Independent Electricity Market Operator

# *18-Month Outlook:*

## *An Assessment of the Reliability of the Ontario Electricity System from October 2003 to March 2005*

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# Executive Summary

The Independent Electricity Market Operator (IMO) publishes quarterly assessments of the reliability of the Ontario electricity system over the next 18 months. This report presents the IMO assessment of the 18-month period from October 2003 to March 2005. This assessment is based on the IMO's forecast of electricity demand, information provided by Ontario generators on the supply available and the latest information on the configuration and capability of the transmission system.

Following the blackout of August 14, 2003, Ontario electricity consumers made important contributions in helping to maintain the supply-demand balance. Although power was restored to almost all customers by the end of the day following the blackout, supplies continued to be constrained for a further week. During the recovery period, prior to all generating units returning to service, there was a significant demand reduction in response to customer appeals. This substantial demand response is acknowledged and appreciated by the IMO. At times, despite the difficulties, we estimate that Ontarians were able to reduce their demand by as much as 4,500 MW. This proved to be an important contributor to avoiding the need for rotational load shedding.

Temporary generators that were installed in response to the request of the Ontario government were successfully used during the recovery period following the blackout. These temporary generators presently provide about 250 MW of capacity from five facilities within the province. This capacity is available to be used during emergency supply conditions. In this Outlook, these temporary generators are not included in the calculation of available reserve and the associated capacity has not been included in either of the two Resource Scenarios presented herein.

### Updates since the last report

There are several updates in this Outlook from the quarterly Outlook published in June 2003.

This Outlook reflects changes to return-to-service plans for laid-up nuclear units. Bruce Unit 4 is expected to begin producing power and to be fully dispatchable in October. Bruce Unit 3 is expected to follow about one month after Unit 4. Pickering Unit 4 began producing power on August 21 as part of the commissioning process, and Ontario Power Generation (OPG) advises it will be fully available in September. OPG advises that the schedule for the return to service of the second Pickering A unit is under review. At this point in time, it is assumed that the unit will not be synchronized to the grid during the time frame of this report.

The risks associated with the return-to-service dates of units from long-term lay-up and planned outages were identified in the previous quarterly Outlook, and the IMO considers that some risk persists with the updated information. This risk is greatly diminished and reduces progressively as return-to-service milestones are met.

There have been substantial updates to the generator outage schedule since the last published report, resulting in some weeks with higher available resources, but with the majority of weeks having lower available resources.

The combination of a lower economic forecast and the inclusion of lower than expected actual demand translates into a demand forecast that is marginally lower than the previous forecast.

### Resource Outlook

Two resource scenarios are considered in this Outlook – an Existing Resource Scenario and a Planned Resource Scenario. These are updates to the scenarios presented in the previous Outlook and are summarized below.

### Existing Resource Scenario

Under the **Existing Resource Scenario**, Pickering Unit 4 is now included, and this represents a significant change from the previous Outlook. Under this scenario, reserve margins have improved from the previous Outlook and are positive for more weeks during the study period. Resource shortfalls which remain are greatest during the remaining months of 2003, and in the summer and fall of 2004 under peak demand conditions. Resource reductions due to a large maintenance outage during October 2003 together with the assumption that only existing resources are available in this scenario contribute to negative reserve margins during the fall of 2003. Other generator outages that have been planned to occur after October contribute to negative reserve margins in November and December of 2003. Resource reductions due to a large maintenance outage during the fall of 2004 contribute to negative reserve margins during that time period.

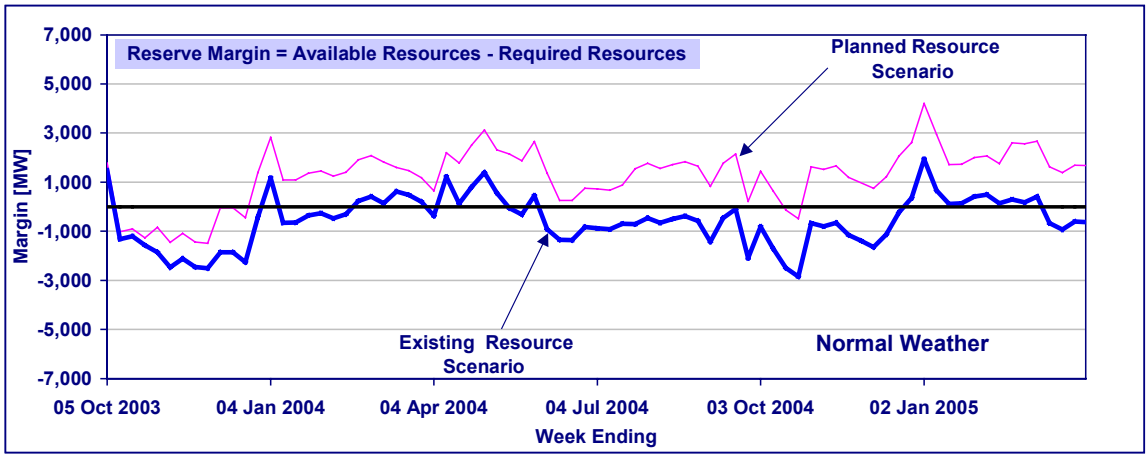
Negative reserve margins indicate that forecast reserve levels are below planning requirements. As such, planned generator outages during negative margin weeks are at risk of cancellation by the IMO for reliability purposes depending on their priority and the resource adequacy situation at the time their approval is being sought.

During most of the study period, a combination of high demand levels under extreme weather conditions and lower than forecast levels of available resources would lead to reliance on imports.

### Planned Resource Scenario

The **Planned Resource Scenario** includes approximately 2,200 MW of additional generation resources that are scheduled to be placed in-service during the Outlook period and 300 MW of price-responsive demand, which was not included in the Existing Resource Scenario. The additional generation resources consist of new facilities currently under construction and two Bruce units returning to service, each assumed to be available on the dates provided by market participants.

Under the Planned Resource Scenario, the resource adequacy situation is significantly improved when compared to the Existing Resource Scenario. For most of the Outlook timeframe, the forecast available resources exceed the planning requirements. However, periods of negative reserve margins are forecast during the fall of 2003 and to a lesser extent in the fall of 2004. The following figure illustrates the weekly resource adequacy situation of the Ontario electricity system for the two resource availability scenarios under normal weather conditions. Reserve margins greater or equal to zero mean adequate resources, while reserve margins less than zero mean resources are below planning target levels.



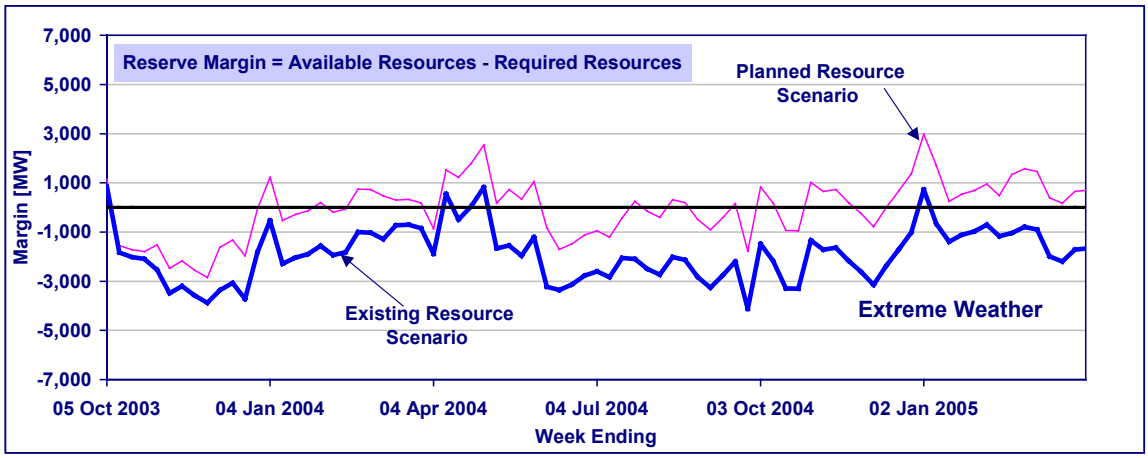

## Weather impact

The potential for extremely hot and humid weather conditions, and extremely cold and windy weather conditions are covered by the Extreme weather scenario.

In order to illustrate the impact of extreme weather on forecast reserve margins during the Outlook period, both the Existing Resource Scenario and the Planned Resource Scenario were re-calculated assuming extreme weather in each week instead of normal weather. The probability of this occurring in every week of the period is extremely small; however, when one looks at an entire summer or winter period, the expectation of at least one occurrence of extreme weather becomes considerably higher.

Under the Planned Resource Scenario with extreme weather, reserve margins could range from about 3,000 MW to -3,000 MW.

The results for extreme weather are shown in the following chart.



### Ontario Demand Forecast

The IMO demand forecasting model has been updated to reflect actual economic, demand and weather data through to the end of June 2003. A sluggish U.S. economy and a sequence of unusual domestic events have resulted in a reduced demand forecast. In conjunction with weak actual demand data for the summer of 2003, total energy demand is expected to be 151.2 TWh for 2003. This represents a 0.1% decrease over the weather corrected total for 2002. The forecast annual energy demand for 2004 is 154.9 TWh.

The seasonal peaks of the forecast horizon are contained in the following table. The Expected Peak is based on the Normal weather scenario, but accounts for the higher probability of observing extreme weather sometime during a season compared with the weekly probability embedded in the Normal weather forecast. For a more detailed discussion of demand please see the document titled Ontario Demand Forecast from October 2003 to March 2005 (IMO_REP_0149).

| Season | Normal Weather Peak (MW) | Expected Seasonal Peak (MW) | Extreme Weather Peak (MW) |
|---|---|---|---|
| Winter 2004 | 24,054 | 25,317 | 26,023 |
| Summer 2004 | 23,835 | 25,995 | 26,469 |
| Winter 2005 | 24,181 | 25,369 | 26,150 |

### Transmission Outlook

The Outlook related to transmission continues to be similar to previous Outlooks. The transmission system is expected to be adequate to supply demand under the forecast conditions studied in this Outlook. Market participants should recognize that Lakeview, Pickering and Darlington units are required to provide reactive capability to maintain adequate voltage levels, especially during summer peak demand periods.

Some transmission outages will be difficult to schedule without reliability impacts or may be recalled on short notice.

**- End of Section -**

**Caution and Disclaimer**

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## List of Figures

# 1.0 Introduction

This Outlook covers the 18-month period from October 1, 2003 to March 31, 2005. It supersedes the report titled "An Assessment of the Reliability of the Ontario Electricity System from July 2003 to December 2004", dated June 24, 2003. 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 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 presented in Section 4. Overall observations, findings and conclusions are contained in Section 5.

This Outlook presents an assessment of resource and transmission 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 updates in assumptions can be considered. The tables contained in the document can be downloaded from the IMO web site in MS Excel format.

In addition to the comprehensive Outlook, the IMO publishes Interim Updates to the 18-Month Outlook during each month for which a full Outlook is not issued. These updates consist of a spreadsheet which reflects changes to Total Resources, Total Reductions to Resources, and Reserve Margins for the Planned Resource Scenario. Similar to the full Outlooks, the Interim Updates are posted on the IMO web. These updates provide Outlook information on a more frequent basis to allow market participants to better adjust their operational plans and outage schedules.

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

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 document entitled "Ontario Demand Forecast from October 2003 to March 2005" (IMO_REP_0149) (found on the IMO web site at www.theimo.com/imoweb/pubs/marketReports/18Month_ODF_2003oct.pdf) describes in detail the 18-month forecast of electricity demand for the Ontario Market used in this Outlook. The demand forecast document 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 document entitled "Methodology to Perform Long Term Assessments" (IMO_REP_0044) (found on the IMO web site at www.theimo.com/imoweb/pubs/marketReports/Methodology_RTAA_2003oct.pdf) contains information regarding the methodology used to perform the demand forecasts, resource adequacy assessments and transmission reliability assessments in this Outlook.
- The document entitled "Ontario Transmission System" (IMO_REP_0045) (found on the IMO web site at www.theimo.com/imoweb/pubs/marketReports/OntTxSystem_2003oct.pdf) provides specific details on the transmission system, including the major internal transmission interfaces and interconnections with neighbouring jurisdictions.

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.

## Updates from Previous Outlook

### Updates to Forecast Demands

This forecast of demand has been produced using an updated economic forecast, while the forecasting model itself has been re-estimated based on the most recently observed demand, weather and economic data. The forecasting methodology remains the same as that used in the previous forecast.

A sluggish U.S. economy, lower domestic consumption and a sequence of unusual events have resulted in a lower demand forecast.

Weak energy demand throughout the summer, combined with the updated economic outlook have led to a reduction in the forecasted total energy demand for 2003 to 151.2 TWh. Energy demand is forecasted to be 154.9 TWh for 2004, also lower than previously forecasted. Most of the decrease for 2003 is due to lower actual demand values over the summer. Peak demands are, on average, 125 MW lower than the previous forecast. The peaks are roughly 100 MW lower in January and 200 MW lower in July.

### Updates to Resources

Bruce Unit 4 is expected to begin producing power and to be fully dispatchable in October. Bruce Unit 3 is expected to follow about one month after Unit 4. Pickering Unit 4 began producing power on August 21 as part of the commissioning process, and Ontario Power Generation (OPG) advises it will be fully available in September.

There have been substantial updates to the generator outages submitted by market participants.

### Updates to Transmission Outlook

The return to service date for circuit B3N has been updated from July 11, 2003 to December 31, 2003, and the return to service date for the phase angle regulator on B3N has been updated from August 31, 2003 to December 31, 2003.

The list of transmission projects and planned and forced transmission outages has been updated from the previous 18-Month Outlook.

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# 2.0 Resources

This section describes the generation resources that were considered in this Outlook based on information available to the IMO.

## 2.1 Existing Generation Resources Included in the Study

The existing installed generating capacity within Ontario is summarized in Table 2.1. This includes nuclear, coal, oil, gas, hydroelectric, wood and waste-fuelled generation, and results in a total capacity of 30,494 MW.

The capacity of installed generation resources in Table 2.1 does not include Bruce A nuclear units, which are currently being prepared for reactivation. Bruce Unit 4 is expected to begin producing power and to be fully dispatchable in October. Bruce Unit 3 is expected to follow about one month after Unit 4. The Bruce A units, together with other additions to generating capacity identified to the IMO, were progressively added to the installed resources, under the Planned Resource Scenario only, as described in Section 2.4.

The four Pickering A nuclear units were included in the list of existing installed generation resources. Pickering Unit 4 began producing power on August 21 as part of the commissioning process, and Ontario Power Generation (OPG) advises it will be fully available in September. The other three Pickering A units are not expected to be reactivated within the 18-month period covered by this Outlook.

The capacity of the existing installed resources also reflects minor unit re-ratings that occurred prior to the publication of this Outlook, as a result of equipment upgrades.

**Table 2.1 Existing Installed Generation Resources[1]**

| Fuel Type | Total Capacity (MW) | Number of Stations |
|---|---|---|
| Nuclear | 10,836 | 4 |
| Coal | 7,546 | 5 |
| Oil / Gas | 4,364 | 22 |
| Hydroelectric | 7,682 | 61 |
| Miscellaneous | 66 | 2 |
| Total | 30,494 | 94 |

## 2.2 External Transactions

An ongoing firm purchase of 200 MW was assumed to be delivered to Ontario for the period from the beginning of the Outlook until October 31, 2003; this purchase was explicitly included in the generation resource scenarios described in Section 2.4. No other firm purchase contracts

[1] In Table 2.1, the number of nuclear stations will increase to five with the operation of the first Bruce A unit.

were identified for the study period. There were no firm sales identified at any point in the study period.

## 2.3 Potential Generation Resource Additions

Table 2.2 summarizes the significant new generation projects in the IMO's Connection Assessment and Approval (CAA) process that are under construction, and are scheduled to be placed in-service within the 18-month study period. Generator owners or operators have provided the information regarding the status of their projects and the in-service/restart dates listed in Table 2.2.

**Table 2.2 Potential Generation Resource Additions in Ontario**

| Proponent/Project Name | Zone | Fuel Type | Capacity MW | Connection Applicant's Estimated I/S Date |
|---|---|---|---|---|
| Bruce Power Inc. - Bruce A G4 | Bruce | Nuclear | 770 | October 2003 * |
| Bruce Power Inc. - Bruce A G3 | Bruce | Nuclear | 770 | November 2003 * |
| Imperial Oil | West | Gas | 98 | April 2004 |
| ATCO - Brighton Beach | West | Gas | 578 | May 2004 |
| Total | | | 2,216 | |

* estimated restart date

Details regarding the IMO's Connection Assessment and Approval process and the status of all projects in the queue, 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 generation resources expected to be available for operation. Two resource scenarios were considered in this Outlook: an Existing Resource Scenario and a Planned Resource Scenario. Both resource scenarios were established starting from the existing installed resources shown in Table 2.1.

Temporary generators that were installed in response to the request of the Ontario government were successfully used during the recovery period following the blackout of August 14, 2003. These temporary generators presently provide about 250 MW of capacity from five facilities within the province. This capacity is available to be used during emergency supply conditions. In this Outlook, these temporary generators are not included in the calculation of available reserve and the associated capacity has not been included in either of the two Resource Scenarios presented herein.

