occur after the demand forecast was produced are generally captured by 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 load and capacity 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 resource imports from other control areas are major factors that significantly impact supply adequacy. Generator outage plans are developed to balance the need for adequate supply while providing 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 to take advantage of lower demands and the availability of surplus capacity from other control areas, if needed, to ensure Ontario's supply adequacy. 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. The above 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, one with the 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 on Ontario's interconnections has been carried out for the last five years. This analysis shows that external generation resources of up to 1,800 MW outside summer peak demand periods are expected to be available to offer into the Ontario market. During Ontario summer peak demand periods of July and August, although many neighbouring systems are often experiencing their peak demands, opportunities for imports still exist, due mainly to the non-coincidence of the daily peak hours between Ontario and the neighbouring areas, 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 Forecast of Resource Adequacy

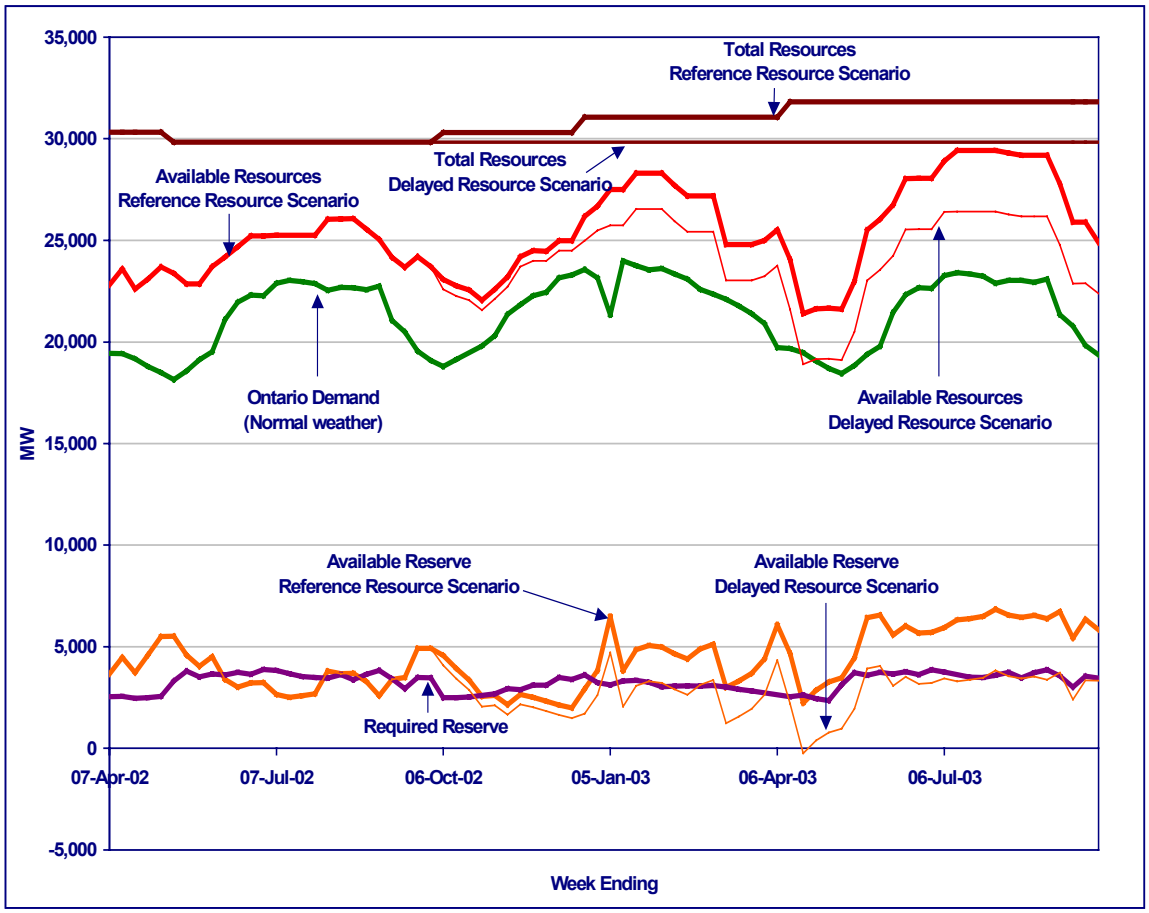


Figure 3.2 Total Reductions in Resources

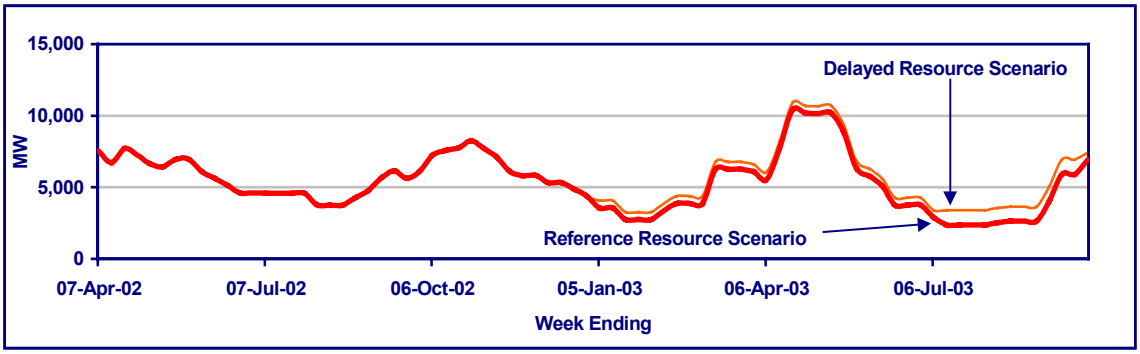
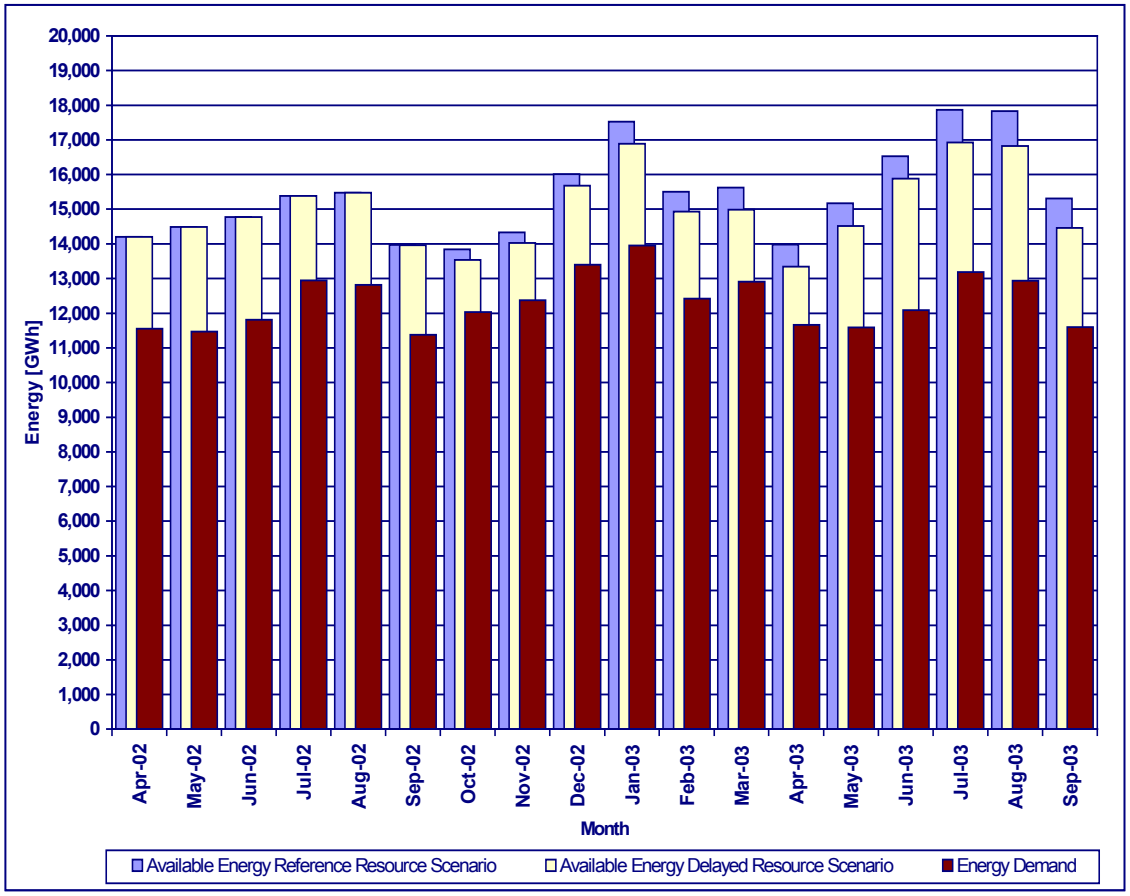


Figure 3.3 18-Month Forecast of Energy Production Capability



4.0 Transmission Adequacy Assessment

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

4.1 Changes from the Previous 18-Month Outlook

Committed transmission projects are summarized in Appendix B by transmission zone. The projects identified for this Outlook are unchanged from the previous Outlook. Projects that had expected in-service dates between January 1, 2002 and March 31, 2002 in the previous Outlook have been removed from the list in Appendix B.

The status of the Ontario – Michigan interconnection modification project has changed from the previous Outlook. By April 1, 2002, it is expected that a new 845 MVA phase angle regulator (PAR) for 230 kV circuit L4D will be in-service. When in-service, it is expected that the operation of the L4D PAR will be restricted to neutral tap operation only. For 230 kV circuit B3N, the Michigan 675 MVA PAR is available for service, but is currently bypassed from use. For 230 kV circuit L51D, the expected return to service date for the failed 845 MVA PAR at the Lambton TGS has changed from October 2002 to November 2002. Full PAR control of the Ontario – Michigan interconnection can only be utilized when all three PARs are in-service. This is expected around November 2002.