Under the **Existing Resource Scenario** Ontario generation resources identified in Table 2.1 were assumed to be in-service with the exception of three of the Pickering A nuclear units, which were assumed to be out-of-service for the duration of the study period. Purchases of 200 MW were assumed available up to the end of October 2003. This resource scenario assumed that none of the additional generation resources listed in Table 2.2 would be placed in service over the study period.

Under the **Planned Resource Scenario** existing Ontario generation resources were assumed to be in-service with the exception of three of the Pickering A units, which were assumed to be out-of-service for the duration of the study period. A firm purchase of 200 MW was assumed available up to the end of October 2003. Additionally, all potential generation additions listed in Table 2.2 were included under this scenario.

Forecasts of available resources were derived for each of the two resource scenarios described above, using information regarding generator output capabilities, planned outages, allowances for hydroelectric generation production below rated capacity, assumptions for the amount of price-responsive demand, and major transmission interface limitations.

Table 2.3 shows a snapshot of the forecast available resources, under the two scenarios, at the time of the seasonal peak demands over the study period. The installed resources in Table 2.3 start with the values listed in Table 2.1 and are incremented, for the Planned Resource Scenario, by the generation resource additions listed in Table 2.2. Imports consist of the purchases that were assumed to be delivered to Ontario as described in Section 2.2. The total reductions to resources include generator deratings, generator planned outages under each resource scenario, capacity limitations due to transmission interface constraints and allowances for hydroelectric generation production below rated capacity. The total reductions were subtracted and the price-responsive demand was added to the total resources, to obtain the available resources. In this Outlook, an amount of 300 MW of price-responsive demand was assumed to be available only under the Planned Resource Scenario, as shown in Table 2.3.

## Table 2.3 Summary of Available Resources

| Notes | Description \ Year | Winter Peak 2004 | | Summer Peak 2004 | | Winter Peak 2005 | |
|---|---|---|---|---|---|---|---|
| | | Existing Resource Scenario | Planned Resource Scenario | Existing Resource Scenario | Planned Resource Scenario | Existing Resource Scenario | Planned Resource Scenario |
| 1 | Installed Resources (MW) | 30,494 | 32,034 | 30,494 | 32,710 | 30,494 | 32,710 |
| 2 | Imports (MW) | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | Total Resources (MW) | 30,494 | 32,034 | 30,494 | 32,710 | 30,494 | 32,710 |
| 4 | Total Reductions in Resources (MW) | 3,420 | 3,446 | 3,573 | 4,418 | 2,744 | 3,565 |
| 5 | Price-responsive Demand (MW) | 0 | 300 | 0 | 300 | 0 | 300 |
| 6 | Available Resources (MW) | 27,074 | 28,888 | 26,921 | 28,592 | 27,750 | 29,445 |

**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 generators registered to participate in the IMO-administered markets at the beginning of the 18-month period, except for Bruce A nuclear units. It also reflects minor unit re-ratings that occurred prior to the publication of this Outlook, as a result of equipment upgrades. Additional generation capacity that was assumed under the applicable resource scenario is progressively included, according to the estimated in-service dates.

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

3. Total Resources (MW): This is the sum of Installed Resources (line 1) and Imports (line 2).

4. Total Reductions in Resources (MW): These reductions represent, under each of the two scenarios, the sum of generator deratings, generator planned outages under each resource scenario, generation

limitations due to transmission interface constraints and allowances for hydroelectric generation production below rated capacity.

5. Price-responsive Demand: This is the amount of price-responsive demand assumed under each resource scenario.

6. Available Resources (MW): This equals Total Resources (line 3) minus Total Reductions in Resources (line 4) plus Price-responsive Demand (line 5).

## 2.5 Energy Production Capability Forecast

The monthly forecast of energy production capability, as provided by market participants, is included in Appendix A, Table A6.

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# 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 resources. The Existing Resource Scenario, which assumes no generation resource additions and no price-responsive demand, represents the lower boundary of the range, considering the potential for delays to the in-service dates of additional generation capacity. The Planned Resource Scenario, which assumes 300 MW of price-responsive demand and capacity additions based on project status and in-service date estimates, represents the higher boundary of the outcome range.

As mentioned in Section 1, 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, as well as an analysis of risk factors, are described in Sections 3.1 through 3.5. Observations, findings and conclusions are provided in Section 5, and detailed tables of results can be found in Appendix A of this document.

## 3.1 Weekly Adequacy Assessment

The assessment of weekly adequacy takes into consideration a range of forecast demands based on a probability distribution of historical weather data. Margins have been calculated assuming both normal weather (with an allowance for the probability of experiencing extreme weather) and assuming extreme weather (with no further allowance for weather uncertainty). Figure 3.1 shows the normal and extreme weather demands assumed for each week in the study period.

### Figure 3.1 Demand Forecast Range

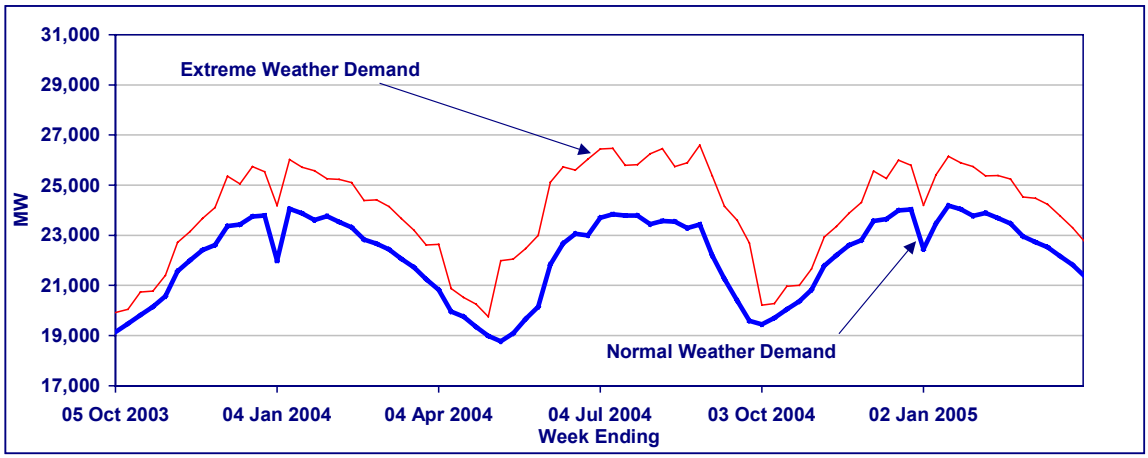


Figure 3.2 shows the Total Reductions in Resources used in the calculation of the Available Resources (as described in Section 2.4).

## Figure 3.2 Total Reductions in Resources

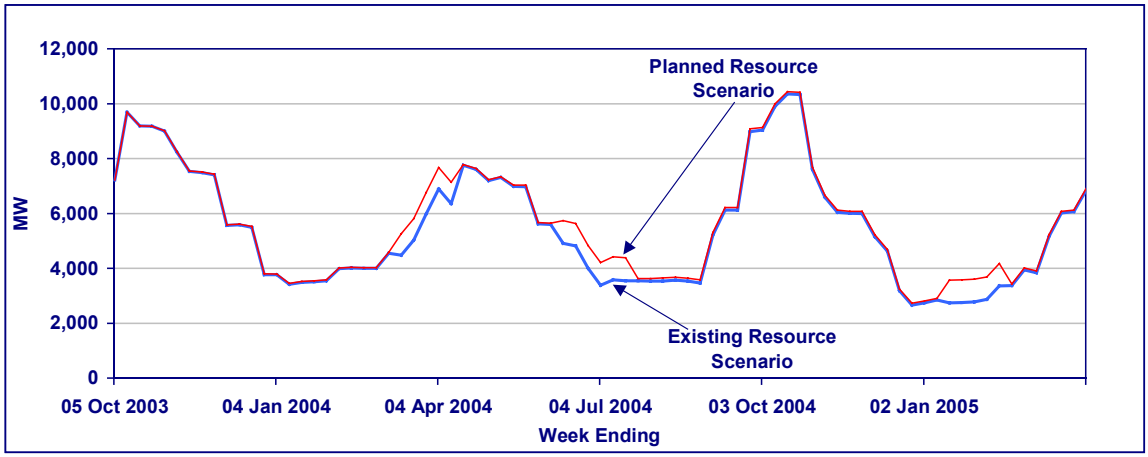
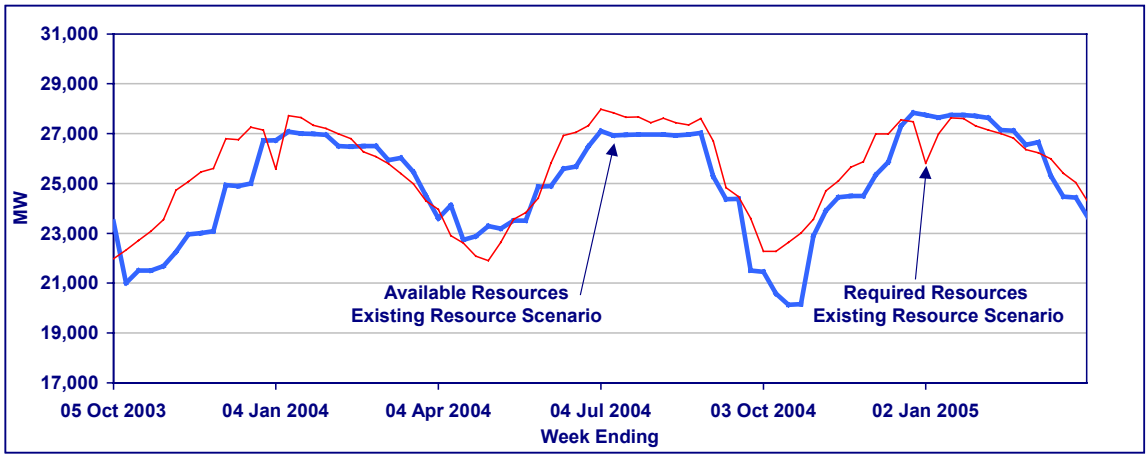
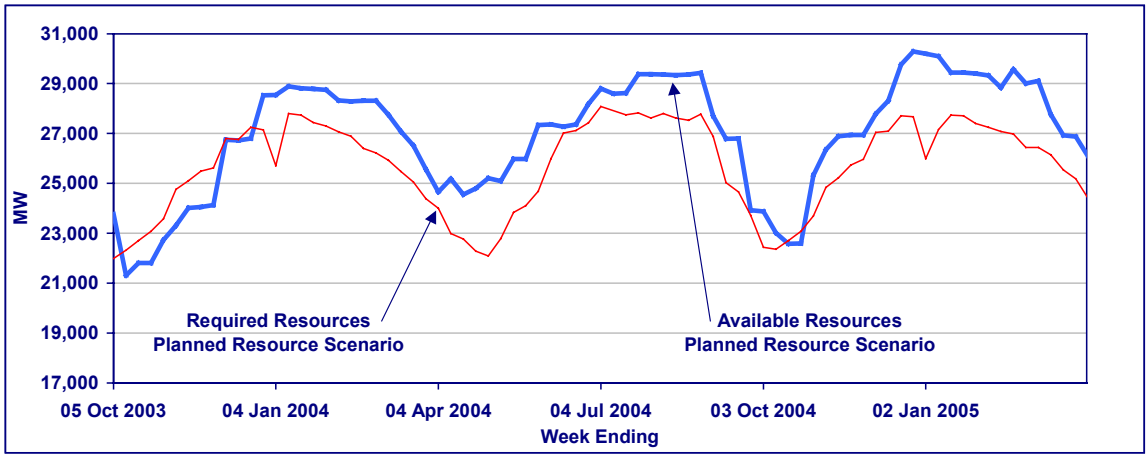



Figure 3.3 provides a comparison between Available Resources, and Required Resources for each week, for the Existing Resource Scenario. The latter quantity is based on a probabilistic calculation, which takes into account load forecast uncertainty due to weather and random generator forced outages. Figure 3.4 provides a similar comparison for the Planned Resource Scenario.

## Figure 3.3 Available vs. Required Resources: Existing Resource Scenario

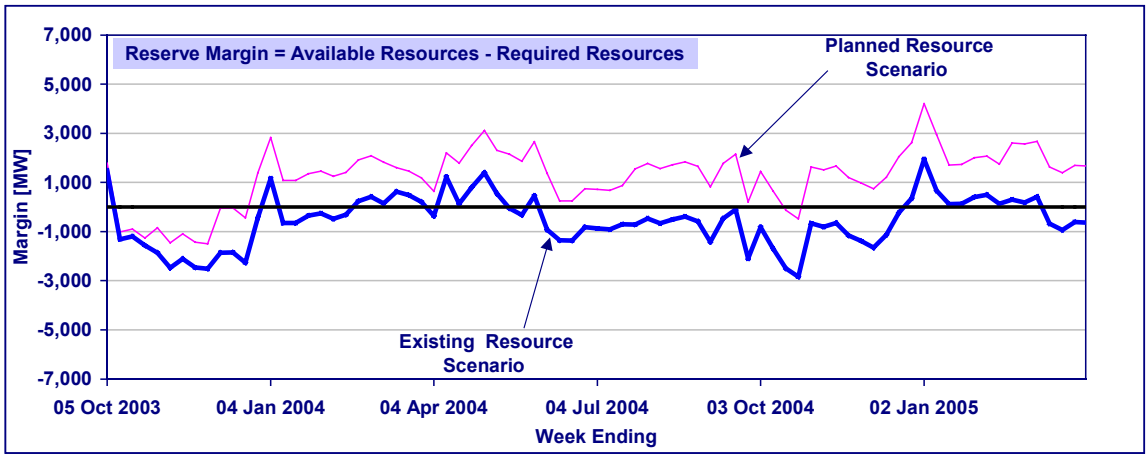


## Figure 3.4 Available vs. Required Resources: Planned Resource Scenario




Reserve Margins, which represent the difference between Available Resources and Required Resources, are shown in Figure 3.5 for each resource scenario studied.

## Figure 3.5 Reserve Margins: Existing Resource Scenario and Planned Resource Scenario




Under the **Existing Resource Scenario**, Pickering Unit 4 is now included, and this represents a significant change from the previous Outlook. Under this scenario, reserve margins have improved from the previous Outlook and are positive for more weeks during the study period. The resource shortfalls which remain are greatest during the remaining months of 2003, and in the summer and fall of 2004 under peak demand conditions. Resource reductions due to a large maintenance outage during October 2003 together with the assumption that only existing resources are available in this scenario contribute to negative reserve margins during the fall of 2003. Other generator outages that have been planned to occur after October contribute to negative reserve margins in November and December of 2003. Resource reductions due to a large maintenance outage during the fall of 2004 contribute to negative reserve margins during that time period. Negative reserve margins throughout most weeks of the Outlook period indicate that forecast resource levels are below planning requirements. As such, planned generator outages during negative margin weeks are at risk of cancellation by the IMO for reliability purposes

depending on their priority and the resource adequacy situation at the time their approval is being sought. Given the large number of weeks with negative margins in this scenario, to the extent this scenario materializes, opportunities for additional planned generator maintenance would be limited and in most weeks imports would be necessary.

The above results must be assessed considering the risk factors described in Section 3.3. During most of the study period, a combination of high demand levels under extreme weather conditions and lower than forecast levels of available resources could lead to significant reliance on imports and upward pressure on the wholesale market prices. During the summer of 2002, under such conditions, import levels approached, and occasionally reached, the Ontario coincident import capability of approximately 4,000 MW.

Under the **Planned Resource Scenario**, the resource adequacy situation is significantly improved when compared to the Existing Resource Scenario. For most of the Outlook timeframe, the forecast available resources exceed the planning requirements. However, periods of negative reserve margins are forecast during the fall of 2003 and to a lesser extent in the fall of 2004. To the extent this scenario materializes, opportunities exist for additional planned generator maintenance and exports. Again, the risk factors described in Section 3.3 must be considered.

Figures 3.6 and 3.7 provide a comparison between the forecast reserve margins in the present Outlook and the forecast reserve margins in the previous Outlook published on June 24, 2003. Under the Existing Resource Scenario, the return to service of Pickering Unit 4 yields a slightly higher supply availability outlook when compared to the previous 18-Month Outlook. Under the Planned Resource Scenario, forecast reserve margins are generally lower in this Outlook than the previous one, due mainly to updates in the generator outage program.

## Figure 3.6 Reserve Margin: Existing Resource Scenario vs. Previous Existing Resource Scenario

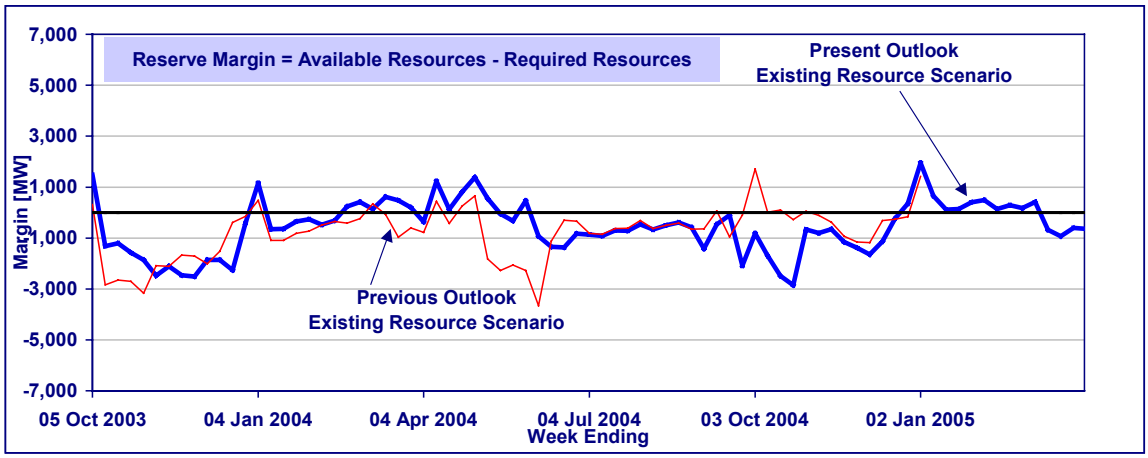
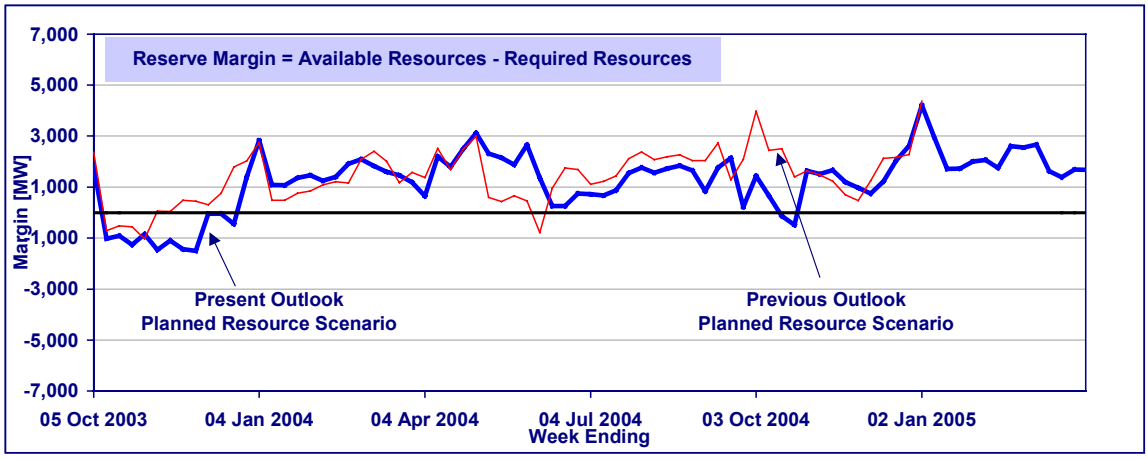


**Figure 3.7 Reserve Margin: Planned Resource Scenario vs. Previous Planned Resource Scenario**




The IMO will closely monitor the resource situation and implement available control actions, if required, in accordance with the Market Rules. Tight demand/supply balances during periods of negative reserve margins will have several potential market impacts. These include upward pressure on the wholesale market prices and limited opportunities for the IMO to approve the release of generators for planned maintenance. Various responses can be anticipated and would be relied upon 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 large consumers, taking measures to reduce their electricity consumption.

## 3.2 Loss of Load Expectation

A number of simulations were performed to calculate the Loss of Load Expectation (LOLE) during the study period. The simulations started from the two resource scenarios described in Section 2.4 and used the methodology described in Section 2.3 of the document "Methodology to Perform Long Term Assessments" (IMO_REP_0044). The calculations were performed in two steps. In the first step, the resource availability was established based on the same levels that were used in the calculations described in Section 3.1. In the second step, additional resources were made available to Ontario, with the purpose of reducing the LOLE value to the target level. The target LOLE value is equivalent to an annual LOLE of 0.1 days/year. The modeling of additional resources was carried out in accordance with the NPCC resource adequacy criterion, which allows for supplemental capacity in the form of interconnection assistance, outage rescheduling and implementation of emergency operating procedures.

Simulation results indicate that, in order to achieve the target LOLE, additional resources would be required, approximately to the level necessary to offset the margin deficiencies under each of the two resource scenarios, shown in Tables A1 and A2 in Appendix A.

## 3.3 Resource Adequacy Risks

The forecast reserve margins for both the Existing Resource Scenario and the Planned Resource Scenario should be assessed bearing in mind the risks discussed below. Each of these risks, whether considered alone or in combination with the others, could result in lower than forecast reserve margins and the need for high levels of imports or curtailment of planned outages.

### 3.3.1 Extreme Weather

The Existing Resource Scenario and the Planned Resource Scenario are based on the assumption of normal (average) weather. However, peak demands in both summer and winter typically occur during periods of extreme weather. Unfortunately, the occurrence and timing of extreme weather is impossible to accurately forecast far in advance. As a result, the impact of extreme weather is accounted for probabilistically in the calculation of the required resources for each week of the study period. The impact of extreme weather was demonstrated in August 2002, when Ontario established an all-time peak demand of 25,414 MW. Approximately 1,700 MW of this demand was due to the higher than average heat and humidity.

In order to illustrate the impact of extreme weather on forecast reserve margins during the Outlook period, both the Existing Resource Scenario and the Planned Resource Scenario were re-calculated assuming extreme weather in each week instead of normal weather. The probability of this occurring in every week is infinitesimally small; however the probability of an occurrence in any given week is greater (about 2.5 percent). When one looks at the summer or winter periods, the expectation of at least one occurrence of extreme weather becomes considerably higher. Results for extreme weather are shown in Figures 3.8, 3.9, and 3.10.

The magnitude of resource deficiencies, under extreme weather, clearly illustrates there are circumstances under which reliance on interconnected supply would approach and possibly reach the limits of the transmission system. Because imports cannot provide supply much above 4,000 MW, even under ideal conditions, the need for other participant impactive actions, such as outage rescheduling, emphasizes the need for new supply and demand responses within Ontario.

**Figure 3.8 Available vs. Required Resources: Existing Resource Scenario Extreme Weather Demand**

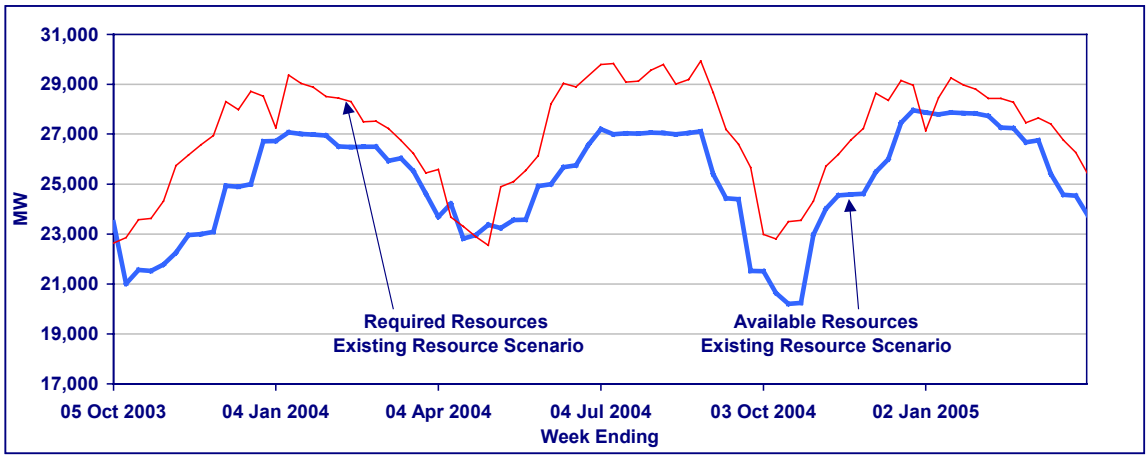


**Figure 3.9 Available vs. Required Resources: Planned Resource Scenario Extreme Weather Demand**

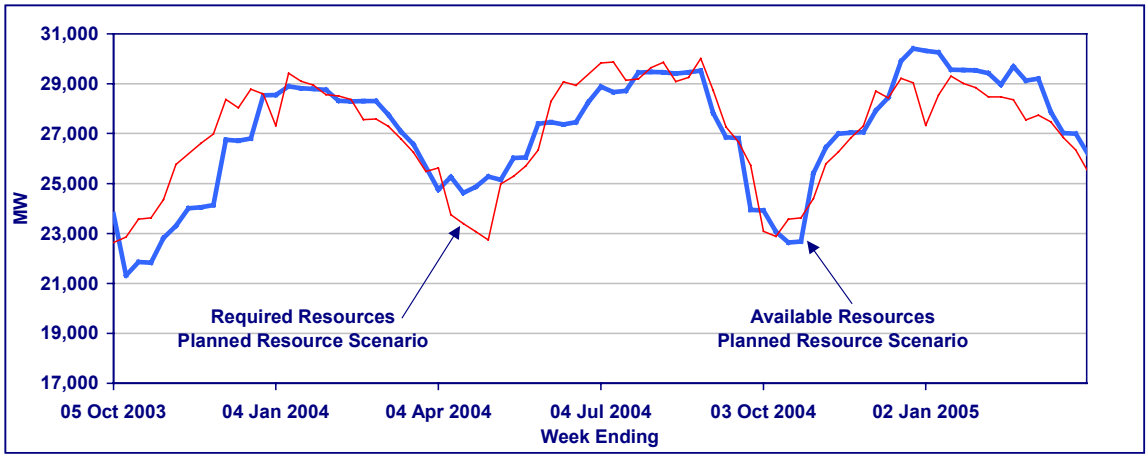
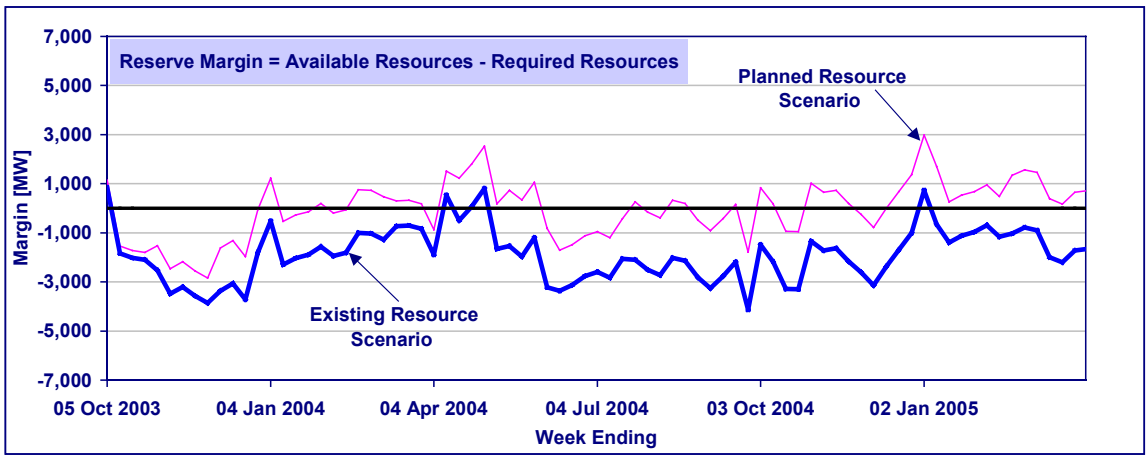



**Figure 3.10 Reserve Margin: Existing Resource Scenario and Planned Resource Scenario, Extreme Weather Demand**




### 3.3.2 Generator Return to Service Delays

The return to service of Pickering Unit 4 is a significant development. However, more new generating capacity is needed, as well as price-responsive demand. The improved demand-supply situation for the Planned Resource Scenario is critically dependent on the returning nuclear units and new generation projects coming to service on schedule. The risks associated with the return-to-service dates of units from long-term lay-up and planned outages were identified in the previous quarterly Outlook, and the IMO considers that some risk persists with the updated information. This risk is greatly diminished and reduces progressively as return-to-service milestones are met.

### 3.3.3 Extensions to Generator Planned Outages

A number of large generating units are scheduled to return to service from outage at the beginning of winter 2003/04, with numerous others scheduled to return from future planned

outages prior to summer 2004. Meeting these schedules is critical to maintaining positive reserve margins. Delays in commissioning new units or returning generators to service, whether from lay-up or maintenance outages, could once again lead to extensive reliance on imports as has been the case during the summer of 2002.

### 3.3.4 Higher than Forecast Generator Unavailability

IMO resource adequacy assessments include a probabilistic allowance for random generator forced outages based on generator reliability information provided by market participants, or on industry-wide data for similar facilities. Along with weather-related demand impacts, the impact of generator forced outages is included in the determination of required resources.

It should be noted that the lack of flexibility in scheduling maintenance outages, which could happen under the Existing Resource Scenario, would have a negative impact on the long-term reliability of the generating units, hence it could increase the number of forced outage occurrences. If the actual amount of generator forced outages is higher than the calculated allowance, reserve margins could be lower than the forecast values.

### 3.3.5 Lower than Forecast Hydroelectric Resources

IMO resource adequacy assessments include forecast amounts of hydroelectric generation provided by market participants. The amount of available hydroelectric generation is greatly influenced both by water-flow conditions on the respective river systems and the way in which water is utilized.

Water-flow conditions are primarily influenced by the amount of precipitation received. To accurately forecast precipitation amounts so far in advance is impossible. Drought conditions over some or all of the study period would lower the amount of generation available from hydroelectric resources.

Experience over the summer of 2002 has also shown that even when sufficient capacity is available, its use can be limited because of a lack of energy due to scheduling decisions. An example of this occurs when peaking hydroelectric generation is operated extensively during the early portion of a week in response to market signals and, as a result, there is insufficient water available in storage reservoirs to support required levels of operation later in the week.

## 3.4 External Resources

An analysis of historical power flows on Ontario's interconnections for the five years prior to 2002 shows that outside of summer peak demand periods up to 1,800 MW of external generation resources might be expected to be available to Ontario. During Ontario's summer peak demand periods of July and August opportunities for imports still exist and imports are still expected to be available despite the fact that many neighbouring systems are often experiencing their peak demand. 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 that are not summer peaking. From the same analysis, up to 1,400 MW would be expected to be available based on observations during summer peak months in recent years prior to 2002.

The actual hourly import levels experienced from market opening in May 2002 up to August 31, 2003 indicates an average import level of 1,120 MW for all hours. During the 2,171 hours when Ontario demand exceeded 20,000 MW the average import level was 1,579 MW. During the 265 hours when Ontario demand exceeded 23,000 MW the average import level was 2,436 MW, and occasionally reached the Ontario coincident import capability of approximately 4,000 MW.

Future levels of imports into Ontario will vary depending on several factors, including the availability and willingness of resources in external jurisdictions to supply the Ontario market, and the availability of required transmission capacity.

## 3.5 Energy Conservation and Peak Reduction through Price-Responsive Demands

A viable and less expensive alternative to building new generation capacity in Ontario is the development of price-responsive demands. Price-responsive demands would improve the supply-demand outlook in two main ways:

- Energy conservation through reduction of the electricity consumption would have beneficial effects on the environment, as well as on the enduring reliability of the existing generating units through lower utilization rates.
- Changing consumption patterns by shifting some of the consumption from peak to off-peak periods would reduce the peak demand with downward effects on electricity prices.

Both types of behaviour would offset, or at least significantly delay, the need for additional generation capacity in Ontario.

Following the blackout of August 14, 2003, Ontario electricity consumers made important contributions in helping to maintain the supply-demand balance. Although power was restored to almost all customers by the end of the day following the blackout, supplies continued to be constrained for a further week. During the recovery period, prior to all generating units returning to service, appeals for conservation led to demand reductions of up to 4,500 MW, which meant lower energy consumption as well as lower peak demand values.

**- End of Section -**

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# 4.0 Transmission Reliability Assessment

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

## 4.1 Transmission Projects

Committed transmission projects, summarized in Appendix B by transmission zone, represent a subset of the transmission projects in the CAA queue. Only those projects that have an estimated in-service date within the 18-month period under study are listed.

By April 30, 2004, it is expected that a new 845 MVA phase angle regulator (PAR) for 230 kV circuit L4D will be placed in-service. With the placing in-service of this PAR, all tie lines associated with the Ontario – Michigan interconnection will have phase shifting capability. Full phase shifting control of the interconnection can be utilized when the B3N, L4D and L51D PARs are not operated at their neutral tap.

## 4.2 Planned Transmission Outages

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 assessment 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 should be rescheduled or changed. As an example, a change in an outage may include reducing the scheduled duration or recall time.

The assessment of transmission outages will also identify any resources that are constrained off due to transmission outage conditions. 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 forecast reserve margins are negative. 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 priority 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 August 2003 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).

Generally, only a few of the planned outages will potentially impact transmission system reliability and available resources. The outages with the highest potential impact are listed below:

**East Zone**

The IMO is concerned with the November 3, 2003 and November 4, 2003 to November 9, 2003 outages for the Chenaux Project involving the addition of two new 230 kV breakers and the reconnection of transformer T4. These two outages may limit the amount of 115 kV load that can be supported in the Renfrew area. The amount of load that can be supported during these two outages will vary from approximately 55 MW to 115 MW depending on the Chenaux Project outage conditions and the available hydroelectric generation from Chenaux and Quebec. It is estimated the Renfrew area demand could vary from a peak of approximately 110 MW to an off peak value of approximately of 75 MW. In addition, the Renfrew area supply/demand balance required for the duration of these outages may not be met due to energy limitations typically associated with hydroelectric supply. In the approval timeframe of these outages, the IMO may delay or cancel the outages if the hydroelectric production capability is not expected to be sufficient to meet the demand. The IMO also suggests that the transmitter review the November 4, 2003 to November 9, 2003 outage to see if the duration of the outage can be shortened.