4.2 Assessment of Transmission Outage Plan

The principal purpose of the transmission adequacy 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 adequacy 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 IMO-controlled grid should be coordinated with the generator operators involved, especially at times when generation 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.

During the transitional period prior to market opening, the Hydro One Networks outage plan is the only transmitter outage plan considered in the Outlook. For this Outlook, the Hydro One outage plan submitted to the IMO on February 1, 2002 was used.

The IMO's assessment of the impact of the transmission outage plan provided by Hydro One is shown in Appendix C, Tables C4.1 to C4.10 for each transmission zone. In these tables, each element in Hydro One's outage plan 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 plan is described in a separate IMO document titled "Methodology to Perform Demand Forecasts, Resource Adequacy Assessments and Transmission Adequacy 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:

Essa Transmission Zone

The Essa 500 kV JL511 breaker outage from March 25, 2002 to May 03, 2002 affects the Flow North limit associated with the Flow North/Flow South interface. The outage is not expected to be limiting.

Northeast Transmission Zone

The 230 kV D2L circuit outage from April 3, 2002 to April 26, 2002 and the 230 kV W71D circuit outage from September 17, 2002 to September 27, 2002 affect the Quebec North interconnection. Neither of the outages is expected to be limiting.

Northwest Transmission Zone

The 230 kV K21W and K22W circuit outages from September 16, 2002 to October 2, 2002 and from October 7, 2002 to October 18, 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 least 50 MW, further reducing dispatching flexibility in the Northwest zone and requiring more coordination in the planning of transmission and generation outages.

Ottawa Transmission Zone

The 500 kV X522A and X523A circuit outages from April 15, 2002 to May 17, 2002and from September 16, 2002 to October 18, 2002, respectively, will reduce the Flow Into Ottawa (FIO) interface limit by 400 MW. These outages are not expected to be limiting.

Toronto Transmission Zone

The 500 kV Bowmanville H3L521 breaker outage from April 2, 2002 to May 9, 2002 will affect the Negative Buchanan Longwood Input (NBLIP) interface by reducing the limit of this interface by 500 MW. This outage is not expected to be limiting.