As detailed in Table C2, Appendix C, Chenaux generation is constrained off for four of the five Chenaux Project outages.

**West Zone**

As detailed in the last two 18-Month Outlooks, outages at the Scott Transformer Station were required to allow the transmitter to upgrade station facilities that would remove a 25 kA fault level restriction at the station. Most of the scheduled outages also required the removal from service of additional equipment to respect the fault level restriction. The last outage – the AL25 breaker – associated with this work is forecast to be completed by mid-October 2003. This outage does not require any additional equipment removed from service to respect the fault level restriction.

The assessment of transmission outages for this Outlook has been limited to those outages with a scheduled duration of greater than five days or to those outages associated with a project where at least one outage has a scheduled duration of greater than five days. 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 reassess the outage for potential system impacts, taking into account all current and forecasted conditions.

## 4.3 System Voltage, Thermal Limits and Supply Reliability

As in previous Outlooks, low system voltage concerns in certain sub-areas of the province may limit some generation and transmission outages from being 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 for exports, particularly during summer peak periods. Planned outages to generating units and/or transmission circuits during peak load conditions with coincident purchases from Michigan will require special control actions to prevent post-contingency thermal overloading of transmission facilities. The special control actions could include the splitting of the Windsor 115 kV local area and arming of the Kingsville under-voltage load rejection scheme. Splitting the Windsor area will result in some Windsor 115 kV loads being served by a single supply. Avoiding planned outages in this area during peak load conditions is desired. The addition of the ATCO – Brighton Beach generation project by 2004-Q2 will improve the voltage profile in this area.

When peak demands exceeded 25,000 MW in August 2001 and July, August, and September 2002, 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. The recent addition of a 125 MVAr, 115 kV capacitor at the Hearn Switching Station and the planned addition of a 125 MVAr, 115 kV capacitor at the Leaside Transformer Station by 2004-Q2 will improve the voltage profile in this area under summer peak conditions.

High transmission facility loadings were also observed during the August 2001 and July and August 2002 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 thermal limits or ratings. The reactivation of the first Pickering A unit will help alleviate loading levels on the Cherrywood autotransformers because the unit will be connected to the IMO-controlled grid via the 230 kV transmission network.

Under 2002 summer peak conditions, loadings on the 230/115 kV Burlington autotransformers in the Southwest zone were also high. For a contingency involving the loss of one autotransformer, the post-contingency loading on the remaining three autotransformers would have been at levels near the 10-Day Limited Time Ratings. The planned addition by the transmitter of 125 MVAr, 115 kV capacitor bank at Burlington TS by the second quarter of 2004 will help alleviate this concern and provide additional voltage support in the area.

In the Northwest zone at least one of the two generators, in combination with the condenser, at Thunder Bay is required to be in-service, most of the time at peak load, to maintain minimum voltages in the area. Coincident planned generator outages are a concern since the condenser, in service by itself, may not be able to maintain minimum voltage requirements. In addition, on loss of the condenser, the Thunder Bay G2 unit is required in service in order to restore the condenser to service. Avoiding planned generator outages during peak load conditions may be required to alleviate this concern. The expected installation of an 80 MVAr shunt capacitor at Birch Transformer Station by 2003-Q4 will result in an improvement of the 115 kV voltage profile in the area and increased reliability in the local peak load supply.

There are also requirements for specific generating unit availability and specific transmission availability in the Toronto zone in order to maintain supply reliability of the Toronto zone during other time periods, in particular as a result of significant planned outages to generating stations close to Toronto. In these situations, transmission capacity on the Flow East Towards Toronto (FETT) interface needs to be maintained as high as possible. Planned outages on the transmission facilities affecting the FETT interface should be avoided. The IMO has identified the exact periods of concern and provided specific requirements to affected transmitters and generators separate from this Outlook.

## 4.4 Forced Outages

Due to a forced outage, 230 kV circuit B3N (Scott Transformer Station x Bunce Creek, Michigan) is unavailable until December 31, 2003. This outage increases the upper limit of the Ontario – Michigan import capability by 200 MW in the summer and by 300 MW in the winter. The Ontario – Michigan export capability decreases by approximately 500 MW in the summer and in the winter. The 230 kV B3N phase angle regulator (PAR) in Michigan is also unavailable until December 31, 2003.

The 230 kV L51D phase angle regulator (PAR) is unavailable until October 31, 2003 but does not affect the import and export capability of the Ontario – Michigan interconnection.

**- End of Section -**

# 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.

**Resource Adequacy**

- Under the **Existing Resource Scenario**, Pickering Unit 4 is now included, and this represents a significant change from the previous Outlook. Under this scenario, reserve margins have improved from the previous Outlook and are positive for more weeks during the study period. The resource shortfalls which remain are greatest during the remaining months of 2003, and in the summer and fall of 2004 under peak demand conditions. Resource reductions due to a large maintenance outage during October 2003 together with the assumption that only existing resources are available in this scenario contribute to negative reserve margins during the fall of 2003. Other generator outages that have been planned to occur after October contribute to negative reserve margins in November and December of 2003. Resource reductions due to a large maintenance outage during the fall of 2004 contribute to negative reserve margins during that time period.
- Under the **Planned Resource Scenario**, the resource adequacy situation is significantly improved when compared to the Existing Resource Scenario. For most of the Outlook timeframe, the forecast available resources exceed the planning requirements. However, periods of negative reserve margins are forecast during the fall of 2003 and to a lesser extent in the fall of 2004. To the extent this scenario materializes, opportunities exist for additional planned generator maintenance and exports.
- Results of the resource adequacy assessment are summarized in the matrix below. The different shadings are intended to suggest the degree of concern regarding the supply/demand situation under each resource-weather scenario combination.

| | Normal Weather | Extreme Weather |
|---|---|---|
| **Existing Resources** | **- many planned outages at risk<br>- imports required for much of the study period** | **- most planned outages at risk<br>- imports maximized during peak periods<br>- risk of insufficient supply** |
| **Planned Resources** | **- periods with opportunities for additional outages/exports<br>- some periods where imports may be required** | **- many planned outages at risk<br>- imports required during peak periods** |

- Tight demand/supply balances during periods of negative reserve margins will have several potential market impacts. These include upward pressure on wholesale 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 large consumers, taking measures to reduce their electricity consumption.

- The magnitude of resource deficiencies under extreme weather, clearly illustrates there are circumstances under which reliance on interconnected supply would be stretched to the limits of the transmission system in the Existing Resource Scenario. The risk of even short-duration inability to meet demand during such conditions emphasizes the need for additional supply and price-responsive demand within Ontario.
- The return to service of Pickering Unit 4 is a significant development. However, more new generating capacity is needed, as well as price-responsive demand. An improved demand-supply situation is critically dependent on the remaining nuclear units and new generation projects coming to service on schedule. The risks associated with the return-to-service dates of units from long-term lay-up and planned outages were identified in the previous quarterly Outlook, and the IMO considers that some risk persists with the updated information. This risk is greatly diminished and reduces progressively as return-to-service milestones are met.
- The importance of demand reductions was demonstrated during the period following the blackout on August 14, 2003, when conservation appeals led to demand reductions of up to 4,500 MW.
- A number of large generating units are scheduled to return to service from outage at the beginning of winter 2003/04, with numerous others scheduled to return from planned outages prior to summer 2004. Meeting these schedules is critical to maintaining positive reserve margins.
- High generator unavailability, whether caused by higher forced outage rates, delays in commissioning new units or returning generators to service, could once again lead to extensive reliance on imports as was the case during 2002. Under these circumstances, opportunities for planned outages, especially during the summer period, would be very limited.
- Lower than forecast amounts of hydroelectric resources, due to drought conditions over some or all of the study period, or due to scheduling decisions, would reduce the available resource levels and increase the risk of energy shortages.
- Over the 18-month period under study, accounting for the availability of imported regional supply, the Northeast Power Coordinating Council resource adequacy criterion is expected to be met.

**Transmission Adequacy**

- In the East zone, the Chenaux project outages may reduce supply reliability to the Renfrew area. These outages will be reassessed by the IMO during the approval timeframe.
- 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.

- Avoiding planned transmission outages affecting the Flow East Towards Toronto (FETT) interface during significant planned outages to generating stations close to Toronto in the fall of 2003 will be required to maintain supply reliability to the Toronto zone.
- 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.

**- End of Section -**

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# Appendix A Resource Adequacy Assessment Details

## Table A1 Assessment of Resource Adequacy: Existing Resource Scenario

| Week Ending Day | Total Resources MW | Total Reductions in Resources MW | Price-Responsive Demand MW | Available Resources MW | Required Resources MW | Available Reserve % | Available Reserve MW | Required Reserve % | Required Reserve MW | Reserve Margin MW |
|---|---|---|---|---|---|---|---|---|---|---|
| 05-Oct-03 | 30,694 | 7,223 | 0 | 23,471 | 21,986 | 22.6 | 4,321 | 14.8 | 2,836 | 1,485 |
| 12-Oct-03 | 30,694 | 9,691 | 0 | 21,003 | 22,322 | 7.9 | 1,530 | 14.6 | 2,849 | -1,319 |
| 19-Oct-03 | 30,694 | 9,189 | 0 | 21,505 | 22,708 | 8.5 | 1,685 | 14.6 | 2,888 | -1,203 |
| 26-Oct-03 | 30,694 | 9,180 | 0 | 21,514 | 23,081 | 6.8 | 1,367 | 14.6 | 2,934 | -1,567 |
| 02-Nov-03 | 30,694 | 9,003 | 0 | 21,691 | 23,550 | 5.4 | 1,114 | 14.5 | 2,973 | -1,859 |
| 09-Nov-03 | 30,494 | 8,242 | 0 | 22,252 | 24,730 | 3.2 | 689 | 14.7 | 3,167 | -2,478 |
| 16-Nov-03 | 30,494 | 7,535 | 0 | 22,959 | 25,072 | 4.3 | 953 | 13.9 | 3,066 | -2,113 |
| 23-Nov-03 | 30,494 | 7,492 | 0 | 23,002 | 25,464 | 2.7 | 595 | 13.6 | 3,057 | -2,462 |
| 30-Nov-03 | 30,494 | 7,413 | 0 | 23,081 | 25,597 | 2.1 | 473 | 13.2 | 2,989 | -2,516 |
| 07-Dec-03 | 30,494 | 5,562 | 0 | 24,932 | 26,795 | 6.7 | 1,567 | 14.7 | 3,430 | -1,863 |
| 14-Dec-03 | 30,494 | 5,590 | 0 | 24,904 | 26,757 | 6.3 | 1,473 | 14.2 | 3,326 | -1,853 |
| 21-Dec-03 | 30,494 | 5,500 | 0 | 24,994 | 27,257 | 5.2 | 1,243 | 14.8 | 3,506 | -2,263 |
| 28-Dec-03 | 30,494 | 3,773 | 0 | 26,721 | 27,146 | 12.3 | 2,934 | 14.1 | 3,359 | -425 |
| 04-Jan-04 | 30,494 | 3,763 | 0 | 26,731 | 25,572 | 21.6 | 4,743 | 16.3 | 3,584 | 1,159 |
| 11-Jan-04 | 30,494 | 3,420 | 0 | 27,074 | 27,727 | 12.6 | 3,020 | 15.3 | 3,673 | -653 |
| 18-Jan-04 | 30,494 | 3,493 | 0 | 27,001 | 27,648 | 13.1 | 3,131 | 15.8 | 3,778 | -647 |
| 25-Jan-04 | 30,494 | 3,511 | 0 | 26,983 | 27,333 | 14.3 | 3,369 | 15.8 | 3,719 | -350 |
| 01-Feb-04 | 30,494 | 3,550 | 0 | 26,944 | 27,204 | 13.4 | 3,178 | 14.5 | 3,438 | -260 |
| 08-Feb-04 | 30,494 | 3,988 | 0 | 26,506 | 26,983 | 12.6 | 2,973 | 14.7 | 3,450 | -477 |
| 15-Feb-04 | 30,494 | 4,014 | 0 | 26,480 | 26,788 | 13.6 | 3,166 | 14.9 | 3,474 | -308 |
| 22-Feb-04 | 30,494 | 3,996 | 0 | 26,498 | 26,262 | 16.1 | 3,675 | 15.1 | 3,439 | 236 |
| 29-Feb-04 | 30,494 | 3,996 | 0 | 26,498 | 26,079 | 16.9 | 3,833 | 15.1 | 3,414 | 419 |
| 07-Mar-04 | 30,494 | 4,555 | 0 | 25,939 | 25,799 | 15.6 | 3,505 | 15.0 | 3,365 | 140 |
| 14-Mar-04 | 30,494 | 4,474 | 0 | 26,020 | 25,397 | 18.0 | 3,959 | 15.1 | 3,336 | 623 |
| 21-Mar-04 | 30,494 | 5,033 | 0 | 25,461 | 24,985 | 17.2 | 3,739 | 15.0 | 3,263 | 476 |
| 28-Mar-04 | 30,494 | 5,983 | 0 | 24,511 | 24,307 | 15.4 | 3,265 | 14.4 | 3,061 | 204 |
| 04-Apr-04 | 30,494 | 6,899 | 0 | 23,595 | 23,961 | 13.3 | 2,765 | 15.0 | 3,131 | -366 |
| 11-Apr-04 | 30,494 | 6,363 | 0 | 24,131 | 22,907 | 20.9 | 4,177 | 14.8 | 2,953 | 1,224 |
| 18-Apr-04 | 30,494 | 7,757 | 0 | 22,737 | 22,613 | 15.1 | 2,984 | 14.5 | 2,860 | 124 |
| 25-Apr-04 | 30,494 | 7,609 | 0 | 22,885 | 22,083 | 18.3 | 3,535 | 14.1 | 2,733 | 802 |
| 02-May-04 | 30,494 | 7,202 | 0 | 23,292 | 21,902 | 22.6 | 4,296 | 15.3 | 2,906 | 1,390 |
| 09-May-04 | 30,494 | 7,311 | 0 | 23,183 | 22,631 | 23.5 | 4,405 | 20.5 | 3,853 | 552 |
| 16-May-04 | 30,494 | 6,986 | 0 | 23,508 | 23,562 | 23.1 | 4,418 | 23.4 | 4,472 | -54 |
| 23-May-04 | 30,494 | 6,983 | 0 | 23,511 | 23,837 | 19.5 | 3,843 | 21.2 | 4,169 | -326 |
| 30-May-04 | 30,494 | 5,625 | 0 | 24,869 | 24,410 | 23.4 | 4,714 | 21.1 | 4,255 | 459 |
| 06-Jun-04 | 30,494 | 5,601 | 0 | 24,893 | 25,816 | 14.0 | 3,054 | 18.2 | 3,977 | -923 |
| 13-Jun-04 | 30,494 | 4,914 | 0 | 25,580 | 26,930 | 12.8 | 2,898 | 18.7 | 4,248 | -1,350 |
| 20-Jun-04 | 30,494 | 4,812 | 0 | 25,682 | 27,051 | 11.4 | 2,628 | 17.3 | 3,997 | -1,369 |
| 27-Jun-04 | 30,494 | 4,004 | 0 | 26,490 | 27,316 | 15.1 | 3,483 | 18.7 | 4,309 | -826 |