This Outlook has limited the assessment of transmission outages, to those transmission outages identified by Hydro One, which have 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 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 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

Due to a forced outage, the Whiteshell T8 transformer in Manitoba is unavailable until April 30, 2002. This has reduced the transfer capability between Manitoba and Ontario. However, the contracted purchase from Manitoba can be maintained. The outage also reduces the East-West Transfer East capability, in the order of least 50 MW, further reducing dispatching flexibility in the Northwest zone and requiring more coordination in the planning of transmission and generation outages.

5.0 Overall Findings and Conclusions

For the Outlook period, reserve levels in June, July, and toward the end of 2002 under the Reference Resource Scenario are forecast to be lower than IMO's required planning reserve levels, while levels in May, the fall of 2002, and beyond the end of 2002 are more than adequate. These periods of high and low available resources represent opportunities for market participants to revise their operational and commercial plans in a manner that would further enhance the reliability of the Ontario electricity system. Under the Delayed Resource Scenario, significant delays in additional resources coming into service would result in reserve levels lower than under the Reference Resource Scenario, particularly late in 2002 and in the spring of 2003.

- The Loss of Load Expectation, (LOLE) is expected to be within the NPCC resource adequacy criterion.
- 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.
- Planned outage rescheduling, in addition to supply from external resources, is required to maintain adequate reserve levels during the spring of 2003.
- Sufficient control actions in the operating timeframe are expected to be available to manage a wide range of uncertainties in demand or resource levels, which might exceed the allowances covered by the Required Reserve.
- For the month of April 2002, the contracted purchase from Manitoba is expected to be maintained despite the forced outage of the Whiteshell T8 transformer that reduces the Ontario - Manitoba transfer capability and may at times limit dispatch flexibility in the Northwest zone.
- 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 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-Apr-02	19,450	30,322	7,516	22,806	19.1	3,656	13.3	2,550	1,106
14-Apr-02	19,421	30,322	6,726	23,596	23.4	4,475	13.5	2,572	1,903
21-Apr-02	19,181	30,322	7,716	22,606	19.7	3,725	13.0	2,463	1,262
28-Apr-02	18,788	30,322	7,237	23,085	24.9	4,597	13.5	2,497	2,100
05-May-02	18,484	30,322	6,631	23,691	30.3	5,507	14.1	2,565	2,942
12-May-02	18,150	29,822	6,457	23,365	30.9	5,515	18.6	3,324	2,191
19-May-02	18,568	29,822	6,956	22,866	25.2	4,598	20.8	3,798	800
26-May-02	19,119	29,822	6,961	22,861	21.5	4,042	18.7	3,510	532
02-Jun-02	19,513	29,822	6,103	23,719	23.5	4,506	19.1	3,671	835
09-Jun-02	21,096	29,822	5,639	24,183	16.3	3,387	17.4	3,611	-224
16-Jun-02	21,961	29,822	5,139	24,683	14.0	3,022	17.3	3,743	-721
23-Jun-02	22,299	29,822	4,607	25,215	14.6	3,216	16.6	3,643	-427
30-Jun-02	22,271	29,822	4,611	25,211	14.7	3,240	17.7	3,882	-642
07-Jul-02	22,884	29,822	4,582	25,240	11.8	2,656	17.0	3,831	-1,175
14-Jul-02	23,035	29,822	4,579	25,243	11.0	2,508	16.2	3,677	-1,169
21-Jul-02	22,956	29,822	4,575	25,247	11.4	2,591	15.6	3,535	-944
28-Jul-02	22,869	29,822	4,571	25,251	11.9	2,682	15.5	3,488	-806
04-Aug-02	22,537	29,822	3,785	26,037	17.1	3,800	15.6	3,461	339
11-Aug-02	22,681	29,822	3,764	26,058	16.4	3,677	16.2	3,629	48
18-Aug-02	22,674	29,822	3,759	26,063	16.5	3,689	15.1	3,377	312
25-Aug-02	22,575	29,822	4,271	25,551	14.7	3,276	16.4	3,648	-372
01-Sep-02	22,748	29,822	4,785	25,037	11.5	2,589	17.1	3,838	-1,249
08-Sep-02	21,065	29,822	5,656	24,166	16.4	3,401	16.5	3,418	-17
15-Sep-02	20,489	29,822	6,137	23,685	17.3	3,496	14.6	2,943	553
22-Sep-02	19,559	29,822	5,631	24,191	25.6	4,932	18.1	3,490	1,442
29-Sep-02	19,087	29,822	6,115	23,707	26.2	4,920	18.5	3,470	1,450
06-Oct-02	18,797	30,312	7,238	23,074	24.7	4,577	13.5	2,490	2,087
13-Oct-02	19,129	30,312	7,559	22,753	20.8	3,924	13.2	2,487	1,437
20-Oct-02	19,477	30,312	7,766	22,546	17.6	3,369	13.2	2,528	841
27-Oct-02	19,801	30,312	8,258	22,054	13.1	2,553	13.4	2,615	-62
03-Nov-02	20,293	30,312	7,716	22,596	13.0	2,603	13.4	2,684	-81
10-Nov-02	21,352	30,312	7,108	23,204	10.2	2,152	13.9	2,935	-783
17-Nov-02	21,843	30,312	6,112	24,200	12.3	2,657	13.4	2,891	-234
24-Nov-02	22,269	30,312	5,825	24,487	11.5	2,518	14.1	3,102	-584
01-Dec-02	22,447	30,312	5,841	24,471	10.5	2,324	14.1	3,115	-791
08-Dec-02	23,155	30,312	5,324	24,988	9.3	2,133	15.3	3,487	-1,354
15-Dec-02	23,300	30,312	5,329	24,983	8.6	1,983	14.8	3,401	-1,418
22-Dec-02	23,565	31,062	4,877	26,185	12.6	2,920	15.5	3,615	-695
29-Dec-02	23,155	31,062	4,382	26,680	16.7	3,825	14.1	3,230	595

(Table A1 continued)