Note: The reader should be aware that Security and 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 | Total Resources MW | Total Reductions in Resources MW | Price-Responsive Demand MW | Available Resources MW | Required Resources MW | Available Reserve % | Available Reserve MW | Required Reserve % | Required Reserve MW | Reserve Margin MW |
|---|---|---|---|---|---|---|---|---|---|---|
| 04-Jul-04 | 30,494 | 3,384 | 0 | 27,110 | 27,979 | 14.4 | 3,408 | 18.0 | 4,277 | -869 |
| 11-Jul-04 | 30,494 | 3,573 | 0 | 26,921 | 27,834 | 13.0 | 3,086 | 16.8 | 3,999 | -913 |
| 18-Jul-04 | 30,494 | 3,541 | 0 | 26,953 | 27,656 | 13.3 | 3,164 | 16.3 | 3,867 | -703 |
| 25-Jul-04 | 30,494 | 3,537 | 0 | 26,957 | 27,668 | 13.3 | 3,169 | 16.3 | 3,880 | -711 |
| 01-Aug-04 | 30,494 | 3,530 | 0 | 26,964 | 27,430 | 15.0 | 3,511 | 17.0 | 3,977 | -466 |
| 08-Aug-04 | 30,494 | 3,535 | 0 | 26,959 | 27,619 | 14.4 | 3,384 | 17.2 | 4,044 | -660 |
| 15-Aug-04 | 30,494 | 3,568 | 0 | 26,926 | 27,432 | 14.4 | 3,381 | 16.5 | 3,887 | -506 |
| 22-Aug-04 | 30,494 | 3,533 | 0 | 26,961 | 27,347 | 15.8 | 3,676 | 17.4 | 4,062 | -386 |
| 29-Aug-04 | 30,494 | 3,471 | 0 | 27,023 | 27,602 | 15.3 | 3,589 | 17.8 | 4,168 | -579 |
| 05-Sep-04 | 30,494 | 5,213 | 0 | 25,281 | 26,706 | 13.9 | 3,092 | 20.4 | 4,517 | -1,425 |
| 12-Sep-04 | 30,494 | 6,123 | 0 | 24,371 | 24,835 | 14.7 | 3,117 | 16.9 | 3,581 | -464 |
| 19-Sep-04 | 30,494 | 6,120 | 0 | 24,374 | 24,473 | 19.5 | 3,979 | 20.0 | 4,078 | -99 |
| 26-Sep-04 | 30,494 | 8,989 | 0 | 21,505 | 23,591 | 9.8 | 1,920 | 20.5 | 4,006 | -2,086 |
| 03-Oct-04 | 30,494 | 9,038 | 0 | 21,456 | 22,274 | 10.4 | 2,012 | 14.6 | 2,830 | -818 |
| 10-Oct-04 | 30,494 | 9,913 | 0 | 20,581 | 22,279 | 4.5 | 880 | 13.1 | 2,578 | -1,698 |
| 17-Oct-04 | 30,494 | 10,357 | 0 | 20,137 | 22,632 | 0.4 | 89 | 12.9 | 2,584 | -2,495 |
| 24-Oct-04 | 30,494 | 10,333 | 0 | 20,161 | 23,006 | -1.0 | -208 | 13.0 | 2,637 | -2,845 |
| 31-Oct-04 | 30,494 | 7,601 | 0 | 22,893 | 23,558 | 9.9 | 2,058 | 13.1 | 2,723 | -665 |
| 07-Nov-04 | 30,494 | 6,586 | 0 | 23,908 | 24,711 | 9.8 | 2,124 | 13.4 | 2,927 | -803 |
| 14-Nov-04 | 30,494 | 6,047 | 0 | 24,447 | 25,100 | 10.1 | 2,241 | 13.0 | 2,894 | -653 |
| 21-Nov-04 | 30,494 | 6,002 | 0 | 24,492 | 25,650 | 8.3 | 1,886 | 13.5 | 3,044 | -1,158 |
| 28-Nov-04 | 30,494 | 6,000 | 0 | 24,494 | 25,877 | 7.4 | 1,686 | 13.5 | 3,069 | -1,383 |
| 05-Dec-04 | 30,494 | 5,151 | 0 | 25,343 | 26,995 | 7.6 | 1,778 | 14.6 | 3,430 | -1,652 |
| 12-Dec-04 | 30,494 | 4,631 | 0 | 25,863 | 26,994 | 9.3 | 2,210 | 14.1 | 3,341 | -1,131 |
| 19-Dec-04 | 30,494 | 3,182 | 0 | 27,312 | 27,551 | 13.8 | 3,316 | 14.8 | 3,555 | -239 |
| 26-Dec-04 | 30,494 | 2,658 | 0 | 27,836 | 27,479 | 15.8 | 3,799 | 14.3 | 3,442 | 357 |
| 02-Jan-05 | 30,494 | 2,742 | 0 | 27,752 | 25,808 | 23.6 | 5,303 | 15.0 | 3,359 | 1,944 |
| 09-Jan-05 | 30,494 | 2,842 | 0 | 27,652 | 26,990 | 17.8 | 4,179 | 15.0 | 3,517 | 662 |
| 16-Jan-05 | 30,494 | 2,744 | 0 | 27,750 | 27,635 | 14.8 | 3,569 | 14.3 | 3,454 | 115 |
| 23-Jan-05 | 30,494 | 2,755 | 0 | 27,739 | 27,606 | 15.4 | 3,700 | 14.8 | 3,567 | 133 |
| 30-Jan-05 | 30,494 | 2,782 | 0 | 27,712 | 27,305 | 16.5 | 3,934 | 14.8 | 3,527 | 407 |
| 06-Feb-05 | 30,494 | 2,865 | 0 | 27,629 | 27,137 | 15.7 | 3,744 | 13.6 | 3,252 | 492 |
| 13-Feb-05 | 30,494 | 3,359 | 0 | 27,135 | 26,999 | 14.6 | 3,451 | 14.0 | 3,315 | 136 |
| 20-Feb-05 | 30,494 | 3,372 | 0 | 27,122 | 26,823 | 15.6 | 3,660 | 14.3 | 3,361 | 299 |
| 27-Feb-05 | 30,494 | 3,946 | 0 | 26,548 | 26,365 | 15.6 | 3,586 | 14.8 | 3,403 | 183 |
| 06-Mar-05 | 30,494 | 3,841 | 0 | 26,653 | 26,234 | 17.3 | 3,927 | 15.4 | 3,508 | 419 |
| 13-Mar-05 | 30,494 | 5,179 | 0 | 25,315 | 25,992 | 12.4 | 2,787 | 15.4 | 3,464 | -677 |
| 20-Mar-05 | 30,494 | 6,020 | 0 | 24,474 | 25,409 | 10.4 | 2,306 | 14.6 | 3,241 | -935 |
| 27-Mar-05 | 30,494 | 6,066 | 0 | 24,428 | 25,033 | 11.9 | 2,600 | 14.7 | 3,205 | -605 |
| 03-Apr-05 | 30,494 | 6,883 | 0 | 23,611 | 24,244 | 10.6 | 2,258 | 13.5 | 2,891 | -633 |

## Table A2 Assessment of Resource Adequacy: Planned Resource Scenario

| Week Ending Day | Total Resources MW | Total Reductions in Resources MW | Price-Responsive Demand MW | Available Resources MW | Required Resources MW | Available Reserve % | Available Reserve MW | Required Reserve % | Required Reserve MW | Reserve Margin MW |
|---|---|---|---|---|---|---|---|---|---|---|
| 05-Oct-03 | 30,694 | 7,223 | 300 | 23,771 | 21,986 | 24.1 | 4,621 | 14.8 | 2,836 | 1,785 |
| 12-Oct-03 | 30,694 | 9,691 | 300 | 21,303 | 22,322 | 9.4 | 1,830 | 14.6 | 2,849 | -1,019 |
| 19-Oct-03 | 30,694 | 9,189 | 300 | 21,805 | 22,708 | 10.0 | 1,985 | 14.6 | 2,888 | -903 |
| 26-Oct-03 | 30,694 | 9,180 | 300 | 21,814 | 23,081 | 8.3 | 1,667 | 14.6 | 2,934 | -1,267 |
| 02-Nov-03 | 31,464 | 9,026 | 300 | 22,738 | 23,582 | 10.5 | 2,161 | 14.6 | 3,005 | -844 |
| 09-Nov-03 | 31,264 | 8,260 | 300 | 23,304 | 24,758 | 8.1 | 1,741 | 14.8 | 3,195 | -1,454 |
| 16-Nov-03 | 31,264 | 7,553 | 300 | 24,011 | 25,103 | 9.1 | 2,005 | 14.1 | 3,097 | -1,092 |
| 23-Nov-03 | 31,264 | 7,510 | 300 | 24,054 | 25,493 | 7.4 | 1,647 | 13.8 | 3,086 | -1,439 |
| 30-Nov-03 | 31,264 | 7,431 | 300 | 24,133 | 25,625 | 6.8 | 1,525 | 13.3 | 3,017 | -1,492 |
| 07-Dec-03 | 32,034 | 5,588 | 300 | 26,746 | 26,795 | 14.5 | 3,381 | 14.7 | 3,430 | -49 |
| 14-Dec-03 | 32,034 | 5,616 | 300 | 26,718 | 26,757 | 14.0 | 3,287 | 14.2 | 3,326 | -39 |
| 21-Dec-03 | 32,034 | 5,526 | 300 | 26,808 | 27,257 | 12.9 | 3,057 | 14.8 | 3,506 | -449 |
| 28-Dec-03 | 32,034 | 3,799 | 300 | 28,535 | 27,146 | 20.0 | 4,748 | 14.1 | 3,359 | 1,389 |
| 04-Jan-04 | 32,034 | 3,789 | 300 | 28,545 | 25,714 | 29.8 | 6,557 | 17.0 | 3,726 | 2,831 |
| 11-Jan-04 | 32,034 | 3,446 | 300 | 28,888 | 27,805 | 20.1 | 4,834 | 15.6 | 3,751 | 1,083 |
| 18-Jan-04 | 32,034 | 3,519 | 300 | 28,815 | 27,733 | 20.7 | 4,945 | 16.2 | 3,863 | 1,082 |
| 25-Jan-04 | 32,034 | 3,537 | 300 | 28,797 | 27,438 | 22.0 | 5,183 | 16.2 | 3,824 | 1,359 |
| 01-Feb-04 | 32,034 | 3,576 | 300 | 28,758 | 27,301 | 21.0 | 4,992 | 14.9 | 3,535 | 1,457 |
| 08-Feb-04 | 32,034 | 4,014 | 300 | 28,320 | 27,067 | 20.3 | 4,787 | 15.0 | 3,534 | 1,253 |
| 15-Feb-04 | 32,034 | 4,040 | 300 | 28,294 | 26,887 | 21.4 | 4,980 | 15.3 | 3,573 | 1,407 |
| 22-Feb-04 | 32,034 | 4,022 | 300 | 28,312 | 26,400 | 24.1 | 5,489 | 15.7 | 3,577 | 1,912 |
| 29-Feb-04 | 32,034 | 4,022 | 300 | 28,312 | 26,227 | 24.9 | 5,647 | 15.7 | 3,562 | 2,085 |
| 07-Mar-04 | 32,034 | 4,581 | 300 | 27,753 | 25,932 | 23.7 | 5,319 | 15.6 | 3,498 | 1,821 |
| 14-Mar-04 | 32,034 | 5,257 | 300 | 27,077 | 25,473 | 22.7 | 5,016 | 15.5 | 3,412 | 1,604 |
| 21-Mar-04 | 32,034 | 5,816 | 300 | 26,518 | 25,060 | 22.1 | 4,796 | 15.4 | 3,338 | 1,458 |
| 28-Mar-04 | 32,034 | 6,766 | 300 | 25,568 | 24,381 | 20.3 | 4,322 | 14.8 | 3,135 | 1,187 |
| 04-Apr-04 | 32,034 | 7,682 | 300 | 24,652 | 24,005 | 18.4 | 3,822 | 15.2 | 3,175 | 647 |
| 11-Apr-04 | 32,034 | 7,146 | 300 | 25,188 | 22,988 | 26.2 | 5,234 | 15.2 | 3,034 | 2,200 |
| 18-Apr-04 | 32,034 | 7,783 | 300 | 24,551 | 22,766 | 24.3 | 4,798 | 15.3 | 3,013 | 1,785 |
| 25-Apr-04 | 32,132 | 7,635 | 300 | 24,797 | 22,288 | 28.2 | 5,447 | 15.2 | 2,938 | 2,509 |
| 02-May-04 | 32,132 | 7,228 | 300 | 25,204 | 22,087 | 32.7 | 6,208 | 16.3 | 3,091 | 3,117 |
| 09-May-04 | 32,132 | 7,337 | 300 | 25,095 | 22,785 | 33.6 | 6,317 | 21.3 | 4,007 | 2,310 |
| 16-May-04 | 32,710 | 7,034 | 300 | 25,976 | 23,831 | 36.1 | 6,886 | 24.8 | 4,741 | 2,145 |
| 23-May-04 | 32,710 | 7,031 | 300 | 25,979 | 24,107 | 32.1 | 6,311 | 22.6 | 4,439 | 1,872 |
| 30-May-04 | 32,710 | 5,673 | 300 | 27,337 | 24,681 | 35.6 | 7,182 | 22.5 | 4,526 | 2,656 |
| 06-Jun-04 | 32,710 | 5,649 | 300 | 27,361 | 25,995 | 25.3 | 5,522 | 19.0 | 4,156 | 1,366 |
| 13-Jun-04 | 32,710 | 5,738 | 300 | 27,272 | 27,017 | 20.2 | 4,590 | 19.1 | 4,335 | 255 |
| 20-Jun-04 | 32,710 | 5,638 | 300 | 27,372 | 27,121 | 18.7 | 4,318 | 17.6 | 4,067 | 251 |
| 27-Jun-04 | 32,710 | 4,830 | 300 | 28,180 | 27,432 | 22.5 | 5,173 | 19.2 | 4,425 | 748 |

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

(Table A2 continued)

| Week Ending Day | Total Resources MW | Total Reductions in Resources MW | Price-Responsive Demand MW | Available Resources MW | Required Resources MW | Available Reserve % | Available Reserve MW | Required Reserve % | Required Reserve MW | Reserve Margin MW |
|---|---|---|---|---|---|---|---|---|---|---|
| 04-Jul-04 | 32,710 | 4,210 | 300 | 28,800 | 28,081 | 21.5 | 5,098 | 18.5 | 4,379 | 719 |
| 11-Jul-04 | 32,710 | 4,418 | 300 | 28,592 | 27,919 | 20.0 | 4,757 | 17.1 | 4,084 | 673 |
| 18-Jul-04 | 32,710 | 4,386 | 300 | 28,624 | 27,747 | 20.3 | 4,835 | 16.6 | 3,958 | 877 |
| 25-Jul-04 | 32,710 | 3,635 | 300 | 29,375 | 27,829 | 23.5 | 5,587 | 17.0 | 4,041 | 1,546 |
| 01-Aug-04 | 32,710 | 3,628 | 300 | 29,382 | 27,615 | 25.3 | 5,929 | 17.8 | 4,162 | 1,767 |
| 08-Aug-04 | 32,710 | 3,643 | 300 | 29,367 | 27,800 | 24.6 | 5,792 | 17.9 | 4,225 | 1,567 |
| 15-Aug-04 | 32,710 | 3,676 | 300 | 29,334 | 27,615 | 24.6 | 5,789 | 17.3 | 4,070 | 1,719 |
| 22-Aug-04 | 32,710 | 3,641 | 300 | 29,369 | 27,530 | 26.1 | 6,084 | 18.2 | 4,245 | 1,839 |
| 29-Aug-04 | 32,710 | 3,579 | 300 | 29,431 | 27,784 | 25.6 | 5,997 | 18.6 | 4,350 | 1,647 |
| 05-Sep-04 | 32,710 | 5,307 | 300 | 27,703 | 26,875 | 24.9 | 5,514 | 21.1 | 4,686 | 828 |
| 12-Sep-04 | 32,710 | 6,217 | 300 | 26,793 | 25,025 | 26.1 | 5,539 | 17.7 | 3,771 | 1,768 |
| 19-Sep-04 | 32,710 | 6,214 | 300 | 26,796 | 24,654 | 31.4 | 6,401 | 20.9 | 4,259 | 2,142 |
| 26-Sep-04 | 32,710 | 9,083 | 300 | 23,927 | 23,714 | 22.2 | 4,342 | 21.1 | 4,129 | 213 |
| 03-Oct-04 | 32,710 | 9,132 | 300 | 23,878 | 22,432 | 22.8 | 4,434 | 15.4 | 2,988 | 1,446 |
| 10-Oct-04 | 32,710 | 9,997 | 300 | 23,013 | 22,358 | 16.8 | 3,312 | 13.5 | 2,657 | 655 |
| 17-Oct-04 | 32,710 | 10,441 | 300 | 22,569 | 22,704 | 12.6 | 2,521 | 13.3 | 2,656 | -135 |
| 24-Oct-04 | 32,710 | 10,417 | 300 | 22,593 | 23,079 | 10.9 | 2,224 | 13.3 | 2,710 | -486 |
| 31-Oct-04 | 32,710 | 7,685 | 300 | 25,325 | 23,696 | 21.6 | 4,490 | 13.7 | 2,861 | 1,629 |
| 07-Nov-04 | 32,710 | 6,660 | 300 | 26,350 | 24,835 | 21.0 | 4,566 | 14.0 | 3,051 | 1,515 |
| 14-Nov-04 | 32,710 | 6,121 | 300 | 26,889 | 25,225 | 21.1 | 4,683 | 13.6 | 3,019 | 1,664 |
| 21-Nov-04 | 32,710 | 6,076 | 300 | 26,934 | 25,741 | 19.2 | 4,328 | 13.9 | 3,135 | 1,193 |
| 28-Nov-04 | 32,710 | 6,074 | 300 | 26,936 | 25,961 | 18.1 | 4,128 | 13.8 | 3,153 | 975 |
| 05-Dec-04 | 32,710 | 5,225 | 300 | 27,785 | 27,039 | 17.9 | 4,220 | 14.7 | 3,474 | 746 |
| 12-Dec-04 | 32,710 | 4,695 | 300 | 28,315 | 27,095 | 19.7 | 4,662 | 14.6 | 3,442 | 1,220 |
| 19-Dec-04 | 32,710 | 3,246 | 300 | 29,764 | 27,711 | 24.0 | 5,768 | 15.5 | 3,715 | 2,053 |
| 26-Dec-04 | 32,710 | 2,722 | 300 | 30,288 | 27,672 | 26.0 | 6,251 | 15.1 | 3,635 | 2,616 |
| 02-Jan-05 | 32,710 | 2,806 | 300 | 30,204 | 25,991 | 34.5 | 7,755 | 15.8 | 3,542 | 4,213 |
| 09-Jan-05 | 32,710 | 2,906 | 300 | 30,104 | 27,165 | 28.3 | 6,631 | 15.7 | 3,692 | 2,939 |
| 16-Jan-05 | 32,710 | 3,565 | 300 | 29,445 | 27,734 | 21.8 | 5,264 | 14.7 | 3,553 | 1,711 |
| 23-Jan-05 | 32,710 | 3,576 | 300 | 29,434 | 27,708 | 22.4 | 5,395 | 15.3 | 3,669 | 1,726 |
| 30-Jan-05 | 32,710 | 3,603 | 300 | 29,407 | 27,405 | 23.7 | 5,629 | 15.3 | 3,627 | 2,002 |
| 06-Feb-05 | 32,710 | 3,686 | 300 | 29,324 | 27,257 | 22.8 | 5,439 | 14.1 | 3,372 | 2,067 |
| 13-Feb-05 | 32,710 | 4,180 | 300 | 28,830 | 27,080 | 21.7 | 5,146 | 14.3 | 3,396 | 1,750 |
| 20-Feb-05 | 32,710 | 3,436 | 300 | 29,574 | 26,976 | 26.1 | 6,112 | 15.0 | 3,514 | 2,598 |
| 27-Feb-05 | 32,710 | 4,010 | 300 | 29,000 | 26,441 | 26.3 | 6,038 | 15.2 | 3,479 | 2,559 |
| 06-Mar-05 | 32,710 | 3,905 | 300 | 29,105 | 26,437 | 28.1 | 6,379 | 16.3 | 3,711 | 2,668 |
| 13-Mar-05 | 32,710 | 5,243 | 300 | 27,767 | 26,142 | 23.3 | 5,239 | 16.0 | 3,614 | 1,625 |
| 20-Mar-05 | 32,710 | 6,084 | 300 | 26,926 | 25,538 | 21.5 | 4,758 | 15.2 | 3,370 | 1,388 |
| 27-Mar-05 | 32,710 | 6,130 | 300 | 26,880 | 25,189 | 23.1 | 5,052 | 15.4 | 3,361 | 1,691 |
| 03-Apr-05 | 32,710 | 6,947 | 300 | 26,063 | 24,389 | 22.1 | 4,710 | 14.2 | 3,036 | 1,674 |