Week Ending Day	Ontario 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
05-Jan-03	21,320	31,062	3,556	27,506	30.9	6,486	14.9	3,122	3,364
12-Jan-03	23,984	31,062	3,556	27,506	16.1	3,822	14.0	3,312	510
19-Jan-03	23,753	31,062	2,761	28,301	20.7	4,848	14.3	3,352	1,496
26-Jan-03	23,539	31,062	2,761	28,301	21.8	5,062	14.0	3,253	1,809
02-Feb-03	23,615	31,062	2,761	28,301	21.4	4,986	13.0	3,034	1,952
09-Feb-03	23,346	31,062	3,360	27,702	20.2	4,656	13.3	3,062	1,594
16-Feb-03	23,091	31,062	3,876	27,186	19.3	4,395	13.5	3,068	1,327
23-Feb-03	22,599	31,062	3,876	27,186	21.9	4,887	13.7	3,063	1,824
02-Mar-03	22,360	31,062	3,876	27,186	23.2	5,126	14.0	3,091	2,035
09-Mar-03	22,100	31,062	6,266	24,796	13.7	2,996	13.9	3,021	-25
16-Mar-03	21,771	31,062	6,266	24,796	15.5	3,325	13.5	2,909	416
23-Mar-03	21,394	31,062	6,266	24,796	17.6	3,702	13.4	2,824	878
30-Mar-03	20,897	31,062	6,065	24,997	21.4	4,400	13.2	2,725	1,675
06-Apr-03	19,721	31,062	5,546	25,516	31.4	6,095	13.6	2,644	3,451
13-Apr-03	19,687	31,812	7,752	24,060	24.1	4,673	13.1	2,548	2,125
20-Apr-03	19,463	31,812	10,430	21,382	11.6	2,219	13.7	2,620	-401
27-Apr-03	19,069	31,812	10,189	21,623	15.2	2,854	13.1	2,451	403
04-May-03	18,697	31,812	10,151	21,661	17.7	3,264	12.9	2,366	898
11-May-03	18,443	31,812	10,196	21,616	19.1	3,473	17.2	3,128	345
18-May-03	18,838	31,812	8,825	22,987	24.0	4,449	20.1	3,735	714
25-May-03	19,390	31,812	6,290	25,522	33.7	6,432	18.8	3,595	2,837
01-Jun-03	19,783	31,812	5,774	26,038	33.6	6,555	19.2	3,742	2,813
08-Jun-03	21,464	31,812	5,067	26,745	26.4	5,581	17.3	3,659	1,922
15-Jun-03	22,327	31,812	3,773	28,039	27.3	6,012	17.1	3,777	2,235
22-Jun-03	22,673	31,812	3,763	28,049	25.4	5,676	16.2	3,627	2,049
29-Jun-03	22,637	31,812	3,766	28,046	25.6	5,709	17.3	3,871	1,838
06-Jul-03	23,261	31,812	2,909	28,903	25.9	5,942	16.4	3,762	2,180
13-Jul-03	23,404	31,812	2,393	29,419	27.3	6,315	15.7	3,628	2,687
20-Jul-03	23,333	31,812	2,390	29,422	27.7	6,389	15.2	3,504	2,885
27-Jul-03	23,235	31,812	2,385	29,427	28.3	6,492	15.2	3,478	3,014
03-Aug-03	22,893	31,812	2,380	29,432	30.3	6,839	15.9	3,599	3,240
10-Aug-03	23,039	31,812	2,515	29,297	28.8	6,558	16.4	3,738	2,820
17-Aug-03	23,031	31,812	2,630	29,182	28.4	6,451	15.3	3,475	2,976
24-Aug-03	22,933	31,812	2,630	29,182	28.9	6,549	16.5	3,731	2,818
31-Aug-03	23,096	31,812	2,630	29,182	28.0	6,386	17.0	3,868	2,518
07-Sep-03	21,348	31,812	4,022	27,790	32.0	6,742	17.0	3,572	3,170
14-Sep-03	20,769	31,812	5,918	25,894	26.5	5,425	14.8	3,020	2,405
21-Sep-03	19,837	31,812	5,913	25,899	32.6	6,362	18.1	3,544	2,818
28-Sep-03	19,365	31,812	6,918	24,894	30.6	5,829	18.2	3,465	2,364

Table A2 Assessment of Resource Adequacy Delayed Resource Scenario

Week Ending Day	Ontario 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-Apr-02	19,450	30,322	7,516	22,806	19.1	3,656	13.3	2,550	1,106
14-Apr-02	19,421	30,322	6,726	23,596	23.4	4,475	13.5	2,572	1,903
21-Apr-02	19,181	30,322	7,716	22,606	19.7	3,725	13.0	2,463	1,262
28-Apr-02	18,788	30,322	7,237	23,085	24.9	4,597	13.5	2,497	2,100
05-May-02	18,484	30,322	6,631	23,691	30.3	5,507	14.1	2,565	2,942
12-May-02	18,150	29,822	6,457	23,365	30.9	5,515	18.6	3,324	2,191
19-May-02	18,568	29,822	6,956	22,866	25.2	4,598	20.8	3,798	800
26-May-02	19,119	29,822	6,961	22,861	21.5	4,042	18.7	3,510	532
02-Jun-02	19,513	29,822	6,103	23,719	23.5	4,506	19.1	3,671	835
09-Jun-02	21,096	29,822	5,639	24,183	16.3	3,387	17.4	3,611	-224
16-Jun-02	21,961	29,822	5,139	24,683	14.0	3,022	17.3	3,743	-721
23-Jun-02	22,299	29,822	4,607	25,215	14.6	3,216	16.6	3,643	-427
30-Jun-02	22,271	29,822	4,611	25,211	14.7	3,240	17.7	3,882	-642
07-Jul-02	22,884	29,822	4,582	25,240	11.8	2,656	17.0	3,831	-1,175
14-Jul-02	23,035	29,822	4,579	25,243	11.0	2,508	16.2	3,677	-1,169
21-Jul-02	22,956	29,822	4,575	25,247	11.4	2,591	15.6	3,535	-944
28-Jul-02	22,869	29,822	4,571	25,251	11.9	2,682	15.5	3,488	-806
04-Aug-02	22,537	29,822	3,785	26,037	17.1	3,800	15.6	3,461	339
11-Aug-02	22,681	29,822	3,764	26,058	16.4	3,677	16.2	3,629	48
18-Aug-02	22,674	29,822	3,759	26,063	16.5	3,689	15.1	3,377	312
25-Aug-02	22,575	29,822	4,271	25,551	14.7	3,276	16.4	3,648	-372
01-Sep-02	22,748	29,822	4,785	25,037	11.5	2,589	17.1	3,838	-1,249
08-Sep-02	21,065	29,822	5,656	24,166	16.4	3,401	16.5	3,418	-17
15-Sep-02	20,489	29,822	6,137	23,685	17.3	3,496	14.6	2,943	553
22-Sep-02	19,559	29,822	5,631	24,191	25.6	4,932	18.1	3,490	1,442
29-Sep-02	19,087	29,822	6,115	23,707	26.2	4,920	18.5	3,470	1,450
06-Oct-02	18,797	29,822	7,238	22,584	22.1	4,087	13.0	2,410	1,677
13-Oct-02	19,129	29,822	7,559	22,263	18.2	3,434	12.8	2,417	1,017
20-Oct-02	19,477	29,822	7,766	22,056	15.0	2,879	13.1	2,516	363
27-Oct-02	19,801	29,822	8,258	21,564	10.6	2,063	13.5	2,635	-572
03-Nov-02	20,293	29,822	7,716	22,106	10.6	2,113	13.5	2,700	-587
10-Nov-02	21,352	29,822	7,108	22,714	7.9	1,662	14.0	2,952	-1,290
17-Nov-02	21,843	29,822	6,112	23,710	10.1	2,167	13.5	2,909	-742
24-Nov-02	22,269	29,822	5,825	23,997	9.2	2,028	14.2	3,113	-1,085
01-Dec-02	22,447	29,822	5,841	23,981	8.3	1,834	14.1	3,131	-1,297
08-Dec-02	23,155	29,822	5,324	24,498	7.2	1,643	15.3	3,497	-1,854
15-Dec-02	23,300	29,822	5,329	24,493	6.5	1,493	14.8	3,414	-1,921
22-Dec-02	23,565	29,822	4,837	24,985	7.4	1,720	15.5	3,610	-1,890
29-Dec-02	23,155	29,822	4,342	25,480	11.5	2,625	14.1	3,230	-605

(Table A2 continued)

Week Ending Day	Ontario 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
05-Jan-03	21,320	29,822	4,076	25,746	22.5	4,726	13.7	2,874	1,852
12-Jan-03	23,984	29,822	4,076	25,746	8.7	2,062	14.3	3,391	-1,329
19-Jan-03	23,753	29,822	3,281	26,541	13.2	3,088	14.2	3,333	-245
26-Jan-03	23,539	29,822	3,281	26,541	14.2	3,302	13.6	3,169	133
02-Feb-03	23,615	29,822	3,281	26,541	13.8	3,226	12.7	2,965	261
09-Feb-03	23,346	29,822	3,880	25,942	12.6	2,896	13.2	3,046	-150
16-Feb-03	23,091	29,822	4,396	25,426	11.6	2,635	13.5	3,085	-450
23-Feb-03	22,599	29,822	4,396	25,426	14.0	3,127	13.4	2,979	148
02-Mar-03	22,360	29,822	4,396	25,426	15.3	3,366	13.4	2,953	413
09-Mar-03	22,100	29,822	6,786	23,036	5.7	1,236	14.2	3,097	-1,861
16-Mar-03	21,771	29,822	6,786	23,036	7.3	1,565	13.9	2,987	-1,422
23-Mar-03	21,394	29,822	6,786	23,036	9.2	1,942	13.7	2,883	-941
30-Mar-03	20,897	29,822	6,585	23,237	12.8	2,640	12.9	2,667	-27
06-Apr-03	19,721	29,822	6,066	23,756	22.3	4,335	12.5	2,426	1,909
13-Apr-03	19,687	29,822	8,232	21,590	11.4	2,203	12.7	2,456	-253
20-Apr-03	19,463	29,822	10,910	18,912	-1.3	-251	14.4	2,758	-3,009
27-Apr-03	19,069	29,822	10,669	19,153	2.0	384	13.9	2,603	-2,219
04-May-03	18,697	29,822	10,646	19,176	4.2	779	13.5	2,488	-1,709
11-May-03	18,443	29,822	10,706	19,116	5.4	973	17.6	3,190	-2,217
18-May-03	18,838	29,822	9,335	20,487	10.5	1,949	19.8	3,669	-1,720
25-May-03	19,390	29,822	6,800	23,022	20.6	3,932	17.3	3,306	626
01-Jun-03	19,783	29,822	6,284	23,538	20.8	4,055	17.7	3,452	603
08-Jun-03	21,464	29,822	5,577	24,245	14.6	3,081	16.4	3,467	-386
15-Jun-03	22,327	29,822	4,283	25,539	15.9	3,512	16.1	3,546	-34
22-Jun-03	22,673	29,822	4,273	25,549	14.2	3,176	15.5	3,458	-282
29-Jun-03	22,637	29,822	4,276	25,546	14.4	3,209	16.6	3,702	-493
06-Jul-03	23,261	29,822	3,419	26,403	15.0	3,442	15.5	3,563	-121
13-Jul-03	23,404	29,822	3,418	26,404	14.3	3,300	14.7	3,396	-96
20-Jul-03	23,333	29,822	3,415	26,407	14.6	3,374	14.1	3,246	128
27-Jul-03	23,235	29,822	3,410	26,412	15.2	3,477	13.9	3,195	282
03-Aug-03	22,893	29,822	3,405	26,417	16.9	3,824	14.4	3,262	562
10-Aug-03	23,039	29,822	3,540	26,282	15.6	3,543	15.2	3,460	83
17-Aug-03	23,031	29,822	3,655	26,167	15.1	3,436	14.1	3,216	220
24-Aug-03	22,933	29,822	3,655	26,167	15.6	3,534	15.3	3,464	70
31-Aug-03	23,096	29,822	3,655	26,167	14.8	3,371	16.0	3,642	-271
07-Sep-03	21,348	29,822	5,047	24,775	17.7	3,727	15.4	3,231	496
14-Sep-03	20,769	29,822	6,943	22,879	11.8	2,410	14.1	2,877	-467
21-Sep-03	19,837	29,822	6,938	22,884	17.1	3,347	16.5	3,221	126
28-Sep-03	19,365	29,822	7,428	22,394	17.5	3,329	16.6	3,169	160