## Table A3 Demand Forecast Range For Required Resources Calculation

| Week Ending Day | Ontario Demand Normal Weather MW | Ontario Demand Extreme Weather MW |
|---|---|---|
| 05-Oct-03 | 19,150 | 19,919 |
| 12-Oct-03 | 19,473 | 20,054 |
| 19-Oct-03 | 19,820 | 20,731 |
| 26-Oct-03 | 20,147 | 20,778 |
| 02-Nov-03 | 20,577 | 21,399 |
| 09-Nov-03 | 21,563 | 22,712 |
| 16-Nov-03 | 22,006 | 23,153 |
| 23-Nov-03 | 22,407 | 23,673 |
| 30-Nov-03 | 22,608 | 24,112 |
| 07-Dec-03 | 23,365 | 25,359 |
| 14-Dec-03 | 23,431 | 25,053 |
| 21-Dec-03 | 23,751 | 25,742 |
| 28-Dec-03 | 23,787 | 25,538 |
| 04-Jan-04 | 21,988 | 24,191 |
| 11-Jan-04 | 24,054 | 26,023 |
| 18-Jan-04 | 23,870 | 25,717 |
| 25-Jan-04 | 23,614 | 25,571 |
| 01-Feb-04 | 23,766 | 25,253 |
| 08-Feb-04 | 23,533 | 25,233 |
| 15-Feb-04 | 23,314 | 25,096 |
| 22-Feb-04 | 22,823 | 24,391 |
| 29-Feb-04 | 22,665 | 24,411 |
| 07-Mar-04 | 22,434 | 24,140 |
| 14-Mar-04 | 22,061 | 23,671 |
| 21-Mar-04 | 21,722 | 23,201 |
| 28-Mar-04 | 21,246 | 22,620 |
| 04-Apr-04 | 20,830 | 22,645 |
| 11-Apr-04 | 19,954 | 20,881 |
| 18-Apr-04 | 19,753 | 20,522 |
| 25-Apr-04 | 19,350 | 20,254 |
| 02-May-04 | 18,996 | 19,756 |
| 09-May-04 | 18,778 | 21,986 |
| 16-May-04 | 19,090 | 22,059 |
| 23-May-04 | 19,668 | 22,471 |
| 30-May-04 | 20,155 | 23,003 |
| 06-Jun-04 | 21,839 | 25,119 |
| 13-Jun-04 | 22,682 | 25,730 |
| 20-Jun-04 | 23,054 | 25,607 |
| 27-Jun-04 | 23,007 | 26,035 |

(Table A3 continued)

| Week Ending Day | Ontario Demand Normal Weather MW | Ontario Demand Extreme Weather MW |
|---|---|---|
| 04-Jul-04 | 23,702 | 26,440 |
| 11-Jul-04 | 23,835 | 26,469 |
| 18-Jul-04 | 23,789 | 25,790 |
| 25-Jul-04 | 23,788 | 25,813 |
| 01-Aug-04 | 23,453 | 26,248 |
| 08-Aug-04 | 23,575 | 26,459 |
| 15-Aug-04 | 23,545 | 25,738 |
| 22-Aug-04 | 23,285 | 25,893 |
| 29-Aug-04 | 23,434 | 26,591 |
| 05-Sep-04 | 22,189 | 25,363 |
| 12-Sep-04 | 21,254 | 24,155 |
| 19-Sep-04 | 20,395 | 23,593 |
| 26-Sep-04 | 19,585 | 22,696 |
| 03-Oct-04 | 19,444 | 20,213 |
| 10-Oct-04 | 19,701 | 20,282 |
| 17-Oct-04 | 20,048 | 20,960 |
| 24-Oct-04 | 20,369 | 21,000 |
| 31-Oct-04 | 20,835 | 21,656 |
| 07-Nov-04 | 21,784 | 22,932 |
| 14-Nov-04 | 22,206 | 23,353 |
| 21-Nov-04 | 22,606 | 23,873 |
| 28-Nov-04 | 22,808 | 24,312 |
| 05-Dec-04 | 23,565 | 25,558 |
| 12-Dec-04 | 23,653 | 25,276 |
| 19-Dec-04 | 23,996 | 25,986 |
| 26-Dec-04 | 24,037 | 25,789 |
| 02-Jan-05 | 22,449 | 24,200 |
| 09-Jan-05 | 23,473 | 25,413 |
| 16-Jan-05 | 24,181 | 26,150 |
| 23-Jan-05 | 24,039 | 25,886 |
| 30-Jan-05 | 23,778 | 25,735 |
| 06-Feb-05 | 23,885 | 25,372 |
| 13-Feb-05 | 23,684 | 25,384 |
| 20-Feb-05 | 23,462 | 25,244 |
| 27-Feb-05 | 22,962 | 24,530 |
| 06-Mar-05 | 22,726 | 24,472 |
| 13-Mar-05 | 22,528 | 24,234 |
| 20-Mar-05 | 22,168 | 23,778 |
| 27-Mar-05 | 21,828 | 23,307 |
| 03-Apr-05 | 21,353 | 22,727 |

## Table A4 Assessment of Resource Adequacy: Extreme Weather, Existing Resource Scenario

| Week Ending Day | Total Resources MW | Total Reductions in Resources MW | Price-Responsive Demand MW | Available Resources MW | Required Resources MW | Available Reserve % | Available Reserve MW | Required Reserve % | Required Reserve MW | Reserve Margin MW |
|---|---|---|---|---|---|---|---|---|---|---|
| 05-Oct-03 | 30,694 | 7,213 | 0 | 23,481 | 22,635 | 17.9 | 3,562 | 13.6 | 2,716 | 846 |
| 12-Oct-03 | 30,694 | 9,681 | 0 | 21,013 | 22,851 | 4.8 | 959 | 14.0 | 2,797 | -1,838 |
| 19-Oct-03 | 30,694 | 9,135 | 0 | 21,559 | 23,581 | 4.0 | 828 | 13.8 | 2,850 | -2,022 |
| 26-Oct-03 | 30,694 | 9,165 | 0 | 21,529 | 23,623 | 3.6 | 751 | 13.7 | 2,845 | -2,094 |
| 02-Nov-03 | 30,694 | 8,920 | 0 | 21,774 | 24,313 | 1.8 | 375 | 13.6 | 2,914 | -2,539 |
| 09-Nov-03 | 30,494 | 8,242 | 0 | 22,252 | 25,738 | -2.0 | -460 | 13.3 | 3,026 | -3,486 |
| 16-Nov-03 | 30,494 | 7,535 | 0 | 22,959 | 26,160 | -0.8 | -194 | 13.0 | 3,007 | -3,201 |
| 23-Nov-03 | 30,494 | 7,492 | 0 | 23,002 | 26,573 | -2.8 | -671 | 12.3 | 2,900 | -3,571 |
| 30-Nov-03 | 30,494 | 7,413 | 0 | 23,081 | 26,948 | -4.3 | -1,031 | 11.8 | 2,836 | -3,867 |
| 07-Dec-03 | 30,494 | 5,562 | 0 | 24,932 | 28,302 | -1.7 | -427 | 11.6 | 2,943 | -3,370 |
| 14-Dec-03 | 30,494 | 5,590 | 0 | 24,904 | 27,975 | -0.6 | -149 | 11.7 | 2,922 | -3,071 |
| 21-Dec-03 | 30,494 | 5,500 | 0 | 24,994 | 28,714 | -2.9 | -748 | 11.6 | 2,972 | -3,720 |
| 28-Dec-03 | 30,494 | 3,773 | 0 | 26,721 | 28,525 | 4.6 | 1,183 | 11.7 | 2,987 | -1,804 |
| 04-Jan-04 | 30,494 | 3,763 | 0 | 26,731 | 27,257 | 10.5 | 2,540 | 12.7 | 3,066 | -526 |
| 11-Jan-04 | 30,494 | 3,420 | 0 | 27,074 | 29,362 | 4.0 | 1,051 | 12.8 | 3,339 | -2,288 |
| 18-Jan-04 | 30,494 | 3,493 | 0 | 27,001 | 29,034 | 5.0 | 1,284 | 12.9 | 3,317 | -2,033 |
| 25-Jan-04 | 30,494 | 3,511 | 0 | 26,983 | 28,880 | 5.5 | 1,412 | 12.9 | 3,309 | -1,897 |
| 01-Feb-04 | 30,494 | 3,550 | 0 | 26,944 | 28,502 | 6.7 | 1,691 | 12.9 | 3,249 | -1,558 |
| 08-Feb-04 | 30,494 | 3,988 | 0 | 26,506 | 28,448 | 5.0 | 1,273 | 12.7 | 3,215 | -1,942 |
| 15-Feb-04 | 30,494 | 4,014 | 0 | 26,480 | 28,302 | 5.5 | 1,384 | 12.8 | 3,206 | -1,822 |
| 22-Feb-04 | 30,494 | 3,996 | 0 | 26,498 | 27,501 | 8.6 | 2,107 | 12.8 | 3,110 | -1,003 |
| 29-Feb-04 | 30,494 | 3,996 | 0 | 26,498 | 27,522 | 8.6 | 2,087 | 12.7 | 3,111 | -1,024 |
| 07-Mar-04 | 30,494 | 4,555 | 0 | 25,939 | 27,224 | 7.5 | 1,799 | 12.8 | 3,084 | -1,285 |
| 14-Mar-04 | 30,494 | 4,461 | 0 | 26,033 | 26,757 | 10.0 | 2,362 | 13.0 | 3,086 | -724 |
| 21-Mar-04 | 30,494 | 4,977 | 0 | 25,517 | 26,220 | 10.0 | 2,316 | 13.0 | 3,019 | -703 |
| 28-Mar-04 | 30,494 | 5,882 | 0 | 24,612 | 25,453 | 8.8 | 1,992 | 12.5 | 2,833 | -841 |
| 04-Apr-04 | 30,494 | 6,801 | 0 | 23,693 | 25,583 | 4.6 | 1,048 | 13.0 | 2,938 | -1,890 |
| 11-Apr-04 | 30,494 | 6,276 | 0 | 24,218 | 23,676 | 16.0 | 3,337 | 13.4 | 2,795 | 542 |
| 18-Apr-04 | 30,494 | 7,684 | 0 | 22,810 | 23,305 | 11.2 | 2,288 | 13.6 | 2,783 | -495 |
| 25-Apr-04 | 30,494 | 7,537 | 0 | 22,957 | 22,900 | 13.4 | 2,703 | 13.1 | 2,646 | 57 |
| 02-May-04 | 30,494 | 7,125 | 0 | 23,369 | 22,552 | 18.3 | 3,613 | 14.2 | 2,796 | 817 |
| 09-May-04 | 30,494 | 7,250 | 0 | 23,244 | 24,901 | 5.7 | 1,258 | 13.3 | 2,915 | -1,657 |
| 16-May-04 | 30,494 | 6,942 | 0 | 23,552 | 25,097 | 6.8 | 1,493 | 13.8 | 3,038 | -1,545 |
| 23-May-04 | 30,494 | 6,920 | 0 | 23,574 | 25,542 | 4.9 | 1,103 | 13.7 | 3,071 | -1,968 |
| 30-May-04 | 30,494 | 5,567 | 0 | 24,927 | 26,136 | 8.4 | 1,924 | 13.6 | 3,133 | -1,209 |
| 06-Jun-04 | 30,494 | 5,504 | 0 | 24,990 | 28,207 | -0.5 | -129 | 12.3 | 3,088 | -3,217 |
| 13-Jun-04 | 30,494 | 4,818 | 0 | 25,676 | 29,034 | -0.2 | -54 | 12.8 | 3,304 | -3,358 |
| 20-Jun-04 | 30,494 | 4,732 | 0 | 25,762 | 28,895 | 0.6 | 155 | 12.8 | 3,288 | -3,133 |
| 27-Jun-04 | 30,494 | 3,922 | 0 | 26,572 | 29,339 | 2.1 | 537 | 12.7 | 3,304 | -2,767 |

(Table A4 continued)

| Week Ending Day | Total Resources MW | Total Reductions in Resources MW | Price-Responsive Demand MW | Available Resources MW | Required Resources MW | Available Reserve % | Available Reserve MW | Required Reserve % | Required Reserve MW | Reserve Margin MW |
|---|---|---|---|---|---|---|---|---|---|---|
| 04-Jul-04 | 30,494 | 3,299 | 0 | 27,195 | 29,793 | 2.9 | 755 | 12.7 | 3,353 | -2,598 |
| 11-Jul-04 | 30,494 | 3,499 | 0 | 26,995 | 29,829 | 2.0 | 526 | 12.7 | 3,360 | -2,834 |
| 18-Jul-04 | 30,494 | 3,457 | 0 | 27,037 | 29,094 | 4.8 | 1,247 | 12.8 | 3,304 | -2,057 |
| 25-Jul-04 | 30,494 | 3,466 | 0 | 27,028 | 29,119 | 4.7 | 1,215 | 12.8 | 3,306 | -2,091 |
| 01-Aug-04 | 30,494 | 3,439 | 0 | 27,055 | 29,556 | 3.1 | 807 | 12.6 | 3,308 | -2,501 |
| 08-Aug-04 | 30,494 | 3,441 | 0 | 27,053 | 29,788 | 2.2 | 594 | 12.6 | 3,329 | -2,735 |
| 15-Aug-04 | 30,494 | 3,497 | 0 | 26,997 | 29,013 | 4.9 | 1,259 | 12.7 | 3,275 | -2,016 |
| 22-Aug-04 | 30,494 | 3,450 | 0 | 27,044 | 29,181 | 4.5 | 1,151 | 12.7 | 3,288 | -2,137 |
| 29-Aug-04 | 30,494 | 3,381 | 0 | 27,113 | 29,933 | 2.0 | 522 | 12.6 | 3,342 | -2,820 |
| 05-Sep-04 | 30,494 | 5,101 | 0 | 25,393 | 28,654 | 0.1 | 30 | 13.0 | 3,291 | -3,261 |
| 12-Sep-04 | 30,494 | 6,062 | 0 | 24,432 | 27,192 | 1.2 | 277 | 12.6 | 3,037 | -2,760 |
| 19-Sep-04 | 30,494 | 6,097 | 0 | 24,397 | 26,594 | 3.4 | 804 | 12.7 | 3,001 | -2,197 |
| 26-Sep-04 | 30,494 | 8,970 | 0 | 21,524 | 25,657 | -5.2 | -1,172 | 13.1 | 2,961 | -4,133 |
| 03-Oct-04 | 30,494 | 8,989 | 0 | 21,505 | 22,990 | 6.4 | 1,292 | 13.7 | 2,777 | -1,485 |
| 10-Oct-04 | 30,494 | 9,860 | 0 | 20,634 | 22,804 | 1.7 | 352 | 12.4 | 2,522 | -2,170 |
| 17-Oct-04 | 30,494 | 10,282 | 0 | 20,212 | 23,503 | -3.6 | -748 | 12.1 | 2,543 | -3,291 |
| 24-Oct-04 | 30,494 | 10,249 | 0 | 20,245 | 23,546 | -3.6 | -755 | 12.1 | 2,546 | -3,301 |
| 31-Oct-04 | 30,494 | 7,518 | 0 | 22,976 | 24,319 | 6.1 | 1,320 | 12.3 | 2,663 | -1,343 |
| 07-Nov-04 | 30,494 | 6,492 | 0 | 24,002 | 25,716 | 4.7 | 1,070 | 12.1 | 2,784 | -1,714 |
| 14-Nov-04 | 30,494 | 5,943 | 0 | 24,551 | 26,185 | 5.1 | 1,198 | 12.1 | 2,832 | -1,634 |
| 21-Nov-04 | 30,494 | 5,903 | 0 | 24,591 | 26,760 | 3.0 | 718 | 12.1 | 2,887 | -2,169 |
| 28-Nov-04 | 30,494 | 5,876 | 0 | 24,618 | 27,231 | 1.3 | 306 | 12.0 | 2,919 | -2,613 |
| 05-Dec-04 | 30,494 | 5,014 | 0 | 25,480 | 28,632 | -0.3 | -78 | 12.0 | 3,074 | -3,152 |
| 12-Dec-04 | 30,494 | 4,507 | 0 | 25,987 | 28,359 | 2.8 | 711 | 12.2 | 3,083 | -2,372 |
| 19-Dec-04 | 30,494 | 3,046 | 0 | 27,448 | 29,145 | 5.6 | 1,462 | 12.2 | 3,159 | -1,697 |
| 26-Dec-04 | 30,494 | 2,542 | 0 | 27,952 | 28,960 | 8.4 | 2,163 | 12.3 | 3,171 | -1,008 |
| 02-Jan-05 | 30,494 | 2,624 | 0 | 27,870 | 27,137 | 15.2 | 3,670 | 12.1 | 2,937 | 733 |
| 09-Jan-05 | 30,494 | 2,699 | 0 | 27,795 | 28,455 | 9.4 | 2,382 | 12.0 | 3,042 | -660 |
| 16-Jan-05 | 30,494 | 2,636 | 0 | 27,858 | 29,251 | 6.5 | 1,708 | 11.9 | 3,101 | -1,393 |
| 23-Jan-05 | 30,494 | 2,646 | 0 | 27,848 | 28,967 | 7.6 | 1,962 | 11.9 | 3,081 | -1,119 |
| 30-Jan-05 | 30,494 | 2,660 | 0 | 27,834 | 28,802 | 8.2 | 2,099 | 11.9 | 3,067 | -968 |
| 06-Feb-05 | 30,494 | 2,767 | 0 | 27,727 | 28,426 | 9.3 | 2,355 | 12.0 | 3,054 | -699 |
| 13-Feb-05 | 30,494 | 3,230 | 0 | 27,264 | 28,430 | 7.4 | 1,880 | 12.0 | 3,046 | -1,166 |
| 20-Feb-05 | 30,494 | 3,254 | 0 | 27,240 | 28,277 | 7.9 | 1,996 | 12.0 | 3,033 | -1,037 |
| 27-Feb-05 | 30,494 | 3,822 | 0 | 26,672 | 27,461 | 8.7 | 2,142 | 12.0 | 2,931 | -789 |
| 06-Mar-05 | 30,494 | 3,742 | 0 | 26,752 | 27,650 | 9.3 | 2,280 | 13.0 | 3,178 | -898 |
| 13-Mar-05 | 30,494 | 5,080 | 0 | 25,414 | 27,403 | 4.9 | 1,180 | 13.1 | 3,169 | -1,989 |
| 20-Mar-05 | 30,494 | 5,925 | 0 | 24,569 | 26,772 | 3.3 | 791 | 12.6 | 2,994 | -2,203 |
| 27-Mar-05 | 30,494 | 5,953 | 0 | 24,541 | 26,263 | 5.3 | 1,234 | 12.7 | 2,956 | -1,722 |
| 03-Apr-05 | 30,494 | 6,782 | 0 | 23,712 | 25,373 | 4.3 | 985 | 11.6 | 2,646 | -1,661 |