Table A3 Adequacy of the Energy Production Capability

Month	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)
Apr-02	11,554	14,202	14,202	2,648	2,648
May-02	11,469	14,492	14,492	3,023	3,023
Jun-02	11,808	14,775	14,775	2,967	2,967
Jul-02	12,948	15,381	15,381	2,433	2,433
Aug-02	12,812	15,478	15,478	2,666	2,666
Sep-02	11,383	13,972	13,962	2,588	2,578
Oct-02	12,035	13,844	13,534	1,809	1,499
Nov-02	12,374	14,330	14,030	1,956	1,656
Dec-02	13,395	16,010	15,679	2,615	2,284
Jan-03	13,950	17,523	16,887	3,573	2,937
Feb-03	12,429	15,506	14,931	3,077	2,503
Mar-03	12,907	15,627	14,991	2,720	2,084
Apr-03	11,665	13,982	13,346	2,316	1,680
May-03	11,589	15,173	14,515	3,583	2,926
Jun-03	12,089	16,524	15,887	4,435	3,798
Jul-03	13,186	17,862	16,919	4,676	3,733
Aug-03	12,936	17,830	16,824	4,894	3,888
Sep-03	11,603	15,310	14,459	3,707	2,856

Appendix B Committed Plans – Hydro One

East Zone - Committed Plans	Projected I/S Date
Longueuil TS: Feeder reconfiguration: Construct a double and single circuit 44 kV line in order to split the load on M23 between itself and the idle M25. Add a tie to facilitate outage planning.	June 30, 2002
Cobden TS: Install a second 44 kV feeder.	September 30, 2002

Niagara Zone - Committed Plans	Projected I/S Date
Allanburg TS: Install 115 kV series reactors.	October 31, 2002

Northeast Zone - Committed Plans	Projected I/S Date
Martindale TS - KT22: Air blast circuit breaker replacement with SF6 type.	July 1, 2002
Martindale TS - PL24: Air blast circuit breaker replacement with SF6 type.	October 1, 2002

Northwest Zone - Committed Plans	Projected I/S Date
Pikangikum: Connect customer 12/16/20 MVA, 120-25 kV station to 115 kV circuit E2R near Ear Falls. The customer will be located approximately 150 kM from tap point.	January 1, 2003

Ottawa Zone - Committed Plans	Projected I/S Date
Kanata MTS: Provide 230 kV connection to C3S near South March.	June 7, 2002
Lincoln Heights TS - SC1/SC2: Replace capacitor banks.	December 31, 2002
Russell TS - SC1/SC2: Replace capacitor banks.	December 31, 2002

Southwest Zone - Committed Plans	Projected I/S Date
Centralia TS: Install 2nd 28 kV, 21.6 MVAR LV capacitor bank.	May 30, 2002
Cambridge & North Dumfries Hydro MTS #1: Build 230 kV 2-circuit line tap (M20/21D) to customer's owned station; 2 x 50/83 MVA, 230-27.6 kV transformer.	June 1, 2002
Detweiler TS - SC1: Replace capacitor bank.	June 30, 2002

Toronto Zone - Committed Plans	Projected I/S Date
Brampton MTS #1: Provide 230 kV connection from R19T/R21T to new customer owned station (between Hanlan Jct & Pleasant TS).	May 1, 2002
Sheppard TS: Add 2 x 27.6 feeder positions to T1/T2 DESN (including breakers).	May 31, 2002
Fairchild TS - SC2/TSC2: Replace capacitor bank and capacitor breaker	October 1, 2002
Cecil TS: Replace T3/T4 with larger 100 MVA units.	December 31, 2002
Manby TS: Replace end of life 230/27.6 kV T3 transformer with one of equal rating.	April 1, 2003
Hearn SS: Add a 125 MVAR capacitor bank.	May 1, 2003

West Zone - Committed Plans	Projected I/S Date
Strathroy TS: Install 2nd 28 kV, 21.6 MVAR LV capacitor bank.	May 30, 2002
Wanstead TS: Install 28 kV, 21.6 MVAR LV capacitor bank.	May 30, 2002
Lambton GS: Install selective catalytic converter on G3, replace the two 230/41.16/4.16 kV, 36/18/18 MVA reserve SST RSS1/RSS2 with larger 43/21.5/21.5 MVA units. Replace drop leads & disconnect switches RSS1-K/RSS2-P.	June 9, 2002
Windsor Brighton Beach: Establish a permanent connection to the 680 MVA station at Keith TS; 2 units at 230 kV and 1 unit at 115 kV.	April 30, 2003

Appendix C Planned Transmission Outages – Hydro One

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

Table C4.1 - Bruce Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
Mon 12-Aug-02 07:00	Fri 13-Sep-02 18:00	Bruce A TS.T4A	CNW	5 Days	FABC	0 MW; S1H also o/s Aug 12 to Aug 30; Bruce T27 & R27 also o/s Aug 19 to Sept 13
Mon 19-Aug-02 05:00	Mon 07-Oct-02 18:00	Bruce A TS.R27 Bruce A TS.T27	CNW	2 Hours	FABC	125-200MW; S1H also o/s Aug 19 to Aug 30; Bruce T4A also o/s Aug 19 to Sept 13; Bruce T3E also o/s Sept 30 to Nov 1
Mon 30-Sep-02 07:00	Fri 01-Nov-02 18:00	Bruce A TS.T3E	CNW	5 Days	FABC	0-50MW; Bruce T27 & R27 also o/s from Sept 30 to Oct 7

Table C4.2 - East Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
Mon 22-Apr-02 07:00	Fri 17-May-02 18:00	B1S_BARRETT	CWW	4 Hours		
Tue 02-Jul-02 08:00	Fri 26-Jul-02 16:00	W6MC_CHATSFALLS	CWW	2 Hours		

Table C4.3 - Essa Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
Mon 25-Mar-02 07:00	Fri 03-May-02 15:30	Essa TS.JL511	CNW	3 Hours	FN/FS	FN limit - 450 MW
Mon 13-May-02 07:00	Fri 21-Jun-02 15:30	Essa TS.L04L10	CNW	3 Hours		
Mon 03-Jun-02 08:00	Fri 21-Jun-02 16:00	D6_DEEPRIVER	CWW	2 Hours		

Table C4.4 - Niagara Zone

No outages to analyze.

Table C4.5 - Northeast Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
Mon 01-Apr-02 10:00	Fri 12-Apr-02 16:00	X27A (Including All Terminals)	CNW	2 Hours		
Mon 01-Apr-02 08:00	Fri 12-Apr-02 17:00	X27A, PTC501 & PTC502 Hanmer-Algoma	CNW	2 Days		
Tue 02-Apr-02 09:00	Fri 26-Apr-02 15:00	Martindale TS.KT22	CNW	None		
Wed 03-Apr-02 07:00	Fri 26-Apr-02 16:00	D2L_DYMOND	CNW	2 Hours	Hydro-Quebec transfer	D4Z Mode 2 - 55MW; D4Z Mode 3 - 35MW
Mon 15-Apr-02 10:00	Fri 26-Apr-02 16:00	A23P (Including All Terminals)	CNW	None		
Mon 15-Apr-02 08:00	Fri 26-Apr-02 17:00	A23P, PTC505 & PTC506 Algoma-Mississagi	CNW	2 Days		
Mon 29-Apr-02 10:00	Fri 10-May-02 16:00	A24P (Including All Terminals)	CNW	None		
Mon 29-Apr-02 08:00	Fri 10-May-02 17:00	A24P, PTC507 & PTC508 Algoma-Mississagi	CNW	2 Days		
Mon 13-May-02 10:00	Fri 24-May-02 16:00	S22A (Including All Terminals)	CNW	None		
Mon 13-May-02 08:00	Fri 24-May-02 17:00	S22A, PTC503 & PTC504 Martindale-Algoma	CNW	2 Days		
Wed 01-May-02 08:30	Wed 29-May-02 15:00	Martindale TS.PL24	CNW	None		
Mon 10-Jun-02 08:30	Wed 19-Jun-02 16:00	Hanmer TS.HL23	CNW	2 Hours		
Mon 03-Jun-02 08:30	Fri 28-Jun-02 15:00	Martindale TS.L24L26	CNW	None		
Tue 17-Sep-02 06:00	Fri 27-Sep-02 16:00	W71D_Widd x Notch	CNW	12 Hours	Hydro-Quebec transfer	D4Z Mode 2 - 55-120MW; D4Z Mode 3 - 25-120MW

Table C4.6 - Northwest Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
Mon 18-Feb-02 07:00	Thu 11-Apr-02 17:00	Fort William TS.SC1A Fort William TS.SC1	CNW	10 Days		
Tue 02-Apr-02 07:00	Thu 11-Apr-02 17:00	R9A	CNW	12 Hours		
Mon 29-Apr-02 08:30	Fri 10-May-02 16:00	Lakehead TS.T7 Lakehead TS.BLT7_BUS Lakehead TS.C7	CNW	2 Hours		
Mon 18-Mar-02 07:30	Fri 17-May-02 16:00	K3D_RABBITLAKE	CNW	4 Hours		
Mon 06-May-02 07:00	Fri 17-May-02 17:00	R1LB (Including All Terminals)	CNW	2 Hours		
Mon 20-May-02 07:00	Fri 31-May-02 17:00	R2LB (Including All Terminals)	CNW	2 Hours		
Mon 03-Jun-02 07:00	Fri 14-Jun-02 17:00	M23L (Including All Terminals)	CNW	2 Hours	OMTE, OMTW & EWTW	OMTE - 0 MW; OMTW - 50 MW; EWTW - 100 MW
Mon 10-Jun-02 09:00	Sat 15-Jun-02 17:00	C1A	CNW	2 Hours		
Mon 17-Jun-02 07:00	Fri 28-Jun-02 17:00	M24L (Including All Terminals)	CNW	2 Hours	OMTE, OMTW & EWTW	OMTE - 0 MW; OMTW - 50 MW; EWTW - 100 MW
Mon 01-Jul-02 07:00	Fri 12-Jul-02 17:00	A7L (Including All Terminals)	CNW	2 Hours		
Mon 08-Jul-02 07:00	Sat 13-Jul-02 16:00	R1LB	CNW	2 Hours		
Mon 24-Jun-02 07:30	Fri 26-Jul-02 16:00	K3D_RABBITLAKE	CNW	4 Hours		
Mon 15-Jul-02 08:30	Fri 26-Jul-02 16:30	A6P	CNW	2 Hours		
Mon 15-Jul-02 07:00	Fri 26-Jul-02 17:00	A8L (Including All Terminals)	CNW	2 Hours		
Mon 29-Jul-02 07:00	Fri 09-Aug-02 17:00	R9A (Including All Terminals)	CNW	2 Hours		
Mon 12-Aug-02 07:00	Fri 23-Aug-02 17:00	Aguasabon SS.K2_BUS	CNW	2 Hours		
Tue 02-Jul-02 07:00	Fri 30-Aug-02 17:00	T1M_MARATHON	CNW	6 Days		
Mon 26-Aug-02 07:00	Fri 06-Sep-02 17:00	Alexander SS.A5A_Terminal A5A_Alex	CNW	2 Hours		
Mon 16-Sep-02 07:00	Fri 04-Oct-02 17:00	K21W (Including All Terminals)	CNW	24 Hours	OMTE, OMTW, MPFN, MPFS, EWTE & EWTW	OMTE - 100MW; OMTW - 100MW; MPFN - 0MW; MPFS - 0MW; EWTE - 50MW; EWTW - OMW
Mon 07-Oct-02 07:00	Fri 18-Oct-02 17:00	K22W (Including All Terminals)	CNW	2 Hours	OMTE, OMTW, MPFN, MPFS, EWTE & EWTW	OMTE - 100MW; OMTW - 100MW; MPFN - 0MW; MPFS - 0MW; EWTE - 50MW; EWTW - OMW

Table C4.7 - Ottawa Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
Mon 15-Apr-02 08:00	Mon 22-Apr-02 15:00	Hawthorne TS.HT4LT2	CNW	2 Hours		
Mon 15-Apr-02 07:00	Fri 17-May-02 16:00	X522A	CWW	4 Hours	FIO	400 MW
Mon 27-May-02 08:00	Sun 09-Jun-02 15:00	Hawthorne TS.T4	CNW	2 Hours		
Mon 16-Sep-02 07:00	Fri 18-Oct-02 16:00	X523A	CWW	4 Hours	FIO	400 MW