## Table A5 Assessment of Resource Adequacy: Extreme Weather, Planned Resource Scenario

| Week Ending Day | Total Resources MW | Total Reductions in Resources MW | Price-Responsive Demand MW | Available Resources MW | Required Resources MW | Available Reserve % | Available Reserve MW | Required Reserve % | Required Reserve MW | Reserve Margin MW |
|---|---|---|---|---|---|---|---|---|---|---|
| 05-Oct-03 | 30,694 | 7,213 | 300 | 23,781 | 22,635 | 19.4 | 3,862 | 13.6 | 2,716 | 1,146 |
| 12-Oct-03 | 30,694 | 9,681 | 300 | 21,313 | 22,851 | 6.3 | 1,259 | 14.0 | 2,797 | -1,538 |
| 19-Oct-03 | 30,694 | 9,135 | 300 | 21,859 | 23,581 | 5.4 | 1,128 | 13.8 | 2,850 | -1,722 |
| 26-Oct-03 | 30,694 | 9,165 | 300 | 21,829 | 23,623 | 5.1 | 1,051 | 13.7 | 2,845 | -1,794 |
| 02-Nov-03 | 31,464 | 8,943 | 300 | 22,821 | 24,348 | 6.7 | 1,422 | 13.8 | 2,949 | -1,527 |
| 09-Nov-03 | 31,264 | 8,260 | 300 | 23,304 | 25,769 | 2.6 | 592 | 13.5 | 3,057 | -2,465 |
| 16-Nov-03 | 31,264 | 7,553 | 300 | 24,011 | 26,190 | 3.7 | 858 | 13.1 | 3,037 | -2,179 |
| 23-Nov-03 | 31,264 | 7,510 | 300 | 24,054 | 26,607 | 1.6 | 381 | 12.4 | 2,934 | -2,553 |
| 30-Nov-03 | 31,264 | 7,431 | 300 | 24,133 | 26,980 | 0.1 | 21 | 11.9 | 2,868 | -2,847 |
| 07-Dec-03 | 32,034 | 5,588 | 300 | 26,746 | 28,366 | 5.5 | 1,387 | 11.9 | 3,007 | -1,620 |
| 14-Dec-03 | 32,034 | 5,616 | 300 | 26,718 | 28,038 | 6.7 | 1,665 | 11.9 | 2,985 | -1,320 |
| 21-Dec-03 | 32,034 | 5,526 | 300 | 26,808 | 28,776 | 4.1 | 1,066 | 11.8 | 3,034 | -1,968 |
| 28-Dec-03 | 32,034 | 3,799 | 300 | 28,535 | 28,587 | 11.7 | 2,997 | 11.9 | 3,049 | -52 |
| 04-Jan-04 | 32,034 | 3,789 | 300 | 28,545 | 27,319 | 18.0 | 4,354 | 12.9 | 3,128 | 1,226 |
| 11-Jan-04 | 32,034 | 3,446 | 300 | 28,888 | 29,422 | 11.0 | 2,865 | 13.1 | 3,399 | -534 |
| 18-Jan-04 | 32,034 | 3,519 | 300 | 28,815 | 29,095 | 12.1 | 3,098 | 13.1 | 3,378 | -280 |
| 25-Jan-04 | 32,034 | 3,537 | 300 | 28,797 | 28,940 | 12.6 | 3,226 | 13.2 | 3,369 | -143 |
| 01-Feb-04 | 32,034 | 3,576 | 300 | 28,758 | 28,562 | 13.9 | 3,505 | 13.1 | 3,309 | 196 |
| 08-Feb-04 | 32,034 | 4,014 | 300 | 28,320 | 28,510 | 12.2 | 3,087 | 13.0 | 3,277 | -190 |
| 15-Feb-04 | 32,034 | 4,040 | 300 | 28,294 | 28,363 | 12.7 | 3,198 | 13.0 | 3,267 | -69 |
| 22-Feb-04 | 32,034 | 4,022 | 300 | 28,312 | 27,562 | 16.1 | 3,921 | 13.0 | 3,171 | 750 |
| 29-Feb-04 | 32,034 | 4,022 | 300 | 28,312 | 27,583 | 16.0 | 3,901 | 13.0 | 3,172 | 729 |
| 07-Mar-04 | 32,034 | 4,581 | 300 | 27,753 | 27,286 | 15.0 | 3,613 | 13.0 | 3,146 | 467 |
| 14-Mar-04 | 32,034 | 5,244 | 300 | 27,090 | 26,788 | 14.4 | 3,419 | 13.2 | 3,117 | 302 |
| 21-Mar-04 | 32,034 | 5,760 | 300 | 26,574 | 26,251 | 14.5 | 3,373 | 13.2 | 3,050 | 323 |
| 28-Mar-04 | 32,034 | 6,665 | 300 | 25,669 | 25,486 | 13.5 | 3,049 | 12.7 | 2,866 | 183 |
| 04-Apr-04 | 32,034 | 7,584 | 300 | 24,750 | 25,616 | 9.3 | 2,105 | 13.1 | 2,971 | -866 |
| 11-Apr-04 | 32,034 | 7,059 | 300 | 25,275 | 23,760 | 21.0 | 4,394 | 13.8 | 2,879 | 1,515 |
| 18-Apr-04 | 32,034 | 7,710 | 300 | 24,624 | 23,398 | 20.0 | 4,102 | 14.0 | 2,876 | 1,226 |
| 25-Apr-04 | 32,132 | 7,563 | 300 | 24,869 | 23,074 | 22.8 | 4,615 | 13.9 | 2,820 | 1,795 |
| 02-May-04 | 32,132 | 7,151 | 300 | 25,281 | 22,747 | 28.0 | 5,525 | 15.1 | 2,991 | 2,534 |
| 09-May-04 | 32,132 | 7,276 | 300 | 25,156 | 24,979 | 14.4 | 3,170 | 13.6 | 2,993 | 177 |
| 16-May-04 | 32,710 | 6,990 | 300 | 26,020 | 25,293 | 18.0 | 3,961 | 14.7 | 3,234 | 727 |
| 23-May-04 | 32,710 | 6,968 | 300 | 26,042 | 25,708 | 15.9 | 3,571 | 14.4 | 3,237 | 334 |
| 30-May-04 | 32,710 | 5,615 | 300 | 27,395 | 26,343 | 19.1 | 4,392 | 14.5 | 3,340 | 1,052 |
| 06-Jun-04 | 32,710 | 5,552 | 300 | 27,458 | 28,283 | 9.3 | 2,339 | 12.6 | 3,164 | -825 |
| 13-Jun-04 | 32,710 | 5,642 | 300 | 27,368 | 29,076 | 6.4 | 1,638 | 13.0 | 3,346 | -1,708 |
| 20-Jun-04 | 32,710 | 5,558 | 300 | 27,452 | 28,938 | 7.2 | 1,845 | 13.0 | 3,331 | -1,486 |
| 27-Jun-04 | 32,710 | 4,748 | 300 | 28,262 | 29,381 | 8.6 | 2,227 | 12.9 | 3,346 | -1,119 |

(Table A5 continued)

| Week Ending Day | Total Resources MW | Total Reductions in Resources MW | Price-Responsive Demand MW | Available Resources MW | Required Resources MW | Available Reserve % | Available Reserve MW | Required Reserve % | Required Reserve MW | Reserve Margin MW |
|---|---|---|---|---|---|---|---|---|---|---|
| 04-Jul-04 | 32,710 | 4,125 | 300 | 28,885 | 29,835 | 9.3 | 2,445 | 12.8 | 3,395 | -950 |
| 11-Jul-04 | 32,710 | 4,344 | 300 | 28,666 | 29,872 | 8.3 | 2,197 | 12.9 | 3,403 | -1,206 |
| 18-Jul-04 | 32,710 | 4,302 | 300 | 28,708 | 29,137 | 11.3 | 2,918 | 13.0 | 3,347 | -429 |
| 25-Jul-04 | 32,710 | 3,564 | 300 | 29,446 | 29,189 | 14.1 | 3,633 | 13.1 | 3,376 | 257 |
| 01-Aug-04 | 32,710 | 3,537 | 300 | 29,473 | 29,628 | 12.3 | 3,225 | 12.9 | 3,380 | -155 |
| 08-Aug-04 | 32,710 | 3,549 | 300 | 29,461 | 29,858 | 11.4 | 3,002 | 12.9 | 3,399 | -397 |
| 15-Aug-04 | 32,710 | 3,605 | 300 | 29,405 | 29,084 | 14.3 | 3,667 | 13.0 | 3,346 | 321 |
| 22-Aug-04 | 32,710 | 3,558 | 300 | 29,452 | 29,251 | 13.8 | 3,559 | 13.0 | 3,358 | 201 |
| 29-Aug-04 | 32,710 | 3,489 | 300 | 29,521 | 30,004 | 11.0 | 2,930 | 12.8 | 3,413 | -483 |
| 05-Sep-04 | 32,710 | 5,195 | 300 | 27,815 | 28,724 | 9.7 | 2,452 | 13.3 | 3,361 | -909 |
| 12-Sep-04 | 32,710 | 6,156 | 300 | 26,854 | 27,264 | 11.2 | 2,699 | 12.9 | 3,109 | -410 |
| 19-Sep-04 | 32,710 | 6,191 | 300 | 26,819 | 26,665 | 13.7 | 3,226 | 13.0 | 3,072 | 154 |
| 26-Sep-04 | 32,710 | 9,064 | 300 | 23,946 | 25,731 | 5.5 | 1,250 | 13.4 | 3,035 | -1,785 |
| 03-Oct-04 | 32,710 | 9,083 | 300 | 23,927 | 23,090 | 18.4 | 3,714 | 14.2 | 2,877 | 837 |
| 10-Oct-04 | 32,710 | 9,944 | 300 | 23,066 | 22,883 | 13.7 | 2,784 | 12.8 | 2,601 | 183 |
| 17-Oct-04 | 32,710 | 10,366 | 300 | 22,644 | 23,582 | 8.0 | 1,684 | 12.5 | 2,622 | -938 |
| 24-Oct-04 | 32,710 | 10,333 | 300 | 22,677 | 23,627 | 8.0 | 1,677 | 12.5 | 2,627 | -950 |
| 31-Oct-04 | 32,710 | 7,602 | 300 | 25,408 | 24,395 | 17.3 | 3,752 | 12.7 | 2,739 | 1,013 |
| 07-Nov-04 | 32,710 | 6,566 | 300 | 26,444 | 25,791 | 15.3 | 3,512 | 12.5 | 2,859 | 653 |
| 14-Nov-04 | 32,710 | 6,017 | 300 | 26,993 | 26,260 | 15.6 | 3,640 | 12.5 | 2,907 | 733 |
| 21-Nov-04 | 32,710 | 5,977 | 300 | 27,033 | 26,835 | 13.2 | 3,160 | 12.4 | 2,962 | 198 |
| 28-Nov-04 | 32,710 | 5,950 | 300 | 27,060 | 27,307 | 11.3 | 2,748 | 12.3 | 2,995 | -247 |
| 05-Dec-04 | 32,710 | 5,088 | 300 | 27,922 | 28,704 | 9.3 | 2,364 | 12.3 | 3,146 | -782 |
| 12-Dec-04 | 32,710 | 4,571 | 300 | 28,439 | 28,434 | 12.5 | 3,163 | 12.5 | 3,158 | 5 |
| 19-Dec-04 | 32,710 | 3,110 | 300 | 29,900 | 29,218 | 15.1 | 3,914 | 12.4 | 3,232 | 682 |
| 26-Dec-04 | 32,710 | 2,606 | 300 | 30,404 | 29,035 | 17.9 | 4,615 | 12.6 | 3,246 | 1,369 |
| 02-Jan-05 | 32,710 | 2,688 | 300 | 30,322 | 27,336 | 25.3 | 6,122 | 13.0 | 3,136 | 2,986 |
| 09-Jan-05 | 32,710 | 2,763 | 300 | 30,247 | 28,545 | 19.0 | 4,834 | 12.3 | 3,132 | 1,702 |
| 16-Jan-05 | 32,710 | 3,457 | 300 | 29,553 | 29,296 | 13.0 | 3,403 | 12.0 | 3,146 | 257 |
| 23-Jan-05 | 32,710 | 3,467 | 300 | 29,543 | 29,009 | 14.1 | 3,657 | 12.1 | 3,123 | 534 |
| 30-Jan-05 | 32,710 | 3,481 | 300 | 29,529 | 28,846 | 14.7 | 3,794 | 12.1 | 3,111 | 683 |
| 06-Feb-05 | 32,710 | 3,588 | 300 | 29,422 | 28,469 | 16.0 | 4,050 | 12.2 | 3,097 | 953 |
| 13-Feb-05 | 32,710 | 4,051 | 300 | 28,959 | 28,474 | 14.1 | 3,575 | 12.2 | 3,090 | 485 |
| 20-Feb-05 | 32,710 | 3,318 | 300 | 29,692 | 28,352 | 17.6 | 4,448 | 12.3 | 3,108 | 1,340 |
| 27-Feb-05 | 32,710 | 3,886 | 300 | 29,124 | 27,554 | 18.7 | 4,594 | 12.3 | 3,024 | 1,570 |
| 06-Mar-05 | 32,710 | 3,806 | 300 | 29,204 | 27,745 | 19.3 | 4,732 | 13.4 | 3,273 | 1,459 |
| 13-Mar-05 | 32,710 | 5,144 | 300 | 27,866 | 27,478 | 15.0 | 3,632 | 13.4 | 3,244 | 388 |
| 20-Mar-05 | 32,710 | 5,989 | 300 | 27,021 | 26,849 | 13.6 | 3,243 | 12.9 | 3,071 | 172 |
| 27-Mar-05 | 32,710 | 6,017 | 300 | 26,993 | 26,338 | 15.8 | 3,686 | 13.0 | 3,031 | 655 |
| 03-Apr-05 | 32,710 | 6,846 | 300 | 26,164 | 25,455 | 15.1 | 3,437 | 12.0 | 2,728 | 709 |