Table C4.8 - Southwest Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
Mon 11-Mar-02 07:15	Fri 12-Apr-02 18:00	Milton SS.L61L71	CNW	72 Hours		
Tue 02-Apr-02 06:00	Tue 16-Apr-02 16:00	Detweiler TS.AL4	CNW	None		
Tue 16-Apr-02 06:00	Tue 30-Apr-02 16:00	Detweiler TS.L4L23	CNW	None		
Wed 03-Jul-02 07:00	Fri 26-Jul-02 18:00	S1H	CNW	3 Hours		
Mon 10-Jun-02 07:00	Fri 30-Aug-02 18:00	S1H	CNW	3 Hours	FABC	100 - 200 MW; Bruce T4A also o/s Aug 12 to Aug 30; Bruce T27 & R27 also o/s Aug 19 to Aug 30

Table C4.9 - Toronto Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
Sun 07-Apr-02 05:00	Sat 13-Apr-02 05:00	Manby West TS.T14 Manby West TS.F_BUS	CNW	72 Hours		
Mon 18-Mar-02 08:00	Fri 19-Apr-02 14:00	Cecil TS.PL6	CNW	72 Hours		
Tue 02-Apr-02 05:00	Fri 19-Apr-02 18:00	Manby East TS.A2L1	CNW	4 Hours		
Sun 14-Apr-02 17:00	Sat 20-Apr-02 18:00	Manby West TS.T13 Manby West TS.V_BUS	CNW	72 Hours		
Mon 08-Apr-02 04:00	Sun 21-Apr-02 18:00	Cherrywood TS.T15	CNW	2 Hours		
Sun 07-Apr-02 05:00	Mon 22-Apr-02 07:00	Lakeview SS.L23T5	CNW	72 Hours		
Mon 22-Apr-02 04:00	Sun 28-Apr-02 18:00	B23C	DNW	1 Hours		
Tue 02-Apr-02 08:30	Thu 09-May-02 15:00	Bowmanville SS H3E breaker	DNW	1 Hours		
Tue 02-Apr-02 08:30	Thu 09-May-02 15:00	Bowmanville SS H3L521 breaker	DNW	1 Hours	NBLIP	500 MW
Mon 08-Apr-02 06:00	Fri 10-May-02 17:00	H1L_LEASIDE	CNW	3 Hours		
Mon 08-Apr-02 07:00	Fri 10-May-02 18:00	H3L_LEASIDE	CNW	3 Hours		
Mon 22-Apr-02 04:00	Sun 12-May-02 18:00	Cherrywood TS.T17	CNW	2 Hours		
Mon 29-Apr-02 05:00	Fri 17-May-02 18:00	Manby West TS.H1H4	CNW	4 Hours		
Sat 04-May-02 07:00	Sun 19-May-02 16:00	Lakeview SS.L23T6	CNW	72 Hours		
Mon 20-May-02 05:00	Fri 07-Jun-02 18:00	Manby West TS.A1L22	CNW	4 Hours		
Mon 20-May-02 05:00	Fri 14-Jun-02 18:00	H2JK_MANBYW	CNW	24 Hours		
Tue 21-May-02 05:00	Fri 21-Jun-02 18:00	H6LC_CECIL H6LC_LEASIDE H8LC_CECIL H8LC_LEASIDE	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		
Tue 02-Jul-02 04:00	Fri 02-Aug-02 17:00	H11L_LEASIDE	DNW	3 Hours		
Fri 23-Aug-02 23:00	Sun 01-Sep-02 15:00	Whitby CGS.T1	CNW	None		
Tue 03-Sep-02 05:00	Mon 30-Sep-02 18:00	Glengrove TS.T2 Glengrove TS.T1_115	CNW	5 Hours		
Mon 12-Aug-02 05:00	Fri 04-Oct-02 15:00	H6LC_HEARN H8LC_HEARN	CNW	3 Hours		
Tue 03-Sep-02 07:00	Fri 04-Oct-02 16:00	H2JK_MANBYW	CNW	None		
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 16-Sep-02 05:00	Tue 05-Nov-02 15:30	Cecil TS.T3	CNW	3 Days		
Tue 15-Oct-02 05:00	Fri 08-Nov-02 15:00	C5E_ESPLANADE C7E_ESPLANADE	CNW	3 Hours		
Mon 07-Oct-02 06:00	Fri 29-Nov-02 15:00	K6J_MANBYW	CNW	2 Hours		
Tue 12-Nov-02 08:00	Fri 13-Dec-02 14:00	Cecil TS.HL7	CNW	72 Hours		
Tue 12-Nov-02 05:00	Mon 06-Jan-03 15:30	Cecil TS.T4	CNW	3 Days		
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		

Table C4.10 - West Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
Mon 08-Apr-02 07:00	Fri 19-Apr-02 19:00	Sarnia Scott TS.KL1	CNW	None		
Mon 15-Apr-02 08:00	Fri 26-Apr-02 16:00	Lauzon TS.L1L6	CNW	24 Hours		
Mon 22-Apr-02 07:00	Fri 03-May-02 15:00	Sarnia Scott TS.PL6	CNW	None		
Mon 06-May-02 07:00	Fri 17-May-02 15:00	Sarnia Scott TS.L2L4 Sarnia Scott TS.PL4 Sunoco CTS.T2 Sarnia Scott TS.N4S_Terminal N4S	CNW	None		
Mon 06-May-02 07:00	Fri 07-Jun-02 17:00	Chatham SS.SC21	CNW	None		
Mon 16-Sep-02 08:00	Fri 27-Sep-02 16:00	Buchanan TS.L2K	CNW	24 Hours		
Mon 30-Sep-02 08:00	Fri 11-Oct-02 16:00	Buchanan TS.L6K	CNW	24 Hours		
Tue 03-Sep-02 08:00	Fri 18-Oct-02 16:00	Buchanan TS.DL5	CNW	2 Weeks		