## Table A6 Energy Production Capability Forecast

| Month | Forecast Energy Production Capability Existing Resource Scenario (GWh) | Forecast Energy Production Capability Planned Resource Scenario (GWh) |
|---|---|---|
| Oct 2003 | 13,319 | 13,408 |
| Nov 2003 | 13,798 | 14,404 |
| Dec 2003 | 16,027 | 16,614 |
| Jan 2004 | 16,715 | 17,389 |
| Feb 2004 | 15,356 | 16,019 |
| Mar 2004 | 15,281 | 16,321 |
| Apr 2004 | 13,668 | 14,711 |
| May 2004 | 13,308 | 14,661 |
| Jun 2004 | 15,693 | 16,695 |
| Jul 2004 | 16,495 | 17,708 |
| Aug 2004 | 16,391 | 17,827 |
| Sep 2004 | 14,199 | 15,602 |
| Oct 2004 | 13,814 | 15,037 |
| Nov 2004 | 14,501 | 15,539 |
| Dec 2004 | 16,930 | 18,431 |
| Jan 2005 | 17,279 | 18,756 |
| Feb 2005 | 14,901 | 16,236 |
| Mar 2005 | 15,061 | 16,538 |

**- End of Section -**

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# Appendix B Transmission Projects

| East Zone | Projected I/S Date |
|---|---|
| Chenaux TS: Add two new 230 kV breakers. Reconnect T4 transformer. | 2003-Q4 |
| Mountain Chute - Chenaux SPS: Modify the SPS to include the new breakers. | 2003-Q4 |
| Sidney TS: Replace low voltage capacitor bank circuit breaker SC1Q. | 2003-Q4 |

| Essa Zone | Projected I/S Date |
|---|---|
| Owen Sound TS: Replace transformer T5 230 kV disconnect switch. | 2003-Q4 |
| Midhurst TS: Expand existing transformer station. | 2004-Q4 |

| Niagara Zone | Projected I/S Date |
|---|---|
| Norfolk TS: Replace transformers with two 83.3 MVA units. | 2003-Q4 |
| Bloomsburg TS: New 115/27.6 kV transformer station connected to A1N. | 2004-Q2 |
| Kalar TS: New 115/14.2 kV transformer station off lines A36N and A37N. | 2004-Q2 |

| Northeast Zone | Projected I/S Date |
|---|---|
| Wawa TS: Install reactive compensation; 2x40 MVAr shunt ractors, 2x39.8 MVAr shunt capacitors. | 2003-Q4 |
| GLP Tranmission Reinforcement Stage1: Remove from service 115 kV circuit No.3 Sault. | 2004-Q2 |

| Northwest Zone | Projected I/S Date |
|---|---|
| Birch TS: Install 80 MVAr shunt capacitor. | 2003-Q4 |
| Fort William TS: Install in-line switches for circuits Q4B and Q5B. | 2003-Q4 |

| Ottawa Zone | Projected I/S Date |
|---|---|
| Albion TS: Replace 230 kV rod gaps with metal oxide surge arresters. | 2004-Q1 |
| Hawthorne TS: Add one 250 MVA 230/115 kV autotransformer and one new double circuit line from Hawthorne to Blackburn Jct. | 2004-Q2 |
| Ottawa Area: Add 115 kV breaker to W6MC and motorize existing disconnect on C7MB. | 2004-Q2 |
| Hawthorne TS: Replace 115 kV shunt capacitor. | 2004-Q4 |
| Merivale TS: Replace 115 kV breakers L1LT22, L1L5, L3L12 and associated disconnect switches. | 2004-Q4 |

| Southwest Zone | Projected I/S Date |
|---|---|
| Bronte TS: Install two new feeders. | 2003-Q4 |
| Goderich TS: Replace capacitor bank circuit breaker SC1B. | 2003-Q4 |
| Kenilworth TS: Replace 115 kV line disconnect and grounding switches. | 2003-Q4 |
| Kenilworth TS: Replace 115 kV rod gaps with metal oxide surge arresters. | 2003-Q4 |
| Kenilworth TS: Replace 115 kV transformer disconnect and grounding switches. | 2003-Q4 |
| London Clarke TS: Increase transformer ampacity. | 2003-Q4 |
| Mohawk TS: Replace low voltage capacitor banks SC2 and SC3. | 2003-Q4 |
| Nanticoke TGS: Replace station service transformers. | 2003-Q4 |
| St. Marys TS: Add two new feeders. | 2003-Q4 |
| St. Marys TS: Refurbish 115 kV station. | 2003-Q4 |
| Niagara West TS: Build new transformer station with two 50/67/83 MVA transformers. | 2004-Q1 |
| North Westover: Replace 115 kV circuit switcher and station protection. | 2004-Q1 |
| Burlington TS: Add 125 MVAr 115 kV capacitor bank. | 2004-Q2 |
| Caledonia TS: Add two new 75/125 MVA 230/115 kV autotransformers and re-supply Norfolk TS off these new autotransformers. | 2004-Q2 |
| Halton TS: Install two additional 27.6 kV breakers. | 2004-Q2 |
| Detweiler TS: Replace 115/230 kV autotransformer T3. | 2004-Q2 |
| Kitchener: Build new 230/14.2 kV transformer station. | 2004-Q3 |
| Beach TS: Install surge arresters on T4 and T7. | 2004-Q4 |

(Appendix B continued)

| Toronto Zone | Projected I/S Date |
|---|---|
| Cecil TS: Increase station capacity. | 2003-Q4 |
| Glengrove TS: Refurbish 115 kV station. | 2003-Q4 |
| Glengrove TS: Replace T2 transformer. | 2003-Q4 |
| Lakeview SS: Replace 230 kV circuit breakers L24T7 and L24T8. | 2003-Q4 |
| Leaside TS: Install series reactors on 13.8 kV capacitor banks SC1 and SC2. | 2003-Q4 |
| Leaside TS: Replace 115 kV line disconnect switch. | 2003-Q4 |
| Manby TS: Replace 115 kV and 230 kV rod gaps with metal oxide surge arresters. | 2003-Q4 |
| Manby TS: Replace 115 kV and 230 kV transformer disconnect switches. | 2003-Q4 |
| Markham MTS #1: Add 19.6 MVAr at 27.6 kV shunt capacitor. | 2003-Q4 |
| Markham MTS #3: Adding 19.6 MVAr at 27.6 kV shunt capacitor. | 2003-Q4 |
| Richview TS: Replace 230 kV breaker disconnect switches. | 2003-Q4 |
| Runnymede TS: Replace low voltage capacitor banks SC3 and SC4. | 2003-Q4 |
| Strachan TS: Replace 115 kV grounding switch and transformer disconnect switch. | 2003-Q4 |
| Cherrywood TS: Reterminate 500/230 kV autotransformers. | 2004-Q2 |
| Kleinburg TS: Install two additional 27.6 kV breakers. | 2004-Q2 |
| Leaside TS: Install 125 MVAr shunt capacitor. | 2004-Q2 |
| Strachan TS: Replace 115 kV rod gaps with metal oxide surge arresters. | 2004-Q2 |
| Markham: New transformer station connected to 230 kV circuits C11R and C12R. | 2004-Q3 |
| Pickering A NGS: Refurbish 230 kV switchyard - G1. | 2004-Q3 |
| Wiltshire TS: Replacement of transformer T6. | 2004-Q3 |
| Manby West TS: Install surge arresters on T3 and T4. | 2004-Q4 |
| Manby West TS: Replace T4 with like unit. | 2004-Q4 |
| Richview TS: Replace 230 kV rod gaps with surge arresters. | 2004-Q4 |

| West Zone | Projected I/S Date |
|---|---|
| Lambton TS: Modify low voltage supply to Terra Nitrogen. | 2003-Q4 |
| London Highbury TS: Replace low voltage capacitor bank SC2. | 2003-Q4 |
| Windsor Area: Enhance Windsor Area Overload Protection Scheme. | 2004-Q1 |
| Belle River East DS: Build new 115/27.6 kV distribution station. | 2004-Q2 |
| Kent TS: Install new 125 MVA 230/115 kV autotransformer. | 2004-Q4 |
| Tilsonburg TS: Replace three transformers with like units. | 2004-Q4 |

**- End of Section -**

# 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, and/or for those transmission outages associated with a major project.

## Table C1 Bruce Zone

No outages to analyze.

## Table C2 East Zone

| Start Date/Time | End Date/Time | Equipment | Outage Type | Recall | Impact | Reduction in Limit |
|---|---|---|---|---|---|---|
| 11/3/03 7:00 AM | 11/3/03 6:00 PM | Chenaux TS.A4_BUS, Chenaux TS.A1A4, Chenaux TS.4-X1P, Chenaux TS.A1-A2, Chenaux TS.A3-A4, Chenaux TS.4X6, Chenaux TS.4X1P, Chenaux TS.4X2Y, Chenaux TS.UFLS | DNW | Non-Recallable | All Chenaux generation is constrained off. Limits the amount of load that can be supported in the Renfrew area from Des Joachims. Approximately 55 and 75 MW of load can be supplied without and with generation support from Quebec, respectively. Renfrew area demand estimated at a peak of 110 MW to an off peak of 75 MW. | |
| 11/4/03 7:00 AM | 11/9/03 6:00 PM | X1P, Chenaux TS.A3-A4, Chenaux TS.A1-A2, Chenaux TS.4X6, Chenaux TS.4X1P, Chenaux TS.4-X1P | CWW | 24 Hour | Chenaux G5 to G8 generation is constrained off. Limits the amount of load that can be supported in the Renfrew area from Des Joachims. Approximately 55 and 75 MW of load can be supplied without and with generation support from Quebec, respectively. With no Quebec support, approx. 95 MW can be supplied with generation support from Chenaux G1 to G4. With Quebec and Chenaux support, approx. 115 MW can be supplied. Renfrew area demand estimated at a peak of 110 MW to an off peak of 75 MW. Hydroelectric production capability is a concern. | |
| 11/10/03 5:00 AM | 12/19/03 11:00 AM | Chenaux TS.A1-A2 | CWW | Non-Recallable | November 10-14: See outage below. November 14-December 19: No impact. | |
| 11/10/03 7:00 AM | 11/14/03 6:00 PM | Chenaux TS.A3-A4, Chenaux TS.A1-A2, Chenaux TS.4X2Y, Chenaux TS.A1A4 | CWW | 24 Hour | Chenaux G1 to G4 generation is constrained off. | |
| 12/19/03 7:00 AM | 12/19/03 11:00 AM | Chenaux TS.T4, Chenaux TS.A1-A2, Chenaux TS.4X6 | DNW | 4 Hour | Chenaux G5 to G8 generation is constrained off. | |

## Table C3 Essa Zone

No outages to analyze.

## Table C4 Niagara Zone

| Start Date/Time | End Date/Time | Equipment | Outage Type | Recall | Impact | Reduction in Limit |
|---|---|---|---|---|---|---|
| 09/22/03 05:00 AM | 10/17/03 06:00 PM | Murray TS.T13 | CWW | 2 Day | | |

## Table C5 Northeast Zone

| Start Date/Time | End Date/Time | Equipment | Outage Type | Recall | Impact | Reduction in Limit |
|---|---|---|---|---|---|---|
| 10/6/03 7:01 AM | 10/17/03 3:01 PM | Anjigami TS 854 | CWW | 12 Day | | |
| 10/20/03 7:01 AM | 10/31/03 3:01 PM | Anjigami TS 864 | CWW | 12 Day | | |
| 5/10/04 10:00 AM | 6/4/04 2:00 PM | Pinard TS.PL20 | CWW | Non-Recallable | | |
| 6/7/04 10:00 AM | 7/2/04 2:00 PM | Pinard TS.PL22 | CWW | Non-Recallable | | |

## Table C6 Northwest Zone

| Start Date/Time | End Date/Time | Equipment | Outage Type | Recall | Impact | Reduction in Limit |
|---|---|---|---|---|---|---|
| 6/16/03 12:35 PM | 6/16/04 11:59 PM | Agimak T1, Agimak T2 | CNW | Non-Recallable | | |
| 12/15/03 12:01 AM | 12/21/03 11:59 PM | Thunder Bay C1 | CWW | Non-Recallable | | |
| 6/14/04 12:01 AM | 6/27/04 11:59 PM | Thunder Bay C1 | CWW | Non-Recallable | | |
| 12/13/04 12:01 AM | 12/19/04 11:59 PM | Thunder Bay C1 | CWW | Non-Recallable | | |

## Table C7 Ottawa Zone

| Start Date/Time | End Date/Time | Equipment | Outage Type | Recall | Impact | Reduction in Limit |
|---|---|---|---|---|---|---|
| 9/29/03 6:00 AM | 10/10/03 4:00 PM | Merivale TS.L12_BUS | CWW | 8 Hour | | |
| 10/14/03 6:00 AM | 11/7/03 4:00 PM | Merivale TS.L1LT22 | CWW | Non-Recallable | | |
| 10/14/03 6:00 AM | 10/17/03 4:00 PM | Merivale TS.LT22_BUS | CWW | 8 Hour | | |
| 10/14/03 7:00 AM | 11/8/03 4:00 PM | King Edward TS.T3 | CWW | 48 Hour | | |
| 10/27/03 6:00 AM | 11/28/03 4:00 PM | Merivale TS.L1L5 | CWW | Non-Recallable | | |
| 10/27/03 6:00 AM | 11/7/03 4:00 PM | Merivale TS.L1_BUS, Merivale TS.SC11, Chesterville TS.73L2M-6 -I/S | CWW | 8 Hour | | |
| 11/17/03 6:00 AM | 11/28/03 4:00 PM | Merivale TS.T2_115, Merivale TS.L5_BUS | CWW | 8 Hour | | |

## Table C8 Southwest Zone

| Start Date/Time | End Date/Time | Equipment | Outage Type | Recall | Impact | Reduction in Limit |
|---|---|---|---|---|---|---|
| 7/25/03 6:00 AM | 10/31/03 5:00 PM | St.Marys TS.T2, St.Marys TS.Y_BUS, St.Marys TS.A2_BUS, St.Marys TS.M1, St.Marys TS.M3 | CWW | Non-Recallable | | |
| 10/6/03 5:00 AM | 11/7/03 6:00 PM | Burlington TS.T6 | CWW | 5 Day | | |
| 10/06/03 01:10 PM | 10/31/03 01:30 PM | Elgin TS.T2 | DWW | 5 Minute | | |
| 10/20/03 5:00 AM | 10/25/03 6:00 PM | Elgin TS.T4, Elgin TS.H1-H2, | CWW | 2 Day | | |
| 10/27/03 05:00 AM | 10/29/03 06:00 PM | Stirton TS.48HL3-28, Elgin TS.H1-H2 | CWW | 2 Day | | |
| 11/03/03 07:30 AM | 11/08/03 04:00 PM | Elgin TS.T1, Elgin TS.T3, Elgin TS.HL4-48, Elgin TS.A1-A2, Elgin TS.T1-A1, Newton TS.26HL4 | CWW | 8 Hour | | |
| 11/10/03 07:30 AM | 11/12/03 04:00 PM | Elgin TS.T1, Elgin TS.T1-A1, Elgin TS.A1-A2, Elgin TS.HL4-48, Stirton TS.48HL4-28 | CWW | 8 Hour | | |

## Table C9 Toronto Zone

| Start Date/Time | End Date/Time | Equipment | Outage Type | Recall | Impact | Reduction in Limit |
|---|---|---|---|---|---|---|
| 9/8/03 5:00 AM | 10/10/03 6:00 PM | Cecil TS.L5L9 | CWW | 4 Week | | |
| 9/29/03 7:00 AM | 10/10/03 3:00 PM | Manby West TS.YRSS1 | CWW | 2 Day | | |
| 9/29/03 7:00 AM | 10/10/03 3:00 PM | Fairchild TS.BY | CWW | 3 Day | | |
| 10/20/03 5:00 AM | 11/21/03 6:00 PM | Fairchild TS.T3, Fairchild TS.T3Q, Fairchild TS.T3J | CWW | 5 Day | | |
| 10/20/03 8:00 AM | 10/31/03 3:00 PM | Runnymede TS.T3B | CWW | 2 Day | | |
| 11/3/03 5:00 AM | 12/5/03 6:00 PM | Cecil TS.PL12 | CWW | 4 Week | | |
| 11/3/03 5:00 AM | 11/28/03 6:00 PM | Lakeview SS.L24CR_Terminal, Lakeview SS.T7_230, Lakeview SS.T8_230, Lakeview SS.RSS4_BUS | CWW | 48 Hour | | |
| 11/3/03 8:00 AM | 11/14/03 3:00 PM | Manby East TS.QRSS2 | CWW | 2 Day | | |
| 11/10/03 8:00 AM | 11/21/03 3:00 PM | Carlaw TS.T2 | CWW | 4 Day | | |
| 12/15/03 7:00 AM | 12/31/03 3:00 PM | Claireville TS.D2_BUS | CWW | 72 Hour | | |
| 10/3/04 5:00 AM | 10/3/04 6:00 PM | Manby West TS.T4, Manby West TS.T4Y | DNW | 8 Hour | | |
| 10/4/04 5:00 AM | 11/26/04 6:00 PM | Manby West TS.T4, Manby West TS.T4Y | CWW | 3 Week | | |
| 11/27/04 5:00 AM | 11/27/04 6:00 PM | Manby West TS.T4, Manby West TS.T4Y | DNW | 8 Hour | | |

## Table C10 West Zone

| Start Date/Time | End Date/Time | Equipment | Outage Type | Recall | Impact | Reduction in Limit |
|---|---|---|---|---|---|---|
| 9/29/03 4:00 AM | 10/17/03 6:00 PM | Sarnia Scott TS.AL25 | CWW | Non-Recallable | | |

**- End of Document -**